Is the Universe in Equilibrium?
The Schwartzschild / de Broglie Equilibrium

The stability of the physical constants suggests quite strongly some sort of cosmological equilibrium. Thermodynamic equilibrium is fundamentally involved in electromagnetic and gravitational equilibrium, yet describing how these realtionships interact encounters certain limitations because of having to describe one constant in terms of the others. The inverse relationship *(E=hf)* between energy and (time and length), has led to the idea of the point particle, the singularity. This reduction is only partially justifiable. We consider the existence of a universal quantum background, effectively dominated by a unique quantity, the force required to contain electromagnetic energy. This singular force value (required of all black holes) is in every case equivalent, making it likely that there is really only one force acting, and that the universe as a whole is in equilibrium.

For this model of "A Universe in Equilibrium", four postulates are necessary.

1. The stability of the physical constants suggests strongly a single Cosmological equilibrium, this gravitational equilibrium is at the Schwartzchild radius.
2. The universe is a simple case of a gravitational/electromagnetic equilibrium which expresses within Planck quantum fluctuations, where quantic probability is essentially equal to the quantic availability.
3. With a general appearance of expansion (when viewed from within,) localized gravitational influences accumulate and generate co-aligned black holes, yet, never surpassing the singular force required to contain electromagnetic energy. Gravitational accelerations may thus vary greatly, yet the acting force in all cases is equivalent to the perimeter force.
4. There exists an active equilibrium between Schwarzschild and de Broglie fields that gives to mass its character, as in a state of fugue or flight (a well), and which within the universal well determines its inertia.

Introduction

Suppose we take Ernst Mach seriously, and determine that the universal constant (G) is actually the acceleration result expected from a sum total of all the available, and equally distributed mass in the universe, at some specified radius. Let us also accept that at this incredibly large radius (almost a perfectly straight line, quite flat), the very slight curvature, namely the acceleration of universal gravity (G) can hold passing light in its feather grasp.

Suppose that universal gravitation G, is proportional to the universal mass M_u.

$$G \propto M_U$$

This could be true for any mass whatsoever, except that the constant G is universal, so then what amount of mass would be sufficient to produce this force required to contain electromagnetic energy at its natural acceleration radius. We must some how find this unique quantity, a unique solution where the acceleration at this radius (g) is equal to G *(g=G)*. We find the radius at which the acceleration g equals G. We can derive the natural radius in terms of mass.

$$r_u = \sqrt{\frac{GM}{(6.674e^{-11})}} = \sqrt{M_U}$$

But what might be this universal radius? And what might be this universal mass?

Fortunately, thanks to modern astronomy, we have reasonable estimations for both.

Below in Table 1 is the beginning of a study of possible solutions to deriving the natural mass and radius of the universe.

Description	(G)	Light sq.	Mass (kg)	Natural radius (r_u)	Schwartzchild radius (m)	Local BH gravity (g)
WMAP Total	6.674E-11	8.988E+16	3.140E+54	1.772E+27	4.663E+27	9.636E-12
WMAP all masses	6.674E-11	8.988E+16	8.855E+53	9.410E+26	1.315E+27	3.417E-11
WMAP in atoms	6.674E-11	8.988E+16	1.520E+53	3.899E+26	2.257E+26	1.991E-10
Planck Total	6.674E-11	8.988E+16	3.041E+54	1.744E+27	4.516E+27	9.950E-12
Planck all masses	6.674E-11	8.988E+16	8.857E+53	9.411E+26	1.315E+27	3.416E-11
Planck in Atoms	6.674E-11	8.988E+16	1.460E+53	3.821E+26	2.168E+26	2.072E-10
Avg Mass/Star	6.674E-11	8.988E+16	1.700E+53	4.123E+26	2.525E+26	1.780E-10
Hoyle in atoms	6.674E-11	8.988E+16	1.680E+53	4.099E+26	2.495E+26	1.801E-10
Hoyle total	6.674E-11	8.988E+16	3.500E+54	1.871E+27	5.198E+27	8.645E-12
Equilibrium universe	6.674E-11	8.988E+16	4.534E+53	6.733E+26	6.733E+26	6.674E-11

Table 1 - The mass values for WMAP, and The European Space Agency's Planck Telescope here are all derived from the appropriate density parameters and the commoving radius ($4.3e^{26}$m).

