The Mantra of Theoretical Physics: Relativity Reigns

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Theoretical Physicist, Lee Smolin, laments in his book that very little progress has taken place in theoretical physics since 1980. This is primarily because almost all the funding and faculty positions in physics have gone to string theorists, who have produced theories that cannot be experimentally verified. It is his opinion that more promising new directions are needed, led by seers and thinkers like Einstein, such that the great mysteries of the universe can be solved. His own special preference is for Quantum Gravity research. His approach is to develop new theories, find experiments to test them, and then show that they produce unexpected predictions that can be verified. Experiments come in after the theory has been developed, and not before. All acceptable theories must contain the successful aspects of Special Relativity, General Relativity, and field theory ala Maxwell's equations, and those theories should be compatible with the Standard Model of particles. His goal is the unification of as much as possible in physics.

The approach taken in this paper is to show that all of Smolin's criteria for valid new theories contain flaws, and these criteria have not been proven to be true experimentally as he asserts. Errors have crept in since Einstein's development of Special Relativity and General Relativity that have set theoretical physics back a century. Maxwell's equations should be stated in terms of potentials rather than fields, which doom the Standard Model. Indeed, we need to go back and find out where we went wrong, and develop a new particle model and a new theory of movement in the universe.

1. Introduction

A 2007 issue of the Australian magazine Cosmos [1] discussed the apparent failure of String Theory, after more than 30 years of development, to elucidate how the universe may have begun, or to begin to unify the four forces, or to reconcile the Standard Model of particles with Quantum Physics. The Editor said, "Is it time to call a spade a spade, and admit that theoretical physics is heading down the wrong track?" This article was based on a book written by Professor Lee Smolin [2], a theoretical physicist and founder of the Perimeter Institute for Theoretical Physics. The implications in the article were that theoretical physics had stagnated for 30 years, and someone needed to find out what had gone wrong. It should have been a call to re-examine what had gone before, and find out if mistakes were made that could still be corrected. Instead, the theme of the book is a lament that almost all faculty positions and research grants for the past 30 years have gone into one direction, String Theory, and this has snuffed out opportunities for new theoretical thinkers and seers to eventually solve the great mysteries of the universe, posed in five great unsolved problems.

The five great problems according to Smolin are:

1. ***Combine General Relativity and Quantum Theory into a single theory that can claim to be the complete theory of nature. This is the problem of Quantum Gravity.*** Smolin says, "The current revolution in physics began in 1900 with Max Planck's discovery that energy is not continuous but quantized. This revolution has yet to end. Albert Einstein was certainly the most important physicist in the twentieth century. Perhaps his best work was his discovery of General Relativity, which is the best theory we have so far of space, time, motion and gravitation. In Einstein's General Theory of Relativity, space and time no longer provide a fixed absolute background. Space is as dynamic as matter, it moves and morphs. These two discoveries each required us to break definitely with Newtonian physics. However, in spite of great progress, the theories remain incomplete. Each has defects that point to the existence of a deeper theory. The main reason each theory is incomplete is the existence of the other."
2. ***Resolve the problems in the foundations of Quantum Mechanics, either by making sense of the theory as it stands or by inventing a new theory that does make sense.*** Smolin says, "General Relativity and Quantum Theory each has a problem of infinities. In nature we have yet to encounter anything measurable that has an infinite value. General Relativity has a problem with infinities because inside a Black Hole the density of matter and the gravitational field quickly become infinite. That appears to have been the case very early in the history of the universe, if we trust General Relativity to describe its infancy. Quantum Theory has its own troubles with infinities whenever you attempt to use Quantum Mechanics to describe fields. Quantum Theory contains within it some conceptual paradoxes that even after eighty years remain unsolved."
3. ***Determine whether or not the various particles and forces can be unified in a theory that explains them all as manifestations of a single fundamental entity.*** Smolin says, "Given the failure of realists to make sense of Quantum Theory as formulated, the only option is the discovery of a new theory that will be more amenable to a realist interpretation. I believe that if the problem has not been solved after all this time, it is because there is something missing. The

desire to unify the various forces has led to significant advances in the history of physics. Maxwell, in 1867, unified electricity and magnetism into one theory, and a century later physicists realized that the electromagnetic field and the field that propagates the Weak force could be unified. This became the Electroweak theory, whose predictions have been repeatedly confirmed in experiments over the last thirty years. There are two fundamental forces that remain outside the unification, Gravity and the Strong force. Can all four forces be unified?"

