The General Relativistic Perspective

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1.0 Abstract

This paper formulates additional General Relativistic [G.R.] equations. They do not contradict General Relativity. They examine the deductions of Dr. Einstein from a relativistically distorted perspective. The equations examine the distorted escape velocity of a G.R. object, determining its true – not relativistically distorted – escape velocity. The values of non-Relativistic velocity and the apparent escape velocity relativistic deformation puts on are it equally true. In contrast to the variables in the Classical equations of Relativity, they are more specific in their aspect, and in their relationship to escape velocity, not simply the time distortion. The values for the quantities of rate (the Time and the Velocity) are the quantities for zero escape velocity‖zero deformation – the non-Relativistic aspects.

Because there are fewer seconds for a Relativistic Perspective that has distortion, the perspective equations have a different relation. They calculate higher velocity perceived by the observers in a General relativistically distorted body. The escape velocity would appear to increase in exactly same proportion as time – but the energy needed for that escape velocity would decrease because of the slowing of all Bosons – including the Graviton.

The development of the equations is done more completely in the paper, but two examples show the principle. The equations show the relation of two points of view: the independent variables had non-deformation and the depending variable would be the value observed because of the deformation. The equation reasoned to show to this relationship is:

$$\text{Time'} = \text{Time}/(1 - 2GM/rc^2)^{\frac{1}{2}}$$

Because escape velocity [$\text{Velocity}_{\text{Escape}} = (2GM/r)^{\frac{1}{2}}$], then [$\text{Velocity}_{\text{Escape}}^2 = 2GM/r$]. So the above |Time| equation could also be expressed as:

$$\text{Time'} = \text{Time}/(1 - \text{Velocity}_{\text{Escape}}^2/c^2)^{\frac{1}{2}}$$

– that could be reasoned to mean that Escape velocity is limited to light speed, just as Real‖non-Relativistic velocity is limited to "c". Less time will go by when there is a relativistic deformation so all Bosons (including the Graviton) would lose their velocity/mass/energy. The inverse relation would be where the independent variables were the observed velocity from the Relativistic or distorted view. The dependent variable would be the True‖non-relativistic‖non-distorted Time‖Escape_Velocity. The parallel equation for that Relativistic Perspective:

$$\text{Time} = \text{Time'}/(1 + \text{Relativistic}_{\text{Escape-Velocity}}^2/c^2)^{\frac{1}{2}}$$

This relationship allows the additional development of 2 formula/equations for the Escape velocity. There are a number of other equations for Mass and Radius that will be proposed in a following paper. These equations are all of the two Perspectives.

All the equations are confirmed to two to thousand figures for 35 different values to have a range of 1.0E-500 m/s to c-(1.0E-500) m/s without the significant error. The tables are available on request.

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2.0 General Relativistic Escape Velocities

Light speed limits are accepted as one of the defining aspects of our reality. While exceptions have been both <u>conceived</u> and reasoned from observations of non-experimentally controlled data, they have never been demonstrated. The principal General Relativistic equation can be shown to establish the same principal the maximum velocity of a matter object is light speed[c]; can be reasoned to set a "c" maximum escape velocity. What follows reasons and begins the additional equations to G.R. theory; equations that will overcome the fundamental "imaginary" values contradiction inherent in the primary G.R. time distortion equation.

After its introduction in "On the Electrodynamics of Moving Bodies" and fuller recognition by the Science Community, Special Relativity theory has always been accepted as an establishing a speed limit of light in our Universe. That limit has characterizations that are inherent to the theory – a vessel exceeding a velocity $|c/(2^{\frac{1}{2}})|$ m/s would be perceived by observers inside it to be moving faster than the speed of light.   So then, a parallel of what was established in the SPECIAL Relativistic Perspective pages. For the Relativistic equation illustrations that follow all theoretic values are presumed exact to 100 decimal places. It is not a declaration, simply a valid theoretic assignment. So, light speed:

   c – speed of light (assumed 2.9979245800~00E+08 m/s)[A]

In General Relativity the principal equation is:

$$\text{Time'} = \text{Time}/(1-2GM/rc^2)^{\frac{1}{2}}$$

Where

       c – speed of light
   Time – real time taken value to pass when the expression: Gravitational constant multiplied by the
               mass of the body divided by the product of the radius and the speed of light conditions
               approach zero – when the point is under no distortion.
   Time' – real time passing when the expression "GM/rc^2" is greater than zero
       G – Gravitational Constant – G = 6.674286700~00E-11m^3 kg^{-1} s^{-2} [B] – a value presumed exact to
               100 decimal places.
       M – Mass of object considered
        r – radius of object considered

 The expression $|GM/rc^2|$ is one that does have an instances $|GM|$ would be greater than $|rc^2|$ – that would mean that the mean the formula would describe, according to current theory, an imaginary environment. If we accept the Universe to have a mass, there is no verifiable evidence of what an

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[A] The NIST Reference on Constants, Units and Uncertain – Fundamental Physical Constants: Speed of light in Vacuum http://physics.nist.gov/cgi-bin/cuu/Value?bg|search_for=universal_in!

[B] The NIST Reference on Constants, Units and Uncertainty – Fundamental Physical Constants: Newtonian Constant of Gravitation
http://physics.nist.gov/cgi-bin/cuu/Value?bg|search_for=universal_in!

imaginary (-1^{½}) quantity represents. They are used in circuit design, astronomy and other applications – but they are a logic technique, not an observable phenomenon. Electrons do not have "negative" charges; they have charges opposite to proton charges. Assignment a negative value was simply a historic occurrence of human bias, not a description of a physical event.

The time distortion equation shows the value undistorted seconds occurring [Time] for any event and the greater number that would occur for the same event when under distortion [Time']. So let us define two alternate variables, ones recognizing |relativistic| seconds and the fact that a fewer number of |relativistic| seconds pass for any given number of [real||undistorted||non-relativistic] seconds.

The Classic General Relativity [G.R.] time equation is entirely from the non-relativistic viewpoint – for each second that would pass were the body under no gravitational distortion, when the body approaches any gravitational body, each second on that body will take "one_undistorted_second/(1 – 2GM/rc^2)" to pass. Observations made from a Relativistic object would not demonstrate a slower pace of time directly. In Relativistic distortion, the distortion is in the outside <u>observed</u> objects. What the perception/observation would be is that more real time units – things happening faster outside the distorted space/time location they occupied. The inverse equation, the equation using the <u>Relativistic</u> values, the values <u>perceived</u> from a viewpoint under that Relativistic distortion, would show how many of those time units would pass for each of the same that would occur under distortion. <u>Fewer</u> relativistic time units will pass under distortion than each of the same when not under distortion.

> Time$_{UndistortedRelativisticSeconds}$ – relativistic time units [seconds] passing from a G.R.
> perspective when the distortion is zero
> Time$_{DistortedRelativisticSeconds}$ – relativistic time units [seconds] passing from a perspective
> under a G.R. distortion defined by:

$$Time_{DistortedRelativisticSeconds} = Time_{UndistortedRelativisticSeconds} * (1-2GM/rc^2)^{½}$$

We do not use the |real| label; what is real and what is relativistic is not determinable in a Universe ruled by Planck's constants – and the simple distribution of objects. Estimations can be made of all the factors in the above equation, but they are only that, estimations. We cannot know the exact value of the variables above because the time distortion cannot really be perceived. However, we can assume, <u>solely</u> for theoretic purposes, a time not distorted by relativistic effects. To avoid the inevitable bias following a |real| label, we will assign values that presume perfection – but it is only a theoretic presumption, a strategy used throughout science. Then we reason the outcomes of that presumption. Defining more descriptive variables, ones that recognize we deal with <u>General</u> Relativity in a theoretical ideal:

> Time$_{noGRPD}$ – time units [presumed as seconds] passing from a G.R. perspective when the G.R.
> distortion factor is exclusively one[1] (no distortion)
> Time$_{GRPD}$ – seconds passing from a perspective under G.R. distortion allowing for a distortion of
> 1 or less

So the relationship becomes:

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$Time_{GRPD} = Time_{noGRPD}*(1-2GM/rc^2)^{\frac{1}{2}}$ Equation 1

As $|Velocity_{escape} = (2GM/r)^{\frac{1}{2}}|$, a valid expression for $|1- 2GM/rc^{2}|$ would be to define "$2GM/r$":

$Velocity_{noGRPDescape}$ – observed escape velocity from a General Relativistic perspective when distortion factor is one

$Velocity_{noGRPDescape} = (2GM/r)^{\frac{1}{2}}$
$Velocity_{noGRPDescape}^{2} = (2GM/r)$

So the equation then can be re-written:

$Time_{GRPD} = Time_{noGRPD}*(1 - (2GM/r) * 1/c^2)^{\frac{1}{2}}$

$Time_{GRPD} = Time_{noGRPD}*(1 - Velocity_{noGRPDescape}^{2} * 1/c^2)^{\frac{1}{2}}$

$Time_{GRPD} = Time_{noGRPD}*(1 - Velocity_{noGRPDescape}^{2}/c^2)^{\frac{1}{2}}$ Equation 2

