Research Article

Gravitation Due to Scalar Potentials and Black Holes

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This paper argues that the universe possesses two scalar potentials similar to those proposed by E.T. Whittaker in which waveforms travel longitudinally. It is proposed that these scalar potentials form through black holes, creating normal transverse electromagnetic radiation as well as gravity. This opens up new avenues for understanding the universe and black holes while applying parsimonious explanations to dark matter theories. Charge is envisioned as a widespread mechanical intermediate in the form of the scalar potentials, thus implying that the universe is similar to an atom. An important speed limit is determined and the critical MOND acceleration is derived using the Rydberg constant.

Introduction

This paper will claim that the universe possesses two black hole-generated scalar potentials similar to those proposed by E.T. Whittaker in which waveforms travel longitudinally and which create transverse electromagnetic radiation. An original cosmology is envisioned centered on black holes creating scalar potentials. This allows for a new understanding of the root cause of dark matter effects. This additionally accounts for gravity as a whole and implies that mass and space are intertwined through a mutually-opposed, moving hyperspace that is equivalent with charge. The widespread and mechanical nature of charge associates the universe, in particular each large galactic mass around a central black hole, with the semblance of an atom. Following from this, one speed of the opposed scalar potentials is proposed to be $1.126 * 10^{13}$ m/s based on the Rydberg wavelength and the energy of an electron. The critical MOND acceleration of $1.2 * 10^{-10} m/s^2$ is derived using the Rydberg constant, the Boltzmann constant, the fine structure constant and the Planck mass.

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Mathematics of Scalar Waves

An electromagnetic wave has both electric and magnetic fields and power is represented by the Poynting vector.

$$S = ExB \qquad (1)$$

$$\begin{aligned} \mathrm{E} &= -\nabla\alpha - \frac{1\partial A}{c\partial t} \\ B &= \nabla x A \qquad\qquad (2) \end{aligned}$$

Where A is the vector (magnetic) potential, alpha is the scalar (electric) potential. According to Maxwell:

$$\begin{aligned} &-\nabla^2\alpha - \frac{1\partial^2\alpha}{c^2\partial t^2} = 0 \\ &-\nabla^2 A - \frac{1\partial^2 A}{c^2\partial t^2} = 0 \qquad (3) \end{aligned}$$

For the case of E=0 and B=0,

$$\begin{aligned} A &= \nabla S \\ \alpha &= \frac{-1\partial S}{c\partial t} \qquad (4) \end{aligned}$$

$$-\nabla^2 S - \frac{1\partial^2 S}{c^2\partial t^2} = 0 \qquad (5)$$

This suggests propagation of a wave even though E=B=0. [1]

It is proposed that energy for the propagation of scalar wave S without Poynting vector power comes from black holes collectively and is localized around each supermassive black hole. They have properties of soliton waves as displayed in Figure 2.

"Dark Matter" as the Result of A Black Hole-Generated Scalar Potential Amidst Large Galactic Masses

The forthcoming gravitational mechanism in nature would be akin to a Weyl fermion with accompanying fermi arcs, whose temperature is already known to behave like spacetime gravity. It would also be similar to the idea of a scalar potential proposed by E.T. Whittaker in 1904. These concepts have been further discussed by certain physicists, particularly T.E. Bearden, Bahman Zohuri, and some contributions from Dr. Andrew Michrowski. [2][3][4] E.T. Whittaker claimed waveform perturbations travelling through scalar standing waves longitudinally do so proportionally to local

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mass-density; there is a local electrostatic scalar potential. Longitudinal propagation allows linear wavefronts to superpose. Two scalar potential functions intersecting at long distances allow for ordinary transverse EM fields to appear.

Following from this, from the point of view of an observer with the energy and speed of a radio wave, a galaxy would appear as three horizontal sheets. The top and bottom sheets would represent "dark matter" while the middle sheet would contain stars and an extremely prominent black hole due to the collective nature of black holes in three dimensions.

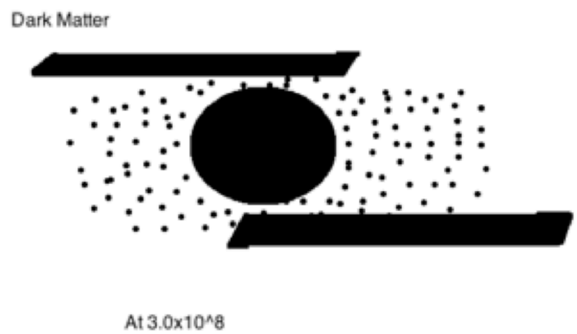

Figure 1. "Dark Matter" at the Speed of Light. Wave Undergoing Gravitational Lensing. Gravity Occurs in the Y-direction.

"Dark matter", seen in Figures 1 and 2 as two of three sheets at the speed of light and energy of a radio wave, accrues around galactic masses to prevent galactic spinoff as specified by Richmond [4]. Yet this occurs according to a different set of physical laws. It forms these two sheets when observed at a speed approaching that of light and becomes slower and more diffuse as the observer decelerates. This indicates that dark matter abides by principles within a different dimension: a mass-energy dimension through time where dark matter is measured in terms proportionally related to the speed of the observer. This limited-range hyperspace through time that carries electromagnetic radiation can explain certain questions in physics such as those related to charge, strong cp symmetry, the arrow of time and wave-particle duality.

