Towards a more realistic Gravitomagnetic Displacement Drive

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”The only way of discovering the limits of the possible is to venture a little way past them into the impossible.”-Arthur C Clarke

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FORWARD

I have been at both physics and Electrical Engineering going on about 32 years now. But I have had two major interests all along. One is to better understand the Cosmos we live in. The other stems back to two events in my life several years removed from each other. The first event happened in Texas back in 1973 while taking a short trip across east Texas with my folks. The event was witnessing something that would be classified as a close encounter of the first type. What my folks and I saw out in east Texas was a very brilliant glowing object circular in shape due south of the road we where on above a cattle field. I and my folks remember pulling over to look at it and we remember driving away afterwards. But we do not remember anything in between. The second event took place back in 1983 in Tucson Arizona while working for the Military. One evening I and several others had gone out into the desert northeast of Tucson to cook out and have a good time. What we did not know was several unidentified objects had been spotted out south of Tucson by workers up on Kitt Peak in the area of Ryan Field a small local airport south of Tucson.. These objects took a slow flight path out across Tucson towards the direction we where at.. I ended up being about 100 yards from one of these as it progressed across the valley. Close enough to see a lot of detail, to get a good idea by its general shape and size and flight aspects that this was not anything our Military had at the time. While I never saw any aliens or little green men. What I witnessed was intelligently controlled, had some motive power different from anything our planet uses and could have been a robotic probe similar to one’s we launch at present into space.. I also learned later that the Military on Davis Monthan had tracked these same objects that evening also. These two events sparked keen interests in space propulsion which later got utilized during the era of Alcubierre Warp Drive research with the group ESAA.

The Cosmology aspect of my involvement has taken many turns throughout the years. Starting with a model similar to the older Spinnor model and working my way up through String theory on into modern Brane Theory I have over the years played with several models. One what I would term a toy model can be found at: This model was never designed to be a real model. Though it did at one point get referenced by a British Press article along with some of Steven Hawking’s work. It was founded upon trying to get around a major problem String Theory had with providing too many vacuum solutions instead of the one that we exist in.

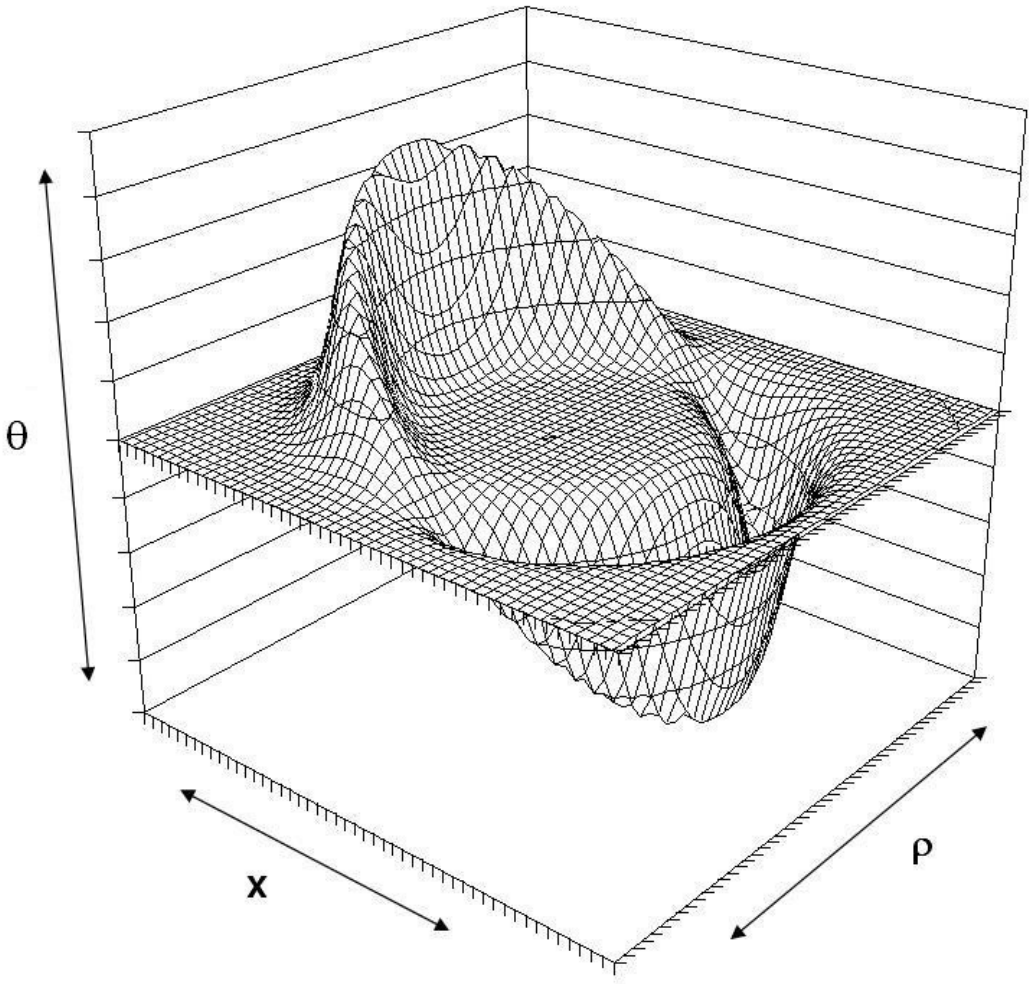
I utilized a bit of FEMM logic and started with our real universe vacuum situation and worked backwards to find a type of String Model that incorporated quantum field theory. The problem is the model has a sort of Aether embedded in it. Not exactly Newton's aether. But an aether none the less. However, in playing with certain numbers out of the whole model it did manage to provide a Neutrino mass solution within error range of the one later detected in labs.

About this time I had become a convert to what is now termed VSL (Variable Speed of Light) cosmology. It was just after this point that a friend of mine by the name of Fernando Loup developed interests in modern Brane Theory over problems we had encountered with AWD. Most of ESAA stayed together and continued work on AWD while Fernando went out on his own to pursue his idea. Our grounds for objection were we had enough problems to deal with out of AWD and Brane Theory had little observation evidence in its favor at that point. However, I myself had noted Brane Theory with Brane lensing could explain how C could appear a constant from one perspective and not be a constant from another perspective which is exactly what a lot of observational evidence was giving cosmologists.

INTRODUCTION:

Doctor Alcubierre's original proposal of warp drive within General Relativity(1) which was published in 1994 had an interesting origin in a simple enough question about if it was possible for a craft to actually warp space-time like the science fiction show Star Trek a lot of my generation had grown up watching. It was not Alcubierre's intent to design a field equation for a fully working "Warp Drive". He simply wanted to show that under General Relativity and metric based gravitational formulism such an exotic propulsion method was possible. But his article spawned a whole collection of Research groups, one of which, ESAA I became involved with many years later. For a short time it even generated a research branch within NASA known as the Breakthrough Propulsion Group or BPP(2).

The space-time metric that Alcubierre exhibited achieves its effect by replacing the zero velocity of the motionless points of empty space by the translational velocity vs(t), but only (to a near approximation)inside a sphere of radius R, which sphere.



Warp Field Plot showing Top Hat Function.

As any honest scientists will point out just because something can be shown correct by math does not translate to it being correct in the physical world. As none other than Albert Einstein pointed out, ”The supreme task of the physicist is to arrive at those universal elementary laws from which the cosmos can be built up by pure deduction. There is no logical path to these laws; only intuition, resting on sympathetic understanding of experience, can reach them”(3). While something can be proven via math that is consistent and logical, physics for example, requires experimental and observational evidence that while derived from the math, transcends the math’s own version of proof with evidence that it does exist. The key to what Einstein was saying is the terms, “no logical path and only intuition” along with the word “Experience”. Experiment and observation are what true science is built upon when it comes to evidence and for all the different groups efforts, including the one I became involved with its that type of evidence all the honest research into what is commonly called Warp Drive lacks at the present time. That is the fundamental reason mainstream wise the Scientific community has tended to label all of this type of thought as rather Crackpot.

There are several main reasons for the rejection of warp drive that the scientific community has pointed out over and over against this theory. They are:
1.) Warp Drive requires negative or exotic energy and the Positive energy Theorem of Schoen and Yau(4) states that when the ADM four-momentum is timelike and future pointing, E>0, unless P^{α} =0.
2.) Control of the forward region of the warp drive space-time for navigation and velocity changes requires a faster than light control signal. This also goes hand in hand with the issue that for warp drive to work the field itself must be in motion FTL to begin with. While ESAA partly addressed this issue(5) the second half has to this date never been addressed. As some put it, Warp Drive requires a Warp Drive to create it.
3.) The energy requirement to create a warp field is way beyond our ability to generate, especially via some sort of ship carried field generator even if we had a working matter/anti-matter reaction system like the Enterprise had on Star Trek. Even if one includes a simple solution to this that was published(6) it still remains an issue.
4.) How to actually navigate and avoid objects in the path of the craft. Borrowing an ancient idea from reality and from SF I had proposed the field could be run in a pulsed mode and one could then navigate and change direction in between pulses. But that actually only side steps the issue and as Natario(7) pointed out it still remains a problem.

To put the whole group of problems in a nut shell, for Warp Drive ever to be accepted as reality we have to properly answer the objections and demonstrate via observation and experiment that such is physically real and creatable. We can redo the warp metric till the end of time. But until we first do the above it remains nothing but pure speculative theory resting on no evidence that demands a verdict. We can use Polarized Vacuum ideas, GR based metrics, String Theory, etc to no honest achievement. We have to rethink the whole Warp Drive idea, find a solution that fits with known evidence and sound quantum theory and one that we can show scientific evidence in its favor. Until that point is reached we are at best venturing a little way past reality into the impossible which will continue to label us a crackpots or on a good day as challenging the Establishment which myself, Lee Smolin and others once got mention as in an article in New Scientists. Even the last is still a nice way of saying we are radicals and odd balls at best.

I do not know about anyone else but I am tired of that label and that is why I will take regular quantum theory and real General Relativity to first take a second look at a solution proposed by Fernando Loup most of us rejected and use accepted quantum theory instead of Brane or String theory to explain it and then not only show you how such a drive could work, but also offer observational evidence in its favor, experimental ways to test the idea and the beginnings of a real quantum gravity theory that fits via the math and current experimental and observational evidence to date.

Fernando Loup's Hyperdrive.

In September 24, 2003 Fernando Loup and Paulo Alexandre Santos and Dorabella Martins da Silva Santos published(8) an article titled Hyperdrive A Go Go-The Star Wars Hyperdrive. Fernando went on after this to do some more published articles related to hyper drive(8). At this time the original ESAA group had split up separating with Fernando over the whole hyper drive idea. Our biggest problem is that brane theory was even more radical, with even more unanswered quantum questions to plague us.

His hyperdrive proposal was based upon the following: The Planck scale can be written as a function of some very well known constants for which its expression was obtained by a research group at the University of Amsterdam Holland(9). In the Dutch equation

$R=4\Pi^2{}_o$ Gh-cross ^{2} m $_0$ / ε_0

Where G, Planck's constant, M and ε have the standard values of the present vacuum state. With Fernando and our own group we had been utilizing a polarized vacuum modeling based somewhat upon Hal Putnoff of the University of Texas own PV alternative to GR(10). In this type modeling ε is no longer a constant and can vary. Which translates to C itself being a variable as well as the Planck scale being also a variable when it comes to size. In fact, the hyperspace of Fernando's hyperdrive Brane Theory based model(author's note 4) is actually the Planck scale itself. So putting aside for a moment the issue of if the planck scale can be varied normal quantum theory should give one a sound idea of what he was trying to point out. However, bare in mind that what follows hinges solely upon the whole general PV approach to begin with.

