Spinfoam model, a base for a unified field and quantum gravity

By Michel Couture

Abstract:

I describe a spinfoam model for the electron which can be extended to all elementary particles having a proper mass. Furthermore, this model shows that energy is conserved not only locally but also at cosmological scales and without the need for a modification to General Relativity. In doing so, the speed of light becomes a true constant. This requires a common instant within a delay of a Planck time across the entire universe, without any violation of causality. This is a (3 + 2) dimensions model. Also, the vacuum energy will be described briefly. I will explain how it simply solves entanglement experiments in another article. For now, I am limiting my model to (2+2) dimensions for simplicity and I keep entanglement out of the equation. To add the third spatial dimension, the description of relational entanglement is necessary.

Introduction

As I will show, gravity and the strong interaction are one and the same (graviton = gluon). My hypothesis is that there are two dimensions of time flowing in a 3 dimensional space. One component of time is transverse (or radial) and based on the Planck time while the other component of time is longitudinal along the circumference and is based on the Compton wavelength of elementary particles divided by the speed of light. The transverse time is gravity and the longitudinal one is inertia. Everything in the universe is composed of elementary particles and every elementary particle is composed of the two dimensional flows in equal parts of inertia and gravity. This produces circular loops which are described in this spinfoam model. This leads to a possible explanation of Dark Matter with multiples types having each a different base length for its inertial flow. The constant Pi becomes a true physical constant having a finite value. The mathematical value of Pi could only be physical (or real) in an infinitely large Universe.

For the electron, the longitudinal flow has a constant curvature in space and forms two complete loops due to intersections with the transverse time flow. You can visualize it in 3D+1 as a Mobiüs strip. These two loops are separated by the Planck length in the transverse time. The length of the entire longitudinal space time is twice the electron Compton wavelength ($2 \times 2\pi R_S$). This is the electron without its external vacuum energy due to the different fields. To get a more complete description, we must find a solution to the vacuum energy which should solve the anomalous magnetic moment of the electron at the same time. If we could separate an individual

electron and place it away to infinity, its magnetic moment would be equal to one. By measuring it, you decrease the distance between your probe and the electron which increases the vacuum energy in-between and it modifies the measurement. It is all a matter of relativistic space-time flow which decreases as the wavelength of elementary particles increases and vice versa.

Calculation of the anomalous magnetic moment of the electron

We can express the electron radius as a sum of corrections, each specific to a force or an interaction:

$\mathbf{R_{el} = \Delta_S \pm \Delta_E \pm \Delta_M \pm \Delta_W \pm \Delta_G}$

Where the subscripts are

S: Strong interaction
E: Electric force
M: Magnetic interaction
W: Weak interaction
G: Gravitational force

Firstly, we can neglect the gravitational force due to its extreme weakness.

$\mathbf{\Delta_G \dashrightarrow 0}$ (see the last section for a description of the gravitational vacuum energy and gravitons)

Secondly, there is no magnetic interaction considered. Experimentally, the electron doesn't **seem** to have other magnetic anomalies than the anomalous magnetic dipole moment. If there are other anomalies, they must be too small in comparison to affect this calculation.

$\mathbf{\Delta_M = 0}$ or $\mathbf{\dashrightarrow 0}$

Thirdly, let us define the strong interaction component as being normalized to 1 for simplicity.

$\mathbf{\Delta_S = R_S = Compton\ wavelength/2\pi = 1}$, thus we are left with

$\mathbf{R = 1 \pm \Delta_E/R_S \pm \Delta_W/R_S}$

It is important to note that having only two forces and that these two forces follow the same law of $1/r^2$, only one relation is needed in terms of force, energy and momentum.

$\mathbf{GM_p^2 = (1/\alpha) * e^2/4\pi\varepsilon_0}$

Where α is the fine structure constant. It is the relative strength of the strong interaction compared to the electromagnetic force. M_p is the Planck mass.

$\alpha = 1/137.035999074(44) = 7.2973525698(24)\times10^{-3}$

The electron having two loops, we may define its internal energy as a relation of its two components.

$$\mathbf{GM_{el}^2/L_p = GM_p^2/R_S = (1/\alpha) * e^2/(R_S * 4\pi\varepsilon_0) = M_{el} * C^2 = h * C / 2\pi R_S}$$

There is an equal amount of space-time flow in the transverse gravitational component as there is in the longitudinal electrical component. The two loops are entangled at a 100% when the distance in-between is actually the Planck length. Gravity becomes the strong interaction at a scale approaching the Planck length when two loops have a comparable curvature and when they are in the same plane or nearly the same plane. Gravitons (or gluons) are transverse loops while the photons are longitudinal loops.