Matter within a black hole would be composed of many 3x3 grids that could be understood as information. "Dark matter" would occur after one of these nine spots alternates randomly and increasingly slowly between inward, outward and empty. At some point this information or "volume"

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would split in two, with the singularity acting as a type of beam splitter. Due to the hyperspatial and fluid nature of dark matter, the two viewed sheets of dark matter represent all the dark matter in the universe acting together on the individual galaxy. The top layer would be superimposed over a cosmic optical background. The gravitational mechanism is displayed in Figure 2 as a bidirectional longitudinally-propagating motion with superluminal propagation, as put forward by E.T. Whittaker [5].

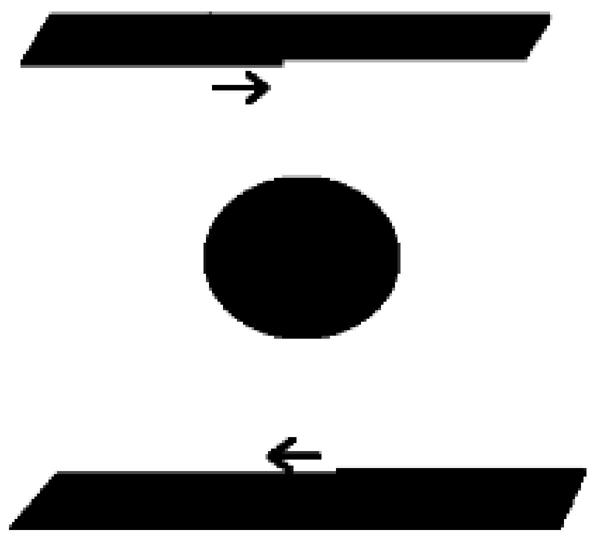

Figure 2. Longitudinal bidirectional motion proportional to transverse wave moving at c. This is dark energy.

Deriving a New Speed Limit and MOND Acceleration via Association of Scalar Potentials to Charge

Whittaker proved that the six components of the dielectric displacement and magnetic force in 3 space can be expressed in terms of the derivatives of two scalar potentials F and G, where the summation is taken over all electrons in the field.

$$F(x,y,z,t) = \sum \frac{e}{4\pi} sinh^{-1} \frac{\bar{z}' - z}{((\bar{x}' - x)^2 + (\bar{y}' - y)^2)^{1/2}}$$
$$G(x,y,z,t) = \sum \frac{e}{4\pi} tan^{-1} \frac{\bar{y}' - y}{\bar{x}' - x} \qquad (6)$$

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One proposed speed of the propagation of the scalar potentials is $1.126 * 10^{13}$ m/s, which is arrived at by associating electron energy to the Rydberg wavelength. The Rydberg constant is the wavenumber of the lowest energy photon capable of ionizing an atom at the limit of infinite nuclear mass. This theory implies that energy is imparted from photon to particle via a mechanical intermediate. All atoms can be viewed together as a collective atom with collective energy, considering the mechanical and widespread nature of charge envisioned here. At the speed and wave nature of light, charge vanishes and becomes infolded into the plane of motion much as time dilates and length contracts. The two scalar potentials can be understood mechanically as a widespread mutually-opposed motion equivalent with charge. The energy of the electron charge carrier is thus related to the wavelength required to impart energy into any form of matter via a much higher frequency:

$$c = \frac{E\lambda}{h}$$
$$v = \frac{m_e c^2}{hR_\infty} = 1.126 \times 10^{13} \text{ m/s} \qquad (7)$$

The maximum speed, however, could be much greater. The critical MOND acceleration [6] can be derived using the Rydberg constant as well. Considering that the charged and moving bidirectional medium imparts energy into matter at the Rydberg wavelength, and that this medium acquires energy from black holes, it is related to the CMB temperature at half the age of the universe minus the present background temperature in the universe (ΔT) as well as average kinetic energy (kb). This is due to the four degrees of freedom of this latent kinetic energy (three spatial, one temporal) becoming two upon splitting within a black hole. The fine structure constant implicates electromagnetic interactions of particles, and the Planck mass (mp) is the only mass constituted solely by physical constants. From these relations a weak “minimum” acceleration can be derived at which the laws of gravity are modified to be stronger. This is the case due to a type of force - the Whittaker potential force - that is exercised on black hole-containing galaxies by the background temperature of the universe:

$$\frac{\alpha k_b R_\infty \Delta T}{m_p} = 1.2 \times 10^{-10} \text{ m/s}^2 \qquad (8)$$

Conclusion

Gravity and the effects of dark matter are the results of the existence of light initially, black holes, and a bidirectional motion. Spacetime ultimately results from some of these interactions. Charge is

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envisioned as permeating the universe as a mechanical intermediate generated by black holes in 3 space. This intermediate serves to carry electromagnetic radiation. The black hole-generated scalar potentials propagate longitudinally and bidirectionally, as proposed by Whittaker in 1904, with at least one speed of $1.126 * 10^{13}$ m/s. This is arrived at by relating the Rydberg constant to the energy of electrons, the latter of which was considered by Whittaker to carry the longitudinally-propagating scalar waves. Furthermore, the critical MOND acceleration of $1.2 * 10^{-10} m/s^2$ can be derived using the Rydberg constant and constants relating charge to mass and energy.

This paper's first and third sections review some math on longitudinal waves and new avenues such as the universe being modelled as an atom. They are not as important as the second section, which contains a few innovations: the union of black holes with Whittaker potentials, ternary information within a black hole, and their collective nature. The paper directs attention to two figures. The second figure of light decoupled from gravity amidst a large galactic mass is likely impermissible. This is dark energy.

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Declarations

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