As we can see, most of these estimates are clearly in the "same ballpark" so to speak, but for our proposal, none of the current estimates quite fit. We propose that the natural radius is that radius naturally generated by the total mass at G, and yet also contains all passing light as well. So we propose an Equilibrium universe as shown on the bottom line. The column, where the Schwartzchild radii are shown serves as evidence that our intuition was correct; there is a single unique solution to the universal frame, Where G can genuinely be a universal constant, and secure electromagnetic energy as well. It is this universe that we propose, and it is within this model that the various natural constants consist, and from which the equilibrium that involves them is discernible and is derived.

Table 2 below shows a different analysis that includes particles

Description	Mass (kg)	Schwartzchild radius (m)	de Broglie Radius λ (m)	Local BH gravity (g)	Local dB gravity	Schwartzchild Force = 1/4 Planck Force	G parameter (u)
Electron-	9.11E-31	1.353E-57	3.8613E-13	3.321E+73	6.08E-41	3.026E+43	6.08E-41
Muon-	1.88E-28	2.7972E-55	1.8676E-15	1.607E+71	1.257E-38	3.026E+43	1.257E-38
Proton-	1.67E-27	2.4841E-54	2.1031E-16	1.809E+70	1.116E-37	3.026E+43	1.116E-37
Neutron	1.67E-27	2.4874E-54	2.1002E-16	1.807E+70	1.118E-37	3.026E+43	1.118E-37
Higgs-	2.23E-25	3.3173E-52	1.5748E-18	1.355E+68	1.491E-35	3.026E+43	1.491E-35
1/2 Planck	1.09E-08	1.6162E-35	3.2324E-35	2.78E+51	7.263E-19	3.026E+43	7.263E-19
Planck	2.18E-08	3.2324E-35	1.6162E-35	1.39E+51	1.453E-18	3.026E+43	1.453E-18
1 kg water	1	1.4851E-27	3.5177E-43	3.026E+43	6.674E-11	3.026E+43	6.674E-11
Earth	5.97E+24	0.00887157	5.8887E-68	5.065E+18	3.987E+14	3.026E+43	3.987E+14
Sun	1.99E+30	2954.07147	1.7685E-73	1.521E+13	1.327E+20	3.026E+43	1.327E+20
Quasar	2.49E+42	3.6926E+15	1.4148E-85	12.169715	1.659E+32	3.026E+43	1.659E+32
Milky Way	3.14E+39	4.6657E+12	1.1197E-82	9631.5797	2.097E+29	3.026E+43	2.097E+29
Eq. Univ	4.53E+53	6.7334E+26	7.7586E-97	6.674E-11	3.026E+43	3.026E+43	3.026E+43
WMAP Univ	3.14E+54	4.6633E+27	1.1203E-97	9.636E-12	2.096E+44	3.026E+43	2.096E+44

Table 2 Demonstration of the force parameter

As might be expected, the acceleration of Local BH Gravity (the earth-like g-perimeter) increases in step with each decreasing Schwartzchild radius for all the examples. This agrees with Einstein's predictions that it is the curvature of space that determines the acceleration at the radius. We can also see that the Schwartzchild force required to contain electromagnetic energy is the same in all cases (a key observation). However, the Gravitational Parameter, a force value, exceeds the Planck force in the case of the WMAP derived mass, this would also be true for the Planck Telescope derived mass, making both of these derivations highly unlikely. The Gravitational Parameter force, matches the Schwartzchild force value for the Equilibrium Universe model alone, at exactly $1/4^{th}$ of the Planck force.

It is now widely accepted that at the center of nearly every galaxy, there is a supermassive black hole. For having used the estimated total dynamical mass for the galaxies, the consequent size of the radii are overstated, yet the study does predict a black hole at each center, and this would occur for all known galaxies.

