

# Is Zero Point Energy a Game Changer?

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Summary of zero-point energy and interview with Dr. Tom Valone

## Summary:

In 1913, Einstein and Otto Stern proposed that quantum systems produce energy. Numerous discoveries in quantum physics over the past century provide evidence for the existence of zero-point energy (ZPE). While energy is derived from quantum fluctuations is not controversial, whether or not you can extract it on a scalable level and use it for practical applications, is. Governments and private researchers are investigating the possibility of tapping ZPE as an infinite, clean, and virtually free energy source and alternative to fossil fuels. Advancements in the field could also help make interstellar travel and flying saucers possible.

## Event Being Forecast:

Scalable ZPE would revolutionize the energy industry and help make interstellar travel possible.

## Pros: Driving Trends

### Proofs of Concept

**ZPE Exists** Tom Valone discusses fifteen observed phenomenon that provide experimental evidence for the existence of ZPE. (Tom Valone. 2005. *Practical Conversion of Zero-Point Energy*. Integrity Research Institute. 23.)

<http://www.integrityresearchinstitute.org/FeasibilityStudyZPE-Valone.pdf>

**Progress in Steps** ZPE occurs at the micro, nano, and pico levels. Over the past decade, the National Nanotechnology Initiative has advanced ZPE considerably especially in research extracting the Casimir force. (Tom Valone. 2007. *Zero Point Energy: Fuel of the Future*. Integrity Research Institute. 121.)

**The Casimir Effect** Using a pair of metal plates located near each other in a vacuum, Hendrik Casimir observed a slight pressure caused by vacuum energy. The imbalance in the density of the ZPF causes attraction between the plates. (Integrity Research Institute 1999)

<http://users.erols.com/iri/ZPEpaper.html>

**The Lamb Shift** In the 1940s, Willis Lamb showed the effect of zero point fluctuations on atomic levels of the hydrogen atom. In the transition between atomic states, ZPE is released.

(Tom Valone. 2007. *Zero Point Energy: Fuel of the Future*. Integrity Research Institute. 40.)

**What's in a Vacuum?** If you pump everything out of a container, the only thing left is a vacuum and the lowest possible energy state or zero point. In an experiment cooling helium to one degree of absolute zero, the helium molecules retain kinetic energy and stay in a liquid state instead of freezing. ZPE is the energy that remains when all the other energy is removed from a system. (calphysics.org)

<http://www.calphysics.org/zpe.html>

**Attractive Forces and Adhesion** Geckos can hang on to glass using only one toe due to van der Waals forces. ([www.st-andrews.ac.uk](http://www.st-andrews.ac.uk) )

<http://www.st-andrews.ac.uk/~ulf/levitation.html>

**Repelling Forces and Levitation** In theory, using repulsive Casimir forces could mean building a device capable of levitation. Using nanocoating, researchers were able to create quantum levitation between two silica surfaces. (Applied Physics Letters 2012) ([www.scientificamerican.com](http://www.scientificamerican.com) Oct.12, 2009)

[http://apl.aip.org/resource/1/applab/v100/i25/p253104\\_s1](http://apl.aip.org/resource/1/applab/v100/i25/p253104_s1)

<http://www.scientificamerican.com/article.cfm?id=darpa-casimir-effect-research&print=true>

**Repelling Forces and Cosmological Antigravity** In 1929, Edwin Hubble observed that galaxies are accelerating away from each. Galaxies are repelling each other faster than theoretical physics predicted. The search for the repulsive force continues. (*Science* Dec. 18,1998)

<http://www.sciencemag.org/content/282/5397/2156.1>

**Dark Energy as a Repelling Force** Observations of space reveal 21% is composed of dark matter which is dense and has a gravitational effect. Dark energy, which composes 75% of the universe, has an anti-gravitational force and is the leading candidate for the universes rapid expansion. (American Institute of Physics 2012)

<http://scitation.aip.org/getpdf/servlet/GetPDFServlet?filetype=pdf&id=APCPCS001445000001000102000001&idtype=cvips&doi=10.1063/1.3701891&prog=normal>

