WATER:
THE KEY TO NEW ENERGY

Moray B. King



Adventures Unlimited Press

Other books by Moray B. King

Quest for Zero-Point Energy: Engineering Principles for "Free Energy"
Tapping the Zero Point Energy
The Energy Machine of T. Henry Moray: Zero-Point Energy and Pulsed Plasma Physics

www.adventuresunlimitedpress.com

Dedicated to all inventors for they create a better world for all of us…

TABLE OF CONTENTS

Introduction.....9

Narrow Gap Electrolyzers (2009).....23

Cavitation in Electrolyzers (2012).....89

Cavitating Electrolyzers and the Zero-Point Energy (2012).. ...159

Thunderclouds and the Zero-Point Energy (2015).....179

From Nanobubbles to Ball Lightning (2016).....239

Introduction

My journey for new energy began in 1974 during the Middle East oil embargo. I was a graduate student in the Masters/Ph.D. program for System Engineering at the University Pennsylvania in Philadelphia. While peering out my apartment window at the long line of cars waiting their turn to buy gas, my roommate, a graduate student in physics specializing in general relativity, asked, "Have you seen this?" He was holding the book, *Gravitation* by Misner, Thorne and Wheeler, opened to the final two chapters. Those chapters were a summary of Wheeler's theory of *Geometrodynamics*. It described how the fabric of space responds to the quantum vacuum fluctuations known as the "zero-point energy" (ZPE).

Zero-point energy? I never heard of such a thing during my entire undergraduate training in electrical engineering. Moreover, not one professor I asked in the engineering school knew of it either. (I was friends with many.) Nonetheless, the university library had physics books and journal articles that discussed the topic. I eagerly read *Geometrodynamics* and was amazed at the description of the fabric of space as it interacted with the quantum vacuum fluctuations. Wheeler dubbed this interaction "the already unified field theory." Quantum field theory had established the function (equation) relating the zero-point energy density to the frequency of the vacuum fluctuations. The energy density increases with the cube of the frequency. This description was required in order to make the mathematical modeling of Quantum Electrodynamics self-consistent. When applied to the fabric of space via the equations of general relativity, space pinches into channels that Wheeler named "wormholes." They channel electric flux of enormous energy, whose (mass equivalent) energy density is on the order of 10^{94} grams per cubic centimeter. The flux enters and leaves our three dimensional space (3-space) through "mini-white holes" and "mini-black holes" scaled at

the Planck length, 10^{-33} centimeters, a size twenty orders of magnitude smaller than the electron. The zero-point energy is a flux that enters and leaves our 3-space orthogonally from a higher dimensional space. The activity manifests a seething turbulence that Wheeler called the "quantum foam." It is an ether model that mimics turbulent plasma, a far more dynamic ether than the hydrodynamic models of the 19th century. This is the "orthogonal flux" model of the zero-point energy, and is perhaps the most powerful of the models describing the nature of the fabric of pure empty space.

But how can we harness the zero-point energy? The physics literature offers a clue. All elementary particles are participating in an intertwining interaction with the ZPE called "vacuum polarization." Electrons, especially when in conductors, are essentially in thermodynamic equilibrium with the ZPE manifesting as a smeared charged cloud. However, the nuclei or ions of plasma manifest steep lines of vacuum polarization converging toward the nucleus. Here abrupt motion of the nuclei can bend some of the ZPE flux to align into our 3-space. Experimental evidence comes from plasma observations, especially during ion-acoustic resonant modes of the plasma where the ions are oscillating synchronously together. Here there are observed high frequency voltage spikes, "run-away" electrons, and anomalous heating.

Even greater anomalies are observed when the plasma particles self-organize into a vortex ring called a "plasmoid." Here the ions undergo a precessional, spin of a spin motion: A poloidal (cylindrical) rotation closing into a toroidal rotation. The precessional motion could twist (orthogonally rotate into our 3-space) the ZPE flux to become trapped coherently into the plasmoid. Such ideas might help future modeling of pair production where the vacuum can give rise to short lived electron-positron pairs. It also could explain the stability and large energy content of ball lightning.

By 1977 I finished my course work for a Ph.D., but took more courses in quantum mechanics in order to learn more about the zero-point energy and interact with physics professors. When I asked them if it were possible to tap the zero-point energy as an energy source, the primary objection was not conservation of energy, for they recognized that the energy existed, but rather it was a violation of entropy. In

their view, the vacuum fluctuations were simply independent, random fluctuations. Random activity must forever remain random. Later that year Ilya Prigogine won the Nobel Prize in chemistry for expanding the second law of thermodynamics. He explained how under certain circumstances a system may evolve from chaos into self-organization. The system must exhibit three conditions: 1) be nonlinear, 2) far from equilibrium, and 3) have an energy flux through the system. Turbulent plasma as well as Wheeler's "quantum foam" vacuum could fulfill these conditions.

In 1978 I wrote the paper, "Tapping the Zero-Point Energy" to propose my Ph.D. thesis in System Engineering. Because Prigogine's thermodynamics were expressed in general system terms, I suggested it applies to the vacuum energy where an abrupt electric discharge is used to jerk ions to drive a naturally nonlinear plasma into a far from equilibrium state. My professor friends open to the idea said such a thesis could only be proven by an experiment, to which I wholeheartedly agreed. That spring I presented the paper at a conference proposing that ball lightning would cohere energy from the vacuum fluctuations and manifest an excess energy output above the input electrical discharge needed to make it. Many were excited by the idea, and folks circulated the paper by Xerox and fax. That was the paper that launched me, for I was soon recruited to join Eyring Research Institute in Provo, Utah. They were interested in doing experimental investigations.

Historically, there were successful energy machines exploiting the energetic activity from plasma tubes. The machine of T. Henry Moray is perhaps the most famous. Moray used weak radioactive material to maintain the plasma in his tube, and he stressed that the fundamental operating principle was to maintain ion oscillations in the plasma. Through the 1920's and 1930's in Salt Lake City, Utah he gave numerous demonstrations of his device and all he asked for was letters of testimony from witnesses, describing what they observed. He gradually improved his device from a few hundred watts to many kilowatts. Moray suffered through threats and suppression, and even defended himself in a gun fight with those raiding his laboratory. In 1939 the machine was destroyed by an agent posing as government investigator from the Rural Electrification Agency.

I first learned of T. Henry Moray in 1976. When given his book, *The Sea of Energy in Which the Earth Floats*, I was stunned to see his last name; it was identical to my first name. The synchronicity of that moment made me realized that my life's purpose was to explain clearly the science of zero-point energy so that mankind could engineer technology to tap it as an energy source.

In that same year I learned of the inventor Edwin Gray. In 1976 he won the prestigious inventor of the year award for his "Pulse Capacitor Discharge Electric Engine," US Patent 3,890,548 (1975). Here he demonstrated an electric motor that provided high torque yet did not heat any wiring in the engine. It was later disclosed that the engine was not driven by capacitor discharge, but rather by a specially crafted plasma tube and circuit: US Patent 4,595,975 (1986) and US 4,661,747 (1987). In the tube a high voltage grid maintained a polarized glow plasma much like a hollow cathode, and a very abrupt switching event via spark gaps on the positive electrode caused the polarized plasma to "snap back" (like snapping a stretched rubber band), which jerked the plasma ions to launch a "cold" displacement current onto the circuit for the electromagnets driving the engine. Gray was also harassed and threatened. In 1993 he was found mysteriously dead with no record of a coroner's report.

Plasma tube engineering is complex and difficult. In view of suppression, a project has to be easy so that hobbyist worldwide could successfully replicate it. I was looking for a fundamental phenomenon that was reliable and easy to repeat.

Such an energetic phenomenon was discovered by a brilliant scientist, Ken Shoulders. He made detailed empirical observations of a microscopic, plasma form resembling ball lightning he called "electrum validum" (EV). It was Latin meaning "strong charge." He would abruptly discharge a small capacitor onto a sharp pointed electrode. The EV would emit from the tip and would travel on a dielectric (insulator) surface. When it hit a metal conductor it would dissipate creating a small crater. Since the tip of the sharp pointed electrode would erode with each launch, Shoulders invented a liquid metal feed to replenish the tip, much like a fountain pen. Liquid metal was important to launch the EV. At launch point, a micron size blob of liquid metal snaps off

the tip, and the plasma forms symmetrically around it pinching it into a perfect vortex ring torus of plasma, the plasmoid.

Ken Shoulders authored his patent, US 5,018,180 (1991). It was beautifully written in clear English, not legalese, and contains over 100 columns. It describes multiple applications for his discovery. I highly recommend reading it for it is rare to see a patent so clear and well written.

Ken Shoulders spent his career studying EVs. They were about a micron in size, manifested charge of billions of electrons and captured about a million ions. They behaved like a macroscopic charged entity and always exhibited the charge to mass ratio of the electron, regardless of size. He observed they could sometimes go dark while on the dielectric and could be reactivated later with a voltage pulse. He even sometimes observed a positively charged EV which exhibited the charge to mass ratio of the positron, yet it was definitely not comprised of actual positrons for it never produced the characteristic gamma radiation of electron-positron annihilation when it struck a conductor. I felt this was the most significant of Shoulders' discoveries. It means that the entity was a macroscopic type of charge - not simply a collection of elementary particles. It was a fundamental self-organization of matter and the vacuum energy.

Shoulders also observed pair production of EVs where the pair would spiral around each other before hitting the conductor and leaving a dual crater. Craters would be produced too easily. Shoulders measurements indicated it was not heat that made the craters, but rather the EV would coherently interact with the metal lattice atomic bonds to make them just "let go" to yield sloshing liquid metal. More surprisingly, Shoulders observed element transmutation events in the craters struck by EVs. He presented the results at the ICCF-10 cold fusion conference in 2003, but was ignored by Western scientists. However, researchers in Russia have conducted similar experiments with large plasmoid strikes. The Russians actively study the phenomena at universities and have a yearly conference called "Cold Nuclear Transmutation and Ball Lightning."

Ken Shoulders was fascinated by the self-acceleration properties of EVs, which he called "propulsion." The EVs would drag debris with them as they accelerated like an Alcubierre warp drive. After years of

research, when Shoulders was thoroughly convinced that the EV truly manifested excess energy sourced from the zero-point vacuum energy, he then renamed the entity to "exotic vacuum object" (EVO).

The extensive research of Shoulders was a thrill for me and especially gratifying since I hypothesized in my original 1978 paper that the discovery of ball lightning would provide the proof that it is possible to tap the zero-point energy. Now the question is how do we harness the discovery into a practical device?

Ken Shoulders did try. He found that he could cascade EV launchers where a small EV could trigger the launch of a bigger EV. By a series of cascaded launchers he could build up an EV about one centimeter in size. However, it was useless to him, for when it struck a conductor it would emit such a huge electromagnetic pulse that it would fry the solid state electronic equipment in his lab.

He also tried exciting a narrow water vortex. He would circulate water through a small bore hole whose diameter was little less than a millimeter. He would shoot an EV down the axis of the vortex, and it created a coherent plasma vortex pulse that was so powerful, it damaged anything it struck. Ken knew he had a significant manifestation of a huge energy event sourced from the ZPE. He traveled across the country in 2001 to personally visit key researchers in the new energy field to share the discovery. He stayed with me for about a week. Ken Shoulders passed away in 2013. He was the most significant scientist I had been blessed to interact with. I reference his work in nearly all my presentations, and as we will soon see, the EVO is the foundation to explain how water could provide a substrate for achieving zero-point energy coherence.

When I first began researching the reports of anomalous energy production from water electrolyzer projects in 2006, I assumed that zero-point energy was somehow involved in dissociating water into hydrogen and oxygen. I soon changed my mind when I learned about the strange behavior of the Brown's gas torch. It exhibited a cool flame just a little above the boiling point of water, yet Yull Brown claimed the torch could vaporize tungsten, which requires a temperature above 10000 degrees Fahrenheit. No other welding torch can do this.

Yull Brown attempted to explain the unusual energy of his welding torch by proposing that atomic hydrogen and oxygen (HHO) was

present; see US Patent 4,014,777 (1977). Most scientists do not believe the explanation because atomic hydrogen is highly reactive and chemically combines upon first collision with another atom or molecule. Hobbyist researchers continued to call the gas HHO because that was what Yull Brown believed.

However, the behavior of the Brown's gas torch reminded me of something with which I was familiar: Ken Shoulders' EVOs. They have the ability to disrupt atomic bonds whenever they strike conductive material. EVOs disrupt atomic bonds with coherent energy, not with heat. It appeared that something akin to EVOs was in the Brown's gas torch. If this were the case, then the various HHO projects offered the simplest means for hobbyists to manifest coherent ZPE activity.

The explanation had one problem: The EVO or microscopic ball lightning requires a tiny, symmetrical, spherical, liquid droplet form of matter, around which a plasma discharge surrounds to make the plasma vortex ring or plasmoid. I hypothesized that some type of microscopic water cluster had to be present, but I could not find any supporting evidence in the standard scientific literature. The quest was now to find out what is the water cluster?

My 2009 presentation describes the characteristics of water electrolyzers that seem to exhibit excess energy production. The electrode plates are intentionally roughened, and they are spaced very closely—about one millimeter apart. During electrolysis the hydrogen and oxygen gas emission would produce much turbulence in the narrow gaps and would shear bubble formation on the electrode plate surface before the bubbles could grow and burst. At that time I did not know about nanobubbles or their significance.

Later in 2009 Steve Eaton claimed to successfully run a generator just on water. His electrodes were concentric stainless steel tubes separated by a thin monofilament insulator similar to a fishing line that spiraled up the inner tube. This forced the water gas sputtering activity to spiral all the way up the thin gap between the concentric tubes. In November 2009 Eaton attempted to share the plans on the internet so that others could replicate. The website was attacked; Eaton withdrew his plans and ceased to have any more communication about the project. I can only surmise that he was suppressed. Steve Eaton's project is summarized in

the later presentations.

The 2012 presentation features the research of Mark LeClair, the CEO of NanoSpire Inc., and his partner Serge Lebid. They claimed a remarkable discovery about collapsing cavitation bubbles. A cavitation bubble is a spherical vacuous region in the liquid. When it collapses near a surface it pinches into a torus and emits a reentrant jet through the hole of the torus as the bubble collapses. The pressure is so great that the jet is actually squeezed into a solid water form that LeClair describes as a "macro-ionic water crystal." LeClair discovered that the tip of the reentrant jet has a microscopic plasma bow shock wave. Most astonishingly that tip can cause element transmutation when it strikes a metallic surface as it makes a crater. This appears to be a phenomenon just like Shoulders' EVO. LeClair and Lebid spent years doing experiments and measuring the transmutation events. Analysis revealed a plethora of elements with unusual isotopes not readily found in nature. The strikes exhibited nucleosynthesis, and LeClair is struggling to convince Western scientists to replicate the experiments. It is noteworthy that Stanislav Adamenko's team at the Proton 21 Laboratory in Kiev, Ukraine has been successfully creating nucleosynthesis from large plasmoid strikes since the mid 1990's. The research is seriously pursued in Ukraine and Russia with university professors proposing new theories of the nucleus to explain the phenomenon. LeClair's work might support the claims by some researchers that they caused element transmutation with their cavitating water electrolyzers. See Mark LeClair's web site: NanoSpire.com or NanoSpireInc.com

Perhaps the most successful cavitating electrolyzer was invented by Ryushin Omasa, the featured inventor of the 2015 presentation. He used flexible, snapping blades in his electrolyzer bath, mechanically vibrating them at about 100 cycles per second. His electrolyzer plates had wide holes in them to accept the activity of the vibrating water. It appears he was unfamiliar with the work of Mark LeClair, for the explanation likely involves reentrant jets shooting from the snapping blades into the electrolyzer. Omasa declared that a new form of water was produced from his electrolyzer. Researchers from a local university helped him detect what was in the water by laser back-scatter measurements: It was water nanobubbles containing hydrogen. They were incredibly stable.

He found he could store the gas under pressure in containers that intentionally leaked hydrogen gas, but the nanobubbles would not leave the containment. They cocooned the hydrogen so that it could not react with the oxygen. Free hydrogen stored with oxygen under high pressure explodes. For energy production, we will soon understand why the stable nanobubble is more important than its contained hydrogen.

Japan has led the world in the discovery of water nanobubbles. Historically the academic water community refused to believe that nanobubbles of water could be stable. In 2006 Japanese scientists proved by use of laser back-scatter techniques that water nanobubbles could persist for days. Today the academic water community has finally accepted their persistence, but water scientists are still struggling to explain their stability. Japan has started a revolution by discovering that nanobubbles of oxygen have significant health benefits. Biological cells open their membranes to nanobubbles, and could explain why turbulent water holds oxygen better. Japanese research in vitro studies have shown that oxygen nanobubble water kills cancer cells while leaving normal cells unharmed. This makes sense since cancer cells are typically anaerobic. Nanobubbles become a new means to deliver therapeutic medications or nutrients. In agriculture nanobubbles containing dissolved fertilizer has created remarkable growth for hydroponic farming.

Biological models should be reconsidered to factor in nanobubble interactions. For example, it appears that homeopathy now has a physical explanation: A reacting substance cocooned in nanobubbles would naturally be permitted through the cell membrane, whereas the membrane would detect and block a foreign substance dissolved in solution as a defense mechanism. This explains the point of succussion: When a homeopath dilutes a mixture, he strikes the mixing vial vigorously against a leather pad. Such forceful activity creates cavitation which results in nanobubbles. Once encased in nanobubbles the substance no longer can be detected by chemical reagent measurements so it appears to be gone. Once the nanobubble enters the cell, the physiology of the cell breaks it open to deliver the payload. The Japanese have started a "nanobubble revolution." For more information Google: Nanobubble Japan YouTube. Because it was so unexpected, the stability of water nanobubbles seems like a scientific miracle.

At last I found my hypothesized water cluster particle to support the formation of microscopic ball lightning: It was the nanobubble! At the International Water Conference in October 2015, I shared via Skype an abbreviated version of the 2015 presentation. Here I proposed that water nanobubbles containing just air could become templates to support the formation of microscopic ball lightning. Microscopic fog particles within a thundercloud (which are essentially microscopic water droplets) can do likewise. The lightning event of a thunderclap creates microscopic ball lightning from the microscopic particles. If the microscopic ball lightning coheres the ZPE, it means that the dominant energy manifested in a thunderclap is sourced from the zero-point energy. It also means that an internal combustion engine that mimics the conditions of a thundercloud inside its combustion chamber would likewise tap the zero-point energy: Thus the thunderclap engine!

In 2016 all the pieces of the HHO/water energy puzzle came together to yield my best presentation on the topic. That year I discovered the research of Walter Jenkins, which for me was a synergistic miracle. On his own, independent of me or any of my information, he created engines based on the thunderclap. His patent application (US 20120186557) showed he created fog by ultrasonic means using a commercial pond fogger, guided the fog into the combustion chamber via electrostatic grids, and most cleverly, he invented a wide plasma spark plug to drive the fog into the plasma state. He fired the spark plug at over 100,000 volts for the entire down-stroke of the piston. Of upmost importance for scientific discovery, he does not use electrolysis to make hydrogen; thus he has a clear, definitive experiment to prove that the energy source is something other than hydrogen combustion. It is noteworthy that Stan Meyer's last invention was the water injector spark plug that similarly used just fine water mist and ionized air combined with an explosive, wide-plasma electrical discharge. Stan Meyer was murdered in 1998 before he could commercialize his invention to retrofit automobiles. I predict Walter Jenkins will become more famous than Stan Meyer. Visit his web site: H2-Global.com

The 2016 presentation also explains why some electrolyzers made more nanobubbles than others: It is the cavitating water turbulence that shears off nanobubbles from the electrode plates before they can

grow into unstable microbubbles, which easily burst to free molecular hydrogen. As Omasa demonstrated, nanobubbles of hydrogen were very convenient to use. Now we do not even need the hydrogen! Nanobubbles of just air or microscopic water droplets (fog particles) are sufficient to support the formation of microscopic ball lightning (or EVOs).

There is one last hurdle for success: suppression. Over the years I have met many famous inventors as fellow speakers at energy conferences that were my heroes because of their experimental work. I personally know four who were murdered, including Paul Brown and Stan Meyer. In the HHO field I witnessed promising breakthrough inventions, only to have the inventors go abruptly silent soon after making convincing demonstrations proving their success. They include Paul Zigouras, Steve Eaton, Oliver and Valentin, and Ryushin Omasa. Their projects are summarized in the presentations.

Because of suppression, it appears impossible for a lone inventor to develop his new energy invention into a successful business. Threats and Mafia tactics are typically invoked to stop him. As a result, an open source movement has evolved where inventors and researchers share their progress on the internet. All breakthroughs in science occur because of a repeating experiment. Thus to achieve a breakthrough success for the world requires that not only must a project succeed, but it must be simple enough that it can be easily replicated by hobbyists. The new energy breakthrough requires massive replication because massive replication beats suppression.

Note that the willingness to share research and "intellectual property" is a consciousness shift. It is a shift from the consciousness of "I am separated from others" to the consciousness of unity: "We are a connected being." It is recognition that humanity has a connected consciousness, and we are all part of it.

If an inventor of new energy is trapped in separateness, he becomes a suppressor: He must stop others from making similar discoveries to protect his turf. As he tries to develop his business, he in turn becomes suppressed by the established energy industry as they protect their turf. As long as mankind is trapped in the consciousness of separateness, the discovery of new energy is automatically self-suppressed by this dynamic. Perhaps it is just as well, for a discovery of new energy would

just evolve to new weapons of war, quickening our self-destruction, for that is the natural evolution of separateness: Us versus them.

On the optimistic side, there is an active ongoing consciousness movement. People are channeling new information from enlightened spirits or their own full potential selves. Many have dreams and visions that guide inventing new energy systems. Near death experiences convey the realization that our consciousness persist after physical death; this realization removes the fear of death. There is evidence showing that our minds can connect in remote viewing experiments or influence random systems. For details, see the book by Dean Radin, *Supernormal.* It shows that all human beings have remarkable, amazing potential.

Perhaps one day humanity will wake up, and we will have telepathy with each other. Then we would be an awake superconscious being, and new energy would be naturally invented by our sharing minds. Note at any time we can choose to be a sharing mind, and those who do so are ushering in the discovery of a new energy source for humankind.

I have been blessed and honored to meet so many brilliant and creative researchers since beginning my quest for zero-point energy. They were people truly trying to make a better world and serve all of humanity. From studying their work, a coherent picture finally manifested to yield a simple solution. With the help and participation of sharing inventors, researchers, and hobbyists, we will prove that water is indeed the key to new energy.

Moray B. King
November, 2017

ACKNOWLEDGEMENTS

The author wishes to thank Rainer Huck, the late David Faust, and the late Jack Slovak for years of collaboration and fruitful discussions. Also immense appreciation is given to Joe Boyer for his efforts in editing and laying out this book, and David Childress for publishing and distributing my books.

The content of this book is a summary across the work of many researchers and inventors who gladly shared their results. They include (in order of appearance in the presentations): Sterling Allan, Yull Brown, George Wiseman, Denny Klein, Ken Shoulders, Patrick Kelly, Stanislav Adamenko, Todd Knudston, Chris Eckman, Ted Suartt, Rob Gourley, Martin Chaplain, Thomas Prevenslik, Bob Boyce, Stanley Meyer, Peter Graneau, Frank Znidarsic, Stephen Meyer, Stephen Chambers, Paul Zigouras, Dave Lawton, Ravi Raju, Gennady Mesyats, Horace Heffner, Walter McNichols, Mark LeClair, Serge Lebid, Vernon Roth, Larry Crum, Roger Stringham, Archie Blue, Ryushin Omasa, Freddy Wells, James Griggs, Dale Pond, Richard Clem, Dan Winter, Andrea Rampado, Steve Eaton, Jeff Sokol, Oliver and Valentin, Stefan Hartmann, Foster Gamble, Adam Trombly, Richard Eardley, Tom Valone, Gary Johnson, Ronald Mitchell, Robert Krupa, David Yurth, Dan Davidson, Norman Wootan, Alexander Putney, Satoshi Anzai, Aaron Murakami.

I wish to honor Walter Jenkins by listing him last because I feel he is destined to make the most significant contribution as the future unfolds…

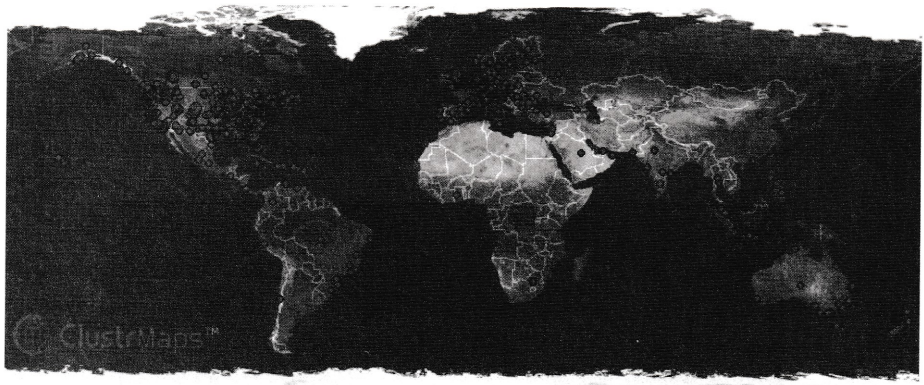
Narrow Gap Electrolyzers (2009)



Moray King

Since the 1970s I have given presentations on the possibility of tapping the zero-point energy (ZPE) as an energy source. Of course such a notion requires a definitive experiment to prove it can be done. With each presentation I have selected what I consider the best "easy" project to try for researchers and hobbyists that could prove we actually have a new energy source. It is unprecedented for me to pick the same project three years in a row. The class of projects regarding the Brown's gas electrolyzers continue to demonstrate compelling energetic anomalies, and they are easy for hobbyists to replicate.

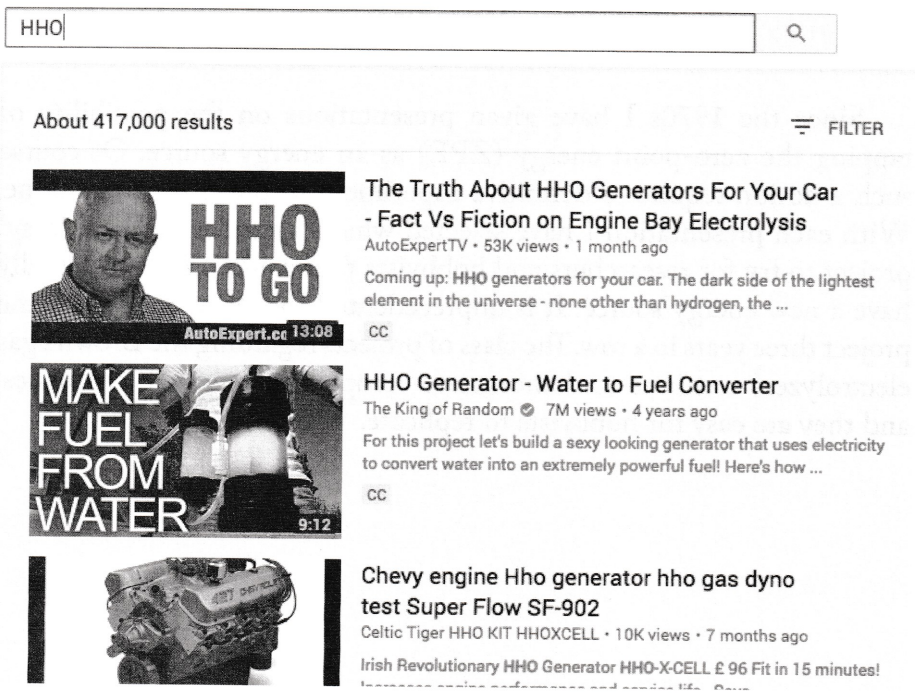
Cluster Map of Web Hits



Google: water fuel

The electrolyzer projects are extremely popular world wide, and they have tremendous traction on the web where information is freely shared. There are numerous sites with blogs and discussion groups where researchers share their latest findings and offer suggestions to new investigators to help them get started successfully.

YouTube: HHO



The electrolyzer projects are popular. On YouTube search for "HHO," a popular name for the produced gas (meaning hydrogen-hydrogen-oxygen). As of September 2017, there are over 417,000 videos demonstrating electrolyzers in action as well as instructions on how to build the equipment. The participants are typically not sharing for personal profit; they simply want to make a better world.



After my first presentation on these projects in 2007, Sterling Allan, founder of the PESWiki web site, produced a short video that succinctly summarizes the main points of the presentation. The most important point is that the dominant form of the energy is not coming from hydrogen, but rather is coming from something better: charged water gas clusters which activate and cohere the zero-point energy.

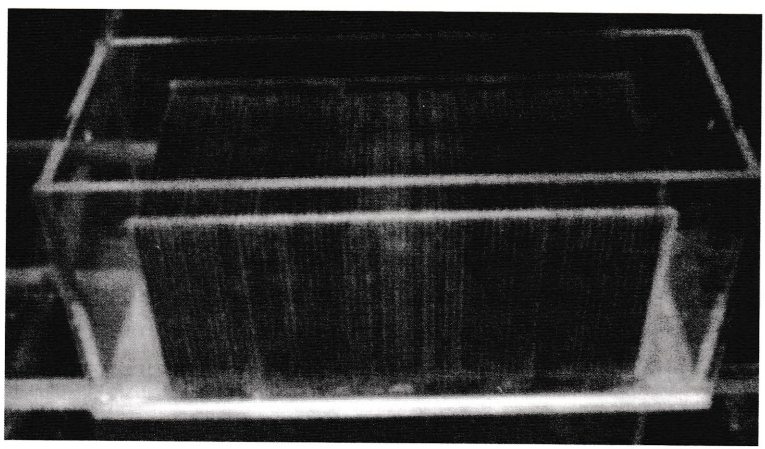
Names for the Gas

- Brown's Gas
- Stoichiometric Mixture H_2 and O_2
- HHO Gas (Atomic hydrogen, oxygen)
- Hydroxy
- "Electrically Expanded" Water
- Charged Water Gas Clusters

There are many names for the gas produced by the electrolyzers. Yull Brown is credited with recognizing and investigating the energetic anomalies of the gas as he was applying it to welding applications, and so perhaps is justified to name it after him. Most researchers believe the gas is simply a 2:1 mixture of hydrogen and oxygen. Brown hypothesized that the gas was atomic hydrogen and oxygen in his attempts to explain the strange energetic effects, and thus the name HHO has remained popular. Hydroxy is another popular name.

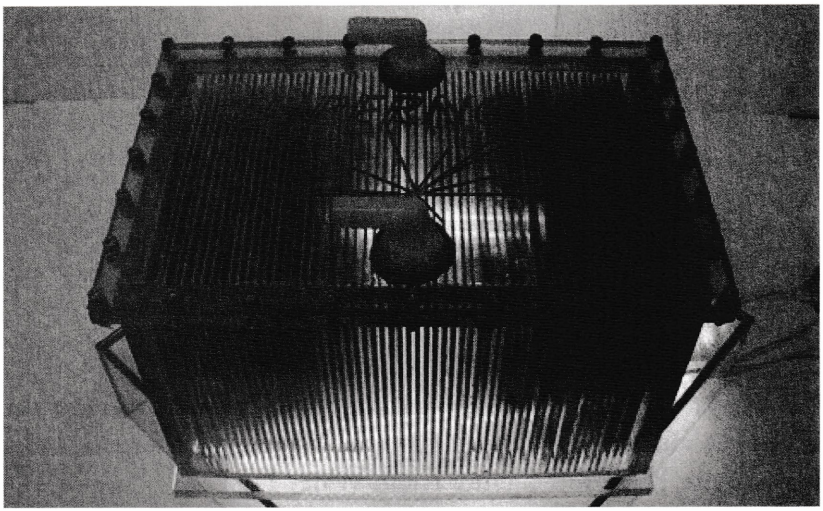
George Wiseman, who was one of the first to recognized the dominant gas produced was not hydrogen, suggested it was "electrically expanded water." Here we will consider a similar hypothesis: the gas is actually charged water gas clusters, which activate and cohere the zero-point energy when converted into plasma form. As we shall see, the gas is wide open for new names as investigators begin to realize that the important, energetic constituent is not hydrogen and claim that they are the first to discover this (since nearly everyone participating on the web believes the energetic gas is hydrogen).

Parallel Plate Electrolyzer

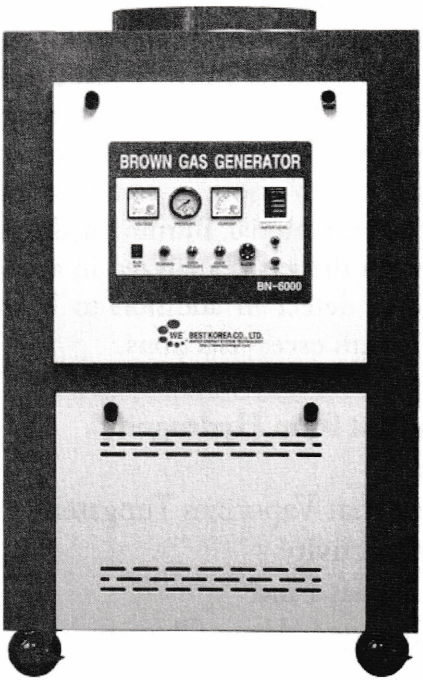


BobBoyce.org

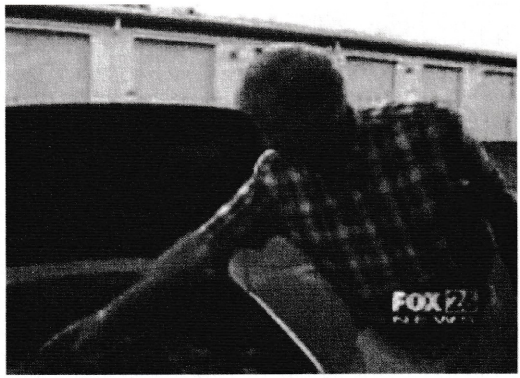
The electrolyzers utilizing parallel plate electrodes are easy to build. As we shall see, the smaller the inter-electrode spacing, the better.



March Labs—There are many commercial units available for sale advertised on the web at MarchLabs.com



The B.E.S.T. manufacturing facility in Korea is perhaps the largest company in the world currently manufacturing commercial units for welding and heating applications.



In the late 1990's Denny Klein received news coverage on his research. The video nicely summarizes the surprising, energetic behavior of Brown's gas. YouTube: Denny Klein Water Fuel

Nearly Everyone Believes The Energy is from Hydrogen

Nearly everyone publishing on the web believes the energy is from hydrogen. Here we will entertain the hypothesis that the dominant energy is not from hydrogen. The best support for the hypothesis is the big anomalies observed regarding Brown's gas: It exhibits a cool flame (266 degrees F), yet it is claimed to vaporize tungsten (vaporization point over 10000 degrees F). Burning hydrogen cannot do that. Also there are experiments which show it can even dramatically reduce radioactivity in radioactive material. Burning hydrogen certainly cannot do that. Moreover, when the gas is analyzed in appropriately equipped laboratories, researchers detect in addition to hydrogen and oxygen, gaseous water clusters with excess electrons.

Dominant Energy Not from Hydrogen

- Big Anomalies:
  - Cool Flame that Vaporizes Tungsten
  - Alters Radioactivity
- Laboratory Analysis Find
  - Gaseous Charged Water Clusters

Source: Zero-Point Energy

- Charged Water Gas Clusters
- Similar to Plasma Charge Clusters

- Microscopic Ball Lightning
  Ken Shoulders
  - EV (Electrum Validum)
  - EVO (Exotic Vacuum Object)
- Cavity Quantum Electrodynamics (QED)

The hypothesis that the zero-point energy is the actual energy source for Brown's gas comes from observing an experimental coincidence. Charged water gas clusters exhibit the same energetic anomalies as the plasma charged clusters, a microscopic form of ball lightning that has been extensively studied in the experiments by Ken Shoulders. He originally named them "Electrum Validum" (EV) meaning "strong charge," and later named them "exotic vacuum objects" (EVO) when he became convinced that their excess energy was cohered from the zero-point vacuum fluctuations. To further support the hypothesis, we will review a reference that shows how zero-point energy can be coherently activated within a collapsing microscopic bubble of water via cavity quantum electrodynamics.

Net Energy Gain

- Condition Electrode Surface
  - Rough, sharp, pointy
  - White powdery layer (oxide?)
- Small gap between electrodes (< 1mm)
- No Electrolyte
- Low Current
- Pulsing Voltage

To demonstrate a net energy gain from the electrolyzers requires care. The electrodes must be properly cleaned and conditioned. Microscopically, the surface should be rough, sharp and pointy. Also, some successful researchers claim that after proper conditioning, the electrodes exhibit a white, powdery layer. It is not yet clear what the whitish material is. (Some suggest it might be a metallic oxide.) A small gap between the electrodes allows electrical discharges in the water without using an electrolyte. It is important to minimize conduction current with its associated heat losses. Also pulsing voltage waveforms

appear to help optimize gas production using minimal input power.

Huge Energy Gain

- Explosive Emission Mixture
  - Water Mist
  - Ionized Air
  - Inert Gas
- Stan Meyer Water Injector Plug

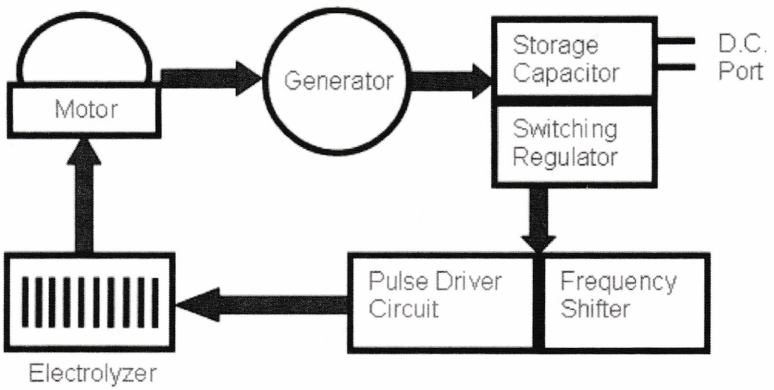
Surprisingly large energy gains can be achieved by abrupt, electric, explosive emissions in a mixture of water mist, ionized air and inert gas. As we will see from reviewing his patent, this is the basis for Stan Meyer's water injector plug invention, which he claimed could be used to power a car completely from water.

Goal

- Minimize input power
- Maximize gas production

The goal is to minimize input power while maximizing water gas production in order to prove we have a new energy source.

Closed Loop System



Self Running

The best way to prove to a skeptical world that we have a new source of energy is to build a self-running system. Here the electrolyzer's gas is used to run a small internal combustion engine generator whose electrical output is rectified onto a storage capacitor. The capacitor provides the energy for the electronic circuits that properly pulse the electrolyzer to maximize gas production. No external power should be used in the circuit except for a battery to give it a "kick start." To keep such a system self-running is extremely impressive because it is well known that over half the energy is lost in the internal combustion engine. If numerous researchers can successfully replicate such a demonstration, it will prove the existence of a new energy source.

The researchers featured in this presentation are: Yull Brown, Ken Shoulders, George Wiseman, Chris Eckman, Thomas Prevenslik, Horace Heffner, Bob Boyce, Stan Meyer, Stephen Chambers, Paul Zigouras, Dave Lawton, Ravi Raju, and Patrick Kelly.

Patrick J. Kelly: Practical Guide to Free-Energy Devices

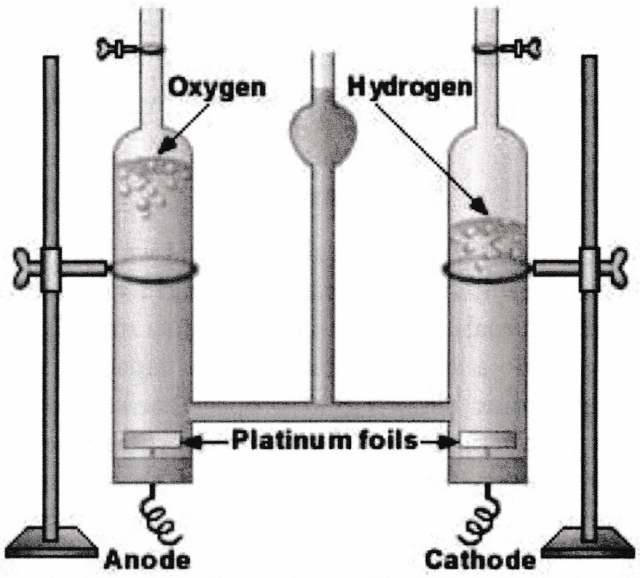
A special kudos goes to Patrick Kelly for his extensive publications on the web. He has interviewed many inventors and has clearly written about their projects with numerous diagrams. The information is available for free download from his web site. His ebook, "Practical Guide to Free-Energy Devices," is well written and contains lots of technical details in its 1,700 pages. Anyone interested in pursuing this research should

read Chapter 10 on vehicle systems where critical details are thoroughly discussed. See his web site: free-energy-info.com

Energy Gain is Not From Hydrogen

This book stresses that the energy gain in the electrolyzers is not coming from hydrogen production, despite the fact nearly everyone publishing on the web believes it is.

Electrolysis



Cannot Yield Excess Energy

It is well known in chemistry that electrolysis of water to produce hydrogen and oxygen cannot yield a net energy gain.

Violates Thermodynamics

Electrolysis:

$$H_2O + E_1 \rightarrow H_2 + O_2$$

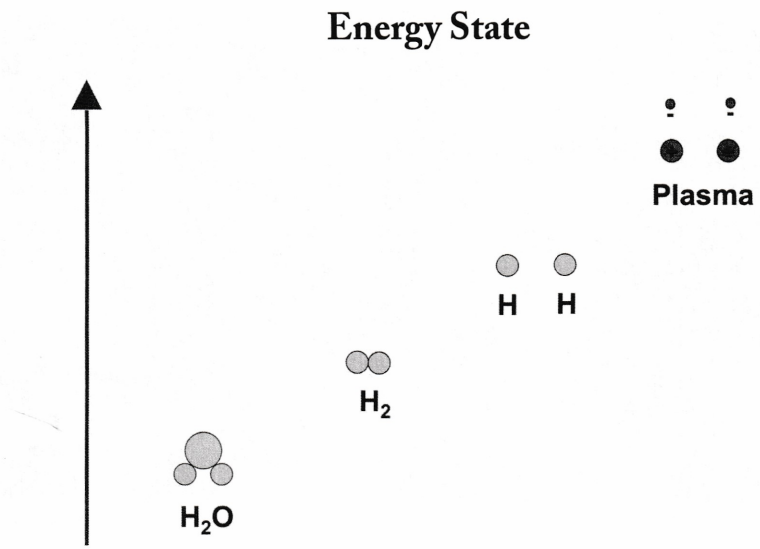
Combustion:

$$H_2 + O_2 \rightarrow H_2O + E_2$$

Energy:

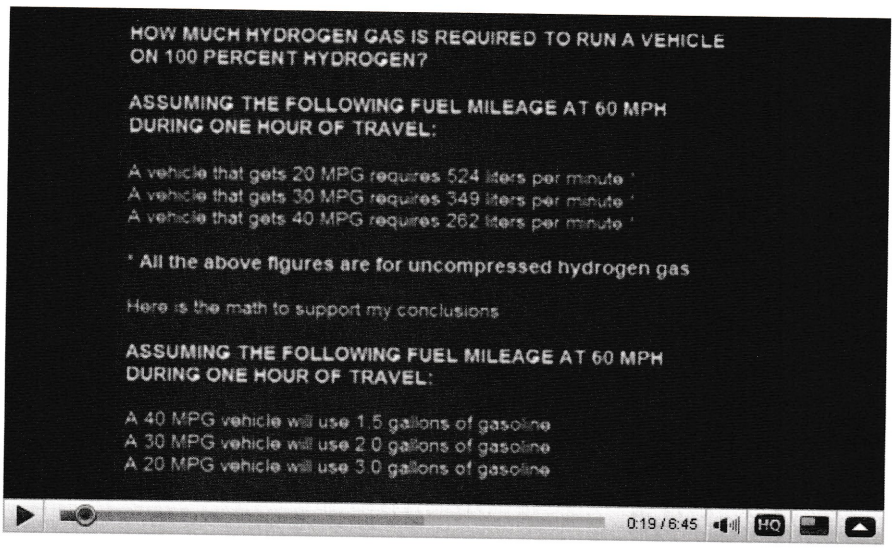
$$E_1 > E_2$$

It costs more energy to separate water into hydrogen and oxygen than can be returned when the hydrogen is burned.



Another way of viewing this is with an energy state diagram. The water molecule is in a lower energy state than molecular hydrogen. Atomic hydrogen is at an even higher energy state. If we ionize the hydrogen to make plasma, it costs more energy still. Converting water to diatomic hydrogen or mono atomic hydrogen consumes energy and results in an net energy loss.

Run Car on Hydrogen
300 to 500 liters per minute

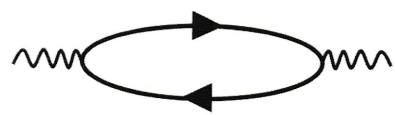


YouTube: Absolute proof impossible HHO

Moreover, the few liters of gas per minute produced in the typical electrolyzers would yield little energy if the gas were simply hydrogen at standard atmospheric pressure. To get the BTU equivalent to gasoline at standard pressure would require 300 to 500 liters of (uncompressed) hydrogen to run a car. Yet investigators are discovering they can significantly increase gasoline fuel efficiency using the gas from their electrolyzers, and some have even claimed they can run a car solely from the electrolyzer's gas. The energy is not coming from hydrogen. It is coming from something better.

Energetic Vacuum

$$\Delta E \, \Delta t > \hbar$$



Uncertainty Principle **Pair Production**

What is the energy source?

Here we will explore the possibility that the energy is coming from the energetic vacuum fluctuations known as the zero-point energy. Throughout history the scientific community has had various notions as to the nature of empty space. Before the twentieth century most scientists believed in an ether that supported wave propagation of light. In 1905 when Einstein's theory of relativity became accepted the ether was discarded and scientists then believed the vacuum was empty. In the 1930's when quantum mechanics was discovered it became apparent there was an underlying jitter to all systems. It gave rise to Heisenberg's uncertainty principle, and Dirac realized the source was from the fabric of space itself where electron-positron particle pairs could spontaneously pop into and out of existence. The fluctuating energy was called "zero-point" energy meaning it existed in the fabric of space even at absolute zero degrees Kelvin in the absence of all heat, light, and matter. It is interesting to note that there was only a twenty five year gap in the history of science where the fabric of empty space was considered a true void. Yet today most scientists believe that the vacuum of space is empty, because most scientists are not physicists and the topic of the zero-point energy is not taught in typical undergraduate text books.

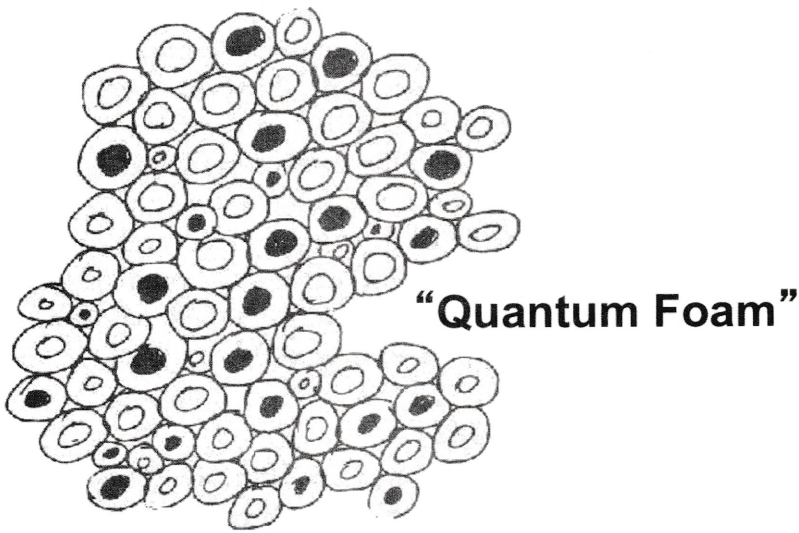
Zero-Point Energy: Basis

Quantum Effects – Boyer, *Phys. Rev. D 11(4)*, 2832 (1975).
Hydrogen Atom – Puthoff, *Phys. Rev. D 35(10)*, 3266 (1987).
Energy Source – Cole, Puthoff, *Phys. Rev. E 48(2)*, 1562 (1993).
Gravity – Puthoff, *Phys. Rev. A 39(5)*, 2333 (1989).
Inertia – Haisch, Puthoff, Rueda, *Phys. Rev. A 49(2)*, 678 (1994).

However, the theories of zero-point energy are well represented in the standard journals of physics. The Physical Review, perhaps the most prestigious journal in the United States, contains numerous papers on the zero-point energy. In the 1970's Timothy Boyer was a leading proponent in the United States. He showed how quantum effects could arise from matter's interaction with the zero-point energy. In the 1980's Hal Puthoff became a leading proponent showing how the hydrogen atom could be stable due to zero-point energy, how it can be an energy source without violating thermodynamics, how it could be the source

of gravity, and perhaps most exciting, how it might be the source of inertia. The inertia paper implies that if we can learn to cohere the zero-point energy, we can in principle invent inertial propulsion: The ability to undergo abrupt acceleration like hairpin turns without feeling inertial stress, i.e. "flying saucer" type of technology.

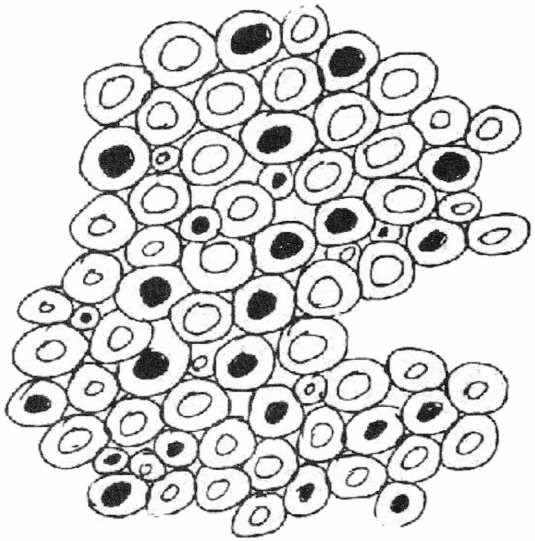
The Zero-Point Energy is a Turbulent Virtual Plasma



Electric flux enters and leaves our 3D space through mini virtual particles that constantly appear and disappear.

Wheeler, in his theory of *Geometrodynamics* models the zero-point energy like a virtual, turbulent plasma, called the "quantum foam." Here electric flux enters and leaves our three dimensional space through mini holes that act like mini virtual particles. These holes are sized at the Planck length, 10^{-33} cm. That is twenty orders of magnitude smaller than the electron. The energy density through them is enormous, 10^{94} grams/cc.

Can Self-Organization be Triggered in the Quantum Foam?



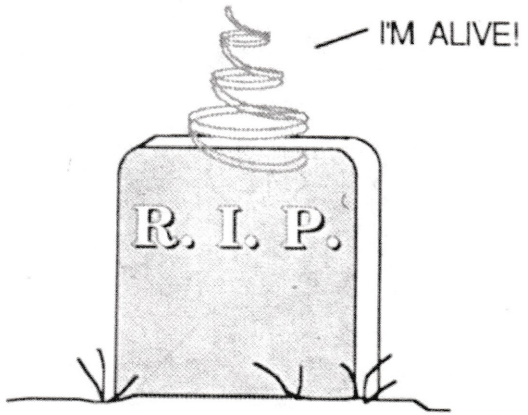
The key question for allowing the ZPE to become a large energy source is, can self-organization be triggered in the quantum foam?

Entropy
Everything decays to randomness



Most scientists believe not. They say that the action is random and chaotic. Random things must forever remain random. That is the law of entropy.

Ilya Prigogine
Under certain conditions self-organization may occur.



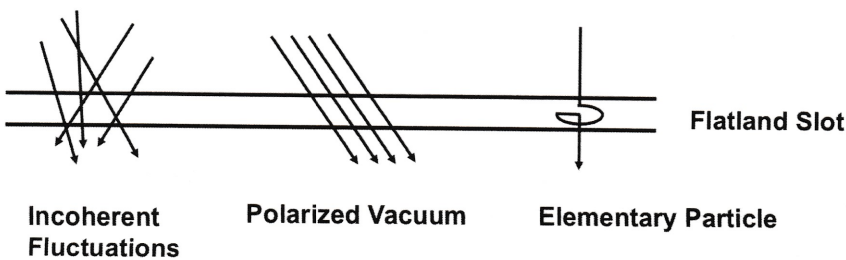
However, in 1977 Ilya Prigogine won the Nobel prize in chemistry for showing how under certain conditions a system may evolve from chaos into self- organization.

System Self-Organization

- Nonlinear
- Far From Equilibrium
- Energy Flux

For self-organization a system must be nonlinear, far from equilibrium, and have an energy flux through it. The theories of the zero-point energy show that under certain circumstances these conditions can occur.

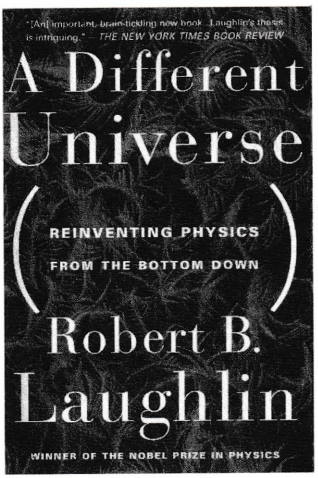
ZPE from Hyperspace Flux



The zero-point energy can be modeled as a flux from a higher

dimensional space. In this diagram the thin "flatland slot" represents three dimensional space. As the flux penetrates the flatland slot randomly, it manifests the background incoherent vacuum fluctuations. If there is a tilt to the flux as it enters our 3-space, the vacuum is said to be polarized. If there is vorticity as the flux passes through our space, it manifests elementary particles. In this model the flux is like the flow of a stream, and the whirlpool is like an elementary particle. Just as the constant flow of the stream is necessary to sustain the existence of the whirlpool, the zero-point flux is necessary to sustain the existence of the elementary particle. Thus all elementary particles, and therefore all matter in the physical universe, are sustained by the zero-point flux.

Everything Emerges from Collectives



Despite Prigogine's Nobel prize, most scientists have a hard time believing self-organization can occur. A notable exception is Robert Laughlin, also a Nobel prize winner. His thesis is that everything, including the laws of physics, arise from self-organized collectives. His recent book, *A Different Universe*, explains the ideas clearly in layman's terms.

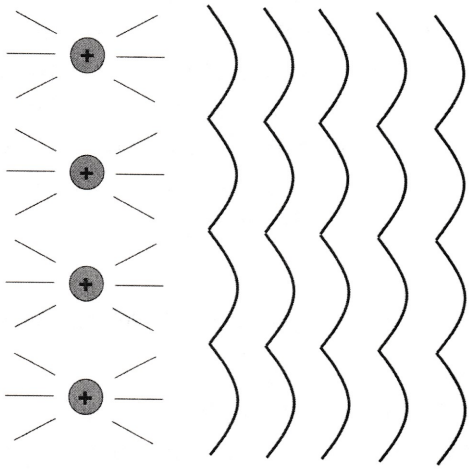
Principles for Cohering The Zero-Point Energy

- Highly Nonlinear System
- Abruptly Drive Far From Equilibrium
- Maximize ZPE Interaction Using
  - Ions
  - Vortex Forms

What are the principles for cohering the zero-point energy? Simply follow Prigogine's principles. Work with a highly nonlinear system like

a plasma. Abruptly drive it far from equilibrium with an abrupt electrical discharge, and work with particles that maximally interact with the ZPE like ions and vortex forms.

Plasma Ion Acoustic Oscillations



Manifest Energetic Anomalies

When many ions of a plasma oscillate synchronously together, it is called the ion-acoustic mode of the plasma. During this mode plasma physicists have observed energetic anomalies.

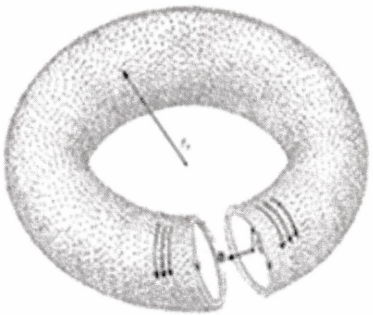
Ion Acoustic Activity Triggers Plasma Self-Organizational Modes

- Large radiant energy absorption
- High frequency spikes
- Runaway electrons
- Anomalous plasma heating

Harold Aspden, "A Problem in Plasma Science" (2005);
Watanabe, et al., "Self-organization and dynamo responses in toroidal confinement plasmas" (2005) .
Google: "Anomalous electron ion energy transfer"

Scientists have observed that ion acoustic plasma activity can trigger self-organizational modes. Energetic anomalies include large radiant energy absorption, high frequency spikes, runaway electrons, and anomalous plasma heating.

Ball Lightning Plasmoid

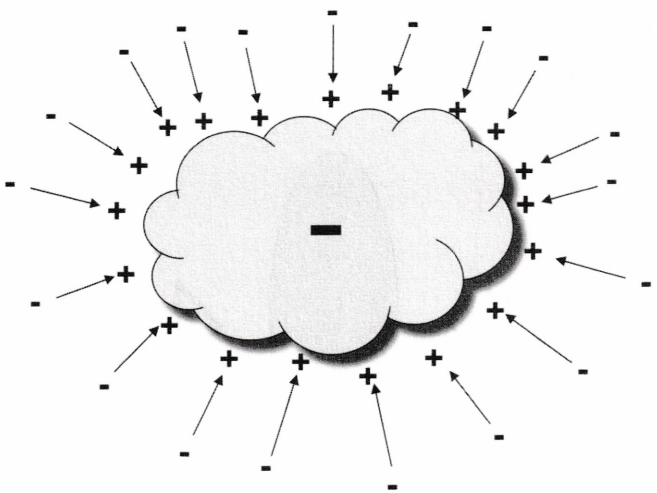


Electron Spiral Toroid

electronpowersystems.com
C. Seward, C. Chen, K. Ware, Ball Lightning Explained as a Stable Plasma Toroid
Google: Ball-Lightning-Explained.pdf

One observed self-organized form is the vortex ring plasmoid. It has often been proposed as a model for ball lightning.

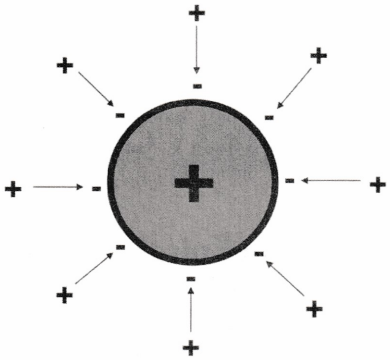
Vacuum Polarization
Conduction Electron Cloud



In equilibrium with ZPE

Electrons in wires typically do not coherently activate the zero-point energy. Conduction band electrons are described as a smeared charge cloud whose vacuum polarization is essentially in equilibrium the zero-point fluctuations. That is why we see very little ZPE activation from typical electronics and electrical circuits based on electron conduction.

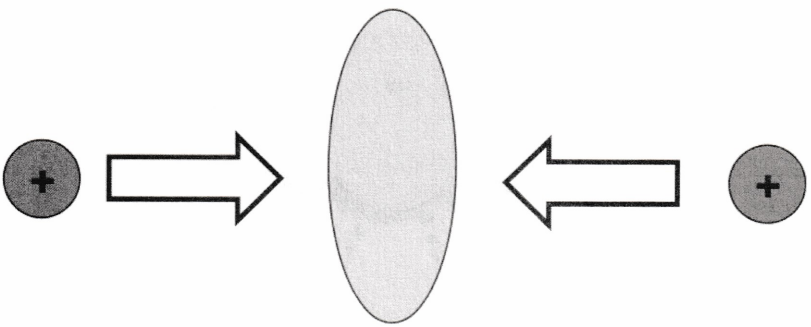
Vacuum Polarization of Nucleus



Can trigger self-organization in ZPE

However, the vacuum polarization of the nucleus is quite different; it exhibits steep lines of polarization converging toward its center. Thus abrupt motion of ions or nuclei can trigger self-organizational phenomena in the vacuum's quantum foam.

