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AIMING FOR THE STARS: A REALISTIC POSSIBILITY...?

The Late Dr. Robert L. Carroll: Ultra-Cold Disruption (UCD) and the Pion Drive

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REVOLUTIONARY SCIENCE: IMPLICATIONS

Cold Fusion, now known as Low Energy Nuclear Reactions – LENR – continues to be the subject of research and development, in spite of continuing skepticism by much of the scientific community. Pons and Fleishmann began a furor in 1989 when they claimed to have produced fusion in a table-top laboratory experiment.

Their research stimulated successful replication six months later by Dr. Robert Huggins and his associates at Stanford University. This fact, published in the refereed journal *Fusion Technology*, confirmed that they had achieved "Breakeven", a goal still not attained by the hot fusion community after billions have been spent worldwide.

However, what AESOP terms Ultra-Cold Disruption, at temperatures close to absolute zero, was the subject of a rejected U.S. patent application by Dr. Robert L. Carroll in 1971. It was a secondary effect of an even more fascinating invention, a propulsion system intended to open a practical path to visiting the stars.

Carroll was one of the few scientists to immediately applaud Pons & Fleishmann following their controversial press conference. Shortly afterwards, he wrote a two page technical memorandum explaining why he believed they had achieved fusion. In it, he stated that their experiments produced a catalytic reaction resembling that between Platinum and Hydrogen that he had tried to patent in 1971.

THE DOUGHNUT SHAPED UNIVERSE

Carroll, a mathematical physicist, struggled to gain a hearing for more than half a century. His analysis indicates we inhabit a toroid (doughnut) shaped universe that is neither expanding nor contracting.

Carroll had a life-long argument with relativity theory. Although relativity is accepted by the large majority of physicists, a Section of the 1994 American Association for the Advancement of

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Science (AAAS) Pacific Division Meeting in San Francisco featured a number of dissenting voices, including Carroll's. He was well received.

In an expanding universe, interstellar space travel is an extremely unlikely event. If what has been called Carrollian Mechanics (in contrast with classical and quantum mechanics) proves valid, robotic interstellar flight may become increasingly practical and near-term.

According to the Search for Extraterrestrial Intelligence (Project SETI) there are one billion stars for each person now alive on earth. Articles have mentioned that our Milky Way galaxy is estimated to contain as many as four hundred billion stars. It currently appears the universe contains upwards of one hundred seventy billion galaxies.

William R. Corliss once wrote that: "The energy requirements for interstellar exploration are so great that these voyages will be impossible unless a new device is found that can completely transform mass into energy." Carroll developed the theoretical physics necessary for such a device. He believed it makes possible space travel at 20 million times the speed of light.

HOW LONG WOULD IT TAKE TO REACH A STAR IF CARROLL PROVES CORRECT?

In his opinion, a craft of suitable design, leaving earth at dusk, would be orbiting the bright star Arcturus by the time dawn arrives at the point of departure. A younger scientist, familiar with Carroll's work for many years and convinced it is fundamentally correct, has stated more conservatively that it might take a few weeks, or even months, for a spacecraft to execute a round trip.

Carroll began his analysis toward the end of World War II. He was influenced by a 1942 *Physical Review* article by Robert Millikan and two colleagues, speculating that the spontaneous annihilation of certain atoms in space, blown about by the solar winds, might explain the origin of at least some cosmic rays. The Millikan team performed additional high altitude balloon measurements, reported in 1943 and 1944 *Physical Review* articles, that they believed confirmed their hypothesis.

Experiments at Lawrence Berkeley Laboratory in 1947 demonstrated that proton, anti-proton annihilation, yields highly energetic pi neutral mesons – Pions. Carroll began to pursue technology that would induce a controlled collapse of specific atoms in a manner that would release all of the enormous internal energy, far exceeding the formula $E=MC^2$ that has long been accepted as gospel. In short, he began designing an immensely powerful Pion drive.

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CARROLL: A BRIEF BIOGRAPHY

Carroll was the retired Chairman of the physics and math departments at what is today known as the Charleston Southern University in South Carolina. His career included sufficient merit to warrant inclusion in Two Thousand Men of Achievement; Who's Who in American Education and American Men of Science. He earned a doctorate in mathematical physics from West Virginia University.

His first full-time job was as a Research Associate at an MIT Field Experimental Station operated by what was then the U.S. Bureau of Standards, during 1944-45. In addition to his own Carroll Institute editions of The Eternity Equation; The Energy of Physical Creation; Arcturus by Dawn and Beyond the Farthest Star, he is the author of The Aerodynamics of Powered Flight, a once popular text published by John Wiley & Sons.

SHOULD HE PROVE CORRECT: MILLIONS OF HUMANS COULD LIVE IN SPACE

If the galaxy is truly open to low cost voyages of exploration by earthlings, many millions of people could conceivably live elsewhere in space.

Realization of Carroll's Pion propulsion system may supersede expensive chemical rocketry. Once a Pion drive is proven practical, a spacecraft design firm has expressed interest in exploring that safer, simpler and lighter possibility.