Formulating a new theorem armed with the above equation – rather than concluding that when objects reach the Schwarzschild limit, they become imaginary, <u>Special</u> Relativity logic allows the conclusion that escape velocity never exceeds light speed. Slowdown of time is accepted on a Special Relativistic Level to slow down the acceleration of the moving body. Reactions would take place at a slower pace, so the accelerative force exerted by the propellant would decrease. That is one of the most fundamental declarations of Special Relativity. If you deny that acceleration slowdown, you are effectively denying the legitimacy of Special Relativity principles. While the growing mass of the accelerant would increase its propulsive force, the increased mass of the body being propelled would exactly match the increased mass of that propellant. As well, very fundamentally, the velocity of all Bosons will slow under Relativistic distortion. So surely there is a parallel in General Relativistic distortion: slowdown of time on the <u>gravitational</u> body would have to mean that the velocity of all gravitational <u>Bosons</u> [Gravitons] would lessen. If the Boson were not slowed along with the rest, then all of the other forces that maintain the structure of the Universe would be overpowered by the Gravitons and be forced into "classic" S.O.'s and collapse into a single non-radiating body

There is also this argument against the notion of an extremely hot and dense singularity (hereafter we will label the "Cosmic Egg") present at the beginning of the Universe could not be principally Energy/Bosons because all of them – with the possible (though not accepted by this writer) exception of the Graviton – would be slowed down under Relativistic distortions. But because General Relativity can be expressed in a way that shows that Relativistic forces must DIRECTLY affect gravitational forces in a way that limits escape velocity to light speed, we must either presume the Gravitational Bosons do undergo a Relativistic slowdown and that then reduces their force, or deny the legitimacy of all of General Relativity. We can be very certain that Special Relativity affects the velocity of

gravitational Bosons, because if it did not, the objects we see receding at the edge of the Universe would collapse on themselves; an un-slowing Graviton would develop greater and greater proportionate energy.

This author makes no such claim and asks the reader to consider a Graviton slowdown as a result of General Relativistic effects: if that gravity/Graviton force did not slow down as well as the other Bosons then the force of gravity itself would appear to increase. That would mean that objects affected by the relativistic gravitational force would increase their velocity, accelerate, at a greater rate than predicted by current theory – there would be no "halt" at the Schwarzschild border, there would be an acceleration. As an aside, while some promote that kinetic halt, it is a completely unreasonable idea: by that presumption no S.O. would ever grow. Though what affect an endlessly thickening cloak of matter/energy would bring is hard to postulate.

So fewer GRPD time units (e.g. seconds) will pass for any given number of non-GRPD time units. The "particulate" aspects of the Graviton may be under debate, but that it moves at a relativistic speed is not - it is a Boson. That is fundamental to General Relativity. Then other equations can be deduced using the time distortion effect. Square both sides:

$$\text{Time}_{\text{GRPD}}^2 = \text{Time}_{\text{noGRPD}}^2 * (1-\text{Velocity}_{\text{noGRPDescape}}^2/c^2)^{\frac{1}{2}}$$

Set the <u>variable</u> $\text{Time}_{\text{noGRPD}}$

$$\text{Time}_{\text{noGRPD}} = 1m / \text{Velocity}_{\text{noGRPDescape}}$$
$$\text{Velocity}_{\text{noGRPDescape}} = 1m / \text{Time}_{\text{noGRPD}}$$

Because the time was slowed, it would APPEAR that the escape velocity was increased by the distortion, by exactly the margin of that time distortion.

$$\text{Velocity}_{\text{GRPDescape}} = 1m / \text{Time}_{\text{GRPD}}$$

So in the Relativistic Perspective version of the equation, divide both sides with 1 real (undistorted/non-Relativistic) metre:

$$\text{Time}_{\text{GRPD}} /1m_{\text{noGRPD}} = (\text{Time}_{\text{noGRPD}}/1m_{\text{noGRPD}})*(1-\text{Velocity}_{\text{noGRPDescapee}}^2/c^2)^{\frac{1}{2}}$$

Invert the expression:

$$1m_{\text{noGRPD}}/\text{Time}_{\text{GRPD}} = (1m_{\text{noGRPD}}/\text{Time}_{\text{noGRPD}})/(1-\text{Velocity}_{\text{noGRPDescape}}^2/c^2)^{\frac{1}{2}}$$

Dividing both sides by <u>one</u> metre would not change the distortion. But the distortion could then be expressed in Velocity, not Time. G.R. time distortion would then make the escape velocity appear to be greater than it was:

$$\text{Velocity}_{\text{GRPDescape}} = \text{Velocity}_{\text{noGRPDescape}}/(1-\text{Velocity}_{\text{noGRPDescape}}^2/c^2)^{\frac{1}{2}} \quad \text{Equation 3}$$

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Let us then suppose (as we do in Special Relativity) that "1-" format of the relativistic equation means that "Velocity$_{noGRPDescape}$" has an absolute limit of light speed – from a viewpoint from <u>outside</u> the area of distortion. In the area of distortion, escape velocity would appear greater than light speed, but only because of the time distortion. We know (or can deduce) Special Relativistic distortion effects would make a sub-light velocity appear to be greater than light from a viewpoint within the distorted area. G.R. distortion would be different from the one in Special Relativity: the mass of the "matter" in a body would be increased by the matching decrease in the speed of light that would have to take place if their were a time as well as a gravity distortion. The mass all of all zero-rest-mass particles/Bosons [Photon/Gluon/z meson/w meson]'s and their energy would decrease as the time distortion reduced their speed. The Graviton has not actually been "discovered", and even if it is, again, it may not move exactly at the speed of light. But that marginal difference would not mean it is not a Boson – were it anything else, it would have been identified long before now. That the force/particle would reduce under relativistic distortion is not debatable. The time distortion MUST reduce the value of the Gravitational Constant. Again, again, again, it is completely unreasonable that the <u>gravitational</u> Time distortion would alter the other three forces and not <u>Gravity</u>. So deducing an alternate relationship of Velocity$_{GRPDescape}$‖Velocity$_{noGRPDescape}$ would be from within the area of distortion by squaring both sides to determine its inverse form:

$$\text{Velocity}_{GRPDescape}{}^2 = \text{Velocity}_{noGRPDescape}{}^2/(1-\text{Velocity}_{noGRPDescape}{}^2/c^2)$$

Multiplying both sides with the $|(1 - \text{Velocity}_{noGRPDescape}{}^2/c^2)|$ expression

$$\text{Velocity}_{GRPDescape}{}^2 * (1 - \text{Velocity}_{noGRPDescape}{}^2/c^2) =$$
$$\cancel{(1 - \text{Velocity}_{noGRPDescape}{}^2/c^2)} * (\text{Velocity}_{noGRDPescape}{}^2/\cancel{(1 - \text{Velocity}_{noGRPDescape}{}^2/c^2)})$$

Expanding ‖ $\text{Velocity}_{GRPDescape}{}^2 * (1 - \text{Velocity}_{noGRPDescape}{}^2/c^2)$‖:

$$\text{Velocity}_{GRPDescape}{}^2 - \text{Velocity}_{GRPDescape}{}^2 * \text{Velocity}_{noGRPDescape}{}^2/c^2 = \text{Velocity}_{noGRPDescape}{}^2$$

<u>Adding</u> ‖$(\text{Velocity}_{GRPDescape}{}^2 * \text{Velocity}_{noGRPDescape}{}^2/c^2)$‖ to both sides:

$$(\text{Velocity}_{noGRPDescape}{}^2 - \cancel{\text{Velocity}_{GRPDescape}{}^2 * \text{Velocity}_{noGRPDescape}{}^2/c^2}) +$$
$$(\cancel{\text{Velocity}_{GRPDescape}{}^2 * \text{Velocity}_{noGRPDescape}{}^2/c^2})$$
$$= \text{Velocity}_{GRPDescape}{}^2 + (\text{Velocity}_{GRPDescape}{}^2 * \text{Velocity}_{noGRPDescape}{}^2/c^2)$$
So
$$\text{Velocity}_{noGRPDescape}{}^2 = \text{Velocity}_{GRPDescape}{}^2 + (\text{Velocity}_{GRPDescape}{}^2 * \text{Velocity}_{noGRPDescape}{}^2/c^2)$$

Simplifying ‖$\text{Velocity}_{GRPDescape}{}^2 + (\text{Velocity}_{GRPDescape}{}^2 * \text{Velocity}_{noGRPDescape}{}^2/c^2)$‖

$$\text{Velocity}_{noGRPDescape}{}^2 = \text{Velocity}_{GRPDescape}{}^2 * (1 + \text{Velocity}_{noGRPDescape}{}^2/c^2)$$

Dividing both sides with ‖$(1+ \text{Velocity}_{noGRPDescape}{}^2/c^2)$‖

$$\text{Velocity}_{noGRPDescape}{}^2 / (1+ \text{Velocity}_{noGRPDescape}{}^2/c^2)| =$$
$$\text{Velocity}_{GRPDescape}{}^2 \cancel{(1 + \text{Velocity}_{noGRPDescape}{}^2/c^2)} / \cancel{(1+ \text{Velocity}_{noGRPDescape}{}^2/c^2)}$$

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Thus

$$\text{Velocity}_{noGRPDescape}^2 / (1+ \text{Velocity}_{noGRPDescape}^2/c^2) = \text{Velocity}_{GRPDescape}^2$$

Or

$$\text{Velocity}_{noGRPDescape}^2 = \text{Velocity}_{GRPDescape}^2/(1 + \text{Velocity}_{GRPDescape}^2/c^2)$$

Taking the square root of both sides

$$(\text{Velocity}_{noGRPDescape}^2)^{\frac{1}{2}} = (\text{Velocity}_{GRPDescape}^2)^{\frac{1}{2}}/(1 + \text{Velocity}_{GRPDescape}^2/c^2)^{\frac{1}{2}}$$

So then then the real escape velocity when not distorted by G.R. effects:

$$\text{Velocity}_{noGRPDescape} = \text{Velocity}_{GRPDescape} /(1+\text{Velocity}_{GRPDescape}^2/c^2)^{\frac{1}{2}}$$ Equation 4

Let us examine the escape velocity at the surface of an Schwarzschild Sphere with the mass of the Sun (Mass_{sun}).

