Holy Grail

Equation B.9 is what is used to recover electromagnetism and gravitation.

The principle is slightly convoluted, but you never expected life to be simple…

The idea behind is the minimization of stresses on the Fabric of Space, or minimization of the work done by constraints.

Think about the dilators (solitonic lightspeed traveling deformation states of the four-dimensional space) as always working in phase with the surrounding dilatons (four-dimensional space waves).

For them to be in phase with the surrounding dilatons, they should arrive at each de Broglie expansion step of the Hyperspherical Universe at the maximum of the Total Waveform, in fact, at the closest maximum to its original position in the prior step.

The spacetime wave for a single particle can be represented by:

$$\psi_1(x,y,z,\tau,\Phi) = \frac{\cos(\vec{k}_1.\vec{r})}{1+P.f(\vec{k}_1,\vec{r}-\vec{r}_0)} \tag{B.7}$$

where

- || means absolute value
- $f(\vec{k}_1,\vec{r}) = \theta(|\vec{k}_1.\vec{r}|-2\pi)|\vec{k}_1.\vec{r}|$
- P (absolute value of the phase volume) is 3.5 for a particle with spin half and 3 for neutral matter. The meaning of P is that for each de Broglie wavelength traversed path by the Hyperspherical Universe, a propagating spacetime wave spread along by a factor of P2π (7π for charged particles and 6π for neutral-zero spin matter).
- M=1 for neutral matter-matter or antimatter-antimatter interactions or opposite charge interactions
- M=-1 for neutral matter-antimatter interactions or same charge interactions

Similarly, for a 1 Kg body located at position $\vec{R}$:

$$\psi_2(x,y,z,\tau,\Phi) = \frac{M.N.\cos(\vec{k}_2.(\vec{R}-\vec{r}))}{1+P.f(\vec{k}_2,\vec{R}-\vec{r})} \tag{B.8}$$

where the effect of the 1 kg mass is implicit in the k_2-vector and expressed by the factor N. The wave intensity scales up with the number of particles (N). One kilogram of mass has 1000 moles of 1 a.m.u. “zero-spin neutrons”, or $|k_2|$ = 1000.Avogrado. $|k_1|$=N. $|k_1|$

To calculate the effect of Gravitational/Electrostatic attraction, one needs to calculate the displacement on the crest of each particle or body wave due to interaction with the waves generated by the other body.

This is done for the lighter particle, by calculating the derivative of the waveform and considering the extremely fast varying gravitational wave from the macroscopic body always equal to one, since the maxima of these oscillations are too close to each other and can be considered a continuum.

The total waveform is given by:

$$\psi_{total}(x,y,z,\tau,\Phi) = \frac{\cos(\vec{k}_1.\vec{r})}{1+P.f(\vec{k}_1,\vec{r}-\vec{r}_0)} + \frac{M*N}{1+P.f(\vec{k}_2,\vec{R}-\vec{r})} \tag{B.9}$$

The term $f(\vec{k}_2,\vec{R}-\vec{r})$ contains the treatment for retarded potentials, but for simplicity we will neglect differences in dimensional time between $\vec{R}$ and $\vec{r}$.

Equation (B.9) is the one and only Unification Equation, that is, it is the four-dimensional wave equation that yields all the forces, when one consider four-dimensional wave constructive interaction. It shows that anti-matter will have gravitational repulsion or anti-gravity with respect to normal matter.

The derivative for ψ_1 is given by:

$$\left.\frac{\partial\psi_1(x,y,z,\tau,\Phi)}{\partial x}\right|_{\tau=\lambda_1} \cong -k_1^{\,2}r \tag{B.10}$$

$\nabla\left(P.f(\vec{k}_1,\vec{r}-\vec{r}_0)\right) = 0$ due to $\left|\vec{k}_1.(\vec{r}-\vec{r}_0)\right| << 2\pi$.