4. ***Explain how the values of the free constants in the Standard Model of particle physics are chosen in nature.*** Smolin says, "For all its usefulness, the Standard Model has a long list of adjustable constants. We have no idea why these numbers have the values they do, we simply determine them by experiments and then plug in the numbers. There are about twenty such constants, and the fact that there are so many in a fundamental theory is a tremendous embarrassment."
5. ***Explain Dark Matter and Dark Energy. Or, if they don't exist, determine how and why gravity is modified on large scales. More generally, explain why the constants of the Standard Model of Cosmology have the values they do.*** Smolin says, "Even as we celebrate the encompassing of all known phenomena in the Standard Model plus General Relativity, we are aware of two dark clouds, Dark Matter and Dark Energy. The predictions of General Relativity have been found to be in agreement with observation to a very precise degree. Newton's laws of Gravity and motion provide an excellent approximation to the predictions of General Relativity, but they don't predict how the motion of a star is influenced by the other stars and other matter in its galaxy. Either there is more mass in a galaxy than visible, or Newton's laws fail to correctly predict the motion of the stars in the gravitational field of their galaxy. Things have become even more mysterious. The expansion of the universe appears to be accelerating, whereas given the observed matter plus the calculated Dark Matter it should be decelerating. Again, there are two possible explanations. General Relativity could simply be wrong. It has only been verified precisely within our own solar system [Perihelion of Mercury] and nearby systems in our own galaxy [1919 eclipse]. Or there is a strange new energy, which we have postulated to fit the data, called Dark Energy. Only 4 percent of the universe is ordinary matter. Of the other 96 percent, we know absolutely nothing. There is now a Standard Model of Cosmology, which has a list of about 15 freely specified constants. No one knows why these constants have the values they do."

2. Analysis of the Situation

In the first six Chapters of the book, it is alleged that physics entered a roughly 30 year period of stagnation beginning in the 1980s. From a philosophical standpoint, the likelihood is that the problem began much earlier, and it was only noticed in the 1980s. I detect two main themes, an extreme admiration for the contributions of Albert Einstein and a preoccupation with the idea of unification of the forces, and almost everything else for that matter. The solution offered in the book for finding one's self in a deep hole is to dig deeper, but in a new direction! At no time should one look backward to see if any mistakes have been made somewhere along the way. The past is simply a prologue to the future!

As an engineer, it seems to me that the above themes have formed a type of tunnel vision, where little attention was placed on any side paths. It is as if the direction of the train was chosen to follow that narrow path, and now it seems that the train is in a dead end canyon. The way theoretical physicists are working is to try to find a new side track that will allow the train to exit the canyon in the forward direction. An engineer would back up, identify the major places where the train chose a branch to follow, and evaluate whether taking the other branch might get him out of difficulty. An engineer would also work in the opposite direction from a physicist. The theorist develops a theory and looks for an experiment to confirm it, while an engineer looks at a range of experiments and tries to develop a theory to match them.

A central tenet of all discussions of theoretical physics in the book seems to be the insistence that all acceptable theories have to include Special Relativity and General Relativity, which allegedly have both been experimentally proven, and must somehow be consistent with the Standard Model of particles which contains Special Relativity and is also alleged to have been experimentally verified. Maxwell's equations are given as the example that electromagnetic fields have been unified and connected to the Weak force field.

Any critique of this philosophy must therefore examine the truth of those allegations. Is Special Relativity correct? Is General Relativity correct, and does it apply to the Big Bang and to Black Holes? Are Maxwell's equations complete, and can physics problems be entirely posed in terms of fields? Is the Standard Model of particles reasonable, or should it be replaced? Is there such a thing as Dark Matter and Dark Energy?

3. Special Relativity Proof

Francisco Müller [3] wrote a 200 page book analyzing Einstein's 1905 Special Relativity paper and subsequent post-1905 papers line-by-line. He finds 29 errors and inconsistencies, of which he denotes 15 are grave, and eleven are moderate. He says that Arthur Miller, an Einstein biographer, agrees with 8 of these grave errors but then ignores their significance. But these errors are precisely the ones that produce paradoxes like the "twins", and produce the problems noted by Cahill [4] and others about two-way synchronization of transmission in cables. GPS satellite clocks are not corrected using Special Relativity, but rather by engineering fixes, as noted by Hatch [5] who works in this field.