Data for the observable universe, derived from the WMAP study for the Hubble constant, and the resulting critical density of 9.3e-27, place it plainly within its own black hole with a total mass of 3.14-3.35e^{54}kg. Yet, as seen above in Table 1, what most catches the attention is that the gravitational acceleration at the event horizon falls below the universal constant G. More importantly, the force relation of all black holes (in any universe) is in every case equivalent, at exactly $1/4^{th}$ of the Planck force. This value is important for having a direct connection with the universal frame.

The universal frame

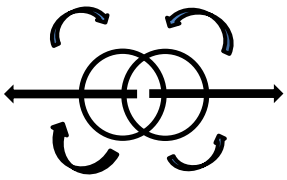
At this point, we consider this universal quantum background, where all existence is effectively dominated by a unique quantity, the force required to contain electromagnetic energy.

It turns out that the universal constant α is a simple force derivation made from the ratio of the Columbic force at a Planck particle's Schwartzchild radius, and the gravitational Schwarzschild radius force. It is also derivable from the Columbic force at the de Broglie radius in ratio to the Planck force. **and** similar reltionships are obvious for the Planck energy ground state. This may be more clearly represented by Table 3 below.

Item	Mass (kg)	Gravitational Equilibrium radius	Schwartzchild radius (m)	de Broglie Radius ƛ (m)	Columb force at Gravitational Equilibrium radius	Columb force at Sch radius	Columb force at dB radius	Schwartzchild Force (FSc)	Planck Force (Fpl)	1/2 Planck Force (Fpl)	→	Results
Planck	2.177E-08	1.475E-04	3.232E-35	1.616E-35	1.060E-20	2.208E+41	8.832E+41	3.026E+43	1.210E+44	→	→	7.247E-03
1/2 Planck	1.088E-08	1.043E-04	1.616E-35	3.232E-35	2.120E-20	8.832E+41	2.208E+41	3.026E+43	1.210E+44	→	→	7.247E-03

The alpha constant here shown is unique in that it is a purely force derivation. If the Planck particle really does exist, then we can assume that the cycle repeats itself, thus acting as a universal source for the quantum fluctuation, and reality.

This graphic shows a single point of the Planckian background field, an "ever-continuing moment of creation", in universal equilibrium, where space-time is quantized within the Planck interaction.



The Planck Interaction

In our model, the universal radius is simply the square root of the universal mass, (in meters of course), it is a singular solution which resolves to its own Schwartzchild radius, unique to this mass value alone.

$$r_u = \sqrt{M_U} = \frac{c^2}{2G} = \frac{2GM_U}{c^2}$$

Intuitively, wherever you are on the interior of a black hole, your universe appears to be expanding, and because of space-time deformation, the relative views of all accelerations at the apex* is not discernible from the view at the event horizon.

* The "apex" (Lorentz space) is postulated to be that limit beyond which, accelerations produce velocities approaching the velocity of light, and at which point masses "transform" into the larger perimeter electromagnetic containment well. This limit exists for all matter and at any location within the universal event horizon.

The Lorentz space

As an example we consider a particle (or a galaxy full of particles) being accelerated towards the speed of light.

Where, $m_v = \frac{m_O}{\sqrt{1-\frac{v^2}{c^2}}}$, the limit being the Planck mass for approaching the speed of light, mass increases, until approaching the Planck mass, (The reason for this limit is that it (whatever mass it contains) is engulfed in its own black hole, thus rendering it impossible to add further attractive force). Rather, the envelope expands in (accordance with Berkenstein's' law), held by the Schwartzchild force (F_{Sc}).

But before this, at a certain density a simple quantization occurs according to the equation below. The equation holds true for any and all mass including the Planck particle.

$$l_P^2 = \lambda\!\!\!^{-}_P{}^2 = \frac{\lambda\!\!\!^{-}{}'_{sw}\lambda\!\!\!^{-}{}'}{2}$$

Where $l_P^2 = \lambda\!\!\!^{-}_P{}^2$ equals the Planck length^2; $\lambda\!\!\!^{-}{}'_{sw}$equals the Schwarzschild radius; and $\lambda\!\!\!^{-}{}'$equals the de Broglie radius of the particle.

For any mass whatsoever, a general equilibrium is achieved according to the de Broglie radius, and the Schwarzschild radius. This is where we are today; all things are in a state of Fugue.