Fernando went on to show the following case example:

Considering the metric

$$ds^2 = dt^2 - e^{2\alpha}dX^2 - dH^2$$
$$\alpha = -kH + \ln[a(t)]$$
$$e^{2\alpha} = e^{2(-kH+\ln[a(t)])} = e^{-2kH}e^{2\ln(a(t))}$$
$$e^{-2kH}e^{2ln(a(t))} = e^{-2kH}a(t)^2$$
$$ds^2 = dt^2 - e^{2\alpha}dX^2 - dH^2$$
$$ds^2 = dt^2 - e^{-2kH}a(t)^2dX^2 - dH^2.$$

It follows

$$ds^2 = dt^2 - e^{-2kH}a(t)^2dX^2 - dH^2$$
$$a(t) = e^{-(\sqrt{2}kt+Yt)}$$
$$0 = dt^2 - e^{-2kH}a(t)^2dX^2 - dH^2$$
$$0 = 1 - e^{-2kH}a(t)^2\frac{dX^2}{dt^2} - \frac{dH^2}{dt^2}$$
$$1 = e^{-2kH}a(t)^2\frac{dX^2}{dt^2} + \frac{dH^2}{dt^2}$$
$$e^{-2kH}a(t)^2\frac{dX^2}{dt^2} = 1 - \frac{dH^2}{dt^2}$$
$$\frac{dX^2}{dt^2} = \frac{1}{e^{-2kH}a(t)^2}\left(1 - \frac{dH^2}{dt^2}\right)$$
$$\frac{dX^2}{dt^2} = \frac{e^{2kH}}{a(t)^2}\left(1 - \frac{dH^2}{dt^2}\right)$$
$$\frac{dX}{dt} = \frac{e^{kH}}{a(t)}\sqrt{1 - \frac{dH^2}{dt^2}}.$$

We observe that k is large for Brane Lensing. In turn, H doesn't need to be large and

$$\frac{dH}{dt} << 1.$$

From which we find

$$\frac{dX}{dt} >> 1$$

And

$\alpha=1/\varepsilon\sqrt{2}kt +Yt$

Manipulating this we get

$$\frac{dX}{dt} = \frac{e^{kH}}{e^{-(\sqrt{2}kt+Yt)}}\sqrt{1-\frac{dH^2}{dt^2}}$$
$$\frac{dX}{dt} = e^{kH}e^{\sqrt{2}kt+Yt}\sqrt{1-\frac{dH^2}{dt^2}}.$$

Consider then

$$T^{00} = -6k^2 + 3\left(\frac{1}{a}\frac{da}{dt}\right)^2$$
$$T^{00} = -6k^2 + 3\left(\frac{d\ln(a)}{dt}\right)^2$$
$$T^{00} = \left(g^{00}\right)^2 T_{00},$$

1

Where g^{oo}=1 we have

$$T^{00} = -6k^2 + 3\left(\frac{1}{a}\frac{da}{dt}\right)^2$$
$$T^{00} = -6k^2 + 3\left(\frac{d\ln(a)}{dt}\right)^2$$
$$T^{00} = \left(g^{00}\right)^2 T_{00},$$

1

$$a = e^{-(\sqrt{2}kt+Yt)}$$
$$\frac{1}{a} = e^{\sqrt{2}kt+Yt}$$

So that

$$\begin{aligned}\frac{da}{dt} &= \frac{de^{-(\sqrt{2}kt+Yt)}}{dt} \\ &= e^{-(\sqrt{2}kt+Yt)}(-1)(\sqrt{2}k+Y).\end{aligned}$$

We find

$$\frac{1}{a}\frac{da}{dt} = e^{\sqrt{2}kt+Yt}e^{-(\sqrt{2}kt+Yt)}(-1)(\sqrt{2}k+Y)$$
$$\frac{1}{a}\frac{da}{dt} = (-1)(\sqrt{2}k+Y).$$

From which we derive

$$T^{00} = -6k^2 + 3\left[(-1)(\sqrt{2}k+Y)\right]^2$$
$$T^{00} = -6k^2 + 3\left(Y^2 + 2\sqrt{2}Yk + 2k^2\right)$$
$$T^{00} = -6k^2 + 3Y^2 + 6\sqrt{2}Yk + 6k^2$$
$$T^{00} = 3Y^2 + 6\sqrt{2}Yk.$$

When we maintain

$$3Y^2 > -6\sqrt{2}Yk,\, T^{00}$$

To obey the positive energy theory with the limit case we get

$$3Y^2 + 6\sqrt{2}Yk = 0$$
$$3Y^2 = -6\sqrt{2}Yk$$
$$Y^2 = -2\sqrt{2}Yk$$
$$Y = -2\sqrt{2}k$$
$$T_{00} > 0$$
$$Y > -2\sqrt{2}k$$

When

$$T_{00} = 0.$$

where k is the coefficient for the Chung-Freese Brane Lensing.

The total energy needed for local brane lensing is given by

$$E = \int T^{00} dV.$$

From this he showed in this example the energy needed to enlarge the Planck scale was both positive and small by astronomical terms compared to the energy needed for Alcubierre's version of an FTL drive. But even Fernando never took a direct look in any article at the type of space-time his field would enlarge and it's properties.

It was Dirac(11) who first pictured this region as populated in whole by negative energy states. Modern Casmir(12) experiments have shown that smaller and smaller artificial barriers allow less and less energy wave modes to exist within their barrier, making the vacuum state within less. Theory predicts at the Planck scale and below the actual energy state would be negative. Now any simple look at Einstein's Special Theory of Relativity when one plugs in negative energy one gets velocity results that are tachyon like and predict FTL states. This is where the whole idea of hyperspace as far as physics goes derives the hyper light velocity effect from. But Fernando and very few others have ever published anything on what the actual velocity of light is within hyperspace even though there is a way to figure it out,

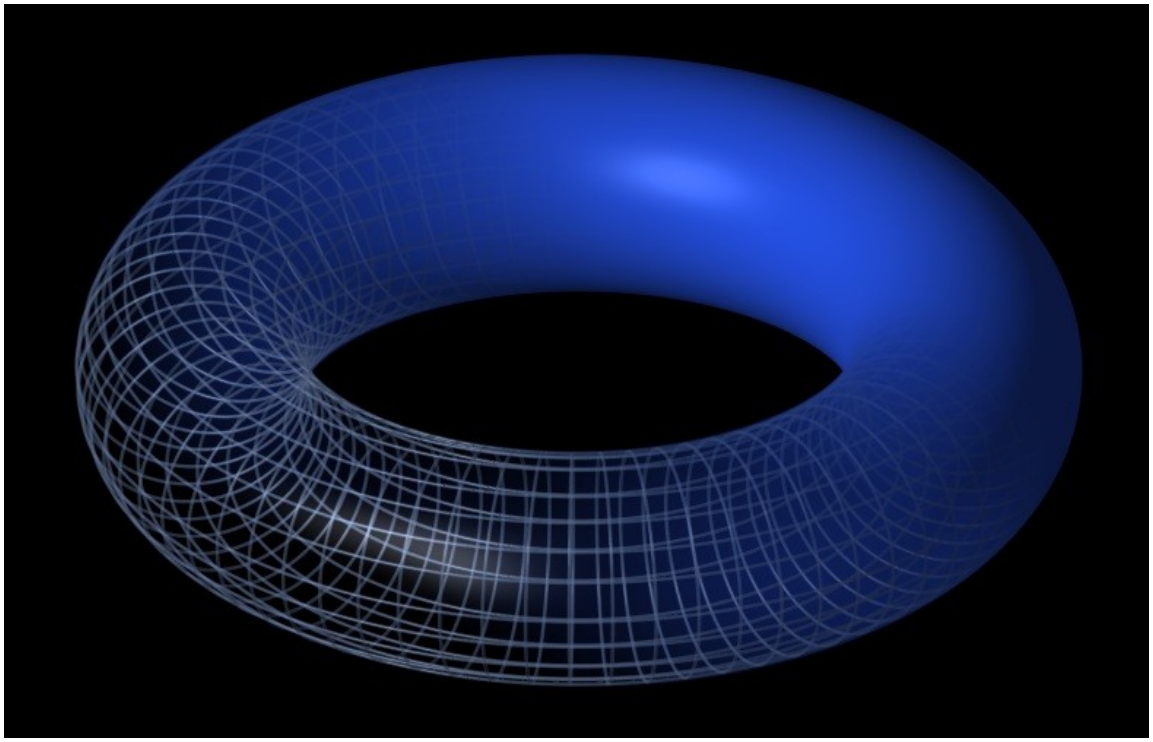
At the trans-planking boundary we find part of that answer when we combine it with the positive energy theory. When we normally attempt to compute the total energy of the ZPF, the large energy of this boundary tends to giver us infinities or we get an answer that is far above what experiment and observation show us it

is. In fact it is some 120 powers too high to be correct. But that is because we only can measure part of the circuit in this case. Inside this boundary all the negative energy counter balances this large positive value. What we end up with is actually the value observation shows us. One way of looking at this is via the Higgs(13) mechanism. This mechanism was proposed to account for why particles have the mass/energy they have. It started as a simple math trick to cancel the infinities quantum theory gave us. Later it was assumed there must be actual Higgs bosons that achieve this.

But no one to date has ever been able to detect in a lab a real Higgs Boson. The reason will become clear.

Inside this boundary there is a transition zone between the high positive energy and the high negative energy further inside. Normally one could assume it transitions to zero energy at some point. The outer boundary could then be considered a hollow Schwarzschild sphere with two internal trapped regions. One of negative energy and the other a flat Minkowski region or sheet where $\eta_{\alpha\beta}$ =1. I choose the value of one for a reason. Instead of being totally flat this region is forced into a stabilized condition where the energy is not zero. It has a forced false vacuum state to it. Its in this state that the higgs field and its bosons exist. We cannot measure them because they are trapped outside our ability to detect them via any C=1 detection method, except indirectly through the different particle masses they generate(see 14 for a similar vacuum state proposal).

One simple way to model these three regions is as standard 2-Torus subset of R^3. A 2-Torus is homeomorphic to the surface of a doughnut in R^3 and



But, the Lawson Conjecture (also known as the Hsiang-Lawson conjecture) states that any minimally embedded torus in the 3-sphere with the round metric must be a Clifford torus and the Clifford torus is a special kind of torus sitting inside R^4. This object has negative curvature on the internal parallel circle and inner region, positive curvature on the external circle and outer region and zero curvature on the upper and lower parallel circles. One can also combine the energy signatures of each region to develop a combined metric. That metric matches the original AWD metric in spherical format. This spherical format allows this metric to cause a warp effect in all directions with motion determined by the ship's own motion under a crews direct control instead of the original warp metric which was unidirectional an required the field itself to be in motion. But there is one big difference with this warp metric. Unlike the one proposed by Alcubierre, this metric is natural occurring and well supported by known quantum theory as well as brane theory.

So if one could enlarge the planck scale to envelope a craft(see author note 7) one would have solved the first objection about how to generate a warp field. Taken with Fernando's mathematic example of the energy requirement being lower in astronomical terms and this proposal answers at least two objections at once.

But it also solves other objections and provides solutions to other big physics questions.

