

SOLAR ENERGY AND THREE QUESTIONS

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Introduction

The universe could not exist in the absence of a source of energy and there is good reason to believe that what we observe in our experiments as electron-positron particle pair creation is the ongoing interplay between matter and a hidden source of energy that pervades all space. Therefore, since our technology has made us dependent upon the Earth's hydrocarbon decay products which are now dwindling away, we really need to know the answers to certain fundamental questions pertaining to energy science. One must surely wonder if there is scope for tapping into the primary energy source that created our universe and so we need answers to three questions. These are:

Question No. 1: Is the Sun really powered by the energy of nuclear fusion or can it be that the energy it radiates is drawn directly from the energy source that governs the underworld of space that physicists portray, unknowingly, by their formulations of quantum theory?

Question No. 2: When the Sun was created how did it acquire its angular momentum, meaning why did it begin to spin, given that material objects do not turn of their own accord but need something external to apply the necessary torque?

Question No. 3: When the Sun was created how did it acquire its cosmic motion, meaning its motion of 390 ± 60 km/s relative to the cosmic radiation background, as measured in 1977 by G. F. Smoot, M. V. Gorenstein and R. A. Muller, *Physical Review Letters*, **39**, 898, that quite possibly being motion relative to that underworld source of energy?

The Answers?

What, you may wonder, are the answers to these three questions? Physicists in general will assure you that the Sun, most definitely, is powered by the nuclear fusion of its hydrogen atoms as they combine to form deuterium and helium and so, guided by that belief, they urge costly research aimed at developing nuclear fusion reactors, hoping to succeed in that quest before our oil and gas reserves are wholly exhausted. This is in spite of the fact that half a century of such research has led nowhere. It is in spite of the fact that the Sun has a surface temperature of about 6000 degrees, whereas nuclear physicists declare that it needs a temperature of 100,000,000 degrees to trigger nuclear fusion. This they say exists in the centre of the Sun but then one must wonder why that has not initiated a chain reaction resulting in the total annihilation of the Sun and us with it in one mighty explosion, given that this is the technology of the hydrogen bomb.

My own answer to Question No. 1 is different but it relies on the answers to Questions Nos 2 and 3 of which physicists are less confident. Yes, as to Question No. 2, you might be told that the Sun acquired its spin thanks to the very rare event of a very close encounter with another star that happened to pass close by in its transit through space. Alternatively you will be assured that, since all stars were created at the same time in what is described as a Big Bang birth of the whole universe, the close interaction and collision

of stars when born would cause some stars to spin in one sense and others to spin in the opposite sense. On such argument the Big Bang can also be said to account also for the answer to Question No. 3 but the simple truth is that this is all a matter of speculation, speculation that has no relevance to a possible solution of our emerging energy problems. Only their belief that the Sun is powered by nuclear fusion and their hope that we can replicate the physical process involved in a nuclear reactor remains. It is a hope that always seems to promise success on the far horizon when those in charge of the project know they are due to retire.

So, as humanity struggles to eliminate conflict and build a better world for future generations, those who guide in the search for power, meaning real power, that which needs an energy source, are wandering in the dark and losing confidence. Why else would their thoughts be concerned with the possible dangers ahead, as envisaged in the unpredictable outcome of their costly government-funded experiments? Here I have in mind the recent book entitled '*Our Last Century*' by Martin Rees, now Lord Rees, the Master of Trinity College, Cambridge who tells us of the need to weigh the risk that certain experimental projects might have deadly consequences, not just for those closely involved but for everyone on Earth.