Similarly

$$\left.\frac{\partial\psi_2(x,y,z,\tau,\phi)}{\partial x}\right|_{\tau=\lambda_1} \cong \frac{N}{Pk_2.R^2} \tag{B.11}$$

Solving for x:

$$x = \frac{N}{Pk_1^{\,2}k_2.R^2} = \frac{\lambda_1^{\,2}\lambda_2 N}{P(2\pi)^3 R^2} \tag{B.12}$$

This amount x is the displacement between one step of Hyperspherical Universe expansion. How can the effect of a force to be displacement. One would expect acceleration, isn't it…☺

One has to remember that a displacement indicates a change in angle and angle is velocity. A change in velocity is **acceleration**.

From equation (A.5), acceleration in the moving reference frame can be calculated to be:

$$Acceleration_{\Pr ime} = c^2 \frac{d \tanh(\alpha)}{d\tau_{\Pr ime}} \tag{A.12}$$

In the particle reference frame the acceleration has to be given by Newton's Second Law

$$Force = M_0 Acceleration_{\Pr ime} = M_0 c^2 \frac{d \tanh(\alpha)}{d\tau_{\Pr ime}} \tag{A.13}$$

This means that any force locally twists spacetime, and not only Gravitation as it is considered in General Relativity. It also shows the as the relative speed between the two reference frames increases towards the speed of light, the required force to accelerate the particle approaches infinite.

Now let's understand the difference between Gravitation and Electromagnetism. Since there is only one equation for every force, there should be away to distinguish their effects.

The solution to this problem, albeit surprising and surprisingly simple is that the field is the same, the difference is in what is sensing the field. Needless to say, that this idea was never considered. Current physics always considers a different field for a different force, which by definition makes them different…☺

How different subjects to these dilatons would result in two forces distinct by 36 orders of magnitude. The answer is which angle is being changed.

I made the assumption that non-zero spin particles would change k-vector by the angle associated with each expansion step. There are no hadronic zero-spin particles, matter has zero spin but it is at the cost of creating dimmers (proton, electron= neutron – neutrino, where a neutrino corresponds to spinning the dimmer).

It should be clear by now, that spin is treated as an extrinsic dimension and corresponds to just a tumbling or rotation around the axis perpendicular to R and X (or Y, or Z). The other quantum numbers correspond to similar rotational states from different solitonic deformation states.

There are two regimen of spacetime travel and they are depicted in Figure 4 below:

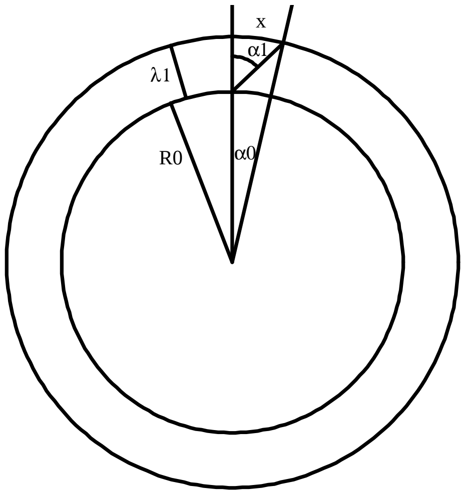

Figure 4. This figure shows the geometry of a surface bound particle. This is a X versus τ cross-section of the Hyperspherical Expanding Universe. Notice that the two circles represent a one de Broglie expansion of the Hyperspherical Universe.

Normally a wave created in the inner de Broglie surface will have a crest exactly in the radial direction in the outer surface. If shifted by a value x, it would have its crest defined by the angle α_0, which is extremely small. This is valid for 'hypersuperficial waves", that is, waves that propagate along the de Broglie surface without ever leaving it (zero spin particles).
For the case of spin half particles, the new crest is given by the angle α_1, that is, the k-vector of the wave is free to redirect itself without having to bend the de Broglie hypersurface.
Tan(α) is given by $\tan(\alpha_1) = x/\lambda_1$ or by $\tan(\alpha) = x/\lambda_1 * (\lambda_1/R_0)$ depending upon if the interaction is such that the particle k-vector shifts as in α_1 or it just acquires the radial pointing direction as in α_0. A further refinement introduced by Equation (B.13) will introduce a level of local deformation of the de Broglie hypersurface or Fabric of Space.

