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Hyperbolic Einstein: Towards Tachyonic Relativity

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Abstract: *General Theory of Relativity can be thought to violate the speed of light in a faster than light travel provided it follows a 5-tuple hyperbolic generator* $(\alpha, \beta, \gamma, \xi, \mu) \subset \eta^k$ *where there is General Relativity as we had known for* $k = 0$ *and Tachyonic Relativity for* $k = 1$.

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Methodology:

For the 5-tuple hyperbolic generator, it is not so difficult to assume that the value of k in the set of elements $(\alpha, \beta, \gamma, \xi, \mu) \subset \eta^k$ – the value is 1 or we can say the generator is active for the hyperbolic space. In normal norms of relativity, one usually see two kinds of geometry, the planets are of a positive or elliptic curvature which revolves around the sun – a star that is also of positive curvature via an angular momentum because of the bending of spacetime in a hyperbolic curvature and in this case the value β which is a summation of the value of the General Relativity being dubbed as g where β takes two values[1-3],

$$\beta_{\binom{\epsilon}{\hbar}} \equiv \begin{cases} \beta_{\hbar}^{C,r,\epsilon} \Longrightarrow \begin{cases} \quad \textit{the central object } c - \textit{the revolving object } r - \textit{all in elliptic curvature } \epsilon \\ \beta^{\hbar} \Longrightarrow \textit{the hyperbolic space over which the stars and planets have their actions} \end{cases} \end{cases}$$

Another value of β is just the reciprocal or opposite of $\beta_{\binom{\epsilon}{\hbar}}$ – that is $\beta_{\binom{\hbar}{\epsilon}}$ where the general Relativity is dubbed as the inverse of $\mathscr{g}$ that is $\mathscr{g}^{i^2}$ where the relation holds as,

$$\beta_{\binom{\hbar}{\epsilon}} \equiv \left\{ \beta_{\epsilon}^{C,r,\hbar} \Longrightarrow \left\{ \begin{array}{c} \text{the central object } c - \text{ the revolving object } r - \text{all in hyperbolic curvature } \hbar \\ \text{the elliptic space over which the stars and planets have their actions} \end{array} \right. \right.$$

Thus, the relation can be deduced as,

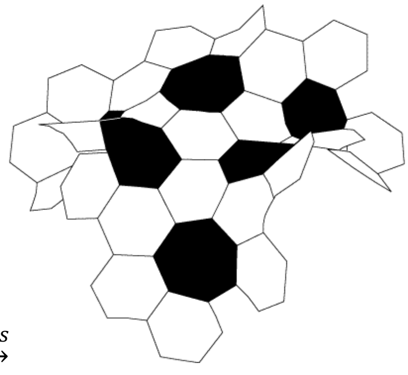
$$\left\{ \begin{array}{r} \mathscr{g} \cong \beta_{\binom{\epsilon}{\hbar}} \equiv \beta_{\hbar}^{C,r,\epsilon} \cong (\alpha,\beta,\gamma,\xi,\mu) \subset \eta^{0} \\ \mathscr{g}^{i^2} \cong \beta_{\binom{\hbar}{\epsilon}} \equiv \beta_{\epsilon}^{C,r,\hbar} \cong (\alpha,\beta,\gamma,\xi,\mu) \subset \eta^{1} \\ \exists \beta_{\binom{\epsilon}{\hbar}}, \beta_{\binom{\hbar}{\epsilon}} \in \beta \end{array} \right.$$

Now, it is easy to assume that, in the Tachyonic Relativity that is $\mathscr{g}^{i^2}$ – what exactly happens is that as all the stars and planets took the hyperbolic geometry therefore, when it sits on spacetime, the space will move upwards with a convex hull and becomes elliptic thereby make every celestial object including the stars to roll down at a greater speed than to take the angular momentum as seen in $\mathscr{g}$: thereby making the space a hill and the celestial objects are the hyperbolic balls that will roll down faster and faster like the balls rolling down the hill towards the valley and hence their acceleration α increases depending on their shape γ which will ultimately lead to cross the speed of photon in an interesting way: but for that it is necessary to describe both the shape and acceleration of the hyperbolic ball,

