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# Simply Relativity



## Abstract

There's something about the probabilistic formulation of Quantum Mechanics that doesn't sit right with me. I began contemplating various ways to visualize the concepts presented by the various theories, and to this day have never been able to "get comfortable" with the inherently random nature of wave functions. This was just aggravated by the dreadful awareness that besides our two major ways of describing the universe not getting along, neither method actually gives a description of what matter is.

So I began to apply old thoughts I had about magnets, attempting to understand as a child what exactly that these descriptions of the electromagnetic force meant. The simplest way I could find to describe the action of two magnets was that they were imposing a location change on one another, depending on the orientation of the field and poles. This suggested to me that there was some shape to the space around these magnets. That what the theories described as an exchange of photons, was actually an extended spatial nature of the magnets. Now, this sounded weird to anyone I suggested it too, since everyone knows that electromagnetism involves the interactions of electrons and photons.

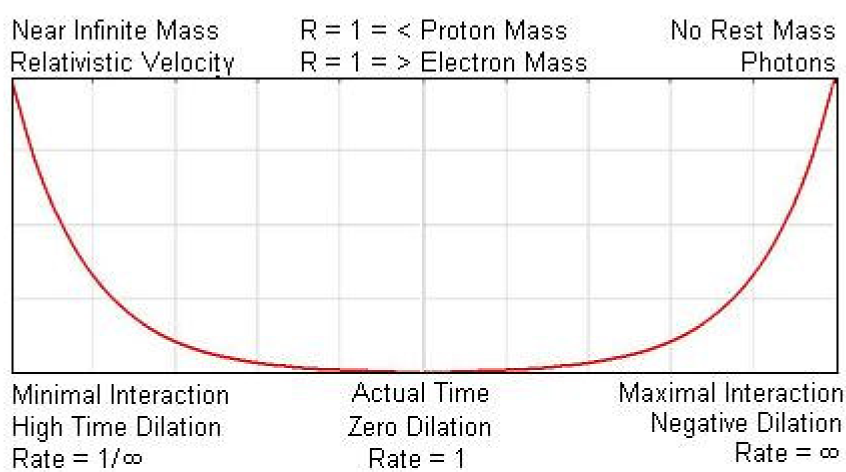
So I began to think along those lines, if EM interactions ARE an exchange of photons, yet my intuition tells me there is an extended shape to the space around the magnets I was playing with. What if photons are nothing but a shape in space, and the orientation of the domains within these magnets I played with acted to reinforce that extended shape. Years passed as I toyed with these ideas, read various new developments in physics, and tried in vain to find an explanation that fit what my observation and intuition were telling me. Without any luck, and after extending these concepts in various informal models in my head, I decided to attempt to explain them myself. In the process of teaching myself every bit of math I could, reading every theory I could find, and lots of thinking, I had a strange realization one day, which I felt I simply had to share.

**Hypothesis**

Quantum Effects emerge from a Retrocausal Relativistic description.

During my rather obsessive delving into the mathematical formalisms of Quantum theories, while refreshing my memories of the equations of GR, I came upon a few interesting findings. The first one popped up while I was reading into the EPR paradox, and Bell’s Inequalities. I noticed the condition that in order to describe the effects of a Quantum theory without probabilistic wave functions, you had to give up locality, or causality. This intrigued me, especially after reading more about such things as Feynman Diagram anti-particle path integrals, the Abraham-Lorentz “pathological” pre-acceleration solutions, and a strange thought I had while reading about Gravitational Red Shift.

It seemed odd to me, but Einstein set the rate of time constant to equal 1 at infinite distance from a Gravitational field. Looking at that, and considering retrocausal effects for Quantum Theories, I stumbled upon the Bohm Interpretation of QM. It intrigued me, because though the pilot-wave description felt off, the note that “the final position of the particle, can in itself be considered the hidden variable” clicked in my head so I started pondering again. It hit me that if the actual rate of time = 1 constant were changed to a mass near the point at which quantum effects are essentially described by classical physics, a very interesting thing would happen.




Rate is the ratio between 1 increment of actual time, and 1 increment of observed time. Having high dilation means for every 1 observed increment of time, more than 1 increment of actual time passes. Negative Dilation means for every 1 increment of actual time, more Than 1 increment of time is observed or interacted with.

Note that the use of Actual Time there simply means an outside observer at rest relative to the cosmic microwave background. The implication being, that for the side of the scale above the R=1 point, the effect would simply be the time dilation described in General Relativity.

Whereas the side tending towards zero rest mass would represent bodies interacting with larger and larger slices of time, relative to the R=1 point of classical mechanics. This has the fascinating effect of being able to describe a semi-Bohmian interpretation of Quantum Mechanics, where the non-local operator of the pilot wave is replaced by the retrocausal influence of a particles future state. Where the extended temporal interaction related to the reduced mass of the particle gives the obvious hidden variable of its future state. This replaces the inherent uncertainty assumed for so long as an innate feature of the universe, with a simple inability to observe more than a single slice of time at once. Confusingly, I first referred to this idea as negative time dilation, which was an endless source of confusion when I attempted to explain it, so I now just use extended temporal interaction, or extended temporal state.