For me this becomes a message which says that physicists have to change their ideas as to the fundamental theory that accounts for the creation of matter and pay attention when someone claims to have discovered something that does not quite conform with what they have come to believe. Maybe our Sun is not powered by nuclear fusion. Maybe it spins because that invisible source of energy has supplied the necessary angular momentum. Maybe it moves through the cosmic radiation background because it has been pushed by a force asserted by that same invisible source of energy. Maybe even there are of record reports that hint at anomalous phenomena associated with release or gain of energy and a state of spin. Maybe also there are of record experiments involving electrical discharges in which anomalous reaction forces are asserted on the electrodes of the discharge apparatus. Maybe the latter phenomenon has already been encountered in those experiments aimed at discovering a route to power by nuclear fusion but discarded as being unimportant, though still interesting enough to warrant mention in the vast archives of scientific literature that define and measure the academic prowess of members of the scientific community.

In what follows I will enlighten you as to the reality of this 'maybe' scenario since all the necessary answers have emerged from a private research interest that I have pursued for more than half a century and all I seek by this web site is to share my findings with fellow scientists in the hope that they will see a better way forward in their search for a new energy source.

Proton Creation

One such finding, the most important, is the explanation of how the proton is created, the proton being the nucleus of the hydrogen atom which accounts for 99.95% of its total mass and so, hydrogen being the primary constituent of the Sun, is highly relevant to our discussion above.

I mention this first in order to present, as it were, my credentials, before getting too involved in the onward discussion.

My Ph.D. research at Trinity College, Cambridge, dates from 1950-53 and concerned an anomalous energy phenomenon associated with ferromagnetism. Sadly, the

anomaly concerned an excess loss of energy, whereas what we now wish to see is an anomalous energy gain. I was interested in how the loss was affected by mechanical stress and why iron, nickel and cobalt are ferromagnetic. This led me to picture a structured system of electric charges (certain electron states of adjacent atoms) sharing, in synchronism, an orderly orbital motion that could relate energy and angular momentum. I then came to realise that I could translate that 'picture' into a form representing the hidden energy source of the quantum underworld, but knew that if I spoke of this I would then be seeking to revive a belief in something that had been pronounced dead by the physics community, namely the aether, and so prudence prevailed and my thesis was restricted to the energy anomaly research.

I then left Cambridge to enter the corporate world of industry, seven years with English Electric Co. Ltd and then twenty-three years with IBM before taking early retirement and, with IBM's initial sponsorship, resuming my own research interests at Southampton University close to where I live. That absorbed the next nine years following which I now pursue this interest from my home in my retirement years.

However, half a century ago, within a year or so of leaving Cambridge, my thoughts reverted to that picture I had formed of synchronous electron orbital motion within the atoms of a structured ferromagnetic crystal as being analogous to the properties of what was possibly the quantum underworld energy source that regulates our universe and accounts for its creation. So it was back in the 1950s that I first began to indulge in this research interest in my own time with no work connection and, amongst other research findings, came to see how a state of spin could be set up by interaction between matter and that quantum energy underworld. Eventually this led to an insight into how protons are created. It emerged in stages and it was not until 1975 that the scientific paper showing how to calculate the proton-electron mass ratio was published. It was entitled: '*Calculation of the Proton Mass in a Lattice Model for the Aether*', and its reference is *Il Nuovo Cimento*, **30A**, 235-238 (1975). The paper, though of fundamental importance, was duly ignored by the scientific community, no doubt because it relied on the existence of that all-pervading energy medium in space, one that could impart rotation to matter when created, but a medium which physicists prefer to ignore because they wish to rely on the empirical concepts that they refer to as 'quantum theory' and dislike mention of the word 'aether'.

I found this surprising because I was not the sole author of that paper. Dr. D. M. Eagles, a well-recognized English physicist, a Ph.D. of London University, who had worked in USA for NASA and by then had moved to The National Measurement Laboratory in Australia, had taken an interest in my research findings and our collaboration resulted in that paper on proton creation theory. Physics, it seems, is not simply a search for the fundamental scientific truth but rather, given the need for recognition and research funding, a contest for popularity of ideas, with intruding proposals ignored if that means backtracking and a change of direction.