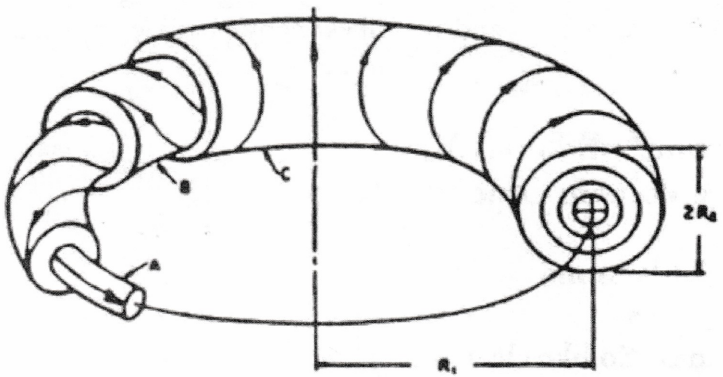
Exotic, Coherent Vacuum States in Quantum Electrodynamics arise from heavy ion collisions



Calenza, et al., Phys. Rev. Lett. 57(1), 55 (1986)

Physicists see such self-organizational phenomena in their heavy ion collision experiments. They call them "exotic, coherent vacuum states in quantum electrodynamics."

Helical Flow in Plasmoid Vortex Ring Filament

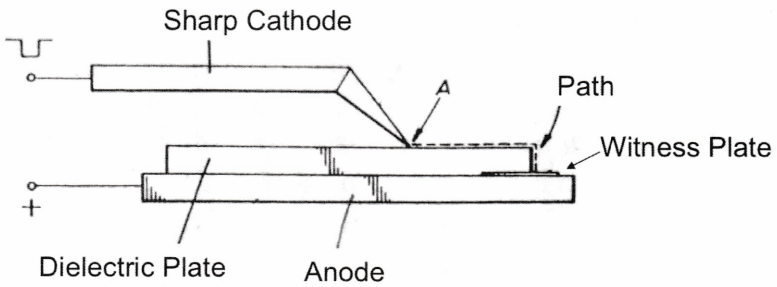


Force Free Vortex Yields Natural Stability

Alex, Radar, Fusion Tech. 27, 271 (1995)

In plasmoids the electrons and ions spiral around the vortex ring, and the force free vortex yields a natural stability, which sustains the plasmoid form.

Ken Shoulders Launching Charge Cluster



U.S. Patent 5,018,180 (1991)

Ken Shoulders has learned to repeatedly launch a microscopic charge cluster plasmoid-like form with a relatively simple apparatus. An abrupt electric discharge from a capacitor through a sharp, pointed electrode onto a dielectric surface creates the charge cluster. It appears to be a micron-sized form of ball lightning, which travels on the surface of the dielectric to the anode. It can punch a hole through the witness plate manifesting a crater that was made by a high energy event. Shoulders patent is well written and describes many possible applications of his discovery.

Electrum Validum (EV)
Exotic Vacuum Object (EVO)

10^{11} Electrons
10^{6} Ions
e/m Ratio like electron
Contains excessive energy

Shoulders originally named the charge cluster form "electrum validum" (EV), meaning "strong charge." Later he named it "exotic vacuum object" (EVO) after he became convinced that the entity cohered and trapped zero-point energy. The EVO contains the equivalent of about 100 billion electrons and one million ions. It exhibits a charge to mass ratio similar to the electron, and it contains excessive energy exceeding the amount originally stored on the capacitor that launched it.

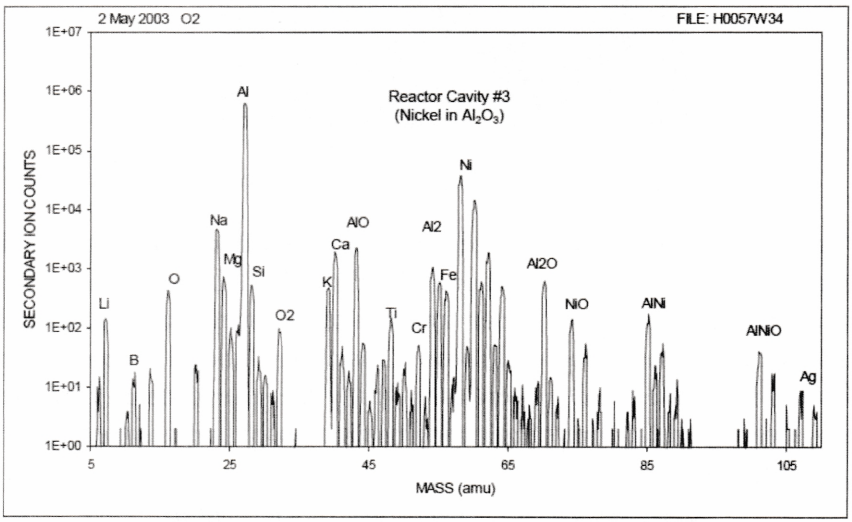
Charge Cluster Anomalies

- Adhere to dielectrics
- Many can clump into "necklace" formation
- Bore holes in ceramics (aluminum oxide)
- Disruption of electron bonds appears like melting
- Element Transmutation
- Radioactivity Reduction

Shoulders has observed numerous charge cluster anomalies. They adhere to dielectrics and can persist for a long time. Many can clump

together into a necklace-like formation. They can bore holes through high melting point ceramics like aluminum oxide. Shoulders conjectured that the EVO disrupts the electron bonds in the target lattice, and thus it appears like melting. It is not heat, but a more coherent form of energy that causes the melt. Perhaps as the most surprising anomaly, Shoulders has done experiments that demonstrate element transmutation and radioactivity reduction when radioactive material is transmuted into benign elements.

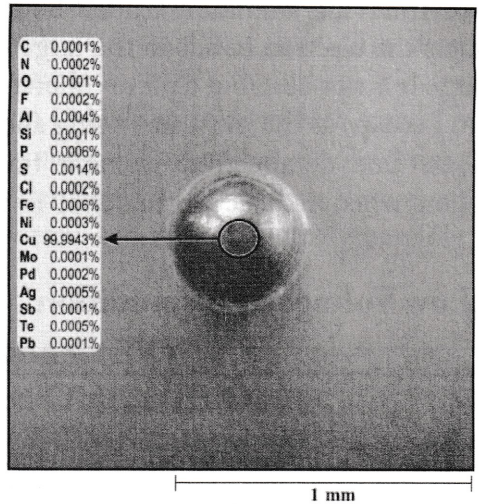
Low Voltage Transmutation



Google: Ken Shoulders, "ICCF-10 Low Voltage Nuclear Transmutation"

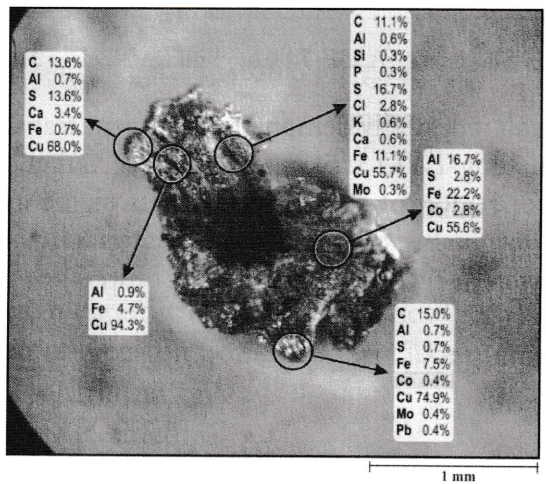
Shoulders can repeatedly demonstrate element transmutation at low energy by launching EVO strikes at an anode target. After an EVO strike, the crater region of the target exhibits elements that were not present in the original anode or cathode material. Moreover, the new elements are often in the form of unusual isotopes not readily found in nature.

Nucleosynthesis



proton21.com.ua/articles/Booklet_en.pdf

Shoulders is not alone in observing transmutation due to plasmoid strikes. Stanislav Adamenko's team at the Proton-21 Laboratory in Kiev, Ukraine repeatedly creates super transmutation using large, kilo-joule plasmoid charge cluster forms. Proton-21 is a large laboratory employing professors from the local university to study the phenomena. Depicted here is a very pure copper target they meticulously prepare that will be struck by the plasmoid.



proton21.com.ua/articles/Booklet_en.pdf

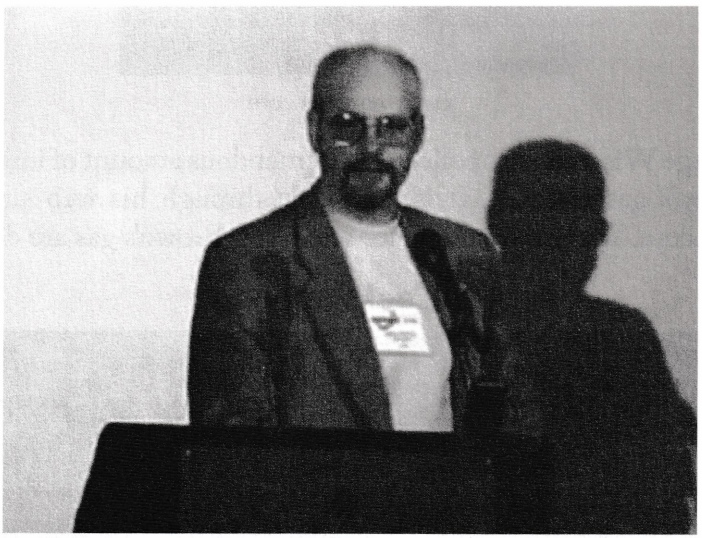
After the target is smashed by the energetic plasmoid, it contains

elements all over the periodic table. The Proton-21 Laboratory appears to be conducting the best research in the world regarding element transmutation. Their work is pretty much ignored by western scientists because of the egregious paradigm violations their experiments are exhibiting. Like Shoulders has shown in his experiments, the input energy is not sufficient to produce nuclear level events, and thus the experiments strongly imply coherent ZPE activation is occurring.

Charged Water Gas Clusters Can Also Cause Element Transmutation

Perhaps the most spectacular claim regarding Brown's gas is that it can likewise induce element transmutation.

George Wiseman



youtube.com/watch?v=E-dca5fVLTM

George Wiseman, a leading researcher on Brown's gas, has posted a video recently where he discusses the experiments where Brown's gas can induce radioactivity reduction in radioactive materials.

Brown's Gas Information



eagle-research.com

George Wiseman has collected a tremendous amount of information on Brown's gas research. It is accessible through his web site, eagle-research.com. The many anomalies regarding Brown's gas are discussed.

Cool Flame



youtube.com/watch?v=4wYY1V46YDQ

Brown's gas exhibits a cool flame (130 degrees C) when used for a welding torch. There have been many demonstrations of quickly passing one's hand through the flame.

The cool flame does not boil water



youtube.com/watch?v=wK85QQPAuiU

Vaporizes Tungsten?



Melt 6192 deg F Vaporize 10031 deg F

youtube.com/watch?v=NQ0yQK16M-Q

As shown in the video, Yull Brown believed he was sublimating Tungsten.

In his experiments, George Wiseman observed through extremely dark glass that the tungsten was first melting and not directly sublimating. This would lead to oxidation at a lower temperature than vaporization. Vaporization might still be occurring, but it has not yet been definitively proven.

Temperatures

Tungsten		
Melt	6192 F	3422 C
Vaporize	10031 F	5555 C
Browns Gas	266 F	130 C
Torches		
Acetylene	5972 F	3300 C
Hydrogen arc	7232 F	4000 C
Cyanogen	8477 F	4525 C
Dicyanacetylene	9009 F	4987 C

This table summarizes the startling nature of Brown's gas when used in welding applications. The temperatures of the standard welding torches are not sufficient to vaporize tungsten, yet the low temperature, Brown's gas torch not only melts and oxidizes tungsten, it might vaporize it as well. It is not heat that is causing the disruption of the electron bonds in the tungsten. Like Shoulder's EVOs, the evidence implies Brown's gas has trapped a coherent form of energy.

Brown's Gas Anomalies

- Adheres to matter (electrically polarized)
- Electric shock
- Implodes instead of explodes
- Cool flame
- Claims of vaporizing tungsten
- Cuts cleanly through wood, metal, ceramics
- Claims of neutralizing radioactive waste
- Claims of element transmutation

Todd Knudston, amasci.com/freenrg/hydroxy.html
George Wiseman, eagle-research.com

The anomalies of Brown's gas are similar to the plasma charge clusters (Shoulders' EVOs). It adheres to matter and is electrically polarized. It gives an electric shock if it implodes back to water. The isolated gas tends to implode instead of explode in piston experiments. However, if there

is additional air added to the mixture, the air is heated which can cause expansion. As a welding torch, it exhibits a cool flame, yet it melts and oxidizes tungsten. The torch cuts cleanly through solid, high melting point materials and can weld dissimilar metals together. The claims of neutralizing radioactive materials as well as element transmutation are extraordinary. The similarity of the anomalies to those observed in the experiments with the plasma charge clusters suggest an common underlying phenomena. It motivated the hypothesis that Brown's gas is comprised of charged water gas clusters which activate and cohere zero-point energy.

Brown's Gas Measurements
Chris Eckman

Electron Density (EDMA)

- Diatomic Hydrogen and Oxygen
- No Monoatomic Hydrogen
- Gaseous Water with Excess Electrons

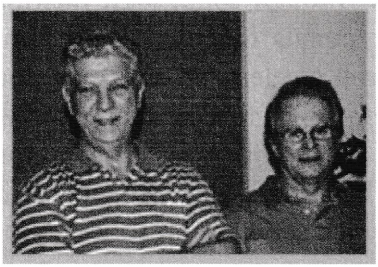
Thermal Imaging (InfraCAM SD)

- Flame Temperature 130 C (266 F)

Extraordinary Technology, vol. 2(6), pp 15-25, 2008

In 2008 Chris Eckman measured the characteristics of Brown's gas at Idaho State University. The measurements showed no monoatomic hydrogen was present. In addition to diatomic hydrogen and oxygen, he detected a gas that was a form of water with excess electrons; it was neither water vapor nor steam. When ignited, the flame temperature was measured to be about 130 degrees C.

SG Gas
Extract Pure Water Gas



Ted Suartt Rob Gourley



Ice Infused with SG Gas
Can store gas under pressure

Rhodes and Brown's gas are "dirty cocktails" with mixtures of gases including H_2 or O_2.

wateriontechnologies.com

Ted Suartt and Rob Gourley appeared on the web this year. They realized that the dominant electrolyzer gas is not hydrogen, and claiming they are the first to discover this, named the gas after themselves, "SG Gas." Their extraction process involves widely separated electrode plates to only grab gas vented from the middle region between the electrodes, and avoid the hydrogen or oxygen bubbles that are emitted at the electrodes. They are investigating the properties of water infused with the gas; the picture shows a spire of ice produced as they freeze the water.

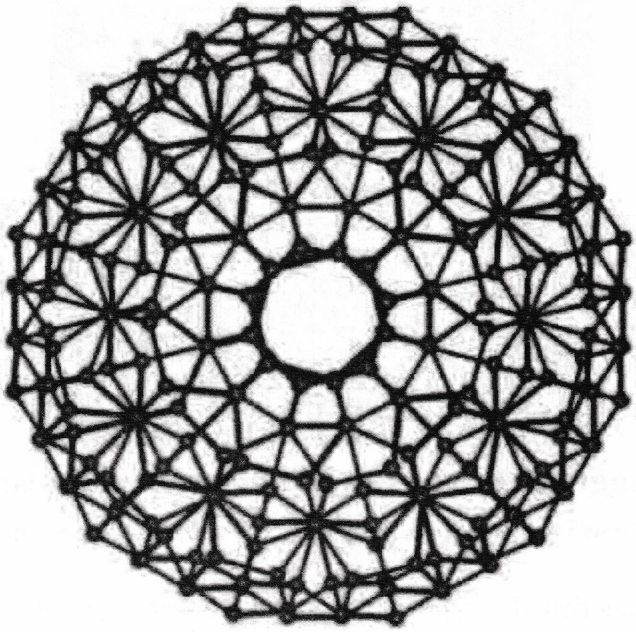
2017 Update from Dana and Rob Gourley:

The process to make the gas has been improved, and it does not use electrolysis. Instead the water is subjected to strong electromagnetic fields in an "electron rich, reaction zone" to alter the structure of the water. The proposed water gas structure is H_4O_2 which they name "dioxytetrahydride." For more information, Google: "White Paper on Dioxytetrahydride Gas"

Water Clusters

The mainstream scientific community has accepted the existence of water clusters, and a number of universities worldwide are studying them.

Water Cluster Architecture
Based on Gas Clathrates

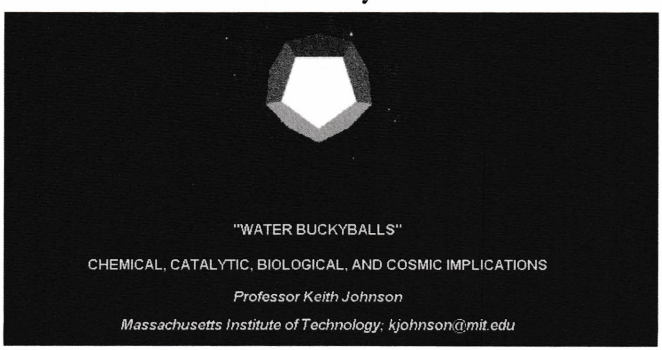


Prof. Martin Chaplain, London South Bank University

lsbu.ac.uk/water/clathrate.html

Professor Martin Chaplain of London South Bank University has perhaps the most extensive site on the web for the study of water. Depicted is a water cluster based on gas clathrates where gas is tapped in the spaces between the water molecules comprising the cluster.

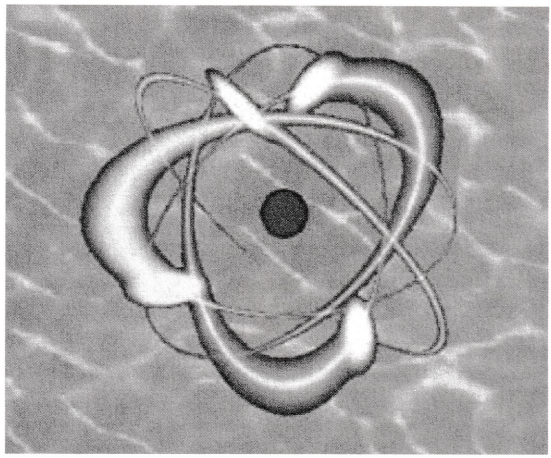
Water Buckyballs



Keith Johnson proposed a novel water cluster. Google: Water Buckyballs

Hydrated Electrons

Negatively Charged Water Clusters



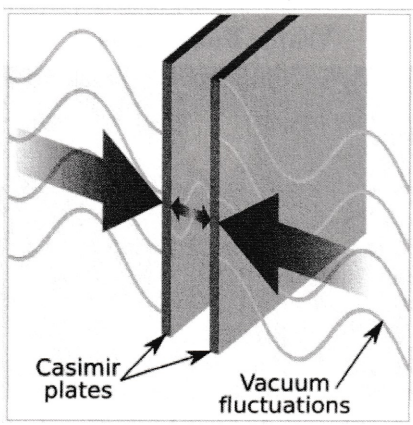
Aggregates between liquid water and steam

lbl.gov/Science-Articles/Archive/CSD-hydrated-electrons.html

It appears that the hypothesized charged water gas cluster has been detected and discussed in the standard scientific literature. It is described as "hydrated electrons" because the clusters are negatively charged. Moreover, it is recognized to exist in the gaseous state.

Coupling Zero-Point Energy into Water Clusters

Cavity Quantum Electrodynamics QED



There are discussions in the literature on how zero-point energy can be cohered within microscopic water bubbles via cavity quantum electrodynamics (QED). The theories of cavity QED originated with the Casimir effect where closely spaced plates are forced together by action of the ZPE. Later it was recognized that abrupt motion of surfaces could coherently activate the zero-point energy especially in a compression event.

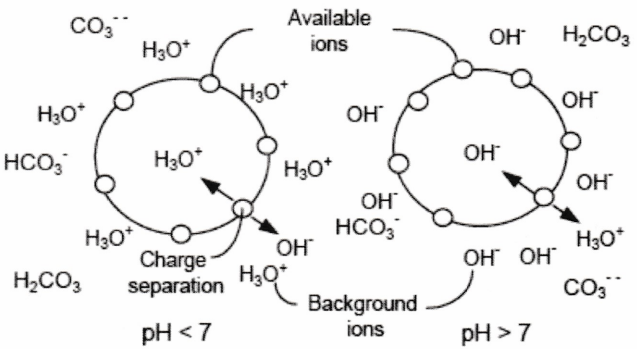
Thomas V. Prevenslik
Bubbles and Steam Electricity

- Steam Electricity
- Waterfall Ionization
- Thunder Cloud Charge Separation
- Sonoluminescence

esdjournal.com/techpapr/prevens/previndx.htm

Recently T.V. Prevenslik publish a paper on the web showing how stream electricity, waterfall ionization, thunder cloud charge separation, and sonoluminescence can arise from cavity QED during microscopic water bubble compression.

Water Bubble, Cavity QED Model Coheres ZPE



Charge Separation: Hydronium + Hydroxyl -

esdjournal.com/techpapr/prevens/previndx.htm

In his model Prevenslik shows how the various ions of water get separated during bubble compression and how coherent ZPE activation is the energy source underpinning it.

Bubble Cavity Quantum Electrodynamics

In bubble cavity QED the zero-point energy is activated as the bubble abruptly collapses. During collapse the standing wave in the cavity manifests an increasing resonant frequency, which acts like an ultraviolet to x-ray laser. The frequency range coincides with the dissociation frequency of the water molecule bonds, which separate. If Prevenslik thesis is correct, it implies that the actual energy source for thunder cloud lightning comes from the zero-point energy.

Sonoluminescence

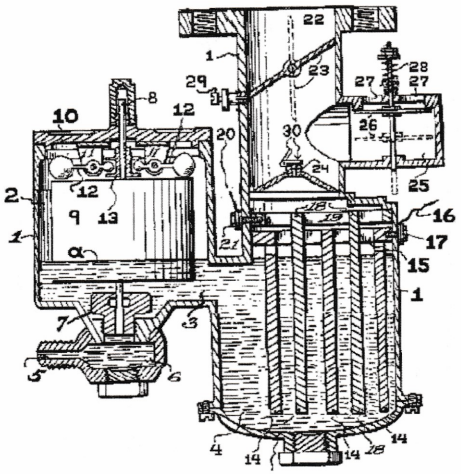
- Bluish light
- Ultrasonic excitation, water + argon
- Shock Waves: Bubble wall collapse
- Cavity QED resonance couples in ZPE
- Creates excimers: Ar*OH
- Emits photons when excimers decompose during rarefaction

Prevenslik also explains sonoluminescence, the bluish light emitted when water mixed with some inert gas (like argon) is excited by ultrasonic waves. When microscopic water bubbles abruptly compress, the resulting shock wave manifests a cavity QED resonance which couples in the ZPE. The energy creates excimers of argon and OH ions. The blue light photons are emitted when the excimers decompose during rarefaction. Prevenslik's seminal paper describes a general mechanism for microscopic water bubble dynamics to coherently interact with the zero-point energy. The ideas might help explain how charged water gas clusters could contain excessive energy.

"Water Fuel" Projects

There are many "water fuel" projects on the web. Most researchers are interested in producing some gas (which they believe to be hydrogen) in order to improve a car's gasoline mileage. Some researchers have claimed that they can run a car completely on water. The most significant projects are those that can disconnect the battery (after starting) and keep running to prove that there is a new energy source.

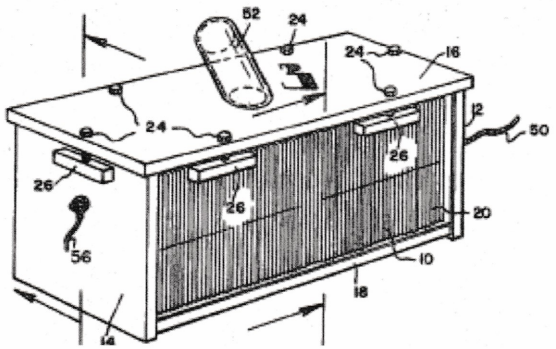
Charles Garrett
Electrolytic Carburetor



U.S. Patent 2,0006,676 (1935)

The "water fuel" projects have an interesting history. In 1935 Charles Garrett invented an electrolytic carburetor. There were newspaper articles in Texas describing him running his car on water.

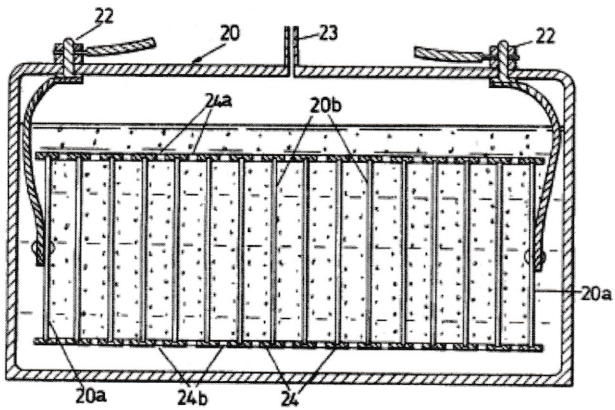
William Rhoads
Multicell Oxyhydrogen Generator



U.S. Patent 3,310,483 (1967)

The modern, multi-parallel plate electrolyzer invention is attributed to William Rhoads. He thought he was just making a hydrogen and oxygen mixture.

Yull Brown Welding



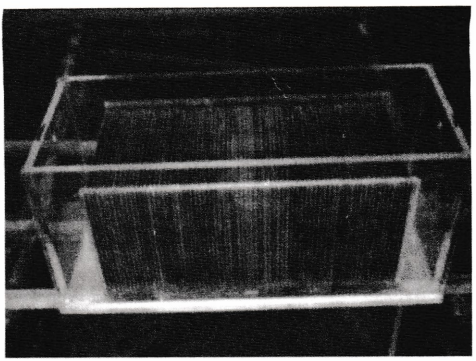
U.S. Patent 4,014,777 (1977)

In the 1970's Yull Brown applied the gas to welding applications. Brown is credited with first observing the big anomalies of the welding gas, and perhaps it is fitting to name the gas after him. In his attempts to explain the energetic anomalies, Brown postulated that the electrolyzer was making atomic hydrogen and oxygen (HHO). Most researchers today believe likewise, despite the evidence that no atomic hydrogen has ever been measured. (A hydrogen atom will typically combine on its first collision with whatever it contacts.)

Bob Boyce







70 Plates

3 mm gap

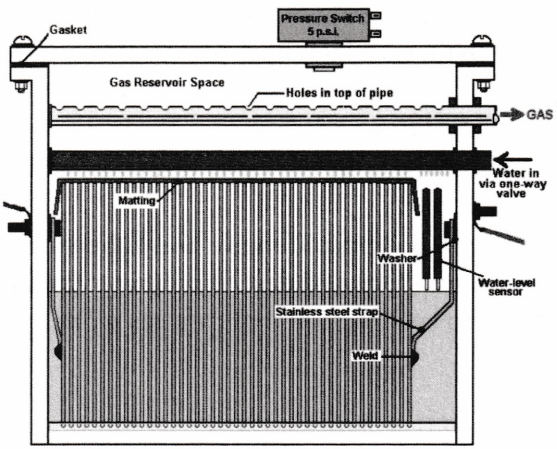
bobboyce.org

Google: "Bob Boyce electrolyzer plans"

In the 1980's Bob Boyce was successful in making electrolyzers to provide gas for racing boats. Later he claimed to have run a car engine in his workshop completely on the water gas with the battery disconnected. Because of suppression and harassment, Boyce has chosen to share his research publicly on the web in order to encourage massive replication.

Boyce Electrolyzer

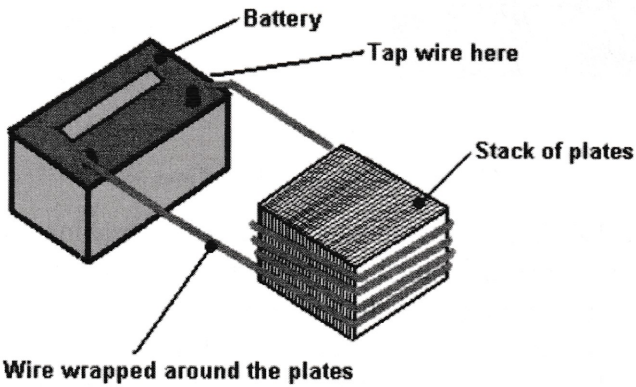
70 – 101 plates
3 mm gap
KOH electrolyte



Patrick Kelly, free-energy-info.co.uk Chap 10, p 75

Patrick Kelly has an extensive section in his e-book clearly describing the details of Boyce's electrolyzer. The plates are 316L stainless steel separated at 3 mm. Boyce uses a weak potassium hydroxide electrolyte solution. The chambers are isolated from each other to prevent current from flowing around the plates. On the web the isolated cell design has been named the "dry cell." The advantage of isolating the cells is that only the end plates need to be connected to the electronic drive, voltage source. The floating plates get charged by electric field polarization as equipotential surfaces.

Magnetic Alignment

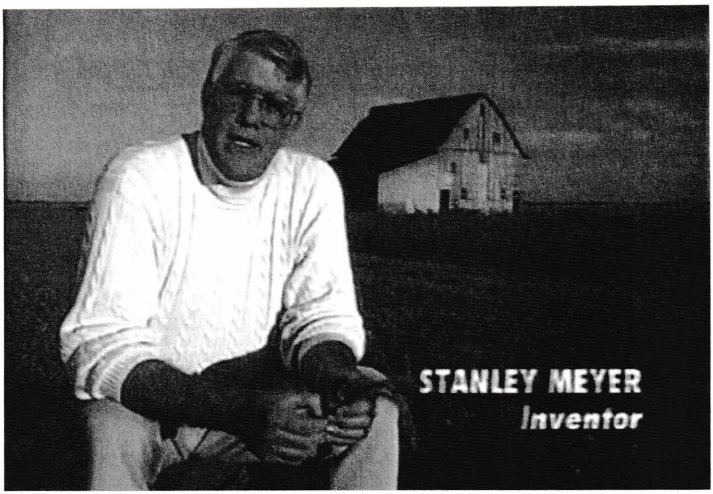


Patrick Kelly, free-energy-info.co.uk/ Chap 10, p 85

Some researchers have noted concerns about stray magnetic fields from their stainless steel plates. Boyce intentionally creates a uniform permanent magnetic field on his plates by wrapping a coil around a stack of plates and applying direct current. The plates are mounted in the electrolyzer in the same direction which keeps their magnetic fields aligned.

Boyce has posted many YouTube videos of his presentations, where he tells his story and describes how to build electrolyzers. He is eager for others to successfully replicate his work.

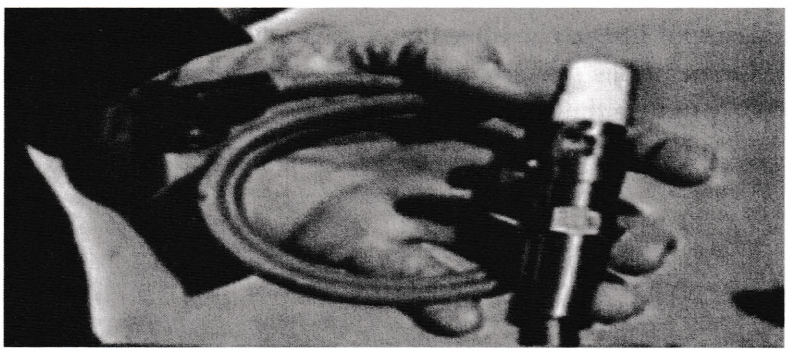
Stanley Meyer



Documentary *It Runs on Water* Narrated by Arthur C. Clark

Stanley Meyer is perhaps the most famous of the "water fuel" researchers because of the publicity he has achieved. He claimed to have successfully run a dune buggy completely on water. The web site has available the British documentary, *It Runs on Water*, narrated by Arthur C. Clark.

Water Fuel Injector Plug

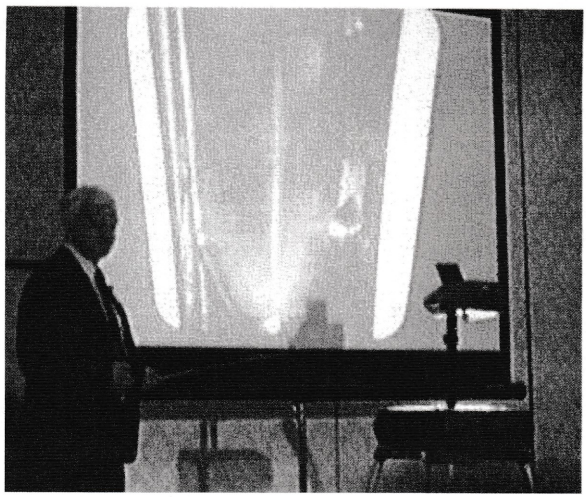


Meyer's best invention was his water fuel injector plug, which he felt was superior to the electrolyzer approach. The injector explodes a small amount of water into a plasma as it enters the internal combustion chamber.

There are academic studies of explosive electrical discharges in water,

which are recognized to produce energetic anomalies.

Water Arc Explosions

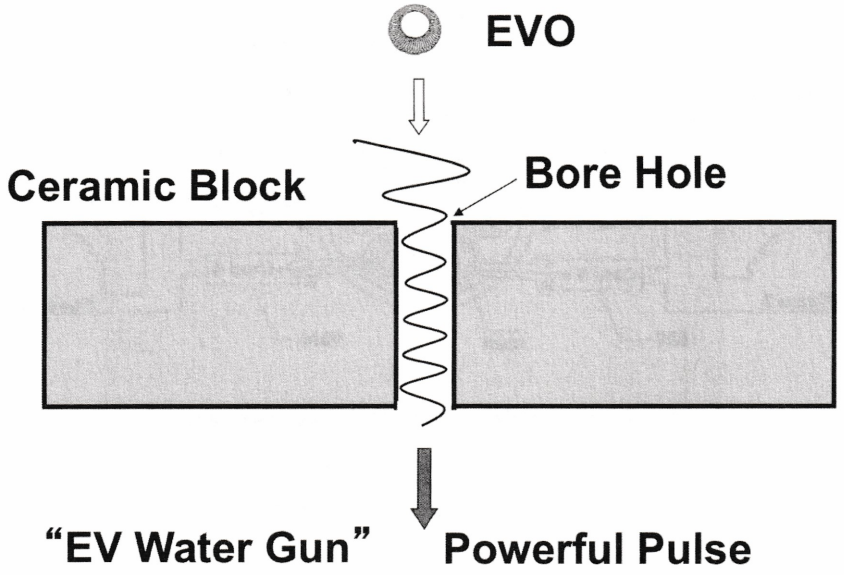


Peter Graneau photographed plasmoid

Frank Znidarsic, Ball Lightning
angelfire.com/scifi2/zpt/chapter2.html

While at M.I.T. in the 1980's, Peter Graneau has experimentally studied abrupt capacitor discharge into a water chamber and has measured both excessive force and excessive energy output that exceeded his capacitor's input energy. Moreover, he has photographed the presence of a plasmoid in the chamber that was produced during the explosive event. Graneau has stressed that the capacitor discharge must be very abrupt to produce the energetic anomalies.

Shoot EV Into Water Vortex



Ken Shoulders claims a huge force event can be created by shooting a (charge cluster) EVO down a thin water vortex. The output force is so great that it damages anything that it hits. Shoulders has not found a way to harness the energy. An analogy describes the difficulty: It is like shooting a bullet at a windmill blade.

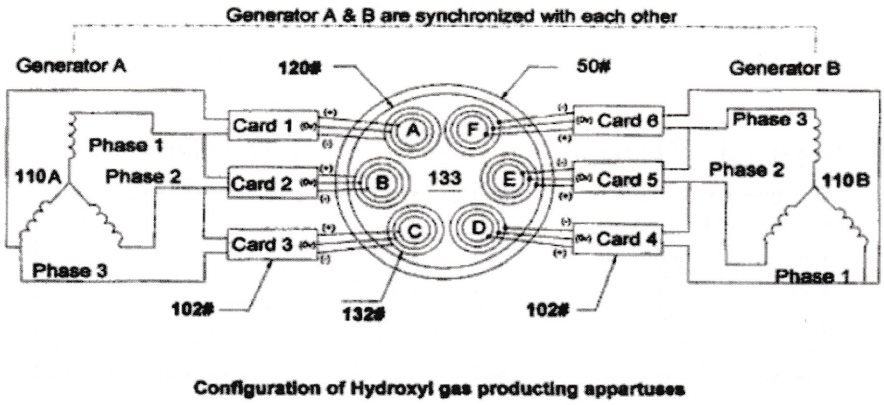
Stanley Meyer Murdered

In 1998 Stanley Meyer was murdered. He was poisoned at a restaurant while celebrating the agreement with two Belgian "investors" to fund building a factory to mass produce the water fuel injector plugs. During the murder investigation there were audio tape interviews of a dozen witnesses, but the audio tapes of the two Belgians are mysteriously missing. In 2007 the reporter, Dean Narciso, investigated the circumstances around the death of Stan Meyer; his findings are on the web. Google: Dean Narciso "The Car that Ran on Water"

Stephen Meyer

However, all is not lost. Stan's twin brother, Stephen Meyer, is still pursuing the research. Stephen has a degree in electrical engineering, and he was the electronics genius behind Stan's inventions. After Stan's

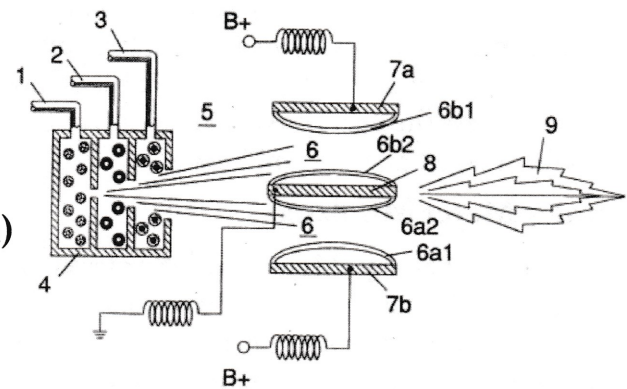
death, Stephen has remained somewhat reclusive and does not wish to participate publicly on the web.



Stephen Meyer, MLS-Hydroxyl Filling Station
US Patent Application 20050246059 (2005)

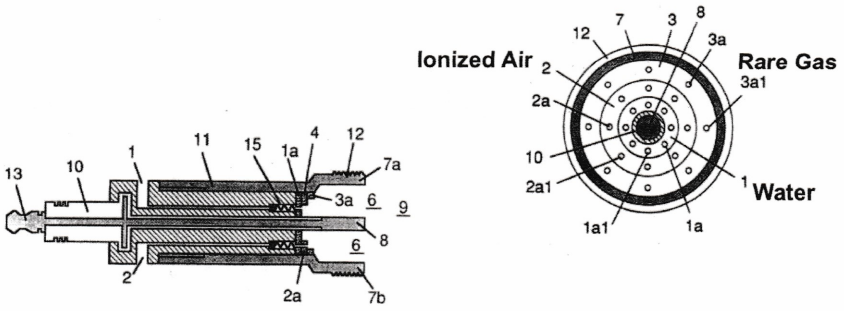
Meyer Water Injector

1 Water
2 Ionized Air
3 Rare Gas (argon)



Canada Patent # 2,067,735 1991, 1992, 1998 (May 15)

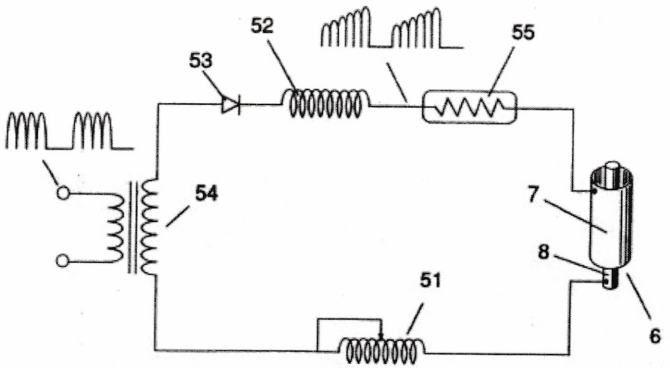
Stan Meyer did receive a Canadian patent for the water injector, and the patent is available on the web. Meyer fed a mixture of water, ionized air and inert gas (argon) into the reaction chamber where high voltage excitation caused the explosive emission. Use of argon was a surprise; it appeared to enhance the output energy (like it does for sonoluminescence).



Canada Patent # 2,067,735

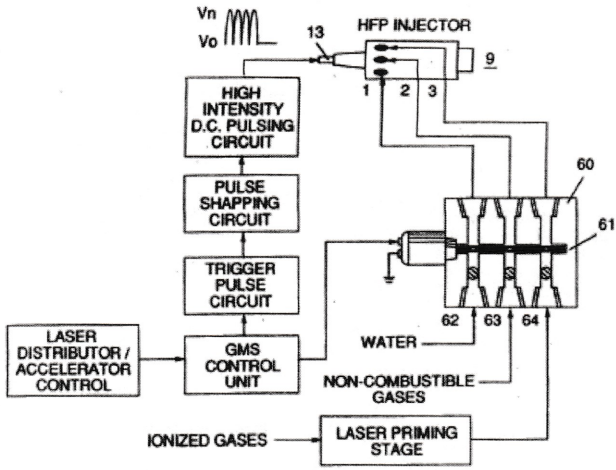
Shown is a side and front view of the water injector plug. Three concentric spray rings are used. Water mist comes through the inner ring, ionized air through the middle ring, and argon through the outer ring.

Circuit for Injector



Canada Patent # 2,067,735

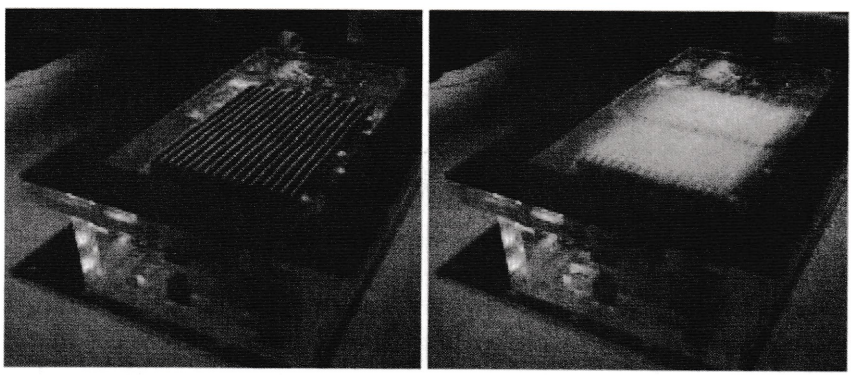
Meyer's voltage excitation circuit was similar to the voltage intensifier circuit originally used in his earlier electrolyzers. Meyer felt that the modulated unipolar waveform was ideal for triggering the explosive emissions.



Canada Patent # 2,067,735

Behind the injector plugs was a sophisticated feed system. The air was ionized by a laser priming stage. In the video Meyer thought he could retro-fit automobiles to run on water for about $1500 if the system were mass produced.

Xogen Power, Inc.
Xogen Technologies, Inc.



After the death of Stan Meyer the saga continued with the founding of Xogen Power, Inc. in Canada. They created a very successful, parallel plate electrolyzer. The name was later changed to Xogen Technologies.

Stephen Barrie Chambers

U.S. Patents:

6,126,794 (2000)
6,419,815 (2002)
6,790,324 (2004)

(12) **United States Patent**
Chambers

(10) **Patent No.: US 6,790,324 B2**
(45) **Date of Patent: Sep. 14, 2004**

(54) **HYDROGEN PRODUCING APPARATUS**

(75) Inventor: **Stephen Barrie Chambers**, Calgary (CA)

(73) Assignee: **Xogen Power Inc.**, Calgary (CA)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 207 days.

(21) Appl. No.: **10/183,855**

(22) Filed: **Jun. 25, 2002**

(65) **Prior Publication Data**

US 2002/0179453 A1 Dec. 5, 2002

Related U.S. Application Data

(63) Continuation of application No. 09/608,316, filed on Jun. 30, 2000, now Pat. No. 6,419,815, which is a continuation of application No. 09/105,023, filed on Jun. 26, 1998, now Pat. No. 6,126,794.

(51) **Int. Cl.**[7] **C25D 17/00**

(52) **U.S. Cl.** **204/242**; 204/267; 204/272; 204/278; 204/293; 204/278.5

(58) **Field of Search** 204/242, 267, 204/293, 278, 272, 278.1; 205/628–632

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,311,097 A		3/1967	Mittelstaedt	123/119
3,954,592 A	*	5/1976	Horvath	204/229.7
4,107,008 A	*	8/1978	Horvath	205/339
4,184,931 A		1/1980	Inoue	204/129
4,316,787 A		2/1982	Themy	204/242
4,394,230 A	*	7/1983	Puharich	205/341
4,599,158 A		7/1986	Ofenloch	204/228
4,798,661 A		1/1989	Meyer	204/228
5,338,421 A	*	8/1994	Abe et al.	204/514
5,632,870 A		5/1997	Kucherov	204/241

FOREIGN PATENT DOCUMENTS

JP	9071886	3/1997	C25B/1/04
RU	2 048 609 C1	11/1995	
WO	9809001	3/1998	C25B/1/04

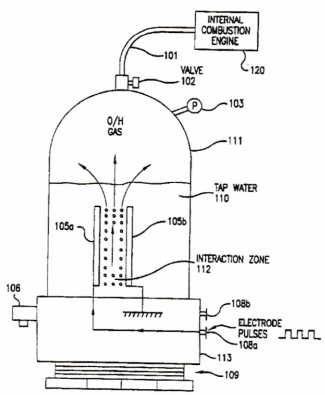
* cited by examiner

Primary Examiner—Donald R. Valentine
(74) *Attorney, Agent, or Firm*—Stoel Rives LLP

(57) **ABSTRACT**

An apparatus for producing orthohydrogen and/or parahydrogen. The apparatus includes a container holding water and at least one pair of closely-spaced electrodes arranged within the container and submerged in the water. A first power supply provides a particular first pulsed signal to the electrodes. A coil may also be arranged within the container and submerged in the water if the production of parahydrogen is also required. A second power supply provides a second pulsed signal to the coil through a switch to apply energy to the water. When the second power supply is disconnected from the coil by the switch and only the electrodes receive a pulsed signal, then orthohydrogen can be produced. When the second power supply is connected to the coil and both the electrodes and coil receive pulsed signals, then the first and second pulsed signals can be controlled to produce parahydrogen. The container is self-pressurized and the water within the container requires no chemical catalyst to efficiently produce the orthohydrogen and/or parahydrogen. Heat is not generated, and bubbles do not form on the electrodes.

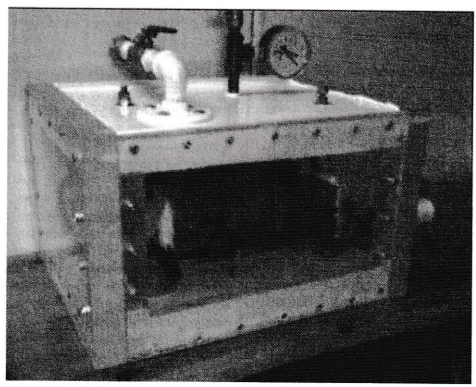
16 Claims, 10 Drawing Sheets



Xogen's lead scientist, electrical engineer, and inventor was Stephen Barrie Chambers. Stephen Chambers' sister, Marilyn Chambers, was the wife of Stan Meyers. She delivered Stan's technical information, which she inherited after his death. Stephen Chambers filed essentially the same patent three times, where only the claims were rewritten. (The body text and figures were identical.) His earlier patent claimed the production of parahydrogen, but the last patent played down that claim.

Chambers' patent described using 40 stainless steel electrodes at a tight spacing. He did not use an electrolyte, and he produced a reasonable amount of gas at low current (0.3 amps). Chamber's methodically explored a wide frequency range for his square wave driver to discover the best operating point for gas production. The circuits in the patent are quite simple. He successfully ran a 1 KW Honda generator from just the electrolyzer's gas, but there was no discussion about attempting a closed loop, self-running system.

Paul Zigouras



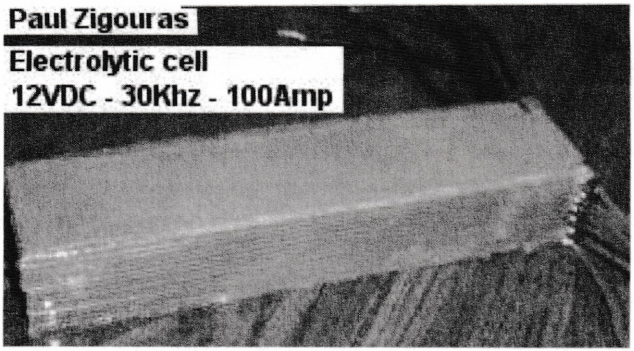
Electrolyzer

Paul Zigouras is one of the most recent successes producing an electrolyzer that outputs abundant gas. He heads a small company that employs a competent engineering team.

His team was so successful they were able to make a car that ran completely on the water gas produced from his electrolyzer. The car got a whopping 3 mpg in the city and 6 mpg on the highway. That is miles per gallon of water.

Since he was originally in the boat racing business, his plan was to scoop water in the front and dump the exhaust water out the back. There is a suppression story on the web, but Paul stated that the story is

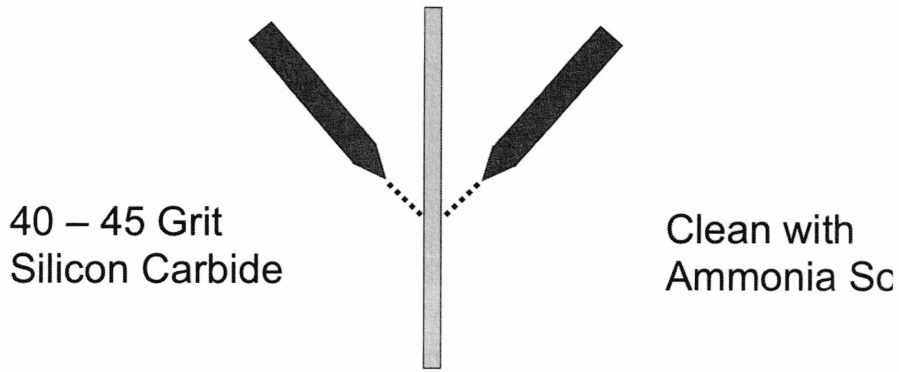
exaggerated. He did sell his original company Zigouras Racing, and now leads his new company, *Zigouras Engineering.*



316L Stainless Steel Plates
Spacing 0.6 mm

Zigouras' 316L stainless steel electrodes are space very tightly, about 0.6 mm. Unlike Meyer's system, he draws a lot of current and rapidly converts water to a lot of gas.

Zigouras Sand Blasting



316L Stainless Steel Plate

Ziguouras used sand blasting (actually "media" blasting with silicon carbide) to condition his plates. He stressed that it was important to hit the plates at a 45 degree angle to make an extremely rough, sharp, pointy surface. After blasting he would clean the plates with an ammonia solvent.

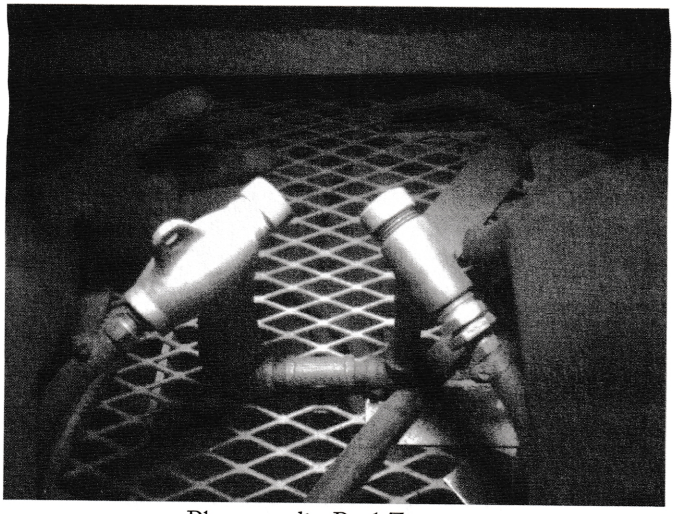
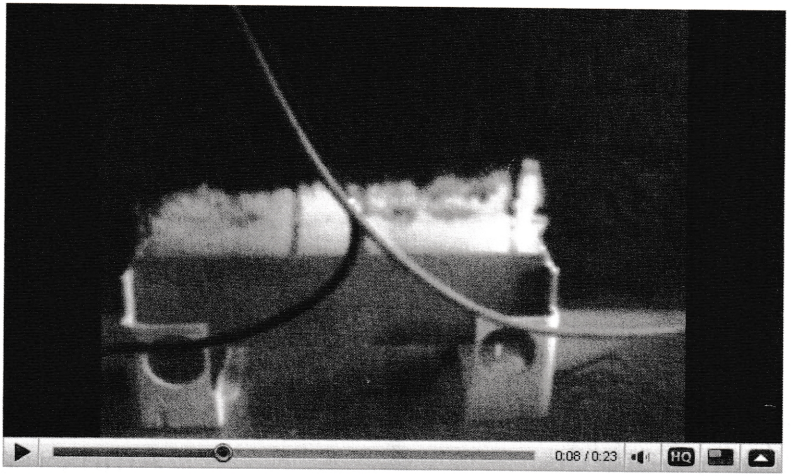


Photo credit: Paul Zigouras

Here is a photo of the Zigouras media blaster.



Zigouras rate of gas production is probably one of the best on the web. The short video clip shows rapid gas production. YouTube: Walter McNichols hydrogen

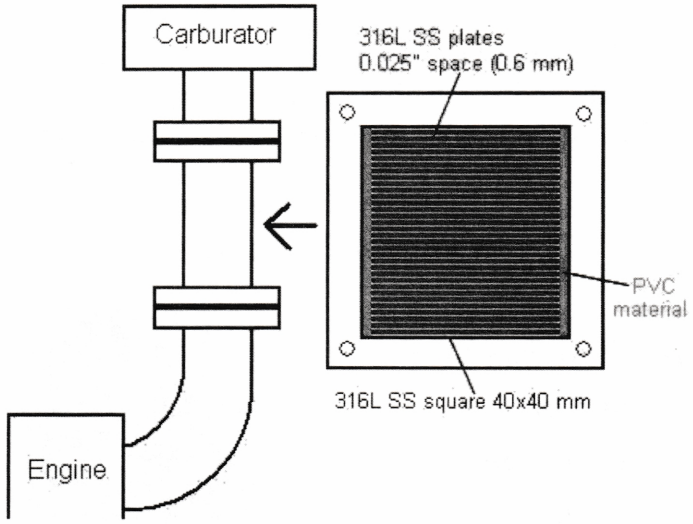
Zigouras Electrolyzer

- Stainless steel 316L (nickel alloy)
- Sand blasted
- 32 parallel plates, spaced 0.6 mm
- 40 KHz square wave, 12 volts
- Frequency modulation: +1 to -3 KHz

- 3 second period
- Converted 2 gallons per minute

Zigouras feels that he has discovered a superior method to drive the electrolyzer, which he wishes to keep proprietary. Discussion groups on the web have suggested that he was driving the electrolyzer with square waves around 40 KHz, where he gradually wobbles the frequency between 37 – 41 KHz at a three second period. Zigouras realized that the system is complex and does not just settle at one resonance frequency. A dynamic system that uses feedback based on measuring gas production (or a vibrational signature indicating lots of bubbles) might yield optimal production.

Vacuum of Venturi Feed

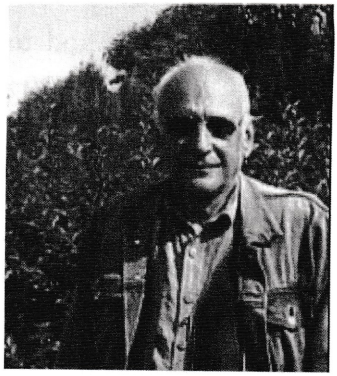


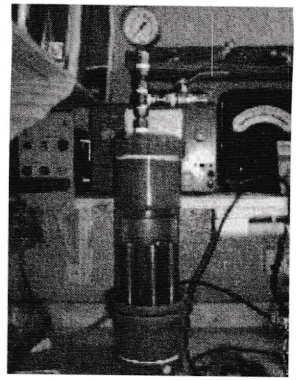
On the web there are also suggestions about using vacuum of Venturi to feed the Zigouras electrolyzer. Here water flows in one end and is immediately converted to gas to run the engine.

Successful Replications and Sharing of Details

There have been successful replications published on the web. The researchers have been eager to share details so that others can likewise succeed.

Dave Lawton



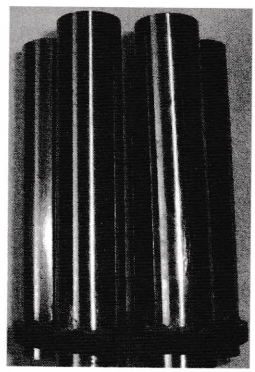


free-energy-info.co.uk/Chapter10.pdf

Dave Lawton has replicated Stan Meyer's cylindrical tube electrolyzer. Lawton is a retired engineer from Harwell Laboratory in Great Britain and is a highly competent experimental investigator. Patrick Kelly's book contains many details about Lawton's replication.

Lawton Concentric Cylinder Electrodes

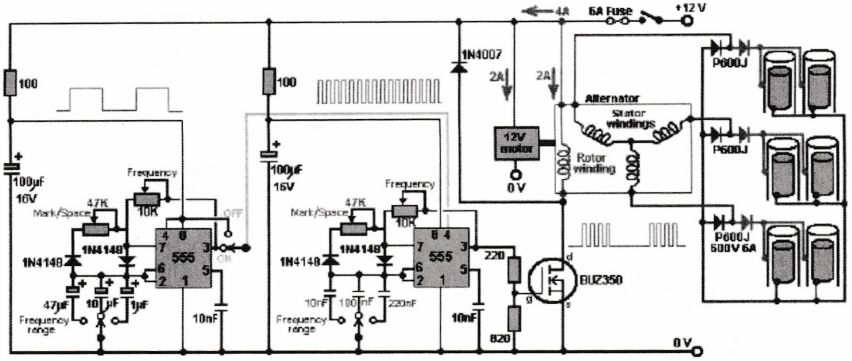
316L Stainless Steel
Height 5 in
Diameters 1 in
¾ in
Gap 1/16 in
(1.59 mm)



free-energy-info.co.uk/Chapter10.pdf

Displayed are Lawton's concentric cylindrical electrodes. The gap between the inner and outer electrode is about 1.6 mm. (The inner electrodes cannot be seen in this side view photo)

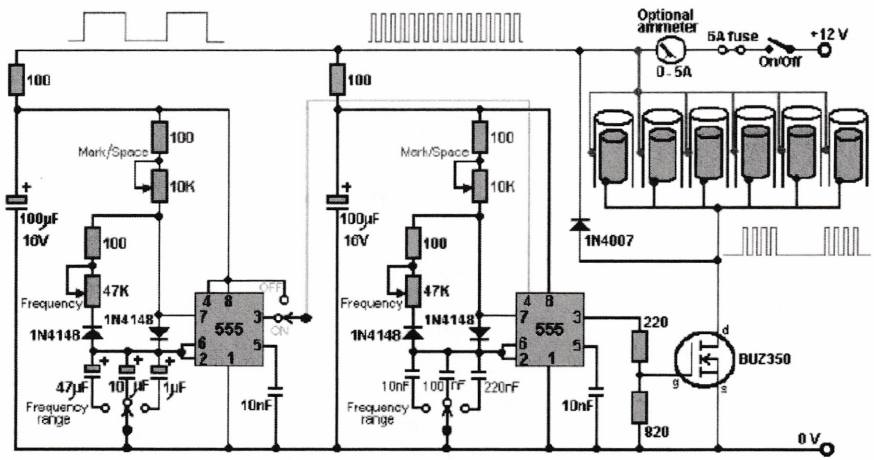
Lawton Original Driver Circuit



free-energy-info.co.uk/Chapter10.pdf

Lawton has freely shared the details of his driver circuits. This is the original Meyer driver circuit that used the coils in an alternator.