Mass_{sun} (presuming) = 1.989100~00E+30kg)[C]

$\text{Radius}_{SchwarzschildSun}$ = (2*6.674286700~00E-11*1.989100~00E+30)/299,792,458[2]
$\text{Radius}_{SchwarzschildSun}$ = 2.95426919122266502991831134478878122485487802043697~
          31425277615261531334596851134087483161015331701111E+03m

The escape velocity from the border of that object is (unsurprisingly):

$\text{Velocity}_{escape} = (2GM/r)^{\frac{1}{2}}$
$\text{Velocity}_{escape} = ((2*6.674286700\sim00E-11 * 1.98900\sim00E+30)/(2.954\sim111E+03))^{\frac{1}{2}}$
Velocity_{escape} = 299,792,458 m/sec

But consider: because Special Relativistic effects will make any velocity appear greater than it is, Relativistic escape velocity would appear to be GREATER than light speed. That would not that velocity was unattainable, it would be that distortive effects made it SEEM to be greater than light speed. The escape velocity after considering Relativistic effects would not be that, those effects would slow the exertion of gravity for the Relativistic body. That is very fundamental in Special Relativity, it is confirmed by observations of the entire Universe. A body under slow down from Special Relativistic effects will not emit as much EM energy (or Strong Nuclear, Weak Nuclear or Gravitational) as it would were it not in a Relativistic Environment. So the above velocity is what escape velocity would be were there no distortion.

[C] Sun Fact Sheet - National Space Science Data Centre
http://nssdc.gsfc.nasa.gov/planetary/factsheet/sunfact.html

2.1 Additional arguments as to Light Speed limits

There is another form of the light speed limit to escape velocities. Though the equations are very similar, they do offer a reasonable postulate as to the source of the above limitation.

Again, it begins with the General Relativity Gravity equation:

$$Time_{GRD} = Time_{noGRD}*(1-GM/rc^2)^{\frac{1}{2}}$$
$$Time_{GRD}^2 = Time_{noGRD}*(1-(GM/r)/c^2)$$

Since it is currently assumed that the current equation for escape velocity presumes no Relativistic distortion to the Gravitational constant:

$G_{nonGRPD}$ – the Gravitational Constant – $G = 6.674286700{\sim}00E{-}11 m^3\ kg^{-1}\ s^{-2}$ – theoretically presumed exact to 100 decimal places when under no Relativistic distortion.

The General Relativistic Escape velocity equation becomes:

$$Velocity_{noGRPDescape} = (2G_{nonGRPD}M/r)^{\frac{1}{2}}$$
$$Velocity_{noGRPDescape}^2 = (2G_{nonGRPD}M/r)$$

So $G_{nonGRPD}$'s mathematic definition would be

$$G_{nonGRPD} = (Velocity_{noGRPDescape}^2 r/2M)$$

Currently the velocity of Gravitons/gravitational propagation speed is though to be $[c]^D$. In Special Relativity, the G constant would have to vary with velocity otherwise moving objects would behave in a fundamentally different way at high velocities. If nothing else, the apparent velocity of the Graviton would seem to increase beyond c at high velocities. Is it not reasonable, then, that the Graviton would suffer the impairments that befall the other Bosons? If they do, then they would slow down under General Relativistic distortion.

There may be a Radial distortion (that will be examined in another paper), but because a Relativistic radial distortion would appear homogenous. That is, unless the observations were made from a point very close to the centre of a compressed distorting body, and the objects more distorted/not as distorted would be so visible there radial change were visible, the distortion would be so small as to be un-measurable.

So the parallel distortion, from the General Relativistic Perspective would presume a that Relativistic distortion:

G_{GRPD} – the Gravitational Constant presumed to be altered under General Relativistic Distortion.

[D] Hartle, JB (2003). *Gravity: An Introduction to Einstein's General Relativity*. Addison-Wesley. p. 332. ISBN 981-02-2749-3.

So <u>its</u> mathematical definition would be:

$$G_{GRPD} = (Velocity_{GRPDescape}^2 * r/2M)$$

Again, Relativistic Distortions are presumed to affect the other 3 Bosons: is it reasonable it not do the same to the <u>Graviton</u>? So let us write the General Relativistic escape velocity equation more specifically:

$$Velocity_{GRPDescape} = Velocity_{noGRPDescape} /(1-(2G_{nonGRPD}M/r)/c^2))^{1/2}$$
$$Velocity_{GRPDescape} = (2 G_{nonGRPD} M/r)^{1/2}/(1-(2 G_{nonGRPD} M/r)/c^2))^{1/2}$$
$$Velocity_{GRPDescape}^2 = (2 G_{nonGRPD} M/r)/(1-(2 G_{nonGRPD}M/r)/c^2))$$
$$(2G_{GRPD}M/r) = (2 G_{nonGRPD} M/r)/(1-(2 G_{nonGRPD}M/r)/c^2))$$

Divide on both sides with |2M/r|

$$(2G_{GRPD}M/r)/(2M/r) = (2 G_{nonGRPD} M/r)/(1-(2 G_{nonGRPD}M/r)/c^2))/ (2M/r))$$
$$(2G_{GRPD}\cancel{M/r})/(2\cancel{M/r}) = (2 G_{nonGRPD} \cancel{M/r})/(1-(2 G_{nonGRPD}M/r)/c^2))/ (2\cancel{M/r}))$$

So another expression of the above, and the parallel to Equation 4 would be:

$$G_{GRPD} = G_{nonGRPD}/(1-(2 G_{nonGRPD}M/r)/c^2))$$ Equation 5

$$G_{GRPD} = G_{nonGRPD}/(1-(2 G_{nonGRPD}M/r)/c^2))$$

Which is reasonable, it would make no sense for Gravitational relativistic effects to have no influence on the Graviton. To return to the original equation

Multiply both sides of $||(2G_{GRPD}M/r) = (2 G_{nonGRPD} M/r)/(1-(2 G_{nonGRPD}M/r)/c^2))||$ with $||(1-(2 G_{nonGRPD}M/r)/c^2))||$

$$(2G_{GRPD}M/r) *(1-(2 G_{nonGRPD}M/r)/c^2)) =$$
$$((2 G_{nonGRPD} M/r) \cancel{* (1-(2 G_{nonGRPD}M/r)/c^2))}/(\cancel{1-(2 G_{nonGRPD}M/r)/c^2})$$

Expand the left side

$$2G_{GRPD}M/r – ((2G_{GRPD}M/r)* (2G_{nonGRPD}M/r))/c^2 = (2 G_{nonGRPD} M/r)$$

Add $|((2G_{GRPD}M/r)* (2G_{nonGRPD}M/r))/c^2|$ to both sides

$$2G_{GRPD}M/r \cancel{– ((2G_{GRPD}M/r)* (2G_{nonGRPD}M/r))/c^2) + ((2G_{GRPD}M/r)* (2G_{nonGRPD}M/r))/c^2} =$$
$$(2 G_{nonGRPD} M/r) + ((2G_{GRPD}M/r)* (2G_{nonGRPD}M/r))/c^2$$

$$2G_{GRPD}M/r = (2 G_{nonGRPD} M/r) + ((2G_{GRPD}M/r)* (2G_{nonGRPD}M/r))/c^2$$

Simplify the left side

$$2G_{GRPD}M/r = (2\ G_{nonGRPD}\ M/r)*(1 + ((2G_{GRPD}M/r)/c^2)))$$

Divide both sides with $|(1 + ((2G_{GRPD}M/r)/c^2)))|$

$$(2G_{GRPD}M/r)/(1 + ((2G_{GRPD}M/r)/c^2)))\ = (2\ G_{nonGRPD}\ M/r)*\frac{(1 + ((2G_{GRPD}M/r)/c^2)))}{(1 + ((2G_{GRPD}M/r)/c^2))}$$

Reverse the terms

$$(2\ G_{nonGRPD}\ M/r) =\ (2G_{GRPD}M/r)/(1 + ((2G_{GRPD}M/r)/c^2)))$$

Divide both sides with $(2M/r)$

$$(2\ G_{nonGRPD}\ M/r)/ (2M/r)\ =\ ((2G_{GRPD}M/r)/(2M/r))/(1 + ((2G_{GRPD}M/r)/c^2)))$$

Or more simply:

$$G_{nonGRPD} =\ G_{GRPD}/(1 + 2G_{GRPD}M/rc^2) \hspace{3cm} \text{Equation 6}$$

Or alternately:

$$G_{GRPD} = G_{nonGRPD}/(1-Velocity_{noGRPDescape}{}^2/c^2)^{\frac{1}{2}} \hspace{2cm} \text{Equation 7}$$

And

$$G_{nonGRPD} = G_{GRPD}/(1+Velocity_{GRPDescape}{}^2/c^2)^{\frac{1}{2}} \hspace{2cm} \text{Equation 8}$$

In Special Relativistic Perspective, the determination is what "Real" or non-Relativistic velocity, with mass, time, and linear distortion and the values those variables would take when the observation point was either from the Relativistic or non-Relativistic Perspective.