The next question concerns Natario's issue with warp drive: How do we

navigate, and how do we alter velocity and course. For the solution here we need to consider true quantum gravity this modeling exposes in a unique way. One issue raised by Brane Cosmology modeling is:

Brane Cosmology

- *Brane Cosmologies have their origins in strong coupling limit of $E_8 \times E_8$ heterotic string theory (Horava, Witten).*
- *4-d universe viewed as a hypersurface, or* ***brane****, in a 5-d spacetime called the* ***bulk****.*
- *Standard model particles (open strings) are constrained to the brane and see only 4-d.*
- *Gravity is 5 dimensional.*
- *Differs from Kaluza-Klein models in having a large, non-compact extra dimension.*

The central issue is the third point of the above. However, looking at quantum gravity we find a solution to this.

Einstein's theory of gravitation and inertia has long predicted a carrier particle for the gravimagnetic field. That particle is known as a graviton which is itself a Boson of zero rest mass just like photons. However the difference is photons have a spin value of 1 while gravitons have a spin value of 2 and the first carries the EM field while the later carries the gravimagnetic field. The field equation of gravity is

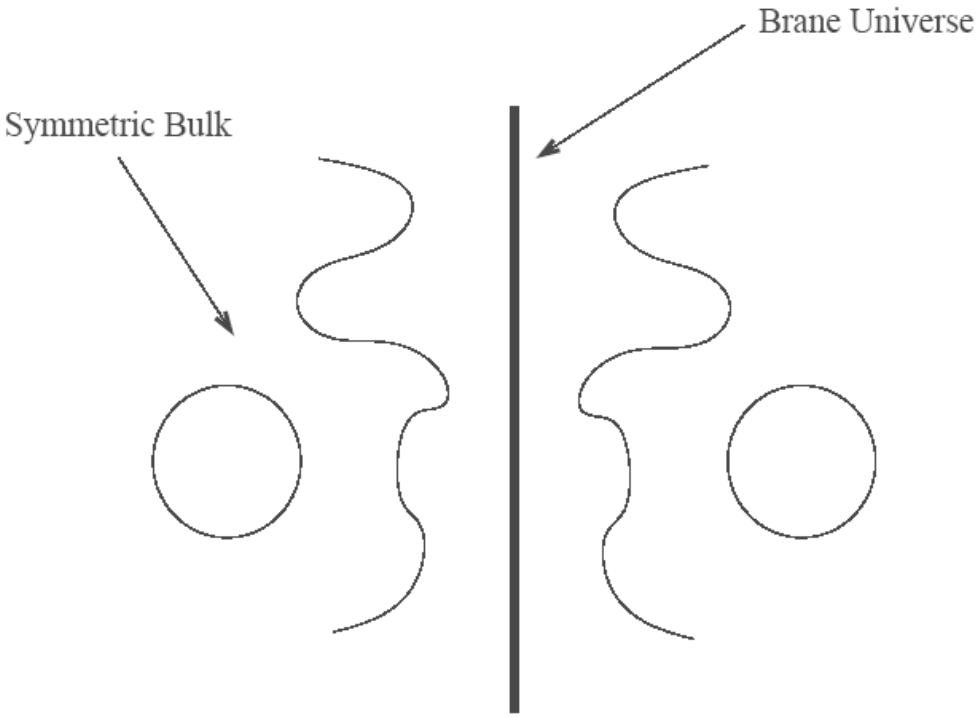
$G_{\alpha\beta} = 8\Pi T_{\alpha\beta}$

It is a quadrapole field where as EM is a dipole field. Also EM fields have two charges or polarity. Gravity as we have been able to measure it has only one. The measured difference in strength between the two fields is 1000 fold. Em fields are 1000 times stronger than gravity even though both fields obey the $1/r^2$ rule. To this date no method has ever been found to detect either the individual gravitons or the predicted gravity waves.

What I am going to suggest is the graviton, like the higg's boson is itself trapped in that transplanckian region. But it has two messenger particles, one of which can be detected in our space-time and one that can be detected in hyperspace. These could be termed graviphotons. The way to find the proof of this part of General Relativity is to not search for a gravity wave, or gravitons, but find a photon signal that matches the right frequency of an predicted gravity wave at half the expected amplitude. The reason for half the amplitude is the fact that the

source gravimagnetic radiation which is quadrapole only sends out half its signal as normal photons, the rest travel via hyperspace as tachyon like photons. For example, if one takes the alternative metric theory commonly called the Moffat theory, takes its value for the quadrpole contribution to say the perihelion advance of Mercury and divides it in half one gets a value that is in line with current experimental evidence(15 and 16). But this is not to say it or the Bimetric Rosen theory, where one has dipole gravity radiation is correct. Indeed, under this theory gravitational radiation is still quadrupole. What this translates to is there is no free in anyone space-time quadrapole radiation. It only exists in full strength inside that junction region of both space-times. Inside our space-time we measure gravity with half the circuit as 1000 times weaker than EM. But with the whole circuit the two fields are equal in strength as they share a common untrapped carrier. Mach's principle still holds: Mass there tells space-time here how to move and bend. But there are two carriers, one Advanced and the other Retarded, that you have to measure to fully understand gravity.

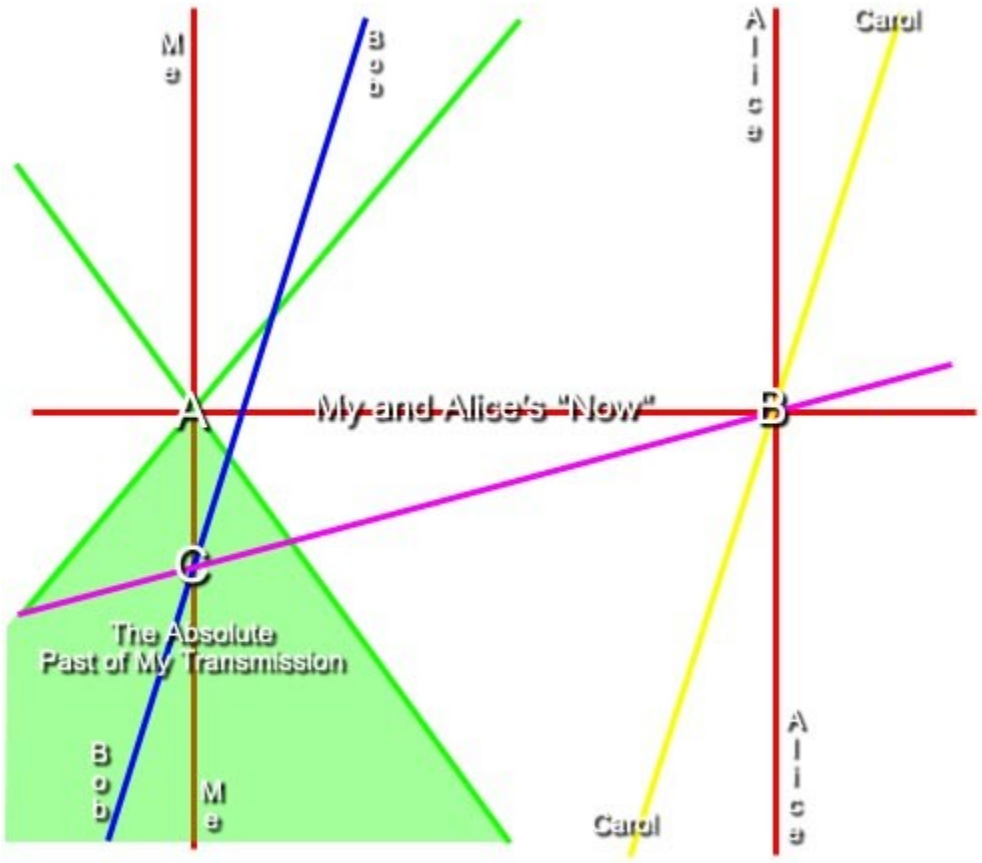
If one can detect the signal of gravity one can detect the mass of objects in our path. Not only that but hyperspace is by theory a twin copy of our space-time.



Standard assumption is that the spacetimes either side of the brane are mirror images of each other (Z_2-**symmetry**).

Its just time moves faster there than in our space-time. That being the case then we also have visual means by which to navigate. Adding this to the fact that it is the craft that generates the field that enlarges the planck scale and the craft providing the thrust that moves this enlarged region Natario's problem is solved.

I'll will also suggest we now have a means to communicate both inside hyperspace and to someone back on earth. In both cases if the transceivers are inside of hyperspace or a hyperspace bubble their communication speed is the local velocity of light inside of hyperspace.



The pretty much undeniable Problems of Causality Paradoxes in FTL Travel

I arrange for Alice to move out into space, and then assume a position at rest relative to me. Things are arranged so that Alice and I are moving with the same speed, and both are moving in the direction from me towards some further out point directly in front of us. At event A I use a laser to transmit a message to Alice at event B. In a normal space condition Alice and I can be just as vastly separated by appearance as we would in this normal space-time diagram. Yet, at some fundamental level in hyperspace we could actually be sitting in a region

that is casually connected because of a differently local value for C. Even though our outside observable lightcones are separated, they in this special frame of reference would be connected. So, in essence, by using this alternative frame of reference I could signal Alice even though a normal space-time light pulse I sent would not reach her in the same amount of time. From those of us in say Bob's or even a further away position there would be no way for a signal to reach there. Yet, if we could view things at the hyperspace frame we'd realize that all these reference frames are interconnected.
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For that figure we must do some rather simply math figuring based first on the planck boundary vacuum expectation value and its escape velocity figure minus the higg's field value. In fact, one could actually ignore that last part for a good approximation. Try C^3 for a good approximation. That's about what the actual value for C is inside of hyperspace.

Based upon that thrust value that in our space-time produce a given velocity in this vacuum will produce a velocity in hyperspace that is raised to the third power. If we could generate here a thrust that allows a craft to move at say 100 miles per second, inside hyperspace that same thrust would let the same craft travel at 1000000 miles per second or 5.36 C(see Author note 5). I would suggest that a matter/anti-matter propulsion system could achieve at least that much thrust. That translates to Warp velocity being possible with a few simple advances forward in conventional propulsion systems. With Ion drive we currently can achieve about 10 miles per second velocity which in hyperspace would allow us to move at 1000 miles per second.

Another aspect this theory could help explain is the observed accelerated expansion of the cosmos. Close tied to this is the Dark matter issue and also the Pioneer Probe is known to have a slight slowing in its velocity as it has proceeded out of our solar system(16). Actually, there have been other probes that confirm this slowdown. However, NASA uses on more modern probes spin correction which they admit has a noise factor that makes it impossible to confirm the effect via even more recent probes. If we assume there could exist a natural method within which the Planck scale varies then one effect that would be present and detectable within our space-time would be its mass/energy leaving a gravitational red shift or blue shift signature even though visually there would be no other evidence of its presence. The Pioneer probe signals show an 8 meter per second velocity slowdown with an absolute Sunward pointing vector.

Whatever causes this has its source in the Sun and displays itself measurably past a certain point of distance from the Sun. Its cause must, following Fernando's hyper drive findings, be a positive energy field or particle that the Sun admits. This translates to the planck scale size being smaller here than outside of the system. If we follow the logic here then all stars probably produce this effect. That effect, while not an actual change of the local velocity of light, but

rather, a gravitational red shift(see author note 2) similar to that encounter say by an object falling into a gravity well like a black hole on a smaller scale would the further out in the universe one observes have its pointing vector change and eventually line up with the CMB itself. At that point we'd no longer see it as a red shift. It would now show up as a blue shift making it seem like the expansion rate had increased with time even though the actual rate had never varied from that normally predicted.

At the same time, each region where the Planck scale was larger would gravitational effect other regions around it. Because we cannot directly observe these enlarged regions we'd assume there was extra mass present. So based upon this there is observational evidence that tends to support this revised gravitational theory and the PV model of a variable Planck scale. It also confirms Fernando's predicted local brane lensing effect on a different scale. More on that in my notes.