4. General Relativity Proof

4.1 Galaxy Data

There is a lot of experimental evidence that indicates the motion in the universe is not explained by General Relativity. The six deep redshift galactic pencil surveys [7], and indeed the entire Sloan survey indicate that the distribution of galaxies is symmetric about an origin in the vicinity of Virgo (about 70 million light years from Earth), is damped at approximately 1-over-r-squared from that origin, and is periodic with a period of about 400 million light years (the first two periods being called the Great Wall and the Sloan Great Wall). These findings are contrary to the conditions for General Relativity to give a solution (called the Big Bang), because the mass distribution is not isotropic and homogeneous, and it is not centerless.

4.2 Derivation

The late Robert Heaston wrote a paper following all the steps in Einstein's derivation of General Relativity [6]. Heaston's steps, with some of the dates they occurred, are shown graphically in Figure 2. Step 2a or 2b gives a maximum condition between the size of a body and the mass it can contain. Heaston noted that Einstein made an error when he went to geometrized variables by setting c = 1, and that error led to a singularity as an asymptotic solution. But if that step was not taken, then the relationship 2a or 2b leads to the limit given in relationship 5 or 8 where mass has to convert to energy.

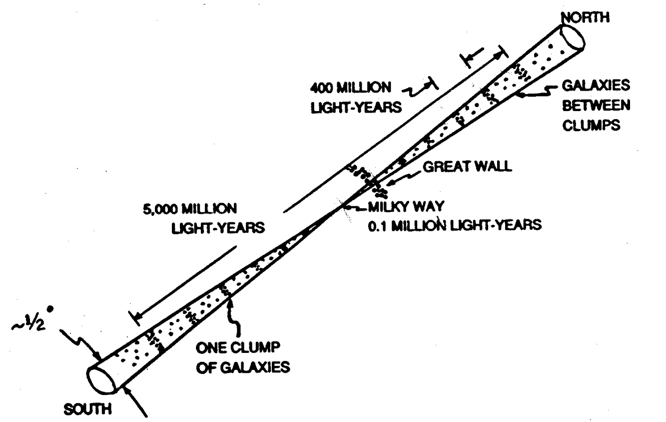

Fig. 1. Cartoon of experimental setup where dots in cone represent galaxies. Note that the first clump of galaxies to the North Galactic Pole is due to the intersection of our observing cone with the Great Wall

A Neutron Star begins at n = 0.3 and a Black Hole begins at n = 0.5. The consequence of having n <= 1.0 is no Big Bang, finite Black Holes, no String Theory, etc. After all, gravity does escape a Black Hole, so gravity must move much faster than light as the late Tom Van Flandern, an expert in Celestial Mechanics pointed out.