The General Relativistic Perspective is very much parallel. An object being observed from a non-Relativistic Perspective will appear to have an escape velocity limited to light. From the Relativistic Perspective the escape velocity can approach infinity. But that would only be because of time distortion. Moreover, there is no suggestion that there is a parallel mass increase with the increase of escape velocity. The mass of any energy associated with a Relativistic object will decrease by exactly the same proportion as the mass of matter increases with velocity in S.R. This writer makes no suggestion that the energy disappears, like all "disappearing" pure energy in Special Relativity, it would add to the mass of the matter.

It should be emphasized that the above refers to a point in Space, and the observations from the two Perspectives. Movement in any direction would change the values. The above, however, is valid and is the creature that inhabits so much of Classic/Relativistic/Quantum science – the theoretical "ideal".

2.2 Quasars as Evidence of General Relativistic Perspective

The dichotomy between distortions is more obvious with a phenomenon that we are reasonably certain exists: Quasars. Current theory is that Quasars are partial <u>extreme</u> collapsing to an S.O. in the centers of Galaxies[E]. A reasonable illustration of that phenomenon would be using an established valid theoretic value for the Milky Way (9.0E+11 Solar Masses)[F]. As Quasars are singular objects, presume a Quasar to be a Galactic object, with a mass 10 times that of the Milky Way. We will also assume that half of the mass of this theoretic Quasar collapsed into an Schwarzschild object at the center. Yet again, the reader is reminded that this is an <u>illustration</u>. However valid the assumed mass values are is unimportant, the mathematic logic works for all "Quasar" masses.

$Mass_{Galaxy} = 9.00{\sim}00E+11*Mass_{Sun} = 1.7901900{\sim}00E42$
$Mass_{Galactic\_Scale\_Quasar} = (Mass_{Galaxy}*10)/2 = 8.9509500{\sim}00E42kg$

The radius of such a quasar:

$Schwarzschild\_Radius_{Galactic\_Scale\_Quasar} = 2*G\ Mass_{\_Galactic\_Scale\_Quasar}/c^2$
$Schwarzschild\_Radius_{Galactic\_Scale\_Quasar} = 2*6.6742867E-11*89509500{\sim}00E42kg/c^2$
$Schwarzschild\_Radius_{Galactic\_Scale\_Quasar} = 1.3294211360501992634632401051549515551{\sim}184695109196637914137492686768910056858301033936742245689265500E+16m$

The gravity of that that galactic S.O. would be relatively low for such a massive object:

$Gravity\_at\_Schwarz_{Galactic\_Scale\_Quasar} = G*\ Mass_{\_Galactic\_Scale\_Quasar}/{\sim}$
        $Schwarzschild\_Radius_{Galactic\_Scale\_Quasar}{}^2$
$Gravity\_at\_Schwarz_{Galactic\_Scale\_Quasar} = 6.674286700{\sim}00E-11m^3\ kg^{-1}\ s^{-2}*3.9778400{\sim}00E40kg/{\sim}$
        $(1.329{\sim}500E16m)^2$
$Gravity\_at\_Schwarz_{Galactic\_Scale\_Quasar} = 3.380250074130310905450427280400458344{\sim}41277930982899552067532453282419896945040447930166319340894721 9E0m/s^2$

The classic distortion a little farther out at the Schwarzschild + Planck position would be 'slightly' higher (assuming a Planck length of $1.61625200{\sim}00E-35m$[G])

$Distortion\_at\_Schwarz\_plus\_Planck_{Galactic\_Scale\_Quasar} = 1/(1-G*Mass_{Galactic\_Scale\_Quasar}/{\sim}$
        $(Schwarz\_Radius_{Galactic\_Scale\_Quasar}*+Planck_{Length})*c^2))^{1/2}$

$Distortion\_at\_Schwarz\_plus\_Planck_{Galactic\_Scale\_Quasar} = 1/(1-2*6.674286700{\sim}00E-11*{\sim}$
        $89509500{\sim}00E42kg)/(3.9778400{\sim}00E40m+1.61625200{\sim}00E-35m)*c^2))^{1/2}$

[E] More Red Quasars May Loom in the Universe - Jet Propulsion Laboratory, California Institute of Technology http://www.jpl.nasa.gov/releases/2002/release_2002_125.html
[F] The Masses of the Milky Way and Andromeda Galaxies – Cornell University Library http://arxiv.org/abs/1002.4565
[G] The NIST Reference on Constants, Units and Uncertainty – Fundamental Physical Constants – Planck length[l_P]; http://physics.nist.gov/cgi-bin/cuu/Value?plkl

Distortion_at_Schwarz_plus_Planck$_{Galactic\_Scale\_Quasar}$ = 2.86798418362916728329279404~
          18666063533851288411735387312321282642557197319186 01196355168~
          2033731013657E+25

Then one <u>full</u> meter out:

 Distortion_at_Schwarz_plus_One$_{Galactic\_Scale\_Quasar}$ = 1/(1-G*Mass__$_{Galactic\_Scale\_Quasar}$/~
          (Schwarzschild_Radius__$_{Galactic\_Scale\_Quasar}$*+1.00~00E0)*c^2)^{½}

 Distortion_at_Schwarz_plus_One$_{Galactic\_Scale\_Quasar}$ = 1/(1-2*6.674286700~00E-11*~
          (3.9778400~00E40m+1.00~00m)*c^2)^{½}

 Distortion_at_Schwarz_plus_One$_{Galactic\_Scale\_Quasar}$ = 1.1530052628024727986103837~
          5410526531872450998763202620813374534799791917753624018580514~
          26201056821477E+8

The proportion of those distortions:

 Proportion$_{Distortions}$ = Distortion_at_Schwarzschild_plus_Planck$_{Galactic\_Scale\_Quasar}$ /~
          Distortion_at_Schwarzschild_plus_One$_{Galactic\_Scale\_Quasar}$
 Proportion$_{Distortions}$ = 2.867~657E25/1.153~477E8
 Proportion$_{Distortions}$ = 2.4873990398433213867925456901310768131253639 0062325~
          7046785457996710252908516772521584900575866940 0567E+17

So current theory presumes the distortion is reduced by a factor of 2.487~567E+17 over one metre less
one Planck Length.

Compare those values to a <u>confirmed</u> Astronomic phenomenon: a neutron star. Presuming a simple
radius of 9.1E+3m for that neutron star (in the <u>4U 1820–30</u> binary system) with a mass 1.58*Mass$_{Sun}$[H]:

 Mass$_{Neutron\_star}$ = 1.58* Mass$_{Sun}$
 Mass$_{Neutron\_star}$ = 3.14277800~00E30

 Gravity$_{Neutron\_star}$ = G* Mass$_{Neutron\_star}$ /Radius$_{Neutron_star}$^{2}
 Gravity$_{Neutron\_star}$ = 6.674286700~00E-11*3.14277800~00E30/(9.100~00+3)^2
 Gravity$_{Neutron\_star}$ = 2.53300343031670088153604637121120637604154087 67057118~
          7054703538220021736505252988769472285955802439 32E+12

[H] THE MASS AND RADIUS OF THE NEUTRON STAR IN 4U 1820–30
http://iopscience.iop.org/0004-637X/719/2/1807

As opposed to the distortion:

$\text{Distortion}_{Neutron\_Star} = 1/(1-G*\text{Mass}_{Neutron\_Star} / (\text{Radius}_{Neutron\_Star}*c^2)^{\frac{1}{2}}$
$\text{Distortion}_{Neutron\_Star} = 1/(6.674286700{\sim}00\text{E-}11*3.14277800{\sim}00\text{E}30/{\sim}$
$\qquad (9.100{\sim}00+3)*c^2)^{\frac{1}{2}}$

$\text{Distortion}_{Neutron\_Star} = 1.1375772756546911338530999308912860657054 3740857450{\sim}$
$\qquad 9224719599293543012992677086490763613197666 0586994\text{E}0$

The Galactic vs. the Neutron star predictions surely do not jibe.

Consider an alternative: is it reasonable that an object under G.R. slowdown exerts the same gravitational pull as it would were it not under Relativistic distortion? If gravitational force were not lessened, is it reasonable that anything would be distorted by G.R. factors?   Consider then, escape velocity when G.R. concerns are taken into account:

$\text{Velocity}_{GRPDescape} = \text{Velocity}_{noGRPDescape}/(1 + \text{Velocity}_{noGRPDescape}{}^2/c^2)^{\frac{1}{2}}$
$\text{Velocity}_{GRPDescape} = 299{,}792{,}458/(1 + 299{,}792{,}458^2/299{,}792{,}458^2)^{\frac{1}{2}}$
$\text{Velocity}_{GRPDescape} = 2.1198528000038323887394410859085474720613952788 6362{\sim}$
$\qquad 4696980003434655188354692935645180295865843215 2222\text{E+}8$

The above is what that "General Relativistic" escape velocity would be. It should be noted that in the non-Relativistic world, there is no limit to what the escape velocity could be. General Relativistic distortion would take any escape velocity, though, no matter how high, and limit it to c – lightspeed.