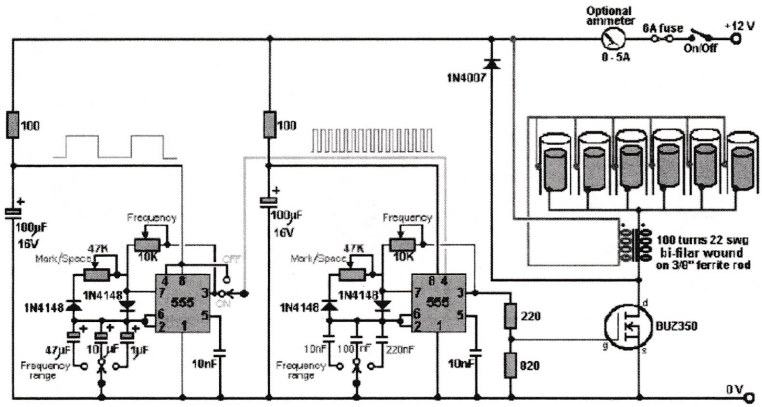
Lawton Simplified Driver Circuit



free-energy-info.co.uk/Chapter10.pdf

Lawton later simplified the circuit, driving the electrodes directly from solid state MOSFETs.

Lawton Driver Circuit
Bifilar Ferrite Coil

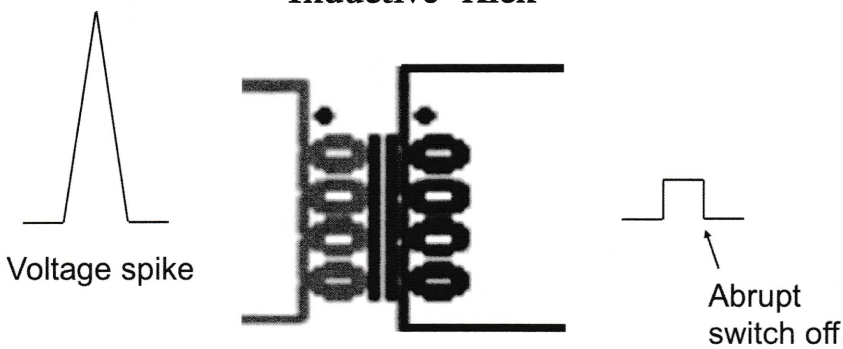


Switching induces sharp, 1200 volt spikes

free-energy-info.co.uk/Chapter10.pdf

Lawton then discovered he could improve the performance by driving the electrodes with a sharp spiking waveform. He inserted a bifilar wound, ferrite rod, transformer into the circuit to produce the voltage spikes.

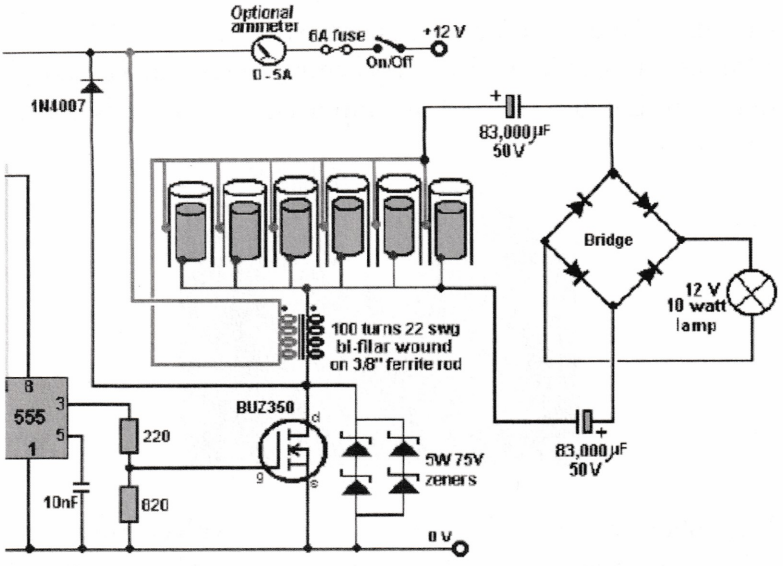
Inductive "Kick"



$$V = L\frac{di}{dt}$$

During the abrupt switch-off point (trailing edge) of the square wave driver, the bifilar transformer coil responds with an "inductive kick" that produces the voltage spike.

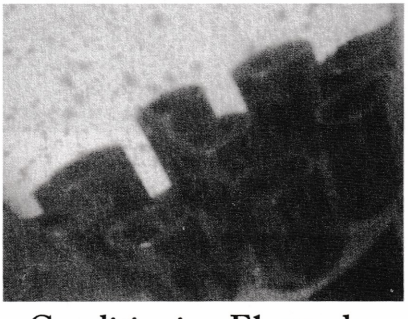
Lawton Driver with Coil and Load



free-energy-info.co.uk/Chapter10.pdf

Lawton's latest work involves investigating the electric output coming directly from the electrolyzer's electrodes. He rectifies the output and has observed a "cold current" effect, where appreciable power can be conducted on thin wires without heating them. This line of investigation is exciting. For if the device produces charge water gas clusters that emit an electromagnetic pulse as they implode back into water, it appears possible to rectify this activity directly as electrical output. If the charge water gas clusters indeed contained excess energy from the ZPE, then Lawton is discovering how to extract this energy directly as electricity.

Ravi Raju



Conditioning Electrodes
ravi_20cell.pdf

Ravi Raju of India has come on the web in the last few years as he replicated the work of Dave Lawton. When he first attempted the replication, he failed to get any gas bubbles whatsoever. (This is a typical result for most researchers when they begin.) He contacted Dave Lawton for advice and Lawton stressed the importance of properly conditioning the electrodes.



ravi_20cell.pdf

Ravi followed Lawton's protocol, which involved running current through the electrodes under tap water in a prescribed manner. During the conditioning process the electrodes emit a brownish sludge. It is likely iron oxide (rust).

Conditioned Surface is White

Chromium Oxide? Nickel Oxide?



ravi_20cell.pdf

After about a month of conditioning the electrodes exhibit a whitish powdery surface. We do not yet know what the whitish material is. Ravi has suggested a metallic oxide like chromium oxide or nickel oxide, but these oxides are known to be black. Once the electrodes exhibit the white powdery surface they should not be touched.

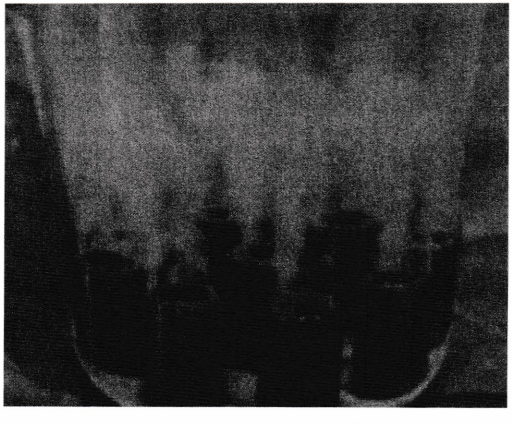
Conditioning in Tap Water

0.5 A	25 minutes	Stop 30 minutes
1 A	20 minutes	Stop 30 minutes
1.5 A	15 minutes	Stop 20 minutes
2 A	10 minutes	Stop 20 minutes
2.5 A	5 minutes	Stop 15 minutes
3 A	2 minutes	Air dry 1 hour

Change water, repeat cycle **1 Month**

Ravi shared Lawton's conditioning steps in his paper on the web. Ravi explained that prescribed sequence of current controlled the grain size of the whitish material. Low current produced small grains, higher current produced larger grains. The smaller grains are needed to cement in the larger grains so that the resulting rough surface does not just flake off. It does take patience to condition the electrodes for one month, but Ravi says the results are worth it.

Ravi Success



12 Volts 0.51 Amps Pulsed

ravi_20cell.pdf

After electrode conditioning Ravi's electrolyzer produced abundant gas at low current without using electrolyte, just like Lawton and Meyer.

Conditioning with Electrolyte

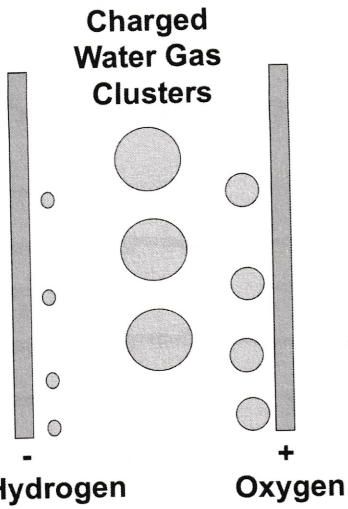
- Sandpaper 60 – 80 grit, cross hatch pattern
- Potassium hydroxide 5-10% solution
- Repeat until free of crud:
  - D.C. Voltage, 4 amps, several hours
  - Rinse with distilled water
  - Remove brownish residue from water
- 3 Days
- Steel exhibits rough, white surface
- After conditioning, electrolyte not needed

Bob Boyce used a faster protocol for conditioning his electrodes. He first roughen the plates with sandpaper and then conditioned his electrodes in distilled water with a weak potassium hydroxide (KOH) electrolyte solution. He would run the electrolyzer at 4 amps DC for several hours, and the electrodes would emit the brownish crud. He would rinse the electrodes with distilled water and removed the brownish residue from the water. He kept repeating this process until the electrodes stopped emitting the crud. After about three days the electrodes exhibited a rough whitish surface. After conditioning in this quicker manner, experiments can then be performed without using an electrolyte solution as long as the gap between the electrodes is small (1 mm or less).

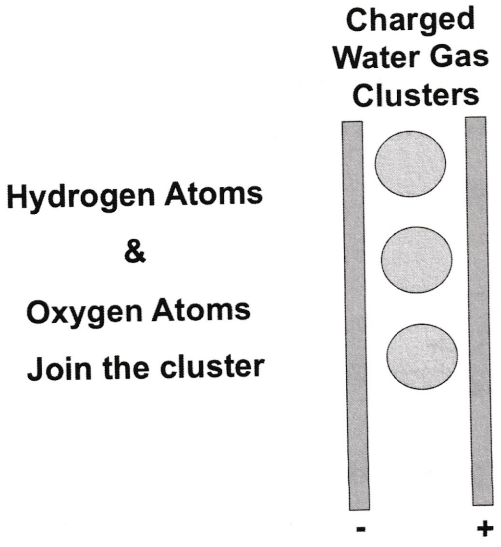
Emitting Surface

It is clear that carefully making the proper emitting surface is crucial to the success of the electrolyzer, especially if we want to make a self-running system. It would be valuable to understand the physics of the activity occurring on and near the electrode surface.

Three Types of Bubbles

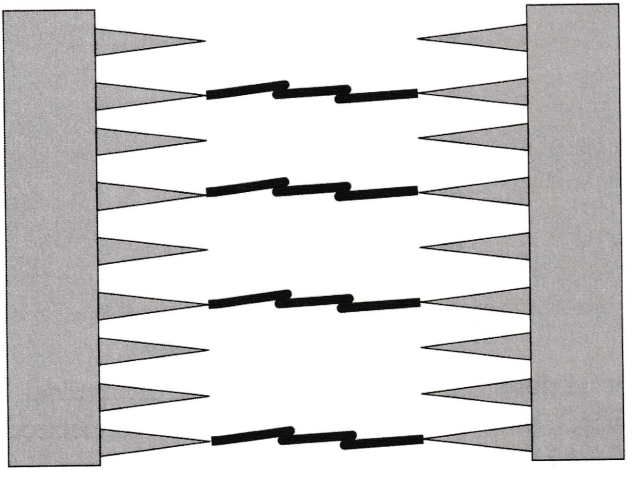


It has been observed over the years that the typical Brown's gas generators which have a wide spacing between the electrodes manifest three sets of bubbles between the electrodes. Hydrogen is produced on the negative electrode and oxygen is produced on the positive electrode as would be expected in standard electrolysis. However, in the middle there appears a set of bubbles that many researchers believe is the most energetic component, the hypothesized charged water gas clusters.



When the electrodes are tightly spaced, any free oxygen and hydrogen atoms can easily join the cluster. Hydrogen atoms tend to combine with whatever they hit on first collision. Thus tightly spaced electrodes would produce more charged water gas clusters and less free hydrogen.

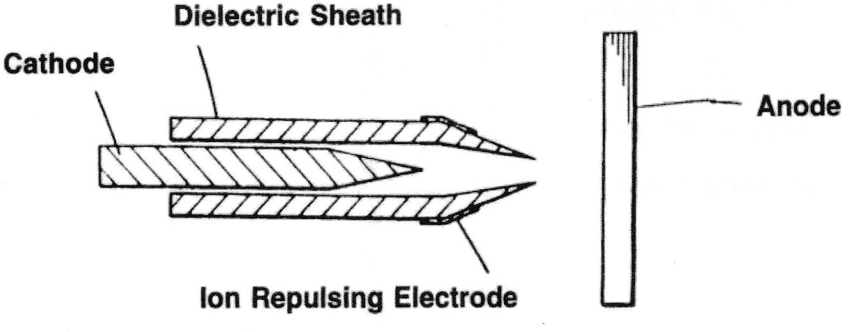
Microscopic Sharp Pointed Surface



Would launch sparks in air at low pressure

A microscopic sharp pointed surface would exhibit high electric field intensity, which could enhance abrupt electrical discharges. Such a surface would launch sparks in air at low pressure when the gap is less than a millimeter.

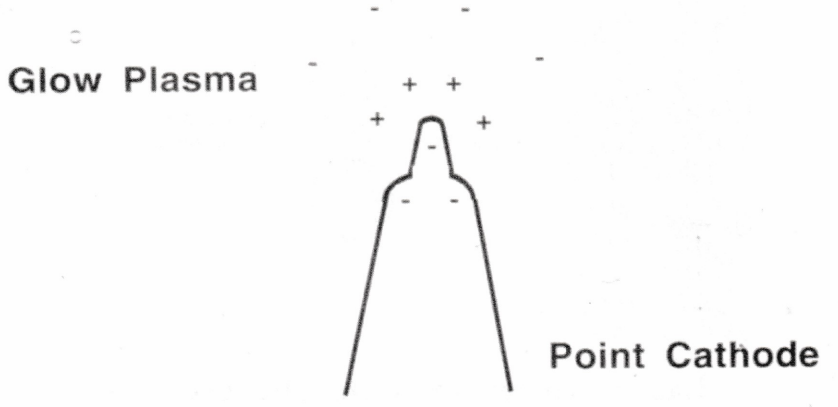
Pure EV Launcher (Cross Section of Cylinder)



Shoulders, US Patent # 5,018,180 (1991)

The launching of microscopic plasma charge clusters (Shoulders' EV) likewise requires a sharp point of emission. Shoulder invented a liquid metal tip electrode for EV launching. The liquid metal would replenish the sharp point that would gradually erode with each EV launch.

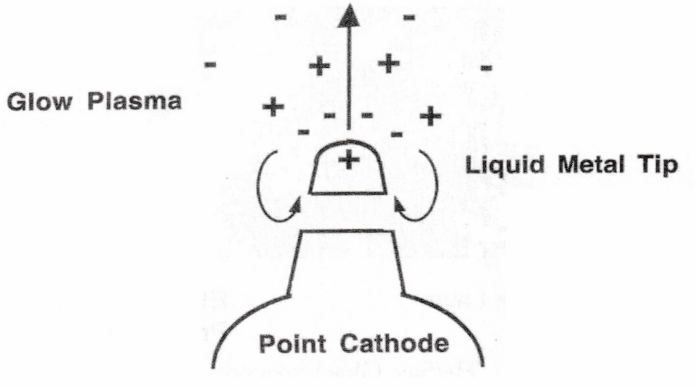
Liquid Metal Protuberance



Mesyats, Proc. 17th Int. Sym. on Discharges and Electrical Insulation in Vacuum, 720 (1996)

Gennady Mesyats, Vice President of the Russian Academy of Sciences, has published details of launching the EV (which he named "ecton"). Depicted is a magnified view of the sharp point of the cathode. Just before the EV is emitted, a liquid metal protuberance forms at the tip of the electrode. It is surrounded by a polarized glow plasma.

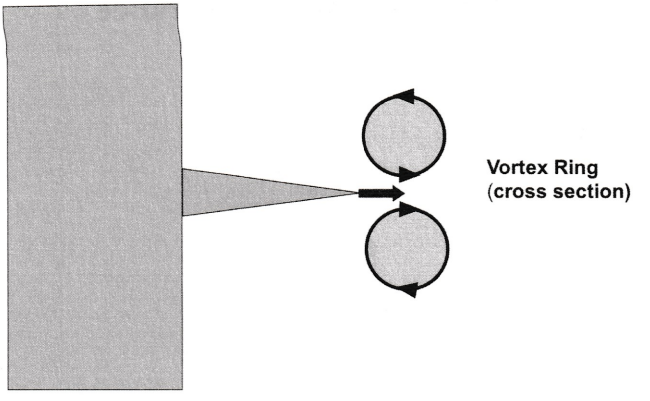
Explosive Emission



The EV is launched when the tip of the protuberance blows off

in an abrupt explosive emission. Note the plasma circulation around the detached tip naturally forms into a vortex ring due to the perfect symmetry around the liquid metal protuberance.

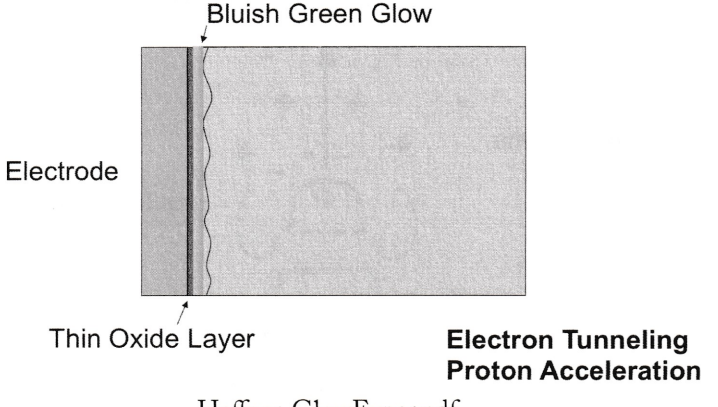
Sharp Pointed Surface



Launch vortex ring water clusters?

Could a similar phenomenon be happening microscopically in the water surrounding the sharp points on the rough electrode surface when stimulated by an abrupt electric pulse? Could vortex ring formation be the self-organizing seed for stabilizing and growing the charge water gas cluster? The speculative idea naturally arises from considering the similarity between plasma charge clusters and charged water gas clusters.

Huge Electric Field Across Thin Dielectric Layer



Heffner, GlowExper.pdf

Horace Heffner has written about some interesting physics that can

occur across a thin oxide, dielectric layer on the surface of a submerged, charged electrode. When the oxide layer is only a few molecules thick, there can be a huge electric field across the boundary, which can manifest electron tunneling and proton acceleration. Experimentally there is observed a bluish green glow near the surface. Google: GlowExper.pdf

- Semi Conductor Diode Behavior
- Polarization Stress
- Micro Dielectric Breakdown
- Abrupt Discharge Events
- Fractoemmission
- EVO Formation
- Charged Water Cluster Formation

The huge electric field across a thin dielectric can also manifest semi conductor diode behavior, polarization stress, micro dielectric breakdown, abrupt discharge events, fractoemission, and EVO formation. All this activity might likewise support coherent ZPE activation and charged water gas cluster formation.

Two Hypothesis for the Electrode Surface

- Rough, Sharp and Pointy
- Thin Dielectric Layer

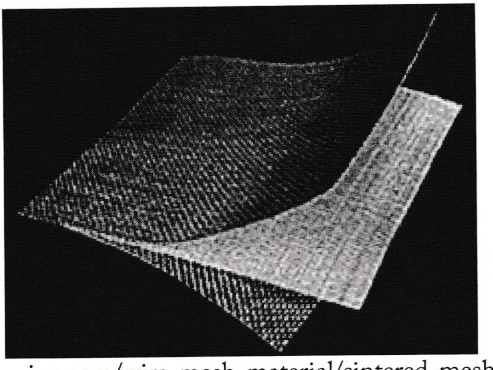
What is the whitish material?

We have two hypothesis regarding the best electrode surface: 1) Simply clean, rough, sharp and pointy or 2) a thin dielectric layer. Both exhibit interesting physics. Sharp points can launch EVOs, and dielectric breakdown can do likewise. We have seen successful electrolyzer's that do not need electrolyte using both techniques. Zigouras has made the rough surface just by media blasting with no lengthy conditioning. His apparatus draws more current, but it has produced the most gas. Meyer, Lawton and Ravi Raju used tap water and a slow, low current, conditioning process which manifest the whitish surface.

They succeeded in producing abundant bubbles at low power. We still need to discover exactly what is the whitish material on the conditioned electrode surface. It could be any of the salts or minerals present in tap water, but Boyce observed a whitish surface after conditioning in distilled

water with some potassium hydroxide. Understanding how to make the best emitting electrode surface appears crucial for experimentally demonstrating a new energy source.

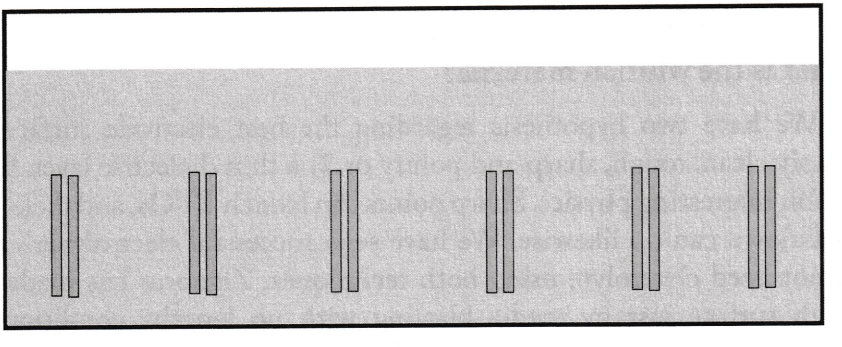
Sintered Stainless Steel



twpinc.com/wire-mesh-material/sintered-mesh

If only a rough surface is needed, other materials might provide such a surface directly without any conditioning such as sintered stainless steel. It is available from 1 to 140 micron mesh. However, the material is somewhat expensive.

Study Electrode Pairs



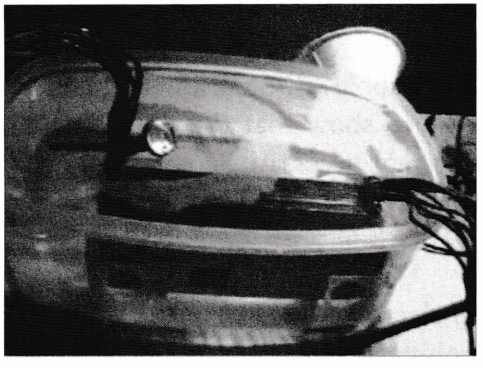
An ideal research effort would involve studying electrode materials. Pairs of equally sized electrodes driven under identical electrical conditions could be put under water to see which pair makes the most bubbles. Sintered stainless steel electrodes at various mesh sizes could be

compared to potassium hydroxide conditioned electrodes, sand blasted electrodes, etc. Proper electrodes might be the critical factor for successful replication of the high-output electrolyzer projects.

Electrode Competition: Properly Conditioned Versus Poorly Conditioned

To illustrate the importance of electrode conditioning, let's have a competition between properly conditioned electrodes and poorly conditioned electrodes.

Zigouras Electrodes



YouTube: Walter McNichols Hydrogen Experiment

The winner is Paul Zigouras who might be the current record holder on the web for producing the most gas quickly. Here is a video clip posted by Walter McNichols as he tests the Zigouras' electrodes.

The loser is the team at Myth Busters, who did not condition their electrodes at all; they had results that are typical of beginners entering this research. (YouTube: MythBusters HHO) Without proper electrode conditioning, in tap water you get nothing – no bubbles whatsoever. At this point most researchers add electrolyte to their water, which results in drawing plenty of current, and they get bubbles. Unfortunately this mode takes their apparatus toward standard electrolysis especially if their electrodes are widely spaced, and thus they are losing energy. The output still contains some charged water gas clusters so that there is an anomalous energy content that could enhance an automobile's performance, but the prospect of proving a net energy gain is unlikely.

Summary

- Pulsing electrolyzers make charge water gas clusters
- They exhibit anomalies similar to plasma charge clusters
- Dominant Energy Not from Hydrogen
- ZPE coupling occurs via Cavity QED

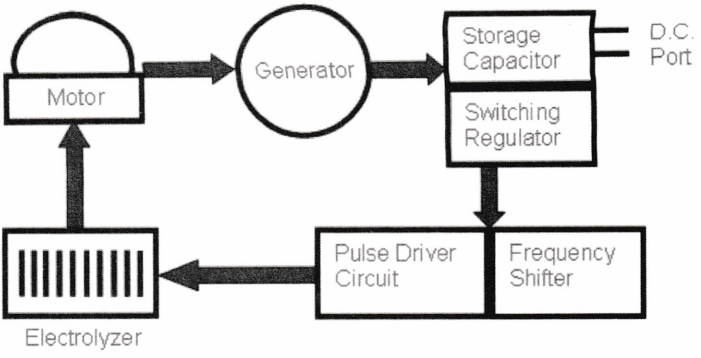
We have explored the hypothesis that the pulsing Brown's gas type of electrolyzers make charged water gas clusters. They exhibit the same anomalies as those manifested by the plasma charge clusters (Shoulders' EVOs). The energetic anomalies like melting high temperature ceramics and element transmutation strongly imply a coherent zero-point energy activation. There is literature that describes how ZPE coupling occurs in microscopic water bubbles through cavity quantum electrodynamics. Thus we built a case to show that the dominant energy output from the electrolyzers does not necessarily come from hydrogen, but rather it might come from the zero-point energy.

Simplest Electrolyzer

- Stainless steel electrodes (316L)
  - Rough, pointy surface
  - Clean, conditioned
- Small gap < 1 mm
- Electrical Drive: Large voltage spikes, minimize current
- Wobble frequency around 40 KHz
- Optimize gas output

For massive replication by hobbyists, the best electrolyzer would be the simplest that does the job. The electrode plates should be clean, rough and pointy. They might also require a white powdery dielectric surface. A small inter-electrode gap is best so as to avoid using an electrolyte, which minimizes input current and heat losses. Electrical drives with square waves are effective, and driving with voltage spikes have yielded intriguing observations. While the device is running, it also helps to wobble the drive frequency to optimize gas production.

Make Closed Loop System



Self Running

A closed loop, self-running system is the goal. It is ambitious to use an internal combustion engine, electrical generator in the system, for we typically lose over half the input energy due to its inefficiency. But if the replicating community were successful in producing a closed loop system that could just idle in a self-running fashion without any external input power (other than a kick start), it would prove that we indeed have discovered a new energy source.

Change the World

- Create a self-running system
- Simplify it
- Post information on web

It only takes a single investigator to change the entire world. Create a self- running system, simplify it so that others can do likewise, and post the information on the web. If others are indeed successful, a wave of replication will sweep the world, and mankind will have a new source of energy.

Author's Note: Because I did not learn how a conditioned electrode surface causes the emission of nanobubbles until 2016, the best explanation is in that presentation.

Cavitation in Electrolyzers (2012)

Cavitating the water in electrolyzers produces anomalously excessive energy over the input energy, which some researchers call "over unity." "Over unity" means we are tapping into an energy source that is typically not recognized as existing or not believed to be a source, the zero-point energy.

To discover new energy we must first accept it as a scientific possibility. Otherwise we will just not look, and ridicule those who do.

Two improvements to the popular HHO electrolyzers could convert them into zero-point energy devices. Cavitating and circulating the water through the electrolyzers might dramatically increase the energy output to where it becomes apparent that the major energy is not from hydrogen, but rather from the zero-point energy. HHO stands for atomic hydrogen and oxygen, which Yull Brown hypothesized to explain why the gas from his electrolyzers was so powerful.

HHO Device to ZPE Device

Cavitate the Water

Activates/Coheres Zero-Point Energy

Circulate the Water

Creates Turbulence

Electrostatic Charging

Builds Up Energy Content

We will see how cavitating water activates, coheres and traps zero-point energy. Circulating the water through the electrolyzer creates turbulence for cavitation, charges the water by electrostatic rubbing, and integrates the water's energy content as it recycles repeatedly back through the electrolyzer.

Featured Inventor: Mark LeClair

Mechanical Engineer
Fluid Dynamics - Cavitation
Element Transmutation Experiment
Microscopic Water Crystal
Extraordinary Energy Density - ZPE

The featured inventor is Mark LeClair, the founder of NanoSpire Corporation, and his partner Serge Lebid. Mark is a mechanical engineer who specializes in computational fluid dynamics as well as experiments in water cavitation. He has recently announced a simple experiment to create element transmutation from water cavitation. He has also discovered a microscopic water crystalline form that manifests an extraordinary energy density that he believes is sourced from the zero-point energy. His discovery will be used to explain the energetic anomalies of Brown's gas.

LeClair's Water Crystal Similarities

- Ken Shoulder's
  - EV Electrum Validum
  - EVO Exotic Vacuum Object
- S.V. Adamenko's
  - Plasmoid Strikes
  - Super-Nucleosynthesis
- All Exhibit Element Transmutation

The energetic behavior of Mark LeClair's water crystal is similar to Ken Shoulder's microscopic plasmoids he named "electrum validum" (Latin for "strong charge"). He changed the name to Exotic Vacuum Object (EVO) when he became convinced that their excessive energy was from the vacuum (zero-point) energy. As shown in the 2009 presentation, Stanislav Adamenko's team at the Proton-21 laboratory in the Ukraine made a similar discovery with larger plasmoids. All plasmoid strikes into targets exhibited element transmutation.

Explain Brown's Gas

Excess Energy Anomalies

Not from Burning Hydrogen

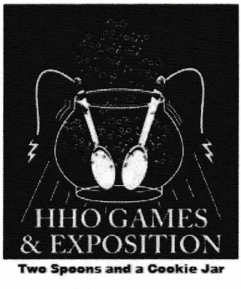
Charged Water Gas Cluster:

LeClair's Microscopic Water Crystal
Stabilized in a Ring Form

LeClair's discovery will used to explain Brown's gas. The excessive energy is not from burning hydrogen. The energy is from charged water gas clusters where it is coherently stored in LeClair's microscopic water crystal stabilized in a ring form.

After my first presentation on the electrolyzer projects in 2007, Sterling Allan, founder of the PESWiki web site, produced a short video that succinctly summarizes the controversy regarding excessive gas and energy produced by the electrolyzers. The most important point is that the dominant form of the energy is not coming from hydrogen, but rather is coming from something better: charged water gas clusters which activate and cohere the zero-point energy.

HHO Games



HHO Games & Exposition, Inc.

A Florida Non-Profit Educational Organization
PROUDLY PRESENTS

2010 HHO SUMMER GAMES

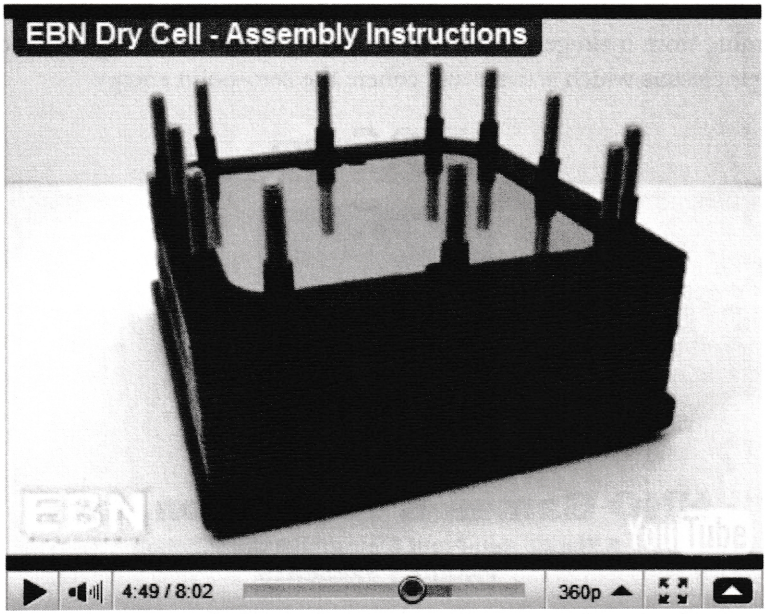
hhogames.com

The HHO electrolyzer projects are popular world-wide. In Florida hobbyists and vendors gather annually to demonstrate their projects.

As of October 2017, a search for "water fuel" on YouTube yields 5,280,000 videos, most of which are demonstrating electrolyzers. There are many commercial units available for sale advertised on the web. The B.E.S.T. manufacturing facility in Korea is perhaps the largest company in the world currently manufacturing commercial units for welding and heating applications.

In the 1980's Bob Boyce was successful in making electrolyzers to provide gas for racing boats. Later he claimed to have run a car engine in his workshop completely on the water gas with the battery disconnected. Because of suppression and harassment, Boyce has chosen to share his research publicly on the web in order to encourage massive replication. See 2009 presentation.

Dry Cell Kits



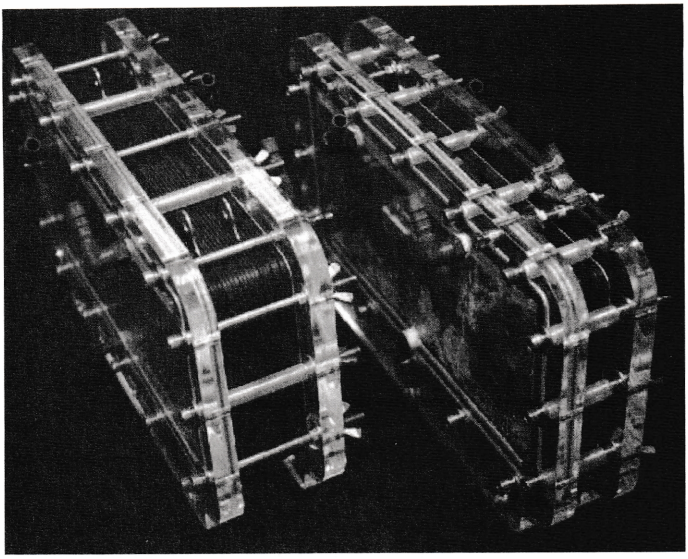
Gaskets Separate Plates

YouTube: EBN Dry Cell Assembly Instructions

There are many kits for sell. "Dry cells" are popular; here gaskets are used to separate the plates. The plate edges never touch the water.

Anton Cell

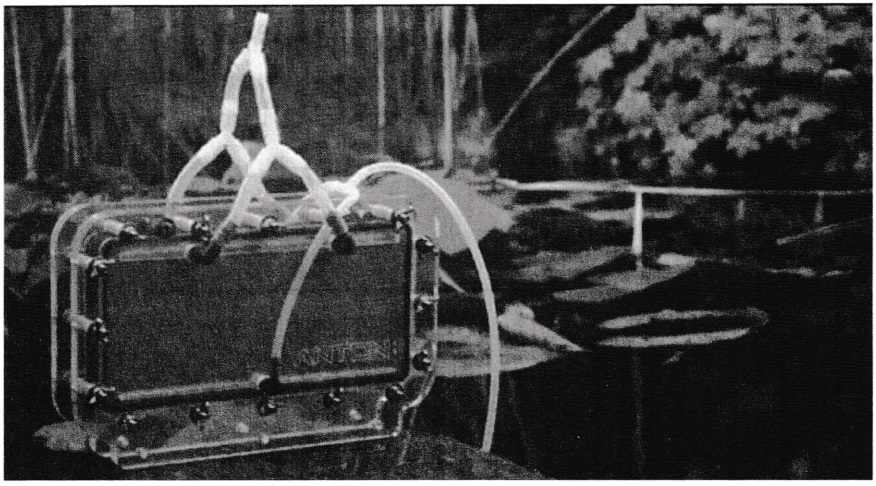
1 mm Gap



Google: Anton HHO Drycell

The Anton cell from Germany uses thin gaskets and offers a very tight interplate spacing, which produces a higher yield. We will soon see why.

Anton Cell Feeds Water at Bottom

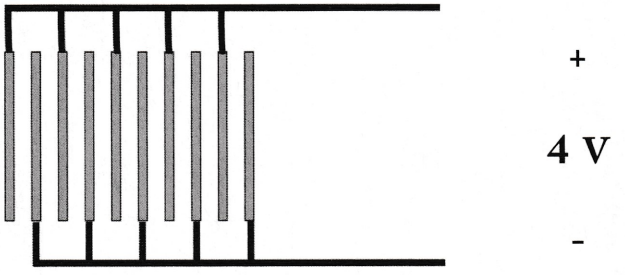


YouTube: Anton HHO Drycell

The Anton cell feeds in water from the bottom, which is ideal for circulation experiments. We will revisit the Anton cell; it was used in a successful self-running system.

Electrolyzer Wiring

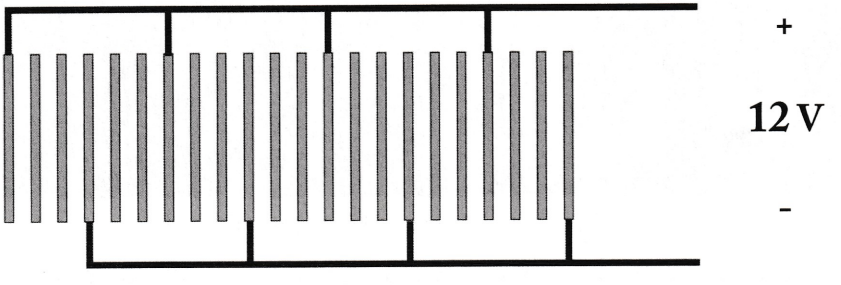
Typical Wet Cell
Plates Completely Immersed



All Plates Connected

There are two popular methods of wiring the electrolyzer plates when the goal is to make hydrogen. In the "wet" cell all plates must be directly connected to the power supply because the plates are totally immersed. Four volts between the plates is considered an over-voltage since only 1.23 volts is required for electrolysis when using an electrolyte (typically potassium hydroxide or sodium hydroxide). The over-voltage helps overcome resistance and allows less electrolyte to be used. For hydrogen production high current is desirable. Rather than hydrogen, we will show that a more energetic gas can be produced from the electrolyzer, and it is produced using far less current.

Typical Dry Cell



Floating plates are equipotential surfaces
Charged by electric polarization

The "dry" cell only needs to have a few plates connected to the power supply because the floating plates in between are charged as equipotential surfaces via electric polarization. Here the plates edges are not immersed in the water and are typically separated by gaskets. Holes are drilled into the plates to allow the water to flow into all the gaps.

In the late 1990's Denny Klein received news coverage on his research. The video referenced in the 2009 presentation nicely summarizes the surprising, energetic behavior of Brown's gas. YouTube: Denny Klein Water Fuel.

Nearly everyone experimenting with the electrolyzers believes the energy is from hydrogen. Here we will entertain the hypothesis that the dominant energy is not from hydrogen. The best support for the hypothesis is the big anomalies observed regarding Brown's gas: It exhibits a cool flame (266 degrees F), yet it is claimed to vaporize tungsten (vaporization point over 10,000 degrees F). Burning hydrogen cannot do that. Also there are experiments which show it can even dramatically reduce radioactivity in radioactive material, or cause element transmutation. Moreover, when the gas is analyzed in appropriately equipped laboratories, in addition to hydrogen and oxygen, researchers detect gaseous, water clusters.

The hypothesis that the zero-point energy is the actual energy source for Brown's gas comes from observing an experimental coincidence. Charged water gas clusters exhibit the same energetic anomalies as the plasma charged clusters, a microscopic form of ball lightning that has been extensively studied in the experiments by Ken Shoulders. He named them "exotic vacuum objects" (EVO) when he became convinced that their excess energy was cohered from the zero-point vacuum fluctuations. They manifest a self-organized conglomerate of matter/plasma with zero-point energy. We will see how such a conglomerate can form in water.

The typical conglomerate arising from turbulent plasma is a self-organized vortex ring called a "plasmoid." It has often been proposed as a model for ball lightning. In a plasmoid the electrons and ions spiral around the vortex ring; the force free vortex yields a natural stability, which sustains the plasmoid form.

Ken Shoulders Launching Charge Cluster

Ken Shoulders has learned to repeatedly launch a microscopic charge cluster plasmoid-like form with a relatively simple apparatus. An abrupt electric discharge from a capacitor through a sharp, pointed electrode onto a dielectric surface creates the charge cluster. It appears to be a micron-sized form of ball lightning, which travels on the surface of the dielectric to the anode. It can punch a hole through the witness plate manifesting a crater that was made by a high energy event. See the pictures in the 2009 presentation.

Electrum Validum (EV)

Exotic Vacuum Object (EVO)

The EV or EVO contains the equivalent of about 100 billion electrons and one million ions. It exhibits a charge to mass ratio similar to the electron, and it contains excessive energy exceeding the amount originally stored on the capacitor that launched it.

Shoulders has observed numerous charge cluster anomalies. They adhere to dielectrics and can persist for a long time. Many can clump together into a necklace-like formation. They can bore holes through high melting point ceramics like aluminum oxide. Shoulders conjectured that the EVO disrupts the electron bonds in the target lattice, and thus it appears like melting. It is not heat, but a more coherent form of energy that causes the melt. Perhaps as the most surprising anomaly, Shoulders has done experiments that demonstrate element transmutation and radioactivity reduction when the radioactive material is transmuted into benign elements.

The plasma charge clusters and the charged water clusters exhibit the same anomalies. This implies that Brown's gas is not simply hydrogen combustion. There is a greater energy stored in a more coherent form.

Brown's gas exhibits a cool flame (130 degrees C) when used for a welding torch. There have been many demonstrations of quickly passing one's hand through the flame. The cool flame does not boil water. Yet the Brown's gas flame is claimed to vaporize tungsten, whose boiling point is above 5500 degrees C.

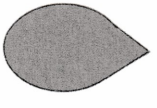
Temperatures

Tungsten		
Melt	6192 F	3422 C
Vaporize	10031 F	5555 C
Browns Gas	266 F	130 C
Torches		
Acetylene	5972 F	3300 C
Hydrogen arc	7232 F	4000 C
Cyanogen	8477 F	4525 C
Dicyanacetylene	9009 F	4987 C

This table summarizes the startling nature of Brown's gas when used in welding applications. The temperatures of the standard welding torches are not sufficient to vaporize tungsten, yet the low temperature, Brown's gas torch is claimed to do so. Like Shoulder's EVO's, it is not heat that is causing the disruption of the electron bonds in the tungsten, but something more coherent.

Burning hydrogen cannot explain this. Another energetic gas is present. Here is some more empirical evidence observed by hobbyists...

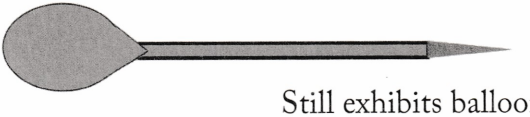
Balloon Test



Fill balloon with gas

Wait, (hydrogen leaks away)

Balloon falls to ground



Still exhibits balloon torch

The balloon test: Fill a balloon with electrolyzer gas. Wait for the hydrogen to leak way; the balloon falls to the ground. It still exhibits a balloon torch as the gas is expelled through a small tube.

Paper Bag Test



Fill paper bag with gas.

Seal bag shut.

Wait 12 hours, hydrogen vents away.

Open bag.

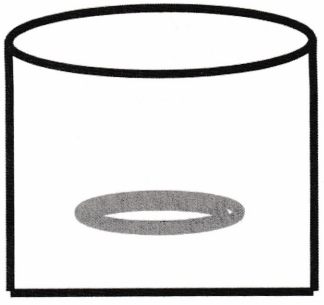
Heavier than air gas remains.

Gas can be ignited.

The paper bag test: Fill a brown paper bag with the gas and carefully glue the bag shut. Wait 12 hours; the hydrogen vents away. Carefully open the bag. A heavier than air gas remains that can be ignited.

George Wiseman

Electrically Expanded Water



Burns downward in an imploding ring

George Wiseman, a leading Brown's gas researcher, describes the ignition of the gas in an open container. It burns downward in an imploding ring.

Action Item: Chemistry Departments

It would be desirable for university chemistry departments to analyze the secondary gas from a Brown's gas electrolyzer after venting away the hydrogen.

Action Item for University Chemistry Departments: Create Brown's gas. Vent away the hydrogen component. Does the remaining gas "burn?" Analyze what is it?

Brown's Gas Measurements
Chris Eckman

Electron Density (EDMA)

- Diatomic Hydrogen and Oxygen
- No Monoatomic Hydrogen
- Gaseous Water with Excess Electrons

Thermal Imaging (InfraCAM SD)

- Flame Temperature 130 C (266 F)

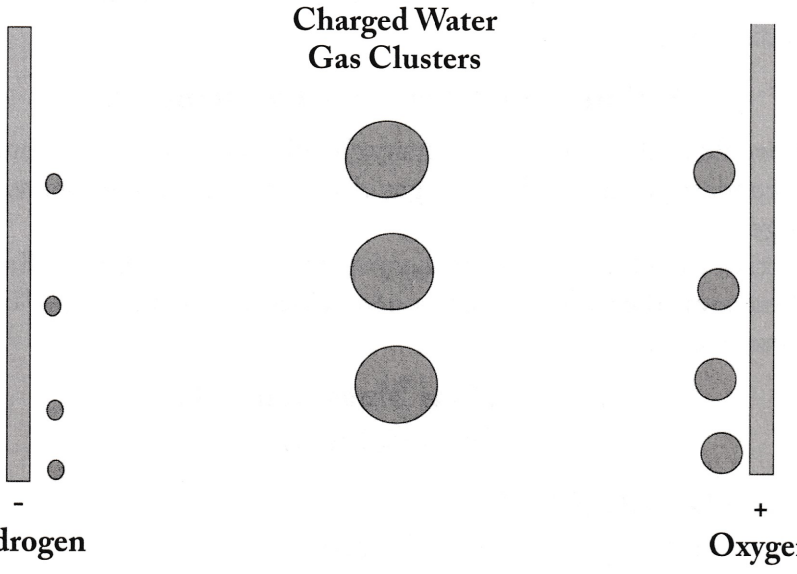
Extraordinary Technology, vol. 2(6), pp 15-25, 2008

In 2008 Chris Eckman measured the characteristics of Brown's gas at Idaho State University. The measurements showed no monoatomic hydrogen was present. In addition to diatomic hydrogen and oxygen, he detected a gas that was a form of water with excess electrons; it was neither water vapor nor steam. When ignited, the flame temperature was measured to be about 130 degrees C.

It appears that the hypothesized charged water gas cluster has been detected and discussed in the standard scientific literature. It is described as "hydrated electrons" because the clusters are negatively charged. Moreover, it is recognized to exist in the gaseous state. Google: "hydrated electrons"

George Wiseman has collected a tremendous amount of information on Brown's gas research. It is accessible through his web site, eagle-research.com. The many anomalies regarding Brown's gas are discussed.

Wiseman: Middle Bubbles

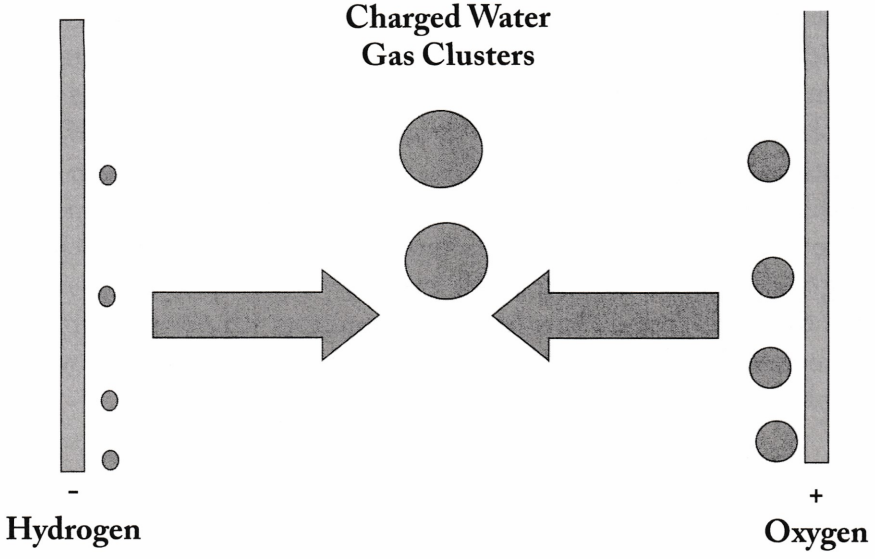


eagle-research.com/browngas/whatisbg/watergas.php

George Wiseman has made an observation in his transparent plexiglass generators that he says is never mentioned in any text book describing electrolysis. Between the plates with a wide spacing (greater than a cm) manifest three sets of bubbles. Hydrogen is produced on the negative electrode and oxygen is produced on the positive electrode as would be expected in standard electrolysis. However, in the middle

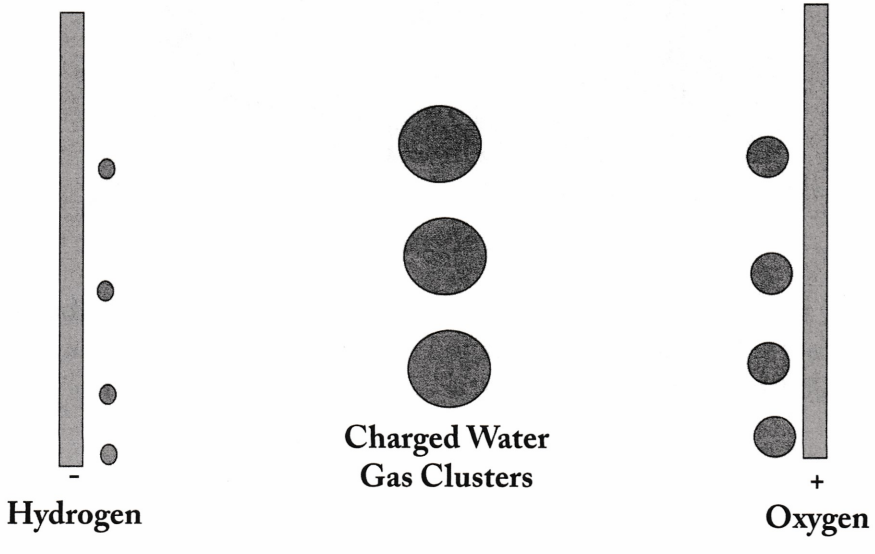
there appears a set of bubbles that many researchers believe is the most energetic component, the hypothesized charged water gas clusters.

Bob Boyce: Two Colliding Jets



Bob Boyce has made a similar observation. He viewed that when the electrolyzer first starts, there are two jets that start from the plates and collide in between where the middle bubbles are formed. Keep the idea of colliding jets in mind, we will be revisiting it.

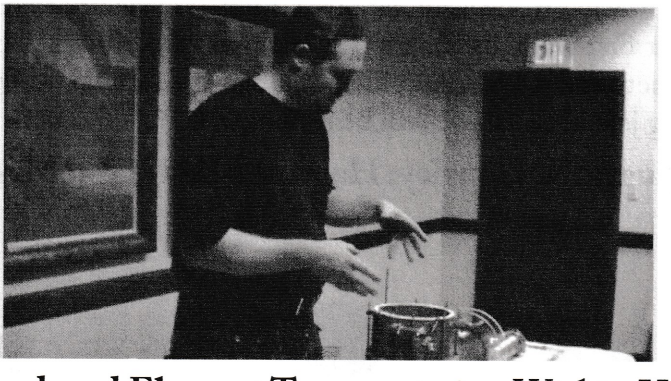
Suartt & Gourley: Harvest Middle Bubbles



Ted Suartt and Rob Gourley have not only made the same observation, but have developed a process and applied for a patent where they intentionally harvest just the middle set of bubbles. See discussion of SG Gas in the 2009 presentation.

The anomalies of Brown's gas are similar to the plasma charge clusters (Shoulders' EVO's). It adheres to matter and is electrically polarized. It gives an electric shock if it implodes back to water. The isolated gas tends to implode instead of explode in piston experiments. However, if there is additional air added to the mixture, the air is heated which can cause expansion. As a welding torch, it exhibits a cool flame, yet it vaporizes tungsten. As a welding torch, it exhibits a cool flame that can cut cleanly through solid, high melting point materials and can weld dissimilar metals together. Tremendous heat only manifests after it interacts with the material. The claims of neutralizing radioactive materials as well as element transmutation are extraordinary.

Vernon Roth



Produced Element Transmutation Within His Electrolysis Cell

At the 2011 Tesla Conference, Vernon Roth announced that he has observed element transmutation in his electrolysis cell. YouTube: "Vernon Roth alchemical hydrogen"

Mark LeClair Explains

How Water Cavitation

Creates Microscopic Craters
Carves Trenches
Transmutes Elements
Manifests Excess Energy

Mark LeClair, the founder and CEO of NanoSpire Inc., and his partner Serge Lebid can explain how water cavitation creates microscopic craters in metallic surfaces, carves trenches in high melting-point ceramics, transmutes elements, and manifests excess energy. We will see how his primary discovery explains the puzzling and anomalous phenomena observed in the Brown's gas electrolyzers.

Sonoluminescence

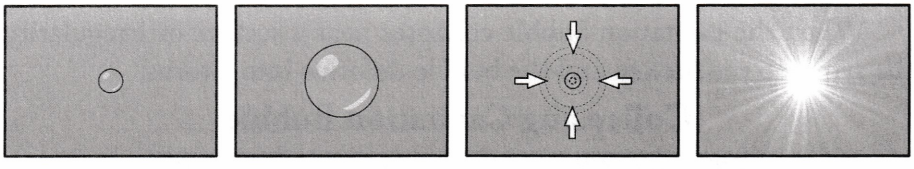
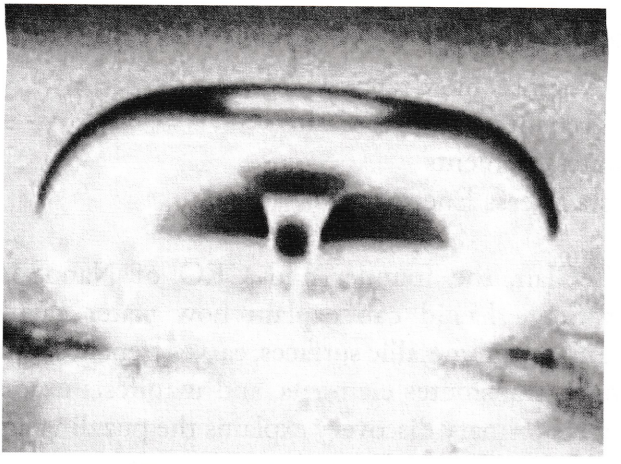


Image courtesy: Dake (https://en.wikipedia.org/wiki/Sonoluminescence)

Water + Argon or Xenon
Ultrasonic Excitation
Blue Light: If Thermal > 10,000 degrees K
Abrupt Scalar Compression
ZPE Coherence

Cavitation bubbles have been studied, and have been shown to produce anomalous energy. Sonoluminescence occurs when water mixed with inert gas like argon or xenon is excited by ultrasonic waves. A blue light is emitted as the bubble abruptly collapses symmetrically. If the light arose from thermal activity, the bluish spectrum would imply temperatures greater the 10,000 degrees Kelvin, which caused many scientists to suggest that it could be used for hot fusion. Nobel laureate, Julian Schwinger, suggested instead that the light arises from the zero-point energy. Here the abrupt scalar compression of the bubble walls activates a ZPE coherence, emitting the bluish light at a far lower temperature.

Torus Cavitation Bubble

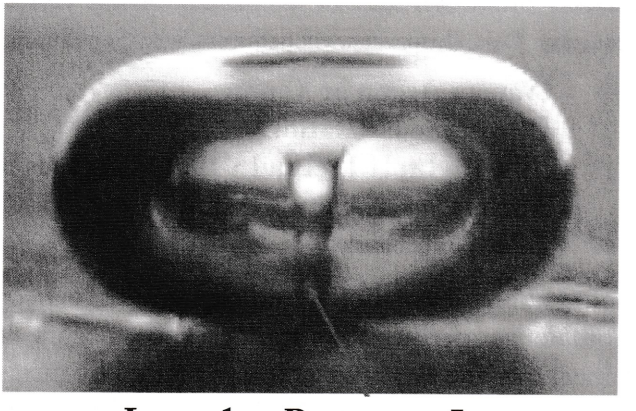


Forms Near Surface

Photo credit: Larry Crum

When the cavitation bubble collapses near a surface or irregularity, the symmetry is broken and the bubble deforms into a torus.

Collapsing Cavitation Bubble



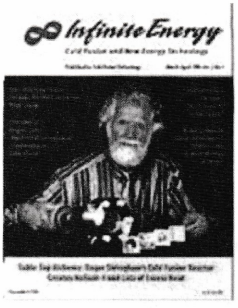
Launches Reentrant Jet

Photo credit: Larry Crum

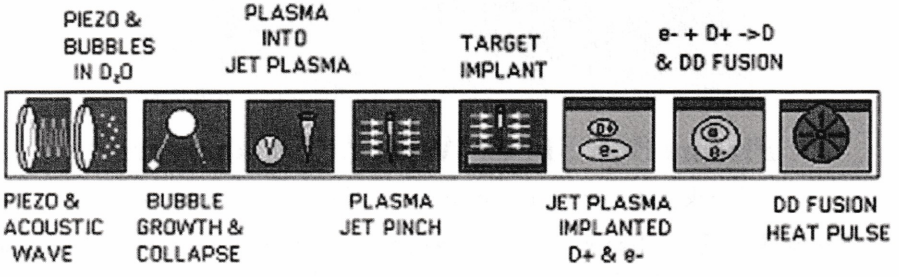
Here all the energy of the collapsing bubble gets channeled into a reentrant jet squeezed through the hole of the torus and launched toward the surface. The jet exhibits an extraordinary concentration of energy. Professor Lawrence Crum is a world-renowned researcher of cavitating bubbles and is credited for his amazing photographs of the phenomena. See reference: "Surface Oscillations and Jet Development

in Pulsating Air Bubbles," L.A. Crum, J. de Phsique Colloque 40, 285-288 (1979).

Sonofusion

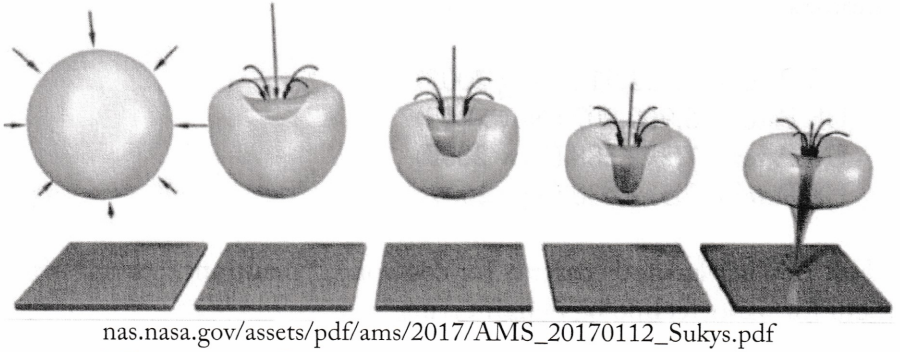


Roger Stringham



Roger Stringham, pictured on the cover of the first issue of Infinite Energy magazine, claims to have successfully produced cold fusion in his sonofusion experiments. Here the reentrant jets from collapsing cavitation bubbles in heavy water excited via an ultrasonic transducer would strike a metal target and inject deuterium nuclei with such force that it would induce fusion events.

Reentrant Jet Formation

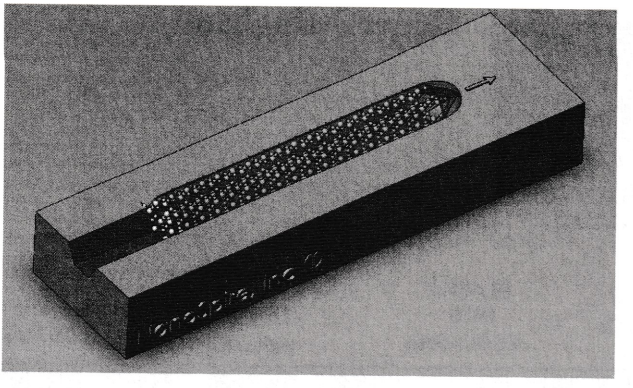


nas.nasa.gov/assets/pdf/ams/2017/AMS_20170112_Sukys.pdf

Internal Pressure: Over 300000 psi
New Solid State: Macro-ionic Water Crystal

The reentrant jet concentrates an internal pressure which could exceed 300,000 pounds per square inch. Here a new solid state of water forms, which Mark LeClair calls a "macro-ionic water crystal."

Reentrant Jet Water Crystal



Plasma Bow Shock Wave: ZPE Coherence

Mark LeClair, NanoSpire.com NanoSpireInc.com

Mark LeClair discovered the reentrant jet water crystal. He also discovered that at its leading tip is a plasma bow shock wave. LeClair suggests that here manifests a zero-point energy coherence because of the exhibited energy anomalies like carving trenches in high melting point ceramics (e.g. aluminum oxide). That plasma bow shock wave might be the same phenomenon as Shoulders' EVO.