For each type of force and interaction, we may also define one entry point on a loop and one exit point on the other loop, both separated internally by a transverse distance of the Planck length and a longitudinal distance of the Compton wavelength. This is necessary to account for each flow exchanged with the vacuum energy (and the entire universe).

(image to insert here)

Solution to the external electric component of the anomalous magnetic moment

We want to find the differential of the electron radius due to a maximized energy leak in the electrical vacuum. This leakage is observed as the electric charge. It forms an external spinfoam having a radius of R_S / α which is concentric with the electron basic spinfoam. Inside the electron, the potential grows from the entry point up to the exit point with a longitudinal distance of one electron wavelength. The maximum vacuum energy between two charges is obtained when the two charged spinfoams are side by side at a distance of R_1+R_2. The entry-exit point pair of each particle are rotating around the spinfoams. Thus, we need an integration over a full rotation due to a quantization factor of a full Compton wavelength (QED Alert!). Therefore, the maximum contribution to the electric vacuum energy (or space-time flow) from two massive and electrically charged elementary particles is given by:

$$\mathbf{V_E = e^2 / [4\pi\varepsilon_0 * (2\pi*R_1+2\pi*R_2)] = \alpha * h*C / [2\pi * (2\pi*R_1+2\pi*R_2)] = \alpha/2\pi * (M_1+M_2) * C^2}$$

where $\varepsilon_0 = e^2 / 2\alpha hc$ and $2\pi R = \lambda_{Compton}$ for each particle 1 and 2.

Therefore, $\Delta_E/R_S = \alpha/2\pi$, evaluated at the first order. By increasing the radius, the electrical repulsion is reduced, decreasing the radius. A decrease in the radius produces a higher repulsion, increasing the radius and so on, with always a smaller amount of correction by a factor of $\alpha/2\pi$. The relation of R to V being linear and of the first order then,

$\Delta_E/R_S = \alpha/2\pi - (\alpha/2\pi)^2 + (\alpha/2\pi)^3 - (\alpha/2\pi)^4 + \ldots\text{-}\ldots\ldots = (\alpha/2\pi) / (1 + \alpha/2\pi)$

$\Delta_E/R_S = 0.0011600624252$

$R/R_S = 1 + 0.0011600624252 \pm \Delta_W/R_S$

All the terms in the series should correspond to levels of entanglement between all charged particles in relations to the considered electron. This represents a series of concentric circles. To be discussed in another article. Pauli exclusion principle and the Casimir effect…

The experimental value of the electron magnetic moment is

$1.0011596521807 = R_{exp} /R_S = R$

Therefore, the correction for the weak interaction is

$\Delta_W/R_S = -4.10244$ x10e-7

http://en.wikipedia.org/wiki/Weak_interaction

The hydrogen atom:

The actual measurement of the radius of the hydrogen atom at the ground state corresponds to the Bohr radius, which is the basic charged radius of the electron, corrected by adding the proton basic charged radius. It is in agreement with my approximate spinfoam model of the proton (made of 3 quarks). To be demonstrated later.

Remarks and interpretations:

The maximum electric vacuum energy of the external charge is **$\alpha * M*C^2$**. The difference

$[\alpha - (\alpha/2\pi) / (1 + \alpha/2\pi)] * MC^2$ corresponds to the background vacuum energy contribution of an external charge within a compact system of particles (produced by earlier radio activity chain reactions). This is the best measurement situation with entanglement maximized…

One simple interpretation to explain the sign of the charge is to view all the positive spinfoams as rotating in the same direction and in the same plane while the negative spinfoams are rotating in the opposite direction. This produces an acceleration inward between + and - charges and an acceleration outward between particles of the same sign following $1/r^2$.

An interesting correlation is the weak interaction coupling constant possible value of **4.10244 x10e-7**. First observation, it is negative for the electron, it indicates a deficiency in its Weak

momentum and an excess in its Weak binding energy, which is the opposite of its electromagnetic coupling. This seems to be the sign of an uncharged particle with a mass that could correspond to the electron-antineutrino. The Weak interaction energy contribution from the electron mass:

E_W = -4.10244 x10e-7 * electron mass-energy = 0.2096344 eV /c^2

Could this be the mass of the electron-antineutrino?

http://en.wikipedia.org/wiki/Neutrino#Mass

Gravity:

For the electron, gluons are transverse spinfoams having a radius of the Planck length which bind the two longitudinal loops all along the circumference. The total energy for the gluons is MC^2. The total energy for the electron is not MC^2 (radial + longitudinal) = $2MC^2$. This is two separated time dimensions. If there is a sum to be made, this will be equal to zero net energy or space-time flow… As gravitational energy may be considered negative. Time can potentially disappear, especially if there is only one Big Bang in the universe (a big bounce with an entropy reversal).