Where, the shape of a hyperbolic ball is called $order_7$ $truncated\ triangular\ tiling$ that can be described as a hyperbolic soccer ball which holds the below property,

$$\gamma = \left\{ \begin{array}{c} \text{order}_7 \text{ truncated triangular tiling} \\ \downarrow \\ \text{a soccer ball is constructued by switching a hexagon } (6-\text{gon}) \text{with a pentagon } (5-\text{gon}) \\ \text{where, iff, that positive curvature can be switched to a hyperbolic soccerball then, whats} \\ \text{needed is the switching of the hexagon with a heptagon } (7-\text{gon}) \text{ where in the previous} \\ \text{case of less material giving positive curvatures: now the excess material will give negative} \\ \text{or hyperbolic curvatures.} \\ \downarrow \end{array} \right.$$

$\xrightarrow{\textit{yields the hyperbolic soccerball obeying the above rules}}$



To calculate the hyperbolic acceleration α – one needs a three-acceleration form for a Lorentz factor Λ, the coordinate time T, proper time τ – one needs a the $\xi - axis$ for the accelerating particle provided the motion continues and is not from the inertial stage or 0-motion state defined via[4-6],

From the perspectives of T,

$$\nabla(T) = \nabla_0\Lambda_0 + \left[(1-\nabla^2/c^2)^{-\frac{3}{2}}\frac{\partial\nabla}{\partial T}\right]T\left(1+\left(\frac{\nabla_0\Lambda_0+\left[(1-\nabla^2/c^2)^{-\frac{3}{2}}\frac{\partial\nabla}{\partial T}\right]T}{c}\right)^2\right)^{-\frac{1}{2}}$$

$$\equiv c\tan h\left[arsin\,h\left(\frac{\nabla_0\Lambda_0+\left[(1-\nabla^2/c^2)^{-\frac{3}{2}}\frac{\partial\nabla}{\partial T}\right]T}{c}\right)\right]$$

$$\xi(T) = \xi_0 + \frac{c^2}{\left[(1-\nabla^2/c^2)^{-\frac{3}{2}}\frac{\partial\nabla}{\partial T}\right]}\left(1+\left(\frac{\nabla_0\Lambda_0+\left[(1-\nabla^2/c^2)^{-\frac{3}{2}}\frac{\partial\nabla}{\partial T}\right]T}{c}\right)^2\right)^{\frac{1}{2}} - \Lambda_0$$

$$\equiv \xi_0 + \frac{c^2}{\left[(1-\nabla^2/c^2)^{-\frac{3}{2}}\frac{\partial\nabla}{\partial T}\right]}\left(\cos h\left[arsin\,h\left(\frac{\left[(1-\nabla^2/c^2)^{-\frac{3}{2}}\frac{\partial\nabla}{\partial T}\right]T}{c}\right)\right] - \Lambda_0\right)$$

$$c\tau(T) = c\tau_0 + \frac{c^2}{\left[(1-\nabla^2/c^2)^{-\frac{3}{2}}\frac{\partial\nabla}{\partial T}\right]}log_{10}\left(c^2+\left(\nabla_0\Lambda_0+\left[(1-\nabla^2/c^2)^{-\frac{3}{2}}\frac{\partial\nabla}{\partial T}\right]T\right)^2+\nabla_0\Lambda_0+\left[(1-\nabla^2/c^2)^{-\frac{3}{2}}\frac{\partial\nabla}{\partial T}\right]T\right)$$

