Origin 5: A Cosmic Casimir Effect

This series comprises four entries….. Consciousness, Love, Origin 1 and Origin 2– The Quest for Proof. I will expand the series as needed and as more research is done and evidence comes in. Im confident of my position on this, as both science and spirituality seem to be on my side as of now. Stay Tuned!

I find that in our attempts to reduce everything to fundamental parts we lose the forest for the trees, so to type. Whether we're talking about the mind-body interaction of a single person or the whole structure of the cosmos, we're learning that, upon closer examination, the forces at work which create the tapestry we see as reality have such abstract qualities that reduction only reveals a single facet of their properties– that to understand them more fully, we have to look at the big picture and see how everything is connected to each other and how interactions can occur between particles and people that are a vast distance apart. We learn that space is nonlocal and that time is just an invention of perception. And in so doing, not only do we learn a lot about the universe, we learn a lot about ourselves.

I've recently been working with a self created model where ZPE concentrations throughout the multiverse are determined by whether a given universe is expanding or contracting. As a universe expands, it gains ZPE ("dark energy"), thus maintaining a similar ZPE density, even though it is expanding (thus solving a major "unsolved" problem in physics)…. and a universe which is contracting is actually losing ZPE to the bulk because as a universe ages, more massive stars turn into black holes and suck ZPE out of the universe at a faster rate than the rate at which it is being pulled in through worm holes (as it starts to lose its dark energy, gaining entropy and "coming back empty" but still maintaining a similar ZPE density since its volume is decreasing) which then is gained by expanding universes through a process that is analogous to "osmosis" through black hole worm hole conduits on various scales (but especially through quantum foam as the Casimir Effect.) After all the dark energy is gone, the black holes slowly evaporate, but not before their gravitation sets the universe on the path to collapse and lays the groundwork for the next big bang cycle. Averaging out the various universes in the multiverse that are in different stages of expansion or collapse creates a consistent cosmological constant throughout the multiverse. Thus the density fluctuations of ZPE throughout the multiverse (in addition to black hole worm hole conduits) not only determine the rate and direction of net ZPE transfer between different universes, they also determine which universes expand and which contract through a mutual feedback process and maintain an overall balance in the multiverse, thus nothing is created or destroyed and Conservation Laws are maintained.

I will probably start writing another paper on this when I've worked a bit more with this model.

Physics hates singularities and one of the problems with Relativity is the fact that it creates singularities, not only inside black holes, but also at the level of the big bang. As a matter of fact, the mere fact that black holes have the "singularity" in common with the

big bang leads one to the natural conclusion that the big bang actually occurred inside a black hole– and thus our universe itself is inside a black hole inside, perhaps, an even larger universe. I wrote about this a while back, and towards the end of April, I saw a paper published about this very possibility, by a physicist from Indiana University. Any theory of everything will have to iron out the singularity issue as well as combining quantum physics, gravity and relativity under one umbrella.

One of the leading frameworks for a theory of everything is loop quantum gravity, in which the basic formula for density (mass/volume) breaks down under 10 Planck lengths and thus avoids the singularity issue. As a matter of fact, as you get closer and closer to infinitesimal volume– density goes down to near zero! Why does this happen in LQG and not in Relativity? Because one of the mistakes Einstein made was looking at space-time as a continuum, when as a matter of fact, it's made of discrete particles at the Planck scale– in other words, as you get closer and closer to Planck scale size, the "holes" between the particles of space-time get larger and larger in proportion and thus the total density of the psuedo-singularity goes down. Eventually, nothing is left but the hole– thus density goes down to zero!

All of this is interconnected and this mere issue of density going down to zero is what can make our universe exist inside a black hole. Not only that, it's what could make black hole – worm hole travel possible, since journeying through a black hole with near zero density in the center (as opposed to infinite density and unbearable gravity) is really impossible. But there's a lot more.

The above is one of the reasons why there is a great disparity between quantum mechanics and relativity. But there are others. One of them is that space-time itself disappears at the quantum level. Locality itself breaks down! See my article in the science forum about quantum teleportation and the new record distance of 10 miles? I think that's just the tip of the ice berg. At the quantum level, there is no "speed of light barrier" and no concept of "here" and "there"– as every part of the universe is adjacent to every other part (since the origin of the universe itself was as a single particle) and this is why quantum teleportation, superposition and tunneling can occur. Quantum effects (according to some articles I've read) travel as much as 10,000x times the speed of light– and for this to happen, not only must space itself break down at that level, but time must also break down. This makes sense when one considers the fact that space and time are just two sides of the same coin and to go faster than light, you have to break down the concept of time as well as space. Brian Greene makes just this sort of proposal when he talks about how space-time is just an artifact of some more fundamental effect of the quantum level and by extension, so is relativity. This occurs on the sub-Planck level where space is replaced with hyperspace and time with imaginary time (explained further below) and these are the fundamental dimensions of the bulk, the background fabric of the omniverse and the template upon which space-time (and all higher dimensions) are built. It's also the source of the great ultimate duality of the omniverse– zero point energy and gravity (which is why gravity is so strong in black holes)– which balance each other out on the ultimate level and keep the whole system from either expanding into oblivion or collapsing in upon itself like its individual island

universes do. And Stephen Hawking said recently that the only way for FTL or time travel to be possible is if we can take quantum effects and somehow make them manifest at our level– at the macroscopic level.