There are some who believe that any sort of causal violation is pathological, and can lead to paradoxes. This only holds true if the causal violation is not self-consistent, and given the nature of the interaction described here, it is inherently so. Particles aren't going to go back in time and kill their grandfathers, so a little cross time influence isn't an issue at all. It is even less worrisome when you consider that to the body in question, these times in its own future would be experienced concurrently with whichever observation was being performed. Extending the interaction of a particle with time also neatly escapes the need to invent advanced waves.

The thoughts that followed this concerned the invariance of lightspeed. I remembered hearing the rather strange sounding statement that "a photon does not experience the passage of time." Now let's continue my earlier line of thought. That means a photon would interact with all time at once! The statement that a photon is its own anti-particle rings very true in that sense. This actually implies mass/energy equivalence! If a photon with no rest mass interacts with an immense period of time compared to a body with less than the classical/quantum boundary mass. Then photons with only momentum/energy, but high temporal interaction, must be transformable into bodies with rest mass, and lesser temporal interaction. So then I began to consider what exactly a photon was. What sort of physical extent or structure should a photon have? What material would it be composed of? If a photon is immaterial, shouldn't mass be as well? Since a photon has no rest mass that suggests to me that a photon cannot stop moving. So perhaps a photon could be described as an excitation traveling along the coordinates of spacetime at it's maximal velocity. If a photon is just a wave of disturbed coordinates, then what changes when energy increases enough for a particle to acquire a rest mass?

Perhaps it’s as simple as a folding over of the disturbed coordinates onto their neighbors. Not an adjustment of some energy field, or some point particle translation, just folded up distance. This thought took form while trying to describe some of these ideas to a friend with little knowledge of physics, so I’ll use the form I did with him for a simple example.

Take a really simple coordinate setup.

s=[1, 2, 3, 4, 5, 6, 7, 8, 9]

Moving from comma to comma is one interval of distance, don’t need to be specific to get the idea across.

Now let's drop a body of mass in there.

s’=[1, (x:2+3), 4, 5, 6, 7, 8, 9]

Now 1 > 4 covers one fewer interval, since the (x:2+3) set incorporates two intervals worth of coordinates.

Lets put another body in there.

s”=[1, (x:2+3), 4, 5, 6, (y:7+8+9)]

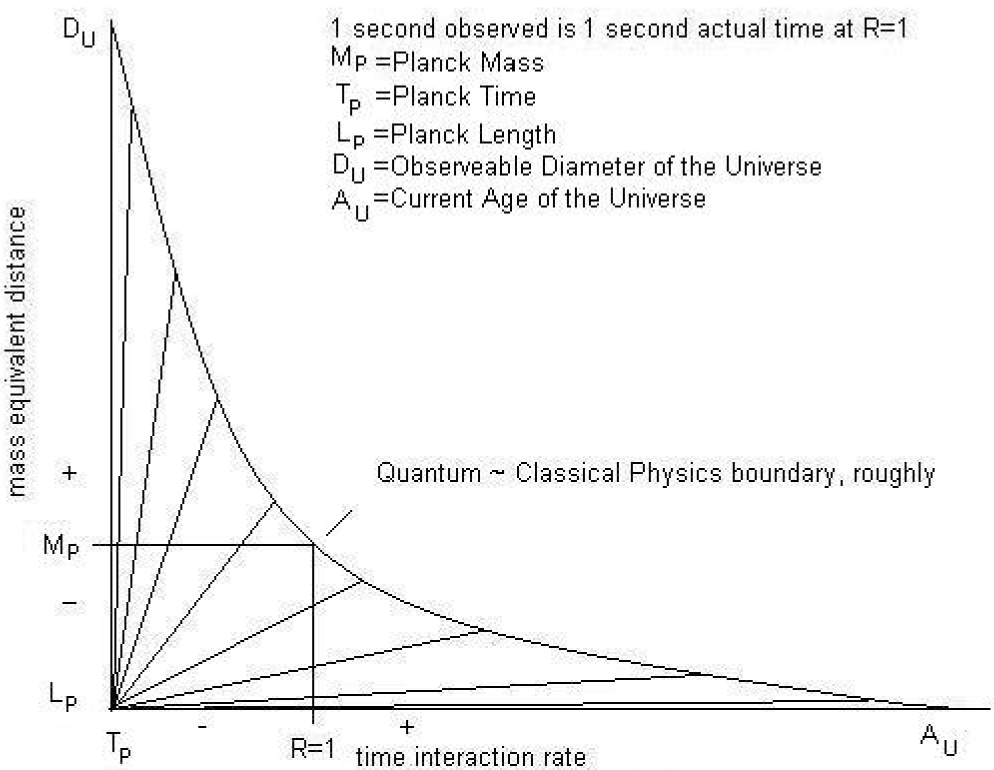
Let's run time over the coordinate sets, ignoring the fractional changes for simplicity.

s”$t^1$=[1, (x:2+3), 4, 5, 6, (y:7+8+9)]
s”$t^2$=[1, 2, (x’:3+4), 5, 6, (y’:7+8+9)]
s”$t^3$=[1, 2, 3, (x”:4+5), (y”:6+7+8), 9]

Since the 3 coordinate body distorts local coordinates more, it adjusts the location of the 2 coordinate body more than its own position is adjusted. The interaction corresponds to the Einstein field equations/Newtonian gravity as the two bodies seek to reach a state with minimal distortion to local coordinates. Coming into contact and assuming a spherical shape satisfies this.