What kind of RS brane model does this actually support. I would suggest there is strong indication in this that we live in a RS triple 3-brane universe with our brane caught between. Our brane, plus hyperspace makes up 8 dimensions when you take each as a mirror image of the other with different values for C. The outer third brane does not seem to have a velocity of light that we can at present measure any effects from. It literally acts like a shell of very dense matter/energy fitting the properties of a spherically symmetric Schwarzchild shell with 3 dimensions only and non-rotating(author's note 1) with the inside space-time we live in being very close to a perfect Minkowski metric $\eta_{\alpha\beta}$ irrespective of how much combined mass/energy density there actually is in our space-time.

This combined with the solution to the Dark matter problem would well explain why we seem to exist in an FRW type universe where k=0 even though most attempted measurements of mass/energy density would suggest the value should be less than 0 and most Big Bang modeling with or without inflation has always suggested that without a cosmological constant the universe should have collapsed. This translates to both models being a bit off.

This does however leave a few problems unsolved. The spherical shell could, given our vacuum's low and positive energy density be explained itself along positive energy theory respects if we assume there exists outside of it a higher energy system, perhaps the false vacuum we sprang from. This would tend to support the baby universe ideas proposed by others. It's character would also explain why the universe acts very much like a giant holograph. We are literally inside the cosmos' huge version of a holographic information storage medium.

My normal assumption even without exact dark matter/gravity figures for the whole cosmos tend towards the idea that eventually our universe will collapse in a big crunch which perhaps starts a recycle effect. However, the outer shell, based upon the logic of Mach's principle where matter there from any

perspective tells space-time here how to bend would itself have to shrink. This would in turn imply it undergoes its own version of Hawking radiation into that false vacuum state. This would tend to suggest our universe is a onetime event where collapse means every bit of energy here returns to the false vacuum from which it sprang in the first place. That makes for a neat tidy physics situation. But from the perspective of life forms in the universe its not good news.

The only thing I can say for sure is the Boundary, that third brane really even though under the normal boundary of the boundary principle the outside is a zero as far as the math is concerned has a history tied directly to our own. It's fate is our fate. Einstein would have loved the way the universe obeys Mach's principle. But he probably would have asked if God would create something simply destined to vanish. However, he'd have loved the way chance rolls of the dice tended to vanish from the equation when you look at the big picture.

Its been asked how much real evidence favors multidimensional theories? I've used simple quantum theory to come to the same basic model. If quantum theory is correct then we do live in a universe with more than 4 dimensions. That being the case I would suggest the natural origin of the dark matter effect does relate to supersymmetry.

The simplest answer if one removes all other possible answers is usually the correct one. The simplest answer from supersymmetry is the stable gravitinos. They alone have the ability to increase or decrease gravity of all the known particle states. They occur from the decay of exotic neutrinos into selectrons which in turn decay to them. This would also explain the missing neutrino problem itself.

There is also some modern brane theory related to the Israel junction condition behind the neutrino idea. The governing of curvature is determined by the Israel Condition

$$\Delta K_{\alpha\beta} = 8\Pi[T_{\alpha\beta} - 1/3 h_{\alpha\beta} T]$$

Where $T_{\alpha\beta}$ includes both the brane tension and the fields living on the brane. The brane tension is governed by the discontinuity in the slope of the warp factor of the brane.

$$ds^2 = e^{-2\mu y}\eta_{\mu\nu}dx^{\mu}dx^{\nu} + dy^2$$

is the usual five dimensional metric when $T_{\alpha\beta} = 0$. If one follows the double brane approach our brane has negative tension and the hidden bulk has positive tension.

If one follows the standard path of supersymmetry there is a restriction on the brane tensions that must obey the following:

$|T_{0,\Pi}| = T$

where T is the fine tuned tension related to the five dimensional Plank Mass by

$T=6M^3_5k$.

When this bound is satisfied the full bulk brane theory remains invariant under five dimensional N=2 supersymmetry, and restricted to four dimensional N=1 supersymmetry on the branes themselves. However, with Fernando's PV type modeling of the Dutch equation involved in the Planck scale and also it's mass this whole issue becomes a variable that no longer is forced to obey the tension restriction. I suspect the key is in modifying the slope of the warp factor itself. Thus,

$ds^2 = e^{-2\mu y}\eta_{\mu\nu}dx^\mu dx^\nu + dy^2$

Becomes an equation of interest which is controlled by

$\Delta K_{\alpha\beta} = 8\Pi[T_{\alpha\beta} - 1/3h_{\alpha\beta}T]$

or the Israel Condition as it is referenced as.

I had followed the path of the missing neutrino issue because:

The effect of the black hole charge on the brane arises via the junction conditions and leads to the modified Friedmann equation

$$H^2 = \frac{\kappa^2}{3}\rho\left(1+\frac{\rho}{2\lambda}\right) + \frac{m}{a^4} - \frac{q^2}{a^6} + \frac{1}{3}\Lambda - \frac{K}{a^2}. \qquad (225)$$

The field lines that terminate on the brane imprint on the brane an effective negative energy density $-3q^2/(\kappa^2 a^6)$, which redshifts like stiff matter ($w = 1$).

This is what I suspect the graviton's do as their field decreases following a 1/r^2 rule. However, we should be able to duplicate this effect through other sources. The problem is finding a field that can duplicate this effect. If one particle in nature can do this then a field with similar properties ought to be able to be generated.

However, it is not a solution of how to generate Fernando's hyperspace field. The entire solar output only yields a local 8 meter per second effect. Something else is needed for his field to work.

That something else is within a fully worked out version of his field equations which is not the purpose of this article at all. That something else if past history

in this research is any indicator will have it's own set of problems to over come. I would suggest is start there and keep a constant reference in the book: Gravitation and Inertia by Ciufolini and Wheeler from the Princeton series in Physics along with any good book on quantum theory.

Even if you work all this out you are still a long way from any Warp five type crafts. But you could at least step out in a 2 year mission and visit the nearest system to our own. That would be another small step for man and a giant leap for mankind.

I titled this article with an interesting title that comes from both early and modern names for Zephram Cochran's warp drive in Star Trek fantasy. But in reality what Fernando suggest is real warp drive of the Star Trek type It is displacing the mass of a craft into an alternate or sub-space-time who's properties match that of the original AWD metric and that has a velocity multiplication factor very much akin to the SF show's one. It comes complete with warp communication methods, warp navigation solutions, etc. But neither the Great Bird of the Galaxy, nor even Alcubierre gave you the total road map. Both did an excellent job of simply suggesting a way.

To quote Steven Hawkins on the set of STNG when he saw the warp core I'm working on that. There are a lot of us still out here doing just that. All the approaches have merit. But leap a bit beyond all the metrics and think more about how to make the field work.

Nature has solutions in the simplest way. Keep it simple stupid fits all real research methods. I had to get away from all the research to begin to see the whole picture. Most of us where too tied up in clinging the AWD metrics versus Fernando's hyper drive to even notice how the two match and how PV fits into it all. Though I was the one who many years back introduced myself to this group with the statement that the metric belonged in an 11 dimensional format I forgot along the way why it belonged in that format and became blinded by the whole AWD metric itself. Mostly because of all the String Theory problems. Alcubierre is not some Godlike person, neither is Fernando or anyone else involved in this. We are flawed men trying to be men. We make mistakes, we charge down blind avenues and along the way I hope we learn from those mistakes. That's part of being human in the first place.

Ronald is right Metrics do serve a purpose in all this. Todd is right in that PV works well as a model. But each only gives you part of the picture. Boil it all down the best theory is the tried and true one's: General Relativity and Quantum Theory. Sure we can debate aspects of both. If you notice, I who support VLS cosmology actually state the whole 8 meters per second aspect is not a real change in the local velocity of light. But you can along PV methods model it that way. It could be both solutions are correct depending upon the perspective you use. I used simple GR equations for a gravitational mass effect on red shift and

blue shift. Anyone can work the math out to derive how much the Planck scale increases or decreases by total solar output. You can find the math needed to even figure out a ball park on total missing neutrino output. Anyone could figure out the accelerated expansion effect from logic alone. It does not take rocket science to figure out a small microscopic change in planck scale size is not enough to do a warp drive unless we use the microscopic bottle idea. Which I have yet to see anyone suggest how we perform that trick. It simply suggests Fernando was right even if the fields are different.

One thing would still hold true: The Speed of Light in the vacuum state as Einstein stipulated it remains constant. Alter that vacuum state and that no longer is true. Nothing in that statements rejects SR. In fact, it supports SR fully. SR is the very foundation of GR and quantum theory springs from both. Our part of the Universe has Lorentz invariance. So does hyperspace. Its just that even though they are quantum entangled the vacuum state of each is different. In neither space-time can you out run a photon. But you can use one to out run a photon in the other.

Anyone with a bit of math or research can derive the escape velocity for a BH state like the Plank boundary. It is even published in a few places out there as C^3. It can very some from that figure based upon mass/energy density. But that is the general ball park for it. I suspect those who helped develop ST had seen that figure somewhere before for a Black hole and guessed the rest or incoporated that value because it sounded good. Sure the internal velocity is slightly different. But it is close enough to make a solid way to figure theoretical ship velocity. ST had domain jumps in their figures. Real life does not seem to suggest that is the case. The field for enlarging the planck scale would remain constant irrespective of ship velocity. Only the thrust energy would change for a given warp velocity. The scale is linear all the way up to C^3. But like under our SR energy needed increases after a point geometrically. It still takes infinite energy to reach the hyperspace velocity of light.

Where do we start? I suggest we start with what we can show. We suspect gravitinos can modify the local Israel junction condition. Given that we need a workable theory based upon math on how they do this. Here is my suggestion:

Starting with a curve in $\mathbb{R}^4$ can be specified by either Cartesian coordinates x^m or by curvilinear coordinates η^i. $\mathbb{R}^4$ becomes a subspace H^8 with internal coordinates ξ^α, there will exit a general coordinate transformation $x^m(\xi^\alpha(\eta^i))$ from $\mathbb{R}^4 \rightarrow H^8 \rightarrow \mathbb{R}^4$ resulting in

$$g_{ik}=\frac{\partial x^m}{\partial \xi^\alpha}\frac{\partial \xi^\alpha}{\partial \eta^i}\frac{\partial x^m}{\partial \xi^\beta}\frac{\partial \xi^\beta}{\partial \eta^k}\,, \qquad g_{ik}=:\sum_{\mu,\nu=1}^{8} g_{ik}^{(\mu\nu)}, \quad g_{ik}^{(\mu\nu)}=\frac{\partial x^m}{\partial \xi^{(\mu)}}\frac{\partial \xi^{(\mu)}}{\partial \eta^i}\frac{\partial x^m}{\partial \xi^{(\nu)}}\frac{\partial \xi^{(\nu)}}{\partial \eta^k}.$$

The following denotation for the metric describing hermetry form

H_ℓ with $\ell=1,...,12$

With

$$g_{ik}(H_\ell)=:\sum_{\mu,\nu\in H_\ell} g_{ik}^{(\mu\nu)}$$

The expression

$g_{ik}(H_\ell)$

interpreted as different physical interaction potentials caused by hermetry form

H_ℓ,

These extend or add on to GR.

We get two fields, the gravitational field, as described by gravitons, and a a repulsive interaction,
Described by

H_{10}

.