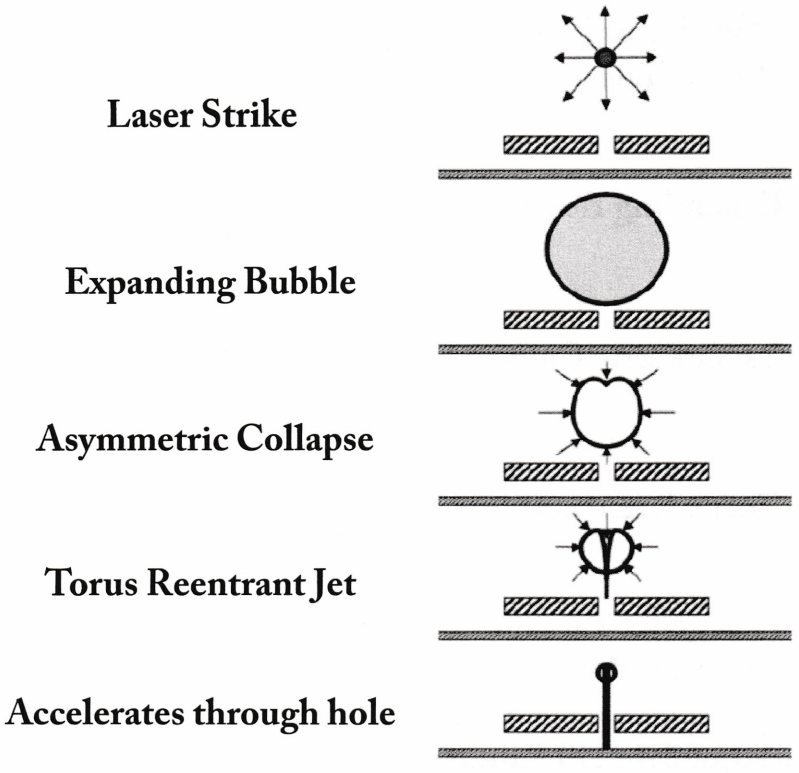
Mark LeClair Patents

"Method and Apparatus for the Controlled Formation of Cavitation Bubbles"

US Patent 6,932,914 (Aug 2005)
US Patent 6,960,307 (Nov 2005)
US Patent 7,292,288 (Nov 2007)
US Patent 7,517,430 (Apr 2009)

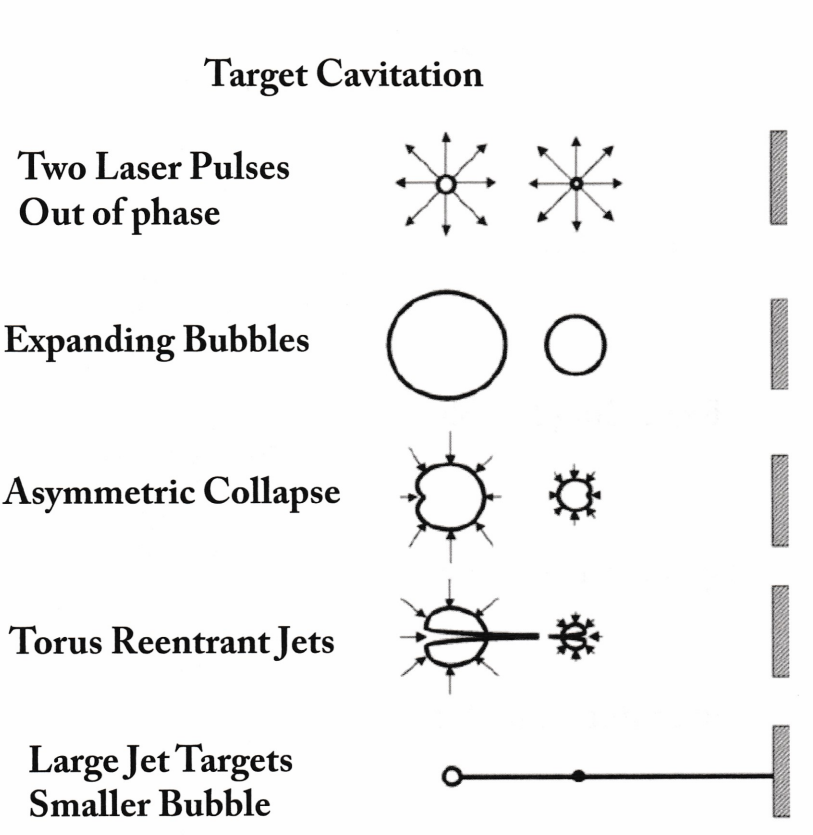
Mark LeClair has four patents for controlling reentrant jets and using them for nano-technology engineering.

Controlled Cavitation



Mark LeClair, US Patents 6,960,307 and 7,517,430

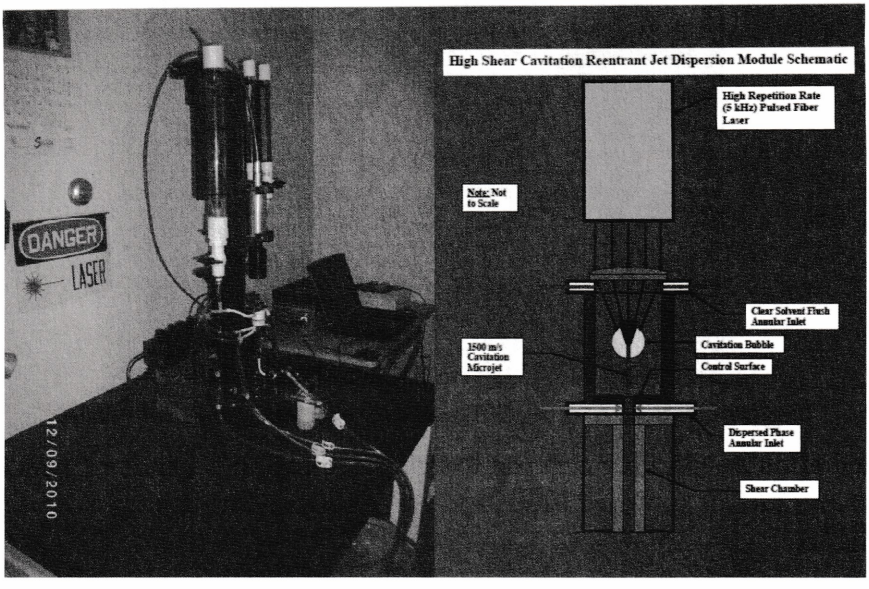
Two patents involve shooting a reentrant jet through a small hole. A laser strike forms the cavitation bubble directly over the hole. When the bubble collapses into a torus, the emitted reentrant goes through the hole rather than striking the plate. After accelerating through the hole it can then strike the desired target, typically for cutting purposes at nanometer precision.



Mark LeClair, US Patents 6,932,914 and 7,297,288

The other two patents involve making using a second cavitation bubble to aim the reentrant jet that is emitted from the first bubble. The second bubble is started by a laser strike just after the first bubble is started. The second bubble presents a nearby irregularity that breaks the environment symmetry of the first bubble and causes its torus hole to form such that the reentrant jet targets the second bubble. The reentrant jet then destroys the second bubble and keeps traveling to the intended cutting point. What would happen if two bubbles formed simultaneously and both emitted reentrant jets toward each other? Keep that idea in mind, we will revisit it.

LeClair Controls Reentrant Jet



Mark LeClair, NanoSpire.com NanoSpireInc.com

Here is a photo of the apparatus that LeClair uses to launch and control his reentrant jets.

Pistol Shrimp

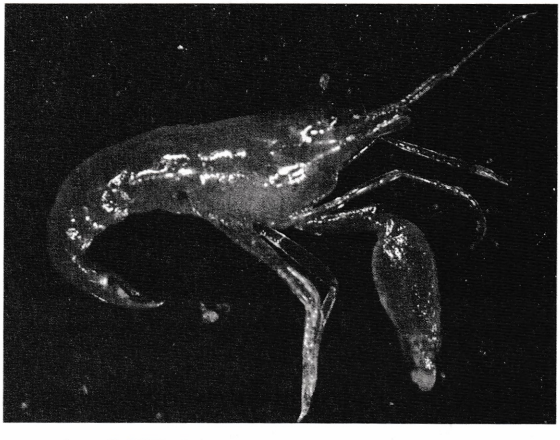


Photo credit: CSIRO, scienceimage.csiro.au/image/10852

Mark LeClair is not the only one controlling reentrant jets from cavitation bubbles. Check out what pistol shrimp can do. YouTube: Sonor Efe Pistol Shrimp

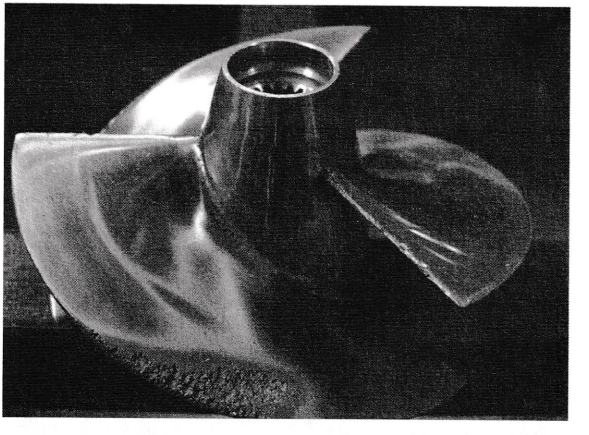
Propeller Cavitation



blog.pes-solutions.com/pes-201-boat-propeller-cavitation-and-repair/

Cavitation bubbles form in the low pressure region behind any rapidly moving surface in water. Propellers are notorious for making cavitation bubbles.

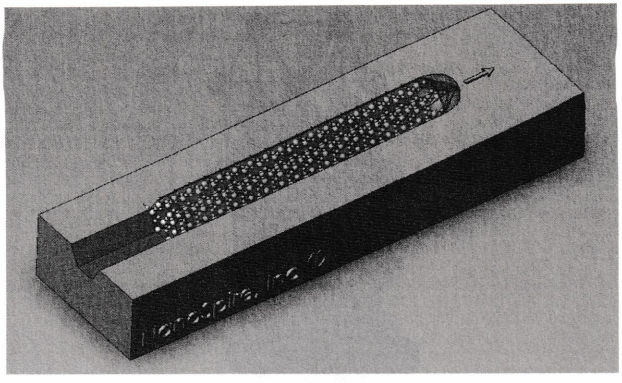
Cavitation Erosion



boattest.com/view-news/4464_spring-prop-check-are-you-propped-right

The cavitation bubbles pit, erode and carve small craters in the propeller. The damage is caused by the reentrant jets.

Reentrant Jet Water Crystal

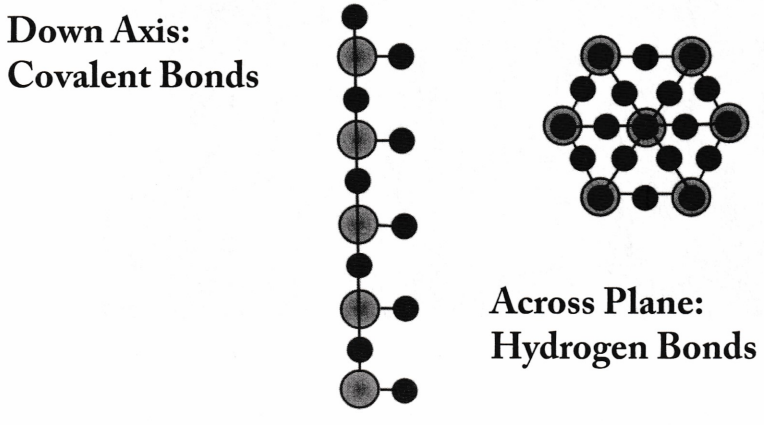


Hexagonal Form **Linear Axis**

Mark LeClair, NanoSpire.com NanoSpireInc.com

LeClair discovered that the reentrant jet launches a new solid state form, a water crystal. The crystal has a hexagonal structure around its periphery, and its axis has a linear structure.

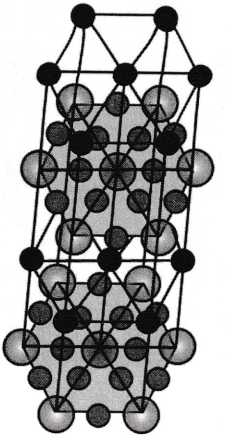
Water Crystal Structure



Mark LeClair, NanoSpire.com NanoSpireInc.com

The axis is comprised of parallel chains of linear water. In the diagram only one chain is shown. The parallel chains are connected by hydrogen bonding.

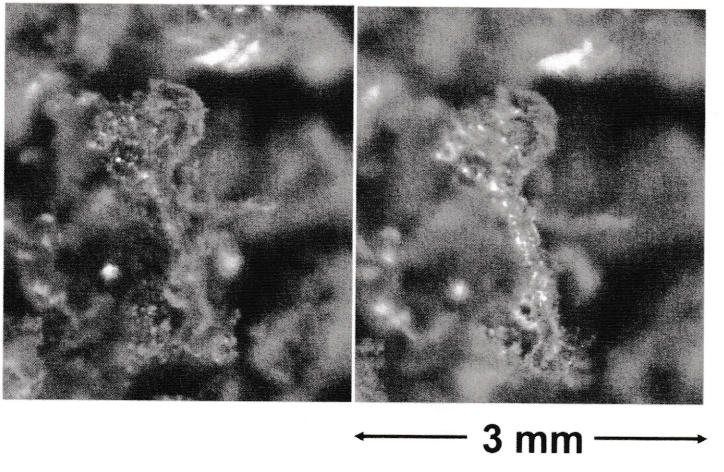
Water Crystal Structure 3D



Mark LeClair, NanoSpire.com NanoSpireInc.com

This diagram illustrates the structure in three dimensions.

Macroionic Water Crystal Imprint



Mark LeClair, NanoSpire.com NanoSpireInc.com

Mark LeClair was able to photograph imprints of the water crystal striking a rust particle.

Reentrant Jet Characteristics

- **Velocity: 1500 m/s** **Up to Mach 4**
- **Pressure: > 100,000 psi**
- **Water Crystal**
  - Axis: Linear HOHOHOHO...
  - Shape: Trigonal, Hexagonal
  - Head: Positively Charged
  - Tail: Negatively Charged
- **Head: Plasma Bow Shock**
  - Creates Craters
  - Carves Trenches
  - Self-Accelerates

Shoulders' EVO Does Likewise

The reentrant jet and its water crystal exhibit extraordinary concentrated energy. Its velocity is 1500 meter per second and can accelerate up to Mach 4. The pressure is impresses on targets is over 100,000 psi. The water crystal has a positively charged head and a negative tail. The plasma bow shock creates the craters and carves trenches. Surprisingly, it causes the crystal to self-accelerate, a phenomena the Ken Shoulders likewise observed in his EVO's.

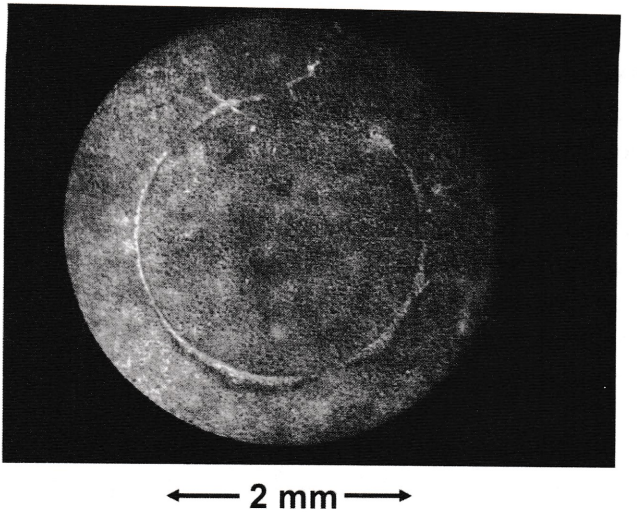
LeClair Effect



Bow Shock – ZPE Coherence
Like Shoulder's EVO
Manifests Self-Acceleration
Causes Nuclear Reactions

The bow shock wave and Shoulder's EVO both appear to manifest a ZPE coherence because both exhibit self-acceleration, and as we shall soon see, both can cause nuclear reactions. This extraordinary behavior arising from the water crystal is called the "LeClair Effect."

Water Crystal Carves Trenches
Aluminum Oxide



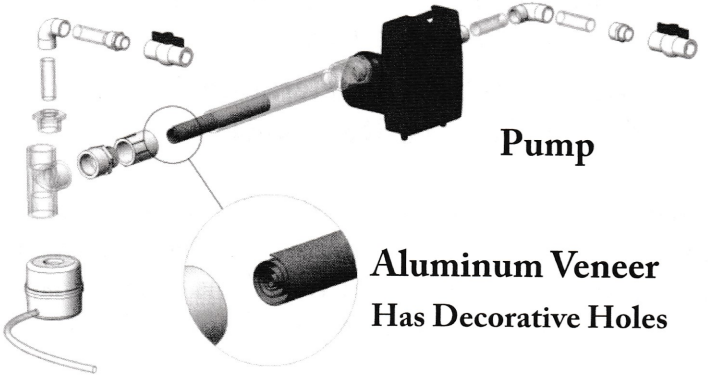
Mark LeClair, NanoSpire.com NanoSpireInc.com

Here is a photograph of a circular trench carved in aluminum oxide by a water crystal chasing its own tail.

Mark LeClair's Transmutation Experiment

Mark LeClair perhaps has the simplest element transmutation experiment. Element transmutation is considered impossible by Western academia at ordinary energies typical in bench-top experiments.

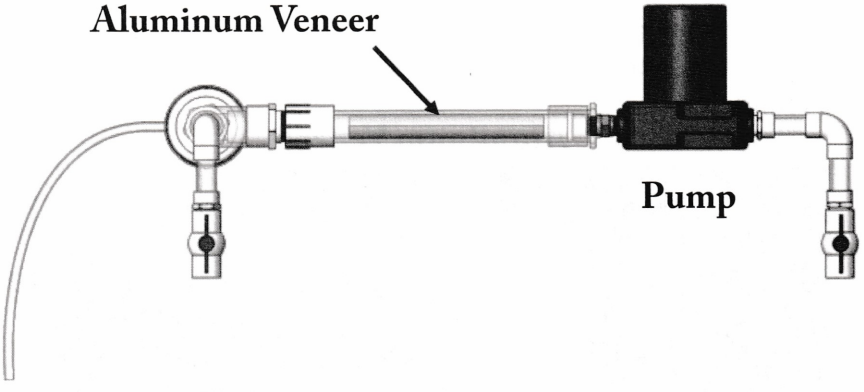
Assembly Components



Mark LeClair, NanoSpire.com NanoSpireInc.com

The components are PVC tubing and a robust water pump used for a swimming pool filter. A rolled sheet of aluminum veneer is placed in the PVC pipe reaction chamber. The aluminum veneer has many holes so that the reentrant jets arising from the cavitation bubbles accelerate through the holes rather than immediately hitting the aluminum plate.

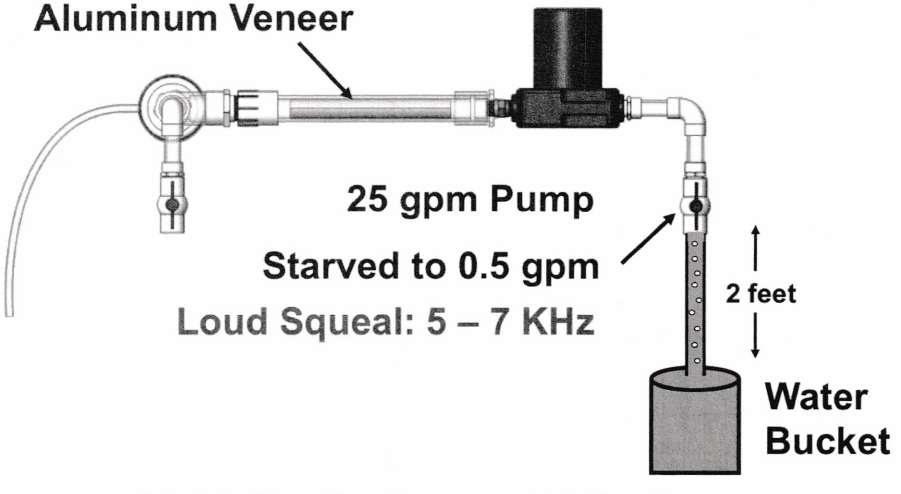
Assembled Apparatus



Mark LeClair, NanoSpire.com NanoSpireInc.com

Here is the assembled apparatus.

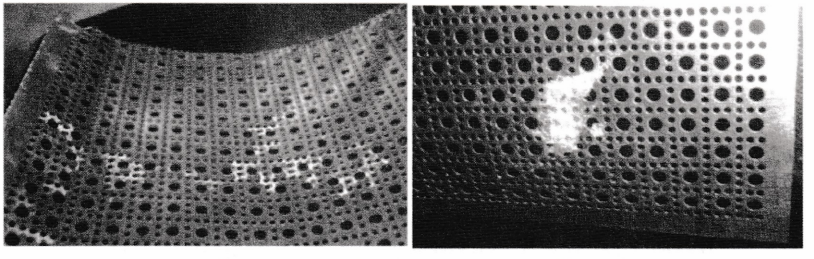
Experimental Setup



Mark LeClair, NanoSpire.com NanoSpireInc.com

In the experiment the pump, which runs at 25 gallons per minute, is starved to a level of just a half gallon per minute by closing off the intake valve. The pump emits a loud squeal of around 5 to 7 KHz. The valve is consistently adjusted to maintain the loud squeal to maximize cavitation activity. The water bucket is approximately two feet below the intake valve to pull the water up against gravity, which creates a partial vacuum for cavitation bubble formation. LeClair warns that being too close to the apparatus during the experiment gave him the symptoms of radiation poisoning. He recommends that anyone wishing to replicate the experiment should shield the reaction chamber and adjust the intake valve remotely.

Aluminum Veneer

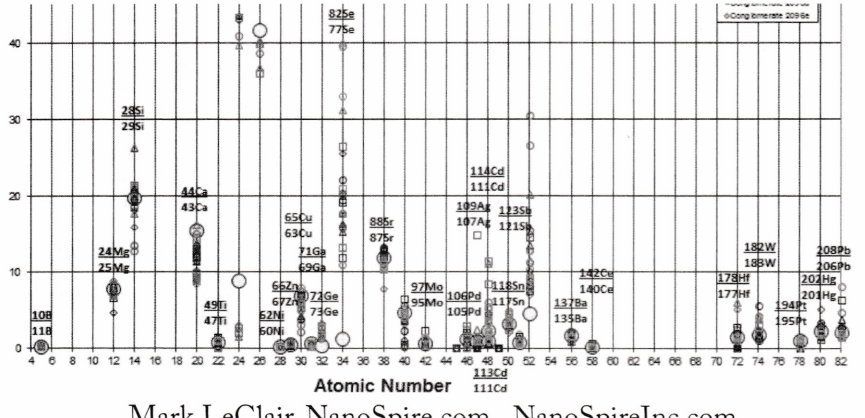


Mark LeClair, NanoSpire.com NanoSpireInc.com

Transmuted Elements on Surface
Carbon in Diamond Form (white blotch)

After the experiment runs for a half an hour or more, the aluminum veneer is unrolled and analyzed for the presence of new elements. The white blotches are carbon in the diamond crystalline form.

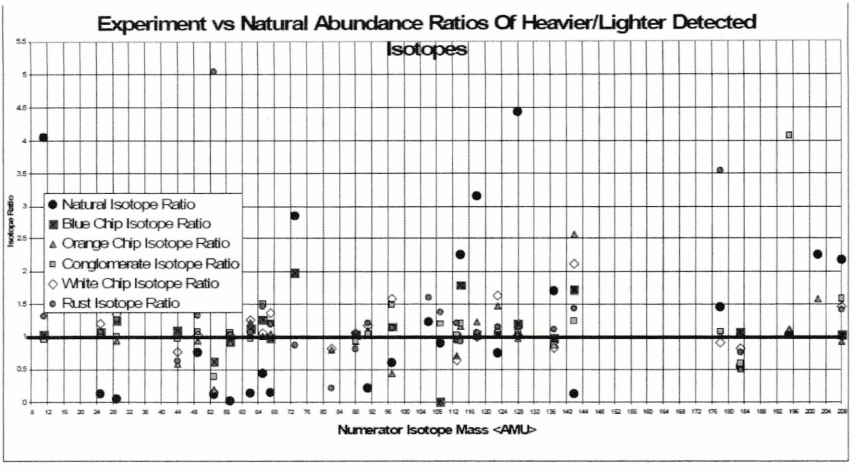
Nucleosynthesis



Mark LeClair, NanoSpire.com NanoSpireInc.com

LeClair detected an abundance of nuclear synthesis across the periodic table. The result is surprising.

Rare Isotopes



Mark LeClair, NanoSpire.com NanoSpireInc.com

Multiples of Helium Nucleus

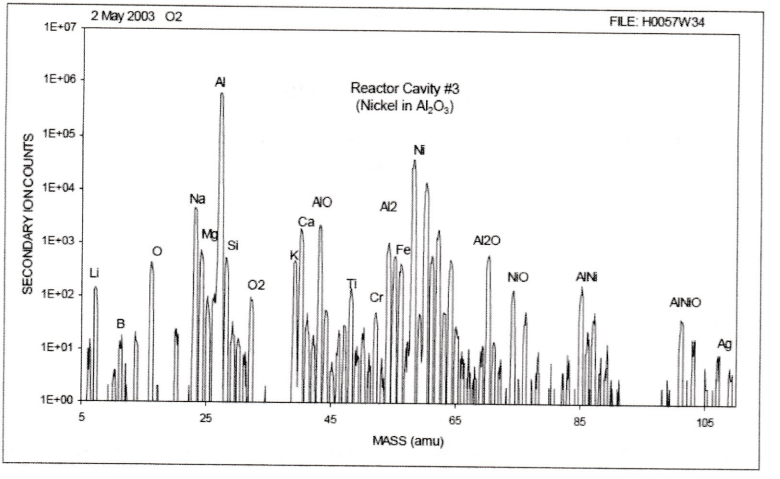
Moreover, rare isotopes were detected, not readily found in nature. The isotopes tended to be multiples of the helium nucleus implying a nucleosynthesis typically associated only with super nova explosions. Academia would simply dismiss this result as too far fetched.

EVO & Plasmoid Strikes

Also Exhibit Transmuted Isotopes across the Periodic Table Akin to Nucleosynthesis in a Supernova

However, there are other experiments yielding a similar absurd nucleosynthesis. Both EVO strikes and large plasmoid strikes yield transmutation across the periodic table akin to nuclear synthesis in supernova activity.

Low Voltage Transmutation



Google: Ken Shoulders, "ICCF-10 Low Voltage Nuclear Transmutation"

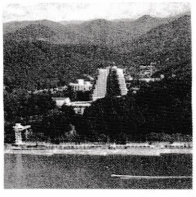
Shoulders had repeatedly demonstrate element transmutation at low energy by launching EVO strikes at an anode target. After an EVO strike, the crater region of the target exhibits elements that were not present in the original anode or cathode material. Moreover, the new elements are often in the form of unusual isotopes not readily found in nature. Shoulders presented his results at the 10th International Conference on Cold Fusion (ICCF-10).

Nucleosynthesis

Ken Shoulders is not alone in observing transmutation due to plasmoid strikes. As shown in the 2009 presentation, the Proton-21 Laboratory in Ki[illegible], Ukraine repeatedly creates super transmutation using large, kilo-joule plasmoids. Proton-21 is a laboratory employing professors from the local university to study the phenomena.

As was shown in the 2009 presentation, after the target is smashed by the energetic plasmoid it contains elements all over the periodic table. The Proton-21 Laboratory appears to be conducting the best research in the world regarding element transmutation. Their work is pretty much ignored by western scientists because of the paradigm violations their experiments are exhibiting. Like Shoulders and LeClair have shown in their experiments, the input energy is not sufficient to produce nuclear level events, and thus the experiments strongly imply coherent ZPE activation is occurring.

Annual Conferences in Russia



The 16th Russian Conference on Cold Nuclear Transmutation and Ball-Lightning (RCCNT&BL-16)

Dagomys, Sochi, Russia *June 1 - June 8, 2009*

RCCNT&BL-16 INVITATION Download

PROGRAM COMMITTEE of RCCNT&BL-16

ORGANIZING COMMITTEE of RCCNT&BL-16

RESOLUTION of RCCNT&BL-16

PROGRAM & ABSTRACTS of RCCNT&BL-16

Even though the experiments are ignored by Western academia, the Russians are enthusiastically pursuing the research. There are annual conferences in Russia dedicated to studying cold nuclear transmutation from ball lightning.

Action Item: Physics Departments

- **Repeat LeClair's Transmutation Experiment**
- **Measure New Isotopes**
- **Ask Colleagues to Replicate**

Action Item for University Physics Departments: Repeat LeClair's transmutation experiment. Measure the new elements and unusual isotopes. If successful, ask colleagues to replicate the experiment.

How Does Cavitation Relate to Brown's Gas?

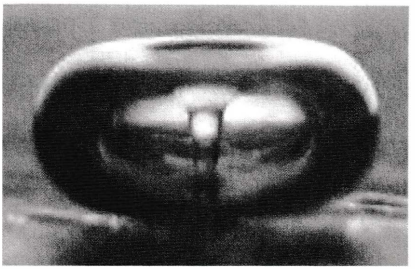
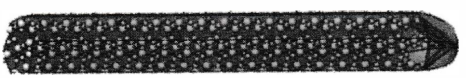


Photo credit: Larry Crum

Collapsing Bubble Launches Reentrant Jet

How does water cavitation relate to Brown's gas? The collapsing cavitation bubbles in a restricted environment launch reentrant jets.

LeClair's Reentrant Jet Water Crystal

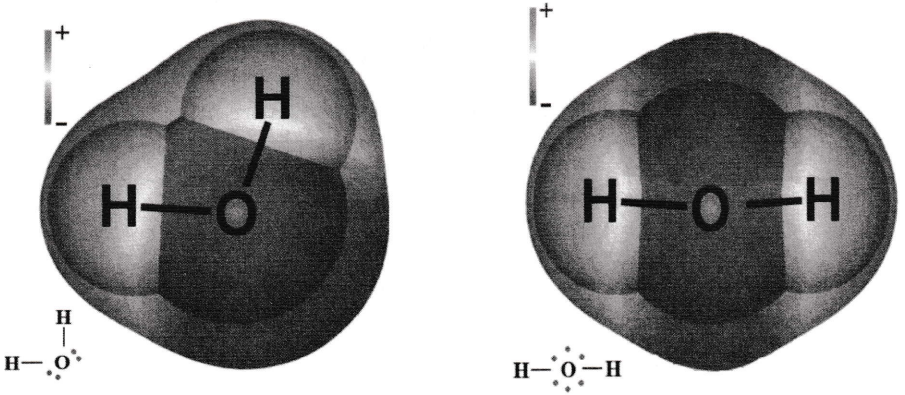


Axis Linear Chains

...HOHOHOHOHOHOHO...

The reentrant jets store energy coherently in the water crystal, which have a long axis of OH atoms. Has other Brown's gas investigators seen evidence for such a structure?

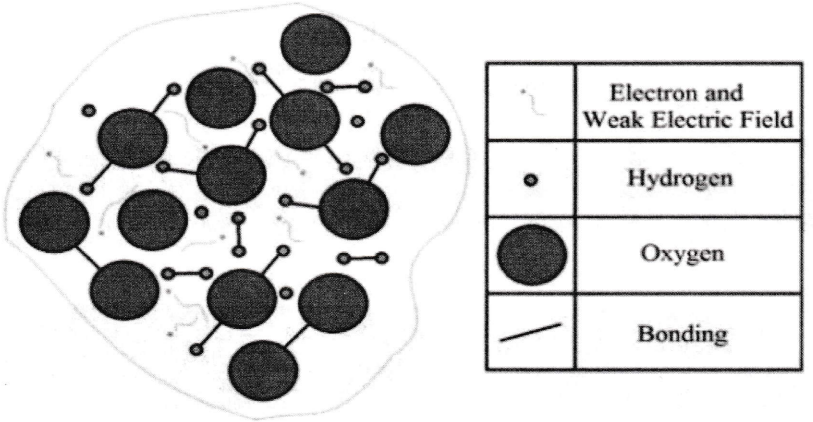
Chris Eckman
Plasma Orbital Expansion of the Electrons in Water



Linear Water Isomer with Extra Electrons

Proc. NPA, vol. 6, no. 2 (2010)

In his studies at Idaho State University, Chris Eckman did make preliminary measurements that discovered a linear isomer of water was present in Brown's gas. Here the hydrogen atoms are 180 degrees apart. With consulting by a plasma physicists, Eckman proposed a model similar to a cold plasma where excess electrons could be stored in the d-orbitals around the oxygen atom offering a meta-stable, high energy state for the isomer.

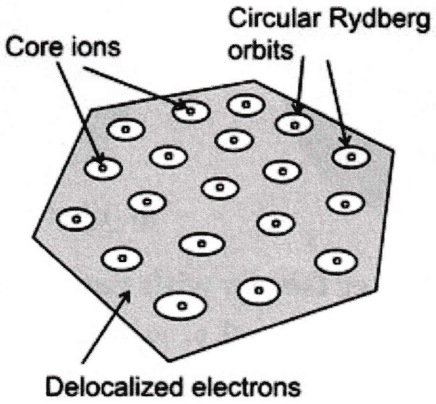


Linear Water Stable in Rydberg Cluster

Proc. NPA, vol. 6, no. 2 (2010)

Long term stability can only be achieved if the linear water isomer participates in a water cluster. Eckman proposed that the isomer and surrounding molecules somehow formed a state of Rydberg matter.

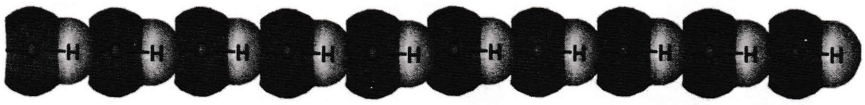
Rydberg Matter
Meta-stable Cold Plasma

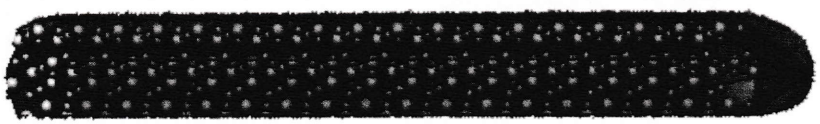


D orbital electrons - high energy state

In Rydberg matter many atoms are supporting the high energy, d orbital electrons, which are distant and de-localized from any single nuclei. Clearly there must be a coherent structure of many nuclei to support the distant d orbital electrons.

Linear Chains
Along Axis of Water Crystal

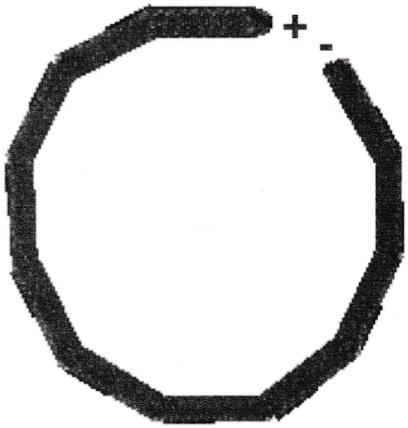




How can its energy be captured?

LeClair's water crystal offers such an atomic structure with its long chains of linear water isomers down the axis of the crystal. However, the linear water crystal is short lived since it tends to accelerate into any nearby target. How can its energy be captured?

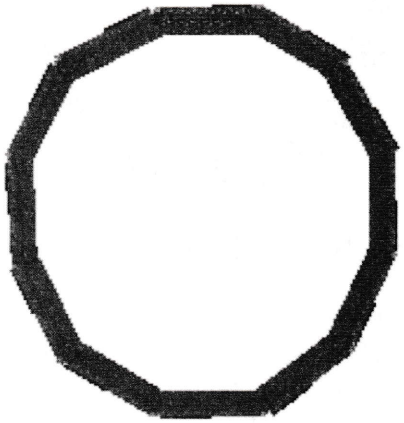
Long Water Crystal Can Close Into Loop



Positive Head Attaches to Negative Tail

LeClair has observed long loops of a the water crystal. Here the positive head is attracted to the negative tail, and can combine with it. The energy of the plasma bow shock can be transmitted to exciting d orbital electrons surrounding the structure.

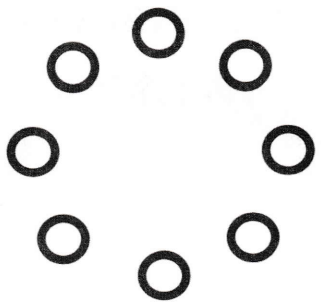
To Form Water Crystal Ring



Large Ring is Unstable

LeClair observes that the large water crystal rings are unstable and short lived.

Fractal Decay into Smaller Rings



Like Decomposing Vortex Ring

For stability, the large rings must decay into smaller rings. The decay might exhibit a fractal decay pattern that occurs in decomposing vortex rings (as observed in decaying smoke rings).

Small Ring: Seed of Water Cluster Gas



Stable Under 0.5 Microns

The small water crystal ring could be the seed for the water cluster gas. Here the ring is stable under a half micron, and would take a gaseous form due to Brownian motion. Note: Only the main axis of the ring is depicted in the figure. Not shown are the covalent hydrogen atoms attached to the ring.

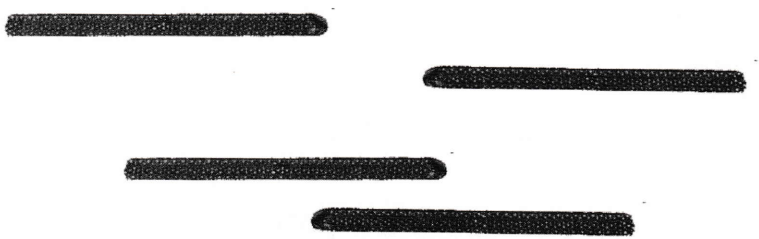
Water Crystal Collisions Produce Small Ring, Water Cluster Seeds

Another hypothesis is that colliding linear water crystals could produce small water crystal rings.

Two Approaching Water Crystal Jets



As two water crystal jets accelerate toward each other...

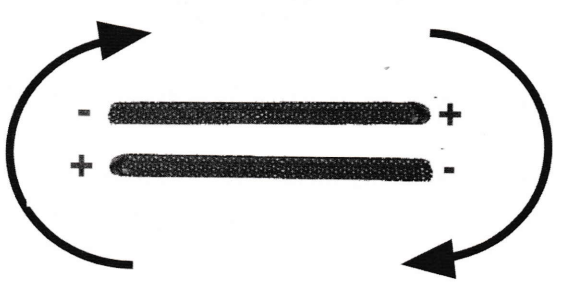




Attract Head to Tail

The positive heads would be attracted toward the negative tails.

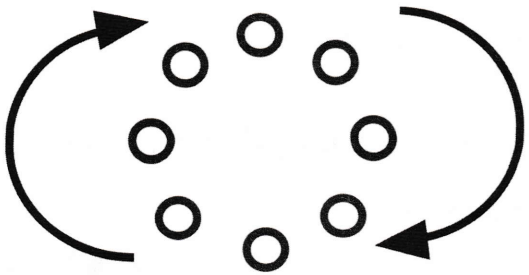
Shear Collision



Spirals Into Vortex

The resulting shear collision would cause the pair to spiral into a vortex. From the melee would come the debris...

Shear Collision Debris



Small Water Crystal Rings

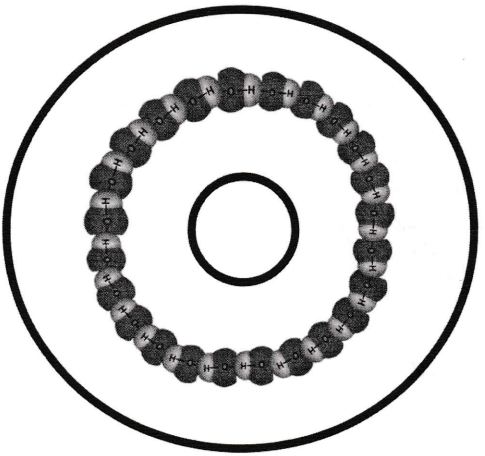
A collection of small water crystal rings. An analogy would be the particle debris that manifests during collisions in high energy particle accelerators.

Small Water Crystal Ring



Electrons held in d orbitals – Rydberg Matter

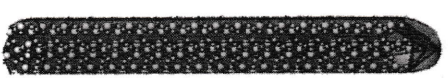
The small water crystal ring offers a stable atomic structure to support high energy, d orbital electrons - a form of Rydberg matter. Note: Only the main axis of the ring is depicted in the figure. Not shown are the covalent hydrogen atoms attached to the ring.



Meta-Stable Torus Form

The electrons in the outer d orbitals give the entire structure a torus form. This model supports both George Wiseman's hypothesis of electrically expanded water and Chris Eckman's hypothesis of linear water isomers to explain the coherent energy storage for Brown's gas. The meta stable torus form can be long lived allowing the gas to be stored for a long time. When ignited, the torus collapses back to normal water.

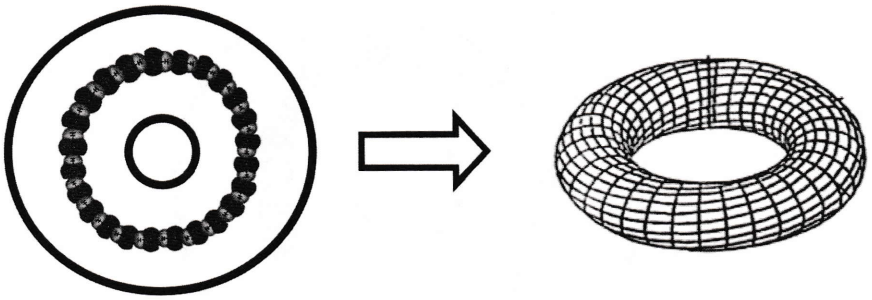
Breaking the Ring Re-launches Water Crystal



Coherent ZPE Bow Shock Causes LeClair Effect, Nuclear Reactions

Mark LeClair speculates another possibility for the water crystal ring: When ignited in a Brown's gas torch, the ring could break apart and re-launch linear water crystals. Here the plasma bow shock at the tip of the crystal could once again exhibit ZPE coherence and manifest the LeClair effect nuclear reactions.

When Ignited Ring Converts to EVO



Water Crystal **Ring Plasmoid**

Alternatively, when ignited, the sub-micron size ring could convert straight up into an EVO plasmoid. If so, it could likewise explain how the Brown's gas torch itself could induce nuclear reactions that cause element transmutation. Consequently Brown's gas could offer a technology for radioactivity remediation as some researchers have proposed.

How to Cavitate

It is desirable to induce cavitation in the water electrolyzers in order to get a large energy output. Fortunately there are many ways to do so, and it turns out that many inventors have done it inadvertently.

- **Electrolysis Gas in tight gaps**
- **Venturi Vacuum**
- **Blow Air through Gaps**
- **Oscillate Electric Field, PWM**
- **Vibrate Mechanically**
- **Sonic, Ultrasonic**
- **Cavitating Pumps, Vortex Action**

The most common way to cavitate water in the electrolyzer is actually done inadvertently. Because researchers have stressed the importance of tight narrow gaps between rough surfaced electrodes, electrolysis gas bubbles in the tight gaps produce turbulence in the water causing cavitation. Other inventors have used vacuum of Venturi feeds

or blow air through the electrolyzer. Oscillating electric fields cause the charge water clusters to likewise oscillate producing turbulence. Direct mechanical vibration as well as sonic and ultrsonic stimulation produces cavitation. Finally cavitating pumps or vortex water flows can be directly used. We will visit examples of each...

Narrow Gaps

As shown in the 2009 presentation, the use of narrow electrode gaps with rough surfaces is well discussed on the web. Lengthy conditioning techniques are described where a rough surface is gradually grown on the electrodes using electrolytic processes.

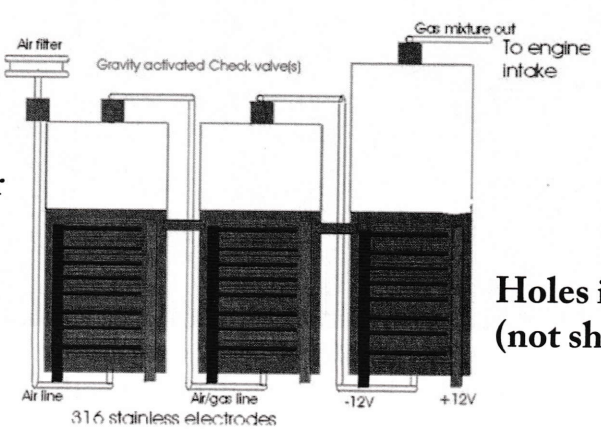
The 2009 presentation showed Paul Zigouras used the simplest approach to make his rough, tight gap electrodes. He so was so successful in his gas production that he was able to run a car strictly from his electrolyzer gas. Zigouras' 316L stainless steel electrodes were spaced very tightly, about 0.6 mm. The electrodes are each wired, a "wet" cell configuration. Zigouras used a Venturi vacuum to feed water into the electrodes and convert it immediately to gas to run his car. The vacuum from such a feed produces more cavitation bubbles.

How to Cavitate
Blow Air Through Gaps

Blowing air through the electrolyzer water can also produce turbulence and cavitation.

Archie Blue
U.S. Patent 4,124,463 (1978)

Blow air through electrolyzer



Holes in plates (not shown)

In the 1978 Archie Blue received a patent for his electrolyzer which featured blowing air through it. The resulting turbulence and cavitation yielded more energetic gas, which was used to run a car engine.

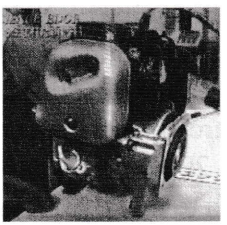
Mechanical Vibration

Mechanical vibration can cause turbulence and cavitation.

OHMASA Gas



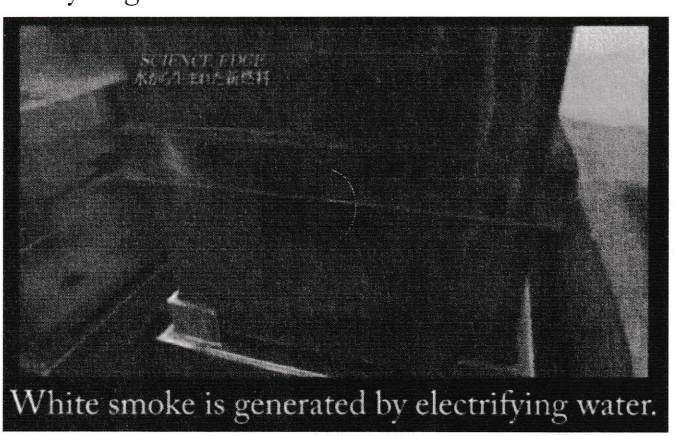
Torch



Runs Engine

Mechanical Vibration 100 Hz
Parallel Plate Electrolyzer
Stored gas under pressure, 2 years

Omasa used paddles vibrating at 100 Hz in his electrolyzer. As long as the paddles jerk fast enough to exceed 40 mph, they will induce enough low pressure to produce cavitation bubbles. He was able to store the resulting gas under pressure for 2 years. When storing the gas under pressure, it is important that the containment system vents any residual hydrogen; otherwise the mixture can be explosive and dangerous. Omasa did not store hydrogen.



YouTube: OHMASA Gas by watermemory

When viewing this video, keep the cavitation hypothesis in mind while reading the subtitles.

How to Cavitate
Oscillating Electric Field

As long as the gas bubbles or water clusters are charged or polarized, an oscillating electric field will cause them to likewise oscillate to produce turbulence and cavitation.

Xogen Power, Inc.
Xogen Technologies, Inc.




Xogen Power inadvertently produced a novel means of electric field oscillation in the water.

Stephen Barrie Chambers

U.S. Patents:
6,126,794 (2000)
6,419,815 (2002)
6,790,324 (2004)

Xogen's lead scientist, electrical engineer, and inventor was Stephen Barrie Chambers. Stephen Chambers' sister, Marilyn Chambers, was the wife of Stan Meyer. She delivered Stan's technical information, which she inherited after his death. Stephen Chambers filed essentially the same patent three times, where only the claims were rewritten. (The body text and figures were identical.) There was one novel component in Chamber's patent...

(12) **United States Patent**
Chambers

(10) **Patent No.: US 6,790,324 B2**
(45) **Date of Patent: Sep. 14, 2004**

(54) **HYDROGEN PRODUCING APPARATUS**

(75) Inventor: **Stephen Barrie Chambers**, Calgary (CA)

(73) Assignee: **Xogen Power Inc.**, Calgary (CA)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 207 days.

(21) Appl. No.: **10/183,855**

(22) Filed: **Jun. 25, 2002**

(65) **Prior Publication Data**

US 2002/0179453 A1 Dec. 5, 2002

Related U.S. Application Data

(63) Continuation of application No. 09/608,316, filed on Jun. 30, 2000, now Pat. No. 6,419,815, which is a continuation of application No. 09/105,023, filed on Jun. 26, 1998, now Pat. No. 6,126,794.

(51) **Int. Cl.**[7] **C25D 17/00**

(52) **U.S. Cl.** **204/242**; 204/267; 204/272; 204/278; 204/293; 204/278.5

(58) **Field of Search** 204/242, 267, 204/293, 278, 272, 278.1; 205/628–632

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,311,097 A		3/1967	Mittelstaedt	123/119
3,954,592 A	*	5/1976	Horvath	204/229.7
4,107,008 A	*	8/1978	Horvath	205/339
4,184,931 A		1/1980	Inoue	204/129
4,316,787 A		2/1982	Themy	204/242
4,394,230 A	*	7/1983	Puharich	205/341
4,599,158 A		7/1986	Ofenloch	204/228
4,798,661 A		1/1989	Meyer	204/228
5,338,421 A	*	8/1994	Abe et al.	204/514
5,632,870 A		5/1997	Kucherov	204/241

FOREIGN PATENT DOCUMENTS

JP	9071886	3/1997	C25B/1/04
RU	2 048 609 C1	11/1995	
WO	9809001	3/1998	C25B/1/04

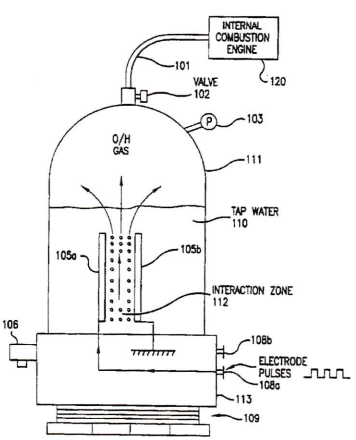
* cited by examiner

Primary Examiner—Donald R. Valentine
(74) *Attorney, Agent, or Firm*—Stoel Rives LLP

(57) **ABSTRACT**

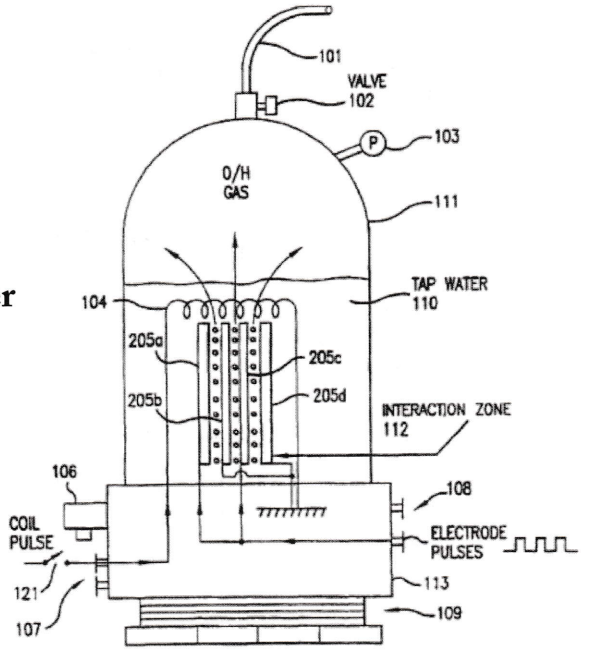
An apparatus for producing orthohydrogen and/or parahydrogen. The apparatus includes a container holding water and at least one pair of closely-spaced electrodes arranged within the container and submerged in the water. A first power supply provides a particular first pulsed signal to the electrodes. A coil may also be arranged within the container and submerged in the water if the production of parahydrogen is also required. A second power supply provides a second pulsed signal to the coil through a switch to apply energy to the water. When the second power supply is disconnected from the coil by the switch and only the electrodes receive a pulsed signal, then orthohydrogen can be produced. When the second power supply is connected to the coil and both the electrodes and coil receive pulsed signals, then the first and second pulsed signals can be controlled to produce parahydrogen. The container is self-pressurized and the water within the container requires no chemical catalyst to efficiently produce the orthohydrogen and/or parahydrogen. Heat is not generated, and bubbles do not form on the electrodes.

16 Claims, 10 Drawing Sheets



Toroidal Coil

Under Water
1500 turns
19 Hz

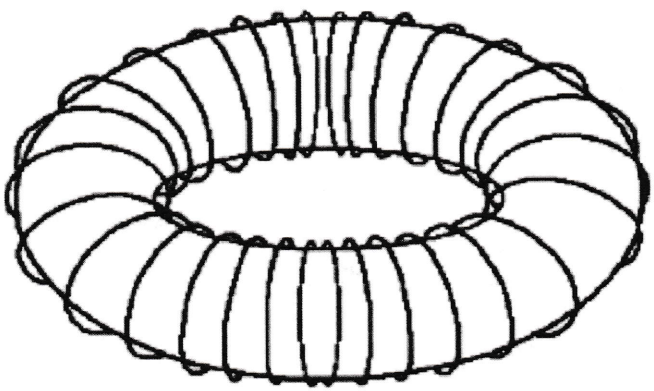


Chambers, US Patent 6,790,324 (2004)

A toroidal coil was located under the water. It was driven at about 19 Hz. Chambers believed that the magnetic field from the coil caused the electrolyzer to produce para-hydrogen because the gas would run a 1 KW Honda generator better. Para-hydrogen is known to burn slower than ortho-hydrogen and thus would be a better match for timing a gasoline engine. However, the gas was never measured for the presence of para-hydrogen, nor does a toroid coil's magnetic field leave the confines of its ferrite core.

Induced Electric Field

$$\mathbf{E} = -\frac{\partial \mathbf{A}}{\partial t}$$



Charge water clusters oscillate with E field
Causes turbulence in water

However, an oscillating magnetic field inside the core produces an oscillating vector potential which produces a surrounding, torus shaped, oscillating electric field in the water. Charged water clusters and polarized bubbles would oscillate with the field to produce turbulence.

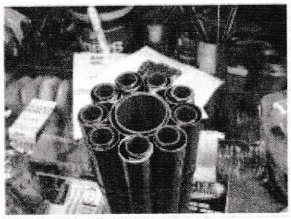
Author's note: It was not until 2016 that I learned the real advantage of turbulence in an electrolyzer. Turbulence can shear stable nanobubbles from electrolysis plates before they can grow to unstable microbubbles, which burst to free hydrogen gas. The 2016 presentation will discuss the significance of nanobubbles.

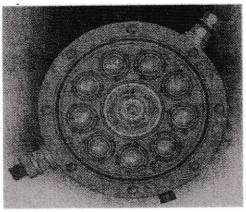
How to Cavitate

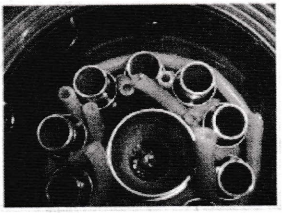
Sonic, Ultrasonic Vibrations

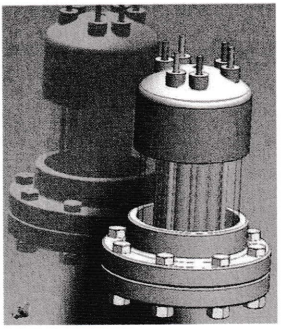
Sonic and ultrasonic stimulation is well known to produce cavitation bubbles.

Freddy Wells









Vibrate Pipe Electrodes Acoustically

Inner & Outer Pipes Tuned Identically

Ran 2004 Dodge Truck

Google: Freddy Wells HHO

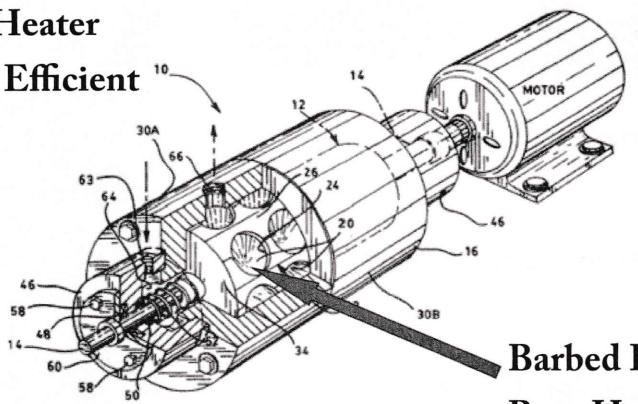
Freddy Wells stressed the importance of tuning his cylindrical electrodes so that they all vibrate at the same acoustical frequency. This was a challenge since the inner electrode had a smaller diameter and thus had to be longer. When the electrical pulse drive frequency matched the acoustic frequency, the electrolyzer emitted an abundant high energy gas which was used to power a 2004 Dodge trunk as the sole fuel. Such careful tuning of the cylinders is difficult and expensive (akin to making wind chimes). Wells said future versions would be driven at ultrasonic frequencies. Wells believed that the acoustical resonance causes water molecule dissociation. This is unlikely because the water molecule atomic bond resonance is in the infrared frequencies. However, acoustical mechanical resonance of the electrodes can induce abundant water turbulence, which might yield the energetic charge water cluster gas.

How to Cavitate
Cavitating Pumps
Vortex Implosion

Pumps can be designed to create cavitation. Vortex action in turbulent water flow can likewise induce cavitation bubbles.

James Griggs
Hydrosonic Pump

Water Heater
Overly Efficient
130%



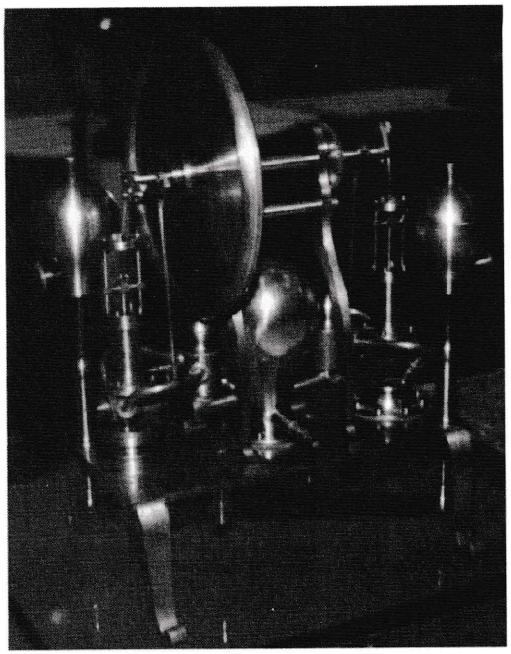
Barbed Edge
Bore Holes Cause
Cavitation

U.S. Patent 5,188,090 (1993)

In the 1990's James Griggs invented his hydrosonic pump which heated water by cavitation. The rotor had counter-sunk bore holes to induce vortex action, and the lips of the bore holes had barbed edges to increase the cavitation activity. Measurements showed that the pump was 130% efficient producing more hot water over and above electrical power input to drive the pump. This was unbelievable to the standard scientific community. To avoid charges of fraud, and to run a successful business, Griggs had to back off claiming over unity. We can now see how cavitation might indeed yield excess energy.

John W Keely

Hydro Vacuo Engine



Patent Filed 1872

Based on Water Hammer

Bulbs are Pulsating Chambers

Photo credit: Dale Pond, svpwiki.com

svpwiki.com/The+Keely+Motor
svpwiki.com/Hydro+Vacuo+Engine+Patent

In the 1870's John Keely may have been the first inventor to propose a "free energy" machine that might have actually worked. The device was based on water hammer causing cavitation and inducing vortex flow in the bulb shaped pulsating chambers. Keely was ahead of science at the time because he invented the device before water hammer was discovered and scientifically recognized. Dale Pond has been sharing his research on Keely on the web, and shows his attempts to replicate Keely's inventions.