We must consider Special Relativity distortion as well in determining what the escape velocity will be with both distortions included. The S.R. time equation is a parallel to Equation 1 above:

$\text{Time}_{SRPD} = \text{Time}_{noSRPD}*(1 - \text{Velocity}_{noSRPD}{}^2/c^2)^{\frac{1}{2}}$ Equation 5

Using exactly the same logic [introduced in A Relativistic Space-Time Perspective] used in Equations 2 and 3, that would lead to:

$\text{Time}_{noSRPD} = \text{Time}_{SRPD}/(1 + \text{Velocity}_{SRPD}{}^2/c^2)^{\frac{1}{2}}$ Equation 6

The mathematical validity of equations 1 through 6 was confirmed using 39 different velocity$_{noSRPD}$|| velocity$_{noGRPDescape}$ values ranging from |1.00~00E-500| to |c-1.00~00E-500|. The calculations were done to 2000 decimal places, and the largest inequality was 1.00~00E-1992. An irrational inequality that is inevitable with all irrational number calculations. The Special Relativistic effects would slow down the interactions whatever body concerned was having with the external environment – as was stated before, those interactions would include gravity. Although those bodies would be distorted in terms of mass, it has been established since Galileo that mass does not effect the gravitation acceleration (be it positive or negative acceleration) so the lessening of the mass of the body escaping would not affect the gravitational slowdown. Using Relativistic Perspective equation 7 above to determine to what degree that S.R. slowdown distortion would have on the escape velocity:

Velocity$_{noSRPD}$ = (2.119~222E+08)/(1 + (2.119~222E+08)c^2/299,792,458^2)½
Velocity$_{noSRPD}$ =1.7308525632731957604232687639438429944002051081837595813~
       34780451811501639968149083156826535950941994E+08

As a double check, we can determine the special relativistic time distortion of that speed:

Time$_{SRPD}$ = Time$_{noSRPD}$/(1 − Velocity$_{escape}^2$/c^2)½

Assuming a one second passage for Time$_{noSRPD}$, the equation becomes

Time$_{SRPD}$ = 1/(1 − (1.730~994E+8)^2/299,792,458^2)½
Time$_{SRPD}$ = 1.2247448713915890490986420373529456959829737403283350642 16~
       3462836254801887286575132699297165523201174E0

Multiply the real speed by that time distortion:

Velocity$_{SRPD}$ = (1.224~174E0)*(1.730~994E+8)
Velocity$_{SRPD}$ = 2.119~222E+8

This mathematic reasoning is supported by an uncontestable fact. In an Einsteinian Universe, a one kilogram object moving at a real (non-relativistically distorted) speed of light would have infinite units of momentum because of relativistic mass distortion. Conservation of energy/matter/mass should also be considered. Objects falling towards one another under gravitational forces acquire both speed and mass because of relativistic effects. On current theory then, both objects would gain a possibly infinite amount of mass because of relativistic effects. Even if the time distortion meant the object continually slows and does not actually pass the Schwarzschild barrier, from a relativistic perspective, the velocity is continually increasing because of the time distortion – and so it gains mass. The minor object (or layer of matter surrounding the S.O.) would eventually gain enough mass to become an Schwarzschild object itself. The question then becomes: are they both moving towards one another at the speed of light? A simple conservation of energy issue then arises – where did that infinite (or "approaching infinity") matter/energy come from? That simple infinity issue is another argument against the existence of a "Classic" S.O. Even if you accept that there is some sort of stoppage (or "slowage") at the S.O. border, there is no limit to how much kinetic energy the body will gain under S.R. – a revealing an inconsistency in Classic General Relativity reasoning.

If you accept that the time distortion limits escape velocity, would it not be doing so by lessening gravitational force? For relativistic slowdown to take place, the velocity of all Bosons – EM/photons, Strong Nuclear/gluons, and Weak Nuclear/W‖Z bosons (as it would have to for simple execution of molecular, ionic and even nucleic reactions) – the escape velocity would continually slow in its increases. Then the gravitation phenomenon would be affected by the absolute limit to escape velocity. Because the gravity is determined by the inverse square of the radius and not the square root of that radius, it would have no limit in its level – it would simply slowdown the rise of that level. Contrary to modern scientific thought, Schwarzschild objects are escapable – or at the very least: orbit-able.

Such reasoning is supported by another piece of evidence: think of the slowdown of Gluons where G.R.

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distortions were great – say at a Galactic core. Meaning that higher atomic number elements would break down – and so at the Galactic core would be the greatest number of Population II stars with the highest ratio of low atomic number elements – as there are[I]. There currently is an unfortunate "reverse logic" employed to explain the aspects of Population II stars: because they are "older" and formed from a higher hydrogen/helium proportion clouds they have not formed higher Atomic number elements. That is completely illegitimate reasoning. Because they are older, they would have formed more of the higher elements. There is also the concern that the enormously higher rate of background radiation (from all the closer adjacent stellar bodies) would speed the maturation of any object in the core, and increase the occurrence of stellar scale catastrophic events. It is completely unreasonable to then suppose that only the "heavy" elements (with a higher Atomic number than Iron) would be ejected from the core, then cool to the point where their spectral radiation of those heavier elements would approach zero, and so be unobservable. If it were formed in the core it would need a greater amount of energy to escape that core. It would receive no more kinetic energy, proportionately, from the simple explosive actions. The other repulsive force, EM pressure, would be pushing at a denser object – the mass of atomic scale objects would increase by the cube of the radius, whereas the pressure area would only increase by the square of that radius. Moreover, the EM pressure would not be pressing against a "flat" sail, but against a spherical one. Only the radiation that pressed against the relative center of the half sphere would push it directly out – any EM force that pressed against the portions that were at a greater and greater angle to the repulsive force from the center of the galaxy would not receive as much outward pressure. So there would be a lower and lower pressure/mass proportion. Additionally the centre radiation would not be pressing exclusively outward. A very large proportion of EM force would be generated by objects not at the exact centre of the core, and would be generating inward radiation pressure. Finally, the greater and greater Relativistic effects the closer one came to the Galactic S.O. would slow the velocity of outward pushing photons – lessening the kinetic energy they transmitted in terms of both mass and velocity.

The EM force would lessen, but the KINETIC energy that increasing temperature would bring upon the particles/atoms would mean that those particles/atoms would face both increasingly velocity/energetic collisions with one another, and decreasing binding force. It adds an argument to the simple existence of Population II star at the core – despite the fact that those stars are recognized as the older population, they have a structure that would be appropriate to stars that were newly formed more recently after the BB and somehow managed to maintain their youth 14 billion years into our time. But again: if a star is older, that would mean that it would create a greater number of higher Periodic table elements – both through the "pulsing" of variables stars (that would provide times of abnormal compression) and novae. Both of those represent catastrophic action in a star's lifetime, even if they do not match Supernovae activity. Unless you accept the argument of slowed down Gluons, leading to more fragile nucleii – broken apart by the energy they absorbed emanating from the much denser star population at the galactic centre.

So from a G.R. Perspective, the "1-" equations are just as valid as "1+" – unless the calculations are done for an area with a high gravitic distortion. Unless that gravitic distortion is very local – producing strong tidal effects or variance of gravitational force over distance from the source of that force. The variance between the two will be great enough for the observer to use whichever form he or she thinks appropriate. On simple planetary gravitational field, with minimum observable tidal effects or motions,

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[I] Populations of Stars – Walter Baade http://astronomynotes.com/ismnotes/s9.htm

the "1-" flavour would be the most useful. Though were your holiday cabin were on a body appearing to have high gravitational distortion (i.e. almost all the radiation around you seems extremely blue-shifted) the best strategy would be to use the blue shift to make an estimate of your point within that gravitational distortion and use the "1+" flavour for your calculations. Relativity is, as we know now, the most accurate view of the macro world – but it has complexities that are not always appreciated.

An alternate current view to stoppage at the border is that a body falling towards a S.O. would continually accelerate, and exceed the speed of light at the border of the S.O. They see that as the only alternative, if the body surrenders to normal relativistic powers to somehow stop at the border, for time not to proceed within the S.O. – or to become imaginary.

The same thinkers see Schwarzschild objects will distort space sufficiently to allow – either on escape or descent – to exceed the speed of light. There are no <u>mathematical</u> necessities for that. The procession of time is altered by G.R. powers. By any standard you would care to apply, for observers within the S.O., because of the distortion of time, their velocity increases at a rate than can be accounted for by the "Relativistic" gravity and their apparent velocity could exceed light speed.

That reasoning adds another argument against the supposition that time will "stop" at the S.O. border. In Special Relativity, there is no suggestion that because time slows, the object itself slows. The notion is also completely inconsistent with the notion of Hawking "leakage" (accepting the reasoning in this paper means that the physical conditions never arise or are needed for Hawking particle escape). Still, if that idea is accepted, you cannot have both the development of spontaneous matter creation and a "halted" environment. There is also the simple consideration that if matter/antimatter pairs form as is postulated, they would not disappear when they combined, they would produce Electromagnetic Radiation energy: that would be captured by the S.O. because the gravity/Gravitational distortion would be slowing down the EM so much.