A practical Pion space drive could help make possible the late Gerard O'Neill's vision of numerous satellites with populations averaging 10,000, in orbits between Earth and Mars.

Carroll's analysis of the energy contained in the atom led him to an alternative source of power and propulsion based on induced electron capture.

A secondary effect suggested to him that a fusion reaction, involving spongy Platinum and Hydrogen, would be possible at a temperature close to absolute zero. This was the subject of his 1971 patent application. The fuel for electron capture might be fractional Hydrogen which AESOP calls Energy from Collapsing Hydrogen Orbits - ECHO. (Brilliant Light Power uses the term Hydrino). Neither the fuel nor the products of the reaction are radioactive. Carroll did an analysis indicating such systems could be designed to meet safety requirements.

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AESOP's ULTRACONDUCTORS MAKE PROTOTYPES POSSIBLE

A device that Carroll termed a Resonance Absorber, which can reduce the temperature of the fuel to close to absolute zero, might induce ECHO. This would be a controlled collapse of the structure of the Hydrogen atom. One variation, which AESOP Energy intends to prototype, was granted a U.S. Patent as a Heat Transfer device in 1972. The Supercold fusion and space propulsion applications, submitted at the same time, were denied patents. The device requires a room temperature superconductor. AESOP's Ultraconductors were proven, by four successful Small Business Innovation Research (SBIR) Contracts to be functional equivalents of room temperature superconductors.

In a system of induced atomic collapse (Ultra-Cold Disruption) the complete mass to energy conversion is expected to yield a copious supply of Pions. These short-lived, high energy particles can be ejected to spin a turbine for power production. Carroll believed the system can be made practical for cars, trucks, ships and power plants for aircraft. They are expected to drive a spacecraft at phenomenal speeds with a light, compact, fuel load.

Electron capture has become the subject of experiments. Fresh insights by others, and knowledge gained as a result of the increasing interest in "cold fusion" makes it entirely possible that with sufficient efforts practical new embodiments of the technology suggested by his ideas might be realized.

PRACTICAL APPLICATIONS – POWERING CARS, TRUCKS, SHIPS & AIRCRAFT

His life-long argument with relativity theory is one reason his work has been largely ignored. However, the singularly significant question is whether technology derived from his inventions will function as predicted. AESOP Energy has a pending contract to power an 18 wheeler with a new source of energy and intends to develop prototypes.

Galilean Electrodynamics, a refereed journal dedicated to the work of a small number of physicists who take issue with relativity, carried articles by Carroll in three of the first four issues. His work has also been featured in *Aperion*, a similar Canadian journal. In a small body of published (and a large collection of unpublished) work he has detailed his unorthodox, dissenting, interpretation of many key experiments that are used to support relativity.

He stated that spacecraft, powered as he suggests, can transcend the Mach limit for the speed of light as readily as Chuck Yeager broke the Mach limit for the speed of sound.

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TESTING CARROLL'S INVENTION IN SPACE

It is now possible to build Resonance Absorbers. If electron capture is achieved, and the systems prove practical for power production and vehicle propulsion, a robotic spacecraft could be designed and constructed. It may prove possible to fabricate it at the microscale, as nanotechnology. If it reaches Arcturus, or some other destination star and rapidly returns with proof in the form of useful data, consistent with extrapolated observations of the same star using the Hubble telescope, Carroll will have brought about a revolution in physics and cosmology.

THE IMPORTANCE OF DISSENT: IN SCIENCE AND EVERYTHING ELSE

The very unorthodoxy of his approach is a reaffirmation of the importance of the stubborn individual when faced with overwhelming authority. If he is proven correct, he has unlocked the doors to exploring the universe in a manner hardly suspected previously, except by a handful of writers of science fiction.

We are reminded by the late Thomas Kuhn, author of *The Structure of Scientific Revolutions*, and from the furor that still surrounds cold fusion, that physics is usually taught as dogma. A case can be made for presenting physics students with two systems – both self consistent. Each explains all the experimental data within its own framework. One would be Carroll's physics and the other the physics of relativity. As an example of its utility, Carrollian Mechanics does away with the mystery of the missing 90% of the mass of the universe which has deepened for conventional physics with data revealed by the Hubble. Students would learn to use whichever perspective seems appropriate, just as we switch from seeing an electron as a particle or a wave. Perhaps physicists would then become more open minded about anomalies.

AESOP is converting conventional engines to run without fuel, substituting atmospheric heat, a huge untapped reservoir of solar energy, larger than all of earth's fossil fuel reserves. A Ford engine was converted by Chris Hunter, a brilliant inventor, to prove the concept. Engines running on atmospheric heat force modification of the Second Law of Thermodynamics. While skepticism is welcomed, the extreme certainty expressed by many scientists that this is impossible confirms the fact that, given the realities of Global Warming, encouraging new physics has become extremely important – perhaps a matter of survival for humanity.

For additional information about Carroll's work, see aesopinstitute.org Look under MORE.