Which is

$$g_{ik}(H_{12})=(55)+(56)+(65)+(66), \quad g_{ik}(H_{10})=(77)+(78)+(87)+(88).$$

This combined equation set yields the regular graviton and a second repulsive carrier. It is my conjecture that this second repulsive force is carried by gravitinos that under certain conditions can manage to persists long enough to counter gravity. These odd gratitinos are produced in high energy regions like inside the Sun via selectrons produced via interaction of certain KK series Neutrinos, and that as the selectrons decay they produce the gravitinos.

The spaces corresponding to the two hermetry forms having anti-symmetric properties are identified as

S^2 and I^2.

We introduce

$$(\mu\nu) := g_{ik}^{(\mu\nu)}.$$

The gravitational field, as described by gravitons, is given by hermetry form

$$H_{12},$$

and the vacuum field by

$$H_{10}$$

as

$$g_{ik}(H_{12}) = (55)+(56)+(65)+(66), \quad g_{ik}(H_{10}) = (77)+(78)+(87)+(88).$$

A third metric, $S^2 \times I^2$, establishes an attractive and a repulsive interaction, This shows us there exists two types of particles, the graviton and by our other examination, the Gravitino. Their respective coupling constants are denoted by

$$G_{gp}^{-} \quad \text{and} \quad G_{gp}^{+}$$

yielding the metrics

$$g_{ik}(H_{11}^{-}) = (55)+(56)+(65)+(66)+ (57)+(67)+(58)+(68),$$

$$g_{ik}(H_{11}^{+}) = (77)+(78)+(87)+(88)+ (75)+(76)+(85)+(86).$$

This shows there exist three physical interactions acting on material particles, namely, gravitation, the vacuum field, and the gravitino field that acts to modify the Israel boundary condition. H11 is the only hermetry form that is identically 0 that is

$$g_{ik}(H_{11}) = g_{ik}(S^2 \times I^2) = 0.$$

the gravitational constant G is comprised of the three individual coupling strengths of these

interactions,

$$G = G_g + G_{gp}^{-} + G_q = 6.6736918 \times 10^{-11}$$

where

$$G_{gp}^{-} \approx 1/67^2 G_g \text{ and } G_q \approx 4 \times 10^{-18} G_g .$$

A comparison show that the photon and the other two are related

$$g_{ik}^{(ph)} := g_{ik}(H_5) = \sum_{\mu,\nu=4}^{8} g_{ik}^{(\mu\nu)} \quad \text{and} \quad g_{ik}^{(gp)} := g_{ik}(H_{11}) = \sum_{\alpha,\beta=5}^{8} g_{ik}^{(\alpha\beta)} = 0.$$

The metric of the photon is

$$g_{ik}^{(ph)} = g_{ik}^{(gp)} + g_{ik}^{(44)} + \sum_{\alpha,\beta=5}^{8} \left(g_{ik}^{(\alpha 4)} + g_{ik}^{(4\beta)} \right).$$

For real charged particles in an accelerator the additional tensor potential does not exist. repulsive gravitinos and gravitons can be converted into changes in the Israel boundary condition. One can increase the tension and one can decrease the tension.

Now taking a stationary superconducting magnetic coil with a rotating torus like a flywheel of some 100 kg or more, there should be a combined force generated in the rotating torus. From the Lorentz force,

$$\boldsymbol{F} = q\,\boldsymbol{E} + q\,\boldsymbol{v}^{\boldsymbol{T}} \times \boldsymbol{B},$$

where

$$\boldsymbol{v}^{T}$$

denotes the velocity of the rotating torus, there follows the existence of a scalar electric potential denoted

$$\phi$$

and a vector potential

$$\boldsymbol{A}$$

,

with components

$$A_i = \mu_0 Q v_i / R$$

where Qv_i gives us the total current in the magnetic coil and $\mathrm{i}=1,2,3.$ the metric tensor for the photon comprises an electric potential, a vector potential, and a tensor potential, representing a new force applying the geometrization principle of Einstein to this same situation. The complete electromagnetic interaction is therefore given by a 4-dimensional tensor potential

$$(\phi,\ A_i,\ A_{ik}) \text{ with } i,k = 1,2,3.$$

We choice the velocities within our field generator so that

$$v_i\,, v_i^T$$

in combination with the total charge Q in the current loop or magnetic coil so that $r_N < \lambda_C\,,$

There is a location rN for which the shielded electric and magnetic potentials cancel, namely for

$$r_N = \frac{Z\,e}{Q}\,R\,\frac{c}{v_i}\,\frac{c}{v_i^T}$$

When

$$\Delta e = Ae$$

where the value of A is derived from vacuum polarization, and a value of r_N smaller than the

Compton wavelength of the electron we find

$$h_{44}^{(ph)} = \frac{1}{4\pi\epsilon_0}\frac{1}{m_e c^2}\frac{eQ}{R}\ \ \frac{v_i}{c}\frac{v_i^T}{c}\left(A - \frac{v_k}{c}\frac{v_k^T}{c}\right).$$

If we now require A takes on a value Ã that is

$$\tilde{A} = \frac{v_k}{c}\frac{v_k^T}{c},$$

where the value of Ã depends on the velocities of the charges in the coil and the rotating torus.

This conversion takes place at a larger value of r, when

$$h_{44}^{(ph)} \approx 0$$

Is obtained. Adding in

$$w_{ph}(r) - w_{ph} = Nw_{gp}$$
$$w_{ph}(r) - w_{ph} = Aw_{ph}.$$

We find the shielding potential

$$Nw_{gp} = Aw_{ph}.$$

With the following three conditions

$$\tilde{A} = \frac{v_k}{c}\frac{v_k^T}{c}$$

$$r_N < \lambda_C = \frac{h}{m_e c}$$

$$r_N = \frac{Z e}{Q} R \frac{c}{v_i}\frac{c}{v_i^T}$$

The two particle pairs can be generated when a threshold of $\tilde{A} \approx 10^{-11}$ is meet. This converted

field takes the metric

$$h_{44}^{(gp)\mp} = \mp\left(\frac{N w_{gp}}{w_{ph}}\right)\left(\frac{N' w_{gp}}{w_{ph}}\right)\frac{1}{4\pi\epsilon_0}\frac{1}{m_e c^2}\frac{eQ}{R}\ \frac{v_i}{c}\frac{v_i^T}{c}.$$

The equation governing the repulsive Israel modifying part of our field is

$$\boldsymbol{F}_{\boldsymbol{gp}} = -\Lambda_p e \mu_0 \boldsymbol{v}^{\boldsymbol{T}} \times \boldsymbol{H},$$

yielding

$$\Lambda_p = \frac{32}{3}\left(\frac{N w_{gpe}}{w_{ph}}\right)^2 \left(N w_{gpa}\right)^4 \left(\frac{\hbar}{m_p c}\right)^2 \frac{d}{d_0^3} Z.$$

α_{gp} needs replaced with $N^2\alpha_{gp}$. Λ_p which is non-linear.

n	$N\, w_{gpe}$	$\mu_0 \boldsymbol{H}$ (T)	$\boldsymbol{F}_{gp}$ (N)
10^4	2.6×10^{-14}	2.0	7.14×10^{-43}
10^5	1.1×10^{-5}	6.3	3×10^{1}
10^6	1.5×10^{-4}	20.0	4.5×10^{7}
10^6	2.5×10^{-4}	50.0	1.45×10^{9}

The right most column shows the total gravitophoton force in Newton that would act on the rotating ring. The force results from the absorption of attractive gravitophotons by protons. The number of turns of the magnetic coil is denoted by n, the magnetic induction is given in Tesla, and the current through the coil is 100 A, except for the last row where 250 A were used. The mass of the rotating torus is 100 kg, its thickness, d (diameter) 0.05 m, and its circumferential speed is 103 m/s. The wire cross section is 1 mm2. For instance, if a larger spacecraft of 10^5 kg with a rotating ring of 10^3 kg needs to have a constant acceleration of 1g, a magnetic induction $\mu_0 \boldsymbol{H}$ of some 13 T is needed together with a current density of $100\ A/mm^2$; and a coil 4×10^5 turns for a value of $N\, w_{gpe}=4.4\times10^{-5}$.

The transition into hyperspace space modified C leads to an increase in speed by a factor n, compared to our space-time. Because of Israel Junction condition modification, Φ is reduced.

We denote this new space as $\mathbb{R}^4(n)$ with $n\in\mathbb{N}$. For $n=1,\ v(1):=v$ And $\mathbb{R}^4(1):=\mathbb{R}^4$. For

$$G(n)=G/n,\ M(n)=nM,\ \text{and}\ c(n)=nc,$$

the spacecraft would transition into

$$n^{\text{th}}\text{-parallel space}\ \mathbb{R}^4(n).$$

For hyperspace $\mathbb{R}^4(n)$, we get a scaling transformation of

$$x_i(n)=\frac{1}{n^2}x(1), i=1,2,3\,; t(n)=\frac{1}{n^3}t(1)$$

$$v(n)=n\,v(1); c(n)=n\,c(1);\;\; G(n)=\frac{1}{n}G\,; \hbar(n)=\hbar\,; n\in\mathbb{N}.$$

The value of n is obtained from

$$n=\frac{g^{+}_{gp}}{g_g}\frac{G_{gp}}{G}.$$

This relates the field strength of the modifying field g^{+}_{gp}, to the gravitational field g_g, produced by the spacecraft itself, Since n is an integer, it requires a threshold value for g^{+}_{gp}.

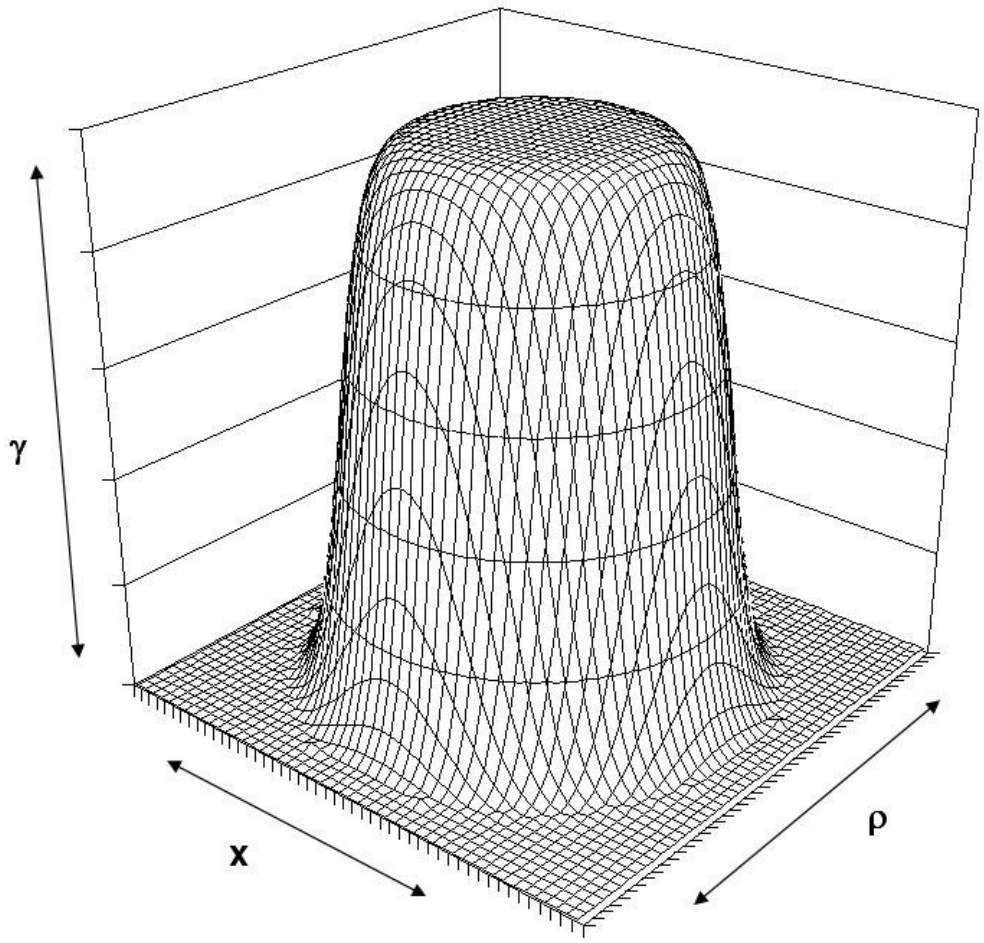
The above modified metric for GR was first proposed by Walter Dröscher, and Jochem Häuser from work developed by the late B. Heim (1977). See:

http://www.1000planets.com/papers/hqtforspacepropphysicsaip2005.pdf for

their treatment. However, as I have attempted to show this same general idea can be derived from normal GR and Brane theory on hyperspace drive as proposed by Fernando Loup and from cosmic modeling of how our Sun seems to perform local brane lensing itself through the decay of exotic Neutrinos(See author note 3). The biggest reason I see some validity in Helm's idea is it is not only similar to an idea proposed by Doctor Forward, but it also could explain some of the odd effects noted with gyros in general. I suspect it is not anti-graviphotons that cause the effect, but, rather, Gravitinos.