Schwarzschild borders are simply a point where escape velocity reaches light speed – not a barrier/obstruction. Even accepting entirely (under protest) the current notions of a real light speed being reached by objects falling from infinity to its Schwarzschild border, turn that viewpoint over. The Schwarzschild definition does not include the distance the object would travel beyond the border before returning to the S.O. The escape velocity of the Earth at its surface is approximately 1.1813E+04 m/s. That does not mean that any object with a lesser velocity will not move upward until achieving it. The object moves up in a parabolic path, the height of that parabola determined by its velocity. An object then gaining tangentially a given orbital speed would achieve that orbit. Even if current limits of Schwarzschild objects are accepted as they are (excepting the "imaginary" conjectures), the fundamental of gravity/projectile/escape velocity/relativistic theory means projectile objects can pass the Schwarzschild border, simply not fully escape. Escape <u>into orbit</u>, then assuming a permanent orbit around that S.O. is possible without any concessions to this theory. The following section will examine <u>mathematically</u> the consequences resultant in absolute acceptance of current theory.

Let us compare of General Relativity prediction values and G.R. Perspective values. What we can perceive and define of our Universe (or this local one) is finite. As there are no absolute values for the mass of our Universe, we will simply assume for theoretical purposes, that mass of matter to be exact to 100 decimal places:

$Mass_{MatterUniverse} = 3.00{\sim}00E+52^{J}$

The above mass is solely a theoretical presumption. We will also presume the mass of all various forms of energy are present, in a value 10 times greater than the matter. The ratio of matter to energy is gigantically debated issue – so this paper will not cite any value as a "Reference". A value ten times greater is as valid as any other estimate and this is solely an illustration, not a declaration:

$Mass_{Universe} = (3.00{\sim}00E+52) + 10*(3.00{\sim}00E+52)$
$Mass_{Universe} = 3.300{\sim}00E+53kg$

We will presume that the matter/energy in the Universe is still existent as a "Cosmic Egg" and has a radius of 1 Planck length. The Schwarzschild radius of our Universe would then be:

$Schwarzschild_{RadiusUniverse} = 2GMass_{Universe}/c^{2}$
$Schwarzschild_{RadiusUniverse} = 2*6.674286700{\sim}00E-11 *3.300{\sim}00E+53/299,792,458^{2}$
$Schwarzschild_{RadiusUniverse} = 4.9012560107761271925646912864124368015791551 29{\sim}$
        $17500948687427129671979308077063709661125289581190556 86E+26$

Under current theory, that radius would represent the point where gravity/distortion became infinite, then "imaginary". What that state is, precisely, is un-debatable, and currently unknowable. A point a single Planck length beyond the above Schwarzschild marker the gravity would be:

$Gravity_{SchwarzschildUniverse} = 6.674286700{\sim}00E-11*(3.300{\sim}00E+53)/{\sim}$
        $(9.802{\sim}73E+26 + 1.61625200{\sim}00E-35)^{2}$

$Gravity_{SchwarzschildUniverse} = 9.1686210306171837573156066865152977638975580 89{\sim}$
        $797389316842084126429656168223293644296451389045165733 2E-11$

It is a rational presumption that the principal General Relativity equation is not applicable when a body has the mass and dispersion as has our Universe. That would yield an unreasonable distortion value for such a widely dispersed matter/energy environment. Although strict application of current theory would argue relativistic effects somehow distorts space and time sufficiently so that Schwarzschild borders represent a time stoppage. That is surely a powerful argument that a disperse body would not exert the same relativistic distortion as one with the matter collapsed to the Planck length (1.616252E-35m) radius. So let us presume our Relativistic equations are always dealing with the extremely collapsed high mass Universe object. Current relativistic equations predict a single Planck Length beyond the <u>Schwarzschild</u> radius of such a collapsed body (and presuming a simple 1 second time span) the distortion will be:

$Relativity_{ClassicPlusPlanck}$ – Distortion 1 Planck length beyond Schwarzschild radius

$Relativity_{ClassicPlusPlanck} = Time/(1- 2GMass_{Universe}/rc^{2})^{\frac{1}{2}}$

[J] On the Expansion of the Universe. http://www.grc.nasa.gov/WWW/k-12/Numbers/Math/documents/ON_the_EXPANSION_of_the_UNIVERSE.pdf

Relativity$_{ClassicPlusPlanck}$ = 1/(1- 2*6.674286700~00E-11*3.300~00E+53/
        (4.584~335E+26 + 1.61625200~00E-35m)*299,792,458^2)^{½}
Relativity$_{ClassicPlusPlanck}$ = 7.78778860149693147271523822806925345823526950 91~
        5463316671242700909265867335990099240181927 30848455929E+30

So current theory espouses the existence of a point where gravity is of the order of 4.584~350E-11m/s^2, the distortion will be 7.787~929E+30.

The distortion at slightly less than 1 metre (1.0E0m – PlanckLength) further:

Relativity$_{ClassicPlusOne}$ – Distortion 1 metre beyond Schwarzschild radius
Relativity$_{ClassicPlusOne}$ = 1/(1-(6.67424800~00E-011)*(3.300~00E+53)/~
        ((4.901~690E+26m) + 1.0E00~00m)*299,792,458^2)½
Relativity$_{ClassicPlusOne}$ =3.13089636071720751315687050814678053094541022988564~
        1346706392959898444111954121900220143339144196 5992E+13

The proportion of the two distortions

Proportion$_{Distortions}$ = 7.787~929E+30/3.130~992E+13
Proportion$_{Distortions}$ = 2.48739903984332148034450497369636880285111244333165~
        16255318139313987561023732430163206772861086519461E+17

So distortion reduces by an factor of more than 248 quadrillion over the course of travel a little less than one metre in a 9.168~330E-11m/s^2 gravity environment. If we are to accept General Relativity as valid <u>complete</u> theory, the above must have been true at some point in the history of the universe. The only argument against that would be that the "expansion" of space <u>created</u> that space from the Planck length radius/diameter (which cannot really be known without a Planck length scale ruler) into a place where there was no space before. That presumption would mean that the Universe came to be from nothing – no space, no matter, no energy.

Distortion at the same radii for Relativistic Perspective is (the inverse to make them comparable, because the RP value <u>is</u> inverse to Classic Relativity):

Relativistic$_{PerspectivePlusPlanck}$ – distortion under RP 1 Planck Length beyond the
        Schwarzschild limit
Relativistic$_{PerspectivePlusone}$ – distortion under RP 1 metre beyond the Schwarzschild
                limit

Relativistic$_{PerspectivePlusPlanck}$ =1*(1+2*6.674286700~00E-11*3.300~00E+53/~
        (4.901~690E+26m + 1.616252~00E-35m)*299,792,458^2)½

Relativistic$_{PerspectivePlusPlanck}$ =1.41421356237309504880168872420969807856 9671~
        87537694807317667973216129433651660809808802831 30333904338E0

The distortion 1 metre beyond the Schwarzschild radius –

Relativistic$_{PerspectivePlusOne}$ = 1*(1+2*6.674286700~00E-11*3.300~00E+53/~
(4.901~690E+26 + 1.00~00E0m)*299,792,458^2)½

Relativistic$_{PerspectivePlusOne}$ = 1.41421356237309504880168872384902176435966632297~
7795019315603032923383397382722376869743523710411410E0

The numbers are so close the <u>difference</u> between them rather than the ratio is more illustrating:

Difference$_{Distortions}$ = 1.414~338E0 - 1.414~410E0

Difference$_{Distortions}$ = 3.60676314210005552399153053861076699237910939133885 72~
1218284789322979292796095690470000E-28

Both distortions are of an extraordinary value for a gravity of 4.584~350E-11m/s^2 – though both sets of distortion do require a concentration to quantum linear dimensions of the matter concerned. Though surely a difference of 3.606~00E-28 is more reasonable. Classic theory also espouses a distortion progression from 5.506~838E+30 to an infinite/imaginary value, travelling 1.61625200~00E-35m in 9.168~514E-11m/s^2 gravitational field (the actual difference between the two gravities being less than Planck's Constant).

Although a distortion of "1.414213562~338E0" does seem extraordinary for such a low gravity, consider that we speak of <u>time</u>, a dimension that functions in a fundamentally different way than the linear dimensions. Also consider the "slope" of the distortion – it would reduce at a very slow pace. The distortion at twice the Schwarzschild radius would be:

Relativistic$_{PerspectiveTwiceSchwarsz}$ = 1*(1+2*6.674286700~00E-11*3.300~00E+53/~
(2*(4.901~690E+26m))*299,792,458^2)½
Relativistic$_{PerspectiveTwiceSchwarsz}$ = 1.22474487139158904909864203735294569598297~
37403283350642163462836254801887286575132699297165523201174E0

The proportion of those two distortions:

Proportion$_{Distortions}$ = 1.414~338E0 / 1.224~174E0
Proportion$_{Distortions}$ = 8.66025403784438646763723170752936183471402626905190 31~
40279034897259665084544000185405730933786242878 4E-1

The above is a more logical proportion for gravity of the order 9.16862~57332E-11m/s^2. There is also this final point: Space/Time distortion (whether it be Classic/Newtonian or Relativistic/Einsteinian) depends on an objects mass concentration at the <u>centre</u> of the gravitational field (or all along a simple one dimensional line). If it were not, then the greater distance from whatever measuring point is used would weaken any tangential forces/distortions exerted by any mass not along that simple line. That would not invalidate either the Classic or Relativistic distortion values - it would simply mean that distortion would have to be calculated using integral calculus rather than the simplest mathematic operators. As all the basic Relativistic equations do.

