

# Super Unification of All Forces

Edward J. Bacinich

*Alpha Omega Research Foundation Inc. 1048 S. Ocean Blvd. Palm Beach Fl 33480*

**Abstract.** The annihilation of Planck and anti-Planck mass is paramount in explaining the Big-Bang. This total release of primordial energy in the form of electromagnetic-like radiation through ‘nothing’ offers a model similar to the standard model of a Riemannian hypersphere. Our model however would expand radiantly outward from time zero in the form of a hyper-wave which would carry the total energy of the Big-Bang with it. By using this wave concept and the Planck force ( $F_{Pl}$ ) inherent in the quantum vacuum, it is possible to explain the space-time geometry of our universe and complete unification.

*The Greatest Cosmological Riddle: Why is there Something rather than Nothing?*

Special Relativity and Quantum Theory promote energy to a predominant role where particles and fields are seen as being nothing more than different forms of energy. Energy exists in the realm of all ‘that which is’ or of being, i.e., worlds, universes, spacetime, dimensions, mathematics, and information. Ultimately these are all a construction of energy. Along with this arena of all that which is, there also exists an arena of ‘non-being’. To emphasize this idea we could say there is a quantum state of nothingness. In logic this is called a categorical negative. It is difficult to define a region of nothingness without using something to describe it. This counter-intuitive relationship seems to be reflected in the structure of our universe. We discovered that energy from the Big-Bang in the structural form of a wave universe, may be forced into forming and containing regions of absolutely nothing.

In this model, primordial energy of our universe takes the form of a single spherical wave, moving radiantly away from the Big-Bang at the speed of light. Its very 4D ‘c’ motion from the Big-Bang is asymmetric time at any location of the spherical wave surface [1]. We also think of it as ‘the all pervasive now’ which is globally simultaneous. On this 3D-wave surface, regions of high-energy density flow towards regions of lower density. This flow of energy is accelerated and identical to the attributes of an ordinary gravitational field. In our opinion, gravity is the accelerated motion of the electromagnetic-like nature of this hyper-wave front. If we follow this accelerated vacuum field down to the quantum level, we find that the imploding vacuum acceleration becomes relativistic. However, the speed of light is reached not at an infinitesimal point, but at the radius of a nucleon (see Appendix 1). Here space is relativistically contracted to a hard spherical shell surrounding

absolutely nothing. According to Special Relativity, a room full of people approaching the speed of light will be contracted flat in the direction of travel. It is not just the room and the people. It is the very spacetime within the room that is contracted flat as far as the rest of the universe is concerned. No one inside the room will experience 'flatness'. Similarly, we do not experience flatness even though we are moving at lightspeed away from the Big-Bang in a particular 4D time direction.

The quantum vacuum as a super-energetic electromagnetic-like field will also experience contraction and time dilation when subjected to special relativistic limit at right angles to its lightspeed motion away from the Big-Bang. Acting in this way, the vacuum creates mass similar to event-horizons of black-holes. The amount of mass created is a result of the incremental displacement of spacetime which leaves a zero volume  $(\text{cm}^3)^0$  hole ( $V_0$ ) in its 'fabric' (hyper-wave surface). The magnitude of  $V_0$  is a quantum state related to the Planck state but forty orders of magnitude larger.  $V_0$  is the magnitude between the Planck force and the strong nuclear force as well as the magnitude between the strong nuclear force and the gravitational force. Each is separated from the other by the same huge order of power ( $10^{40}$ ). However, at the Big-Bang initial Planck state, they are exactly equal.

As the vacuum accelerates to  $c$  at a nucleon's radius, time dilates and space contracts to a hard spherical shell, which spins off the hypersurface (4D direction towards the past) with an intrinsic half spin. This implosion occurs incrementally in energetic pulsations of  $10^{23}$  per second as indicated by de Broglie's  $v = mc^2/h$ .

The accelerated imploding vector arrows from every direction gives us a local understanding of inertia and inertial-mass without relying on Mach's principle. Contrary to general opinion, there is no natural way Mach's principle is contained in general relativity. This phenomena also gives us an understanding of the matter-wave duality, where wavelength  $\lambda = h/mc$  and the matter-wave duality; the quon ' $\phi = m\lambda$  and is the constant  $(h/c)$ . This indicates gravity is connected to matter through relativistic effects when the reference frame of the vacuum is accelerated.