For each longitudinal unit of $2\pi L_P$, you have a corresponding transverse gluon having an energy of :

$E_{Gl} = L_P/R * MC^2$ where R is the electron radius from its Compton wavelength $R=\lambda/2\pi$.

Furthermore, in the case of a maximum external gravitational potential energy, there is a graviton (a pair of gluons) between each of the gluons on opposite sides having each a combined energy of

$E_{Gr} = 2 * (L_P^2 / R^2) * MC^2$ (equation 1)

(Here, we must have a minimal description of the entanglement between the gluons to get a better understanding of all the implications. Let just say that each graviton represents a graviton of graviton at a certain level of entanglement according to a form of the Kaluza-Klein tower equation. Each graviton as a relation to all others and the sum of the energy is equal to the equation 1 while the sum of the sum is equal to equation 2. The complete description deserves an article of its own due to its deep implications…!)

The total energy of these gravitons is equal to the energy of two single gluons:

$E_{Gr}(total) = 2 * (L_P/R) * MC^2 = 2GM^2/L_P$ (equation 2)

The $\Delta G/R_S = - 2 * L_P / R_S$

and the maximum gravitational potential for an observer at infinity is given by

$V_G = 2 * (L_P/R) * C^2 = 2GM/L_P$

Each graviton has a single wavelength between any two elementary particles. As the distance increases, the energy of the gravitons decreases by the same proportion. This energy is not lost but it is transferred to the elementary particles creating a blue shift. As the distance decreases, the energy of the gravitons increases by reducing the internal energy of the particles, creating a redshift. Thus, energy is not only conserved locally but at all scales and the speed of light is also constant everywhere. When a particle approaches a group of particles, the total differential flow of space-time between all particles of the group must be considered in the calculation of the gravitational potential and you must subtract the background potential of the observer. There are gravitons between all elementary particles. ISW effect included.

Special Relativity:

Space-time flows at the speed of light. The standard equation for the Lorentz contraction may be rewritten as:

$$V^2_{ext} + V^2_{int} = C^2$$

Where V_{ext} is the speed of the particle relative to the observer and V_{int} is the relative internal speed of the particle. For particles with no proper mass, the internal speed is zero and the external speed is C. For massive particles, V_{int} cannot be reduced to zero because their center may have a relative external speed lower than the speed of light. The relative speed would be zero at a temperature of absolute zero.

(magnetism is to be developed)

The solution to space, faster than light entanglement and infinite quantity of gravitons generation:

Last but not least, gravitons have a mass and they should generate other gravitons which themselves should create other gravitons ad infinitum. Even if you stipulate an asymptote toward a finite value, there is still a problem: The last gravitons of the chain have no mass because they don't produce gravitons. A particle with no mass has no energy according to Einstein. It would be unwise to bet on such a particle as this principle is so deeply rooted in the Theory of General Relativity. Or so it seems. And if it was not a particle at all? What else could it be...?

Einstein said that photons follow null geodesics. What he meant was that photons going at the speed of causality, they may only follow a path on which there is no net force or action. This path can only be the result of past actions. This was confirmed by Noether's theorem (conservation law and least action principle). This has a very important implication. It means, for any observer having a proper time frame, there is a present instant which is the result of past actions and which has a proper interval.

When you look at the moon (or anything else for that matter), photons appear to move from the moon to your eyes instantaneously. Not only that, but for you, the photons mass-energy was in the moon just before hitting your retina. And this is causally true in all physical aspects. Remember, there is no preferred frame in GR. Moreover, the causality relationship is reciprocal for the photon-retina system. So how could this be possible?

Gravitons should be modified in a certain causal order as time flows in the same direction. Also, their number should be finite. Therefore, the last gravitons of the causality chain shouldn't have any mass at all… They can only be the result of the entire causality chain. They have no mass, no curvature. They convey the spatial information. They are space! Space is the end result. It is the the null path, a straight line… Having no energy, it is faster than the speed of light. According to my hypothesis, space information is exchanged within a Planck time across the entire universe. Spatial information is the result and it is inserted in the next iteration of duration of a Planck time. No violation of causality…

$$L_P/T_P = C$$

A simple explanation of the delayed choice quantum eraser is to come later. Just a hint: Once you have all the good instruments and components for your delayed choice quantum eraser, what is the most critical thing that is left to do with the highest possible precision? And what is the most obvious cause to the outcome in your experiment, apart from you? Answer these two simple questions without thinking too much and you will have the answer to this lasting riddle…

Michel Couture
Quebec city, Canada

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