If the particle is capable of traveling longitudinally, its dimensional time axis or k-vector will be displaced by the angle α_1. Charged particles and neutrons are particles with non-zero spin. This model proposes that spin is a rotation along a direction perpendicular to dimensional time and one of the space dimensions, thus x, y and z polarizations are possible. The presence of spin also allows for the particle to detach from the Fabric of Space and to realign its local Fabric of Space. Local Fabric of Space Realignment means that the direction of spacetime wave propagation changes.

Neutral matter (spin zero), interacting with non-charged bodies, will travel as hypersuperficial waves, that is, their dimensional time will realign itself according to angle α_0 for a corresponding displacement x, after one de Broglie wavelength hyperspherical expansion.

A change in angle α_0 corresponds to a much smaller angle change between the radial directions (by a factor λ_1/R_0 = 9.385E-42, with R_0 as the dimensional age of the Universe). The experimental spacetime torsion due to gravitational interaction lies someplace in between 1 and 10^{-41}, thus showcasing a level of local deformation of the Fabric of Space.

From figure 4, one calculate tan(α) as:

$$\tan(\alpha) = \frac{x}{\lambda_1}\delta = \frac{\lambda_1 \lambda_2 N}{P(2\pi)^3 R^2}\delta \qquad \text{(B.13)}$$

Where $9.385.10^{-42} = \frac{\lambda_1}{R_0} \leq \delta \leq 1$ and M=1. It will be shown that the upper limit is valid for charged particle interaction, while the lower limit modified by a slight deformation of the fabric of space will be associated with gravitational interaction.

A dual way of thinking about spacetime torsion is to consider that matter/volume tunnels between gravitational (hypersuperficial) and non-gravitational (longitudinal or volumetric) states. The amount of time in the non-gravitational state results in different gravitational masses for the particles.

For the case of light, one has the following equation:

$$\tan(\alpha_0) = 1 \qquad \text{(B.14)}$$

That is, light propagates with dimensional time τ at 45^0 with respect to the Radial time.

To calculate the derivative of tan(α) with respect to τ, one can use the following relationship:

$$\frac{\partial}{\partial \tau}\tan(\alpha_0) = \frac{\tan(\alpha_0)}{\lambda_1} = \frac{\lambda_2 N}{P(2\pi)^3 R^2}\delta \qquad \text{(B.15)}$$

Since the wave interference at the previous crest happens at a null angle.

Acceleration is given by:

$$a = c^2 \frac{\partial}{\partial \tau}\tan(\alpha_0) = \frac{c^2 \lambda_2 N}{P(2\pi)^3 R^2}\delta \qquad \text{(B.16)}$$

To calculate the force between two 1 Kg masses (1000 moles of 1 a.m.u. particles) separated by one meter distance one needs to multiply equation (B.15) by 1Kg (N particles/Kg* 1Kg):

$$F = G_{Calculated}\,(\delta)\frac{(1Kg)^2}{(1meter)^2} = -\frac{c^2 \lambda_2 * \left(\frac{N}{1Kg}\right)^2}{P(2\pi)^3}\delta\,\frac{(1Kg)^2}{(1meter)^2} \qquad \text{(B.17)}$$

For δ=1 and P=3.5 one obtains the $G_{Electrostatic}$ (B.5).

$$G_{Calculated}\,(\delta = 1) = \frac{c^2\left(\frac{N}{1Kg}\right)\lambda_1}{P(2\pi)^3} = 8.29795214E + 25 = G_{Electrostatic} \qquad \text{(B.18)}$$

where one made use of $\lambda_1 = N\lambda_2$ and considered the absolute value.

It is important to notice that the derivation of the $G_{Calculated}$ never made use of any electrostatic property of vacuum, charge etc. It only mattered the mass (spacetime volumetric deformation) and spin. Of course, one used the Planck constant and the speed of light and Avogrado's number. By setting δ=1 one recovers the electrostatic value of G!

To analyze Gravitational interaction, let's consider that Hubble coefficient measurements estimate the Universe as being around 15 Billion Years old or 1.418E26 meters radius.