Newton's gravity was instantaneous. Einstein correctly showed that the gravitational interaction could not exceed the speed of light, but this did not necessarily mean that the gravitational interaction was *at* the speed of light. We predict that the gravitational interaction would be at the speed of light only at the event horizon of black-holes, which in our scheme includes baryons. We further predict that the speed of gravitational interactions is not any faster than the calculated escape velocity at any particular radius from a gravitating body. On the earth's surface the implosive velocity of the vacuum is roughly 11.18 km/s. The implosion velocity ( $v_{im}$ ) is given by our gravity equation for:

$$\text{macro ,} \quad v_{im} = (2M_{\oplus} c^3 L^* / \hbar R_{\oplus})^{1/2} = 11.18 \text{ km/s.} \quad (1.0)$$

$$\text{micro (at } r_i), \quad v_{im} = (c^2 M_i L^* / V_0 M_{PL} r_i)^{1/2} = c , \quad (1.01)$$

where  $c$  is the speed of light;  $M_{\oplus}$  and  $R_{\oplus}$  are the earth's mass and radius respectively,

$M_{PL}$ ,  $L^*$  &  $\hbar$  are Planck's mass length & constant respectively;  $M_i$ ,  $r_i$  and  $V_0$ , are ideal nucleon's mass, radius and displaced volume, respectively.  $M_i = 1.714075 \times 10^{-24}$  g,  $r_i = 7.424155 \times 10^{-14}$  cm and  $V_0 = 1.714075 \times 10^{-39}$  pure, (see appendix 2 for constants).

Special Relativistic effects are applied as the implosion velocity approaches the speed of light mimicking General Relativity except on the quantum level. The quantum world comes into being as spacetime implosively accelerates to the relativistic limit. Actually it is the quantum  $V_0$ , of the nothingness world that causes the acceleration, giving rise to the gravitating macro world of concrete or what we call reality. Notice that zero volume could be treated as being equivalent to a zero point particle but with a circumference and a magnitude.

We will show why the quantum vacuum, as a geometric structure of energy, must accelerate by its very nature. It explains why the Davies, Unruh formula  $kT = (h/2\pi)(g/c)$  gives us a thermal ambience in an accelerated frame, whereas, the same probe in an inertial frame registers nothing. This is incompatible with Einstein's Principle of General Covariance but supports our model. See Einstein's Elevator [2].

Although not directly measurable in the ground state, we believe that the quantum vacuum, as a state of the electromagnetic field with 'zero' point force, carries super-energy. This quantum vacuum state can also give us the geometry of a reference frame. We think all motion is relative to this energetic frame, which, besides expanding at  $c$ , also has the dynamic ability of space-wise acceleration.

## Extended Special Relativity

A finite amount of energy was released in the Big-Bang to create the universe we observe. This release of energy through absolutely nothing created our spacetime vacuum in the nature of ordered EM-like spherical waves. This Super-Light is carried by the ultimate boson, the Planck boson which has the energy of Planck mass multiplied by the speed of light squared  $\sim 10^{19}$  GeV. The Planck boson has the geometric shape of a hemispherical bubble (packet of energy), which moves at lightspeed radiantly away from the Big-Bang with the symbol  $(\gamma_0)$ , thus  $\gamma_0 = 2\pi cL^{*2}$  and generates a quantum of cubic space per unit of time ( $4.919 \times 10^{-55} \text{cm}^3/\text{s}$ ). In this scenario our universe is but a single wave, one, among an almost infinite number of ordered concentric waves. Even if the Big-Bang had lasted for only one second, then  $10^{44}$  parallel (concentric) wave-universes would have been created. No other 'initial condition' is required to describe the totality of our universe or the many-worlds idea.

The major difference between Special Relativity (SR) and Extended Special Relativity (ESR) is that the light cone in Einstein's SR sits in a stationary geometry whereas, in ESR the apex of the light cone *is* geometry and moves at the speed of light in every 4D time direction [3-4].