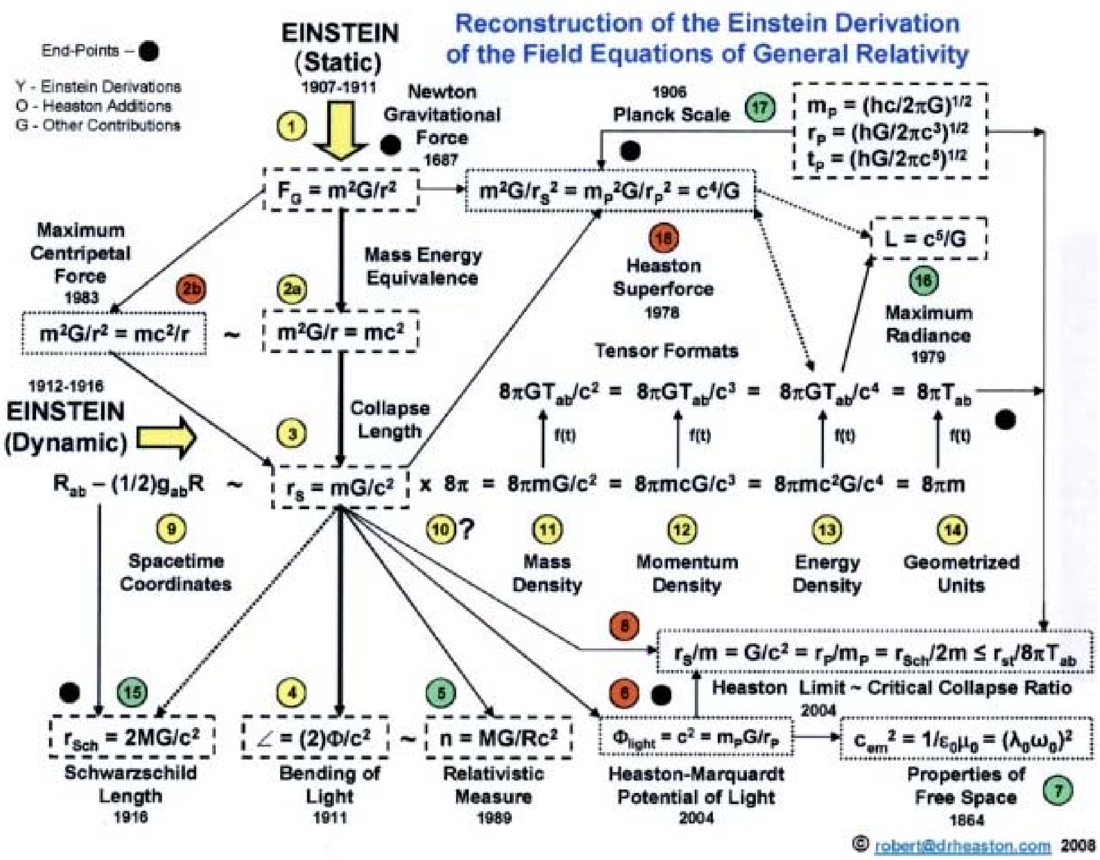

Fig. 2. Heaston's Schematic of Einstein's General Relativity Derivation. Key Steps are Step 2a or 2b and Step 5 or 8.

4.3 Solution Problems

An Australian, Stephen Crothers, contends that General Relativity physicists use a solution to the Black Hole problem that is different from Schwarzschild's original published solution, and this solution gives only one singularity and not two [8]. Then, he says that the usual General Relativity formulation does not contain mass, violates conservation, and has differential geometry flaws. Crothers says, "It is reported almost invariably in the literature that Schwarzschild's solution for the Ricci tensor, $Ric = R_{\mu\nu} = 0$, is (using $c = 1$, $G = 1$),

$$ds^2 = \left(1 - \frac{2m}{r}\right)dt^2 - \left(1 - \frac{2m}{r}\right)^{-1} dr^2 - r^2\left(d\theta^2 + \sin^2\theta \cdot d\varphi^2\right)$$

$$0 \le r < \infty \qquad (1)$$

wherein it is asserted by inspection that r can go down to zero in some way, producing an infinitely dense point-mass singularity there, with an event horizon at the 'Schwarzschild radius' at $r = 2m$: a Black Hole. Contrast this metric with that actually obtained by K. Schwarzschild in 1915 (published January 1916).

$$ds^2 = \left(1 - \frac{\alpha}{r}\right)dt^2 - \left(1 - \frac{\alpha}{r}\right)^{-1} dR^2 - R^2\left(d\theta^2 + \sin^2\theta \cdot d\varphi^2\right)$$

$$R = R(r) = \left(r^3 + \alpha^3\right)^{1/3}, \quad 0 < r < \infty \qquad (2)$$

wherein a is an undetermined constant. There is only one singularity in Schwarzschild's solution, at $r = 0$, to which his solution is constructed. Contrary to the usual claims made by the astrophysical scientists, Schwarzschild did not set $a = 2m$ where m is mass; he did not breathe a single word about the bizarre object that is called a Black Hole; he did not allege the so-called 'Schwarzschild radius'; he did not claim that there is an 'event horizon' (by any other name); and his solution clearly forbids the Black Hole singularity because when Schwarzschild's $r = 0$, his $R = a$, and so there is no possibility for his R to be less than a, let alone take the value $R = 0$."