Now we have an established relationship between mass, energy, time, distance, and the framework to describe the effects of Quantum Mechanics. Surprisingly, it seems my intuition about the extended spatial shape of magnets may have been true after all. Using the concept of folded spatial coordinates describing the force of gravity, how could one extend that to other forces? Rather easily, it turns out, as I realized after gorging myself on 11D Supergravity Matrix Theory. Fascinating though the structures implied may be, I was looking for a simpler sort of elegance. Since two bodies of folded coordinates could describe a gravitational distortion of a Lorentzian Manifold, it seems to me that this method should be extended.

Treat the EM tensor direction as a function of the shape of the folded coordinate sets, which act roughly as stress energy tensors for Gravity. The directional coordinate adjustment of the EM tensors on other EM tensors, combined with the coordinate stretching due to Gravity become rather trivial to visualize and compute. I am still working out the exact mathematical formalism for this, but I believe the Weak Force can be treated as a simple rotational handedness distinction in the coordinate bodies. The Strong force is a little more complex, but would essentially be a function of bodies with a significant amount of folded coordinates. The shape of the folding required would include an "overlap" with its nearby coordinate bodies. With the effect that increasing the distance between the two eventually becomes sufficient to produce another particle group.




Each line under the curve above roughly approximates a particle, or collection of particles in the case of the high mass/distance, low time interaction limit. It is my current hope that I will be able to naturally produce the masses of the particles, strengths of the forces, and physical constants from this relation.

Interestingly, I was considering what aspect the age of the universe would have on the vacuum energy density, and found that there was a similar relation described in [1]. The difference I propose is that the cosmological constant, and therefore the vacuum energy density would change in relation to the age of the universe. Much like the proposal of Sakharov[2], as I found out after investigating the Zero-Point-Field.

At a very short time after the birth of the universe, such as the Planck time, the universe would have been on the order of the Planck length. Any particles that existed could only have interacted with an incredibly short period of time. So they would have equivalently been interacting with incredibly large distances. Since the entire universe wasn't capable of having large distances to interact with yet. The only way to resolve this while maintaining the distance/time relationship I've proposed, is introducing bodies with significant amounts of folded distance. Proportional to the Planck time, these folded distances would be enormous. Correspondingly, this is equivalent to traditional descriptions having an incredibly dense body of mass at the beginning of the universe.

I will need more time to mull over the problem of singularities, and how to properly describe them in this framework. I will say that I find the concept of infinite anything being part of a finite universe to be very distasteful. I favor the idea of a fluctuation in a prior maximal entropy region. Likely the remnants of a prior heat death. This leads to a runaway increase in local entropy, taking possibly trillions of trillions of gigayears to run back towards another maximal entropy state. Using the concepts I'm working with here, one could perhaps assume that any fluctuations of a maximal entropy region with shorter durations than the Planck time would not be sufficient to trigger an inflation event at all. Thus avoiding the problem of an initial singularity, as a Planck time scale fluctuation would be required to set up the self-sustaining and self-reinforcing conditions that we know as a universe to begin with!

## Equations

In general most of the equations will be obtained through simple adjustments of General Relativity to represent the folded distance=mass relationship, and a derivation of Bohmian Quantum Mechanics to represent the extended Time Interaction Function. These are still under construction, as the formal outline of the theory has only recently been realized. My early form of the time interaction formula needs to be reconstructed to account for mass=distance, which is a very recent idea.

After consideration, but while still working out the exact relationships, I've decided to attempt to place the Rate of Time = 1 point at the Planck Mass. I'm sure that it may require adjusting. As it is the point at which Quantum Gravity should take over, that seems a better classical/quantum boundary than my initial somewhat arbitrary choice of the proton mass.

$$t_f=(M_p - Ev)\ (c\ (v/c))$$
$$E=(d/(t_f+A_U))c^2$$

$t_f$ =Time Interaction Function
$M_p$ = Planck Mass
E = Energy of the chosen system
$A_U$ = Age of the Universe

The other values are simple enough, distance, velocity, and light speed.

## References


Scott Funkhouser: http://arxiv.org/ftp/physics/papers/0611/0611115.pdf
Andrei Sakharov: http://en.wikipedia.org/wiki/Sakharov_induced_gravity



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