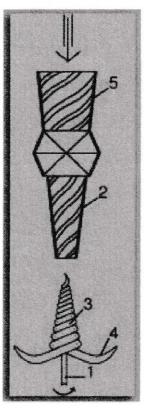
Viktor Schauberger

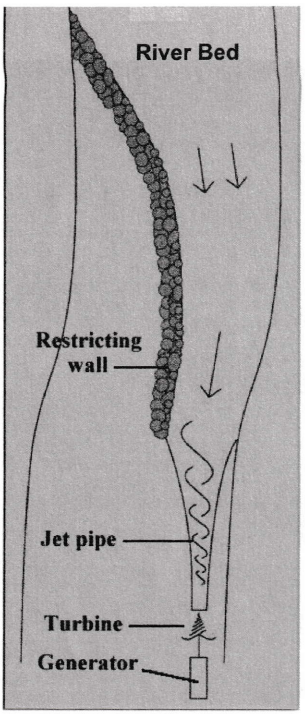


1885 - 1958

Water Jet Turbine

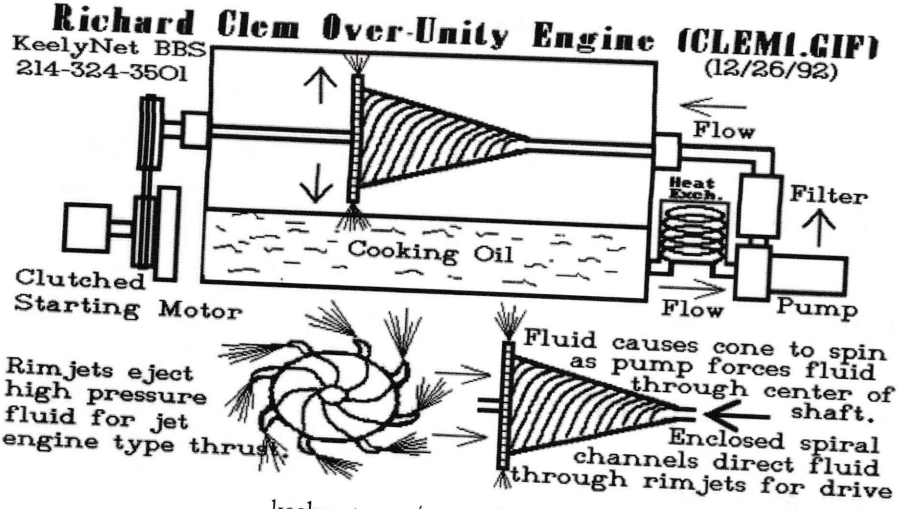
Austrian Patent 117,749 (1930)





Viktor Schauberger is famous for his vortex studies in water. He patented a water jet turbine that he claimed produced excess energy.

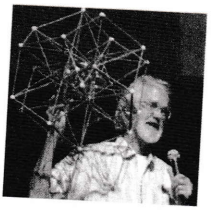
Richard Clem Engine



keelynet.com/energy/clem1.htm

Richard Clem invented a similar turbine that used cooking oil as a working fluid. He claimed his engine was self-running.

Vortex Imploder



Dan Winter





fractalfield.com
theimploder.com/products/imploder-shower-nozzle

Dan Winter posts a highly educational web site. He claims vortex implosion self-organizes energy from the ether or zero-point energy. He offers a vortex "imploder" shower nozzle to produce energized water.

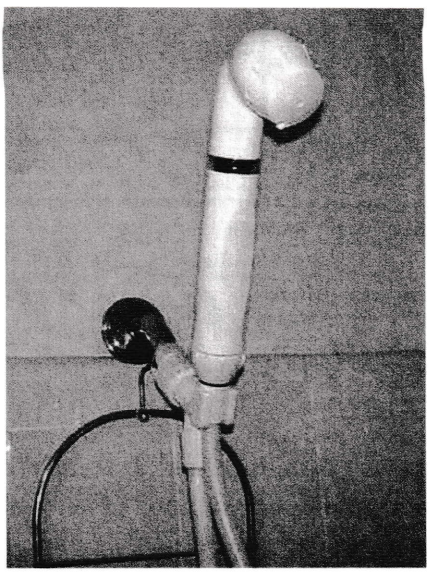
Biokavitus (Bio Cavitation)
Andrea Rampado

Enhanced Plant Growth

Water Purification

Separate Oil from Water

Nuclear Remediation



Google: "Cavitation as a Purification Panacea"

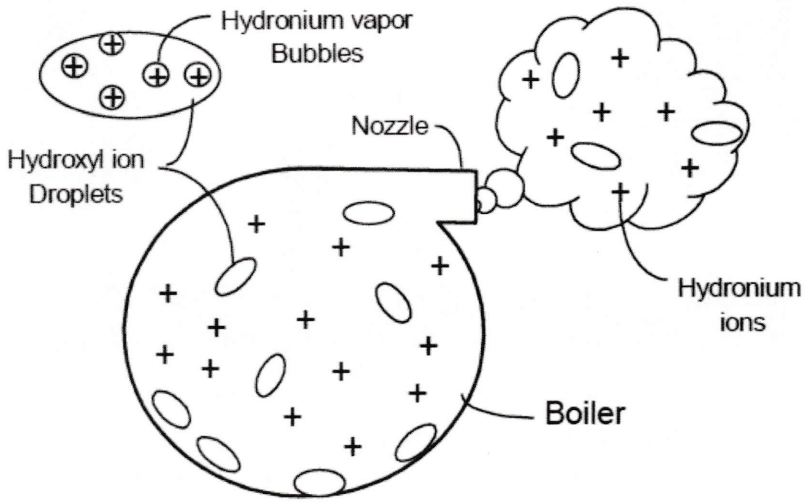
Venturi Shower Head

While on a trip to Italy, Sterling Allan met Andrea Rampado, the lead researcher at Biokavitus. They specialize in cavitation research, especially for beneficial biological applications. Rampado invented a cavitating show head based on the Venturi effect. It emits a high pitch tone as it runs. Keep the idea of a vibrating shower head in mind; the idea could inspire the best embodiment for a cavitating electrolyzer.

Circulate Water to Both Cavitate it and Charge it by Electrostatic Rubbing

Circulating water through the electrolyzer could improve its gas/energy production. Circulation can produce turbulence and cavitation as well as charge the water by electrostatic rubbing.

Thomas V. Prevenslik
Bubbles and Steam Electricity



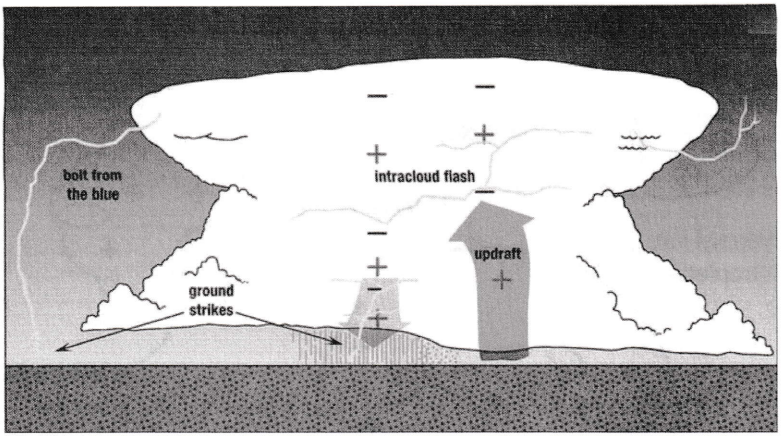
esdjournal.com/techpapr/prevens/previndx.htm

As discussed in the 2009 presentation, T.V. Prevenslik published a seminal paper on the web, titled "Bubbles and Steam Electricity." It describes energetic activation of water via electrostatic rubbing and how the ZPE becomes coherently involved.

- **Steam Electricity**
- **Waterfall Ionization**
- **Sonoluminescence**
- **Thunder Cloud Charge Separation**

Prevenslik explains how stream electricity, waterfall ionization, sonoluminescence, and thunder cloud charge separation can arise from cavity Quantum Electrodynamics during microscopic water bubble compression. If Prevenslik's model is correct, it means that lightning's energy is actually sourced from the zero-point energy.

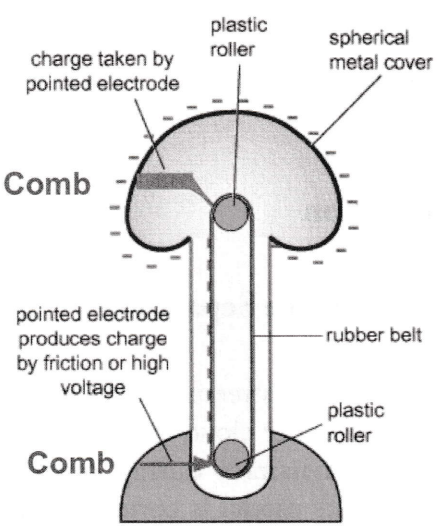
Thundercloud Dynamics



nssl.noaa.gov/education/svrwx101/lightning/types/

Thundercloud dynamics involve tremendous electrostatic charging from friction. Updrafts blow tiny ice crystals called "grapple," which fall back down as rain drops.

Van de Graaff Generator



hk-phy.org/iq/van_de_graaff/van_de_graaff_e.html

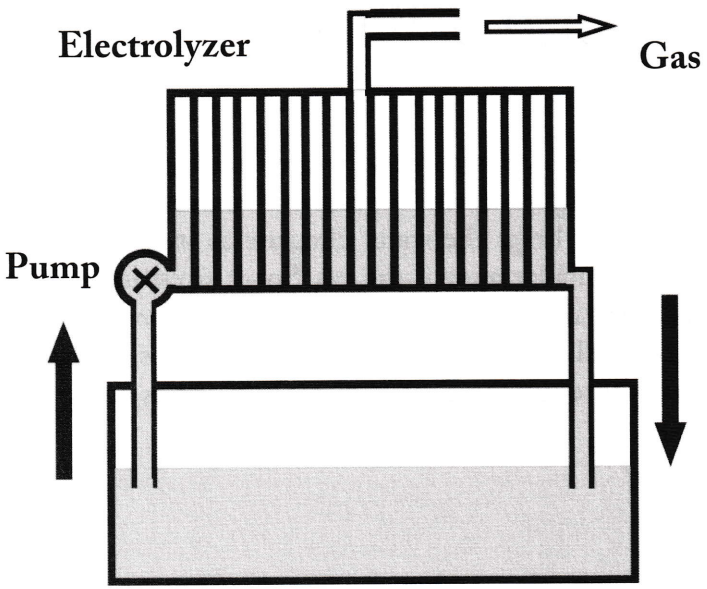
The activity is similar to the van de Graaff generator. Here a dielectric belt transfers electric charge by rubbing against sharp pointed, conductive combs.

Circulating Water Electrolyzer Like Van de Graaff Generator

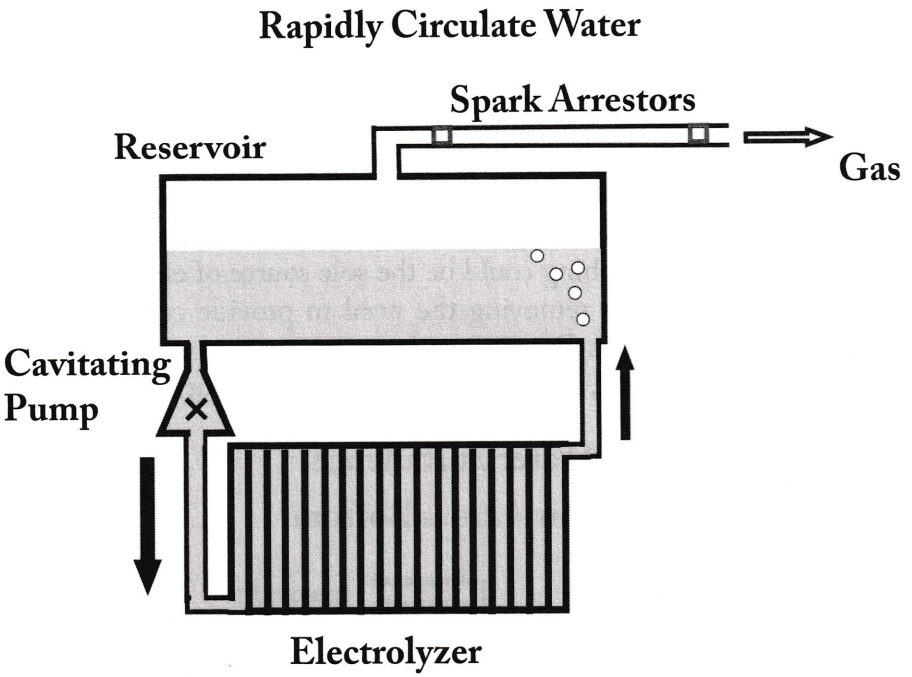
- Distilled water acts as dielectric belt
- Rough conductive plates act as combs

Rapidly circulating distilled water through a electrolyzer mimics a van de Graff generator. Here the distilled water is an insulator and acts as the dielectric belt. The rough electrode conductive plates act as the combs. Electrostatic rubbing could be the sole source of electrical input to the electrolyzer, thus removing the need to provide current from a power supply or battery. Remember, here we are not trying to make hydrogen via electrolysis, and thus we can avoid high current.

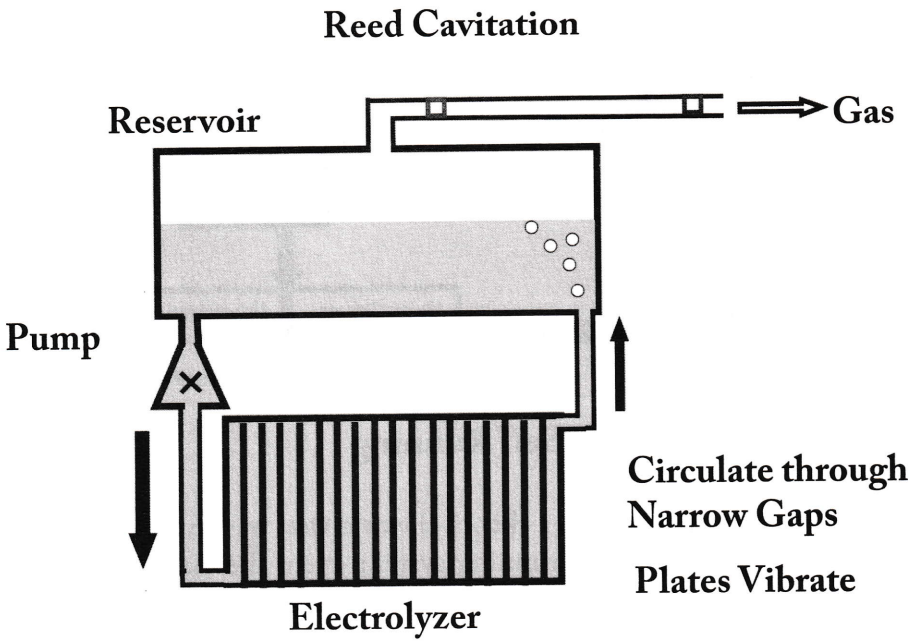
Water Turbulence Flow Across Bottom



One embodiment to mimic a van de Graaff generator is to rapidly circulate water across the bottom portion of the electrolyzer through holes drilled in the plates. Here the circulation will naturally produce turbulence and cavitation.



Another embodiment is to rapidly circulate the water completely through the electrolyzer form a reservoir above it. Here the gas production naturally helps the water circulate as it raises upward. The reservoir acts as a bubbler to emit the gas. Spark arrestors prevent flash-back from accidentally igniting the gas in the reservoir. A cavitating pump could be used to make more cavitation bubbles. Circulating the water repeatedly through the electrolyzer integrates its energy content.

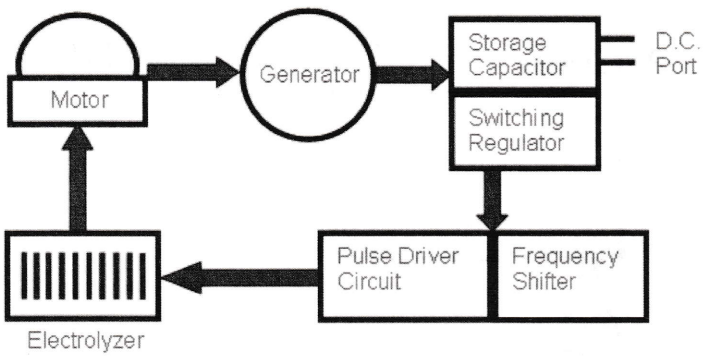


The best embodiment could invoke reed cavitation where the plates themselves vibrate (like a shower massage) in response to rapid water flow through very tight inter-electrode gaps. Here the circulation produces all the effects: electrostatic rubbing, acoustical vibration, cavitation, gas production, and continuous integration of the water's energy content.

Goal: Make Self-Running System and Prove New Energy Source

Once we have a highly efficient electrolyzer, the goal is to make a self-running system and prove the discovery of a new energy source.

Closed Loop System



Self Running

The best way to prove to a skeptical world that we have a new source of energy is to build a self-running system. Here the electrolyzer's gas is used to run a small internal combustion generator whose electrical output is rectified onto a storage capacitor. The capacitor provides the energy for the electronic circuits that properly pulse the electrolyzer to maximize gas production, or alternatively, power a circulation pump. No external power should be used in the circuit except for a battery to give it a "kick start."To keep such a system self-running is extremely impressive because it is well known the internal combustion engine is highly inefficient (~25%). If numerous researchers can successfully replicate such a demonstration, it will prove the existence of a new energy source.

Action Item: Inventors

- Make Closed-Loop, Self-Running System
- Prove Discovery of New Energy Source
- Share Information on Web

The best action by inventors is to make a closed-loop, self-running system to prove a new energy source. Then share the information on the web to spread it and overcome suppression. So far, two teams have claimed success in making self-running systems with generators.

HybridTech Releases Plans

3.25 KW Troy-Bilt Generator
Self-running for 20 minutes
6 liters/minute HHO
12.5 V DC 30 amps
Extra loads:
Light bulbs
Power drill





In November 2009 Steve Eaton and Jeff Sokol of Hybrid Tech released plans on the web where they described Eaton's electrolyzer and his closed loop system running a 3.25 KW Troy-Bilt generator. The electrolyzer output 6 liters of uncompressed gas per minute and there was sufficient extra power to light some bulbs and run a power drill. The system was self-running for about 20 minutes.

Steven Eaton
Concentric Cylinder Electrodes

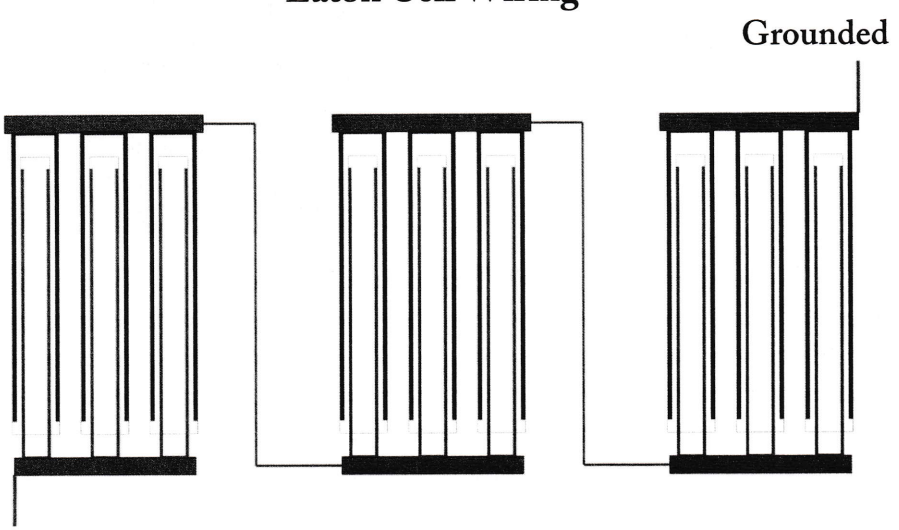


Photo credit: Jeff Sokol

6 inches high **1/2 inch outer** **3/8 inch inner**
1/32 inch gap

The first embodiment of the electrolyzer was 6 inches with concentric cylindrical electrodes. The gap between the electrodes was very small, just 1/32 of an inch.

Eaton Cell Wiring



Eaton's wiring diagram was shared on the web to encourage replication and briefly appeared in Jeff Sokol's eBook, *You Can Turn Water into Fire*. Within weeks the information was withdrawn, and Steve Eaton never communicated again. It appears that he was suppressed. A simplified circuit diagram is redrawn and described as follows:

Eaton assembled the tubular electrodes into banks electrically connected by conductive plates. Each bank was comprised of three tube pairs, and together they resembled three cylindrical capacitors connected in parallel. Here the capacitors' "dielectric" was distilled water or low conductivity water (via adding a small amount of KOH). The three banks were wired like three capacitors in series. The system was driven at 12 volts DC with each bank experiencing an electrical potential drop of 4 volts. Four volts would be an over-driving voltage for electrolysis, but it is appropriate for low conductivity water. The goal here is to make some hydrogen that is trapped as bubbles in the gap between the concentric tubes. The bubble activity creates turbulence as they are forced to spiral up the gap guided by the monofilament line. Later we will see how the turbulence yields nanobubbles, and more are produced when the activity persists up a longer tube.

Shortly after Eaton shared his plans on the web there were a couple of replication attempts that were unsuccessful. It could be that for Eaton, the surfaces of the electrode tubes were gradually conditioned by a buildup of KOH residue during early runs using more KOH electrolyte. After the surfaces were conditioned, then the amount of electrolyte could be reduced appreciably. The electrode conditioning process was described by Dave Lawton, Ravi Raju and Bob Boyce; it is summarized in the 2009 presentation.

Eaton Cell
Concentric Cylinder Electrodes

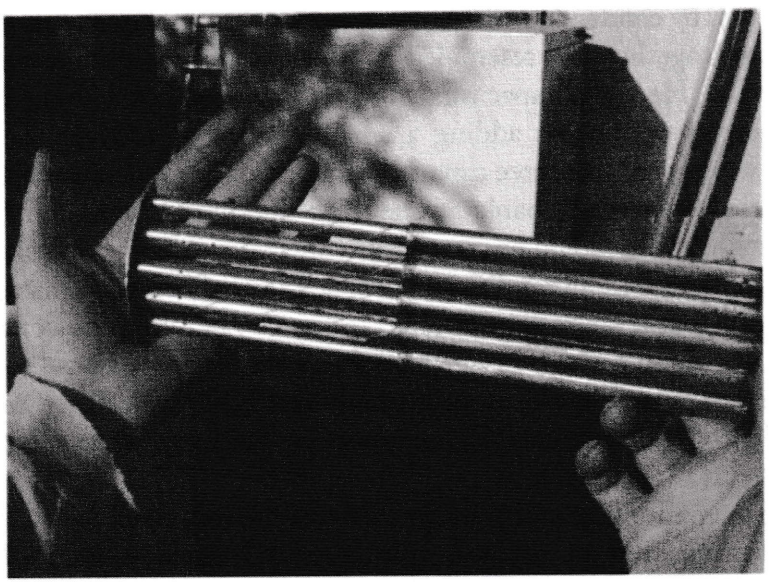


Photo credit: Jeff Sokol

1/32 inch gap

The electrodes were separated by a polystyrene monofilament line wrapped as a spiral on the inner electrode.

Eaton Cell
Spiral Monofilament Line

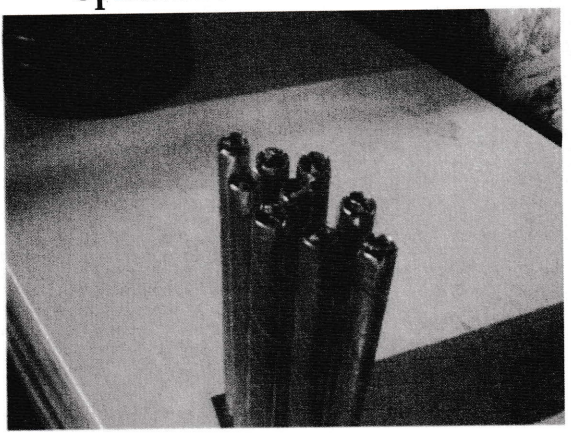


Photo credit: Jeff Sokol

Can induce vortex flow

The spiral wrapped monofilament line forces the water gas to flow up the pipes in a vortex.

16 inches

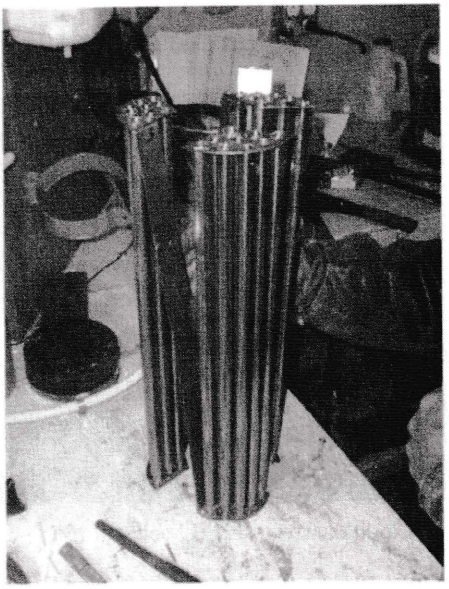


Photo credit: Jeff Sokol

Eaton found that he had to use cylinders that were 16 inches high to create enough power and gas to achieve the self-running system.

Eaton Cell

16 inch



6 inch

Photo credit: Jeff Sokol

Had Eaton known about re-circulating energized water back through the electrolyzer, the small 6-inch system might have been sufficient.

Oliver & Valentin
Closed-Loop, Self-Running, HHO System

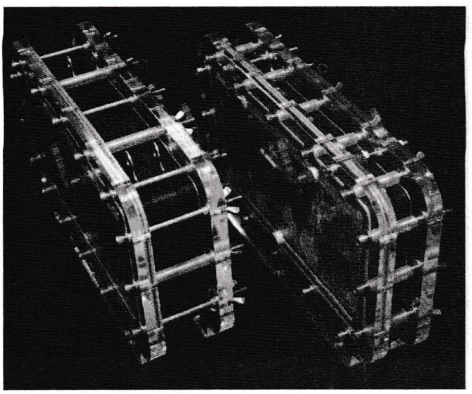


Google: Anton HHO self-running

In December 2010, Oliver and Valentin from Germany posted a YouTube video showing a successful self-running system. As hobbyists on a low budget, they worked with a cheap small Chinese generator where they changed the timing with external rigging in order to run on the gas emitted from the electrolyzer.

Anton Cell

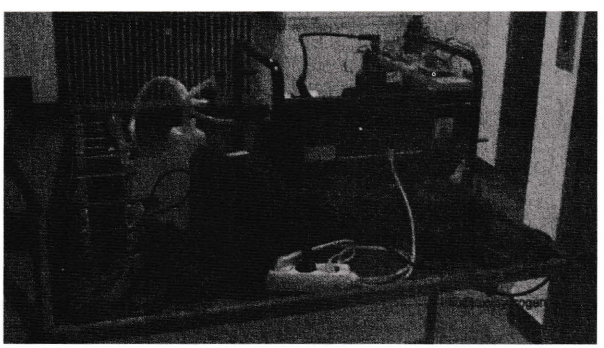
1 mm
Gap



Google: Anton HHO Drycell

For the electrolyzer Oliver and Valentin used Anton cells which have a narrow, one millimeter inter-electrode gap.

Oliver & Valentin



YouTube: Think different, the power of HHO selfrunning

Self-running for 8 minutes

Rode on elevator

The system was mounted on a hand cart, and it was self-running for 8 minutes as they took the cart on an elevator ride. The system had enough excess power to light a head lamp.

Oliver & Valentin Finale



YouTube: Self-looped Hydroxy Generator: Christmas 2010
Awakening from Slavery by PESNetwork

Stefan Hartmann made an inspiring video by splicing Oliver and Valentin's breakthrough demonstration with the famous 1984 Apple commercial. It makes a fun finale.

Summary: Electrolyzer

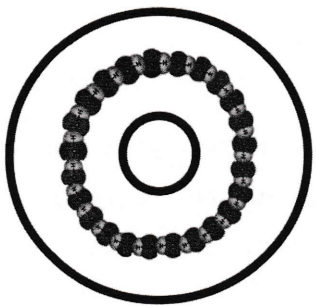
- **Electrodes**
  - **Rough, Clean Surface**
  - **Small Gaps (< 1mm)**
  - **Causes Turbulence, Cavitation**
- **Electrical Stimulation**
  - **Pulsed Waveforms**
  - **Minimize Current and Electrolyte**
  - **Frictional Rubbing via Circulation**

The Electrolyzer. The electrodes should have a rough clean surface with small inter-electrode gaps, ideally under a millimeter. This allows the electrolysis gas to cause turbulence and cavitation.

The electrical stimulation can use pulsed waveforms, but with minimal current and electrolyte. Remember, we are not trying to make hydrogen. Rapidly circulating the water could charge it by electrostatic rubbing and might even allow removing the electrode power supply.

Summary: Cavitation

- **Bubble Collapses**
- **Reentrant Jet**
- **Water Crystal**
- **Closed Rings**
- **Stable Torus**
- **Coherent Energy**
- **LeClair Effect**



When a cavitation bubble collapses near a hole or irregularity, it forms a torus and all the energy of the collapsing bubble gets concentrated into a reentrant jet. The extreme pressure in the jet creates a new solid state of water, a water crystal with a plasma bow shock wave where a ZPE coherence manifests. In collisions, the water crystal can form small rings trapping the energy in a meta-stable torus form. This might be the seed of the charge water gas cluster. When ignited in the torch, two hypotheses were proposed: The ring breaks to re-launch the LeClair effect water crystal, or the ring forms into a plasmoid EVO. Both would exhibit excessive coherent energy.

Summary: How to Cavitate

- **Electrolysis Gas in Narrow Gap**
- **Blow Air**
- **Venturi Vacuum**
- **Vibrations**
  - **Mechanical**
  - **Acoustical: Sonic, Ultasonic**
  - **Oscillate Electric Field**
- **Toroidal Coil**
- **Pulsed Waveform**

There are many ways to cavitate water: Make electrolysis gas in narrow gaps, blow air through the electrolyzer, pull a Venturi vacuum, vibrate the water by mechanical, acoustical or ultrasonic means, oscillate

an electric field via a toroidal coil or via pulsed waveforms. Here charged or polarized clusters or bubbles will oscillate with the field causing turbulence and cavitation.

Summary: Circulation

- **Water Charged by Rubbing**
- **Turbulence, Cavitation**
- **Vibrate Plates: Reed Cavitation**
- **Recycling Water Integrates Energy Content**

Rapidly circulating water through the electrolyzer causes numerous energetic effects. It charges the water by electrostatic rubbing, cause turbulence and cavitation as it flows through the tight, rough gaps; it can vibrate the plates yielding reed cavitation. Best of all, recycling the water repeatedly integrates its energy content. With sufficiently charged water, you could spray water mist into the carburetor of an engine and give the illusion that water is a fuel.

Action Items

- **Chemistry Departments:**
  - **Make Brown's Gas --- Remove Hydrogen**
  - **What is the water cluster gas?**
- **Physics Departments:**
  - **Repeat LeClair's Transmutation Experiment**
  - **Measure Isotopes**
- **Inventors:**
  - **Make Self-Running Systems**
    - **Electrolyzer -- Generators**

Chemistry Departments: Make Brown's gas, vent away the hydrogen. Does the remaining gas burn? What is it?

Physics Departments: Repeat LeClair's transmutation experiment. Measure the new isotopes.

Inventors: Make self-running electrolyzer-generator systems. Cars will be easy to retrofit once engineers are convinced there is a new energy source. Share information on the web to make a new world!

Addendum: An Archtype Form

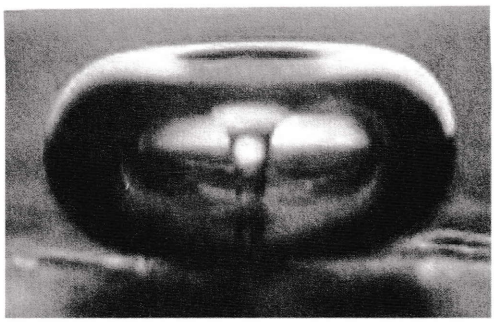
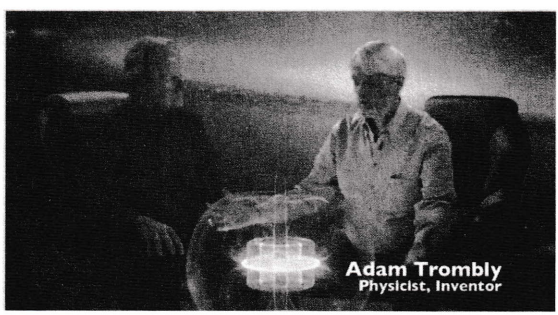


Photo credit: Larry Crum

Cavitation Bubble Collapses into Torus

The cavitation bubble collapses into a torus to emit the reentrant jet, which appears to have ZPE coherence at its tip. Likewise the torus shape is used to model ball lightning and Shoulders' EV/EVO. Many recognize the torus as an archetype form reappearing at many different scales, and it is associated with self-organization in energetic systems.

Thrive Movement



ThriveMovement.com

The Thrive documentary is the latest incarnation on that theme.

Authors Note: The 2012 presentation covered many ideas attempting to hypothesize what is the water cluster comprising the secondary, non-hydrogen component of Brown's gas. I did not learn of nanobubbles until 2016, which offered a far simpler hypothesis. The best is yet to come.

Cavitating Electrolyzers and the Zero-Point Energy (2012)

The gas emitted from popular water electrolyzer projects manifests unusual energetic anomalies, which include claims of vaporizing tungsten when used in a welding torch and running internal combustion engines on small quantities of the gas. Some claim to run generators in closed loop fashion solely on the gas from the electrolyzer, which is powered solely from the generator. Most investigators believe the energy is from burning hydrogen. A hypothesis is proposed that the dominant energy is not coming from hydrogen, but rather it is coming from charged water gas clusters, which activate and coherently trap zero-point energy. Cavitating the water in the electrolyzers appears to maximize gas and energy production.

The water electrolyzer projects are popular with inventors and hobbyists worldwide. There are thousands of videos posted on YouTube under the search, water fuel. Nearly everyone believes their electrolyzers produce a mixture of hydrogen and oxygen gas known by various names such as HHO, hydroxy, oxyhydrogen, and Brown's gas. Brown [1] is famous for investigating the welding applications of the gas and discovered intriguing energetic anomalies [2]. The gas exhibits a cool flame, ~130 degrees C, yet it is claimed to vaporize tungsten, a feat beyond today's commercial welding torches [3]. The academic community has yet to explore or explain this anomaly. Burning hydrogen cannot account for it.

Perhaps the most popular application of the water electrolyzers is to boost an automobile's gasoline mileage [4, 5]. An energy anomaly manifests here as well for the boosters typically produce only a few (5-20) liters of uncompressed gas per minute. Yet many claim significant increase in miles per gallon (20-50%). Burning hydrogen cannot account for it.

Even more surprisingly some investigators have claimed to run gasoline generators on 5 to 6 liters per minute of the uncompressed gas,

and the generator's electrical output was stable on the order of a kilowatt [6 – 8]. Such claims appear remarkable, considering the low efficiency of typical internal combustion engines (~20%). Burning hydrogen certainly cannot account for this.

This paper will explore the hypothesis that the dominant energy coming from the water electrolyzers is not from hydrogen, but rather it is from another source which might be far more energetic: charged water gas clusters, which activate and coherently harvest zero-point energy (ZPE). Others have proposed a coherent water zero-point energy interaction. Prevenslik [9] introduced a model where a collapsing nano bubble coherently activates a standing wave from the ZPE whose continuously increasing resonant frequency acts like an ultraviolet to x-ray laser which coincides with the dissociation frequency of the water's hydrogen-oxygen bond to yield charge separation. He applied the model to explain steam electricity, waterfall ionization, sonoluminescence, and thundercloud charge separation. If Prevenslik is correct, it implies the zero-point energy significantly contributes to lightning formation. Appendix A summarizes the author's hypothesis [10, 11] on how the zero-point energy might coherently participate in self-organized collectives involving ionized matter or plasma.

To further support the ZPE hypothesis, another phenomenon that exhibits energetic anomalies similar to Brown's gas is discussed in Appendix B: plasma charge clusters. Plasma charge clusters are a form of microscopic ball lightning that have been experimentally observed and extensively studied by Ken Shoulders [12]. He named them "electrum validum" (EV) meaning "strong charge," and later renamed them "exotic vacuum objects" (EVO) when he became convinced that they coherently coupled to the ZPE to account for the excessive energy they manifested [13].

Recent studies by Mark LeClair [14] show a similar phenomena arising in water cavitation. When a cavitation bubble collapses near a surface or irregularity, it deforms into a torus, and the entire energy of the collapsing bubble goes into forming a reentrant jet at a nanometer scale. LeClair discovered that the extreme pressure within the reentrant jet causes the formation of a novel solid state of water, a macro-ionic water crystal. The tip of the water crystal exhibits a plasma bow shock wave, which manifests similarities to Shoulders' EVO. This might account for the extreme pitting and corrosive damage on propellers caused

by cavitation. Both LeClair and Shoulders observed highly energetic anomalies like pitting craters and carving trenches in high melting point ceramics (e.g. aluminum oxide). Shoulders suggests that the energy of the EVO is stored coherently, and its interaction with the ceramic or metal directly disrupts the electron atomic bonds. The bond disruption is not due to heat. The EVO anomalies are similar to those exhibited by the Brown's gas welding torch.

Brown's Gas Anomalies

Brown's gas exhibits energetic anomalies that have not yet been addressed by the scientific community. The most frequently observed anomaly occurs in welding applications. Here the burning gas exhibits a cool flame measured to be about 130 degrees C, cool enough to quickly pass one's hand through it [3]. The flame does not boil water by direct contact, yet when it interacts with metal, it readily melts it. It has been claimed to vaporize (and oxidize) tungsten. Commercial welding torches cannot vaporize tungsten.

Recent university studies by Eckman [15] confirmed the low temperature of the Brown's gas flame, and it did melt and oxidize tungsten. A mass spectrometer was used to determine the constituents of the gas, and he discovered the gas contained the expected diatomic hydrogen and oxygen, but no mono-atomic hydrogen. In addition he found clusters of water in a gaseous form that contained excess electrons. This observation matches the literature that discusses an observed form of water clusters known as "hydrated electrons" [16], where experiments have determined that the excess electrons are trapped in the interior of the cluster. Eckman suggests that at the heart of the cluster there exists a linear isomer of the water molecule where the excess electrons are held in the d orbitals of the oxygen atom. Here the cluster might be a form of Rydberg matter where nearby molecules in the cluster shares the high-energy band electrons. Eckman's hypothesis was inspired by a preliminary x-ray diffraction image showing a linear water molecule shape, but further studies must be completed to confirm it. The Rydberg matter hypothesis offers a coherent storage mechanism to hold excess energy in a gaseous charge water cluster.

Eckman's hypothesis gets further support from LeClair's model [14] of the macro-ionic water crystal formed in the collapsing cavitation

bubble's reentrant jet. The water crystal has a long axis of parallel strands of covalently bonded HOHOHO... The crystal has hexagonal symmetry around the circumference. The parallel strands are staggered such that hydrogen bonds couple them. The covalent bonds down the axis effectively manifest Eckman's linear isomer. LeClair has observed loops of the crystal evidenced by microscopic photographs of their imprints. Large water crystal loops are unstable and short lived, but LeClair suggests that sub-micron loops might be stable, and these could manifest as a heavier-than-air gas via Brownian motion. LeClair's sub-micron water crystal loop might be the structure of the proposed charged water gas cluster. If so, it would imply that cavitating the water in the electrolyzer would significantly enhance gas production.

Wiseman [2] has gathered a repository of research about Brown's gas. Perhaps the most astounding anomaly claimed involves replication of Yull Brown's experiments to alter the radioactivity of americium [17]. The experiment involves impinging the welding flame onto a mixture of aluminum and iron (akin to thermite) on which sits the americium sample. The flame triggers a small explosive event, after which the americium sample exhibits little radioactivity. There are similar experiments involving EVO strikes [18] as well as high-energy plasmoid strikes [19] into pure metallic targets that manifested transmutation into elements whose isotopes are not readily found in nature (see Appendix B). Moreover, LeClair has claimed to create a similar nucleosynthesis with an extreme cavitation experiment. In the experiment, a rolled up piece of aluminum veneer with many decorative holes is placed in a chamber with water bubbles produced by a cavitating pump. The reentrant jets tend to accelerate through the holes to strike a more distant portion of the veneer. Here LeClair has claimed to measure new and unusual isotopes. The tip of the accelerating, reentrant jet water crystal seems to behave like the EVO and plasmoids. Thus all three investigators claim to cause transmutation or nucleosynthesis from strikes of plasmoid-like entities.

Just like plasmoid strike events, could the abrupt explosive interaction of the Brown's gas charged water clusters with the thermite alter the nuclei of the radioactive sample? Such experiments would have to be extensively and carefully repeated by the academic community before concluding that element transmutation is occurring. If such events could be repeatedly demonstrated, it might imply a coherent ZPE

interaction with atomic nuclei to account for an energy density sufficient to influence the nucleus.

The charge water gas hypothesis gains further support from observation of electrolyzer bubbles between the parallel plate electrodes. When the plates are separated over a centimeter, near the cathode are observed the hydrogen bubbles and near the anode are observed the oxygen bubbles as in standard electrolysis. However, in the gap between them are observed a third set of bubbles that contain the more highly energetic gas that Wiseman [20] suggested to be "electrically expanded water," which is essentially the same as the charged water gas cluster hypothesis here. This is the pure form of the gas, which is the source of the energetic anomalies. Suartt and Gourley [21] have filed a patent, where they further separate the electrodes so that they can harvest just the middle set of bubbles, and eliminate hydrogen from the mix. The pure gas still exhibits all the welding anomalies, and they are able to safely store it under pressure because it contains no hydrogen. With the electrodes so widely spaced, Suartt and Gourley had to add extra electrolyte to their water and conduct appreciable current to generate the gas, which prevents them from exhibiting any net energy gain. Nonetheless, they have developed a technique to harvest the pure form of the gas for repeatable study that might be intriguing to the scientific community: a form of water that "burns" with coherent energetic content sufficient to melt and oxidize tungsten.

Vibrating The Water

Another technique for making the pure form of the charge water cluster gas might have been invented by Omasa [22]. Omasa subjects the water to mechanical vibration at ~100 Hz by a set of paddles to dramatically lessen its surface tension. Even if detergent is added to the water, it will not form visible bubbles during vibration. Omasa states that bubbles are forming at nano scales, which are not visible to the naked eye. When the water is electrolyzed, he produces abundant gas that exhibits all the anomalies of Brown's gas, yet it apparently contains little free hydrogen for he can likewise safely store the gas under pressure for long periods of time (over two years), after which the gas still exhibits its energetic form when ignited. Omasa was able to run an internal combustion engine with just the gas, while blocking any extra air intake

into the engine. Omasa claims that vibrating the water lowers its surface tension to make nano bubbles, which yields a superior, more energetic form of the water gas from the electrolyzer.

Vibrating the water with rapid, abrupt paddle motion would produce cavitation bubbles from the low pressure just behind the paddle. If these bubbles launch reentrant jets, then they could help make the hypothesized charge water clusters.

It appears that Chambers [23] inadvertently discovered an efficient means to vibrate water in an electrolyzer. Chambers used a toroidal coil (1500 turns of wire on a ferrite core) under water in his electrolyzer, and drove it at ~19 Hz. The gas from the electrolyzer exhibited a superior burning characteristic that allowed him to directly use it to fuel a 1 KW Honda generator without needing to adjust the timing on its internal combustion engine. Chambers believed his electrolyzer was producing parahydrogen via the coil's magnetic field because the gas would burn slower than natural hydrogen. When he did not use the coil, the electrolyzer emitted gas that would burn faster, which he assumed was orthohydrogen. It is unlikely that the coil's magnetic field influenced the water since the field lines are effectively confined inside the ferrite toroid. In view of Omasa's discovery, we can now infer the actual purpose of the coil: The alternating magnetic field has a corresponding alternating vector potential surrounding the coil, which in turn induces an oscillating, toroidal electric field around the coil. The charged water clusters created in the electrolyzer would then oscillate with the electric field causing the water to vibrate at the drive frequency. Here too, the vibrating water could exhibit cavitation bubbles. Like Omasa discovered, the result of electrolyzing water while it is vibrating produces a superior, more energetic form of water gas.

Many inventors and hobbyists have tried using toroidal coils to make a better gas. Eardley (private communication) used ten ½ inch diameter ferrite toroidal coils with 25 windings of 4 gauge wire on each and mounted them on a circuit board as two groups of five coils, each group connected in series. He drove one group with low frequency pulsed DC square waves at 12 volts, 30 amps and the other group at 35 amps (because that was the maximum rating of the coils). He drove his electrolyzer with pulsed DC square waves at 12 volts, 10 amps. The electrolyzer consisted of 25 parallel plates (304L stainless steel, 16 gauge, 8 inch x 11 inch, with 1/8 inch rubber gaskets separating

the plates). The electrolyzer emitted sufficient gas to run a lawn mower engine. To investigate the quality of the gas, Eardley filled balloons with the gas emitted from the electrolyzer. It is interesting to note that when the toroidal coils were activated, the gas in the balloon was heavier than air, and the balloon would drop. When the coils were inactive, the electrolyzer gas would be lighter than air, and the balloon would rise. Eardley also isolated the heavier-than-air water gas by storing it overnight in a paper bag. Since the bag is porous to hydrogen, any free hydrogen vents away. The next day he opened the bag, and the residual water gas would not disperse. When lit, it would implode back to liquid water with a distinctive pop. Eardley surmised that the heavier-than-air water gas contained little free hydrogen, and he would then contain the gas under medium pressure (~50 psi) in order to drive larger internal combustion engines.

Eardley recently tried experiments where the water was constantly circulated through the gaps between the electrolyzing plates via a small pump (powered at 12 volts, 8 amps toggled off and on each second to maintain a circulation water pressure of ~25 psi). He could then avoid using the toroidal coils entirely. Eardley found that rapid water circulation produced the most gas of all his experiments, and the gas appeared white like fog. He then was able to reduce his total input power to ~200 watts. It appears that charging water that is rapidly flowing multiple times through the inter-electrode gaps integrates the energy content of the water, and yields a more powerful water gas.

Originally for the electrolyte Eardley added a mixture of potassium carbonate (2 teaspoons) plus a little sodium hydroxide (1/2 teaspoon) per gallon of pure water made by reverse osmosis. The potassium carbonate reduces the surface tension of the water, but it is emitted from the electrolyzer along with the water gas. To recover it, Eardley recycled the engine's exhaust water back to the electrolyzer. Later, when Eardley used the water pump instead of the toroidal coils, he found he could omit the potassium carbonate from the solution. However, he still continued to recycle the engine's exhaust water. Recycling the exhaust water appears to offer an added benefit: There still might exist energetic charged water clusters in the water after discharge in the engine. If so, the clusters would exhibit behavior akin to the "black" EVO [24], a plasmoid-like form that seems to be dormant, but can be re-activated with a voltage pulse (see Appendix B). Recycling the exhaust water might allow an

effective energy recapture and integration for the system.

Perhaps the simplest means to produce an abundance of charged water gas clusters has been discovered by the inventors and hobbyists whose electrolyzers have very small gaps between the electrodes (less than 1 mm). Here any free hydrogen or oxygen atoms produced on the electrodes tend to join the water clusters forming in the middle. The primary motivation for the small gaps is to reduce or eliminate the use of electrolyte in the water, which allows a significant reduction in drive current and thus input power. It is electrolyzers of this type that have resulted in the claims of excessive energy production.

Another benefit of tight gaps is that the electrolyzer gas itself causes the water to cavitate. If the cavitation bubbles launch reentrant jets and these form the charged water cluster gas, then tight gaps between rough electrodes become an ideal environment for launching the water cluster gas with less input power.

Conditioning the Electrodes

Since water (especially distilled water) does not readily conduct electricity, inventors have learned that they must "condition" their electrodes, which are typically 316L stainless steel. The result of conditioning creates a rough, microscopic sharp pointy surface, which induces high electric fields around the points and facilitates microscopic electric discharges into the water. If the electrodes are not properly prepared, no current will flow, and the electrolyzer will fail to produce any bubbles whatsoever. This is a frequent occurrence for hobbyists when they first begin their research, and they typically add electrolyte (potassium hydroxide or sodium hydroxide) to the water and are then happy to produce gas bubbles. Since most researchers believe they are making hydrogen with their electrolyzers, they naturally want to supply a large drive current to follow Faraday's law, which essentially states you need to supply one electron for each hydrogen atom you wish to dissociate from the water. The inventors that properly condition their electrodes produce an abundance of gas that appears to exceed Faraday's law, but the law is not actually violated because the gas abundance is not from hydrogen production.

Techniques for electrode conditioning have gradually improved as researchers have been sharing their results. Lawton, who was replicating

the electrolyzer of Meyer, developed a long protocol by conditioning his electrodes in tap water [4, p114]. He would run a repetitive, hourly sequence of low current to high current for about a month. During the conditioning a reddish brown crud (likely iron oxide) would discharge from the electrodes and the water would have to be periodically replaced. Gradually, a whitish grainy surface would accumulate on the electrodes. The whitish material has not yet been analyzed but it could be salts, carbonates, or silicates present in the tap water. Ravi [25] who replicated Lawton's electrolyzer was frustrated with no gas production whatsoever until he followed Lawton's conditioning protocol, after which he was able to produce abundant gas using only 0.5 amps of current. Tap water is a poor medium for scientific replication because the water's mineral content is unknown.

Boyce developed a technique that conditioned his electrodes in a mixture of distilled water and potassium hydroxide that took about three days [4, 5]. He first roughened the electrodes by cross-hatching them with sandpaper. Then he conditioned them in the electrolyte solution with DC current. The electrodes would likewise emit a brownish crud, and the water would have to be periodically cleaned. After three days the electrode would exhibit a grayish white surface and then would be ready for use. All researchers stressed the importance of not touching the electrode surface once it is conditioned because it would damage their charge emitting properties

Zigouras (private communication; panacea-bocaf.org; [26]) discovered a straightforward technique for preparing stainless steel electrode plates. He media blasted them with 40-grit silicon carbide and then cleaned them with an ammonia-based cleaning solvent. No further conditioning was needed. Zigouras stressed it was important to media blast the surface at 45 degrees and not straight on. The microscopic craters from the media blasting would then have sharp edges. Zigouras also had a very tight gap between his plates, 0.6 mm, which allowed him to convert water sucked through the plates nearly instantly into energetic water gas by means of high current. Zigouras exhibited one of the fastest gas producing electrolyzers on the web, and his approach to conditioning the plates offers the opportunity for easy replication.

Eardley (private communication) prepared his 304L stainless steel plates by having a plating company immerse them in hydrochloric acid for 30 minutes, a harsh descaling technique called "pickling." The

plates are rinsed with water, and then immersed in a bath of potassium hydroxide solution where they are electrolyzed at 10 amps for about 45 minutes until they no longer discharged brownish crud. Afterward Eardley immerses the plates in vinegar for 30 minutes, and washes them in a dishwasher using standard (dishwasher) detergent. The hydrochloric acid (especially with residue ferric chloride) aggressively erodes the surface of the stainless steel leaving a microscopically rough, pointy surface that supports electric discharge characteristics apparently favorable for charge water cluster formation. The surface yields abundant gas production from the electrolyzer, and the water remains crud free. Eardley's protocol for preparing stainless steel electrodes offers consistent repeatability for manufacturing high quality electrodes.

Conductive materials that already have a rough dendritic surface might make good candidates for electrodes. Mixed metal oxide titanium has been used in standard commercial electrolysis without any need for preparatory conditioning. It has been successfully tried in some booster water electrolyzer projects [5], but so far only with large inter-electrode gaps, which requires electrolyte solution and high current. (Since most researchers believe they are making hydrogen, they typically add electrolyte to produce large currents and see no reason to have small gaps between the electrodes.) Other rough materials such as sintered stainless steel have been discussed as good candidates, but so far not yet tried. Most hobbyists use 316L stainless steel because it is cheap, and it has a track record on the worldwide web with many claims of success.

Powering Generators

There are numerous projects on the web that demonstrate powering small motors and portable generators exclusively from the water electrolyzer's output gas. Omasa [22] shows it in his video, and Chambers' [23] patent mentions running a 1 KW Honda generator. The goal is to produce enough gas at minimal electrical input to the electrolyzer to make the system self-running where the rectified output from the generator is the sole source of input power to the electrolyzer. This would dramatically prove the existence of a new energy source. At first glance this goal appears ludicrous because the generator's internal combustion engine is only about 20% efficient, and there are other energy losses throughout the closed loop system as well. The net energy

content of the hypothesized charged water gas clusters would have to be extraordinary (over 5x the input power) to overcome these losses to manifest a self-running system. Yet there have been announcements claiming to have done so.

Steve Eaton has claimed to have successfully run a closed loop, generator electrolyzer system that produces six liters of gas per minute that even exhibited some excess power to drive external loads [6]. He teamed with Sokol [27] of Hybrid-Tech Corporation to publish the plans so that others could replicate his results. The electrolyzer cell consists of 27 pairs of 16-inch long cylindrical stainless steel electrodes (1/2 inch outer diameter) with tight spacing (under 1/32 inch). A spiral wrapping of polystyrene line maintains the gap between the cylinders, and it guides the gas into a helical flow as it travels up the gap between the electrode tubes. The power needed to drive the electrolyzer was 12.5 volts, 30 amps DC. The electrolyzer used a weak electrolyte solution (one gram of potassium hydroxide per gallon of distilled water). The gas output was sufficient to run a 3.25 KW Troy-Bilt generator, which not only provided all input electrical power to the electrolyzer, but also had excess power to light a few light bulbs. Construction of the electrode assembly is not easy, and so far no one has claimed a replication success.

In Germany Oliver and Valentin have claimed to run a small 1 KW generator in a closed loop fashion using three Anton cells [7]. The commercially manufactured Anton cell consists of seven parallel-plate stainless steel electrodes, whose 1 mm spacing is maintained by neoprene gaskets. The electrolyte solution consisted of 3% potassium hydroxide in distilled water. Approximately 900 watts of input power was required to produce a gas output of 6 liters per minute. Oliver and Valentin had to provide their own timing circuit to properly fire the generator spark plug and avoid igniting a waste spark. In April 2010 the system ran for about 40 seconds in closed loop fashion, but was not stable and still required further circuits to regulate the power fed to the electrolyzer from the generator. In December 2010 Oliver and Valentin demonstrated a stable self run of over eight minutes where they mounted the apparatus on a handcart and took on an elevator ride. An open source project has been started in Germany to promote replication.

Perhaps the most spectacular claim is from Frederick Wells, who claims to have successfully run a truck on just the water gas from his electrolyzer without depleting his battery [28]. Wells is now engaged

in an "open source" public project to build a self-running generator, electrolyzer system [8]. His cylindrical electrode assembly is designed to vibrate at acoustical frequencies, which he believed caused water dissociation. Wells was unaware that the acoustical resonance causes water cavitation, which is likely the reason for the abundant gas.

Driving With Pulsed DC Waveforms

A number of investigators have found that using pulsed DC square waves to drive the electrolyzer have enhanced gas production. Chambers patent describes exploring the spectrum from 1 to 250 KHz for the square wave frequency. Many researchers have found that driving the electrolyzer with a square wave around 40 KHz yields good results [4]. Most agree that the best drive frequency has to be experimentally discovered for each electrolyzer because there is no one simple frequency that manifests a full system resonance. Zigouras (private communication; panacea-bocaf.org; [26]) discovered that he had to gradually and continuously alter the drive frequency by a few KHz centered near 40 KHz to optimize gas production. As a waveform improvement, Lawton discovered that a high voltage spike on the leading edge of the square wave increased the energy content of the output gas [4, p125]. Even though successful gas production occurs with a simple DC drive, using pulsing techniques have helped to reduce the need for large input currents.

Summary

This paper was motivated by the apparent success of the researchers and hobbyists in the "HHO community." They have been demonstrating unusual energy anomalies and have been trying to explain them in terms of hydrogen production. Those that are scientifically trained realize that hydrogen cannot account for what is claimed, and thus the discussion groups on the web are engaged in vituperative argument. In a sense, both sides are right: hobbyists appear to be demonstrating energetic anomalies and hydrogen is not the source.

The hypothesis offered is that the single-duct electrolyzers are producing charged water gas clusters, which is the dominant energetic component instead of hydrogen. The electrolyzers that yield the largest energy anomalies appear to make more charged water clusters and less

hydrogen. From the study of the disclosures by many inventors, the following characteristics seem to make favorable electrolyzers:

1. Clean, rough electrode surface
2. Small gap between the electrodes
3. Circulate or vibrate the water
4. Minimum electrolyte (typically potassium hydroxide or sodium hydroxide)
5. Driving electrolyzer with pulsed DC square waves
6. High voltage spike on the leading edge of the square wave
7. Recycling the exhaust water back to the electrolyzer

Turbulent, cavitating water flow through narrow inter-electrode gaps appears to augment the energy content of the emitted gas. LeClair's discovery that the reentrant jets from collapsing cavitation bubbles could be the way excess energy is captured into the water cluster. The evidence implies that the hobbyists have inadvertently been causing water cavitation in their electrolyzers. Cavitation can occur by:

1. Electrolyzer gas production in narrow, rough inter-electrode gaps
2. Vibrating the water by mechanical, sonic, or ultrasonic means
3. Vibrating the water by pulsed or oscillating electric fields
4. Blowing air through the electrolyzer
5. Pulling a Venturi vacuum through the electrolyzer
6. Circulating water rapidly through the tight gap electrolyzer

The later offers novel means to improve the system. If water is recycled between a reservoir and the electrolyzer, the water's energy content can continuously increase by accumulating water gas clusters. If the rapidly moving water vibrates the electrolyzer plates (like a shower massage), it can cause reed cavitation. Intentionally cavitating the water in the electrolyzers might yield a surprising, abundant output.

Conclusion

Since hobbyists typically do not have the equipment to measure the constituents of the gas produced from their electrolyzers, the academic

community can help resolve what is happening by an orderly research program. Since the one energetic anomaly that is well established is the melting and oxidation of tungsten by the cool flame of the Brown's gas welding torch, the first step is to confirm this. The second step is to analyze the content of Brown's gas, and then use the appropriate techniques to produce the pure form of the charged water gas by venting away just the free hydrogen. Analyze the gas to show there is little free hydrogen content, and then reconfirm that it still exhibits the welding torch anomalies. At this point the scientific community would have a pure energetic anomaly to study: a form of water that appears to "burn" with extraordinary coherent energy content.

The second phase would be to investigate the energy content of the pure water gas. If it runs a generator, then the generator's output power and the electrolyzer's input power can be measured. If excess energy is measured, then a closed loop system can be attempted. If a closed loop system involving a (internal combustion engine) generator can idle for a significant time, then a new energy source would be demonstrated. At this point it would be valid for the academic community to consider the zero-point energy hypothesis as a possible explanation.

It is the author's hope that the scientific community would be willing to engage in such a research program. It just might be that the HHO community has inadvertently discovered a surprisingly simple means to tap the zero-point energy.

Acknowledgements

The author wishes to thank Mark LeClair for sharing his research and Tom Valone for helpful discussions, references, and guidance.

Appendix A: Can the Zero-Point Energy Become an Energy Source?

Considering that the zero-point energy might be an energy source is an unusual hypothesis. Most of the scientific community outside of the field of physics, know little about it. The majority of the physics academic community would likely reject the hypothesis as too radical a paradigm shift [29]. However, experts in the field of zero-point energy research realize it is an open question [30, 31]

The zero-point energy of vacuum is comprised of fluctuations of

intense electromagnetic field energy at the scale of the Planck length, 10^{-33} cm. The Planck length is twenty orders of magnitude below the size of the elementary particles. The name "zero-point" refers to absolute zero degrees Kelvin meaning that the energy is integral to the pure "fabric" of space in the absence of light, heat and matter. Historically the energy was discovered at the birth of quantum mechanics where the modeling required an underlying jitter to all quantum mechanical systems. Dirac showed that the source of the jitter was electric field fluctuations inherent to the fabric of space itself, which could birth electron-positron pairs that spontaneously pop in and out of existence in our three dimensional space [32]. Wheeler's theory of *Geometrodynamics* [33] showed that the huge energy densities would alter the space-time metric creating Planck size, black hole - white hole pairs that channel electric flux through microscopic channels he named "wormholes." Wheeler's theory implies that the source of the ZPE is effectively electric flux from higher dimensional space that orthogonally penetrates our 3-space brain. As the electric flux passes through our 3-space it produces a seething, chaotic turbulence called the "quantum foam," which manifests behavior akin to turbulent plasma at the sub-quantum scale.