In a Riemannian hyperspherical wave universe an almost infinite number of time directions exist which are equal to the number of radii inside of a sphere. Importantly, for every direction of time in our universe, there exists an equal and opposite time direction. Asymmetric and symmetric time co-exists in our universe. The only way

the vacuum could exist as a state of the electromagnetic field is if the vacuum moves at lightspeed. The way we view gravity is that it curves on the large scale, and propagates up to the speed of light at event horizons. The velocity diminishes as the radius 'R' increases from the event horizon. The implosion velocity 'v' is,

$$v_{\text{implosion}} = (2E_g L^* / M_{\text{PL}} R)^{1/2} \quad (1.1)$$

where  $E_g$  is the rest energy of a macro gravitating mass,  $L^*$  and  $M_{\text{PL}}$  is Planck length and mass respectively. Orbital velocity is at right angles to, and the square-root of two ( $\sqrt{2}$ ) of the implosion velocity,

$$v_{\text{orb}} = (E_g L^* / M_{\text{PL}} R)^{1/2} \quad (1.2)$$

If in (1.1)  $E_g/c^2$  is the earth's mass  $M_{\oplus} = 5.973781 \times 10^{27} \text{g}$  and the radius  $R_{\oplus} = 6.371 \times 10^8 \text{cm}$ , is the mean radius of the earth, then the implosive velocity is  $11.186 \times 10^5 \text{cm/s} \sim 11.18 \text{km/s}$  which is the speed we have to exceed if we are to escape earth's gravity. We would have to travel  $11.18/\sqrt{2} \text{km/s} = 7.909 \text{km/s}$  to be in close orbit around the earth. The acceleration of gravity 'g' on the earth is,

$$g = v_{\text{imp}}^2 / 2R \quad (1.3)$$

## Implosive Quantum Gravitation

The magnitude of the gravitational force between two particles with masses M and m, and separated by a distance r, is,

$$F_{\text{grav}} = GMm/r^2 \quad (1.4)$$

G is the universal gravitational constant in the sense that G does not depend on the values M or m. We are going to demonstrate in the implosion model that G represents the fundamental quantum accelerated implosion of cubic vacuum per mass, as in,

$$G = L^3 / T^2 M_{\text{PL}} = c^2 L^* / M_{\text{PL}} \quad (1.5)$$

$$\sim G/c^2 = L^* / M_{\text{PL}} \quad (1.51)$$

where  $L^*$  is Planck length  $\sim 1.616 \times 10^{-33} \text{cm}$ ,  $T^*$  is Planck time  $\sim 5.390 \times 10^{-44} \text{s}$  and  $M_{\text{PL}}$  is Planck mass  $\sim 2.1767 \times 10^{-5} \text{g}$ . Also, on a nucleon level some  $10^{20}$  orders larger,

$$G = r_i^3/t_i^2 \mathbf{I}_\emptyset \quad (1.6)$$

$$\sim G/c^2 = r_i/\mathbf{I}_\emptyset \quad (1.61)$$

where  $r_i$  is a nucleon's radius  $\sim 7.424 \times 10^{-14}$  cm and  $t_i$  is the time  $\sim 2.476 \times 10^{-24}$  s to cross such a radius at the speed of light. Now  $\mathbf{I}_\emptyset$  is analogous to  $M_{PL}$  but represents a displaced density of a black hole mass  $\sim 1.7 \times 10^{-24}$  g, per  $\sim 1.7 \times 10^{-39}$  pure, giving us a displaced density of  $1 \times 10^{15}$  g, note:  $\mathbf{I}_\emptyset = r_i c^2/G$ . In the implosive model, a nucleon  $M_i$  is like a black hole which has a displaced volume that is measured outside of the hole. There is no dimension or anything else inside the hole. Hence the volume  $V$  is the displaced volume  $V_0$  with a magnitude only. In order for the displaced density ( $M_i/V_0$ ) be equal to  $\mathbf{I}_\emptyset$  the radius must be  $r_i$ . It can be shown by extrapolation, that on the nucleon level this is true if, and only if, the radius has the dimensions (measured outside of the hole) of  $r_i = 7.42415598449 \times 10^{-14}$  cm. Now,  $M_i$  has the same numerical digits as  $V_0$  so that  $M_i = V_0 \mathbf{I}_\emptyset$ . Here,  $V_0$  is  $4\pi r_i^3/3 = 1.71407 \times 10^{-39} (\text{cm}^3)^0$ . Thus,  $M_i = 1.71407 \times 10^{-24}$  g. We will show that these have a fundamental quantum nature by the fact (1.51) (1.61). Also,  $r_i/\mathbf{I}_\emptyset = L^*/M_{PL} = G/c^2$ .