This did not worry me, inasmuch as I had a very busy and responsible activity in my work with IBM as head of their European Patent Operations as well as involvements internationally with the professional activity of the patent scene but the time came when I decided that my scientific interest was more than enough to deal with without having the constant burden of travel abroad on company business.

It was in 1983 that I retired from IBM to concentrate fully on my research interest and document my findings in scientific papers once again bearing a university affiliation

address and so having an enhanced chance of acceptance. Then, one day in 1985 I received a letter which drew my attention to the remarkable fact that IBM had embarked on a mammoth computer task, that of calculating the proton-electron mass ratio, based on what had come to be known as QCD (Quantum Chromodynamics). The task was seen as so formidable that it was expressed in the following words:

"So far, IBM has been conspicuously absent from the supercomputer market, now dominated by Cray Research, Inc., and Control Data Corp., both based in Minneapolis. However, news of at least one IBM research effort in high-speed computing surfaced at last month's National Computer Conference in Chicago. A team of physicists will soon take over a specially built computer designed to solve a single physics problem. According to an IBM official, this computer is supposed to take less than a year to solve a problem that would take a Cray-1 supercomputer more than 300 years to do. The IBM machine consists of an array of 576 processors, each one capable of 20 million 'floating point' operations per second. The machine will be used to calculate the mass of a proton from 'first principles', applying quantum chromodynamics theory. This year-long exercise should give physicists some clues as to the validity of their concepts about quarks and gluons."

SCIENCE NEWS, v. 128, p. 88.

Until I read this I had no idea that IBM had the slightest interest in the problem of determining the theoretical value of the proton-electron mass ratio. With my 1975 paper in mind and since IBM was sponsoring provision of my research facilities at Southampton University in England, I then wrote to the Director of Research of IBM in USA merely to draw his attention to that paper, which had indicated my IBM affiliation.

This was the reply I received, dated October 2, 1985:

"Dear Dr. Aspden:

As you correctly surmise, the object of the IBM effort in this area is to test, quantitatively, QCD. In order to do so, we want to calculate the proton mass, the masses of a variety of other hadrons, as well as other testable predictions of that theory. These calculations therefore are completely unrelated to any other calculations of the proton mass that may have been performed previously using other approaches.

In general, our writings on this subject have clearly emphasized that the testing of QCD is the object, and we will continue to emphasize this point.

We appreciate your taking the time to communicate to us your concerns about the Science News item.

Sincerely yours,

Ralph E. Gomory

Senior Vice President and Director of Research"

So you see, IBM's interest was merely in proving the prowess of their computer capability, which I could well understand, but I confess that I never saw anything reported as to the result obtained from that QCD effort. Later I bought a book published in 1986 entitled *Introduction to Gauge Field Theory* by D. Bailin and A. Love, thinking that this,

in dealing with QCD, would mention what might be involved in the proton-electron mass ratio calculation, but it did not. QCD, quantum chromodynamics, as these authors state, is based on the colour SU(3) group. It concerns what are referred to as quarks and their 'colour indices' and what seems to be a never-ending sequence of mathematical formulations. It is implied that quarks exist as individual entities having an electric charge that is a one-third or two-third fraction of the proton charge or electron charge, whereas common sense might suggest that the real scenario concerns groups of unitary charges which, by exchange of energy, with charge pairs being annihilated and then being recreated and existing for different fractions of time might only seem to exist as fractional charge.

If our understanding of the creation of matter depends upon such ideas as we see in QCD then we may as well give up any hope of onward progress. As to that 1975 paper of mine it was in that very same year 1985, in which the IBM QCD initiative to calculate the proton-electron mass ratio was announced that the foremost experts on measuring its value (R. S. Van Dyck, Jr., F. L. Moore, D. L. Farnham and P. B. Schwinberg, *Int. J. Mass Spectroscopy and Ion Processes*, **66**, 327, 1985) were able to report on the most precise measurement of that quantity ever made. They had measured it to within a precision of 41 parts in a billion. That is an almost incredible degree of precision, my theoretical calculation of that quantity resulting in the value 1836.15232, but that was not intended to be precise to the last two digits.