## **Tapping ZPE**

**Extracting ZPE Using the Casimir Effect** A recently issued patent describes a method by which vacuum energy is extracted from gas flowing through a Casimir cavity. When the electrons exit the Casimir cavity they are re-energized to their original energy orbitals by the ambient ZP fields. This energy is harvested in a local absorber. The process is repeated to produce continuous power. The device functions like a heat pump for ZPE. (ecee.colorado.edu 2012)

<http://ecee.colorado.edu/~moddel/QEL/Papers/DmitriyevaModdel12.pdf>

**The Feasibility of ZPE** Of the four modalities for extracting ZPE; electromagnetic, mechanical (Casimir force), fluid dynamics, and thermodynamic; Tom Valone rates thermodynamics as having the highest feasibility and energy quality ratings for converting ZPE to usable energy.

(Tom Valone. 2005. Practical Conversion of Zero-Point Energy. Integrity Research Institute. 68-73.)

**Quantum Physics Meets New Age Healing** A device that stores zero point energy appears to specifically target and soothe the nervous and immune systems, as well as enhance the body's flow of chi.

([www.cuhealingarts.com](http://www.cuhealingarts.com))

[http://www.cuhealingarts.com/index.php?p=1\\_11\\_Zero-Point-Energy](http://www.cuhealingarts.com/index.php?p=1_11_Zero-Point-Energy)

**Night Vision Technology** DARPA funded research by HRL Labs to develop a field radiometer to collect thermally radiated power or night vision. (Integrity Research Institute)

<http://www.integrityresearchinstitute.org/ZPDiodeProjectSummary.htm>

## Cons: Opposing Trends

**Laws of Physics Provide Skepticism Among Physicists** The consensus among physicists is that they cannot convert vacuum energy to generate free energy at a scalable level. Tapping ZPE means yielding a greater output than the required input violating the conservation of energy or the First Law of Thermodynamics. ZPE also essentially is perpetual motion violating the Second Law of Thermodynamics.

**Propulsion Program Sinks** Between 1996-2003, DARPA and NASA's attempts failed to build spacecraft capable of traveling at speeds faster than light. The researchers concluded, "No breakthroughs appear imminent." (*Scientific American* Oct. 12, 2009)

<http://www.scientificamerican.com/article.cfm?id=darpa-casimir-effect-research>

**Feynman Wrong?** In 1891, Nikola Tesla predicted existence of ZPE and if the energy is kinetic, it is a matter of time before we harness the quantum fluctuations in nature. Richard Feynman calculated that there is enough energy in the vacuum of a single light bulb to boil all the seas. However, experimentation so far reveals no evidence to suggest that infinite amounts of zero point energy are available for use.

## Positive Impacts:

**Sustainability Energy** ZPE generators will provide infinite, clean, and virtually free energy for laptops, telephones, TVs, cars, homes, spaceships reducing the usage of fossil fuels which will benefit the environment .

**Going to the Stars** Traveling to distant galaxies will require a vastly different energy source than earthlings have developed. Developing ZPE would help enable interstellar travel and abrupt turns in spacecraft seen in sci-fi movies. ([www.hilo.hawaii.edu](http://www.hilo.hawaii.edu) )

<http://hilo.hawaii.edu/academics/hohonu/documents/Vol06x30Zero-PointEnergyandInterstellarTravel.pdf>

**Better Understanding of Our World** Research on ZPE will advance our understanding of basic science.

**Serendipity** Who knows what some bright entrepreneur of scientist may unleash on the world. Researchers are investigating adhesion energy, repelling energy and levitation, and healing energy.

## Negative Impacts:

**Schumpeterian Revolution** This paradigm shift will disrupt public utilities and displace jobs

## The Wild Card of Zero Point Energy – Interview with Dr. Tom Valone

There are wild cards and then there are wild cards. Harnessing Zero Point Energy (ZPE), quantum fluctuations which release energy and affect the behavior of atoms and the universe, is a game changer. Imagine at your job using a slide rule one week and the next week training to use a quantum computer. This is the transition that could occur for the energy industry and for space travel. There is also a serendipity factor. So, who knows what some bright entrepreneur or scientist may unleash on the world.