Our premise is that there is no spacetime inside a black hole, as reflected by the uncertainty principle, and is causally the reason for gravitation. Here, the absence of spacetime acts as an energy sink.  $\mathbf{I}_\emptyset c^2$  represents a negative energy potential which acts in the manner of a super-suction, sucking in spacetime. Due to its super energy  $\sim 10^{32}$  °K, the vacuum accelerates toward zero °K and reaches the speed of light outside the finite radius of a nucleon. Special relativistic effects cause a contracted event horizon to form incrementally around the black hole every  $\sim 4 \times 10^{-23}$  seconds. This pulsation causes the de Broglie particle-wave duality ( $\phi = m\lambda = h/c$ ). From this scenario, gravitational force will transform into the strong force. In effect, all massive quantum particles are replicated and could be considered as *virtual* [5].

There, space contracts, time goes to zero and spins off our hyper-surface with an incremental 1/2 spin at the speed of light. The spin radius is,

$$r_s = \hbar/M_i c. \quad (1.62)$$

When we compare Newton's gravitational force equation with the analogous expression for the electric force between two charges  $e_1$  and  $e_2$  we find,

$$F_{\text{elec}} = e_1 e_2 / 4\pi \epsilon_0 r^2 \quad (1.7)$$

where  $\epsilon_0 = 8.85 \times 10^{-12}$  F/m is the electric permittivity of free space. Both (1.4) and (1.7) have the same 'inverse square-law' behavior. If we compare the gravitational force between the electron and the hydrogen atom's proton and the electric force that supposedly holds them together, we find on this quantum level that the gravitational force is smaller by thirty-seven orders of magnitude ( $10^{-37}$ ). Furthermore, the gravitational force is smaller than the strong force by the magnitude of the hole in space  $V_0 = 4\pi r_0^3/3 = 1.714 \times 10^{-39}$  pure ( $r_0 \sim r_i \sim 7.424 \times 10^{-14}$  cm, but with a magnitude only). In the following equation (1.8) we have M or m as 'baryons'  $\sim 1.71407 \times 10^{-24}$ g,

$$\frac{F_{\text{grav}}}{F_{\text{strong}}} = \frac{GMm/r_i^2}{mc^2/r_i} = \frac{GM/r_i}{c^2} = GM/c^2 r_i = 1.71407 \times 10^{-39} = V_0 \text{ pure.} \quad (1.8)$$

The magnitude of  $V_0$  has a fundamental quantum nature and is exactly,

$$V_0 = \pi/\sqrt{2}(360^0 \times 10^{17})^2 = 1.71407520762 \dots \times 10^{-39} \quad (1.9)$$

$$\text{or} \quad V_0 = \pi/\Gamma\sqrt{2} = 1.71407520762 \dots \times 10^{-39} \text{ pure} \quad (2.0)$$

where  $\Gamma$  is  $6^4 \times 10^{36}$  pure or  $\Gamma = (2\pi/3L_0^*) \times 10^6$  pure,  $L_0^* \sim L^*$  but dimensionless[8]. This also tells us that the implied radius ( $r_0$ ) is now known to millions of decimal places by,  $r_0 = (3V_0/4\pi)^{1/3}$  or,

$$r_0 = (3/\Gamma 4\sqrt{2})^{1/3} = 7.42415598449 \dots \times 10^{-14} \text{ pure} \quad (2.1)$$

Since  $r_0 \sim r_i$  then  $\mathbf{I}_\emptyset$  must be exactly  $1 \times 10^{15}$ g, as in (2.2). More interestingly, is  $G/c^2$  from equations (1.51-1.61) as pointed out in *Gravitation* [6], which is so important we gave it the symbol ' $\wp$ ' and,

$$\begin{aligned} \wp &= G/c^2 = L^*/M_{\text{PL}} = V_0 r_i / M_i = r_i / \mathbf{I}_\emptyset = L^{*2} c / \hbar = 2\pi L^{*2} / m_e \lambda_c = \hbar / c M_{\text{PL}}^2 \\ &= c^2 / \mathbf{F}_{\text{PL}} = \gamma_0 / h = 7.42415598449 \dots \times 10^{-29} \text{ cm/g,} \end{aligned} \quad (2.2)$$