4.4 Experimental Proof

The only experimental proof of General Relativity that I have seen is the bending of light in the 1919 eclipse, and the precession of the Perihelion of Mercury. Eddington reported the results from only 6 plates of about 39 taken in 1919 [3], which amounts to cherry-picking the eclipse data. It has been argued that the portable telescopes used did not have sufficient resolving power for the accuracy quoted, and there were problems of atmospheric heating in an uncontrolled environment. The shift reported from the 6 plates was somewhat near Einstein's predicted value of 1.74, but not so far from the Newton value of 0.87 considering the experimental precision. An uninterested observer would have said that the data were inconclusive as to which theory was better. Nonetheless, Eddington pronounced Einstein the winner. Subsequent attempts to repeat these measurements have not succeeded.

The other experimental proof is the Einstein prediction of 43 arc seconds/century for the discrepancy in the precession of Mercury's orbit. The total measured rotation of the perihelion was about 5600, of which 5025 was the precession of the Equinox, 530 was the contribution of the other planets, and 43 was the difference. Einstein predicted this value as a correction of a pure elliptical orbit, whereas Le Verrier did a complex fit to several planetary orbits to compute corrections to Mercury's orbit. In so doing, he solved an inherently nonlinear multi-body problem by a series of linear perturbations. I translated a portion of this 1859 paper from the French [9] and compared the assumptions to modern values. Errors in the masses of some planets as large as 8% did not seem to make much difference to the final fit, but from a pure accuracy standpoint, Einstein's correction is only 8% of the total, and could be statistical error instead of a real effect.

5. Maxwell's Equations

Roland Dishington is an elderly physicist who lives in California. He distributed a paper on Electrodynamics [10], where he began with a non-point model of an electron, fit to the known properties of an electron, and with this model derived a new Poynting vector solution. He discovered that the proper formulation is in terms of vector and scalar potentials. The E and H fields turn out to be dependent variables derivable from the potentials, and not independent variables. He implies that Maxwell's equations should also be reformulated in terms of potentials, and that Maxwell's equations only work in special cases like microwave transmission, and not in all cases. His contention is that the assumption of point particles is one of the main weaknesses of the Standard Model of particles. A second implication is that any theory predicated on fields alone is headed for trouble. Dishington concluded that theoretical physics went astray in 1905, and has not recovered since.

Francisco Müller is a college teacher and amateur experimentalist interested in Electrodynamics. He has performed a series of magnetically shielded motor-generator experiments and recorded them on videotape [11]. Contrary to Maxwell's laws, an EMF is induced when the generator is shielded. His results can be explained in terms of potentials, but not in terms of fields. These two papers cast doubt on using fields to characterize force problems, and thus cast doubt on the Electroweak model and the Standard Model of particles. Müller also points out that Einstein began his 1905 paper with the example of the unipolar inductor, where physicists were not sure where the EMF was generated, and then Einstein summarily dismissed the problem as unimportant rather than solving it.

6. Standard Model

The Standard Model is based on a type of symmetry table. All of the particles that could fit into this table have been experimentally produced by high energy machines except for the massive Higgs boson. Smolin hopes that the Higgs particle will appear in the forthcoming experiments at CERN in Switzerland. It should be emphasized that simply filling out a table, without knowing why it exists, is hardly proof of any theory! In addition, even if the photon and the W+, W- and Z particles have been produced is not experimental proof that they play a role as exchange particles for electromagnetism or beta decay.

Charles Lucas has proposed an Electromagnetic Model of Particles [12] in terms of three levels of wrapped +- 1/3 e charged fibers. With this model, he has representations of all the exotic particles and their decay products while having conservation of fibers (almost). Stephan Gift [13] has proposed that the Standard Model is too complicated, and the various families of three particles can be considered to be excited states of the basic particle. Lucas' representations as modified by Gift show the structure of the families and how you go consistently from the electron to the muon and tauon, etc.

Using these representations for protons and neutrons, Lucas has a model for all 3000+ isotopes which explains the "Magic Numbers" of shell closings, explains the "liquid drop properties of fission", all the nuclear spins, and gives a new Semi-empirical Binding Energy Formula that is accurate to the measurements including all the low A peaks [14]. The basic idea is that instead of moving at high speeds inside the nucleus, the nucleons assume static positions of force balance and at most vibrate. Edward Boudreaux and Eric Baxter have a numerical model [15] that confirms these positions and gives decay energies for a set of decay examples.