I would also point out that in The Alcubierre Warp Drive in Higher Dimensional Spacetime by H. G. White and E. W. Davis paper they mention a torus em field being able to by the math produce a similar effect. This leads me to the idea that the field shape is important. Their lab experiment can be scaled up for encompassing a much larger area. The charge that gravitino's carry may in general have a field we can reproduce along other avenues.

They, via a conical metric derive a boost in velocity a bit different. (vini): vs≈γ•vini. This acts as a scalar multiplier acting on an initial velocity. In my own I relied upon a quantum expectation value derived multiplier for initial velocity. However, the multiplier effect is the same and one could plug it into their formula.



Conical View of Warp Field: Using the potential ϕ one can then extract the field equation for the spacetime expansion boost, (White, 2003):

The difference is the above methods allows one to create the same field via EM methods. However, the value for n needs reworked in light of known quantum theory in the first which will make some differences in the whole equation it is derived from to begin with. The second deals with a combination of the original AWD metric and the Higher dimensional models. My own is founded more upon quantum theory modeling of higher dimensional spacetimes and their relation to the original AWD metric. This leads me to seeing the conical warp graph should have a more rounded top with the flat and negative regions inside the sphere. As such I would suggest redoing it with a spherical metric.

I do note that Harold White, part of our Stardrive group, did mention and support the idea we had about inflation producing the same negative energy effects under the original AWD metric which several of us had suspected as the solution to the exotic energy problem even if we could not come up with a exact way to duplicate nature there like they did. In all honesty, I think his conical graph is the

result of a direct translation of the normal AWD metric into that format.

The warp field is in general a spherical field with the topology of a doughnut. Its, as they pointed out rather Omni directional and has no actual direction unless acted upon. In that aspect, unless moved by the craft that generates the field it is a static warp bubble. They are also correct to a point that as the craft is displaced into higher dimensional space-time its interaction via em means with the outside world diminishes. But as I pointed out there is interaction via the p-brane mechanism. In general it was the displacement aspect that allowed me to derive the name of this type of drive.

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16.) Pioneer effect

Author's notes:

1.) Hawking and Collins, The rotation and distortion of the universe, Mon. Nat. Roy. Astronomy Society: 162:307-20 (1973) show evidence that any rotation of cosmos is less than 2 x 10^-14 arsec/century. The same would apply to the third brane given Mach's principle. This tends to rule out any model of that third brane that rotates leaving the one I utilized.

Basically, one assumes $g \rightarrow \eta$ at infinity or the boundary of the third brane. η is nondynamic and independent of the energy of the universe. In that aspect it acts as a kind of prior geometry that forces our brane to behave as a flat Friedmann model where k=0 even if its starting energy density is such that it should act as an open Friedmann model with K=-1. Both would expand with no finial singularity, but the rate of expansion would be different. When you add in the concept that the planck scale, as the universe expands modifies itself the overall mass/energy density the expansion rate itself becomes a variable. This being the case it is possible for the universe to eventually act like a closed Friedmann model with k=1 and collapse at least to a point making the one exception to η as nondynamic and independent of the energy of the universe.

The Ricci scalar curvature, R is derived from

$6k/R^2(t)$

With basically our universe starting at some point in the past we term the BB with a value of k<0 evolved to a point where K=0 in a very rapid time, held that value for some time and started eventually as its volume grew to slowly swing towards a k>0 situation. It has maintained a nearly constant homogeneity even in spite of its inflation stage and its slow roll in the value of k over time with an anisotropy of around 6×10^{-6} that is based upon COBE data over integration angles of 7

degrees or more. These variances from pure isotropic stem from around 300000 years after the BB event and suggest Dark Mater components which the k slow roll could well explain.

Stemming from that decoupling era they only began to manifest themselves after a constant bath of Neutrino's in the early stage through cooling and clumping decoupled and allowed slight differences in the Planck scale to arise. Those differences have grown with time in their influence and more recently show up enough for us to measure them. Acting like Cold Dark Matter they helped seed galaxy formation and later grouping of galaxies together, account for some of the odd voids and attractor formations, and eventually may well provide the power to stop expansion and bring about collapse.

The reason I mention it would collapse to a point is that since expansion makes it possible for the Planck scale to expand in regions the reverse should in theory shrink the Planck scale over time. It is possible the universe simply cycles between collapse and expansion. However, given collapse cannot be seen as reaching a true singularity this could imply a build up of heavy elements from each prior cycle which over many cycles leads to a state with less and less material to form stars and eventually you end up with a model where K=-1 holds or blackholes form a majority of large mass objects and everything else is either rocky objects and dark matter regions. It would be anyone's guess then the effect the outer brane has then on overall history.

2.) The red shifts and blue shifts denote path length changes. Basically, even though at macro scales when we observe the universe it appears rather uniform except for local aspects, on smaller scales the topology varies a lot. Picture if you wish a map laid out on a slightly stretched rubber sheet. Now relax and increase the stretching at different points and you get a flat model of what happens in 3D in our universe. We measure the distance to the Pioneer Probe via radio signals. The path back to earth is different than we'd expect it to be at the individual photon scale the signal has to travel. Even though the signal still travels at C, the time of arrival becomes different and without accounting for the path change we'd assume the craft had slowed down for some unknown reason.

To compute via known figures from the Pioneer probe we simply take

$1/1\mathrm{Sqrt}1-2GM/c^2R$

In our case from probe data we know the distance, the value of c and the value of G along with the redshift. We simply have to solve for M to find what the mass of the enlarged Planck regions equals. But actually we need not even go that far because this is exactly a similar case to what Fernando proposed an experiment on the ISS look for in one of his published articles. We already know, as does NASA by it's own admittance, that regular GR of the 4D type cannot account for this. But brane lensing can as Fernando has pointed out and that brane lensing

is proof we live in a universe of Extra Dimensions that are hidden provided on more than one occasion by more than one probe in different directions.

I do not know, though Fernando could figure it out, if his predictions inside the solar system close enough to the Sun and its gravitino effect would be large enough to measure. I think the modification of the Gravitino's would make it to weak to measure(See Author note 6). But, I do know we already have evidence of brane lensing further out from the Sun that can and has been measured. Simply put Fernando was right to jump off on the Hyperspace adventure and I for one can admit to being wrong.

If anyone out there wants something like Warp Drive to be real you will not find it no matter how you alter the metrics in our space-time unless you actually accept the idea of a real physical sub-space. Normal AWD can only be made to work at Sub-light velocities in our space-time. Sure we can stipulate plenty of cases for how to create exotic energy regions, some even large. But remember the field must be in motion superluminal for it to work at real Warp.

To answer all the objections you need a space-time with different properties to begin with. That different space-time is offered by the Universe if we only bother to notice it.

When I had that live experiment with two different size cups of water on a vibrating table it was the difference in wave amplitude that tipped me off to this effect. One could picture the waves as the vibrations of the ZPF itself. As the universe expands, the amplitudes of the waves increase. Each peak is actually part of the path across space-time that all particles must cross. The higher amplitude peaks represent a longer path. Globally, on large scales we hardly notice this effect. Very local its even harder to detect it. But signals we send out over a path we know the macro scale of and the velocity of a given probe tell us another story about the topology. Even globally, given a predicted known like expansion rate they can again signal that the topology is not as smooth as we like to think it is.

Yes, you can get this same effect via PV modeling which instead of distance has the velocity of light vary. It works both ways and in fact since PV is based upon a flat space-time that varies from flat you still end up with path differences again.

Put back into Brane terminology its brane lensing you find evidence of all around if you know where to look. We just happen to live on the third rock from the Sun in the middle of a brane lensed region that is itself part of an even larger grouping of brane lensed regions.

I would suggest that, and I can stand corrected on the total number of probes that displayed this effect, but multiple probes in different directions all displaying

the same slow down effect would equal in my book to experimental evidence supporting Fernando's variable Planck scale(See author note 6). Sure, we could go ahead and launch say a dozen more probes. But how many times do we need to get the same answer before we accept the conclusion? Sure the Establishment wants some evidence out of a lab somewhere. But the evidence has been smacking them in the face all along. They just do not like what the evidence shows them. To me considering Einstein and others said it was going to be this way their refusal to see the truth lacks logic. However, I am reminded of Spock being asked whoever said the human race was logical.

3.) A 5-dimensional fermion Ψ can be decomposed into two Weyl fermions, Ψl and Ψr. The action of the model is given by

$$S = \int d^4x dy \; i\overline{\Psi}^{\alpha}\Gamma_A \partial^A \Psi^{\alpha} \; + \; \int d^4x \left(i\,\overline{\nu}_L^{\alpha}\gamma_\mu \partial^\mu \nu_L^{\alpha} \; + \; \lambda_{\alpha\beta}\, H\, \overline{\nu}_L^{\alpha}\psi_R^{\beta}(x,0) \; + \; \mathrm{h.c.} \right),$$

Where $\Gamma_A, A = 0, \ldots, 4$ are the five dimensional Dirac Matrices. We then introduce dimensionlessYukawa couplings via

$$h_{\alpha\beta} = \lambda_{\alpha\beta}\, M_F^{\delta/2}.$$

We will assume that $h_{\alpha\beta}$ are of the order one.

We can then decompose the five dimensional fermions int $\psi_{L,R}$ into a tower of KK states,

$$\psi_{L,R}^{(n)},\; n = -\infty \ldots \infty.$$

We then find that a certain linear combination of KK states are not coupled to left hand states. The ones that do are

$$\begin{aligned}
\nu_R^{\alpha(0)} &\equiv \psi_R^{\alpha(0)}; \\
\nu_R^{\alpha(n)} &= \frac{1}{\sqrt{2}}\left(\psi_R^{\alpha(n)} + \psi_R^{\alpha(-n)}\right),\; n = 1 \ldots \infty; \\
\nu_L^{\alpha(n)} &= \frac{1}{\sqrt{2}}\left(\psi_L^{\alpha(n)} + \psi_L^{\alpha(-n)}\right),\; n = 1 \ldots \infty.
\end{aligned}$$

It is these other KK states that since they do not couple may be of primary import here. However, the lack of observational evidence supporting a major contribution to neutrino evolution tends to suggest the above forms could also play a factor in local and global brane lensing at least partially. In this context their resulting mass terms are

$$m^D_{\alpha\beta}\left(\overline{\nu}^{\alpha(0)}_R \nu^{\beta}_L + \sqrt{2}\sum_{n=1}^{\infty}\overline{\nu}^{\alpha(n)}_R \nu^{\beta}_L\right) + \sum_{n=1}^{\infty}\frac{n}{R}\overline{\nu}^{\alpha(n)}_R \nu^{\alpha(n)}_L + \text{h.c.}$$

And the Dirac Mass Matrix is

$$m^D_{\alpha\beta} = h_{\alpha\beta}(vM_F/\overline{M}_{\rm Pl}),$$

With

$$v \equiv \langle H\rangle = 246 \text{ GeV},$$

we would use

$$(M^{\delta}_F V_{\delta})^{1/2} = \overline{M}_{\rm Pl}/M_F$$

.

