Hypersphere Cosmology 3.

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Abstract. This paper presents core the equations and physical principles of Hypersphere Cosmology drawn together in summary from a number of the authors previous papers. It presents an alternative interpretation of observed cosmological data to that currently used in the Standard Model.

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If the geometry of a spherical volume of spacetime changes to a hyperspherical (3-sphere or 4-ball) geometry when $\frac{m}{\pi r} = \frac{c^2}{G}$ and if the resulting volume becomes $v = 2\pi^2 r^3$ and if all dust like hyperspherical bodies of matter naturally rotate with a Gödelian type angular velocity $\omega = \sqrt{2\pi G d}$, (where d = density) then a number of things follow if these equations apply to the observable universe.

1) The observable universe (Hubble time x lightspeed) constitutes the entire universe, a hypersphere finite and unbounded in space and time. The universe does not expand, and no big bang occurred.

2) The universe exhibits a centripetal gravitational acceleration $A = \frac{GM}{L^2}$ (where M = mass of universe, and L = antipode length πr) balanced exactly by a centrifugal acceleration of $A = \frac{c^2}{L}$ from its rotation. The 'rotation' of such a 3-sphere consists of the movement of all bodies to their antipode points over a period of the Hubble time.

3) The acceleration A acts omnidirectionally reducing frequency, and redshifts light in proportion to astronomical distance;

$$Z = \frac{\lambda_{obs}}{\lambda_{exp}} - 1 = \frac{c}{c - \sqrt{dA}} - 1$$ (where d = astronomical distance)

The Cosmic Microwave Background Radiation consists of highly redshifted trans-antipodal light in thermodynamic equilibrium with the thin intergalactic medium.

4) The omnidirectional acceleration A flattens galactic rotation curves;

$$v_o = \sqrt{\frac{Gm}{r} + rA}$$ without recourse to dark matter.

5) The omnidirectional acceleration A explains the residual deceleration of the Pioneer Anomaly of about 7 x 10^{-10}m/s^2

$$v_2 = v_1 - At$$

6) A hyperspherical universe exhibits hyperspherical lensing L_h which distorts the apparent magnitudes of sources of luminosity at cosmological distances

$L_h = \frac{1}{1+\sqrt{d-d^2}-d}$ where d = astronomical distance/antipode distance.

Leading to the mistaken assumptions of an accelerating expansion and dark energy.

7) A hyperspherical universe will exhibit Mach's Principle: -

$\frac{GMm_g}{Lc^2} = m_i$ inertial mass arises from the action of a constant scalar field arising from the entire universe.

8) Black Holes will not remain indefinitely stable in a hyperspherical universe and singularities cannot form.

$\sqrt{\frac{Gm}{\pi r}} = c$ represents the greatest compression that matter can attain because it will spin at lightspeed. Black holes will eventually contract towards hyperspheres when matter infall ceases.

Hyperspheres attempting to form within the hypersphere of the universe will acquire the additional angular velocity of the universe itself;

$$\omega = \sqrt{2\pi Gd + \frac{A}{r}}$$

This would result in a spin velocity v_s in excess of lightspeed, instead of which the incipient hypersphere begins to shed matter back into space at near relativistic velocities.

$$v_s = \sqrt{c^2 + rA}$$

A hyperspherical universe thus recycles itself continually. We cannot yet tell if the universe has an origin or not, we can only tell that the universe will have a spatio-temporal horizon of about 14 billion years and 14 billion light years for all observers at all points of space and time within it. We have no reason to consider non-existence as more fundamental than existence.

9) As a consequence of $\frac{M}{L} = \frac{c^2}{G}$ for the entire universe, the ratios of the Planck quantities to the universe's quantities all have the same value expressed here as U, the ubiquity constant, a huge dimensionless number of the order 10^{60}.

$$\frac{M}{m_p} = \frac{L}{l_p} = \frac{T}{t_p} = \frac{E}{e_p} = \frac{a_p}{A} = U \sim 10^{60}$$

Applying the Beckenstein-Hawking conjecture to the universe as a hypersphere suggests that it will possess something of the order of one bit per 10^{60} Planck volumes, corresponding to one bit per 10^{20} Planck lengths.

The most massive stable particle, the Proton has a mass of $\frac{m_p}{\sim 10^{20}}$ and a wavelength of $\sim 10^{20} lp$ and a population of 10^{80} in the universe, making up nearly all of it's mass. It seems possible that exceedingly small hyperspheres rather than dimensionless points may compliment the Compton and Debroglie wavelengths of quanta, if the quanta remain sufficiently small that the uiniverse's spin does destablise them.

References.

The arguments and mathematical derivations used in this paper appear in part or whole or in extended form in the following previous papers.

http://vixra.org/abs/1601.0026 Hypersphere Cosmology 2

http://vixra.org/abs/1709.0112 Modified Newtonian Dymanics in a Hypersphere.

http://vixra.org/abs/1710.0066 Mach's Principle.