This  $\wp$  is defined as a 'certain' conversion factor between grams and centimeters, which we find to be the displaced density of a black hole and its implied radius when measured outside the hole.  $V_0$  is equivalent to the magnitude between Newton's gravitational force and the strong force. Newton's gravitational force transforms into the strong nuclear force via special relativistic effects. It is no wonder

that the strong force is extremely short ranged, acting over  $\sim 10^{-13}$  cm. Space is contracted relativistically into a hard spherical shell equivalent to a black-hole event horizon and is replicated every  $\sim 10^{-24}$  s - along with an increase of entropy. Thus,

$$F_{\text{grav}} / V_o = F_{\text{strong}} \quad (2.4)$$

## Super Unification

Under our scheme, all the forces we observe are different manifestations of a single force given to us by the Big-Bang which is the Planck Force symbolized by ( $\mathbf{F}_{\text{PL}}$ ). It is a superforce on the order of  $10^{49}$  dyne from a quantized, vacuum energy.

The Planck Force  $\mathbf{F}_{\text{PL}}$  is based on Planck Mass ( $M_{\text{PL}}$ ) and Planck Length ( $L^*$ ) and lightspeed squared ( $c^2$ ). It is the maximal force allowed in our universe as suggested by leading contemporary quantum theorists. The finite energy of our universe is  $\sim 1.221054 \times 10^{19}$  GeV that is the energy carried by the Planck boson. The universal force is this rest energy divided by its radius  $L^*$ . We have,

$$\mathbf{F}_{\text{PL}} = M_{\text{PL}}c^2/L^* \quad (2.7)$$

and  $\mathbf{F}_{\text{PL}} = 1.21058229462 \times 10^{49}$  dyne. Since  $M_{\text{PL}} = \hbar/L^*c$  from (2.2), and combining with (2.7), we can say,

$$\mathbf{F}_{\text{PL}} = \hbar c/L^{*2} \quad (2.8)$$

$\mathbf{F}_{\text{PL}}$  is related to most of the fundamental constants as will be shown in another paper. Here we will show a relationship between the Planck Force ' $\mathbf{F}_{\text{PL}}$ ', the Strong Force ' $F_s$ ' and the Gravitational Force ' $F_g$ ' using the 'hole' in space ' $V_o$ ' by

$$\mathbf{F}_{\text{PL}} V_o = F_s \quad (2.9)$$

and from (2.3),

$$F_s V_o = F_g \quad (3.0)$$

Since  $F_s = \mathbf{F}_{\text{PL}} V_o = F_g / V_o$ , it follows,

$$\mathbf{F}_{\text{PL}} = F_s / V_o = F_g / V_o^2 \quad (3.1)$$

Notice,  $F_s = M_1 c^2 / r_1 = \mathbf{F}_{\text{PL}} V_o$  and  $F_g = GM_1^2 / r_1^2 = \mathbf{F}_{\text{PL}} V_o^2$ . From (2.8) it follows,  $F_s = \hbar c V_o / L^{*2}$  and  $F_g = \hbar c V_o^2 / L^{*2}$  where  $F_s = (\mathbf{F}_{\text{PL}} F_g)^{1/2}$  and  $F_g = F_s^2 / \mathbf{F}_{\text{PL}}$ . So,

$$\mathbf{F}_{\text{PL}} = F_s^2 / F_g \quad (3.2)$$

There is only one force in this universe and that is the Planck Force  $\mathbf{F}_{\text{PL}}$  from which all forces in our nature are derived. In our scheme this force exists now - and not just at (time = zero). At the Big-Bang, the Planck Force *is* the Strong Force and *is* the Gravitational Force;  $\mathbf{F}_{\text{PL}} = F_s = F_g$  by,

$$\mathbf{F}_{\text{PL}} = M_{\text{PL}} c^2 / L^* = GM_{\text{PL}}^2 / L^{*2} \quad (3.3)$$

the Strong Force  $F_s = M_{\text{PL}} c^2 / L^* = \mathbf{F}_{\text{PL}}$ , the Gravity Force  $F_g = GM_{\text{PL}}^2 / L^{*2} = \mathbf{F}_{\text{PL}}$ . In equation (1.7), if  $e_1 e_2$  are the fundamental electric charges then,  $F_e = e^2 / 4\pi\epsilon_0 r^2$ . Contained in (2.8) it is known that  $\hbar c = e^2 / \alpha$ . Then we can say,

$$\mathbf{F}_{\text{PL}} = e^2 / \alpha L^{*2}, \text{ and } \mathbf{F}_{\text{PL}} = e\Phi / \pi L^{*2} \quad (3.4)$$