The universal quantum background

At this point the argument obviously diverges into the gravitational and the electromagnetic viewpoints. It has been shown that the total vector force on any point particle (i) is equal to the sum of all the other particles in the ensemble.

$$F_{i=-\sum_{i\neq j}} \frac{Gm_iM_jR_{ji}}{R_{ij}^3}$$

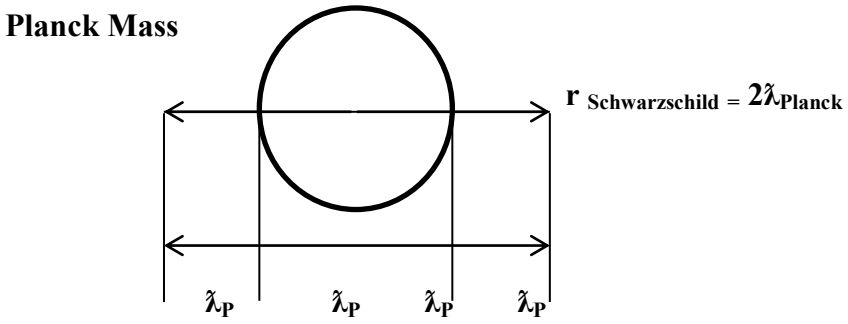
The Schwarzschild force required to retain electromagnetic energy, as already mentioned, has an interesting relation; it is exactly 1/4 of the Planck force.

$$F_P = \frac{E_P^2}{\lambda\!\!\!^{-}_P} = \frac{\hbar}{\lambda\!\!\!^{-}_P t_P} = \frac{c^4}{G} = 4F_{Sch}$$

If we consider this primary resonance field fluctuation interaction, at one Planck radius, the Planck interaction at the Planck length/radius therefore yields the Planck force, which is equal to 4 Schwarzschild force (as taken at the Schwartzchild radius).

$$F_{pl} = \frac{Gm_p{}^2}{\lambda\!\!\!^{-}_p{}^2} = \frac{\hbar c}{\lambda\!\!\!^{-}_p{}^2} = \frac{k_0e^2\alpha^{-1}}{\lambda\!\!\!^{-}_p{}^2} = \frac{4Gm_p{}^2}{\lambda\!\!\!^{-}_{Sw}{}^2}$$

Where, as shown above, $\lambda\!\!\!^{-}_P^2 = l_P^2 = \frac{\lambda\!\!\!^{-}'_{sw}\lambda\!\!\!^{-}'}{2}$



$$\frac{2Gm_P}{c^2} = 2\lambda\!\!\!^{-}_{Planck} = 2l_P = r_{Schwarzschild}$$

The Planck interaction (mentioned above) serves as the symmetric source for the fine structure constant α, and of charge, which as a field then delineate, the balance between gravitational attraction and electrostatic attraction and repulsion.

$$\alpha = \frac{k_0 e^2}{Gm_P^2}$$

α is equal to the ratio of the general Columbic constant, to G times the Planck mass^2.

Discussion

The universe expresses equilibriums of all sorts, and seeks equilibrium, (but as discussed in "the Nature of Energy" on this site) there are still many unresolved questions involved in this model.

Consider the de Broglie radius as compliment to the Schwarzschild radius

All elements (normal matter) are in a natural state of fugue (flight), with regards to the primary quantum field, where inertia might be viewed as this natural elemental interaction with the quantum background.

All the known particle masses and radiant energy are derivable from the Planck constant (h). The relationship is ubiquitous, integral, and determines quantic availability for all particulate mass and energy.

Planck himself observed,

“There can be no doubt that the constant h plays a definite role at an emission center of the elementary oscillation process… The thermodynamics of radiation will have arrived at an entirely satisfactory conclusion only when the constant h is understood in its full universal significance”.

Given the entire above, several questions remain. Is the density of the universe increasing? In a black hole is expansion really equivalent to contraction? Is the likelihood of macro-quantum entanglement effects becoming more frequent certain? Is understanding inertia finally within our grasp? A friend of mine commented, that since all of this occurs within a Schwartzchild radius, it might well explain why it is dark at night. The model leaves many questions, which, in any case is probably a good sign.

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David Harding