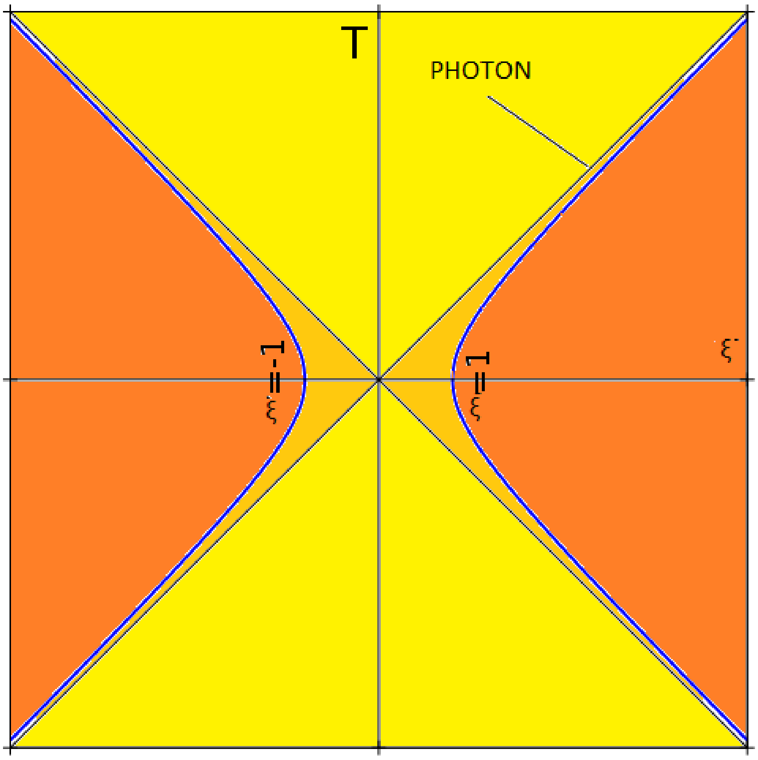
$$\equiv c\tau_0 + \frac{c^2}{\left[(1-\nabla^2/c^2)^{-\frac{3}{2}}\frac{\partial\nabla}{\partial T}\right]}\left(arsin\,h\left(\frac{\nabla_0\Lambda_0+\left[(1-\nabla^2/c^2)^{-\frac{3}{2}}\frac{\partial\nabla}{\partial T}\right]T}{c} - artan\,h\left(\frac{\nabla_0}{c}\right)\right)\right)$$

From the perspectives of τ,

$$\nabla(\tau) = c\tan h\left(\left(\frac{\nabla_0}{c}\right)+\frac{\left[(1-\nabla^2/c^2)^{-\frac{3}{2}}\frac{\partial\nabla}{\partial T}\right]\tau}{c}\right)$$

$$\xi(\tau) = \xi_0 + \frac{c^2}{\left[(1-\nabla^2/c^2)^{-\frac{3}{2}}\frac{\partial\nabla}{\partial T}\right]}\left(\cos h\left(artan\,h\left(\frac{\nabla_0}{c}\right)+\frac{\left[(1-\nabla^2/c^2)^{-\frac{3}{2}}\frac{\partial\nabla}{\partial T}\right]\tau}{c}\right) - \Lambda_0\right)$$

$$ct(\tau) = cT_0 + \frac{c^2}{\left[(1-\nabla^2/c^2)^{-\frac{3}{2}}\frac{\partial\nabla}{\partial T}\right]}\left(\sin h\left[artan\,h\left(\frac{\nabla_0}{c}\right)+\frac{\left[(1-\nabla^2/c^2)^{-\frac{3}{2}}\frac{\partial\nabla}{\partial T}\right]\tau}{c}\right] - \frac{\nabla_0\Lambda_0}{c}\right)$$



Now, in our formulation of $\mathscr{g}$ - if we consider the formula where μ is the energy, m is the mass, v is the velocity and c is the speed of the light in vacuum: one can easily state that[6-8],

$$\mu = mc^2\left[1-\frac{v^2}{c^2}\right]^{-\frac{1}{2}}$$

Energy μ increases with increase in velocity v and becomes heavier due to $mass-energy\ equivalence$ and can never reach c. But in case of a tachyon, as it moves '$where\ here\ we\ considered\ the\ planets$', its velocity approaches infinity by infinite rolling down and for this obeying the equation its energy reaches zero – thus the mass-energy equivalence won't work here and the planets are always in rolling with the stars being in a hyperbolic shape rolled over an elliptic spacetime in case of $\mathscr{g}^{\iota^2}$.

Thus, with the usage of all parameters the 5-tuple relation $(\alpha, \beta, \gamma, \xi, \mu) \subset \eta^k$ is satisfied for the value of $k = 1$ in Tachyonic Relativity $\mathscr{g}^{\iota^2}$.