Unless you are a physicist, electrical engineer, or sci-fi buff; you are probably asking what in the heck is ZPE. This was my scenario, so using the web I was inundated with studies in quantum physics, reading about famous physicists praising the future of this field, while other physicists are skeptical partially because of the laws of thermodynamics.

So for the average person, how do you make sense out of ZPE and forecast how it will impact our future? In your research, if you do not throw in the towel, you will encounter Tom Valone, a former US Patent Office examiner. He is now the President of Integrity Research Institute in Beltsville, MD, prolific writer with numerous publications on ZPE, and hours of YouTube videos for non-physicists who are just curious about this controversial, fascinating, and mysterious topic, as well as experts in the field.

If you are looking for someone who has the ability to effectively communicate highly technical scientific concepts, I would recommend his *Zero Point Energy: The Fuel of the Future* (2007), which has an introduction and history of ZPE, a discussion of fifteen observed phenomenon that provide experimental evidence for the existence of ZPE, along with progress with research in the field.

Once you grasp ZPE, the next step is to understand if we can harvest it. For this topic, I recommend *Practical Conversion of Zero-Point Energy: Feasibility Study of Zero-Point Energy Extraction* (2005), a revised edition of his PhD thesis. They are both available at his website [www.integrityresearchinstitute.org](http://www.integrityresearchinstitute.org), which also has links to many interesting articles and technical papers.

For those of us that are futurists and to put ZPE in the context of forecasting, I asked Dr. Valone about trends that are moving this field forward and holding it back, and about the implications if we are successful in developing it.

### Driving Trends

TechCast: For an interview with Pure Energy Systems News in 2009, you said that ZPE devices are 5-10 years from market. ([http://pesn.com/2009/01/21/9501515\\_ZeroPointEnergy\\_Valone](http://pesn.com/2009/01/21/9501515_ZeroPointEnergy_Valone)) In your opinion, what breakthroughs are needed for harnessing ZPE at a scalable level?

Dr. Tom Valone: More concerted effort by private industry is needed without regard for the immense power that is possible from ZPE extraction. I believe that the current trend for developing energy

harvesting is the proper umbrella for the next generation of clean energy generators. As climate change worsens it probably will be the impetus for change and accelerated deployment of ZPE devices.

In your thesis, you concluded that of the four major extraction methods thermodynamics has the highest feasibility and energy quality ratings; however, from my research it appears that the Casimir Effect has influenced most researchers. What is currently the low hanging fruit and what do you expect to see on the market in the next decade?

Dr. Tom Valone: Though thermodynamic devices have theoretically looked attractive, it is likely that solid state electronic rectifiers or diodes will lead the pack in marketable energy generators that harvest both thermal and nonthermal fluctuations. After all ZPE is nothing more than virtual EM radiation.

### Slowing Trends

TechCast: What is currently holding back progress in the field? Is it understanding basic science, scalability, money for research, skepticism, or other factors?

Dr. Tom Valone: In my opinion there are a few factors involved. First, the need has to be there. The Papp engine which probably taps ZPE was successfully developed in the 1970's but TRW decided to bow to their Detroit "friends" as one confidential memo states and the project budget was "zeroed out". Secondly, the influence of the classified black projects needs to be loosened for civilian sectors to obtain what those projects already have.

### Implications

TechCast: Obviously tapping ZPE for homes, transportation, and electronic gadgets is at the top of the wish list, then space travel. What else do you envision seeing in the markets over the long term that will revolutionize our lives?

Dr. Tom Valone: Though I have heard a firsthand account of material teleportation, I have more interest in "inertial mass shielding". To me this is a proven principle seen in every unidentified flying object sighting (right angle turns and fast acceleration) and it makes space travel and protection from cosmic rays a lot easier. It also is complimentary to electrogravitics. This has already been developed in the black world from black engineering. In the bioenergetics realm, the extension of telomeres is now becoming feasible and is on track to become mainstream very soon, along with stem cell injections and growing replacement organs from our own skin cells modified to become stem cells. In the same realm I also foresee meditation and human transformation becoming more widespread. They go hand-in-hand with sports achievements but will definitely be needed for survival on Mars. Electric antioxidant clothing will also soon become popular for many healthful reasons. We also have the technology with military grade lasers to start nudging earthbound asteroids off course which is an essential technology for long term planetary protection.