Well, if we combine the ideas of Hawking and Greene, with the ideas presented in a recent paper by that physicist from Indiana University we come up with some interesting ideas. What if our universe is a mere particle inside a black hole inside a larger universe? Then it's possible that what we call "macroscopic" on our scale is actually sub-Planck on the scale of that larger universe– in other words– our whole universe would be nothing more than a quantum particle inside that black hole inside that larger universe– and we would be subject to quantum mechanics not relativity if we could tunnel from one point in our universe, through the black hole and back into another point in our universe (or even into the larger universe– or some other universe entirely!) This would also explain the large scale structures of our universe– galaxies, superclusters, supervoids, etc, as being a function of quantum effects that the early universe was subject to. Thus quantum effects = macroscopic effects on a higher level. As a matter of fact, inflation of the universe at many times light speed during its early history was itself responsible for the creation of matter and energy in the universe from the transitioning of the universe from a higher to a lower energy state through the actions of the inflaton scalar field as it transitions to its lowest energy state. Thus conservation laws are maintained throughout the whole system. Of course, all this necessitates the existence of the multiverse– or omniverse as I put it (to allow for universes of different physical laws, so that we don't have to invoke the anthropic principle– that our universe is "special" in some way) to preserve causality and to allow for the fact that all time– past, present and future– exist at every moment– and thus (paradoxically enough!) time does not exist (at least as we know it.) Poking a hole through our universe and into this larger universe (or black hole) and back into another point in our own universe or into another universe at low enough energies to be manageable by our technology at some future state of development would be analogous to superconductivity (or fusion) at near room temp.

The idea of our universe being a mere particle is an interesting one and reminds me of something which cosmologist Andrei Linde said (author of Chaotic Inflation theory) concerning the idea that, inside the new Hadron Collider, we might actually be producing our own micro-universes. The fact that our universe may have itself been generated inside that larger universe by an intelligent entity or entities is a possibility in the same sense. To us, the universe would seem to be expanding, however, for some hypothetical being inside that larger universe, since our space-time curves in upon itself, no change would be noted. How would this hypothetical being communicate its existence to us? Perhaps in the very values of the physical constants that we find so puzzling– like pi, the natural logarithm base e, the alpha fine structure constant, etc. These numbers, which seem so random and meaningless on one hand and yet define all of reality as we know it on another hand might be the hint that being or beings unknown are giving us to be aware of their existence. Perhaps one day we could do the same inside an artificially constructed universe of our own making and design….

The ultimate fate of the universe would also depend on conditions that existed at its inception– at the big bang. Our universe exists inside a false vacuum that could tunnel into a true vacuum at any time– but doesn't. (Although there is concern that construction of bigger and more powerful supercolliders could get us there by the year 2150 or so, in which case– if our universe ever did tunnel to a true vacuum, it would change the fundamental nature of the universe, by altering laws of physics and make life as we know it not possible– a very speculative and non-cheery thought) Where loop quantum gravity and string theory come together and attempt to explain the low value of the cosmological constant is on this level– where the exponentially expanding universe expands so fast (thanks to dark energy) that bubbles of lower energy vacuum formed during the inflationary phase of the universe (when it was expanding at much faster than light speeds) never collide and thus the universe would never tunnel to a lower energy vacuum and the bubbles would eventually dissipate. According to the cyclic model of the universe, the presence of dark energy in our universe would not only expand the universe, but at some point in the distant future the interplay of dark energy and gravity would halt the expansion and allow it to come back and collapse back on itself once again (as a natural result of increasing entropy.) This would mean that the big bang wasnt our universe's only big bang, but just one of many in a long series– something which string theory and loop quantum gravity both seem to be agreeing upon. If this is the case, then at each big bang, the "walls" of the universe would turn inside out as the universe expanded in an opposite direction and the existence of time independent of our universe (since our version of time actually began with the most recent big bang) would be called imaginary time (imaginary in the same sense as imaginary numbers.) This is another concept which opens up the idea of the multiverse, because if you imagine time existing on two axes, parallel time universes would be parallel lines plotted on a graph with both axes. These parallel time universes would all have the same physical laws and would thus be part of the same multiverse. Where the omniverse comes in is when you have different universes with different false energy values, which would bubble up as a natural result of space-time interactions with quantum effects (a natural extension of what we call the Casimir effect– but these virtual particles would be their own universes), each with its own laws of physics and, in a process akin to natural selection, these laws would determine the rate at which each of these bubble universes would decay and spawn child universes with lower energy states and the survivability of these universes would depend upon the various quantum components that lie therein. As a matter of fact, the existence of our universe inside a black hole inside a larger universe can be explained in this way– a virtual particle that survived the virtual phase and got sucked into a black hole inside that larger universe (or, perhaps intentionally placed in an artificial one.) Child universes like ours could exist in a similar fashion inside black holes inside our own universe. The structure of these other universes (and their history and ultimate fate– early collapse, permanent expansion or oscillation– as well as the possible existence or types of life– and the spatial and time scales and dimensions it exists within) might be very different from ours, depending on their physical laws, when and if inflation occurred as a result of the breakdown of the inflation scalar field, as well as quantum fluctuations in the early history of the universe. Being inside the black hole would shelter the universe from any possible catastrophe occurring on the "outside" and since the rate of time (or the very nature of time itself) would be

different in the larger universe compared to the smaller one, they wouldn't be in casual contact (just like we wouldn't be with any universe with different physical laws.) The universes would be separated by a sea of hyperspace, the original spatial dimension of the bulk (like imaginary time is the original temporal dimension), which can only be navigated through black hole worm hole tunnels, which represent the larger scale version of quantum tunneling through the universe and between different universes. It's interesting how everything is connected together– that the very creation of these mini-universes is the reason behind the expansion of our own universe and perhaps its ultimate collapse and rebirth (just like we might be doing for that hypothetical larger universe we reside within.)