I therefore felt somewhat gratified when this paper was drawn to my attention by Dr. Eagles and I read the words:

"The value that they [Aspden and Eagles] calculate is remarkably close to our experimentally measured value (i.e. within two standard deviations). This is even more curious when one notes that they published this result several years before direct precision measurements of this ratio had begun."

Even that, however, has not aroused any real academic interest in what I am now discussing on this web site, namely our understanding on how the Sun, the mass of which is almost wholly that of protons, was created and the energy source involved. Accordingly, in writing these words in October 2005, I mention that I have spent the last few months writing a book of modest size entitled '*Creation: The Physical Truth*' which I expect to appear in print early in 2006. Henceforth, apart from periodically updating this web site and my related web site www.aspden.org, I now intend that to be my final effort to bring some enlightenment as to the mysteries of solar creation, with its spin-off implications for our future energy resource.

The Preferred Answers

The book in its Part I provides the detailed answer to Question No. 2 above and I urge anyone interested in the subject to read that work and in turn urge others to engage in onward research aimed at exploiting that supply of energy that accounts for the spin action and is active everywhere throughout space. The way forward in that pursuit, as regards the issue covered by Question No. 2, involves establishing within a dielectric medium an electrostatic field radially directed from a central axis and somehow inducing pulsations that are associated with energy inflow. As to the Sun, it being ionized and thanks to the effect of gravity asserting a stronger pull between protons than between electrons, that is what accounts for it having an internal radial electric field and, as a one-off initial event, the energy inflow accompanied by angular momentum that causes it to spin.

I leave it to that new book to brief the reader on that subject, but just mention here that my case is founded in part on my discovery of a serious error in classical physical theory and its correction. The error concerns what is referred to as 'Earnshaw's Theorem', which, as can be seen from a paper by J. Reece Roth, *IEEE Transactions on Plasma Science*, **PS-6**, No. 2, June 1978, is part of the folk lore of plasma research connected with nuclear fusion. Radial electric fields supposedly cannot help to stabilize a plasma discharge, but that quantum underworld energy resource that fed angular momentum to the Sun defies Earnshaw's Theorem, and radial electric fields do, as reported by that 1978 paper, have a way of causing the heavy ions in a plasma to have a much higher temperature than the free electrons. The paper is entitled: '*Effects of Applied DC Radial Electric Fields on Particle Transport in a Bumpy Torus Plasma*'.

As to what sustains the energy inflow needed to feed solar radiation, the subject of Question No. 1, I can but point to the activity we see as solar flares, which focusses attention on the relatively quite small amount of electrostatic ionization energy enveloping the body of the Sun. I suggest that ions, whether electrons or protons, are oscillating sporadically in a radial sense with respect to the centre of the Sun and so effectively inducing pulsations in a radial electric field in the Sun's photosphere. A pulsating radial field will cause energy inflow owing to the phase-lock that exists as between regions of the energy medium that are within the body of the Sun and those that are external to that body. The point here is that the external energy system of the quantum underworld is so powerful that it overpowers the internal energy system by keeping its quantum activity in synchronism and so in step with the quantum activity within that photosphere region but in so doing causes small superimposed angular momentum oscillations in the body of the Sun to draw in kinetic energy which can only be returned to the enveloping energy system as thermal radiation. I am leaving it to others to develop the necessary theory. My guess is that the Sun's temperature is regulated by two criteria. If the temperature is too high the ejected ions will range over a further distance from the Sun's surface and so take longer before collapsing back to that surface, which means an excess rate of cooling. Upon cooling to a lower temperature ejected ions will have lower speeds but with less range before collapsing inwards the time cycle will be faster and so the heat generated by the angular momentum fluctuation will then be greater than the rate of energy radiation and so the Sun will find a level of temperature equilibrium.