If

$$M_F/\overline{M}_{\rm Pl} \ll 1,$$

then we find the scale is far below that of the electro-weak symmetry breaking scale.

If

$$M_F \sim 100 \text{ TeV},$$

And

$$0.1 \lesssim h_{\alpha\beta} \lesssim 1,$$

These masses would fit well with those required of solar system observation data at present.

Now the probability for say ν_α to oscillate into sterile neutrinos is given by

$$P_{\alpha s}(L) = \sum_{i=1}^{3} \sum_{k=1}^{\infty} |B_{\alpha i(k)}|^2,$$

Where

$$B_{\alpha i(k)} = l^{\alpha i} \sum_{n=0}^{\infty} L_i^{0n} L_i^{kn} \exp\left(i \frac{\lambda_i^{(n)2} L}{2E_\nu R^2} \right).$$

And

$$\sum_{\beta=1}^{3} P_{\alpha\beta}(L) + P_{\alpha s}(L) = 1.$$

The current observation evidence shows the neutrino flux far below SM predictions and best alternative is some form of oscillation is going on. The actual data shows only a fraction get converted to sterile forms. It is this fraction I find most suspect considering the C velocity difference internal to external system is 8 meters per second which in itself suggests something of a fractural nature.

Large fluxes of anti-electron neutrinos are produced at nuclear power reactors. If the flux can be either predicted accurately or measured by a nearby detector, measuring the ν_e flux at a certain distance L from the reactor gives the electron neutrino survival probability as

$$P_{ee}(L).$$

The results of current experiments are consistent with no oscillation hypothesis, that is,

$$P_{ee}(L) \simeq 1.$$

The electron neutrino survival probability is determined by

$$P_{ee}(L) = \left| \sum_{i=1}^{3} |l^{ei}|^2 A_i(L) \right|^2 ,$$

For

$$l^{e3} \simeq 0$$

and the values chosen for the

$$m_i^D, \;\; P_{ee}(L) \approx 1 - P_{es}(L).$$

The implication of test data so far is

$$P_{ee}(L) > 0.942 \quad [P_{es} < 0.058]$$

Thus, I see our focus should be on those neutrino's that should contribute and do not. That leads us back to the following states.

$$\begin{aligned}
\nu_R^{\alpha(0)} &\equiv \psi_R^{\alpha(0)}; \\
\nu_R^{\alpha(n)} &= \frac{1}{\sqrt{2}} (\psi_R^{\alpha(n)} + \psi_R^{\alpha(-n)}), \;\; n = 1 \ldots \infty; \\
\nu_L^{\alpha(n)} &= \frac{1}{\sqrt{2}} (\psi_L^{\alpha(n)} + \psi_L^{\alpha(-n)}), \;\; n = 1 \ldots \infty.
\end{aligned}$$

The total flux of neutrinos from the sun ought to be some 200 000 000 000 000 000 000 000 000 000 000 000 per second, corresponding to a flux of about 6.5×10^{10} neutrinos per square centimeter per second hitting the earth. The flux of neutrinos observed in Super-Kamiokande is less than 40% of that predicted from standard solar models (Fukuda et al 1998c). No significant variations with either day/night or season have been observed. The energy spectrum of the neutrinos is not significantly different from expectations, though there is a hint of a surplus (or smaller deficit, rather) at the highest energies (Fukuda et al 1998e; Normile 1998a).

Neutrinos of different mass will behave in the same way as K0 mesons. The SNO has confirmed that the other 60% do indeed exist as other flavors of neutrinos. This has given further weight to the KK based modeling.

A small mass difference and a high energy translates to a very long oscillation distance. With the other evidence of little or no oscillations and the fact that the KK series does exist at least in part there is further evidence for this theory and its long range effect out to the bounds of our Solar system would be well supported by probe data in the form of a gravitational redshift instead of an actual real slowdown.

So my suggestion is start with a test field along the lines Heim's work suggested. If it works then we only need to scale the field up in size and power to find a way to enlarge the Planck scale to say 200 meters to encompass a decent size potential test craft. I think anyone here can take the Heim based equations and work that one out to get a figure on the field energy needed. His equations as they stand would be good enough for a simple test in a lab situation. In the mean time if anyone would like to fully work out Fernando's equations into something on a larger scale to see how close they match it would provide a good baseline by which to measure Heim's idea and may suggest other avenues we could explore .

4.) Before RS models, the mechanism to solve the Hierarchy problem in higher dimensions relied on the formula

$M^2{}_{PL} = M^{2+2} V^n$

Where n is the amount of dimensions and M is the 4 plus n planck scale mass and V is the volume.

One interesting factor is:

$E_{\mu\nu} = C^{\alpha}{}_{\beta\rho\sigma} n_{\alpha} n^{\rho} q^{\beta}{}_{\mu} q^{\sigma}{}_{\nu},$

in the decomposition of the Riemann tensor. A dimensional analysis has shown that in the low energy limit, i.e. when the brane's tension is much larger then the characteristic energy scale of the matter, it simplifies to Einstein's gravitational equation. It is zero for an AdS bulk but not zero otherwise. If we respect isotropy and homogeneity it's general metric form is

diag (¡½E; PE; PE; PE) :,

and being traceless implies

PE =1/3ρ_e .

The cosmological constant (CC) problem consists in the huge difference between the value of the vacuum energy density predicted by particle physics, Pvac » (TeV)^4 versus 10^-3 ev^4 as the observed value and why it only recently has started to dominate via accelerated expansion. However, with Fernando's PV based model there is no actual accelerated expansion and the vacuum energy fits more that of observation. This does not change the fact that over time as the universe expands even though true Pvac remains normal, the Dark energy component should alter the overall mass/energy density of the cosmos and cause collapse irrespective of any possible change in Pvac unless it fulfills the ideal cosmological constant and balances against it to keep K=0 for a flat space-time manifold which would be the old problem of the pencil balanced on end revisited. Also, under GR vacuum pressure actually adds to the total mass/energy density and itself contributes to collapse.

Either way, the 4D space-time is no longer a static Minkowski space-time, but, rather, a time-dependent space-time. The mechanism is that the branes' tension changes from an initial value to a different final value as a form of self tuning. The branes' vacuum energy does not curve the 4D space-time as it would in 4D general relativity. The outer third brane simply forces our manifold towards a Minkowski condition and the two other branes (us and hyperspace) fine tune the vacuum energy state as a trapped system.

The bulk space-time is a static black brane or black hole solution depending upon viewpoint. From the static bulk or third brane point of view, the two branes are moving inside this static bulk and the negative tension brane should first hit the singularity unless something causes both to recollapse. That something may very well be the extra mass/energy density of enlarged planck scales. In this case, the bulk remains static and not subject to Hawking radiation back into the outer false vacuum while the other two branes for a time simply cycle between collapse and expansion.

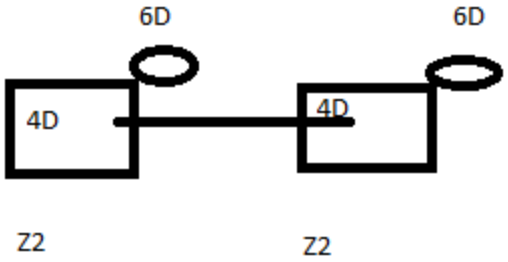
The result is a very fine tuning system that acts as a compact closed universe with time-dependent properties and a value of k that is itself time-dependent. This means that topology wise our universe is far more complicated than any simple model could account for. It may show isotropy and homogeneity on vast scales, but, over time this too is subject to change and regions may themselves seem to display odd behavior which is exactly what CMB studies have shown to date as well as visual observation. Regions like the unknown Great Attractor may simply be some of those odd behaviors manifesting themselves instead of stranger objects like cosmic strings.

Newton's constant is different in both branes also. It varies based upon brane tension, The

$e^{+-L/l}$

part of the formula where (+–) refers to the sign of the branes' tension. Horava and Witten showed that the eleven-dimensional limit of M-theory Compactifed can be identifed with the strongly coupled 10D E8XE8 heterotic string theory with two orbifold fixed planes (branes). Again a similar state to RS models and our own here. When compactified the universe appears as a 5D space-time with two boundary branes.

By the addition of the third Brane, derived from a bit of logic about our space-time having arose out of a false vacuum state probably still existing, that a Cauchy surface should arise under the Positive Energy requirement, and that the planck world models the universe at large we also achieve not only unification of the fundamental forces, we also explain the flatness problem and solve the collision of the branes problem avoiding the Ekpyrotic universe situation in at least one possible outcome.



Both branes exibit symmetry and have matter

What this all boils down to is the Initial-Value equation where all the specifications of the equation of state for the universe can be worked out mathematically. If you know the initial value data you can work out the history of the universe at any slice of that space-time's history both locally and globally. Only under such an equation can we truly begin to work out a complete solution that unifies gravity along with the other forces.

While there are aspects of this we still do not have full solutions to, there is a strong hint at, at least the current equation of state for our universe. If we take the value of how much the universe seems to have accelerated it's expansion, refigure this as actually the result of a blue shift, since we already know approximately the mass/energy density of matter and photons we can compute a good sound result for the total amount of energy to arrive at a more accurate value of K. From K we can then get a better picture of the current evolutionary state of the cosmos and its general topology.

Armed with this and the knowledge that this dark matter/energy addition to the overall value of K will increase with time I can make the prediction that the universe will eventually collapse. It is the outcome of that collapse that is the most questioned issue.

As the universe collapses the BH's that are present at that time period will themselves collapse along with the rest of the cosmos towards a huge singularity. However, if the outer brane or boundary still remains static what is going to be left behind is a pure vacuum state devoid of matter/energy. This pure vacuum state will have a huge negative pressure against the collapsed super BH that was the original cosmos.

Now if you have ever placed a cup or bowl of water in a microwave and watched it boil away in its eventual super excited state that is very much the result at the event horizon of our super BH. Speeded up evaporation is the result. Only the Hawking radiation is boiling off into that pure vacuum state. The result is the BB all over again and the rebirth of the cosmos from the ashes, so to speak.

If the outer negative pressure cannot over come the super BH then there is still a way things will restart. Only this time, since a lot of the matter and BH's that formed this new cosmic egg rotate the cosmos that is born inside will not have the properties of our current one. It will be a Bianchi type IX with rotation which may like the older Godel model have consistent CTC's or may not. It's outer brane will be more akin to a Kerr-Newmann or Reissner-Nordstrom metric with the internal state more along a Kerr solution.

Part of what a lot of us including Steven Hawking have said is our universe is not the Universe of Star Trek. Their Universe includes Time Travel to the past and even a Temporal Cold War. It is interesting that given a rotating Universe's possibility of CTC's that that New Universe could well be an ST like universe compete with something like the original AWD idea being possible as well as time travel both forward and backwards.