EXCITED STATES

Particle Symbol	Particle Name	Quark Structure	Fiber Structure	Net Charge	Net Spin	Principal Decay Modes
e^-	Electron	None	$(\downarrow,\downarrow,\downarrow)$	–1	½	
ν_e	Electron Neutrino	None	$\bar{\Updownarrow}$	0	½	
μ^-	Negative Muon	None	$(\downarrow,\downarrow,\downarrow),\bar{\Updownarrow},(\bar{\Updownarrow},\bar{\Updownarrow})$ e^- $\bar{\nu}_e$ ν_μ	–1	½	$(\downarrow,\downarrow,\downarrow)+\bar{\Updownarrow}+(\bar{\Updownarrow},\bar{\Updownarrow})$ $e^- + \bar{\nu}_e + \nu_\mu$
			$(\downarrow,\downarrow,\downarrow),(\bar{\Updownarrow},\bar{\Updownarrow},\bar{\Updownarrow})$ e^- $\bar{\nu}_\tau$			$(\downarrow,\downarrow,\downarrow)+\bar{\Updownarrow}+(\bar{\Updownarrow},\bar{\Updownarrow})$ $e^- + \bar{\nu}_e + \nu_\mu$
ν_μ	Muon Neutrino	None	$(\bar{\Updownarrow},\bar{\Updownarrow})$	0	½	
τ^-	Negative Taon	None	$(\downarrow,\downarrow,\downarrow),(\bar{\Updownarrow},\bar{\Updownarrow}),(\bar{\Updownarrow},\bar{\Updownarrow},\bar{\Updownarrow})$ e^- $\bar{\nu}_\mu$ ν_τ	–1	½	$(\downarrow,\downarrow,\downarrow)+\bar{\Updownarrow}+(\bar{\Updownarrow},\bar{\Updownarrow},\bar{\Updownarrow})$ $e^- + \bar{\nu}_e + \nu_\tau$
			$(\downarrow,\downarrow,\downarrow),(\bar{\Updownarrow},\bar{\Updownarrow},\bar{\Updownarrow}),(\bar{\Updownarrow},\bar{\Updownarrow},\bar{\Updownarrow})$ e^- $\bar{\nu}_\tau$ ν_τ			$(\downarrow,\downarrow,\downarrow)+(\bar{\Updownarrow},\bar{\Updownarrow})+(\bar{\Updownarrow},\bar{\Updownarrow},\bar{\Updownarrow})$ $e^- + \bar{\nu}_\mu + \nu_\tau$
			$(\downarrow,\downarrow,\downarrow),(\bar{\Updownarrow},\bar{\Updownarrow},\bar{\Updownarrow}),(\bar{\Updownarrow},\bar{\Updownarrow},\bar{\Updownarrow})$ e^- $\bar{\nu}_\tau$ ν_τ			$\downarrow,\bar{\Downarrow},(\bar{\Updownarrow},\bar{\Updownarrow}),(\downarrow,\uparrow)+(\bar{\Updownarrow},\bar{\Updownarrow},\bar{\Updownarrow})$ $\rho^- + \nu_\tau$
ν_τ	Taon Neutrino	None	$(\bar{\Updownarrow},\bar{\Updownarrow},\bar{\Updownarrow})$	0	½	

Chart 3. Leptons

Particle Symbol	Particle Name	Fiber Structure	Net Charge	Net Spin
ν_e	Electron Neutrino	$\bar{\Updownarrow}$	0	½
ν_μ	Muon Neutrino	$(\bar{\Updownarrow},\bar{\Updownarrow})$	0	½
ν_τ	Taon Neutrino	$(\bar{\Updownarrow},\bar{\Updownarrow},\bar{\Updownarrow})$	0	½

u	Up Quark	$\bar{\Uparrow}$	+2e/3	½
c	Charm Quark	$(\bar{\Uparrow},\downarrow,\uparrow)$	+2e/3	½
t	Top Quark	$(\bar{\Uparrow},\bar{\Downarrow},\bar{\Uparrow})$	+2e/3	½

d	Down Quark	$\downarrow$	–e/3	½
$\bar{d}$	Down Antiquark	$\uparrow$	+e/3	½
s	Strange Quark	$(\bar{\Downarrow},\uparrow)$	–e/3	½
$\bar{s}$	Strange Antiquark	$(\downarrow,\bar{\Uparrow})$	+e/3	½
b	Bottom Quark	$(\bar{\Downarrow},\bar{\Uparrow},\downarrow)$	–e/3	½
$\bar{b}$	Bottom Antiquark	$(\uparrow,\bar{\Downarrow},\bar{\Uparrow})$	+e/3	½