There is a tremendous energy density in the chaos of the quantum foam. Can it possibly be harvested as an energy source? At first the answer appears to be no because the fluctuations are chaotic and appear to be random in their behavior. However, in 1977 Prigogine [34, 35] won the Nobel Prize in chemistry for showing that under certain conditions, a system may evolve from chaos into self-organization. Three conditions are required for a chaotic system to exhibit self-organization: The system must be 1) nonlinear, 2) far from equilibrium, and 3) have an energy or matter flux through it.

A good example of self-organization would be vortex formation during hydrodynamic turbulence. Another example would be vortex or vortex ring pair production arising in turbulent plasma. Bostick [36] studied plasma vortex rings called "plasmoids" and noted that they tended to form in pairs of opposite helicity, which conserved angular momentum. Plasmoid pair production in turbulent plasma and electron-positron pair production arising in the quantum foam might both exhibit archetype self-organization, the creation of macroscopic order from an underlying microscopic collective. The archetype self-organization supports Nobel Laureate, Laughlin's thesis [37], where he contends everything at its

foundation arises from the self-organization of collectives including the laws of physics themselves. Collectives in the quantum foam are maintained by the orthogonal electric flux that passes through them, much like the flow of a stream maintains a whirlpool. Jennison [38] and Turtur [39] offer models involving this concept. Modeling elementary particles as collectives is dramatically different from modeling them as point entities or Planck length strings. Laughlin's thesis involves a paradigm shift from today's popular particle theories. Such a paradigm shift might be further supported if even larger, macroscopic collectives could be shown to exist.

Can Macroscopic ZPE-Matter Collectives Exist?

The zero-point fluctuations intimately interact with all elementary particles via vacuum polarization. Quantum Electrodynamics describes a coherent cloud of vacuum energetic activity surrounding all particles that gradually declines with distance. There is no real separation of the particle from its vacuum polarized cloud [40]. In order to theoretically calculate the values for a particle's observed mass and charge, a mathematical renormalization is used to subtract out the high frequency energetic fluctuations to yield the finite values experimentally observed.

The different elementary particles have different descriptions of their vacuum polarization [41]. Electrons, especially those in the conduction band of metals are described as a smeared charge cloud that is effectively in thermodynamic equilibrium with the vacuum fluctuations. No net energetic yield could arise from such a system, which explains why no energy anomalies are observed in standard electrical and electronic circuits. However, an atom's nuclei have steep lines of vacuum polarization converging onto it. This might offer the capability to induce coherence in the zero-point fluctuations by abrupt motion of the nuclei. Exotic coherent vacuum effects are observed in heavy ion collision experiments [42], but no researchers have attempted to measure excess energy anomalies. However, energetic anomalies are observed when a large number of nuclei abruptly surge in plasma experiments involving the ion-acoustic mode. The energetic anomalies include run-away electrons, high frequency voltage spikes, and excessive heating. The energetic anomalies are often observed in conjunction with the formation of vortices and plasmoids [43]. Here might be evidence for

an organized collective involving plasma particles and ZPE coherence.

Appendix B: Plasma Charge Clusters

Shoulders [12] has extensively studied micron size, plasmoid-like forms resembling microscopic ball lightning that exhibit excessive energy anomalies. He creates them from an abrupt discharge from a known capacitor at a known voltage through a sharp pointed electrode. In the abrupt discharge the microscopic tip of the electrode blows off yielding a pure unipolar discharge event, similar to exploding wire experiments. The plasmoid form travels along groves on dielectrics, and when it contacts a metallic surface, it explodes emitting an electromagnetic pulse (EMP) and bores a crater into the target material. The measured EMP is greater than the input energy from the capacitor, and its ability to bore through high melting point ceramics like aluminum oxide convinced Shoulders that the entity contained excessive energy, and thus he named them "exotic vacuum objects" (EVO) to reflect his hypothesis that the excess energy was from coherently coupling the vacuum's zero-point energy into the plasmoid form.

Shoulders [24] speculates that he might be observing the fundamental mechanism by which the vacuum can manifest charge creation. The EVO typically manifests a charge of 100 billion electrons and contains about a million ions. It manifests a charge to mass ratio (e/m) the same as the electron. The ratio appeared even when Shoulders created positive EVO (a rare event), and this event proved that the EVO was not a simple collection of electrons (or positrons) because when the positive EVO decayed, it did not manifest 0.5 MEV gamma rays characteristic of electron-positron annihilation. Another unusual characteristic is that when on a dielectric, the EVO can sometimes stop emitting light and go dark. He has named these entities "black EVO," and he can excite them back into the visible, light-emitting state with a small voltage pulse.

It was the detailed study of the boreholes in aluminum oxide that convinced Shoulders the EVO hold their energy in a coherent form, not as heat. The sloshing characteristic of the melt from the borehole implied that the EVO captured and entrained the liquid ceramic. It was as if the EVO directly disrupted the ceramic's atomic bonds to produce the liquid melt, and the unscarred ceramic next to the borehole showed that heat could not be the cause of the melt. This observation seems

similar to the Brown's gas welding behavior.

Perhaps the biggest anomaly associated with EVO phenomena is transmutation of elements. Shoulders [18] analyzed the material in the crater of EVO strikes and discovered new elements that were neither in the cathode emitter or anode target material. Moreover, the new elements had unusual isotopic content not readily found in nature. Shoulders is not alone in this discovery. The Proton-21 Laboratory in the Ukraine [19] has conducted super nucleosynthesis experiments where they strike very pure copper or tungsten targets with large plasmoids (~1 cm diameter), and likewise observe the creation of multiple new elements of unusual isotopic content. So far these results have been ignored by academia in the United States, but they are continuously studied in Russia [44]. If these experiments could be replicated and confirmed in the U.S., the possibility for a new technology to alter and remediate radioactive waste might arise.

Shoulders [18] offers an easy protocol for generating a plasmoid like phenomena the manifests unusual energetic anomalies. He is willing to help any university seeking to replicate his research.

Recently LeClair [14] announced producing nucleosynthesis with a water cavitation experiment. Here LeClair proposes that a phenomena similar to Shoulders' EVO actually can arise from a cavitation bubble as it collapses into a torus to launch the reentrant jet. Under extreme pressure inside the reentrant jet is formed a solid-state water crystal that exhibits a nanometer scale, plasmoid-like shock wave at its tip. That plasmoid tip behaves like an EVO and can cause nucleosynthesis if it accelerates into a target. If LeClair's experiment can be successfully repeated by the scientifically community, it might usher in a paradigm shift because it appears that only a zero-point energy coherence would have sufficient energy concentration to affect the nucleus.

References

1. Brown, Y., "Welding," U.S. Patent 4,014,777; 1977.
2. Wiseman, G., "Eagle Research: Brown's Gas," eagle-research.com, 1998.
3. Wiseman, G., "The Best Brown's Gas Technology in the World," watertorch.com, 2001.
4. Kelly, P., A Practical Guide to Free Energy Devices, Automotive Systems, free-energy-info.com/Chapter10.pdf, 2008.
5. Panacea, panaceauniversity.org/Hydroxy Boosters.pdf, 2010.

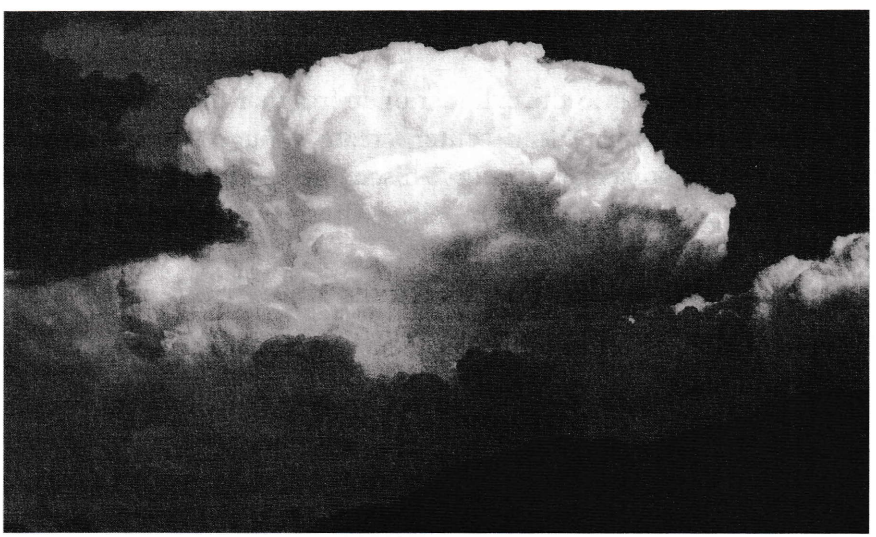
6. Allan, S. D., pesn.com/2009/11/13/9501586_HybridTech-Energy_releases_water-fuel_generator_plans/, 2009.
7. Allan, S. D., peswiki.com/index.php/OS:Self-Looped_Anton_HHO_Cell_System, 2010.
8. Allan, S. D., peswiki.com/index.php/Directory:_Hydrogen_Hog_by_Future_Energy_Concepts,_Inc. 2010.
9. Prevenslik, T.V., "Bubbles and Steam Electricity," esdjournal.com/techpapr/prevens/previndx.htm, 2001.
10. King, M. B., Tapping the Zero-Point Energy, Adventures Unlimited Press, Kempton, IL, 1989.
11. King, M. B., Quest for Zero-Point Energy, Adventures Unlimited Press, Kempton, IL, 2001.
12. Shoulders, K. R., "Energy Conversion Using High Charge Density," U.S. Patent 5,018,180; 1991.
13. Hasslberger, S. "Ken Shoulders' EVOs – Exotic Vacuum Objects Challenge Particle Theory," blog.hasslberger.com/2007/10/ken_shoulders_evos_exotic_vacu.html, 2007.
14. LeClair, M. L., "Fusion," nanospireinc.com/Fusion.html, 2012.
15. Eckman, C., "Plasma Orbital Expansion of the Electrons in Water," Proceedings of the Natural Philosophy Alliance, 2010 p. 141-144; also pesn.com/2009/11/23/9501587_ChrisEckman_BrownsGas_model/
16. Neumark, D., "Hydrated Electrons Can Take More Than One Guise," lbl.gov/Science-Articles/Archive/CSD-hydrated-electrons.html, December, 2004.
17. Wiseman, G., "Brown's Gas Water Torch Research & Applications – Lecture," youtube.com/watch?v=E-dca5fVLTM, 2007.
18. Shoulders, K.R., svn.net/krscfs/ICCF-10 Low Voltage Nuclear Transmutation.pdf, 2004.
19. Adamenko, S. V., "Results of experiments of collective nuclear reactions in superdense substances," Proton-21 Electrodynamics Laboratory, Lyiv, Ukraine, proton21.com.ua/articles/Booklet_en.pdf, 2004.
20. Wiseman, G., "News Flash: New evidence of the unique properties of Brown's gas," eagle-research.com/browngas/whatisbg/watergas.php, 1999.
21. Suartt, T. and Gourley, R., "Method for Making a Gas from an Aqueous Fluid, Product of the Method, and Apparatus Therefore", International Publication Number: WO 2008/131126 A1, wateriontechnologies.com, 2008.
22. Omasa, R., peswiki.com/index.php/Directory:Ohmasa_Gas_by_Japan_Techno_Co.,_Ltd., 2009.
23. Chambers, S. B., "Apparatus for Producing Orthohydrogen and/or Parahydrogen," U.S. Patent 6,126,794; 2000 [also U.S. Patents 6,419,815; 2002 and 6,790,324; 2004].
24. Shoulders, K. R., svn.net/krscfs/Permittivity Transitions.pdf, 2000.
25. Ravi, R., "Research Paper on Ravi's Water Fuel Cell Replication," panaceauniversity.org/Ravi Cell.pdf, 2008.

26. Beene, J., "Scam or No?" mail-archive.com/vortex-l@eskimo.com/msg18986.html, 2007.
27. Sokol, J.D., "You Can Turn Water Into Fire," turnwaterintofire.com, 2009 [The e-book no longer contains Steven Eaton's electrolyzer plans.]
28. Couch, C. M., pesn.com/2010/08/10/9501686_Future_Energy_runs_truck_on_100_Percent_Hydroxy/, 2010.
29. Kuhn, T. S., The Structure of Scientific Revolutions, University of Chicago Press, Chicago, 1970.
30. Cole, D. C. and Puthoff, H. E., "Extracting energy and heat from the vacuum," Phys. Rev. E 1993 48:1562-1565.
31. Davis, E. W., Teofilo, V. L., Haisch, B., Puthoff, H. E., Nickisch, L. J., Rueda, A. and Cole, D. C., "Review of Experimental Concepts for Studying the Quantum Vacuum Field," in the proceedings of Space Technology and Applications International Forum (STAIF 2006), edited by M.S. El-Genk, AIP CP813, 2006 p 1390-1401.
32. Gamow, G., Thirty Years that Shook Physics, Doubleday, NY, 1966.
33. Wheeler, J. A., Geometrodynamics, Academic Press, NY, 1962.
34. Prigogine, I. and Nicolis, G., Self-Organization in Nonequilibrium Systems, Wiley, NY, 1977.
35. Prigogine, I. and Stengers, I, Order Out of Chaos, Bantam Books, NY, 1984.
36. Bostick, W. H., "Experimental Study of Plasmoids," Phys. Rev. 1957 106(3):404 [also "Plasmoids," Scientific American, October, 1957 197:87].
37. Laughlin, R. B., A Different Universe: Reinventing Physics from the Bottom Down, Basic Books, NY, 2005.
38. Jennison, R. C., "A New Classical Relativistic Model of the Electron," Phys. Lett. A, 1989 141(8/9):347-382.
39. Turtur, C. W., "The Fundamental Principle of the Conversion of Zero-Point Energy of the Vacuum," philica.com/display_article.php?article_id=206, 2010.
40. Senitzky, I.R., "Radiation-Reaction and Vacuum Field Effects in Heisenberg-Picture Quantum Electrodynamics," Phys. Rev. Lett. 1973 31(15):955.
41. Scheck, F., Leptons, Hadrons, and Nuclei, North Holland Physics Publ., NY, 1983 p 212-223.
42. Celenza, L. S., Mishra, V.K., Shakin, C.M. and Liu, K.F., "Exotic States in QED," Phys. Rev. Lett. 1986 57(1):55.
43. Watanabe, M., Misono, N., Osanai, Y., Shiina, S. and Saito, K., "Self-organization and dynamo responses in toroidal confinement plasmas," in the proceedings of XXVII International Conference on Phenomena in Ionized Gases, Topic number 14., the Netherlands, 2005 [docstoc.com/docs/20905243/].
44. RCCNT&BL-16, "The 16th Russian Conference on Cold Nuclear Transmutation and Ball-Lightning," iscmns.org/rccnt16/, 2009.

Thunderclouds and the Zero-Point Energy (2015)

A new hypothesis regarding the energy source driving thundercloud activity will be presented. The hypothesis will offer opportunities for inventing new energy technologies by mimicking thundercloud dynamics.

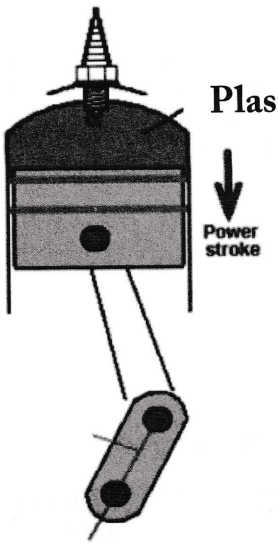
Thundercloud



The perspective could manifest a paradigm shift that the real energy driving thundercloud electrical activity is actually sourced from the zero-point vacuum energy. How can this be so?

Imagine grabbing a handful of thundercloud particles…

Internal Combustion Engine

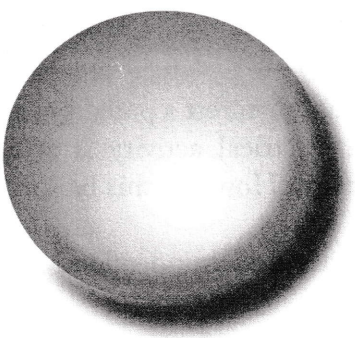


...and stuffing them into the cylinder of an internal combustion engine. With the piston at top-dead-center, create a huge, abrupt electrical discharge from a powerful capacitive discharge spark plug. What would happen? The piston would be propelled with a surprisingly large force. Why?

How Can Fog Particles Be a Fuel?

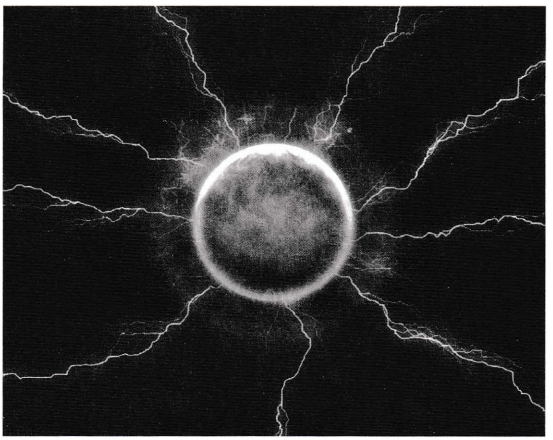
The combustion chamber only contains fog and mist. How can fog particle be a fuel?

Symmetric Droplet



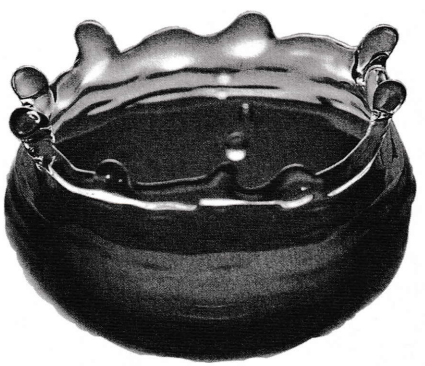
After all, fog particles are nothing more than small droplets of water.

Abrupt Electric Discharge



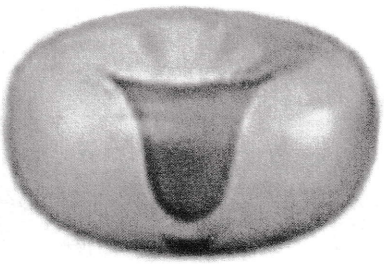
Imagine subjecting the droplets to an abrupt electric discharge containing abundant plasma. What would happen to a droplet?

Blow It Apart



Most would assume the droplet would just blow apart.

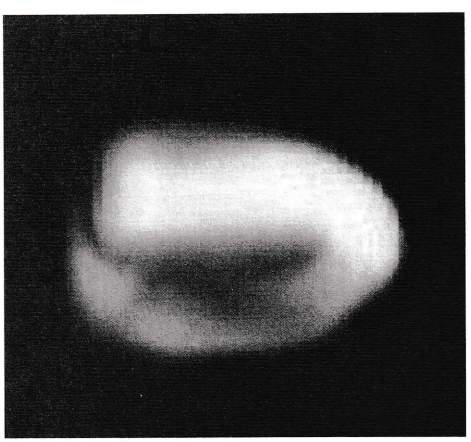
Dimple It



Torus Form

However, if the droplet is small enough and symmetric enough, the electrostriction forces of the encompassing plasma could cause it to dimple into a torus form. The form would act as a "template" to guide the plasma into a vortex ring, which makes the microscopic plasmoid.

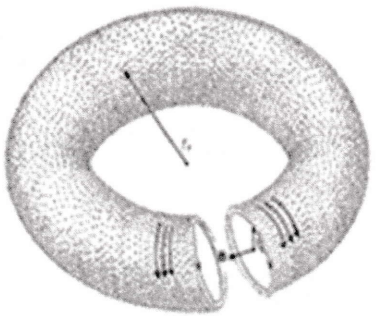
Ball Lightning



balllightning.narod.ru

It is the microscopic plasmoid or ball lightning that exhibits the excess force on the piston.

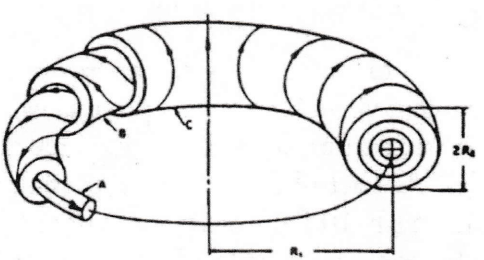
Ball Lightning Plasmoid



electronpowersystems.com
C. Seward, C. Chen, K. Ware, Ball Lightning Explained as a Stable Plasma Toroid
Google: Ball-Lightning-Explained.pdf

Ball lightning is a vortex ring of plasma. It was experimentally studied by Winston Bostick, who originated the name "plasmoid." There was numerous research papers published in the public scientific journals in the late 1950's through the mid 1960's. By the 1970's subsequent research was mostly classified and became part of the Strategic Defense Initiative.

Helical Flow in Plasmoid Vortex Ring Filament



Force Free Vortex Yields Natural Stability

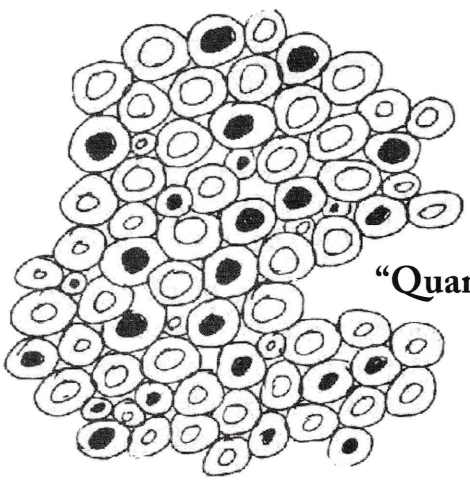
Alex, Radar, Fusion Tech. 27, 271 (1995)

The plasmoid can persist for surprisingly long times. Ball lightning has been observed to last for many seconds. The electrons and ions spiral around the vortex ring, and the force free vortex yields a natural stability. A vortex ring can be pictured as a slinky closing on itself.

Ball Lightning Coheres Zero-Point Energy

Here is the big hypothesis: Ball lightning coheres the zero-point energy, and the coupling manifests excess energy.

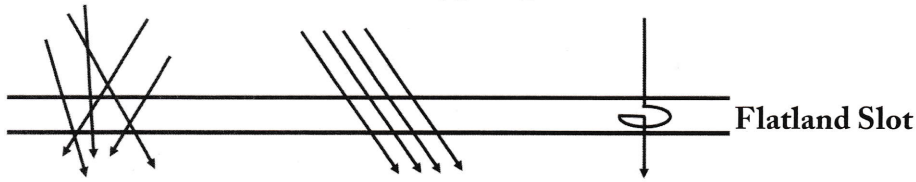
ZPE is a Turbulent Virtual Plasma



Electric flux enters and leaves our 3D space through mini virtual particles that constantly appear and disappear.

John Wheeler, in his theory of *Geometrodynamics*, models the zero-point energy like a virtual, turbulent plasma, called the "quantum foam." Here electric flux enters and leaves our three dimensional space through "mini holes" that act like mini virtual particles. These holes are sized at the Planck length, 10^{-33} cm. That is twenty orders of magnitude smaller than the electron. The calculated energy density through them is enormous, 10^{94} grams/cc. This model of the fabric of space is far more dynamic and energetic than the old hydrodynamic aether models of the 19th century.

ZPE from Hyperspace Flux



In geometrodynamics the zero-point energy is modeled as a flux from a higher dimensional space. In this diagram the thin "flatland slot" represents three dimensional space. As the flux penetrates the flatland slot randomly, it manifests the background incoherent vacuum fluctuations. If there is a tilt to the flux as it enters our 3-space, the vacuum is said to be polarized. If there is vorticity as the flux passes through our space, it manifests elementary particles. In this model the flux is like the flow of a stream, and the vortex "whirlpool" is like an elementary particle. Just as the constant flow of the stream is necessary to sustain the existence of the whirlpool, the zero-point flux is necessary to sustain the existence of the elementary particle. Thus every elementary particle, and therefore all matter in the physical universe, is sustained by the zero-point flux.

Pair Production

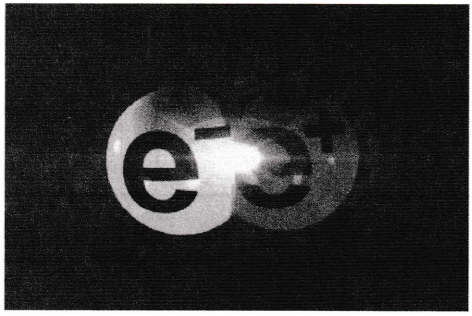


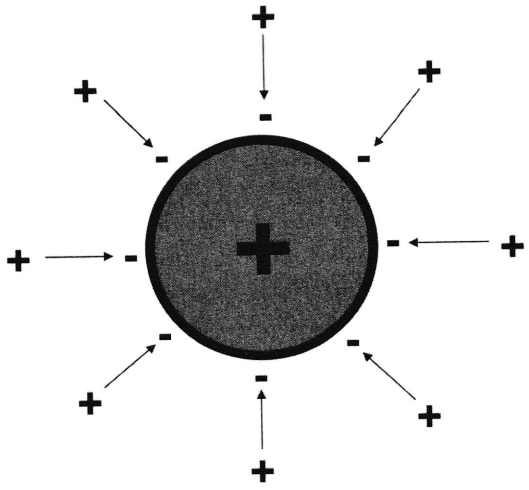
Image credit: NASA/Goddard Space Flight Center Scientific Visualization Studio
svs.gsfc.nasa.gov/182

Electron Positron From Vacuum Fluctuations

The turbulence of the vacuum energy manifests self-organization. A churning production of electron-positron pairs appear and disappear on a rapid time scale in the turbulence of the vacuum fluctuations. Quantum electrodynamics describe them as "virtual" particles because their lifetimes are so short. The activity is the foundation of quantum

electrodynamics with every elementary particle intertwined with the vacuum fluctuations to comprise their quantum wave.

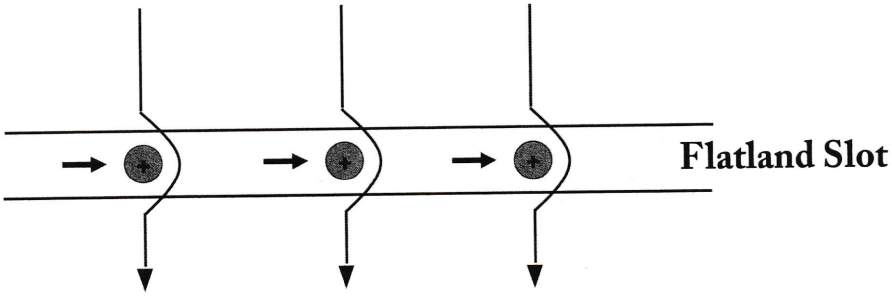
Vacuum Polarization of Nucleus



Can trigger self-organization in ZPE

The vacuum polarization description of the atomic nucleus has steep lines of polarization converging onto the nucleus. Thus nuclei of plasmas are the key to activating coherent, large scale, ZPE events.

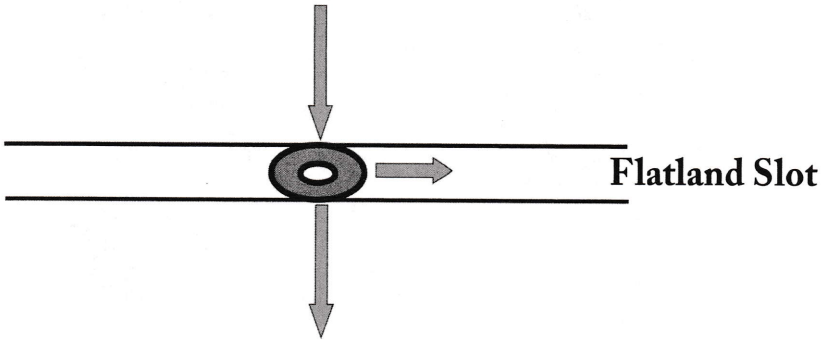
Ion Surge (Jerk)



Bends Zero-Point Energy Flux

Abrupt motion of plasma nuclei can bend the hyperspatial ZPE flux so that more of it aligns in our 3D space. It typically manifests as excessive high voltage spikes in plasma. The more abruptly the plasma ions surge or jerk, the more the flux gets "ortho-rotated" or bent at right angles to align into our 3-space. How can we harvest the energy?

Ball Lightning Plasmoid



Ortho-Rotates ZPE Flux

By trapping it into the ball lightning plasmoid! The natural precession (spin of a spin) of the plasma in the vortex ring ortho-rotates the flux, trapping it in the plasmoid. Simultaneously, it "warps" the space-time metric causing the plasmoid to exhibit an anomalous self-acceleration.

As we will shortly see, experimental studies of microscopic plasmoids have shown them to exhibit anomalous self-acceleration, excessive force, and excessive energy.

Evidence in Nature

There is evidence in nature, but until recently, we have not been able to see it.



The evidence comes from thunderclouds. It is exhibited on every lightning stroke.

Precursor in Lightning

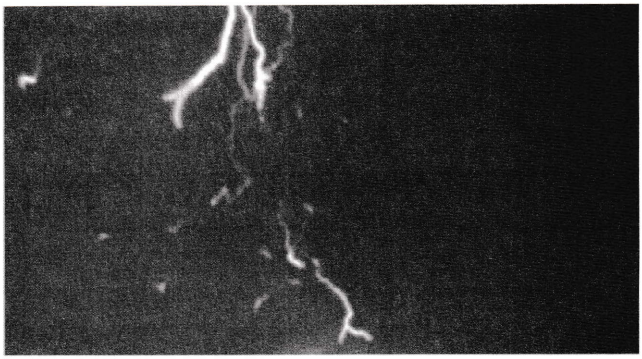
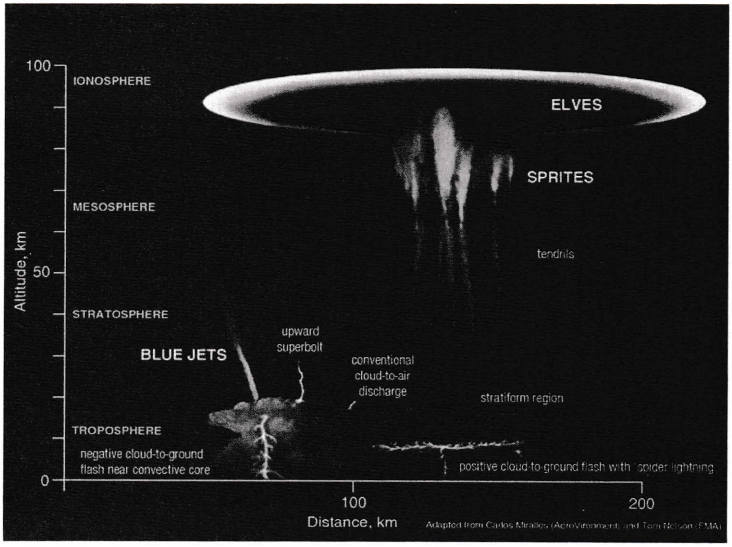


Image credit: Saba, M. M. F., A. R. Paiva, C. Schumann, M. A. S. Ferro, K. P. Naccarato, J. C. O. Silva, F. V. C. Siqueira, and D. M. Custódio (2017), Lightning attachment process to common buildings, Geophys. Res. Lett., 44, 4368–4375, doi:10.1002/2017GL072796
YouTube: Lightning high speed video

It finally was recorded by high speed photography. Every lightning stoke is preceded by a ball lightning precursor. The ball lightning ionizes the channel between the cloud and the earth, and the lightning stroke follows. There are many videos on the web showing this activity.

Above Thundercloud



Google: Sprite lightning

As impressive the lightning activity below the thundercloud is, the electrical activity above the cloud is far greater and spectacular. Associated with big lightning strikes are blue jets and sprites. Until this decade the scientific community refused to recognize this activity despite eyewitness accounts of blue jets seen by pilots. It was only after high speed photographic technology was improved that the events could be recorded.

Sprite

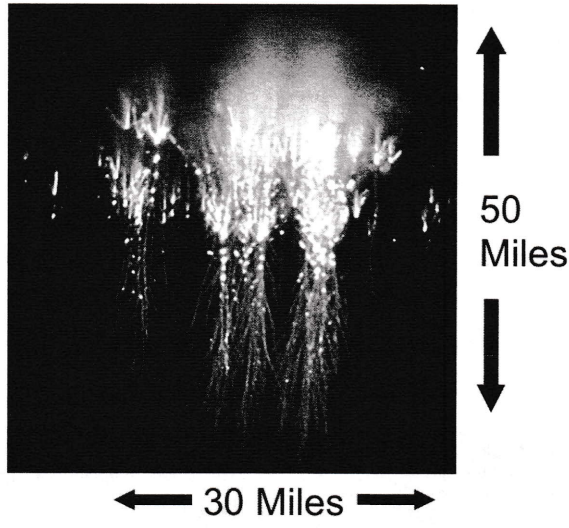
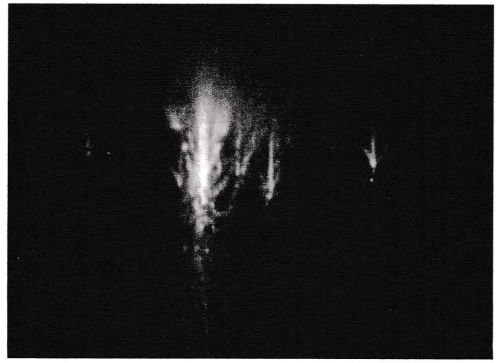


Image credit: Prof. Steven A. Cummer, Electrical and Computer Engineering Department, Duke University, Durham, NC (USA)

The sprite is the most spectacular. Associated with a single large lightning strike is a millisecond event that is physically huge: 30 miles wide and 50 miles high. wikipedia.org/wiki/Sprite_(lightning)

Sprite High Speed Photography

~ 0.001 Second



Filmed by Japan's NHK television at 10,000 frames per second

youtube.com/watch?v=rn0My2ivh2U

The high speed photography shows the sprite originates from the halo above and it exhibits surprising activity. It might be the largest manifestation of coherent zero-point energy interaction on earth.

- **Duration: 1 - 50 milliseconds**
- **Up to 30 miles wide, 50 miles high**
- **Composed: Plasma balls ~10 meters**
  - Travel 0.1 speed of light
  - Launched from Halo
- **Gamma Rays**
  - Antimatter Detected
    - Positron – Electron Annihilation

The fastest resolution photography has captured details of the sprite showing 10 meter or larger plasma balls launched from the halo and traveling downward at a tenth of the speed of light. From these events gamma rays and antimatter in the form of positrons have been detected.

Beams of Antimatter Detected

By Fermi Gamma-Ray Telescope

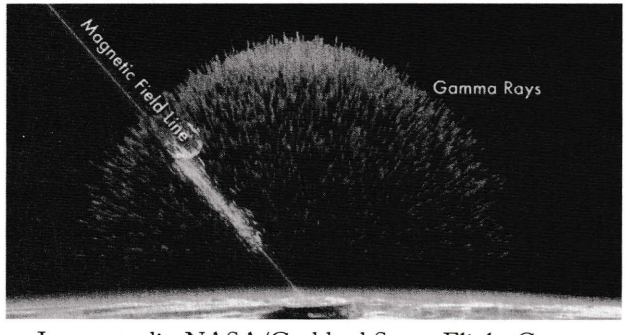


Image credit: NASA/Goddard Space Flight Center
YouTube: Terrestrial Antimatter Fermi

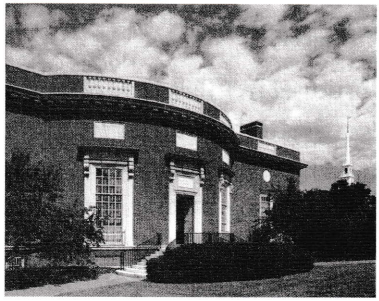
The antimatter was first detected by the Fermi Gamma-ray telescope satellite. The thundercloud activity manifested pair production of electron-positron pairs that followed the earth's magnetic field lines. When they struck the satellite, some positrons annihilated with the satellite's electrons to make the satellite itself a gamma ray source. The particles would reflect back from the earth's south pole and strike the satellite again yielding more events. Later studies revealed that the sprites were the source of the electron-positron pair production. The abrupt plasma activity of the sprite event cohered the vacuum's virtual

pair production into full separation where the particles spiral on the earth's magnetic field lines keeping them apart. Thus the sprite exhibits coherent vacuum energy activation.

Evidence in Experiments
Abrupt Electric Arcs in Water

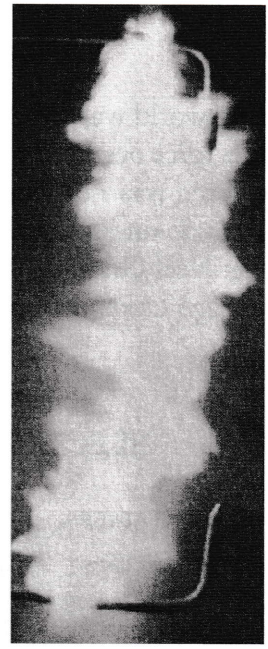
The evidence from nature is only circumstantial. It does not prove there is a net energy gain sourced from vacuum energy. The proof must come from controlled experiments in the laboratory. Here there is evidence from years of study of abrupt electric discharges in water.

Professor Trowbridge, 1907



Harvard University

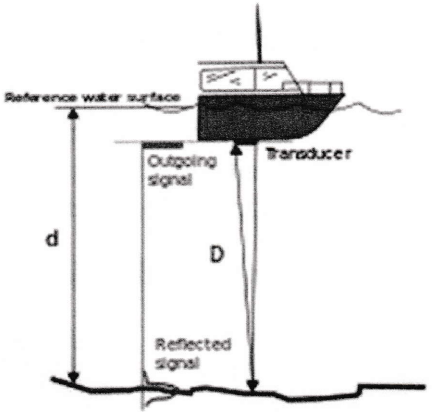
Electric arc in mist
louder than in air



As early as 1907, Professor Trowbridge at Harvard University observed that spraying water mist into an electric arc yielded a much louder sound than the arc in air alone. He could not explain why. Reference: Neal Graneau, *The Anomalous Strength of Cold Fog Explosions caused by High Current Waters Arcs*, (1998).

Professor Frungel, 1948

- Water Arc Experiments
  - Force not from heat or steam
- Under water pulse echo sounding (1965)



During world war two, Professor Frungel in Germany observed that anomalous force occurred in abrupt electric arcs in water. He determined that the force was not caused by heat or steam. Later he applied the discovery to do under water, pulse echo sounding to map the ocean floor Reference: Neal Graneau, *The Anomalous Strength of Cold Fog Explosions caused by High Current Waters Arcs*, (1998).

Metal Forming
Water Arc Explosion

ELECTROHYDRAULIC FORMING

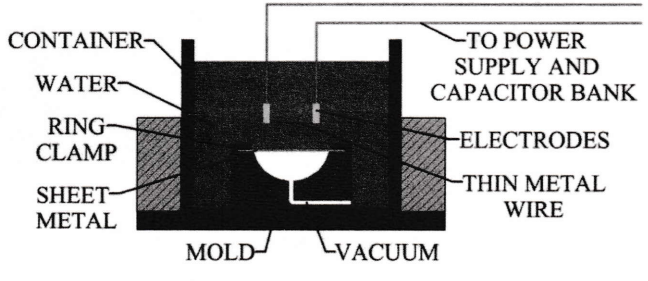
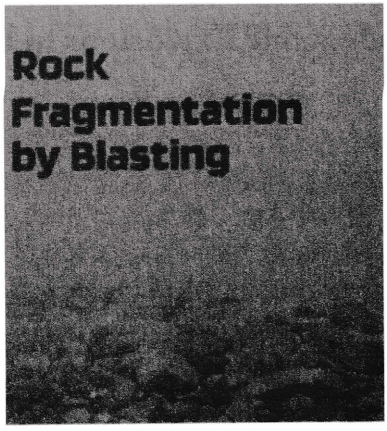


Image credit: The Library of Manufacturing
thelibraryofmanufacturing.com

Water arc explosions are used for electrohydraulic metal forming. Here the shock wave from the abrupt arc symmetrically forces the metal sheet into the mold. Google: "High energy rate forming"

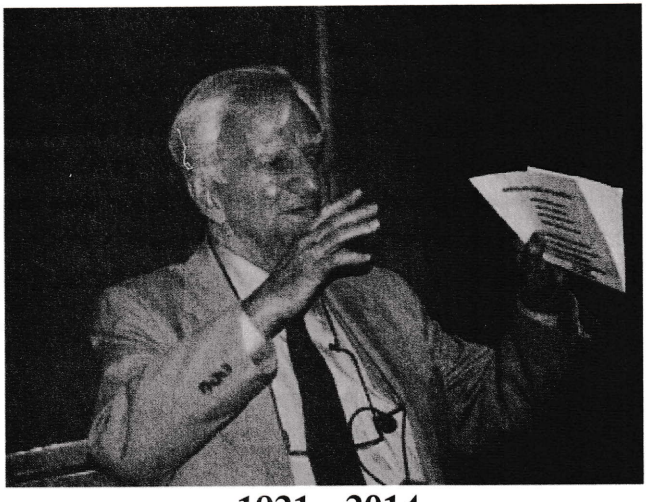
Rock Fragmentation

- Water Arc Explosions (1969)
  - Excessive energy measurement 156%



Electric arcs into water are used for rock fragmentation by blasting. There was a scientific investigation that measured the energy usage in the events. In one case excess energy was measured to be over unity at 156%. The result was disbelieved and simply dismissed as a measurement error. Reference: Neal Graneau, *The Anomalous Strength of Cold Fog Explosions caused by High Current Waters Arcs*, (1998).

Peter Graneau



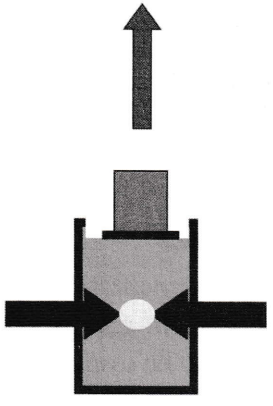
1921 – 2014

Peter Graneau, a professor at M.I.T. in the 1980's, made a career at studying electric arcs in water. His work has yielded convincing

experimental evidence that excessive force and energy are manifested in abrupt electric discharges in water.

Electrodynamic Explosions in Liquids

Peter Graneau



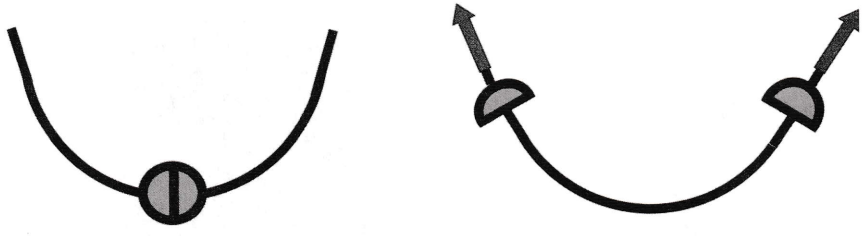
Abrupt Capacitor Discharge
Propelled Weight Upward
Measured Excess Force
Blew Out Bolts
Photographed Plasmoid

Appl. Phys. Lett. 46(5), 468 (1985)

The experiment involves discharging a capacitor into a small water chamber. The energy stored on the capacitor is known. When the discharge is sufficiently fast, an explosive event occurs that propels the weight upward. If the discharge is not abrupt enough, there is just underwater current and no mechanical motion. High speed photographs have recorded plasmoids associated with the explosive event. By measuring the height of the propelled weight, anomalous force was shown. There were some extreme events that blew out the bolts securing the water chamber. Thus the extent of the anomaly was not fully measured here.

Electrically Induced Explosions in Water

Gary Johnson



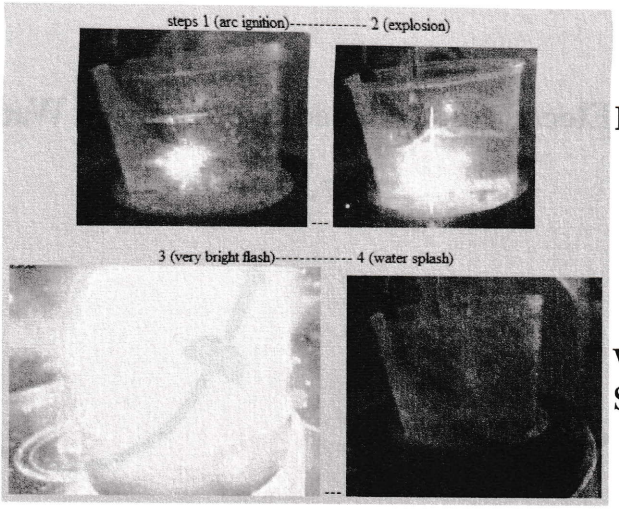
Weights Propelled Up Guide Wires
Confirmed Excess Force and Energy

Proc. 27th IECEC, Vol. 4, 4.335 (1992)

However, Gary Johnson, an electrical engineering professor at Kansas State University, replicated the experiments with an apparatus designed to measure all the force and energy from the explosive event. Johnson used a spherical water chamber designed to blow apart and fly up guide wires. By knowing the weight of the semi-spherical pieces and measuring how high they were propelled, Johnson's experiments confirmed that both excessive force and energy (exceeding what was stored on the capacitor) was consistently exhibited from abrupt electric discharges in water.

Water Explosion as Fuel

Ignition



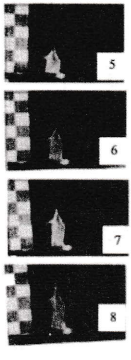
Explosion

Bright Flash

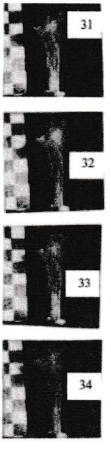
Water Splash

Today there are hobbyists exploring if the effect can be harnessed to drive an internal combustion engine. There are open source discussions on the web. Google: Water Explosion :: Water as fuel

Micron Fog Particles



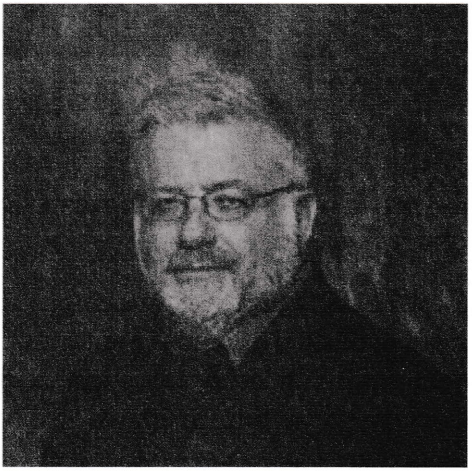
- High Speed Camera
  35000 frames/sec
- Cool
- Supersonic
- Excess Force



P. Graneau, N. Graneau, G. Hathaway, R.L. Hull
J. Plasma Physics (2000), vol. 63, part 2, pp. 115-128.

Detailed studies via high speed photography by Graneau's team has yielded an important insight: The excessive force was due to supersonic acceleration of sub-micron fog particles launched from the water. By absorbing the fog into a balsa wood projectile and measuring its temperature, Graneau showed that the fog was cool and not steam. During the explosive event, did those fog particles become microscopic ball lightning?

David Faust



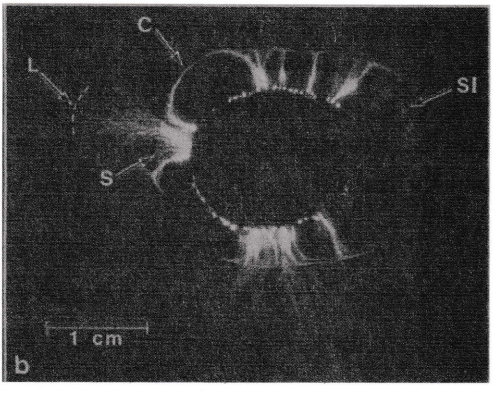
1949 – 2014

My colleague, David Faust, was an electrical engineer and meticulous experimenter. He was able to make microscopic ball lightning from water repeatedly.

Corona Discharge Photography



David Faust



17 KV unipolar, 24 pulses, 0.5 sec
40 usec rise-time

Moisture Content Dominates Image

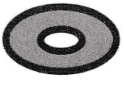
Science 15 October 1976: 263-270.

In the 1970's, David Faust's expertise was corona discharge (Kirlian) photography. His team published a definitive study on the topic in *Science* magazine. There were reports by other investigators that ball lightning events sometimes occurred from the apparatus.

Corona Discharge Video

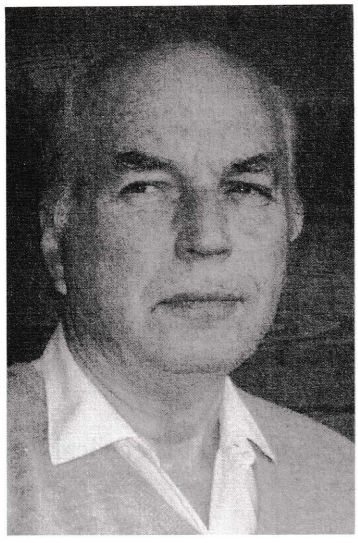
David Faust, Drexel University 1978

- **Pair of Low Light Video Cameras**
- **Single HV Pulse on Water Spray**
- **Pulsating Discharge, Persistent Event**
  - **Ball Lightning?**
- **Lasted over 1 minute**



Faust was well equipped to investigate. By use of state of the art low light video cameras, he discovered that simply spraying water mist onto the photographic plate subjected to a single 17 KV pulse, he could create a ball-lightning-like event that sometimes persisted for over a minute. Little did we know at the time, we were seeing the future discovery of another experimentalist, who most would agree, was the master investigator of microscopic ball lightning…

Ken Shoulders

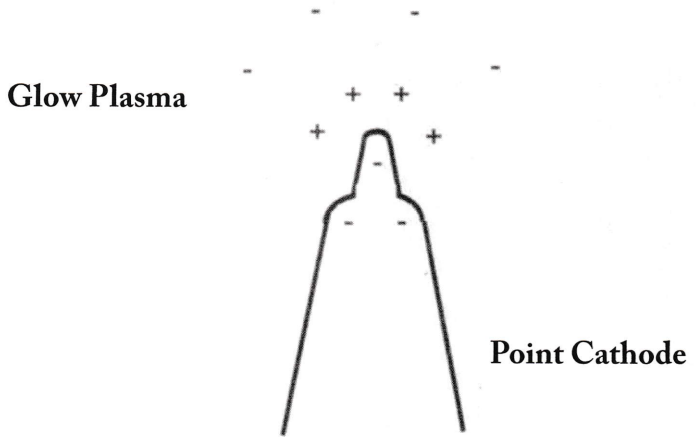


1927 – 2013

Ken Shoulders dedicated his career to the study of microscopic plasmoids. It is his work that provides the best evidence that zero-point energy is cohered by ball lightning.

Ken Shoulders repeatedly launched a microscopic charge cluster plasmoid-like form with a relatively simple apparatus. An abrupt electric discharge from a capacitor through a sharp pointed electrode onto a dielectric surface creates the charge cluster. It appears to be a micron-sized form of ball lightning, which travels on the surface of the dielectric to the anode. It can punch a hole through the witness plate manifesting a crater that was made by an apparently high energy event. Shoulders patent is well written and describes many possible applications of his discovery. See the 2009 presentation.

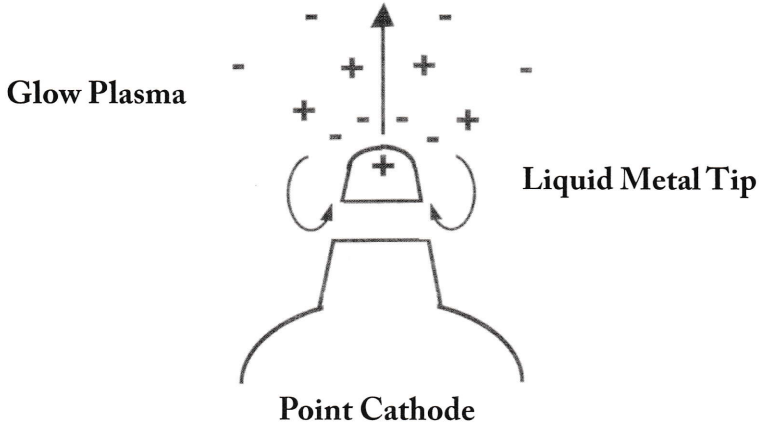
Liquid Metal Protuberance



Mesyats, Proc. 17th Int. Sym. on Discharges and Electrical Insulation in Vacuum, 720 (1996)

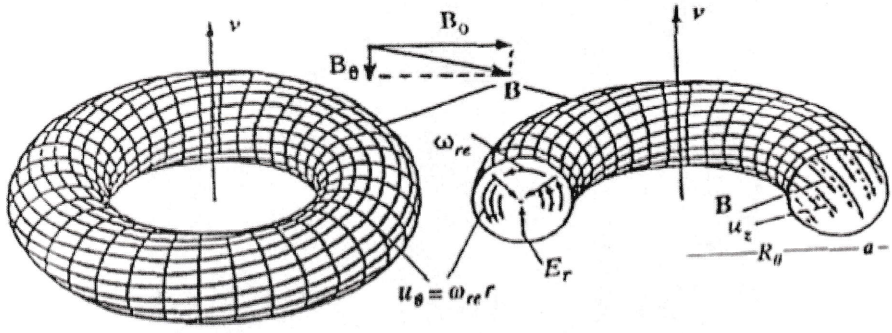
Gennady Mesyats, vice-president of the Russian Academy of Science, studied and experimentally researched Shoulders' discovery. He explained how the sharp pointed cathode (magnified here) emits the EV. Just before the event, the tip surface melts yielding a tiny liquid metal protuberance extending into the surrounding glow plasma...

Explosive Emission



The tip of the protuberance explodes off and the surrounding plasma circulates to form the vortex ring around the symmetrical micron size, dimpled blob of liquid metal.

Charge Cluster Vortex Ring

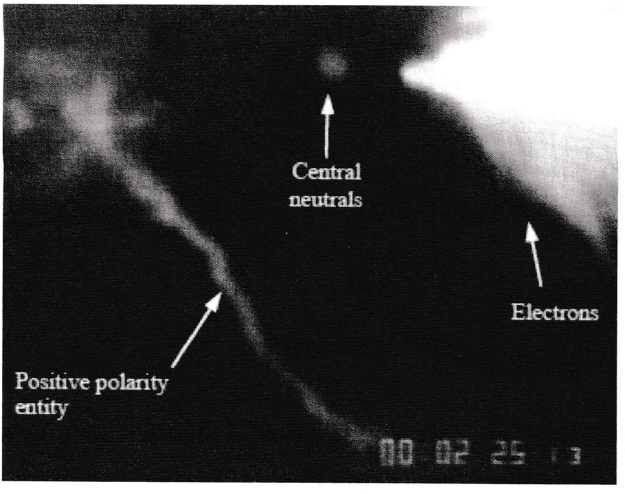


Fast poloidal rotation yields intense toroidal magnetic field
Thin ring filament energy density exceeds neutron star
S.X. Jin, H. Fox, *J. New Energy 1 (4)*, 5 (1996)

Dr. Shang Xian Jin and Dr. Harold Fox derived a classical physics, mathematical model of the microscopic ball lightning entity of Ken Shoulders by assuming it was a high density charge cluster vortex ring. Their calculation of the energy density within the vortex ring exceeded a neutron star. At high energy densities classical physics modeling is inadequate because it fails to include the vacuum energy interactions of quantum electrodynamics. For a mathematical model that includes the quantum mechanical potential and vacuum polarization see: R.W. Ziolkowski, M.K. Tippett, "Collective effect in an electron plasma system catalyzed by a localized electromagnetic wave," Phys. Rev. A 43 (6), 3066 (1991).

However, Ken Shoulders observations imply a far more intriguing model is required. A cluster of standard known elementary particles is not sufficient to explain the following surprises...

Positive EV

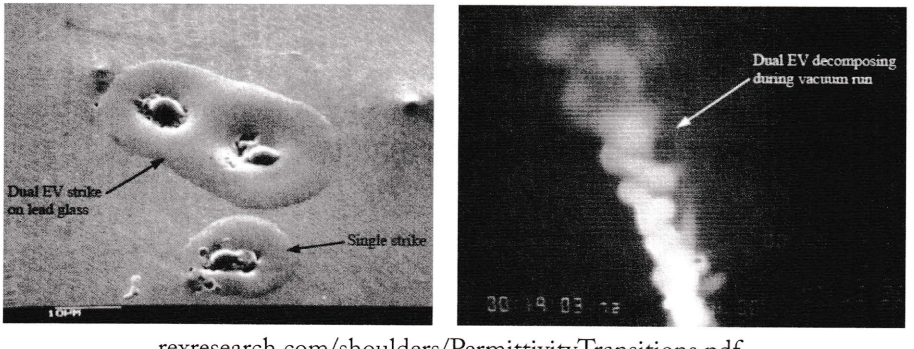


rexresearch.com/shoulders/PermittivityTransitions.pdf

Charge/Mass Ratio Like Positron

In his investigations, Ken Shoulders sometimes measured positively charged EV's. They always exhibited the charge to mass ratio like the positron, but they were not comprised as a cluster of positrons because he never detected the characteristic gamma radiation of positron annihilation. Likewise, the negative EV lacked the corresponding number of electrons to account for all the manifested charge. Shoulders speculated that he was measuring something very fundamental about how the vacuum produces charge regardless of size: It always manifests it in the charge to mass ratio of the electron or positron.

Dual EV

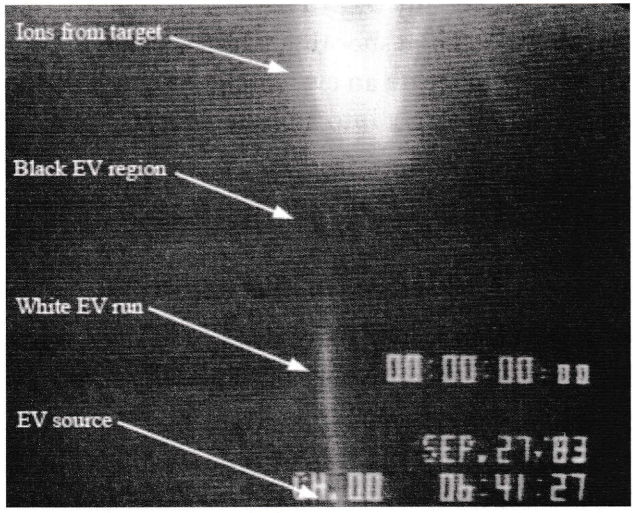


rexresearch.com/shoulders/PermittivityTransitions.pdf

Ken Shoulders also photographed EV pair production: both a positive and a negative EV circulating around each other. This observation could

inspire new self-organizational models of vacuum energy dynamics, and how it yields pair production of coherent forms at any scale. Such models might become the foundation of an engineering theory of the ZPE for technology invention.

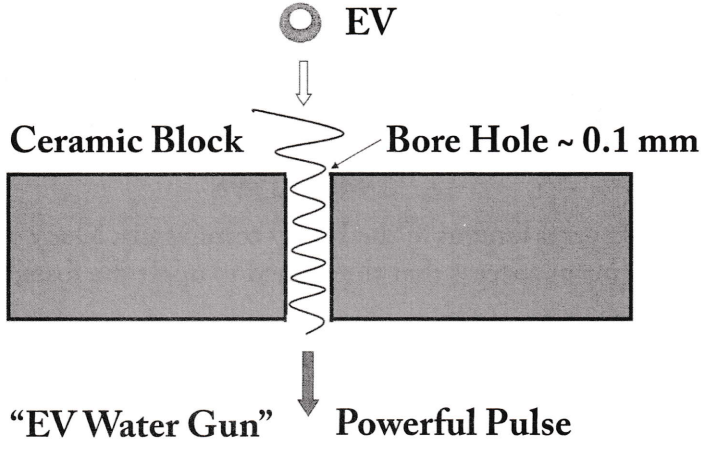
Black EV



rexresearch.com/shoulders/PermittivityTransitions.pdf

Electric Pulse Reactivates It

Shoulders also measured dark EV's that seemed to stop emitting light. An electric pulse could reactivate them. David Faust may have been observing this form with his low-light video cameras. They could actually be occurring quite often in nature.