This object as referred would have a spacelike signature where if we consider the Euclidean line element or the separation of the events between two objects mainly because of an inertial movement of a single object between its events or two separate objects having same events a interval can be found that are time and space separate where the interval can be taken as $\Delta\iota^2$ gives two signatures,

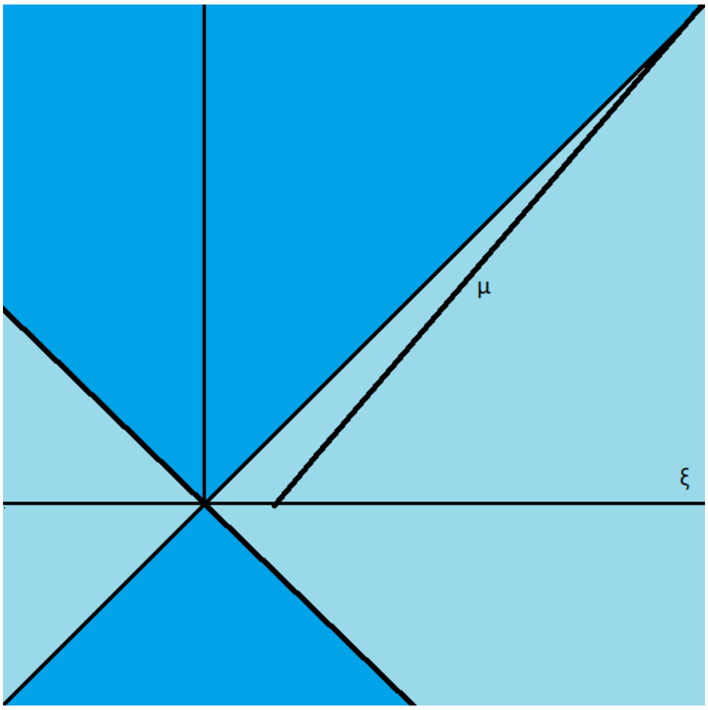
$$\begin{cases} (\Delta\iota^2) = \begin{pmatrix} (\Delta ct)^2 - (\Delta x)^2 - (\Delta y)^2 - (\Delta z)^2 \\ -(\Delta ct)^2 + (\Delta x)^2 + (\Delta y)^2 + (\Delta z)^2 \end{pmatrix} \\ having\ signatures \begin{cases} (\Delta ct)^2 - (\Delta x)^2 - (\Delta y)^2 - (\Delta z)^2 \longrightarrow (+,-,-,-) \\ -(\Delta ct)^2 + (\Delta x)^2 + (\Delta y)^2 + (\Delta z)^2 \longrightarrow (-,+,+,+) \end{cases} \end{cases}$$

The spacelike interval can be defined when $(\Delta\iota^2) < 0$ which when combined with the $4-momentum$ describes the FTL motion where the $4-momentum$ can be described as (p_0, p_1, p_2, p_3) such that,

$$p_0 \equiv mc^2\left[1-\frac{v^2}{c^2}\right]^{-\frac{1}{2}}(c^{-1})$$

Thus, the 4-momentum given by,

$$\begin{array}{ccc|l} p_{(4)} & = & & \left(mc^2\left[1-\frac{v^2}{c^2}\right]^{-\frac{1}{2}}(c^{-1}), p_1, p_2, p_3\right) \\ & \Rightarrow & & (\mu(c^{-1}), p_1, p_2, p_3) \\ \downarrow & \downarrow & & \downarrow \\ \hline \forall(\Delta\iota^2) < 0 & \xrightarrow{generates} & & \mathscr{g}^{\iota^2} \end{array}$$



Thus, the worldline of the objects can be depicted taking T with ξ with two new parameter ζ and ζ' in relation with μ for the hyperbola χ,

$$\chi \equiv \zeta^2 = \xi^2 - T^2\mu^2 \left[\frac{m^2c^4}{c^2 - v^2}\right]$$

Such that, for the hyperbolic coordinates,

$$\left(cT, \xi, \bar{\xi}, \bar{\bar{\xi}}\right)$$

The worldline motion can be reduced to,

$$cT = \zeta' \sin h\ \zeta$$
$$\xi = \zeta' \cos h\ \zeta$$

Conclusion:

General theory of Relativity can be violated by means of an alternative form where the originating structures of both spacetime and the objects lies on the spacetime changes their curvatures into opposite – the stars and planets from elliptic to hyperbolic while the spacetime gets from hyperbolic to elliptic when the hyperbolic object like stars sits on them and for this reason unlike the normal notion of angular momentum as in general relativity: in this case of tachyonic relativity, objects rolls down in a hyperbolic velocity which has been proved via the spacelike norms implying a faster than light speed as provided here in this tachyonic relativity.

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