where  $e\Phi = \hbar c / 2$  is the quanta of electro-magnetic charges. It follows from (1.7) that,

$$F_e = \mathbf{F}_{\text{PL}} \alpha L^{*2} / 4\pi\epsilon_0 r^2 \quad (3.5)$$

therefore,  $\mathbf{F}_{\text{PL}} = F_e 4\pi\epsilon_0 r^2 / \alpha L^{*2}$  (3.6)

combining (3.1) & (3.6),

$$\mathbf{F}_{\text{PL}} = F_s / V_0 = F_e 4\pi\epsilon_0 r^2 / \alpha L^{*2} = F_g / V_0^2 \quad (3.7)$$

or  $\mathbf{F}_{\text{PL}} = F_s / V_0 = e^2 / \alpha L^{*2} = e\Phi / \pi L^{*2} = F_g / V_0^2$  (3.71)

The Universal Force = Strong Force = EM Force = Gravitational Force

If the Electro-weak Force is unified, then, one has:

**The Unification Of All Forces Including Gravity.**

## Conclusion

We have arrived at unification of all the forces to one Super-Force by quantizing the entire universe from the explosion of Planck and anti-Planck masses. The total energy of the Big-Bang is now in the form of a hyperwave carried by Planck and anti-Planck bosons exploding radiantly away from time zero at lightspeed in all 4D directions through ‘nothingness’. The recognition and consideration of the quantum state of ‘nothingness’ (non-being) is just as paramount as the consideration of the observable universe. The conflict between these two quantum states produces all the known forces from the Planck force inherent in the vacuum’s hypersphere.

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## Appendix 1

In this appendix we consider the velocity of accelerating space to be larger than zero and less than or equal to the speed of light  $c$ , which depends solely upon some radius 'r' from an energy sink hole with an implied radius  $r_i$ . Here we have 'V' as the velocity of the vacuum, with 'a' as the acceleration,  $dV/dt$ .

$$V = dr/dt, \quad dt = dr/V \quad (6.2)$$

$$dV = adt = GI_\phi dt/r^2 \quad (6.3)$$

$$\int v dv = \int a dr = \int GI_\phi dr / r^2 \quad (6.4)$$

$$V^2/2 = GI_\phi/2r \quad (6.5)$$

$$V = (GI_\phi/r)^{1/2} = (GM_{PL}(r_i/L^*)/r)^{1/2} \quad (6.6)$$

$$V(r_i) = c = (GI_\phi/r_i)^{1/2} \quad (6.7)$$

$$V = (r_i/r)^{1/2}(GI_\phi/r_i)^{1/2} = (r_i/r)^{1/2}(GI_\phi/r_i)^{1/2} \quad (6.8)$$

$$V = (r_i/r)^{1/2}c, \quad r_i \leq r \leq \infty \quad (6.9)$$

## Appendix 2

### Constants (cgs)

$\alpha$	Fine structure constant	$(e\pi/\phi)$	$7.2973528 \times 10^{-3}$
$e$	Elementary Charge	$(hc/2\phi)$	$4.8032306 \times 10^{-10} \text{ (g cm}^3/\text{s}^2)^{1/2}$
$e^2$	Charge Squared	$(AL^2 r_{se}/a_o)$	$23.071025 \times 10^{-20} \text{ g cm}^3/\text{s}^2$
$\phi$	Magnetic Flux quantum	$(e\pi a_o/r_{se})$	$2.0678449 \times 10^{-7} \text{ (g cm}^3/\text{s}^2)^{1/2}$
$R_\infty$	Rydberg Constant	$(e/4\phi a_o)$	$1.0973731 \times 10^5 \text{ cm}^{-1}$
$\lambda_c$	Compton Wavelength of Elec.	$(h/m_e c)$	$2.4263104 \times 10^{-10} \text{ cm}$
$r_{se}$	Electron Spin Radius	$(\hbar/m_e c)$	$3.8615930 \times 10^{-11} \text{ cm}$
$\mu_e$	Magnetic Moment of Elec. (Bohr)	$(e r_{se}/2)$	$9.2740611 \times 10^{-21} \text{ (g cm}^5/\text{s}^2)^{1/2}$
$m_e$	Electron Rest Mass	$(\hbar/c r_{se})$	$9.1094809 \times 10^{-28} \text{ g}$
$a_o$	Bohr Radius	$(r_{se}/\alpha)$	$5.2917723 \times 10^{-9} \text{ cm}$
$r_c$	Classical Electron Radius	$(\alpha r_{se})$	$2.8179407 \times 10^{-13} \text{ cm}$
$h$	Planck Constant	$(2e\phi/c)$	$6.6261415 \times 10^{-27} \text{ g cm}^2/\text{s}$
$\hbar$	Planck Reduced Constant	$(h/2\pi)$	$1.05458317 \times 10^{-27} \text{ g cm}^2/\text{s}$