Ken Shoulders discovered a powerful energetic event could be created by what he called a "cascade effect." First he would circulate a water vortex through a small bore hole. Then he would shoot an EV down the axis of the vortex. The resulting emitted plasma pulse was huge—it would damage anything it struck.

He could not discover any way to harvest the energy from the event. He used the analogy, "it's like shooting a bullet at a windmill vane." The cascade effect appears to create an even bigger vacuum energy coherence by converting the water vortex into a plasma vortex.

Evidence in Inventions

Inventors have often unwittingly utilized EV or microscopic ball lightning phenomena in their inventions, especially where pulsed plasma discharges occur.

Stanley Meyer



1940 – 1998

Stan Meyer is famous in the HHO community. Many believe he was murdered for his success that threatened to upset the fossil fuel industry.

Dune Buggy



Stan Meyer is best known for his dune buggy that he claimed would run solely on water.

Water Fuel Injector Plug

Meyer's best invention was his last: the water fuel injector plug, which he felt was superior to the electrolyzer approach. The injector explodes a small amount of water into a plasma as it enters the internal combustion chamber. See the pictures in the 2009 presentation.

Meyer did receive a Canadian patent for the water injector, and the patent is available on the web. Meyer fed a mixture of water, ionized air and inert gas (argon) into the reaction chamber where high voltage excitation caused the explosive emission. Use of argon was a surprise; it appeared to enhance the output energy (like it does for sonoluminescence).

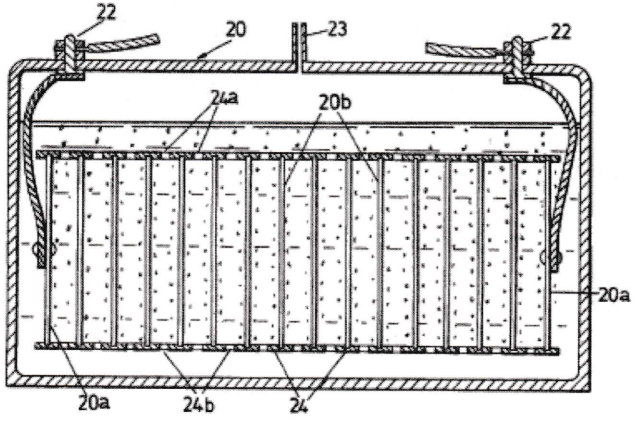
The pictures in the 2009 presentation show a side and front view of the water injector plug. Three concentric spray rings are used. Water mist comes through the inner ring, ionized air through the middle ring, and argon through the outer ring.

Behind the injector plugs was a sophisticated feed system. The air was ionized by a laser priming stage. In the video Meyer thought he could retro-fit automobiles to run on water for about $1500 if the system were mass produced.

Energetic Fog Gas from Water Electrolyzers

The popular water electrolyzers could offer an easy means to generate abundant water mist or fog in addition to hydrogen.

Yull Brown
Welding – Proposed HHO



U.S. Patent 4,014,777 (1977)

In the 1970's Yull Brown applied the gas to welding applications. Brown is credited with first observing the big anomalies of the welding gas, and perhaps it is fitting to name the gas after him. In his attempts to explain the energetic anomalies, Brown postulated that the electrolyzer was making atomic hydrogen and oxygen (HHO).

Most researchers today call the gas HHO, despite the evidence that no atomic hydrogen has ever been measured. At normal ambient temperatures, a lone hydrogen atom typically combines with whatever it contacts.

Electrically Expanded Water
ExW

As discussed in the 2009 presentation, George Wiseman has experimentally studied the gas for over thirty years. In 1996 he proposed the gas included (in addition to hydrogen and oxygen) a water cluster structure that he named "electrically expanded water." He sometimes observed an electric shock when a container of the gas spontaneously imploded back to water.

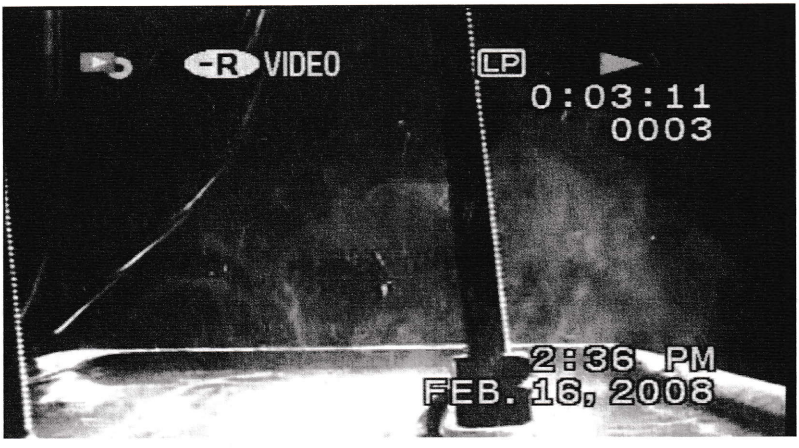
Ronald Mitchell
Cool Fog Sometimes Emitted



Smartscarecrow Show Oct 4, 2012

Ron Mitchell replicated Wiseman's electrolyzer and sometimes observed a cool fog or mist was emitted.

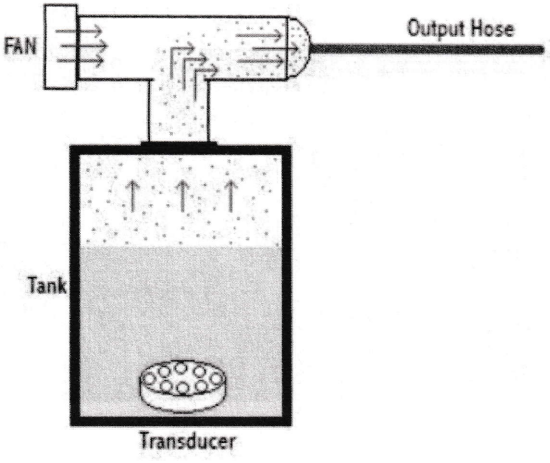
HHO Mist



YouTube: HHO Mist

Other researchers have noticed turbulent mist activity just above the electrolyzer water bath. Here large bubbles of mist break apart into smaller bubbles. This is a good clue. It is the tiny bubbles that are desired because they support microscopic ball lightning formation.

Ultrasonic Fogger



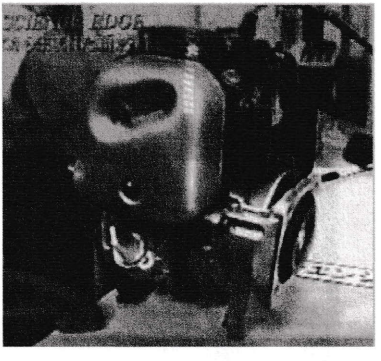
hho4free.com/fogger.html

The use of an ultrasonic pond fogger within the water electrolyzer has been suggested and discussed on the web. This idea appears worth exploring.

OHMASA Gas



Ryushin Omasa



Runs Engine
No Air Input

Mechanical Vibration 100 Hz
Parallel Plate Electrolyzer
Stored gas under pressure, 2 years

Ryushin Omasa appears to have the best protocol to make extremely tiny bubbles with his electrolyzer. He uses vibrating vanes in the water bath, which affect the surface tension so that big bubbles cannot form.

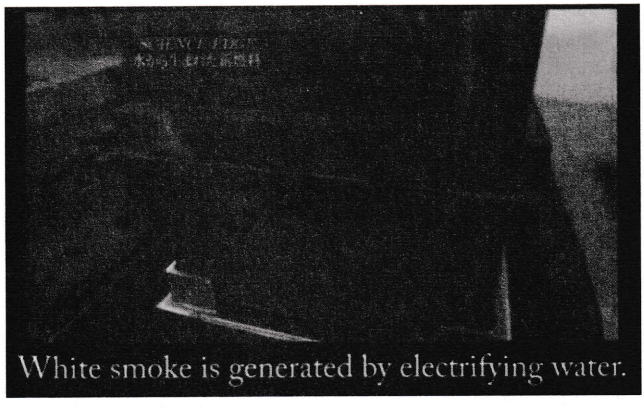
His protocol makes very little free hydrogen—it stays trapped in the stable microscopic or nanoscopic bubbles, which rise out of the water bath like tiny balloons. He was able to store the resulting gas under pressure for 2 years. When storing the gas under pressure, it is important that the containment system vents any residual hydrogen; otherwise the mixture can be explosive and dangerous. Omasa did not store free hydrogen. The gas is able to run a small engine without any extra air input.

OHMASA

Oxygen
Hydrogen
Mixing
Atomic
Symmetrized
Aeration

Ryushin Omasa invented an acronym to name the gas. Coincidentally it sounds just like his name.

OHMASA Gas



YouTube: OHMASA GAS (English telop)

In 2009 a video was released informing the world of his discovery. The video has English subtitles and it summarizes Omasa's research. Here he proclaims "a new form of water has been birthed on earth. It is a fuel that will save the planet."

Japanese News Special



YouTube: OHMASA-GAS SuisaiCorp

In Japan, Ryushin Omasa is somewhat a hero. In 2011 there was a Japanese news special featuring his discovery. The video is only in Japanese.

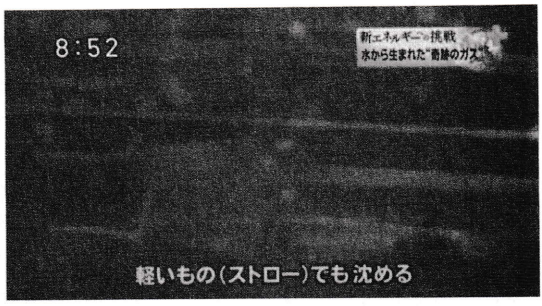
News Special - OHMASA



YouTube: OHMASA-GAS SuisaiCorp

The special described the name of the gas.

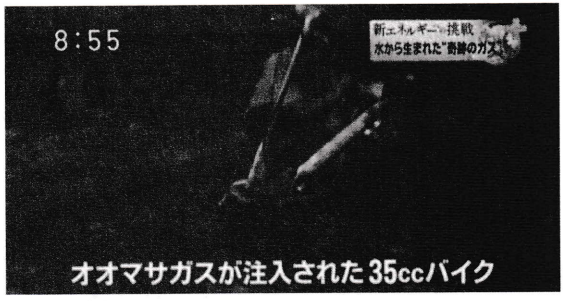
Omasa - Vibrator



YouTube: OHMASA-GAS SuisaiCorp

It showed the vibrating vanes.

Omasa - Scooter



YouTube: OHMASA-GAS SuisaiCorp

100% OHMASA Gas

It showed a scooter running on 100% OHMASA gas.

Omasa - Car



YouTube: OHMASA-GAS SuisaiCorp

50% OHMASA Gas + 50% LPG

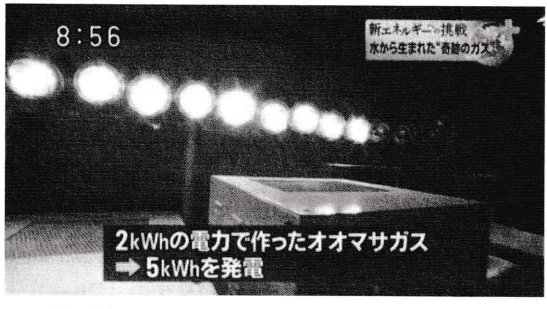
It showed a car. However, here it was running on only 50% OHMASA gas and 50% liquid petroleum gas. Why?

Omasa - Generator.



YouTube: OHMASA-GAS SuisaiCorp

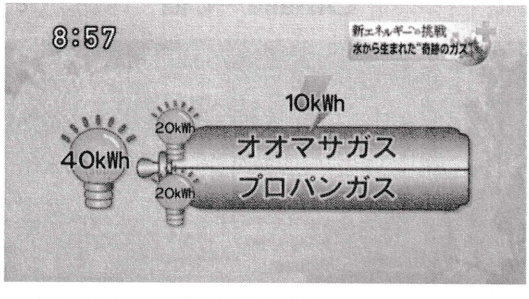
The video featured running a generator on the gas. Here energy input and output could be measured.



YouTube: OHMASA-GAS SuisaiCorp

What does this graphic imply? Is it 5 kWh output from 2 kWh input?

Omasa Energy Study



YouTube: OHMASA-GAS SuisaiCorp

10 kWh → 20 kWh OHMASA Gas + 20 kWh Propane

This was a surprising graphic. The generator was run on a mixture of 50% OHMASA gas and 50% propane. Why is he mixing in propane? This obscures the scientific discovery. Did he not proclaim a new fuel that would save the planet? He showed a scooter and small engine

running entirely on OHMASA gas. Why not a generator? Has Omasa been suppressed? Why is there no longer any web activity regarding Ryushin Omasa after 2012? These questions are intriguing especially in view of the translation of the displayed graphic: It took 10 kWh of energy to make 20 kWh of OHMASA gas which is combined with 20 kWh of propane to yield 40 kWh of output energy from the generator. Did Omasa actually discover a new energy source so disruptive that it had to be suppressed? It implies that despite all the energy needed to run the vibrator and electrolysis to make the gas, it nonetheless yielded so much output power as to prove a new energy source has actually been discovered. Omasa's protocol might yield a paradigm shifting experiment. If others replicate his discovery, he could be worthy of the Nobel prize.

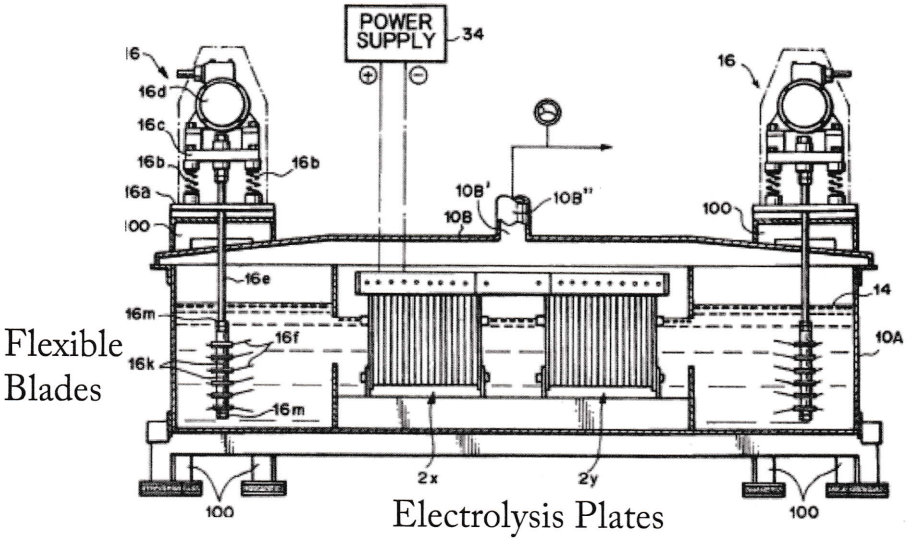
Ryushin Omasa Patents

- **Mixing via Fluttering Vanes (21 claims)**
  US 5,375,926 (Dec 1994), Filed: Sep 1993
- **Both Vibrating & Static Electrodes (54 claims)**
  US 7,318,885 (Jan 2008), Filed: Sep 2002
- **Fluttering Vanes, Static Electrodes (5 claims)**
  US 7,459,071 (Dec 2008), Filed: May 2002
- **Re-filed (8 claims)**
  US Application 20090045049, Filed: Oct 2008
- **Liquefied Gas (17 claims)**
  US Application 20110139630, Filed: May 2009

Technical information regarding the details of Omasa's research is old. The last patent application was filed in 2009. The patent application filed in October of 2008 was a repeat of that filed in May 2002 with the claims enhanced. Omasa's expertise was mechanical mixing as evidenced by his 1994 patent. His mixer was designed to emulsify powders in liquid for a variety of applications especially electroplating. It was in the early 2000's that he began experimenting with water electrolyzers resulting in the large patent filed in September 2002. The last application was filed in May 2009 just before his video was released announcing his discovery to the world. There appears to be no further information on the web past

2012. The patents do reveal interesting technical details and show the competence of Omasa and his engineering team.

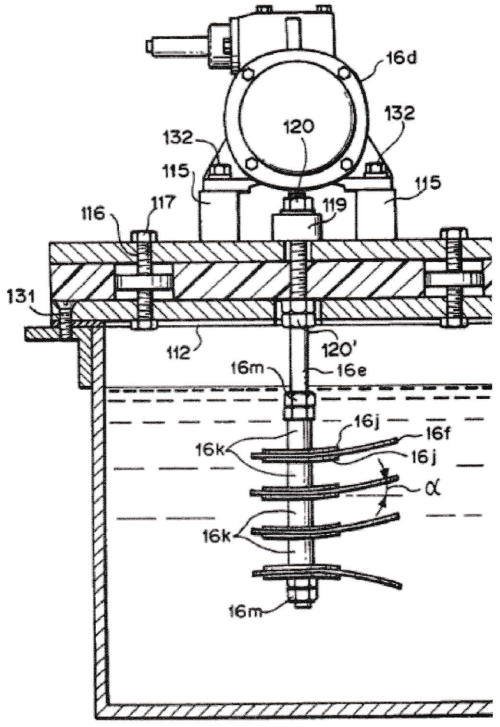
Vibrating Electrolyzer



Omasa, US 7,459,071 (2008)

Here is a side view of Omasa's vibrating electrolyzer. The flexible blades are driven by an electric motor with an off balanced flywheel that vibrate the attachment rod by bouncing a platform on springs. The electrolysis plates in the middle of the water bath are stationary. Omasa controls the vibration frequency (on the order of 100 Hz) by adjusting the speed of the electric motors.

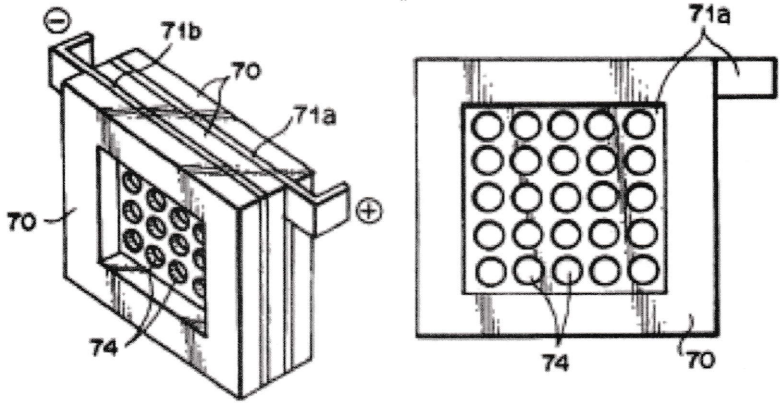
Fluttering Blades



Omasa, US 7,459,071 (2008)

The patent describes the fluttering blades (vanes) in detail. The bottom blade points downward to churn any sediment that might gather at the bottom for the mixing application.

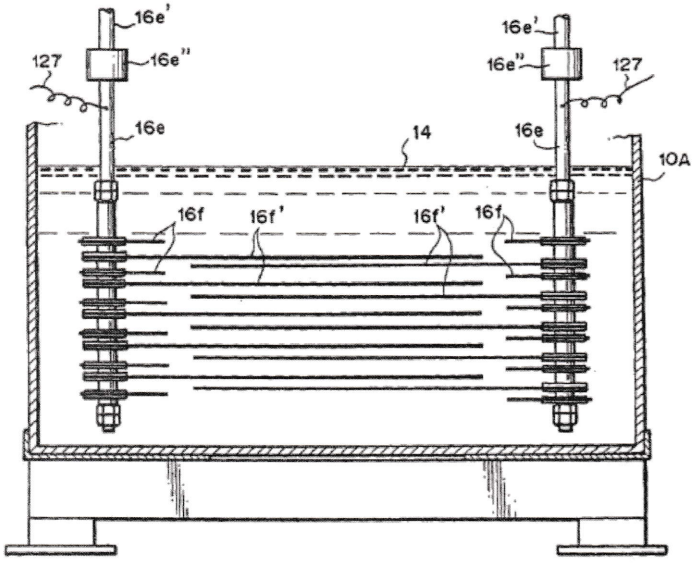
Electrolysis Plates



Omasa, US 7,459,071 (2008)

The electrolysis plates exhibit a surprise: They have holes drilled into them, up to 50% of the plates' surface area. Loosing electrode surface area is the opposite of what should be done to maximize hydrogen production, where maximal surface area supports maximal current. The holes allow the churning water to freely enter the electrolyzer. Each plate is directly connected to the power supply to offer ~2 volts between pairs. Gaskets keep the plates separated. Omasa cites advanced texts on electrolysis, and he selected the best materials for his electrodes: titanium for the cathodes, and platinum coated titanium for the anodes. The patent did mention that holes could be avoided if spacers were used instead of gaskets with the electrode assembly mounted sideways such that the gaps were oriented toward the vibrating vanes. However, all his described embodiments used electrodes with holes. Later we will see another advantage of the holes.

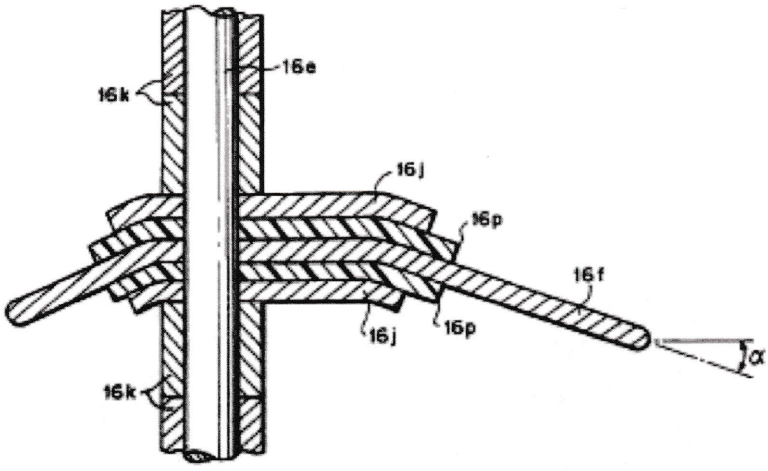
Vibrating Electrodes



Omasa, US 7,318,885 (2008)

The large 2008 patent did describe vibrating electrodes (as well as stationary electrodes). Obviously such a configuration is complex and fraught with mechanical difficulty keeping the electrodes separated during vibration. It appears that Omasa just wanted patent coverage for this idea. All his actual embodiments only used the stationary electrodes.

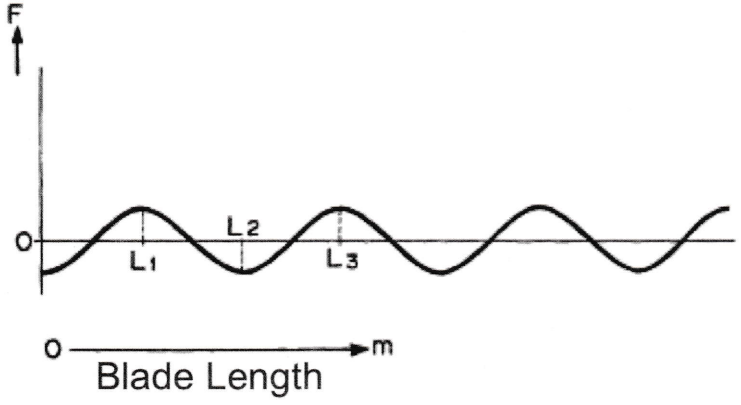
Flexible Blade



Omasa, US 7,459,071 (2008)

The patent meticulously described how to control and maximize the flutter displacement angle, alpha, of the flexible blade.

Maximize Flutter



Adjust Vibration Frequency

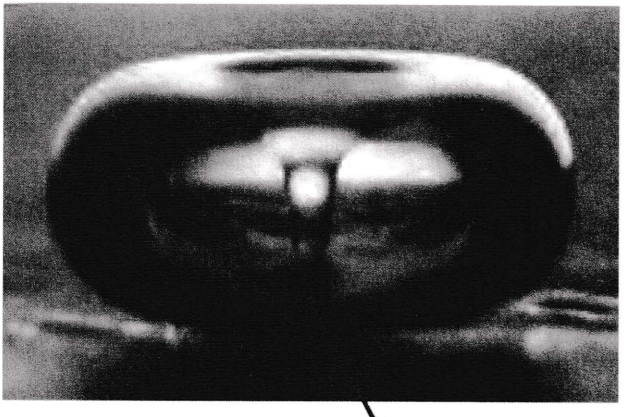
Omasa, US 7,459,071 (2008)

The flutter displacement angle is a function of the blade length, water mixture density in the bath, and mechanical vibration frequency. Omasa would adjust the vibration frequency to maximize the flutter displacement at the tip of the vanes. The maximal displacement results in a high velocity snapping action each time the blade changes direction.

Snapping Blade Makes Cavitation Bubbles

If the blade tip snapping velocity exceeds 40 mph, it can create cavitation bubbles. There is a remarkable effect that occurs when a cavitation bubble collapses into a torus form.

Collapsing Cavitation Bubble



Launches Reentrant Jet

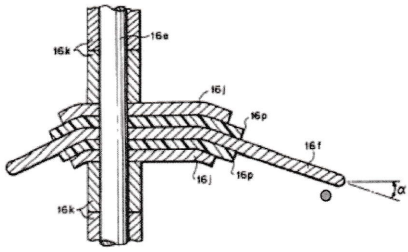
Photo credit: Larry Crum

Here all the energy of the collapsing bubble channels into a reentrant jet as it squeezes through the hole of the torus. It is launched in the direction of minimal pressure in the water bath. The jet exhibits an extraordinary concentration of energy.

Here is where Mark LeClair's discovery of the reentrant jet water crystal (2012 presentation) could help explain the activity in Omasa's water bath. LeClair discovered that the reentrant jet's leading tip is a plasma bow shock wave that helps accelerate the jet (similar to the EVO self-acceleration phenomena observed by Ken Shoulders). Could Omasa's snapping blade mimic the snap of the claw of the pistol shrimp? (2012 presentation) YouTube: Pistol shrimp

Fluttering Blade

High Speed "Snap" at Tip

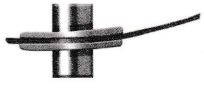


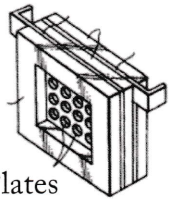
Makes Cavitation Bubble

Omasa, US 7,459,071 (2008)

The payoff for snapping the fluttering blade tip is to create cavitation bubbles.

Snapping Blade Launches Reentrant Jets





Plates

The figure illustrates how the snapping blade creates cavitation bubbles, and reentrant jets from their collapse are launched away from the blade directly toward the holes of the electrolyzer plates because this is the direction of minimal ambient water pressure. The reentrant jets thus naturally enter the zone of electrolysis activity. This is the advantage of having holes in the electrolyzer plates. Omasa may not be aware that this phenomena is occurring in his vibrating electrolyzer.

Reentrant jets offer other surprising effects. LeClair has observed that elongated water crystals can sometimes close into loops. Here the positive head is attracted to the negative tail which combines to form a loop. Likewise colliding reentrant jets can sometimes form loops by mutually attaching head to tail. See the photos in the 2012 presentation.

A small water crystal loop could be the seed for a water cluster gas. Abundant cavitation activity could yield "energized" water that contains many such clusters. LeClair suggests the ring might be stable under a half micron. It just might be an ideal "template" to support creating a submicron water cluster.

Omasa Patent Embodiments

Omasa's US Patent 7,459,071 (2008) describes embodiments that he used in his experiments.

Gradual Improvement

1. DC: 17 liters/min
2. Multiplex current: 20 liters/min
3. Different vibrator motor, DC: 13 liters/min
4. 33 liters/min
5. 42 liters/min
6. 37 liters/min
7. 50 liters/min
8. 58 liters/min

His experiments allowed him to gradually improve his apparatus. Most improvement was achieved by varying the excitation waveform for the electrolysis.

Best Embodiment

- Device Size: 27 x 166 x 39 cm
- Pulse Waveform: 80 msec on, 20 msec off
- 2 V, 5A/dm2
- KOH 8% in distilled water, pH 10
- Gap: 5 mm
- Holes 50% of electrode plate area
- 50 Anodes: Platinum Plated Titanium
- 50 Cathodes: Titanium
- 58 liters/min

The specs for the best embodiment was described as shown. The electrolysis plates were expensive, and half the surface area was holes. For the electrolysis, he appeared to be using a 10 Hz square wave with 80% duty cycle. Because he had access to a sophisticated signal generator, it is possible there could have been a higher frequency modulation within the square wave that he did not disclose. He stated that his electrolysis current density was 5 amps per square decimeter of plate area. The actual plate size was not stated nor the total input current. Thus it was hard to compare his gas production efficiency to other HHO projects. However, if the gas quality is superior yielding abundant stable nano-bubbles,

they could yield superior performance in an engine because they all convert to ball lightning to propel the piston. Thus less gas would be required compared to what is needed to propel the piston via hydrogen combustion.

Surprises

There were some surprising experiments mentioned in the last patent application filed in 2009.

pH 14

- **30% KOH**
- **Caustic!**
- **Each Electric Pulse Yields Underwater Plasma Discharge**

Omasa, US Patent Application 20110139630

Omasa tried an extreme concentration of potassium hydroxide electrolyte. Such experiments are dangerous because the electrolyte is so caustic. The high conductivity allows each electric pulse from the electrolysis plates to manifest an effective underwater plasma discharge. The plasma discharge intermixed with the re-entrant jet activity would no doubt lead to some interesting physics. Omasa reported reasonable gas production in these experiments, but the approach appears to waste too much input power for practical usage.

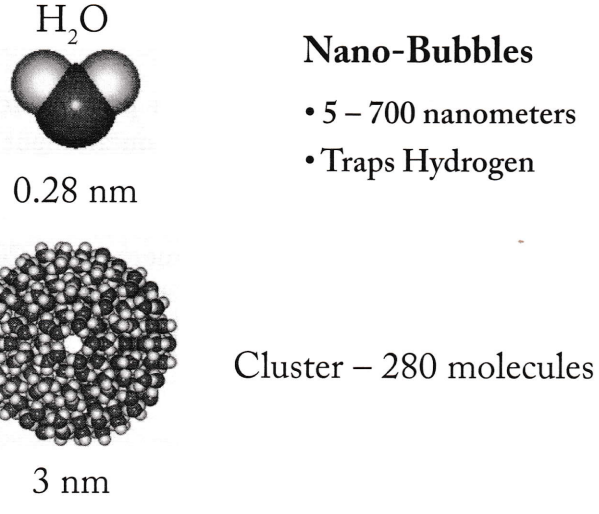


Image credit: Martin Chaplain
LSBU.ac.uk/water/icosahedral_water_clusters.html

Omasa stated that his electrolyzer yields 5 to 700 nanometer size bubbles. There are studies of water clusters on the scale of about 3 nanometers. If some hydrogen atoms were cocooned in the cluster, they could rise out of the water bath like miniature hydrogen balloons.

Liquefied Gas

- -190 to -250 degrees C
- Pressure 43 to 4300 psi
- Re-gasified:
  - Torch still appears to vaporize tungsten

Omasa measured the temperature at where the gas would liquefy at various pressures ranging from 43 to 4300 pounds per square inch (psi). When the liquid melted, it returned back to the same energetic gas that appears to vaporize tungsten as a torch.

Stored Under Pressure

- 10 MPa (1450 psi)
- Two years
- Tried 200 atm (3000 psi)
  - No Explosion
- Brown's Gas Explodes at 30 psi

Omasa was able to store the gas under pressure for long periods of time. In these experiments his storage containment was porous to hydrogen, and would leak any free residual hydrogen. A mixture of hydrogen and oxygen typical of Brown's gas can spontaneously explode at about 30 psi. He even tried pressure experiments up to 200 atmospheres without explosion. Since extreme pressure experiments are so obviously dangerous, they were performed in a shielded area.

Small Spark Above Bath Did Not Ignite Gas

Omasa had so little free hydrogen emitted from his water bath that a small spark above the bath did not ignite the gas. In contrast, hydrogen combustion would immediately occur in typical Brown's gas electrolyzers.

Transmutation Mentioned

Omasa, US Patent Application 20110139630

> **[0065]** Since the liquid material or regasifed gas composed of hydrogen and oxygen according to the present invention thus has extremely high energy, there is hidden potentiality that **elemental transmutation** can be caused by using the gas.

Perhaps the biggest surprise was that Omasa mentioned the possibility of element transmutation in his patent application. There was only one sentence. Why was this mentioned? Did he actually observe element transmutation events?

Transmutation Measured

- Mark LeClair
  - Reentrant Jet Strikes
- Ken Shoulders
  - EV/EVO Strikes 
- Stanislav Adamenko
  - Plasmoid Strikes 

There are other researchers who flat out claim to have measured nucleosynthesis transmutation events, something considered impossible in today's paradigm of standard science. In 2012 Mark LeClair announced to have measure such events in his apparatus designed for extreme cavitation.

Ken Shoulders quietly presented his transmutation measurements caused by EV strikes at the 10th International Conference on Cold Fusion poster session. By far, the most spectacular nucleosynthesis experiments are claimed by Stanislav Adamenko...

Nucleosynthesis from Plasmoid Strikes

As discussed in the 2009 presentation, Stanislav Adamenko lead The Proton-21 Laboratory in Kiev, Ukraine, where he repeatedly created transmutation using large, kilo-joule plasmoids. Proton-21 is a laboratory employing professors from the local university to study the phenomena. For each experiment they meticulously prepared a pure copper target to be struck by the plasmoid.

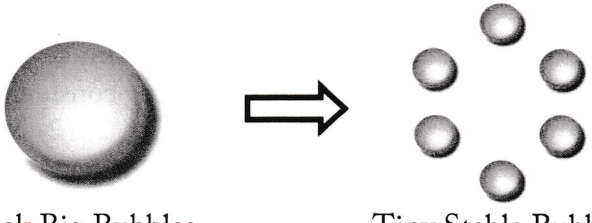
After the target is smashed by the energetic plasmoid, it contains elements all over the periodic table. The Proton-21 Laboratory appears to be conducting the best research in the world regarding element transmutation. Their work is pretty much ignored by western scientists because of the paradigm violations their experiments are exhibiting. Like Shoulders and LeClair have shown in their experiments, the input energy is not sufficient to produce nuclear level events, and thus the experiments strongly imply coherent ZPE activation is occurring.

The research continues today where the Russians are enthusiastically replicating the experiments. There are annual conferences in Russia dedicated to studying cold nuclear transmutation from ball lightning. How does western academia respond to this research activity? They ignore it!

What Can We Do?

There is quite a bit of evidence of interesting energetic activity associated with water structure and plasma discharge into water mist or fog. How can the hobbyist inventor take advantage of this?

Goal



Break Big Bubbles Tiny Stable Bubbles

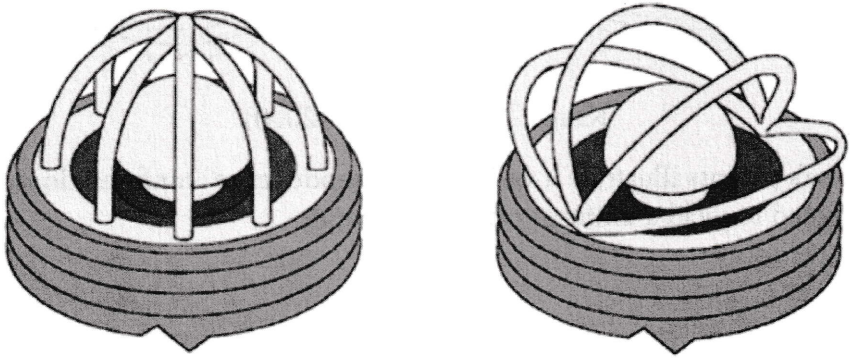
Remember the goal in to transform typical bubbles or fog/mist droplets into extremely tiny stable bubbles. These form the basis for creating abundant microscopic ball lightning.

Plasma Discharge Spark Plug

To make abundant microscopic ball lightning from fog or mist requires a large, abrupt plasma discharge. Thus the spark plug becomes an important component to drive a genset as a pulse plasmoid engine.

FireStorm Spark Plug

Robert Krupa



US 5,936,332 (1999)
US 6,060,822 (2000)

The Firestorm spark plug invented by Robert Krupa appears ideal because it is designed to emit a large spherical shaped plasma with each pulse. Patrick Kelly in his e-book told the story of Krupa and his spark plug. The inventor just could not get any traction with a manufacturer to mass produce the spark plug, which was claimed to have an extremely long lifetime because the electrodes did not wear out.

FireStorm Spark Plug Prototype

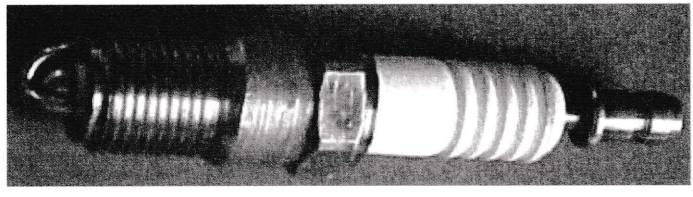
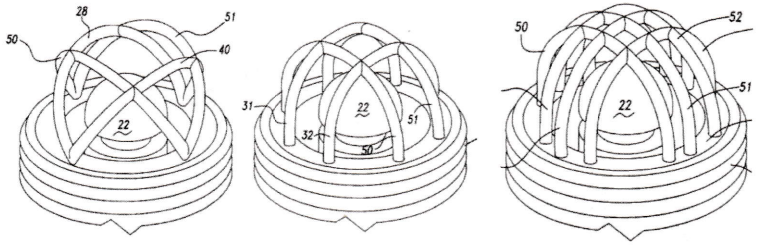


Image credit: Patrick Kelly

Over the years some simple prototypes have been created by researchers.

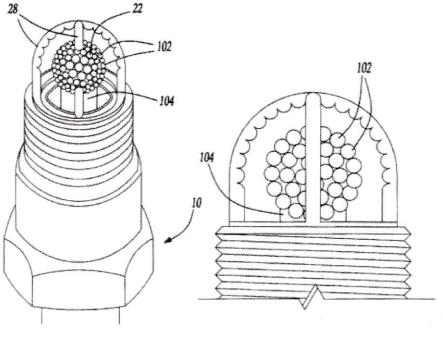
FireStorm Spark Plug Variants



Krupa, US 6,060,822 (2000)

Krupa's patents illustrate a variety of electrode "cage" configurations, all designed to yield a uniform plasma discharge.

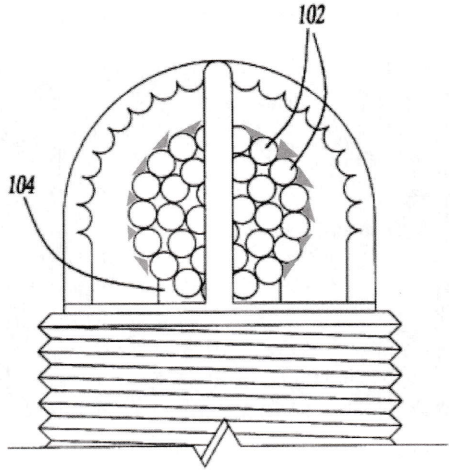
FireStorm Spark Plug Dimpled



Krupa, US 6,060,822 (2000)

Some electrodes had a dimpled configuration which yielded a superior abrupt plasma emission.

FireStorm Spark Plug Glow Plasma

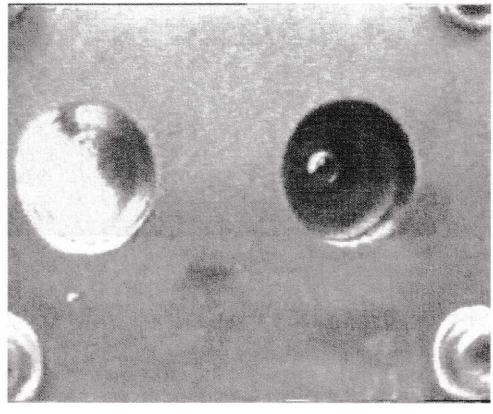


Krupa, US 6,060,822 (2000)

The dimpled surface acts like a hollow cathode switch where glow plasma builds up just before the spark plug fires. Ken Shoulders had observed that abrupt discharge from glow plasma in a hollow cathode switch can itself launch EV/EVO events. It is interesting that Krupa discovered the benefit empirically via his experiments.

Wide Plasma Discharge

FireStorm Plug

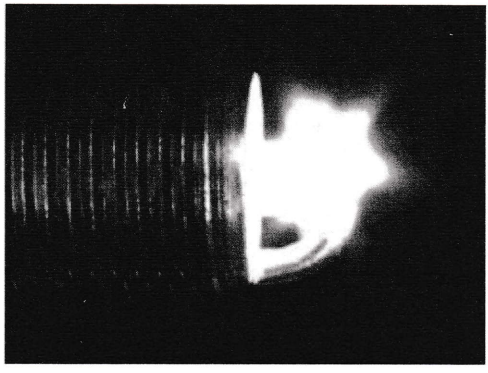


Ordinary Plug

hho4free.com/sparkplugs.html

On the web there is an animated GIF comparing the Firestorm plug with an ordinary spark plug.

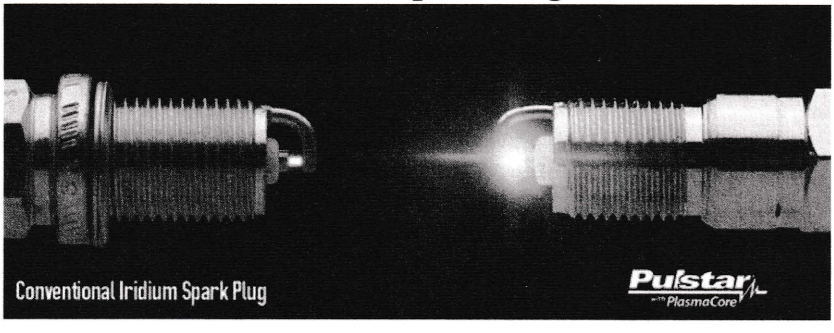
Aqua Pulser Spark Plug



aquapulser.com/performance_ignition/

There are commercial plasma spark plugs available for sale. They are typically used to enhance race car performance.

Pulstar Spark Plug



pulstar.com

The Pulstar spark plug touts capacitive discharge technology.

Capacitive Discharge



Pulstar Plug



pulstar.com

The casing of the spark plug is designed to be a cylindrical capacitor. The capacitor abruptly discharges more plasma into the spark gap.

To maximize microscopic ball lightning formation in the combustion chamber, an abrupt capacitor discharge would ideally occur on each firing event timed with the piston top dead center. The timing must be controlled so as not to fire a "waste spark" during the exhaust cycle since the valve is open to the gas input feed line when the timing is adjusted at top dead center. Thus to make a genset run as a pulse plasmoid engine requires controlling the pulse plasma event.

Halo Emitter on Fog



Pulsed:
75 KV
10 mA
41 KHz

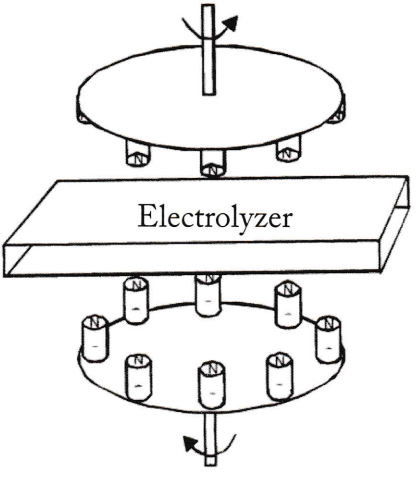
David Yurth, Nova Institute of Technology

David Yurth lead a team to invent a novel spark plug named the "Halo Emitter." It was designed to ignite the fog gas from a novel electrolyzer.

Energetic Fog from Counter-Rotating Magnets

Yurth's team used counter rotating magnets to excite the water and gas in their electrolyzer.

Counter Rotating Magnets



The use of counter rotating magnets is an "archetype" idea that has inspired inventors over the years. The Russian torsion field theories *support the idea with the view that organizing coherent vacuum energy* phenomena must conserve angular momentum. Thus vacuum energy coherence always involves pairing counter-rotating spins. Yurth's team applied this idea to see if it would improve the gas yield from a water electrolyzer. They were encouraged because the electrolyzer did indeed emit abundant fog gas that seemed more energetic.

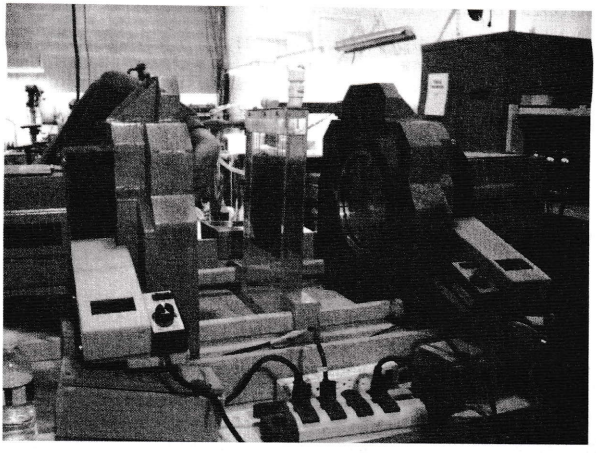
Magnets in Rotor



David Yurth, Nova Institute of Technology

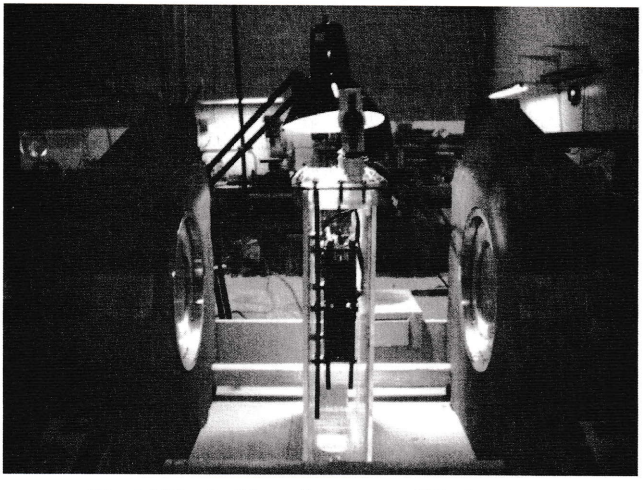
Here is the project's rotor assembly with the embedded neodymium magnets.

Counter Rotation Assembly



David Yurth, Nova Institute of Technology

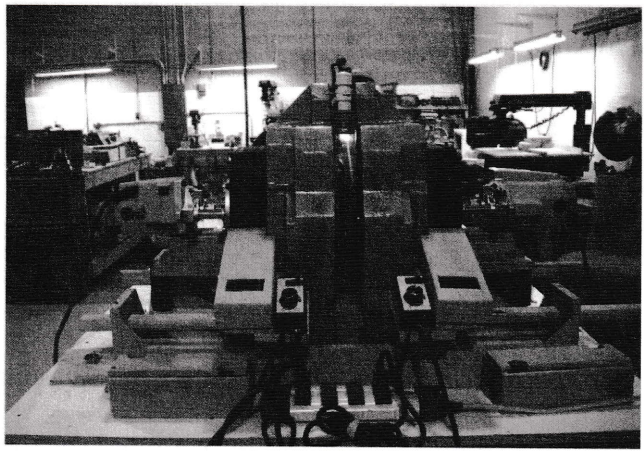
Here is the counter rotating assembly. The electrolyzer is in the center.



David Yurth, Nova Institute of Technology

8 Plate Electrolyzer

For the experiments the electrolyzer had only eight plates.

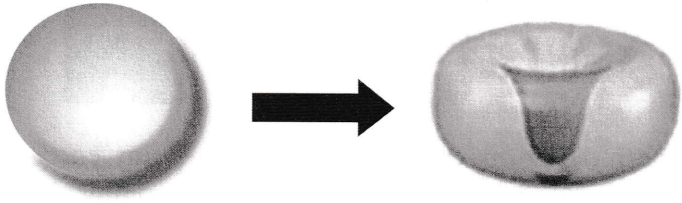


David Yurth, Nova Institute of Technology

Here is the apparatus fully assembled with the rotor housing pushed against the electrolyzer. Because the project was proprietary and funded by investors, there was little technical information shared into public domain.

Summary

Cloud Particles

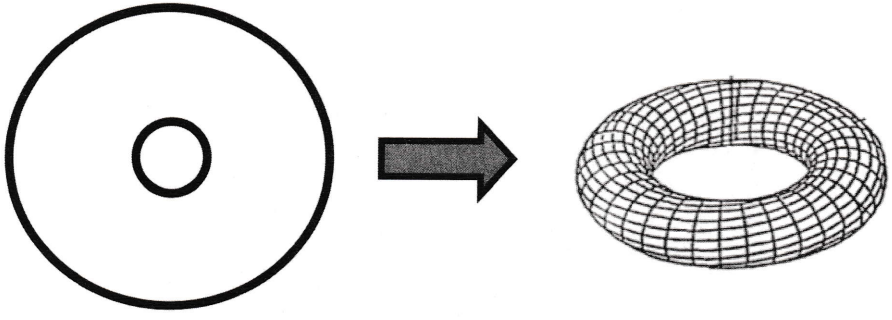


Droplet Torus

When Tiny ~ 0.5 micron

Cloud particles are simply small droplets of water. If small enough they can dimple into a torus form when subjected to a pulse plasma event.

Abrupt Electric Discharge



Matter Torus

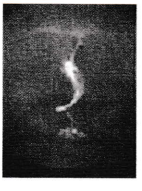
Plasmoid

The abrupt electric discharge plasma can form around the torus to make a microscopic plasmoid.

Ortho-Rotates ZPE Flux

- Self-Organization Occurs
- Plasmoid Self-Accelerates
- Vortex of Plasmoids
  - Big Energy!





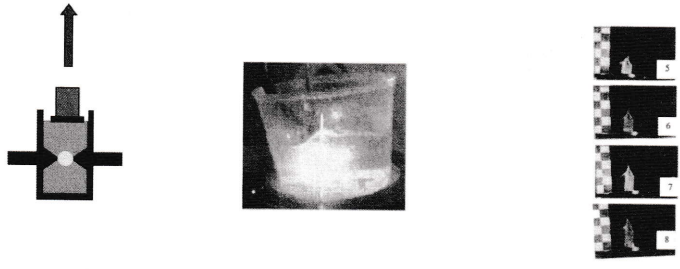
The plasmoid form can cohere the zero-point energy by ortho-rotating the underlying hyperspatial flux, trapping it within the plasmoid. The orthorotation "warps" the space-time metric to manifest a self-acceleration of the plasmoid. If the plasmoid can interact with other vortex activity, the resulting coherence can cascade to manifest even bigger energetic events.

Thunder Cloud Activity

Thundercloud activity could be producing abundant plasmoids. High speed photography shows every lightning bolt has a ball lightning precursor. The huge energetic sprites above the thundercloud also manifest ball lightning activity. The creation of gamma rays and

antimatter imply coherent ZPE activation. The paradigm shifting hypothesis is that thundercloud energy is ultimately sourced from the zero-point energy itself.

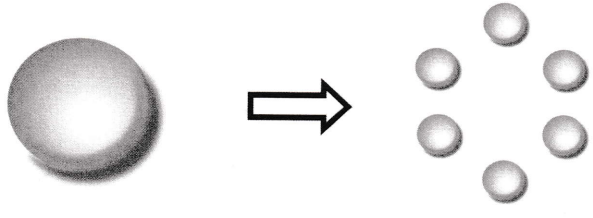
Water Arc Explosion Experiments



Anomalies from Sub-micron Fog Particles

The water arc experiments have shown that the anomalous force comes from the supersonic sub-micron fog particles; they were measured with high speed photography.

Vibrating Electrolyzer

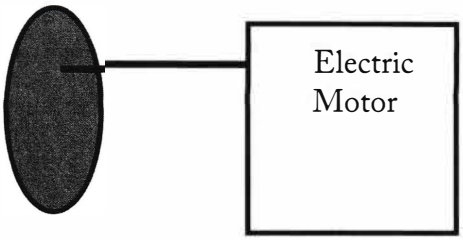


Break Big Bubbles Tiny Stable Bubbles

Any Means of Vibration Helps

The point of vibrating the electrolyzer is to break up the bubbles into tiny stable bubbles. These will be basis for forming the microscopic ball lightning.

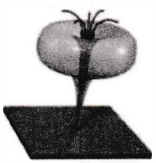
Vibrate Electrolyzer
Unbalanced Flywheel



Speed Sets Mechanical Frequency
Adjust to Maximized Fog

Any means of vibration could help: Sonic, ultrasonic, mechanical. Perhaps even an off-balanced flywheel on an electric motor might work. Here the mechanical vibration frequency is controlled by simply adjusting the speed of the electric motor. Whatever means is tried, the vibration frequency should be adjusted to maximize production of cool fog from the electrolyzer.

Omasa Fluttering Blades



Cavitation Bubble



Reentrant Jet

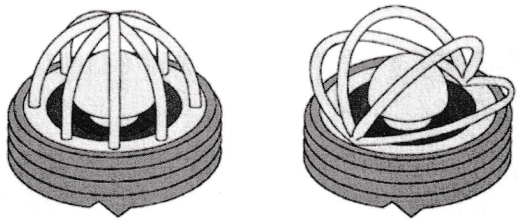


Stable Cluster

Makes Stable Nano-Bubbles

Omasa's fluttering blades were designed to create a snapping action. This would create cavitation bubbles that then would collapse to form reentrant jets. These in turn could support the formation of nano-bubble clusters in the water. Hydrogen trapped in the clusters could lift them from the water bath like microscopic hydrogen balloons. These could be ideal forms for creating microscopic ball lightning. Omasa may have discovered the best protocol for making the ideal gas.

Plasma Spark Plugs

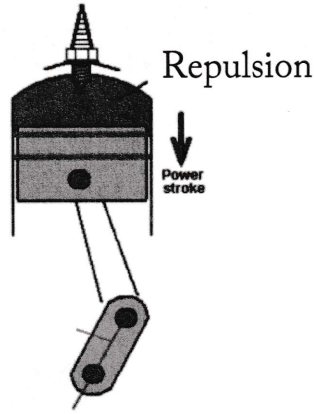


Converts Nano-Droplets to Ball Lightning

To convert all the microscopic bubbles simultaneously into ball lightning, a maximal spherical plasma spark plug should be used. The wider and more abrupt the plasma discharge, the better.

Pulsed Plasmoid Engine

Huge Anomalous Force
Taps Zero-Point Energy



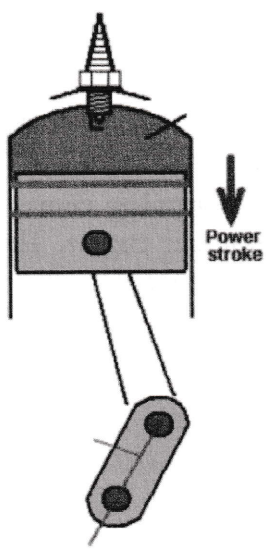
The microscopic ball lightning converts an internal combustion engine into a pulsed plasmoid engine. The huge anomalous force is sourced from the zero-point energy.

Thunder Clouds
Tap the Zero-Point Energy



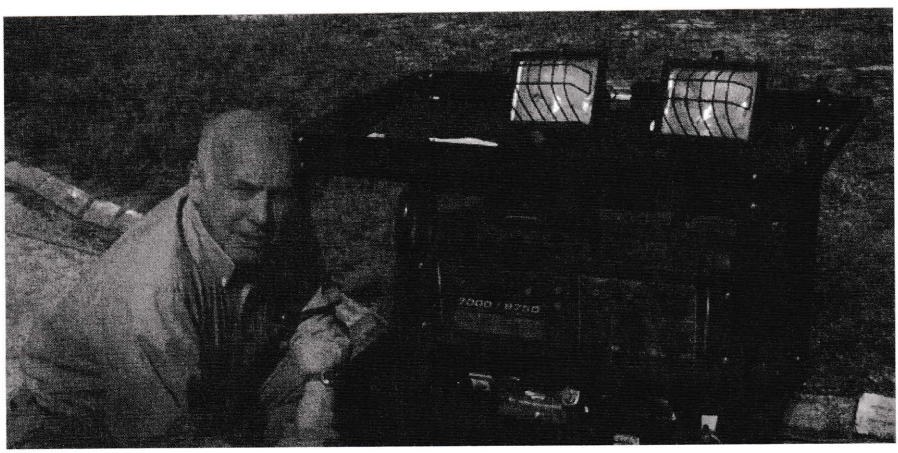
Thunderclouds tap the zero-point energy.

We Should Too!



From Nanobubbles to Ball Lightning (2016)

Genset Runs on Water



A self-running generator that runs on just water? This video was posted January 2016. YouTube: H2G PROMO 8

Fraud? Runs on Hydrogen? Something Else?

After watching the video, what are your first impressions? Do you think it's a fraud? Do you think it runs on hydrogen?

What if the device does not use electrolysis? Would you still think it runs on hydrogen? Or would you think it's something else?

Since 2007 when I first began researching the claims of internal combustion engines and gensets runnning "on water," I entertained all three beliefs before settling on "something else." This year (2016) the pieces of the puzzle connected...

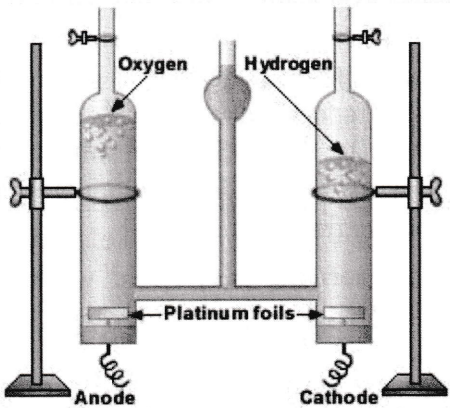
It just might be that the popular water electrolyzers can be improved to produce extraordinary energy. The excess energy is not from hydrogen combustion, but is instead sourced from the zero-point vacuum energy.

A new perspective on water electrolyzers is offered, which shows that the creation of nanobubbles could be the key to producing abundant energy.

Hydrogen?

Yet most inventors believe that somehow hydrogen from their electrolyzers is the energy source.

Electrolysis



Cannot Yield Excess Energy

It is well known in standard science that electrolysis cannot yield a net energy gain.

Violates Thermodynamics

Electrolysis:

$$H_2O + E_1 \rightarrow H_2 + O_2$$

Combustion:

$$H_2 + O_2 \rightarrow H_2O + E_2$$

Energy:

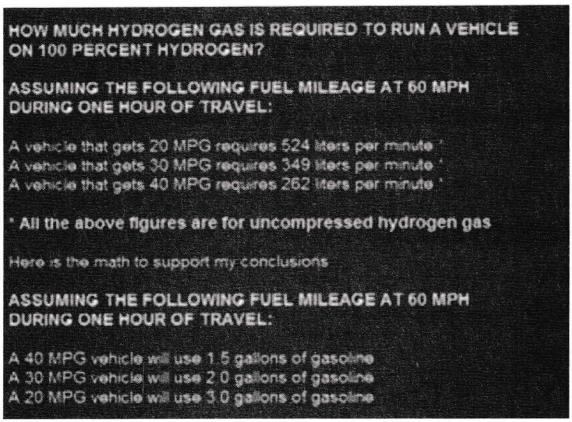
$$E_1 > E_2$$

It simply takes more energy to split apart the water than could ever be returned by combusting the hydrogen. That is standard thermodynamics.

Self-running a genset where the electrolyzer provides the gas for the engine in the generator, whose electricity solely drives the electrolyzer, *is considered absolutely impossible* when just hydrogen combustion is occurring. Not only does it take more energy to dissociate water into hydrogen and oxygen than is ever returned when the hydrogen combusts, but more importantly, internal combustion is extremely inefficient, perhaps 20% at best for a cheap generator. Most of the energy in internal combustion is wasted as heat. Thus any claim of a self-running genset is a spectacular claim. It implies that whatever is happening energetically has to be ~5X over unity to overcome the major losses (assuming combustion). It is no wonder that such claims are immediately dismissed as frauds.

Run Car on Hydrogen

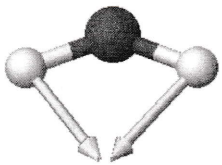
300 to 500 liters per minute



YouTube: HYDROGEN - 524 LITERS PER MINUTE

Moreover, five to twenty liters of gas per minute produced by the typical electrolyzers would yield little energy if the gas were simply hydrogen at standard atmospheric pressure. To get the BTU equivalent to gasoline with uncompressed hydrogen would require 300 to 500 liters per minute to run a car in normal fashion. None of the inventors are claiming to be making this amount of hydrogen.