To obtain the elasticity coefficient of spacetime, let's rewrite $\delta = (\lambda_1/R_0)\xi$ on equation (B.17) and equate the $G_{Calculated}$ to $G_{Gravitational}$ for two bodies of 1 Kg separated by 1 meter.

$$\boxed{F = G_{Gravitaion\ al} = -6.6720\ \mathrm{E}\text{-}11\ \frac{(1Kg)^2}{(1meter)^2} = -\frac{c^2\left(\frac{N}{1Kg}\right)\lambda_1}{P(2\pi)^3}\frac{\lambda_1}{R_0}\xi\frac{(1Kg)^2}{(1meter)^2}} \tag{B.19}$$

Where P =3 since we are considering a spin-zero interaction.

Solving for ξ:

$$\boxed{\xi = \frac{P(2\pi)^3 R_0 G_{Gravitaion\ al}}{c^2\left(\frac{N}{1Kg}\right)\lambda_1^{\ 2}} = 8.567 \times 10^4} \tag{B.20}$$

If we consider that the force is given by mass times acceleration:

$$F = m_{Mass}a_x = m_{Mass}c^2\frac{\partial \tan(\theta)}{\partial\lambda} = \frac{m_{Mass}c^2}{\lambda^2_1}\frac{\lambda_1}{R_0}\xi.x \tag{B.21}$$

$$F = \frac{m_{Mass}c^2}{\lambda_1 R_0}\xi.x = m_{Mass}\left(2\pi.\Omega^G Universe\right)^2.x \tag{B.22}$$

The natural frequency of spacetime oscillations is:

$$\Omega^G{}_{Universe} = \frac{1}{2\pi}\sqrt{\frac{c^2\xi}{\lambda_1 R_0}} = 32.14\,\mathrm{KHz} \tag{B.23}$$

Notice that this is not dependent upon any masses. That should be the best frequency to look for or to create gravitational waves. Of course, Hubble red shift considerations should be used to determine the precise frequency from a specific region of the Universe.

Charged particles are capable of traveling along dimensional time directions of due to the fact that a charged particle is actually a spinning ellipsoid of revolution. The spin is a rotation perpendicular to dimensional time and a space dimension. At each de Broglie cycle, the phase of the wave in the dimensional direction changes sign. This change in sign correlates with the attraction and repulsion seen in charged particles. Spin zero matter does not have that phase change and thus only presents gravitational attraction or antigravitational repulsion.

While spinning dimensional time and the physical dimension axis, charged particles are charged-massive, non-massive and reversely-charged-massive at each de Broglie cycle. Reversely charged particles follow the same trajectory with a 180 degrees phase shift. A full description of the model for nuclear particles will be presented in the Hypergeometrical Standard Model paper of this series.

At last one can calculate the value of the vacuum permittivity from equations (B.5) and (B.18) as:

$$\varepsilon_0 = \frac{7\pi^2 N q_e^2}{c^2 \lambda_1} = 8.85418782 \quad E - 12 \qquad (B.24)$$

Not surprisingly, there is a perfect match between theoretical and experimental (8.85418782E-12 $C^2.N^{-1}.m^{-2}$) values. The screening factor used to calculate the effective charge per particle is due to the effect of non-zero spin on matter.

It is important to notice that this derivation only uses one parameter (screening factor) and that the formula is derived in terms of electron charge, speed of light, Avogrado's Number and Planck's constant to relate it to non-HyperGeometric Physics.

The complete equation for Gravitation is given by:

$$F_{Gravitaional} = \left[\frac{c^2 \left(\frac{N}{1Kg} \right) \lambda_1}{P(2\pi)^3} \frac{\lambda_1}{R_0} \xi \right] \frac{m_1 m_2}{R^2} \qquad (B.25)$$

Quantum aspects can be recovered by not using fast oscillation approximations.

It is also important to notice that equations (B.8) and (B.9) can be used to calculate the interaction between any particles (matter or anti-matter) or to perform quantum mechanical calculations in a manner similar to molecular dynamic simulations. The Quantum character is implicit in the de Broglie wavelength stepwise quantization. It is also relativistic in essence, as it will become clear when one analyzes Magnetism next.