2.1 Other Consequences of Relativistic Distortion

The above equations also make suggestions about Relativistic effects. If an object were to move at a Relativistic velocity or under significant General Relativistic distortion the consequences are not completely recognized by Science. It would both:

a) Slow down the transmission of all Bosons i.e. the Photon(light), the Graviton (gravity), the Gluon (Strong Nuclear Force) and the W/Z Bosons (the Weak Nuclear force – the force no one is really certain of). The absolute degree of that slowdown for different Boson varieties is not completely documented in current Science, but it is an unreasonable proposition that some Bosons would slow down, and some wouldn't. This would then argue that the EM released by the Hubble objects at the edge of the Universe would be moving slower because of Relativistic distortions. The Bosons emitted by any moving object will be slowed down by those distortions. That would also have the effect of reducing the frequency. That slowdown would mean that their mass reduced as well – it is one of the most fundamental tenets in all of physics: Bosons are particles that have a zero mass when at rest.
b) The Relativistic effects would also increase the mass of all the matter particles. It is always difficult to determine what is the most fundamental of all Physics principles, but conservation of energy/matter mass confirmation must be a strong competitor for that spot – and the mass from the Bosons would have to go somewhere

That would mean that any Quantum level interaction would be both dealing with heavier particles and dealing with them with slower (and therefore weaker) Bosonic forces. Time would not simply slow down, the interactions that maintain the structure of any macro level device would weaken. The object would not function as it did at rest.

The mass of the individual particles would increase, and the forces that maintained its quantum structure would weaken. There would perhaps be an equal balance of weakening between the repulsive force of positive charge of protons and bonding force of the Gluons. But that would mean there would be an overall weakening of atomic structure. The increase of the mass of the particles would also mean that they would be colliding with greater kinetic force.

An illustrative parallel: a suspension bridge gains strength for its structure by both the gravitational forces pulling it down/apart and the collective force of the component molecules/atoms/sub-nuclear particles binding it together. Those forces together mean strength gigantically exceeding than the forces acting against it (wind, collective vehicle weight, even seismic forces). Were you to halve both the gravitational and the particulate forces, then the arithmetic, absolutely excess of those forces would be halved as well – it could perhaps hold just as many cars, but would only take half the earthquake to collapse it than it would if things were absolutely normal.

The alterations that occur at very non-Relativistic level would change the fundamental Quantum interactions, but only to a marginal degree. An observed Relativistic scale recession velocity could alternately indicate a Relativistic scale distance and Boson decay, not a Universal expansion. So alternate explanations for the increasing Red Shift of inter-Galactic scale distances could be valid (i.e. EM frequency decay over those distances. The table of a range of 39 Velocity$_{noSRD}$ values that confirm

[Summary of Relativistic Perspective Equations and Confirmation Tables] the velocity equations is available on the Internet.

If it were argued that the expansion is not <u>Real</u> velocity, but space expansion, it would still have the effect of slowing the <u>transmission</u> of Bosons. At any point in that expansion (presuming there is no Relativistic distortion) the Bosons would be measured as moving at the speed of light. But in the time of that measurement, the space ahead of those Bosons would have expanded. So the signal would have farther to travel. Because of that expansion, the wavelength would increase – matching our current observations completely. But that would also mean that it would take considerably more than 13 Billion years to reach us from the edge of reality. We would be seeing the same image, though red-shifted, just as it is today. The question then becomes: how much longer ago than 13.75 Billion years did the Big Bang event take place? Would that not mean that the progression of entropy would have gone much farther than is theorized today?

Finally, there is the simple fact that the density it is debated widely as to whether the Universe is "Open" or "Closed" [there are so many viewpoints on this issue, simply citing a reference would only show the leanings of this writer]. A large number of suppositions are that the Universe is on the "edge" between the two. There are number of arguments against that simplistic view, the first being he question of if the Universe was once so compact that some unknowable force pushed it apart at a super-relativistic velocity, then how did that compression happen in the first place? The second is what is the probability of our Galaxy being at the <u>center</u> of that dispersion?

3.0 Probability of a Cosmic Egg

The earliest that current theory will venture in time is the moment of the Big Bang. The usual line for that moment/instant is that there can be no way we can know what preceded that. While there is some logic to that, we can never (ever, ever, ever!) say that we have all the knowledge that exists for any particular topic – that declaration has been made incalculable times in history on an unknowable number of topics. The only absolute that can be declared from that line of data is that we can never know when we have determined all the data and theory for any particular topic – and that while the number of statements for any issue is indeterminate, they cannot be infinite.   An infinite statements declaration would be that the <u>ordered</u> aspects of our reality are infinitely greater than the <u>disordered</u> aspects. And while the disordered aspects would/could be very great, it is unreasonable to presume they could be infinite because of the limitations on the dimensions of our or any reality would have to be limited by the Planck constants and "c". The same argument applies to <u>ordered</u> aspects.

So let us make what is a reasonable postulation: the Big Bang was preceded, at some time, by a maximal state of disorder in our Local corridor of the Universe (i.e. within 15 billion LY). That is surely more reasonable than a declaration of the maximum order of a Cosmic Egg in the beginning of reality. Entropy is <u>one</u> of the most (if not <u>the</u> most) certain conjectures in all of Science.

So a simple <u>theoretical</u> quantification of that maximum disorder would be to take the arbitrary (but valid) conjecture of the mass and dimension of that beginning state of reality made earlier in this paper. All of the suppositions in what follows are NOT declarations, simply valid hypotheses. Given a Universe mass then of 3.300~00E+53kg in its smallest definable size: a sphere with a radius of a Planck length of 1.61625200~00E-35m. Whether the radius of such an object is the valid assignment

or its diameter is completely indeterminate, but as Dr. Heisenberg would be sure to insist, that indeterminacy is unimportant in dealing with such values. The volume of such an object would be, presuming an <u>exact</u> (to 100 places) value for Pi[Π] of:

Π = 3.14159 26535 89793 23846 26433 83279 50288 41971 69399 37510 58209 74944~
59230 78164 06286 20899 86280 34825 34211 70679[K]

The volume of such a sphere would be:

$Volume_{Planck\_Length\_Radius\_Sphere}$ = 4/3 * 3.14159~70679 * (1.61625200~00E-35m)^3
$Volume_{Planck\_Length\_Radius\_Sphere}$ = 1.76836988543420207950714723889362774035985 9~
    3515371549755322819522662014926210138833151332495218536642E-104m^3

So its density would be:

$Density_{Planck\_Length\_Radius\_Universe}$ = 1.10000~00000E+53kg/1.76836~36642E-104m^3
$Density_{Planck\_Length\_Radius\_Universe}$ = 6.2204180757687363218681861424890149107259365~
    4345369381684270659653491214562120382757965499685624497 35E+156kg/m^3

Such an object is proposed to explode at an ultra-light velocity. The radius of the Universe currently is another gigantically debated issue; simply as a theoretic conjecture, we will presume it to be the Schwarzschild radius:

$Schwarzschild_{Radius\_Universe}$ = 4.90125~55686E+26m

The volume of such a sphere would be:

$Volume_{Schwarzschild\_Radius\_Universe}$ = 4/3 * 3.14159~70679 * (4.90125~55686E+26m)^3
$Volume_{Schwarzschild\_Radius\_Universe}$ = 1.87976170265364511061212315504011751539424 66~
    09027155535730199641778064279312479495351233910216949611 7E+79m^3

So <u>its</u> density would be:

$Density_{Schwarzschild\_Radius\_Universe}$ = 1.10000~00000E+53kg/1.87976~96117E+79m^3
$Density_{Schwarzschild\_Radius\_Universe}$ = 5.8518055690098296840201990653830179656551343~
    5290631331436549247245400079218378313322818724960091361 3E-27kg/m^3

The <u>ratio</u> of those two values:

$Ratio_{Densities}$ = $Density_{Planck\_Length\_Radius\_Universe}$/$Density_{Schwarzschild\_Radius\_Universe}$
$Ratio_{Densities}$ = 6.22041~49735E+156/5.85180~13613E-27
$Ratio_{Densities}$ = 8.5039299442360368057990307845342740124477266198355656095 6262~
    78230676222180975429436359240452987861280E+183

[K] Arndt, Jörg; Haenel, Christoph (2006). *Pi Unleashed*. Springer-Verla. English translation by Catriona and David Lischka.

So what current science conjectures (insists!) is that matter/energy bodies <u>expand</u> at light/ultra-light velocities at densities varying by a multiplicative factor of 8.50392~61280E+183. How could the "Cosmic Egg" ever come to be if that were true?

<u>4.0 Formation of a Universe from Nothing</u>
There is a final supposition to be made: presume an infinite Universe in the maximal state of disorder – only free energy. A <u>maximum</u> state of disorder would be nothing but Boson energy. Then, simply by <u>chance</u> the concentration of Bosons form in one location with density sufficient to form a White Hole. While the name implies a colored radiation emitted by it, by common Science theory, the "White" label simply indicates that it is composed of <u>energy</u> not matter.