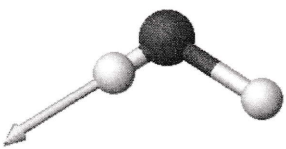
Water Molecule Vibrations



1711 cm^{-1} ~51 THz



3730 cm^{-1} ~112 THz



3851 cm^{-1} ~116 THz

chemtube3d.com/vibrationsH2O.htm **Infra-red**

The internal vibrations of the water molecule bonds are on the order of 50 to 120 Tera Hertz. It is in the infra red band. Inventors are not claiming they stimulate water at these frequencies.

42.8 KHz

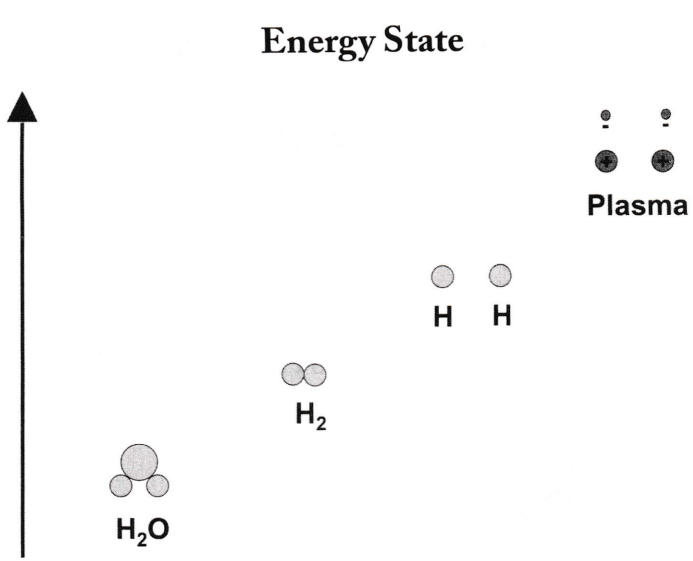
But what about 42.8 kilo Hertz? Many inventors claim this is a significant frequency for dissociating water. Where did that idea come from?

Keely Dissociation Frequency 42.8 KHz

Dissociation into hydrogen and oxygen:
620 Hz + 630 Hz
Dissociation to aether:
42,800 Hz



John Ernst Worrell Keely
1827 - 1898



Another the way to look at it is by energy state: The water molecule is in a lower energy state than molecular hydrogen, which is a lower energy state than atomic hydrogen. It is in a lower energy state than ionized hydrogen, which is in the plasma state. It costs you energy to put hydrogen in the higher energy states.

Resonant Dissociation?

But what about resonant dissociation? What if we "shake apart" the water molecule by driving it at its natural vibratory frequency? Wouldn't that do the trick?

Is Resonance an Energy Source?

Is resonance a source of energy? Resonance is driving a system at its natural vibratory frequency. Small impulses of energy can be applied in phase with the natural oscillations of a system. The energy would be absorbed by the oscillating system and the amplitude of the oscillation would grow (at least up to the point of dissipating losses in the system). Thus resonance allows the efficient absorption of applied energy, but the phenomena of resonance itself is not the energy source. If we wish to stimulate the water molecule atomic bonds at their resonant frequency, what frequency is it?

In 1965 Dan Davidson was consulted to try to explain an accidental event made by a research scientist who wished to remain anonymous, thus he is called "Dr. X." Dr. X created an experiment where he was maintaining an ultrasonic (~40 KHz) standing wave in a quartz cylinder. As water gradually evaporated from the cylinder, his driver circuit adaptively increased its frequency in order to maintain the standing wave. He was recording the frequencies in his lab notebook. After recording 42 KHz he was surprised when he no longer saw any water in the cylinder - nor was there any water splashed on the lab bench. There was no sound or indication of an explosion. When he looked up he was astonished to see a circular hole punched through the ceiling that was the exact diameter of the quartz tube. Further investigation revealed a similar hole punched through the roof of the house. Dr. X was so shaken by the event that he abandoned further investigation. Dan Davidson was later consulted to try to explain what happened from the perspective of Keely's theories. To date there is no one claiming successful replication of this event. It stands alone as the only experiment beyond Keely that claims a spectacular energetic event associated with the 42.8 KHz frequency.

Something Else?

If not hydrogen, what else could it be? Instead of tearing apart the water, what if ultrasonic frequencies make something in the water? The theme of the 2015 presentation hypothesized the importance of microscopic droplets and sub-micron sized bubbles to support creating microscopic ball lightning. It was in 2016 that I discovered the following web site:

H2-Global.com



h4gas.com

It came from John Ernst Worrel Keely, a famous inventor of the late 1800's. Keely specialized in acoustical and ultrasonic stimulation of matter. His writings stated he could dissociate matter to aether at 42,800 Hz. He also stated he could dissociate water into hydrogen and oxygen at the acoustical frequencies 620 – 630 Hz.

Keely Researchers

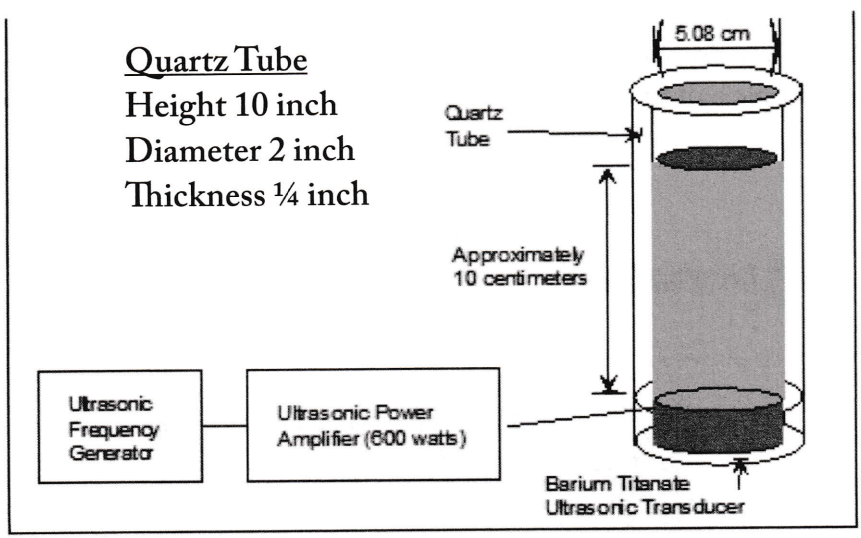
Jerry Decker (keelynet.com/keelyhistory.htm)

Dale Pond (svpvril.com)

Dan Davidson (aethericscience.com)

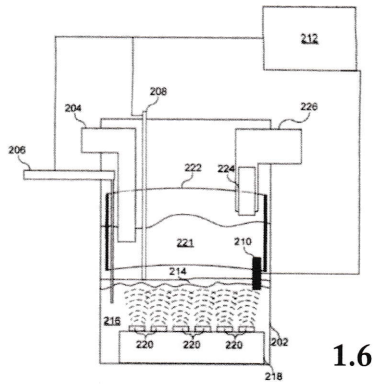
I asked the Keely researchers that I knew from the energy conferences if they could find a reference where Keely stated that he dissociated water into hydrogen and oxygen at 42,800 Hz. They could not; they likewise found he claimed to dissociate water into aether at that frequency. In his book and conference presentation Dan Davidson rejuvenated interest in the Keely dissociation frequency when he described a spectacular event that occurred around 42 to 43 KHz.

Dr. X Experiment



Dan Davidson, Shape Power, RIVAS Pub., 1997, p34

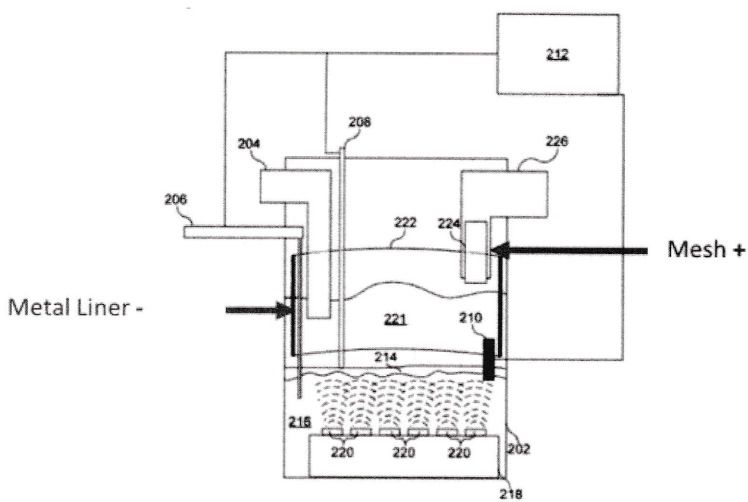
Ultrasonic Fogger



W. Jenkins, US 2012/0186557 A1

He used a commercial ultrasonic fogger at the bottom of a water container.

Electrostatic Grids



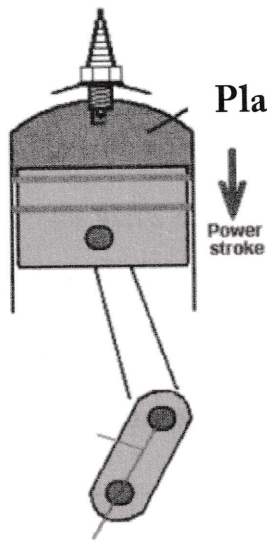
W. Jenkins, US 2012/0186557 A1

Electrostatic grids charge and guide the fog particles to enter the combustion chamber.

Synergistic Miracle

Discovery the research of H2-Global was a synergistic miracle for me. For here appeared explicit experimental evidence that seemed to confirm my hypothesis. The conclusion of the 2015 presentation was to mimic a thunderclap in the combustion chamber of an internal combustion engine:

Internal Combustion Engine



Mimic a Thunder Clap!

Put cloud particles into the combustion chamber, and with the piston at top-dead-center, create a huge, wide, abrupt electrical discharge via a powerful capacitive discharge spark plug. H2-Global appeared to be doing it.

Patent US 2012/0186557 A1
Walter Jenkins

Apparatus, System, and Method for Vaporizing Fuel Mixture

Published: July 26, 2012
Filed: Jan 24, 2012
Provisional: Jan 24, 2011

The inventor, Walter Jenkins, discovered and patented the approach, independent of knowing me or any of my research. He does not use electrolysis.

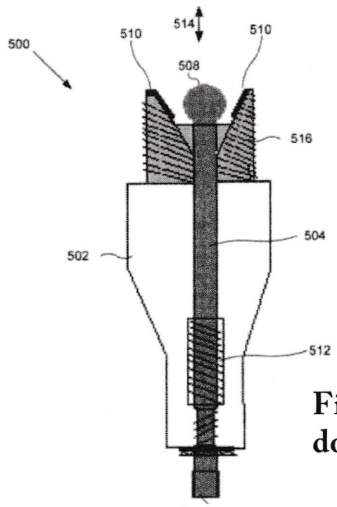
presentation showed that Peter Graneau's experiments as well as the replication by Gary Johnson offer compelling evidence that an explosive electric discharge in water exhibits huge anomalous force. Inventors like Stan Meyer discovered that electric discharge in mist could drive a piston. As a practical matter, mist particles of a few microns in size convert to larger EV/EVO forms which make craters on the piston and walls of the combustion chamber. This was exactly what Shoulders observed with EV/EVO strikes. It is better to use smaller particles like fog or nanobubbles to be the template for microscopic ball lightning formation. Then instead of craters, a smoothing action would occur like media blasting. The definitive, paradigm shifting experiment will likely come from the inventing community. Walt Jenkins might lead the way for he explicitly avoided making hydrogen and worked purely with fog, thus offering a clean experiment to the world.

Why Do Some Electrolyzers Succeed? (Most fail)

There is a mystery left to explore. What was it about narrow gap electrolyzers and conditioning their surface electrodes that allowed them to be successful? The 2012 presentation suggested it was cavitation. There was one more breakthrough idea coming from studying Ryushin Omasa's research (2015 presentation). Measurements at a Japanese university showed Omasa's water contained abundant nanobubbles, and these were remarkably stable. In fact it was the Japanese who have lead the world in discovering that nanobubbles in general were highly stable. We will see that that those electrolyzers that made abundant nanobubbles were the most successful because the stability of those nanobubbles allowed them to become the templates for creating a plenitude of microscopic ball lightning.

The 2009, 2012 and 2015 presentations featured the research of Ken Shoulders, who observed the anomalous self-acceleration characteristic of the ball lightning forms (EV/EVO). It is this activity that causes the huge force on the piston of an internal combustion engine.

Wide Plasma Spark Plug



W. Jenkins, US 2012/0186557 A1

In the combustion chamber Walt Jenkins fires a cleverly designed, custom spark plug. He ignites the plug when the piston is top dead center and persists the discharge for the entire down stroke. High voltage is used for the event, 100 to 200 KV, far larger than typical spark plugs ~50 KV. Jenkins indeed mimics a thunder clap in his combustion chamber.

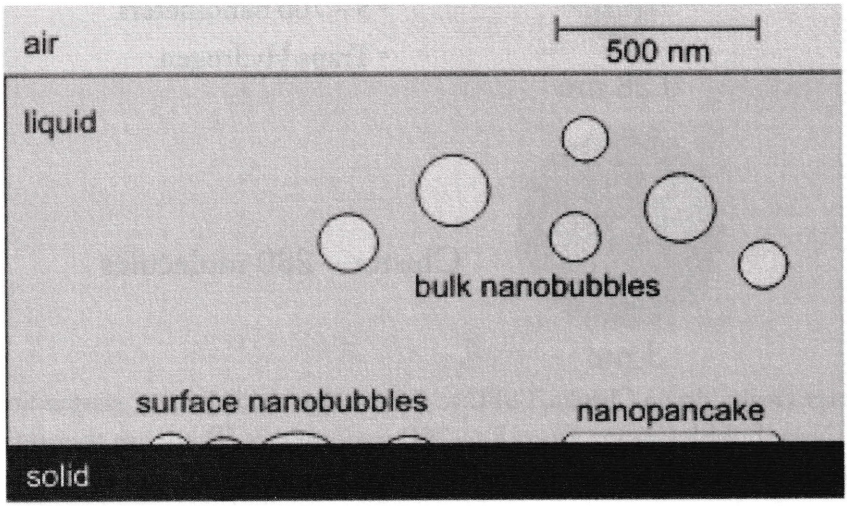
How Can Fog Particles Be a Fuel?

The 2015 presentation presented the hypothesis on how fog particles could appear to be fuel. They essentially become converted to microscopic ball lightning in a wide plasma discharge event. It was Ken Shoulders detailed study of the ball lightning form he called EV or EVO that yielded the evidence that excess energy manifests. The manifested energy was huge compared to the input energy, and the EV/EVO exhibited a self-acceleration like an Alcubierre warp drive. The big hypothesis is that the source of the energy is a coherent self-organization from the zero-point energy itself, which in essence makes it the energy source. Advance models of the ZPE like Wheeler's *Geometrodynamics* with its "orthogonal flux" open the possibility for theoretical physics, but it is a paradigm shift for most to accept it.

Nonetheless, in science it is the experiment that guides the growth of new models in physics, and there have been a number of observations and experiments involving abrupt electric discharges in water. The 2015

scatter measuring techniques irrefutably proved their existence and long life.

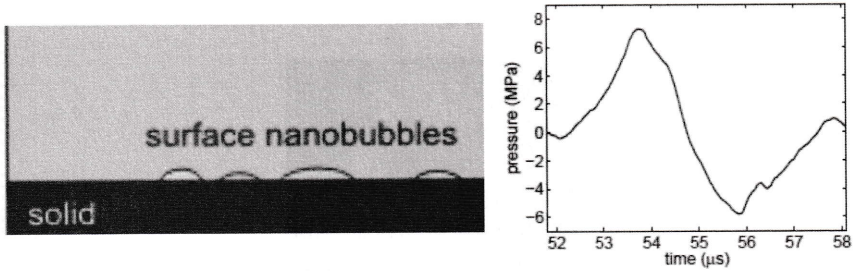
Nanobubbles



LSBU.ac.uk/water/nanobubble.html

Not only are bulk nanobubbles stable, but surface nanobubbles are incredibly robust.

Superstability

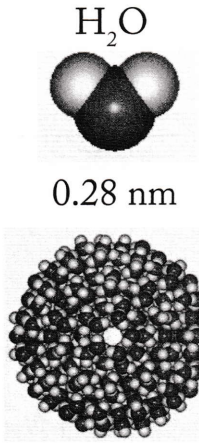


Shock Wave: +- 6 MPa +- 59 atmosphere

arxiv.org/pdf/physics/0703203.pdf

Experiments have shown that surface nanobubbles can withstand pressure shock wave events on the order of 60 atmosphere. The academic water community was astounded by this discovery.

Nanobubbles



Omasa's Nanobubbles

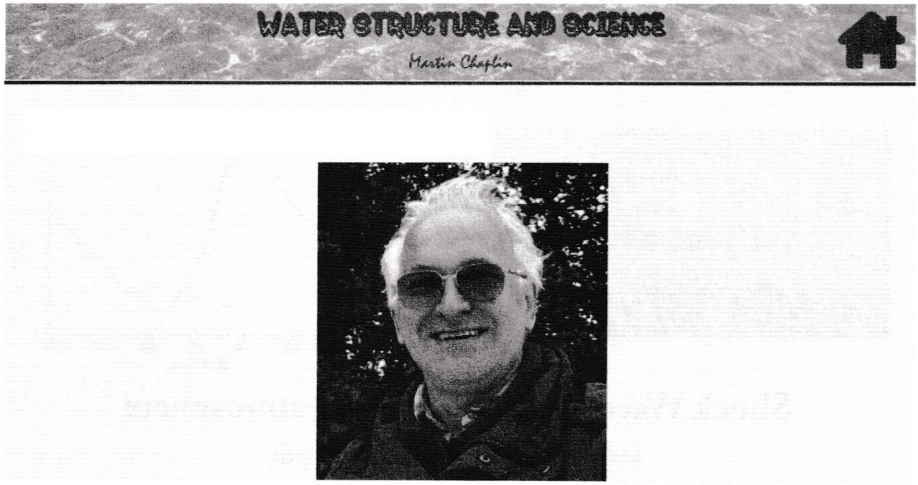
- 5 – 700 nanometers
- Traps Hydrogen

Cluster – 280 molecules

Image credit: Martin Chaplin, LSBU.ac.uk/water/icosahedral_water_clusters.html

Nanobubbles range from 5 to 700 nanometers. There are theoretical models for water clusters as small as three nanometers. In an electrolyzer if some hydrogen atoms were cocooned in nanobubbles, they could rise out of the water bath like miniature hydrogen balloons.

Professor Martin Chaplin



London South Bank University

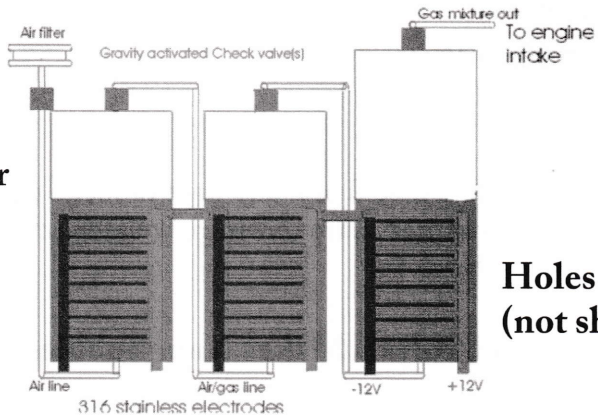
LSBU.ac.uk/water/

Professor Martin Chaplin maintains an extensive web site that references research world wide on the topic of water. The topic of nanobubbles has been controversial since there is no satisfying explanation in academia for their long stability. However, laser back

Archie Blue

U.S. Patent 4,124,463 (1978)

Blow air through electrolyzer



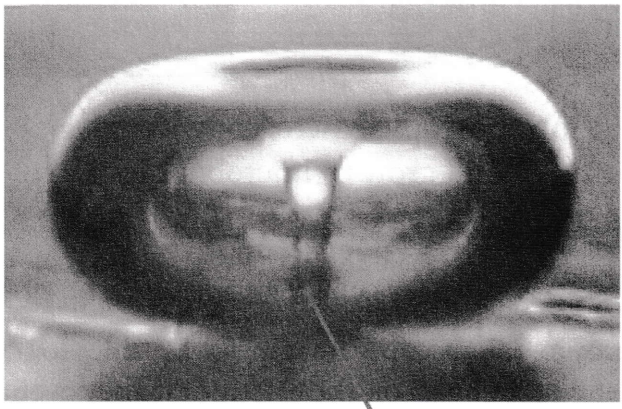
Holes in plates (not shown)

In the 1978 Archie Blue received a patent for his electrolyzer which featured blowing air through it. The air flow could help shear the nanobubbles off the electrodes' surface before they grew to become less stable. Archie Blue claimed to run a car from his electrolyzer.

Cavitation Makes Nanobubbles

Cavitation is a popular technique for making nanobubbles.

Collapsing Cavitation Bubble



Launches Reentrant Jet

Image credit: Larry Crum

What Makes Nanobubbles?

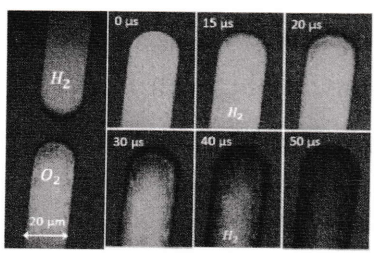
- Electrolysis
- Cavitation
- Microchannels
- Ultrasound

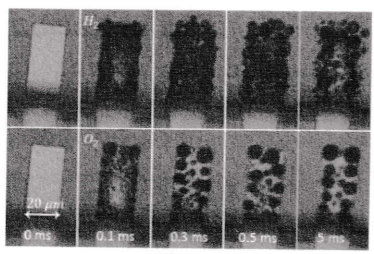
The water literature describes many ways to make nanobubbles. We will see that some inventors have unwittingly used techniques to make them in more abundance.

Electrolysis Makes Nanobubbles

As it turns out, electrolysis naturally makes nanobubbles of hydrogen and oxygen.

Transient Nanobubbles





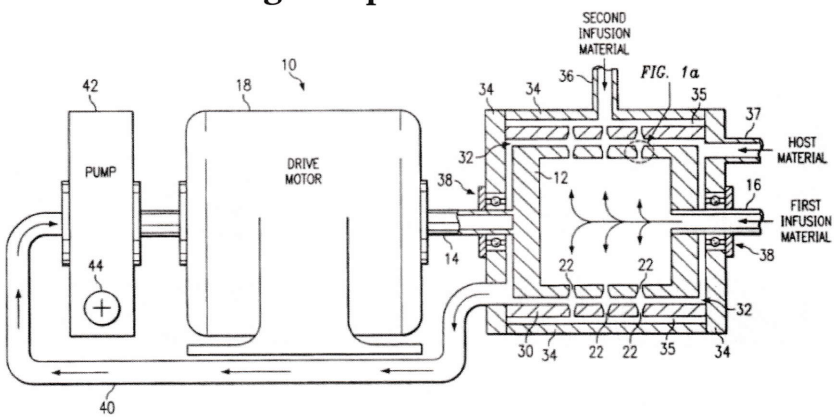
Stroboscopic Microscope Imaging
Will grow to microbubbles

Svetovoy, Sanders, Elwenspoek, "Transient nanobubbles in short-time electrolysis"
arxiv.org/abs/1301.2680

Stroboscopic microscope imaging was able to capture the formation of nanobubbles on the electrodes. They eventually grow into larger unstable microbubbles, which then burst to release diatomic hydrogen. Is there a way to detach the nanobubbles before they grow bigger?

Mark LeClair suggests that reentrant jets can cleave growing micro bubbles into nanobubbles before they get too big. Also nanobubbles might be created in the wake of an accelerating reentrant jet. It is now generally accepted that the turbulence of cavitation can yield abundant nanobubbles.

Cavitating Pumps Make Nanobubbles



Norman Wootan US 6,386,751 (2002)

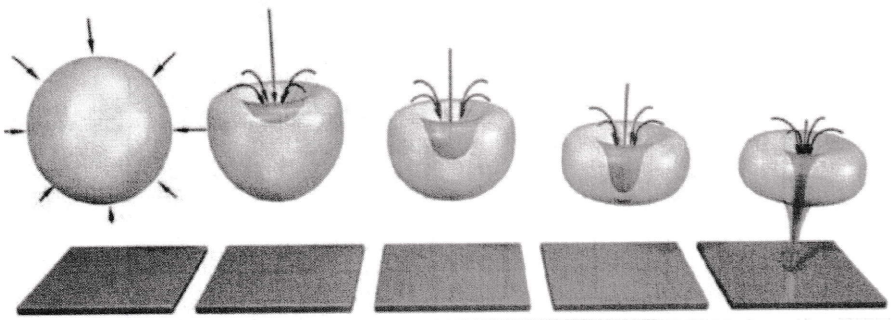
There are numerous patents describing cavitating pumps to make nanobubbles and fine particle mixing. Woontan's pump features multiple colliding liquid vortices in the gap between stator and rotor.

Snapping Blades Makes Cavitation Bubbles

Snapping blades under water also creates cavitation bubbles. This technique when combined with an electrolyzer yielded one of the most successful "water fuel" projects in history.

Cavitation bubbles are vacuous and they tend to collapse. In an asymmetric environment, the collapse can pinch to form a reentrant jet. Here all the energy of the collapsing bubble gets channeled into a reentrant jet squeezed through the hole of the torus and launched toward a nearby surface or gas bubble. The jet exhibits an extraordinary concentration of energy.

Reentrant Jet Formation



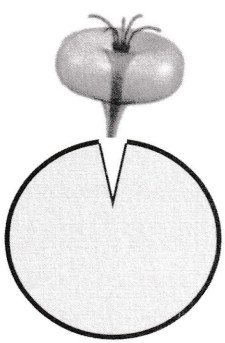
nas.nasa.gov/assets/pdf/ams/2017/AMS_20170112_Sukys.pdf

Internal Pressure: Over 300,000 psi

New Solid State: Macro-ionic Water Crystal

As described in the 2012 presentation the reentrant jet concentrates an internal pressure which could exceed 300,000 pounds per square inch. Here a new solid state of water forms, which Mark LeClair of Nanospire Inc. calls a "macro-ionic water crystal."

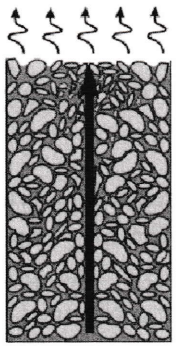
Reentrant Jets Cleave Microbubbles into Nanobubbles



Microchannels Make Nanobubbles

Omasa's protocol made abundant nanobubbles. However, some inventors were achieving energetic anomalies with simpler electrolyzers. Their electrolyzer plates likely had surfaces that exhibited microchannels. Microchannels can also yield nanobubbles. This phenomena can explain why some inventors inadvertently made surprisingly powerful gas from their electrolyzers.

Electrolyte Residue on Surface of Electrodes

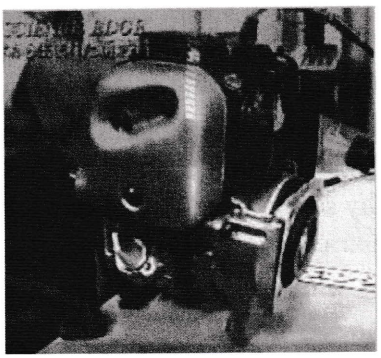


Emitted bubbles carve microchannels

The inventors that have made successful electrolyzers used meticulous techniques to prepare the surface of their electrodes. Here they have unwittingly created microchannels in the electrolyte residue surface as they gradually "conditioned" the electrodes over time. The microchannels help emit abundant nanobubbles of gas rather than simple hydrogen and oxygen. In the volume displacement measurements, nanobubbles displace far more volume than simple molecules; this gives the illusion of creating more hydrogen than allowed by Faraday's law.

OHMASA Gas





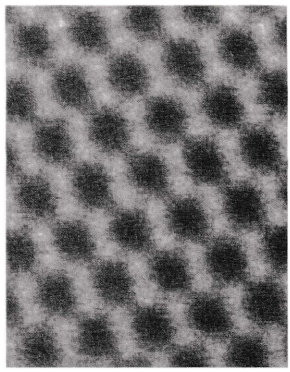
Ryushin Omasa

Blades Vibration Frequency 100 Hz
Parallel Plate Electrolyzer

Runs Engine
No Air Input

The 2015 presentation featured Ryushin Omasa and his water electrolyzer which utilized vibrating vanes that exhibited a snapping action. He appears to have the best protocol to make nanobubbles combined with an electrolyzer. He uses vibrating vanes in the water bath, which affect the surface tension so that big bubbles cannot form. His protocol makes very little free hydrogen – it stays trapped in the stable nanobubbles, which rise out of the water bath like tiny balloons.

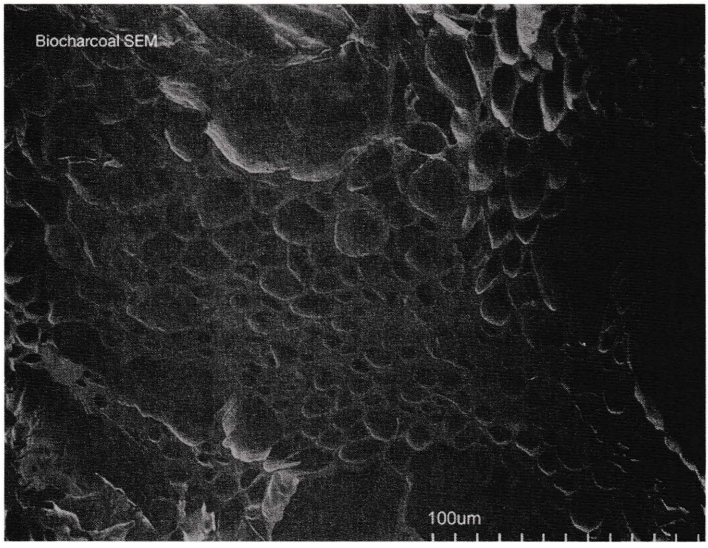
Graphene Surface



chemistryworld.com/research/graphene-made-in-a-kitchen-blender/7282.article

There are discussions on the web of using a graphene surface for the electrodes. If the surface could be deposited such that it provides microchannels, such electrodes could likewise yield abundant nanobubbles. There are other carbon based forms that exhibit microchannels.

Bio-Charcoal



Alex Putney, www.human-resonance.org/geyser_reactor.html

Nanopiping of tree wood

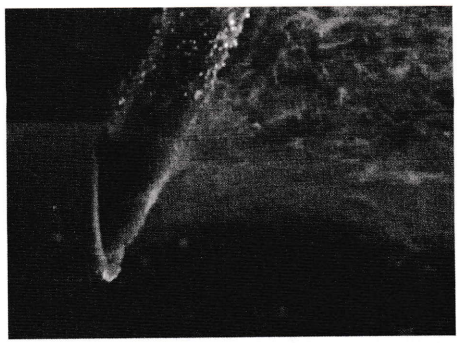
Alex Putney describes how bio-charcoal can become a source of nanobubbles. Google: Alex Putney Resonance Geyser Reactor

To Make Microchannels

- **"Gentle" periodic electrolysis**
- **Clean crud from water**
- **Gradual accumulation of electrolyte precipitate on electrode surface**
- **Emitted bubbles carve channels**

To make the microchannels, the electrodes must be conditioned by gentle periodic electrolysis. The water must be cleaned of crud that appears. Here the electrolyte precipitate gradually grows on the surface while the emitted bubbles carve the microchannels. It is most important to never touch the electrode surface after it is conditioned because it will damage the delicate channels.

The 2009 presentation featured the meticulous electrode conditioning protocols of Dave Lawton, Ravi Raju, and Bob Boyce. Ravi Raju's use of tap water in India illustrates an important insight. It may not matter what material comprises the precipitate accruing on the surface of the electrodes as long as it supports the growth of microchannels so that nanobubbles are emitted. The microchannels prevented the natural growth of the bubbles where they would normally burst to yield free hydrogen. The conditioned electrodes emitted nanobubbles that cocooned hydrogen, which rose from the electrolyzer like tiny balloons. Nanobubbles were the hypothesized water cluster!



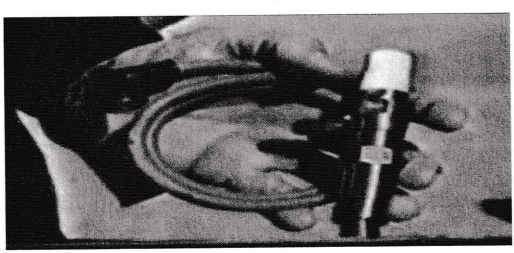
High speed water flow converts microbubbles to nanobubbles
YouTube: Nanobubble technology NHK

The key was to have a high speed water shear across the nozzle while it was emitting gas. The Japanese research has focused on creating nanobubbles of oxygen. There is currently widespread interest of the health benefits of oxygen nanobubbles in water. Preliminary experiments in vitro have shown that such water kills anaerobic cancer cells while enhancing normal cells. Japan is leading the world in these investigations. Google: Nanobubble Japan

Injecting Water Mist

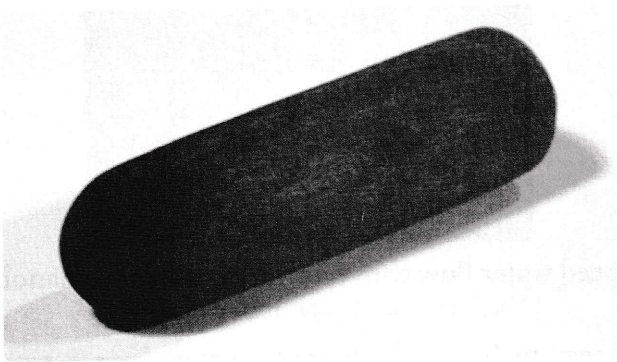
Some experimenters suspected that water mist could be the source of excess energy, especially if mixed with ionized air and plasma.

Water Fuel Injector Plug



Meyer's best invention was his last: the water fuel injector plug, which he felt was superior to the electrolyzer approach. The 2009 presentation discussed his patent. The injector subjects a small amount of water mist and ionized air in the combustion chamber to a high voltage waveform. The resulting plasma converts the water mist particles into microscopic ball lightning, which produces a huge anomalous force on the piston. Many believe Stan Meyer was murdered for the success of this invention because it allowed retro-fitting automobiles to seemingly "run on water."

Bio-Charcoal Nozzle

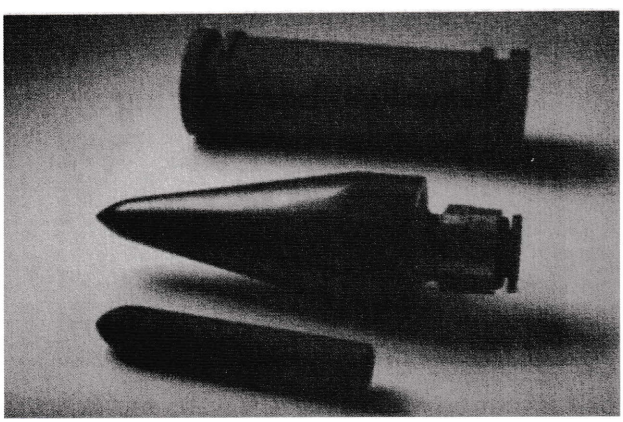


Alex Putney, www.human-resonance.org/geyser_reactor.html

Low pressure gas flow yields nanobubbles

A nozzle made from bio-charcoal can be one of the simplest techniques for making nanobubbles.

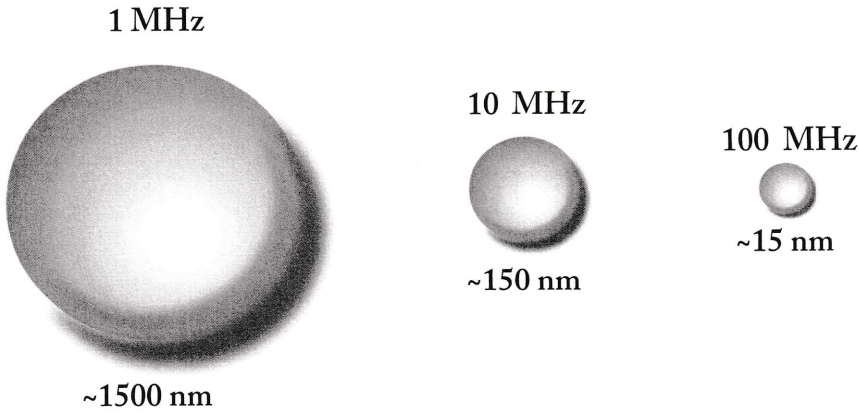
Carbon-based Ceramic Nozzle



YouTube: Nanobubble technology NHK

The Japanese inventor, Satoshi Anzai, discovered that a carbon-based ceramic nozzle could create abundant nanobubbles cheaply, far less expensive that using cavitating pumps.

Ultrasound Frequency

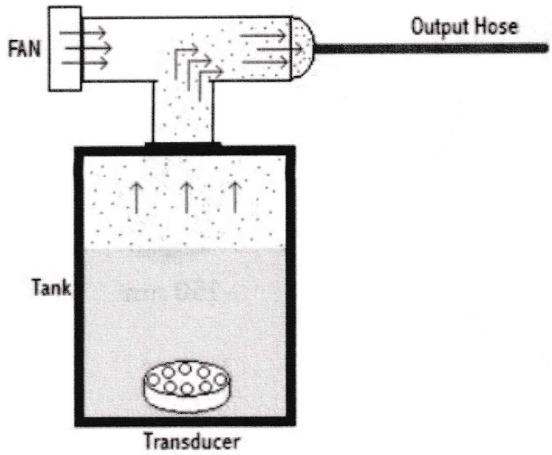


Visible fog particles range from 0.5 to 1.5 microns. Higher ultrasonic frequencies could yield smaller bubbles because the higher the frequency, the smaller the characteristic wavelength. Because small nanobubbles are more stable, they could support abundant nanoscopic ball lightning formation. There might even be ideal resonant frequency bands for optimizing nanobubble production. Smaller nanobubbles yield smaller EVO forms which minimize crater damage when they strike the piston. In fact if small enough, they can manifest a smoothing action like fine grit media blasting. Nano fog particles would yield an invisible water gas, and when converted to billions of ball lightning forms per plasma discharge, could offer huge power for relatively small amounts of water gas per cycle. The best discovery has yet to occur!

Plasma Discharge Spark Plug

To make abundant microscopic ball lightning from fog or mist requires a large, abrupt plasma discharge. Thus the spark plug becomes an important component to drive a genset as a pulse plasmoid engine.

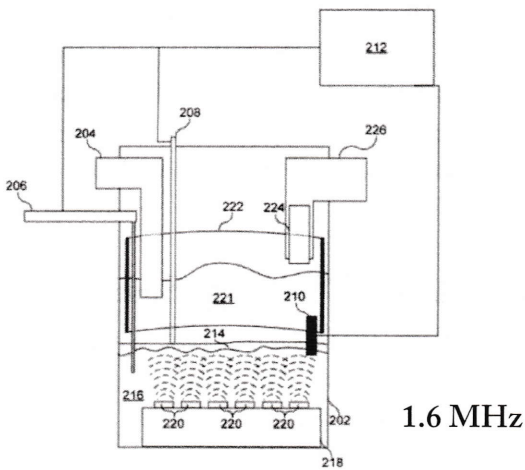
Ultrasonic Fogger



hho4free.com/fogger.html

Even better than water mist could be fog because the droplets are smaller. The use of an ultrasonic pond fogger within the water electrolyzer has been suggested and discussed on the web. This idea appears worth exploring.

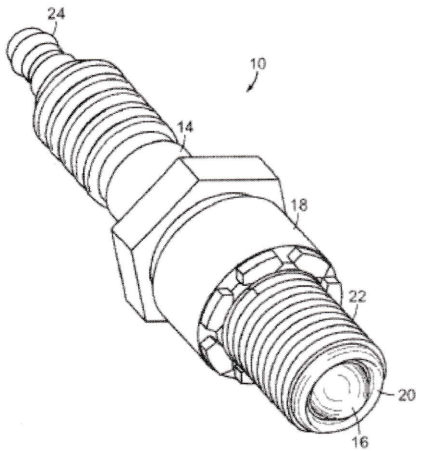
Jenkins Ultrasonic Fogger



W. Jenkins, US 2012/0186557 A1

The inventor who proved success with the ultrasonic fogger is Walter Jenkins, who used a readily available commercial pond fogger. The frequency of 1.6 MHz was used in the commercial units because it makes the most visible fog.

Plasma Ignition Plug



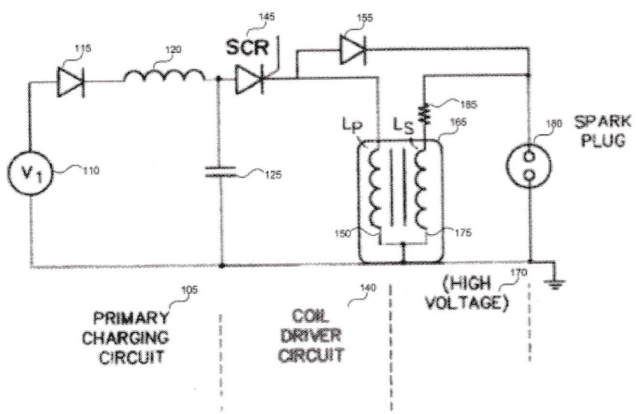


savicorp.com/22-dynoplug

S. Monros, D. Yurth, D. Segota, US 9,236,714 (Jan 2016)

A plasma ignition plug was recently invented by Monros, Yurth and Segota. It features titanium and vanadium electrodes for maximizing electron emission and electrode longevity.

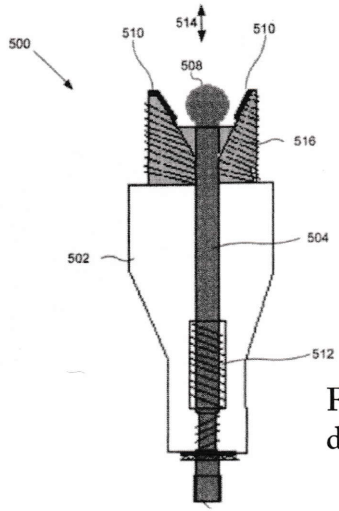
Energy Efficient Plasma Generation



A. Srinivasan, K. Ramanathan, L. Choquette, A. Murakami
US 8,555,867 (Oct. 2013)

Aaron Murakami helped invent a circuit to optimally discharge a capacitor for maximizing abrupt plasma emission into a spark plug. Their

Wide Plasma Spark Plug



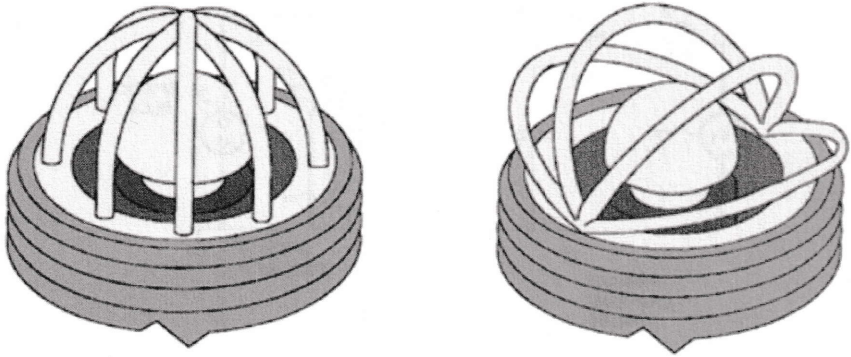
100 – 200 KV

Fires for full piston down stroke

Walter Jenkins patent featured a wide plasma spark plug. It has a center spherical electrode surrounded by a smooth peripheral ring electrode. The huge voltage (100 to 200 kilovolts) is fired for the entire down stroke of the piston.

FireStorm Spark Plug

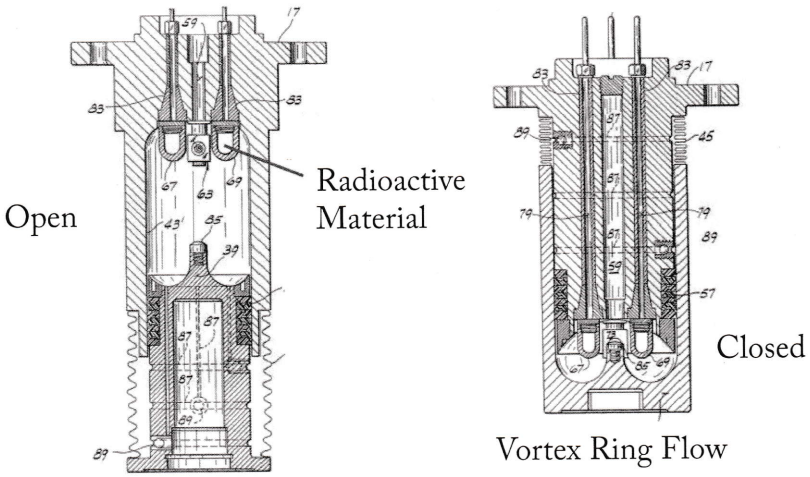
Robert Krupa



The 2015 presentation discussed the patent of Robert Krupa's spark plug. It is designed to emit a large spherical shaped plasma with each pulse. Patrick Kelly in his e-book told the story of Krupa and his spark plug. The inventor failed in all his attempts to team with a manufacturer to mass produce the spark plug, which was claimed to have an extremely long lifetime because the electrodes did not wear out.

When an inert gas mixture is repeatedly excited into a plasma state and allowed to cool, it forms into stable symmetrical clusters. These clusters can then be the matter "template" around which a surrounding plasma can form microscopic ball lightning.

Papp Engine Piston



US Patent 4,428,193 (1984)

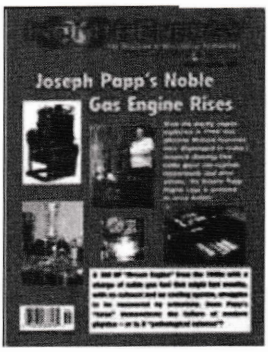
Papp used radioactive material in his electrodes to pre-ionize the gas to facilitate the capacitor discharge across the electrodes. The discharge would convert the inert gas clusters into microscopic ball lightning. Also note that when the piston is closed, the chamber is shaped like a torus, which guides the gas/plasma circulation into a large vortex ring. Here the force could become synergistically greater from the "cascade effect" where a ZPE coherence could occur across the entire macroscopic plasma vortex ring.

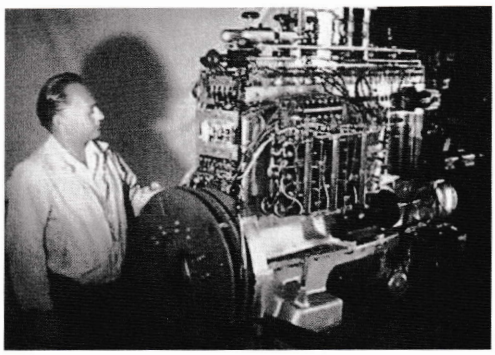
circuit is ideal to combine with the wide plasma spark plugs. Combining their circuit with Walt Jenkins' technology could yield the best pulsed plasmoid engine.

Papp Engine

The pulse plasmoid phenomena can explain the Papp engine.

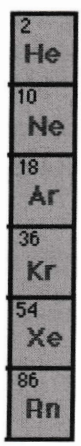
Josef Papp
Noble Gas Engine





Josef Papp created a famous engine that ran with an noble gas mixture in a closed piston. The mixture had to first be prepared by subjecting it to a series of electrical discharges.

Inert Gas Clusters
(Rare Gas, Noble Gas)



Helium

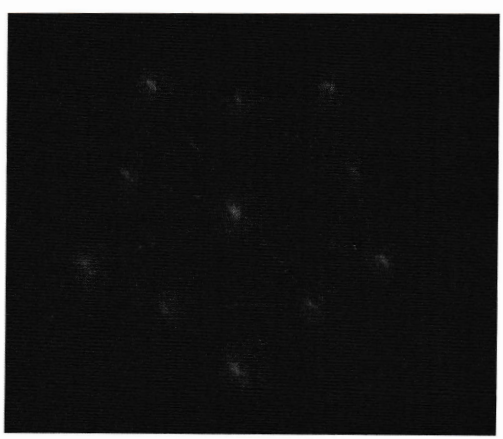
Neon

Argon

Krypton

Xeon

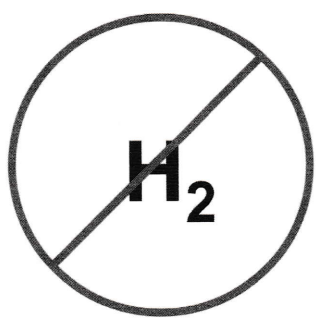
Radon



Self-running a genset where the electrolyzer provides the gas for the engine in the generator, whose electricity solely drives the electrolyzer, is considered absolutely impossible when just hydrogen combustion is occurring. Not only does it take more energy to dissociate water into hydrogen and oxygen than is ever returned when the hydrogen combusts, but more importantly, internal combustion is extremely inefficient, perhaps 20% at best for a cheap generator. Most of the energy in internal combustion is wasted as heat. Thus any claim of a self-running genset is a spectacular claim. It implies that whatever is happening energetically has to be ~5X over unity to overcome the major losses (assuming combustion). It is no wonder that such claims are immediately dismissed as frauds.

However, if the piston in the engine was actually driven by a completely different mechanism, ball lightning plasmoid propulsion, then a new possibility arises. The pulse plasmoid force has to indeed be spectacular to overcome the system losses. Here the quantity of gas needed might be surprisingly small if abundant microscopic ball lightning gets created with each plasma discharge. Simply idling a closed loop genset is proof that a new energy source is present. The proof must come from massive independent replication because that is what is required to accomplish a paradigm shift in the face of suppression.

Energy Source?

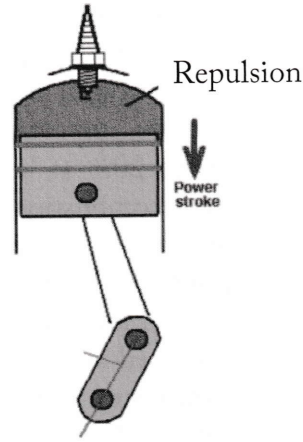


What is the energy source if it's not hydrogen?

Pulsed Plasmoid Engine

Huge Anomalous Force

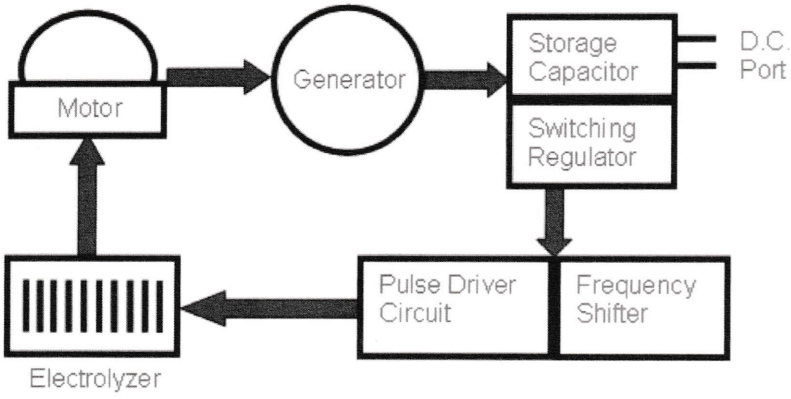
Taps Zero-Point Energy



Thus both the Papp engine and plasma fog gas genset can be explained as a pulsed plasmoid engine where the huge anomalous force is from the zero-point energy.

Summary

Closed Loop, Self Running



Spectacular Claim!

Water Arc Explosion Experiments



Anomalies from Sub-micron Fog Particles

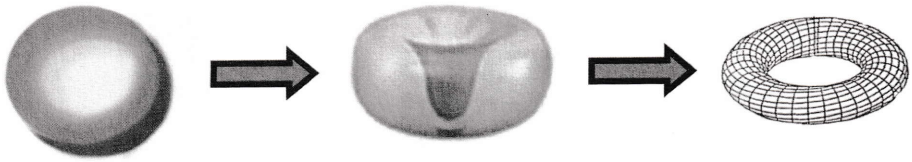
The water arc experiments have shown that the anomalous force comes from the supersonic sub-micron fog particles; they were measured with high speed photography.

Making Nanobubbles

- Electrolysis
- Conditioned Electrode
  - Microchannels
- Nozzle
- Ultrasound

It is the nanobubbles that provides the symmetric matter template for the microscopic ball lightning formation. Nanobubbles form in a variety of processes including electrolysis, microchannels in conditioned electrode surfaces, microchannel nozzles with shearing fluid flow, and ultrasound.

Abrupt Electric Discharge



Fog Particle Torus Plasmoid

Cloud particles are simply small droplets or nanobubbles of water. If small enough they can dimple into a torus form when subjected to a pulse plasma event. This makes a plasmoid, which manifests a precessional circulation of plasma particles.

Ortho-Rotates ZPE Flux

- Self-Organization Occurs
- Plasmoid Self-Accelerates
- Vortex of Plasmoids
  - Big Energy!





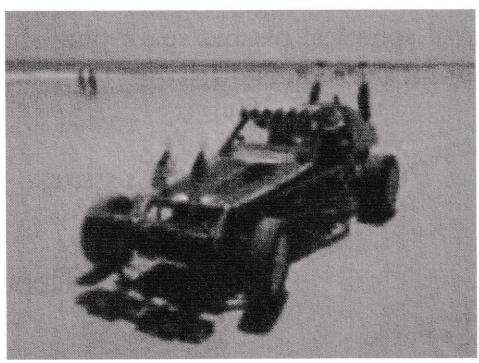
The plasmoid form can cohere the zero-point energy by ortho-rotating the underlying hyperspatial flux, trapping it within the plasmoid. The orthorotation "warps" the space-time metric to manifest a self-acceleration of the plasmoid. If the plasmoid can interact with other vortex activity, the resulting coherence can cascade to manifest even bigger energetic events.

Inventor Methods

Stan Meyer – Injector Plug
Ryushin Omasa – Cavitating Blades
Walt Jenkins – Ultrasound

Inventors that achieved the biggest results made abundant nanobubbles in their devices. Meyer used water mist directly, Omasa used cavitating blades, and Jenkins used ultrasound to make fog.

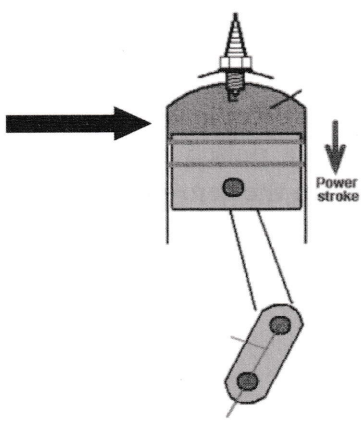
Walter Jenkins



H2-global.com

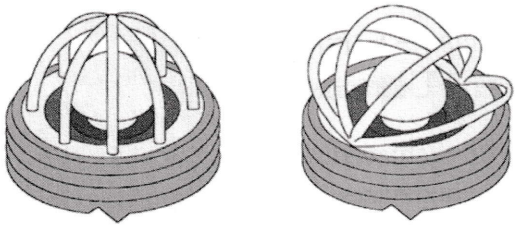
I predict Walter Jenkins will become more famous than Stan Meyer since he put everything together in the simplest fashion to make vehicles and gensets self run as closed loop systems.

Pond Fogger
+
Wide Plasma Spark Plug



Walter Jenkins made the simplest pulse plasmoid engine.

Plasma Spark Plugs

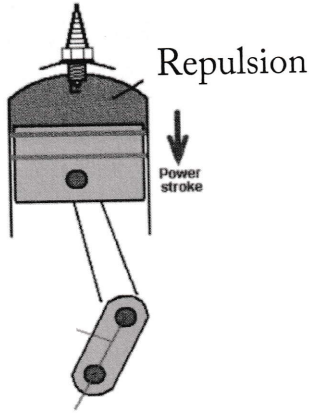


Converts Nano-Droplets to Ball Lightning

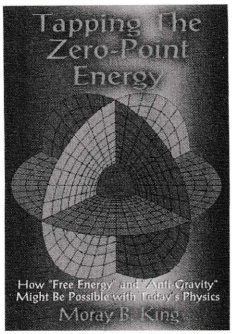
To convert all the microscopic bubbles simultaneously into ball lightning, a maximal spherical plasma spark-plug should be used. The wider and more abrupt the plasma discharge, the better.

Pulsed Plasmoid Engine

Huge Anomalous Force
Taps Zero-Point Energy



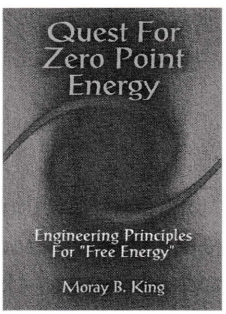
The microscopic ball lightning converts an internal combustion engine into a pulsed plasmoid engine. The huge anomalous force is sourced from the zero-point energy.



TAPPING THE ZERO POINT ENERGY
Free Energy & Anti-Gravity in Today's Physics
by Moray B. King

King explains how free energy and anti-gravity are possible. The theories of the zero point energy maintain there are tremendous fluctuations of electrical field energy imbedded within the fabric of space. This book tells how, in the 1930s, inventor T. Henry Moray could produce a fifty kilowatt "free energy" machine; how an electrified plasma vortex creates anti-gravity; how the Pons/Fleischmann "cold fusion" experiment could produce tremendous heat without fusion; and how certain experiments might produce a gravitational anomaly.

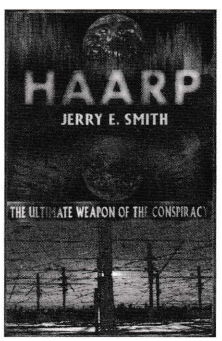
180 PAGES. 5x8 PAPERBACK. ILLUSTRATED. $12.95. CODE: TAP



QUEST FOR ZERO-POINT ENERGY
Engineering Principles for "Free Energy"
by Moray B. King

King expands, with diagrams, on how free energy and anti-gravity are possible. The theories of zero point energy maintain there are tremendous fluctuations of electrical field energy embedded within the fabric of space. King explains the following topics: TFundamentals of a Zero-Point Energy Technology; Vacuum Energy Vortices; The Super Tube; Charge Clusters: The Basis of Zero-Point Energy Inventions; Vortex Filaments, Torsion Fields and the Zero-Point Energy; Transforming the Planet with a Zero-Point Energy Experiment; Dual Vortex Forms: The Key to a Large Zero-Point Energy Coherence. Packed with diagrams, patents and photos.

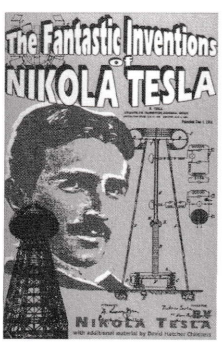
224 PAGES. 6x9 PAPERBACK. ILLUSTRATED. $14.95. CODE: QZPE



HAARP
The Ultimate Weapon of the Conspiracy
by Jerry Smith

The HAARP project in Alaska is one of the most controversial projects ever undertaken by the U.S. Government. Jerry Smith gives us the history of the HAARP project and explains how works, in technically correct yet easy to understand language. At at worst, HAARP could be the most dangerous device ever created, a futuristic technology that is everything from super-beam weapon to world-wide mind control device. Topics include Over-the-Horizon Radar and HAARP, Mind Control, ELF and HAARP, The Telsa Connection, The Russian Woodpecker, GWEN & HAARP, Earth Penetrating Tomography, Weather Modification, Secret Science of the Conspiracy, more. Includes the complete 1987 Eastlund patent for his pulsed super-weapon that he claims was stolen by the HAARP Project.

256 pages. 6x9 Paperback. Illustrated. Bib. $14.95. Code: HARP



THE FANTASTIC INVENTIONS OF NIKOLA TESLA
by Nikola Tesla with David Hatcher Childress

This book is a readable compendium of patents, diagrams, photos and explanations of the many incredible inventions of the originator of the modern era of electrification. In Tesla's own words are such topics as wireless transmission of power, death rays, and radio-controlled airships. In addition, rare material on a secret city built at a remote jungle site in South America by one of Tesla's students, Guglielmo Marconi. Marconi's secret group claims to have built flying saucers in the 1940s and to have gone to Mars in the early 1950s! Incredible photos of these Tesla craft are included. •His plan to transmit free electricity into the atmosphere. •How electrical devices would work using only small antennas. •Why unlimited power could be utilized anywhere on earth. •How radio and radar technology can be used as death-ray weapons in Star Wars.

342 PAGES. 6x9 PAPERBACK. ILLUSTRATED. $16.95. CODE: FINT