### PLANCK STATE

$E_{PL}$	Planck Energy	$(\hbar c^5/G)^{1/2}$	$1.95635619 \times 10^{16} \text{ g cm}^2/\text{s}^2$
$M_{PL}$	Planck Mass	$(\hbar c/G)^{1/2}$	$2.17673983 \times 10^{-5} \text{ g}$
$L^*$	Planck Length	$(\hbar G/c^3)^{1/2}$	$1.6160456 \times 10^{-33} \text{ cm}$
$T^*$	Planck Time	$(\hbar G/c^5)^{1/2}$	$5.39054789 \times 10^{-44} \text{ s}$
$\lambda_{PL}$	Planck Wavelength	$(h/M_{PL}c)$ or $(2\pi L^*)$	$1.01539139 \times 10^{-32} \text{ cm}$
$\wp$	Length-Mass Conversion	$(L^*/M_{PL})$ or $(c^2/A)$	$7.42415598 \times 10^{-29} \text{ cm/g}$
$G$	Gravitational Constant	$(c^2 \wp)$ or $(L^{*3}/T^{*2} M_{PL})$	$6.67249863 \times 10^{-8} \text{ cm}^3/\text{gs}^2$
$A$	Planck, Cosmic Force	$(E_{PL}/L^*)$ or $(c^4/G)$ or $(\hbar c/L^{*2})$	$1.21058229 \times 10^{49} \text{ g cm/s}^2$
$\phi$	Wave-Particle Duality	$(M_{PL} \lambda_{PL})$ or $(h/c)$ or any $(m\lambda)$	$2.21024290 \times 10^{-37} \text{ g cm}$
$\gamma_o$	Ulton Boson	$(L^* c \lambda_{PL})$ or $(Gh/c^2)$ or $(\wp \hbar)$	$4.919350824 \times 10^{-55} \text{ cm}^3/\text{s}$
$q$	Kursunoglu Constant	$(M_{PL}/2L^* T^{*2})^{1/2}$ or $(A/2L^{*2})^{1/2}$	$1.5223992 \times 10^{57} \text{ (g/cm s}^2)^{1/2}$

### PROTON

$E_p$	Proton Rest Energy	$(m_p c^2)$	$1.50330143 \times 10^{-3} \text{ g cm}^2/\text{s}^2$
$m_p$	Proton Mass	$(E_p/c^2)$	$1.67264842 \times 10^{-24} \text{ g}$
$r_p$	Proton Radius	$(\zeta m_p)^{1/4}$	$7.37888575 \times 10^{-14} \text{ cm}$
$\zeta$	Zeta, $r^4/\text{mass of Spin } 1/2 \text{ Particle}$	$(r_p^3 c^2/F_s)$	$1.77238668 \times 10^{-29} \text{ cm}^4/\text{g}$
$\lambda_p$	Wavelength of Proton	$(h/m_p c)$	$1.32140315 \times 10^{-13} \text{ cm}$
$r_{sp}$	Proton Spin Off Radius	$(\hbar/m_p c)$	$2.10307843 \times 10^{-14} \text{ cm}$
$\mu_p$	Magnetic Moment of Proton	$(e r_{sp}/2)$	$5.0507854 \times 10^{-24} \text{ (g cm}^5/\text{s}^2)^{1/2}$
$V_o$	Displaced Volume (Hole in S-T)	$(m_p G/r_p c^2)$ or $(4\pi r_p^3/3)$	$1.68291029 \times 10^{-39} \text{ pure}$
$F_s$	Proton Strong Force	$(E_p/r_p)$ or $(AV_o)$	$2.03730140 \times 10^{10} \text{ g cm/s}^2$
$F_g$	Gravity of Proton Pair at $r_p$	$(Gm_p^2/r_p^2)$ or $(AV_o^2)$	$3.42859552 \times 10^{-29} \text{ g cm/s}^2$