Dark Matter Planets

Jack Sarfatti[1]
adastra1@me.com
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Abstract

The experimental scattering evidence is that electrons and quarks are truly point-like showing no extended spatial structure. A finite charge at a point has infinite energy and would create a black hole. If the charge is extended in, for example, a spherical shell, then what glues the charge together? Niels Bohr evaded this by renouncing the ontological space-time world lines that was so useful to Feynman in the creation of his diagrams. David Bohm's ontological interpretation shows that Bohr was wrong about not being able to have well defined particle trajectories and classical field configurations under the influence of nonlocal entangled quantum potentials that encode all of quantum weirdness including the double slit experiment that Feynman called the "central mystery" of the elusive quantum principle. I proposed back in 1974 that electrons and quarks are quasi-Kerr type black holes with "hair" (internal electroweak-strong charges) in which the space warp is so large that they appear as point particles to the outside observer whilst being large to the inside observer. Indeed, the virtual plasma of fermion-antifermion pairs is the strong short-range attractive "glue" that holds the repulsive electric charge together. There appears to be a fractal scale invariance that shows a similar "geon" (J. A. Wheeler) effect at planetary and galactic scales. In this first part of a series, I only consider stable dark matter spheres of planetary size.

Dark matter globs on various scales have allegedly been observed at planetary scale[i] as well as in the collision of galaxies. Here is a simple toy model for static spherically symmetric globs in hovering Local Non-Inertial Frames (LNIF).

$$g_{tt} = 1 + \frac{2V_{Newton}}{c^2} = -\frac{1}{g_{rr}} \tag{1.1}$$

$$\frac{d^2 r}{d\tau^2} \equiv -\frac{\partial V_{Newton}}{\partial r} \tag{1.2}$$

$$dR \equiv \sqrt{g_{rr}}\,dr = \frac{dr}{\sqrt{1 + \frac{2V_{Newton}}{c^2}}} \tag{1.3}$$

[1] Thanks to Gosta Gahm for telling me last week in Stockholm about the recent observations of planetary scale dark matter globs similar to the larger ones seen in the collision of two galaxies. I also want to thank Gary Gibbons, Mike Towler and Brian Josephson of Trinity College, Cambridge for constructive criticism and to Brian for arranging my stay at Trinity Master's Lodge where this paper was written. All errors, confusions and stupid not-even-wrong notions that may be present are mine and it should not be construed that any of the above gentlemen agree with my ideas in this paper. ☺

$$
\begin{aligned}
&\frac{dR}{d\tau} = \frac{1}{\sqrt{1+\frac{2V_{Newton}}{c^2}}}\frac{dr}{d\tau} \\
&\frac{dV_{Newton}}{d\tau} = 0 \\
&\frac{d}{d\tau}\frac{dR}{d\tau} \equiv \frac{d^2R}{d\tau^2} = \frac{1}{\sqrt{1+\frac{2V_{Newton}}{c^2}}}\frac{d^2r}{d\tau^2} \\
&= -\frac{1}{\sqrt{1+\frac{2V_{Newton}}{c^2}}}\frac{\partial V_{Newton}}{\partial r} \equiv g_{Einstein}
\end{aligned}
\tag{1.4}
$$

The Hawking-Unruh temperature T_{LNIF} measured in this counter-intuitively covariantly accelerating hovering LNIF in curved space-time at a fixed r is

$$
T_{LNIF} \sim \frac{\hbar}{ck_B} g_{Einstein} = \frac{\hbar}{ck_B}\frac{1}{\sqrt{1+\frac{2V_{Newton}}{c^2}}} g_{Newton} \tag{1.5}
$$

Imagine a uniform density sphere of radius a of exotic vacuum in which the plasma density of virtual fermion-antifermion pairs exceeds that of virtual bosons.[ii] The anticommutation rules on the fermion fields needed to obey the Pauli exclusion principle together with Lorentz invariance and the Einstein local equivalence principle all combine[iii] to give a net "dark matter" *Anti de Sitter* (AdS) interior metric field $g_{tt}(r)$

$$
\begin{aligned}
&V_{Newton} = +\frac{r^2}{2a^2} \\
&0 \le r < a \\
&g_{tt(r<a)} = 1 + \frac{r^2}{a^2} \\
&g_{tt}(a) = 2
\end{aligned}
\tag{1.6}
$$

$$
\vec{g}_{Einstein}(r) = -\frac{c^2}{\sqrt{1+\frac{r^2}{a^2}}}\frac{r}{a^2}\hat{e}_r \tag{1.7}
$$

Unlike the dark energy dS case where the virtual boson density exceeds the virtual fermion-antifermion density, there is no AdS interior horizon since $g_{Einstein}(a) = -\frac{c^2}{\sqrt{2}a}$ is finite. We want a smooth transition at the sharp boundary. Therefore, the exterior metric must be

$$g_{tt(r>a)} = 4 - \frac{2a}{r}$$
$$g_{tt}(a) = 2 \tag{1.8}$$

The exterior event horizon is

$$g_{tt(r>a)} = 4 - \frac{2a}{r} = 0$$
$$\rightarrow r = \frac{a}{2} < a \tag{1.9}$$

which is inconsistent. Therefore there is no exterior event horizon.

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[i] Discussion with Gosta Gahm in Stockholm, Sept 16, 2009.

[ii] This involves new quantum gravity physics beyond our current vacuum dynamics with infinite renormalizations.

[iii] *Cosmological Physics*, John Peacock, pp 25-26 (Cambridge)