GIFT
$\rightarrow (\downarrow,\uparrow,\downarrow)$
$\rightarrow (\uparrow,\downarrow,\uparrow)$

Fig. 3. Lucas' Fiber Structures for Leptons, Neutrinos and Quarks with Gift's Modifications Showing the Base Particle and Excited States for These Families

B oudreaux and Baxter's

Finite Toroidal Particle Calculations for Select Radioisotopes

Isotope	Z	A	NBE[a]	NBE[a]	Decay Mode	Decay Energy	Decay Energy	Half Life	Half Life
			calc.	exp.		calc[b].	exp[b]	calc.	exp
Be	4	8	53.7	56.5	2α	0.051	0.04	~10^{-18} s	1.7x10^{-16} s
Na	11	24	174.2	193.5	β^-	5.67	5.51 (4.91)[c]	1 d	0.63 d
K	19	40	297.4 299.4	341.5 -	β^- β^+ β^-	1.3 1.5 3.18[d]	1.32 1.50 -	1.3x10^7yr 21 hr	1.3x10^9yr -
K	19	42	316.3	359.2	β^-	3.50	3.52	12 hr	12.2 hr
K	19	44	333.6	376.1	β^-	5.9	5.66	23 min	22.1 min
K	19	46	344.1	391.9	β^-	7.11	7.72	120 s	107 s
K	19	48	376.1	416.0	β^-	11.4	(12?)[e]	7.2 s	6.8 s
Th	90	231	1559.6	1760.3	β^-	0.4	0.389	24 hr	25.2 hr
Th	90	234	1589.3	1777.7	β^-	0.3	0.270	7,2 s	6.8 s

a. MeV units; data from: Wapstra,A.H. and Gove,N.B. (1971) *Nuclear Data Tables*, 9, 265-301, New York, New York, Academic Press Inc.
b. MeV units; data from: Linde,D.R. (1990-1991), (Ed in Chief), *CRC Handbook of Chemistry and Physics*,71stEd.(pp **11**-13 to**11-**40), Boca Raton,FL: Chemical Rubber Co.
c. Another value in the literature (ref. in b. above)
d. Calculations yield two energy minima not reported in the literature
e. Reported value uncertain

Fig. 4. Decay of Selected Nuclei in Lucas' Charged Fiber Model

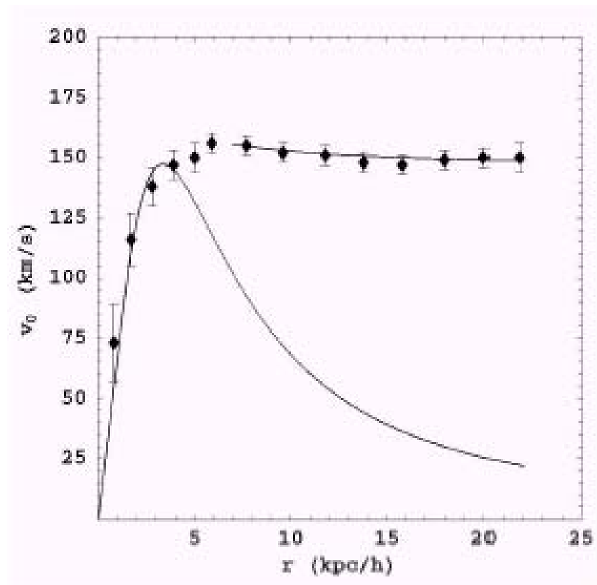

Fig. 3: Data shows the non-Keplerian rotation-speed curve v_0 for the spiral galaxy NGC 3198 in km/s plotted against radius in kpc/h. Lower curve is the rotation curve from the Newtonian theory for an exponential disk, which decreases asymptotically like $1/\sqrt{r}$. The upper curve shows the asymptotic form from (24), with the decrease determined by the small value of α. This asymptotic form is caused by the primordial black holes at the centres of spiral galaxies, and which play a critical role in their formation. The spiral structure is caused by the rapid in-fall towards these primordial black holes.