Again, by Relativistic Perspective logic, the Energy/Bosons slow down, and become more and more concentrated at the centre of the body. Eventually they form <u>matter</u>. The Schwarzschild object begins its transition from a White hole to a Black one. Eventually the gravity becomes great enough to absorb enough energy and compact it into matter, then passing that matter still more energy, until it moves at the "distorted" escape velocity and moves beyond the Schwarzschild border. The object would do nothing but absorb more energy – some of that energy transforming to matter and being expelled from the body.

An additional argument can be made to that supposition. There is observational evidence of exactly that sort of phenomenon: Quasars and Seyfert Galaxies. Even the high proportion of Population II in Galactic Cores: Population II stars tend to be found in globular clusters and the nucleus of a galaxy[L] can be forwarded as an argument for this phenomenon. If a Star were older (as it is proposed that Population II stars would be) the bulk of the higher Atomic Number would have formed at the center of the Body – that is where the fusion takes place. It is not really reasonable to say that those elements would be pushed to the surface of the body (the only place they could be detected with current technology) because they would have a higher proportion of mass to surface area that would reduce the force of radiation pressure against them. It would only be a cataclysmic event <u>originating</u> at the core that would free those higher atomic number elements free. It can also even be proposed that all Galactic scale objects go through a life cycle, as more and more energy and matter concentrates at the core, to the point that it goes through a cataclysmic event on the scale of Seyfert Galaxies or Quasars that would expulse a proportion of the heavier elements. Such an event could even be theorized to be part of the element formation beyond the Iron Peak.

To return the White Hole/Black Hole argument: the life cycle would begin with the concentration of enough energy to begin the formation of matter. The matter would form and the object would absorb enough energy to expel <u>some</u> that matter in a catastrophic event, leaving enough energy/matter remaining to form a seed for an object that would reach the same point further along – and go through another expulsion. The body would continue to grow, until it reached a balance point with the density of Bosons in the immediate neighborhood. Its regular catastrophic events would balance with the amount of absorbed energy. So different sized objects would indicate the density of energy at that site, along with the ongoing exchange of matter with neighboring objects.

[L] HyperPhysics*****Astrophysics http://hyperphysics.phy-astr.gsu.edu/hbase/starlog/pop12.html

The catastrophic event could range from simply a higher than average expulsion of matter from the centre of the object, to Stellar clusters, to Galaxies, to Seyfert Galaxies, to Quasars. All objects could go through that lifetime, the rate (or existence!) of the catastrophic events, followed by a period of contraction and then again expansion. The phenomenon would be characterized by various sized star groupings: Globular Clusters, Galactic Clouds, and Galaxies or Super Galaxies.

A plea is made to the reader: is not a Universe infinite in Space and Time and decays EM radiation frequency over great distances a more reasonable scientific supposition than one that proposes an absolutely indeterminate Cosmic Birth 13.77[M] billion years ago? Science insists that MACS0647-JD[N], an object in Space (our Universe) that has travelled 13.3 billion light years [LY] or 1.2582771528532464000~000E26m. Because the Universe we observe is presently so disperse we must assume that that light velocity of the signal back was an undistorted "c" for the entire journey – if there were somehow a mechanism in that diffuse a medium where normal EM signals could be sped up to some kind of "super-c" velocity then almost all of the Relativistic reasoning in current Science would have to be tossed out. So we will presume it has taken 13.3 Billion years to reach us. If space has "expanded" in that time both its Red Shift and its intensity would not match the MACS0647-JD thought to be 420 million years old[O].   That would mean we see an object that in 4.20E8 years travelled 1.33E+9LY or travelled 1.26E+26m/1.33E+E10LY. That speed would mean an approximate 9.493E9m/s or (3.167E1*c)m/s – 31.67 times the speed of light – is that a reasonable recession speed? Not just that: at this moment in its existence, MACS0647-JD, according to one of the latest Hubble constant figures of 67.8(km/s)/Mpc[P], would be moving with a withdrawal velocity of approximately 2.67E+8m/s at the edge of the Universe. Presuming it is spatial expansion and not actual velocity, is it really reasonable that the signal then emitted not be slowed even more down by the expansion of the space ahead of it? Alternately, Relativistic effects would slow down the speed signal – that is one of the most fundamental tenets of Relativity theory – so it is an even greater divergence from the signal speed than the 31.67 listed above. This writer very deliberately did not try to put a number on the latter, because it strikes as something that must be debated.

A final theoretic speculation: Bosons could not go any slower than a Planck velocity. The equation for Planck length [l_P] is:

$$l_P = (\hbar G/c^3)^{\frac{1}{2}}$$

[M] *WMAP - Age of the Universe*. NASA. 21 December 2012. Retrieved 2013-01-01.
http://map.gsfc.nasa.gov/universe/uni_age.html
[N] NASA, ESA, and M. Postman and D. Coe (STScI) and CLASH Team
(http://www.nasa.gov/mission_pages/hubble/science/distance-record.html
[O] Ibid.
[P] Planck 2013 results. I. Overview of products and scientific results
http://arxiv.org/pdf/1303.5062v1.pdf

Where ℏ is the reduced Planck constant, $\underline{G}$ is the Gravitational constant, and $\underline{c}$ is the speed of light. The equation for the Planck time (with the same constants) is:

$$t_P = (\hbar G/c^5)^{\frac{1}{2}}$$

So it reasons that the maximum Planck velocity would be the greatest possible distance an object could go over the shortest possible time.

$$Planck_{Velocity} = l_P / t_P$$

$$Planck_{Velocity} = (\hbar G/c^3)^{\frac{1}{2}} / (\hbar G/c^5)^{\frac{1}{2}}$$

Determine the value by squaring both sides:

$$Planck_{Velocity}^2 = (\hbar G/c^3)/(\hbar G/c^5) / (\hbar G/c^3)/(\hbar G/c^5)$$

$$Planck_{Velocity}^2 = (\hbar G/c^3)/(\hbar G/c^5)$$

$$Planck_{Velocity}^2 = (c^3)/(c^5)$$

$$Planck_{Velocity}^2 = 1/c^2$$

$$Planck_{Velocity} = 1/c$$

When light velocity (the velocity of Bosons) was distorted to the smallest possible velocity, there would be the (because of energy conservation) maximum number of Bosons for that amount of energy, moving the slowest possible velocity (Planck Velocity) and undergoing the maximum possible concentration of mass. Assuming again, a theoretical Cosmic Egg mass of 3.3E+53Kg. We also would like to have the non-Relativistic/Real escape velocity, the not the distorted velocity appearing from the Relativistic distortion. The point at which that body would have a Boson velocity of 1/c would be at the point where the distortion arrived at an amount of c^2.

So:

$$c^{-1} = c / (1 + 2GM_{Universe}/radius_{Cosmic\_Egg}c^2)^{\frac{1}{2}}$$

$$c^{-2} = c^2 / (1 + 2GM_{Universe}/radius_{Cosmic\_Egg}c^2)$$

$$(1 + 2GM_{Universe}/radius_{Cosmic\_Egg}c^2)* c^{-2} = c^2$$

$$c^{-2} + 2GM_{Universe}/ c^6 = radius_{Cosmic\_Egg}$$

$$radius_{Cosmic\_Egg} = c^{-2} + 2GM_{Universe}/ c^6$$

$$radius_{Cosmic\_Egg} = c^{-4} + 2GM_{Universe}/c^6$$

$$radius_{Cosmic\_Egg} = 2GM_{Universe}/(1 - c^2))$$

$$radius_{Cosmic\_Egg} = 1.485358228340089564175275112055988181279129297925600\sim$$
$$033145790598041590881559182966273975081198342119050E\text{-}27m$$

That value is not quite the infinitesimal $1.0E\text{-}34m^Q$ as some current theories suggest, but surely it is a valid approximation. It is a mathematically reasoned absolute beginning point: something current theory fails on.

5.0 Summary

Current thought regarding space expansion in the Big Bang theory - both the space expansion required by current theory in the beginning and observed space expansion can be explained by the more Universal view of relativity of this paper. This paper supports the Einsteinian limit of light speed, and does not deny it, as current theory does, though it does redefine certain aspects of that limit. It proposes a number of unassailable additional equations to relativity, as well as one:

$$Velocity_{noGRPDescape} = Velocity_{GRPDscape}/(1 + Velocity_{GRPDscape}^2/c^2)^2$$

Its veracity is perhaps a little more debatable, but only if fundamental tenets of relativity are challenged. Absolute application of the original General Relativity equation:

$$Time' = Time/(1 - 2Gm/rc^2)^{\frac{1}{2}}$$

Declares the entire Universe to now be or have been imaginary. Under Classic Relativity, it is the estimation of Universal mass you use that determines what radius is given that imaginary Universe's Schwartzchild. It also leads to the declaration that matter/energy/space expand at densities ranging by a factor of $8.50392\sim61280E+183$.

Your only choice then, is whether you accept Relativistic Perspective – or deny it and insist on both that the fundamental, original General Relativity was entirely complete and that the Reality you occupy is beyond the imagination. That would, perhaps, be something Science Fiction fans would be more adaptable to. Though it would leave the gigantic majority of the population out in the cold.

[Q] **Quasi-Steady-State and Related Cosmological Models: A Historical Review**
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Note to reader: because of a bug on some of the Internet sites, some of the referenced addresses must be cut and pasted to access.