Question No. 3 is not dealt with in that new book of mine. It finds its answer, not in electrostatic action, as does Question No. 2, but rather in electrodynamic action owing to the interaction between electrons and protons as a function of their motion relative to the structure of the quantum underworld, the omnipresent energy system. The latter provides the frame of electromagnetic reference and we are concerned here with a process involving interaction forces that have a rather special property, one that precludes the setting up of a turning couple but can assert linear force action as between matter and that quantum underworld, force action that involves also energy transfer as between matter and the energy of that underworld.

I did not discuss electrodynamic interaction forces in '*Creation: The Physical Truth*' because it involves mathematics in vector form and I sought to concentrate on the easier analysis essential to the primary issue, namely gravitation, the creation of protons and stars, and the physical form of that quantum energy medium. As explained in my book '*Physics Unified*' published in 1980, I did, by a paper published in the *Journal of the Franklin Institute*, **287**, 179, (1969), show how avoidance of turning couple reaction could avoid

reliance on an empirical aspect of the law of electrodynamic interaction between two moving charges and thereby reveal the correct formulation of that law. It was found that if the interaction involved charges of opposite charge polarity and different mass then the particle of heavier mass could be subject to a dominant force component in its line of forward motion in proportion to its mass ratio in relation to the other charge. So where we have protons sharing a forward motion with an entourage of electrons flowing towards those protons owing to their mutual electrostatic interaction there will be a quite strong out-of-balance linear force acting on the protons and accelerating them to higher speed in the forward direction. This will seem to be an anomalous effect but it has firm physical foundation and is surely an indicator that the quantum underworld that defines the electromagnetic frame of reference is asserting force on the proton system and that means supplying energy as necessary.

If you find this hard to believe then take note that historical record includes reports of experiments in which anomalous cathode reaction forces have been measured in electrical discharge tubes classified as 'cold cathode' devices, meaning that heavy ions and not electrons are flowing through the tubes with electron current closing the current loop. This is a system in which the electrons in motion external to the tube interact electrodynamically with heavy positive ions in motion inside the tube. Where, you may well wonder has this been explained? Only by me, so far as I know!

Why, with all the money spent on high energy heavy ion discharges in nuclear fusion research, has this phenomenon not revealed itself? The answer is that it has, but the finding has been ignored - left without explanation - in spite of my own earlier published work on this classical electrodynamic problem. I refer here to the paper in *Physical Review Letters*, **40**, 451 (1978) by J. D. Sethian, D. A. Hammer and C. B. Wharton and quote the following words from that paper saying that they have found:

"Experimental evidence for an anomalous electron-ion energy transfer in a relativistic-electron-beam-heated plasma that is 1,000 times faster than can be predicted by classical processes."

At the end of their paper they suggest 'without particular justification' that the anomalous factor might be the hydrogen ion to electron mass ratio.

So there you are. With all the money being spent on nuclear fusion research, here is an energy anomaly encountered but left unexplained in spite of that paper of mine published in USA back in 1969, a paper which showed why that anomalous force exists in proportion to that ion-electron mass ratio.

Perhaps you are now ready for the answer to that Question No. 3. The Sun was formed by hydrogen atoms coming together owing to the pull of gravity. So much hydrogen was involved that the gravitational pressure compressed the hydrogen to the point at which electrons in adjacent atoms could collide and so be set free. That means ionization and, yes, we know the Sun is ionized. However, it only takes a very limited amount of ionization to free just enough protons for the Sun to acquire a positive net electrical charge density, the self-repulsion of which is exactly balanced by the mutual gravitational attraction effective between matter forming the whole body of the Sun. So here we have the message that the Sun has a uniform mass density over the whole volume enclosed by its radiating surface. That means that we can calculate its energy content.