Fig. 5. Application of Cahill's New Modified Newtonian Gravity Model

To summarize, the Standard Model should be replaced with a model that has fewer problems.

Using the idea that the Strong force is analogous to magnetic attraction, and the Weak force is analogous to incompressibility (i.e., the Strong force does not have to saturate and reverse for small distances between nucleons), Rydin [16] has made a linear model using these forces and the Coulomb force as springs to obtain an Eigenvalue problem analogous to the Schrödinger equation. So, decay can be a simple vibration problem with many degrees of freedom, instead of a Quantum Mechanical barrier penetration problem. It also solves the problem that neutrons interact with nuclei in quantized increments (p-wave, d-wave, etc.) when they miss the nucleus entirely: they interact electromagnetically! I do not know how far this idea can be taken, but it is indeed a new direction that can be explored theoretically.

7. Dark Matter and Dark Energy Problems

I am familiar with Milgrom's MOND (Modified Newtonian Dynamics) model, which is ad hoc and states that gravity simply saturates to 1-over-r at some low value. I read in an article about Milgrom that someone was going to try to create a theoretical General Relativity basis for it. I believe that there may already be a new model for gravity, developed by an Australian, Reginald Cahill. He has an additive term to Newton gravity which is proportional to the fine structure constant, which acts within a distribution of mass [17]. This model is based on three experimental applications, bore-hole gravity inside the Earth, the ratios of galaxy masses to their central Black Hole masses, and an application to the rotation of a spiral galaxy. This theory seems to explain the rotation of a galaxy without using Dark Matter at all, and would obviate the so far unsuccessful search for it.

The Dark Energy idea is based on the fact that the data from Supernova Type Ia explosions lie uniformly slightly above the Hubble curve. Note that the Hubble curve is a fit to data with an uncertainty of at least 10%, and is not a theoretical result of General Relativity. Eric Lerner has given a paper where he contends that the raw data was "corrected" for the presumed expansion of space in the Big Bang model [18], and if that had not been done, the data would have been unremarkable. There are no independent measurements of another type that confirm this acceleration, and in any event the contention is based on the Big Bang model being correct, which I contend is falsified by the galaxy distribution data. Dark Energy does not exist either.

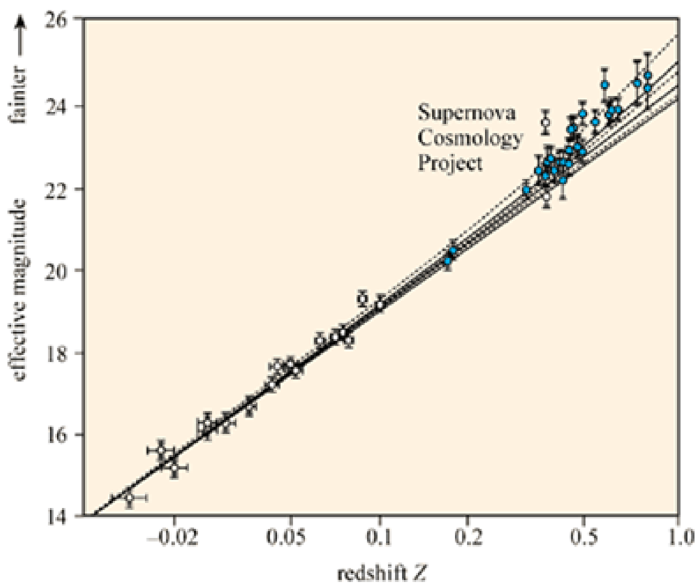

Fig. 6. Supernova Type Ia Data Showing Apparent Deviations on the High Side of the Hubble Curve

Conclusion

Special Relativity leads to all sorts of paradoxes, and has led to long discussions in the dissident community of what is exactly wrong with it. In fact, so many errors have been made in the 1905 derivation, that we are wasting our time when it could be put to better use. General Relativity also contains a major error that led to singular solutions, when there aren't any, but there are other errors in solutions and applications, including coupling space and time when it should not be coupled. Nonetheless, all the galaxy distribution data disagrees with the Big Bang as a model for motion in the universe. The Standard Model of particles is also deeply flawed, probably because it is formulated in terms of fields instead of potentials, and uses point particles. New models should be developed from first principles avoiding all of these old flawed theories, and then there will be no more Trouble with Theoretical Physics!

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