So I can now predict that the end state, of whatever the initial value equation, is one of the above two futures. We now have the middle and the end of that equation of state. We need now to compute what initial state value is needed to accomplish either end. The simplest means, given our lack of some of the data, is to find a best fit. The place to start is fold together the two propagators we already have under both possible futures given above to obtain a third. We have the finial and intermediate. We know that:

$$(\text{final}|\text{initial}) = \sum_{\text{All intermediate configurations}} (\text{final}|\text{intermediate})$$

That much maintains Feynmann's equality of histories formulation. What we are

doing is specifying the conformal Scalar, Vector, and Tensor and keeping fixed York time which is itself the rudder that steers the cosmos.

You might by now have noticed that I have ignored evolution of the outer or third brane. In reality it would evolve or, since it basically exists as a Cauchy horizon between our vacuum and the false vacuum state, as mass/energy density varies here it will itself vary to compensate. However its general character remains the same. It does not evolve into something else that functions different from a Schwarzschild sphere. In that respect it remains static. However, the fact it does change with time in at least one respect shows it too is governed by York time.

We then are left with a model for our universe that is closed in time, has the topology of a three-sphere S^3 or a two-sphere times a circle or more likely a connected summation of those two.

I might also add if we have a Space-time Geometry defined as:

$dS^2 = g_{\alpha\beta}dx^{\alpha}dx^{\beta}-\Phi^2dy^2$

$dS^2 = g_{\alpha\beta}dx^{\alpha}dx^{\beta}-[\phi(t,x)X(y)]^2dy^2$

M5 the 5D Mass is not zero and negative and we have matter in the 5D Extra Dimension according to one of the Ponce De Leon Options and the normal assumption of symmetry making also ${}^5R_{AB}$ the Ricci Tensor in 5D not null. If we have a rest-mass in 5D M5 this rest-mass will be seen in 4D as a rest-mass m0. Where

$M0=m5/1-sqrt1-\Phi^2(dy/ds)^2$

$Mo=m5/1-sqrt1-[\Phi(t,x)X(y)]^2(dy/ds)^2$

Keeping with the Basini-Capozziello-Ponce De Leon and Overduin-Wesson Formalisms reworked for negative hyperspace mass so that 4D rest-mass remains positive, but displays a different mass than its 5D counterpart. We now have Quantum Electrodynamics and Quantum Chromodynamics in 4D while in 5D both are the same which unites not only Gravity and EM, but also now QCD and QED are united inside of hyperspace. You end up with one real force in 5D displayed in 4D in multiple ways.

I would further challenge those into gravity research to search for the predicted graviphoton carriers of gravity waves in our space-time. I think their signal is detectable and this would go a long way to finding further experimental support of Fernando's model and in general Brane based quantum gravity and cosmology.

5.) Real Warp Figures Star Trek Warp Figures

200 MPS	42.941C	1 1C
300 MPS	144.02C	2 8C
400 MPS	343.531C	3 27C
500 MPS	670.96C	4 64C
600 MPS	1159C	5 125C
700 MPS	1841.1164C	6 216C
800 MPS	2748.255C	7 343C
1000 MPS	5367.68C	8 512C
.5C	4338461250C	not in ST figures

The short list is based upon a given thrust capable of the first figure in normal space-time with the second based upon its velocity^3. The ST part of graph is taken from Star trek books, etc. As you can see Warp 5 from ST is exceeded at the point we can exceed in normal space-time a velocity of 300 miles per second once a craft is in hyperspace. Warp seven is matched at 400 MPS thrust and from there on up real warp figures far exceed those of the science fiction show Star Trek. In fact the last figures puts several other Galaxies besides our own in reach. C^3 is in excess of 3.47^11 miles per second to give the ceiling on velocity which puts nearly the whole known universe within reach at anything under .9C.

While I mentioned the current velocity of Ion propulsion one must remember Ion rockets keep gaining velocity over time and eventually could reach the 100 miles per second mark themselves. It would simply take a long time to reach that figure making a voyage a lot longer. Put in perspective almost any propulsion method like Ion, Fission, fusion, and up to Matter/Anti-matter drives could be utilized inside of hyperspace. Regular reaction drives like traditional space exploration uses is just too limited to work for hyper drive except perhaps as thrusters for turning, etc.

6.) One area I have had to struggle a bit is on the gravitino field fall off in our system. Nasa has noted it as slowly measurable from around Jupiter on out.

The repulsive gravitational force Frep has maximum effect at distance $R \sim \delta,$ where it is

$$F_{\rm rep} \sim \frac{Gm^2}{\delta^2} \sim 10^3 \mu \eta^2$$

When the flat space estimation of δ still applies. The function f(r) grows linearly when

$$r < \delta$$

and exponentially approaches unity as soon as

$$r \geq \delta.$$

Setting

$$\delta = (\eta\sqrt{\lambda})^{-1}$$

at the solar core which I think fits well.

We find our force to be repulsive which fits Fernando's equations where enlargement takes positive values and similar to that encountered in treatments of global monopoles. It would fall off at

$$r^{-2},$$

so that the total energy is linearly divergent at large distance.

However, lacking exact data at present on where the 8 meter per second drop off occurs and using the orbit of Mars as a reference point while it linearly diverges, the fall off rate would appear to be more along a 1/r case which is the same for EM and Gravity. Given this, I think any local, to earth, in system measurement is doomed given how small the actual divergence would be once we take into effect local gravitino modification.

7.) You might have wanted to ask if fermions are confined to our brane as well as normal Bosons how does the two gravitational messengers manage to communicate. The answer is two fold.

If we take the action S for a real scalar field Φ coupled to a matter field Ψ in a five dimensional space-time is then

$$S = \int \left[\frac{1}{2} g^{AB} \left(\partial_A \Phi\right) \left(\partial_B \Phi\right) - V(\Phi) + \overline{\Psi} \left(i\Gamma^A \partial_A - \lambda \Phi \right) \Psi \right] \sqrt{g} d^5 x$$

If we then suppose that the Dirac field is coupled to the scalar field through a Yukawa coupling term

$$\lambda\overline{\Psi}\Phi\Psi$$

where λ is the coupling constant then another choice for the coupling term should not effect our outcome. The equation of motion for the scalar field can be easily derived

$$\Phi'' + \chi\eta^2\Phi - \chi\Phi^3 = 0$$

from which domain-wall solutions can then be derived.

If we shift from a single brane to a two-brane world, the solution can be expressed as a kink-antikink pair, each wall being localized respectively at

$$z = -d/2 \text{ and } z = +d/2.$$

The field solution is

$$\begin{aligned}\Phi(z) &= \Phi_-(z) + \Phi_+(z) + \Delta\Phi \\ &= \Phi(z + d/2) - \Phi(z - d/2) - \eta\end{aligned}$$

If we set

$$d \gg \xi \text{ i.e.}$$

Then the two branes remain independent..

We will find that the Dirac matrices are given by

$$\Gamma^\mu = \gamma^\mu \text{ and } \Gamma^4 = -i\gamma^5 = \gamma^0\gamma^1\gamma^2\gamma^3,$$

where

$$\gamma^\mu \text{ and } \gamma^5$$

are the usual Dirac matrices in the four-dimensional Minkowski space-time.

The Dirac equation is therefore:

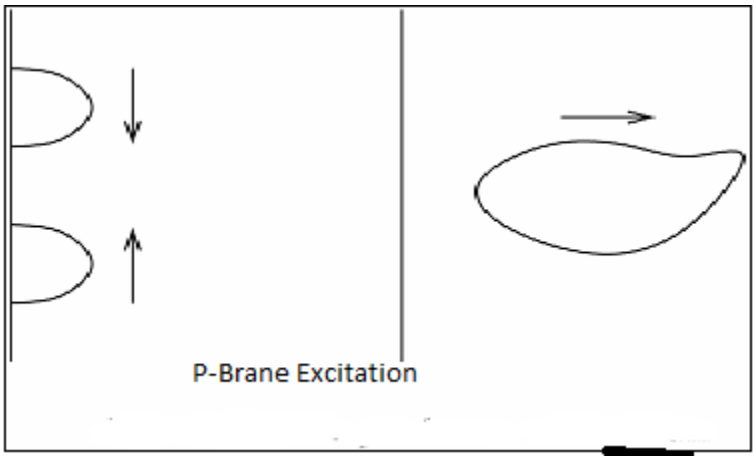
$$\left(i\gamma^{\mu}\partial_{\mu} + \gamma^{5}\partial_{z} - \lambda\Phi\right)\Psi = 0$$

We can then express the solution of Ψ as

$$\Psi(x,z) = f_L(z)\psi_L(x) + f_R(z)\psi_R(x)$$

What we find is Fermions are not always trapped on the brane and they can exchange across the domain wall. This explains in part how the field could be expanded and contracted to surround a craft. Also, I suspect that if the boundary is in flux any matter can cross or exist the system.

Gravitation communicates via P-brane excitations at the boundary. Basically, the incoming normal space-time graviophotons cross the brane boundary. They unite at the flat space transplankian boundary to for an instance form a spin 2 graviton, then separate traveling back into their respective space-time regions with the graviphoton reemerging via p-brane excitations.



Authors Final note: We set out long ago from a diverse set of paths to find a way to make something like Star Trek we had all grown up on as possible. Some of us had visions of either an invite to be part of some well known establishment group like the IOP or the AIP, or perhaps to be on that first adventure into a real unknown. Some of us may have even dared to think we could be part of First Contact. I personally got into this for aspects of the above, but, also I want to see mankind have a wide open future given my own children and Grandchildren now. I believe space exploration and eventually spreading out is part of the path to that future. So I have pushed forward on this at times within the group and

without. I never once sought an invite to anywhere. I have always simply wanted to challenge others and perhaps find a solution about the cosmos to answer some of my own questions. I am not a very religious sort of person now days, though I once was very much a believer. But along the way I have found a question related to religion that begs an answer. Since the Universe acts very much like a giant natural quantum computer who wrote the program it operates on. If I have ever seen anything akin to the handwriting of God on the wall, then that would be the one exception to Science being mostly agnostic since we cannot directly study God who by definition is outside of or supernatural. But I still do not have a complete answer to that question.

But for or against the idea of a Creator I have along the way learned a lot of new things about the Cosmos we all live in. I have also been privileged to see the determination and creative brainpower of man demonstrated over and over again in this group and even in other groups like our own. I will predict that in spite of all the evil and destructive aspects we find in the human race mankind's quest for knowledge will eventually be tempered with the wisdom to utilize that knowledge in far better ways.

My closing remarks to Fernando come from a quote he used from Star Wars: Padawan: Stay Away From The Dark Side And May The Force Be With You. Beyond that for everyone else, USE THE DAMN FORCE(NATURE) instead of you're sight. Remember, for VIGER to find an answer he first had to leap beyond logic. Logic is the beginning of truth, not the end. Metrics and even GR are logic, they provide a framework upon which to build. But what we can visually see even GR predicts through metrics is not all there is to this Universe.

For a person to accept God or even deny God takes a bit of a leap beyond the Logic of Science. Einstein took such a leap once in the name of Science when everyone around him believed Newton was right. Newton took a similar leap against the established belief of the Catholic Church in his Day. Great men of science have always leaped beyond the logic of tradition and found truth along the way. Do not strive to be a great man, just simply be a man. Along the way keep an open mind and be willing to jump a bit beyond the logic.

As Spock would say: LIVE LONG AND PROSPER

Your's: *Paul Hoiland*

ESAA