That balance of gravitational action and electrostatic action tells us that the net core charge is a positive charge of amount Q equal to the Sun's mass M times G , where G is the

constant of gravitation. If R is the Sun's radius then school textbook physics tells us that the gravitational energy potential of the Sun is $3GM^2/5R$. This is negative energy in the sense that it is energy released by the action of gravity in forming the Sun but, owing to that equality of pressure and that relationship between Q and M times G , it is exactly balanced by the electrostatic potential energy of that positive charge Q . So let us now consider the remaining electrostatic energy components, namely the self-energy of the balancing negative electron charge Q that is held in place at the surface of the body of the Sun by electrostatic attraction and the separate electrostatic energy of that interaction of that negative charge Q and the Sun's positive charge Q . The former is a positive energy quantity, which is $Q^2/2R$, and the latter is a negative energy quantity, which is Q^2/R , the difference being the measure of energy released in creating the Sun, energy amounting to $Q^2/2R$.

What then happened to this energy? Did it convert into heat, as was once believed, enough to sustain the Sun's radiation for a few million years, but not enough to explain a four billion year estimate of the Sun's existence or was it that, in forming as an ionized system of protons and electrons, with protons leaping ahead as they converged to nucleate the body of the Sun, that electrodynamic force action just mentioned imparted linear motion to those protons. In this latter case we can calculate how fast the Sun would then need to move relative to the enveloping cosmic background to absorb that energy. All we have to do is equate $MV^2/2$ and $Q^2/2R$, V being the speed acquired by the Sun, and, since Q^2 is GM^2 , this tells us that GM/R is equal to V^2 .

Now as we well know the Sun's mass is very nearly 2×10^{30} kg, its radius is very nearly 7×10^8 m and G , the constant of gravitation, is 6.67×10^{-11} N-m²-kg⁻², which means that V in metres per second is approximately the square root of 1.905×10^{11} . This is 436 km/s. Is it not then a curious circumstance to find, as was noted in the introduction above, that our Sun is actually moving through the cosmic background at a speed estimated as 390 ± 60 km/s. Can this be mere coincidence, another physical discovery to be brushed aside and forgotten, or is it that the theoretical case just presented is a true account of the energy that set the Sun in motion, bearing in mind that 436 km/s is within that measured speed range?

I leave that issue open for discussion, but for my part I say it is highly relevant and I go one step further by drawing attention to the research findings of Alexandra and Paulo Correa who, by reference to that paper of mine in the *Journal of the Franklin Institute* have opened the door on tapping aether energy by their PAGD (Pulsed Abnormal Glow Discharge) research findings as reported in their U.S Patents Nos. 5,416,391, 5,449,989 issued in 1995 and No. 5,502,354 issued in 1996.

Conclusion

I have sought by this brief introduction to the problem of Solar Energy to arouse interest in a research path that I have followed to satisfy my curiosity as to what it is that determines the values of certain physical constants which are the very foundation for understanding of what we see and experience as the physical world we inhabit. To focus reader's attention I have spoken here solely of the Sun as the topic of interest, inasmuch as the Sun poses the greatest mystery, and we are probably on the wrong track in trying to replicate its energy source by nuclear fusion research. My findings concerning other physical phenomena, as presented in full detail elsewhere, www.aspden.org, relate to the way in which Nature determines the values of those fundamental constants, including

particularly the constant of gravitation, Planck's constant and the detailed derivation of the proton-electron mass ratio.

Other than clarifying, as necessary, what I have recorded by my past efforts, there is little more that I can contribute in this quest and I just hope that there will be those who read what I have said in my book '*Creation: The Physical Truth*' and who periodically refer to this web site where I will duly comment on the feedback I receive from those readers.

As a final note here it seems appropriate to mention that it was reading that book by Lord Rees entitled '*Our Final Century*' that prompted me to try, once again, to get my message across in book form, rather than by merely writing scientific papers or publishing on Internet.

I will announce on this web site when my book is to be published. It is expected to be in the early part of 2006.

Harold Aspden
14 November 2005