New Horizons in Mathematical Physics, Vol. 2, No. 2, June 2018
https://dx.doi.org/10.22606/nhmp.2018.22002

Curved Gravitation based on Entropy, Black Holes and Limited Measurement Possibilities

Mark Titleman

Concordia University, Canada
Email: marktitleman@hotmail.com

Abstract. This paper puts forward the notion that the universe operates in a binary manner that is limited in measurability by the information processing ability of the observer. This has important consequences such as increasing the speed limit of light in the universe to 1.14c within a black hole, applying parsimonious explanations of dark matter and dark energy, and accounting for theories such as MOND. These conclusions are arrived at on the basis of an original cosmology as well as mathematical representations of universal rudiments and gravity. Newton's gravitational constant is given a range that should be used at long distances.

Keywords: Gravity, entropy, black holes, dark matter, dark energy.

Introduction

This paper will claim that the universe operates in a binary manner, with several measurement outcomes, due to the limited observational outcomes of the observer. This allows for an increased speed limit of light and new conceptions of Newton's gravitational constant and dark matter. Cosmologically it will be postulated that both black holes and our limited observations affect our understanding of motion. A method is provided to account for MOND based on the scalar and time-invariant mathematical representation of (S)E=(S)mc^2. Another method is provided via an adjusted Newton's gravitational constant which is given a range of 0.820G-G and is derived from a more general and scaled formulation of Newton's universal gravitation equation. These conclusions are followed by an original cosmology centered around a full account of dark matter and dark energy. The cosmology accounts for a new maximum speed limit of light by linking dark matter, which is one binary output of the universe, to dark energy directly via black holes.

Method 1: Usage of Scalar Relations for Creating Distributions of Measurement Limiting Values

Measurements in the universe are often limited by the information processing ability of the observer in a permutable universe composed of binary outputs. One approach to ascertain truth is to set unfalsifiable bounding conditions regardless of information processing ability of the observer. Considering the teleological and universal law of entropy needing to be fulfilled with the existence of mass, and considering how energy and mass must remain in a constant ratio according to E=mc^2, these proportional scalar quantities are representable in polar coordinates. Since these four scalar quantities are so-related exclusively, they can derive physical meaning as a vector field by being represented on a sphere with a conic radius of $\sqrt{2}$ and thus energy being both subtended and angular. Additionally, $\sqrt{2}$ is the only number that allows a geometric intermediate such as that described above to create dimensions commensurate with tetration. The limit is $(\sqrt{2})^2=2$.

$$\lim xn_{n\to\infty} : f(c) = c^2$$

$$x1 = c,\ c>1$$

$$xn+1=c^{xn},\ \ n>1$$

$$c=c^2,\ \ c=1$$

The universe after the big bang involves natural expansion and cannot be modeled by the above infinitely collapsible scalar sphere. Considering an arbitrary time rate and a middle value between $\sqrt{2}$ and 2, the subtended value becomes $\sqrt{3}$ as shown in Figure 1. Any measurement limiting values such as G or c within a scalar sphere can be multiplied by the conic radius maximum and minimum to ascertain the scalar true value x_T within an adjusted resolution.

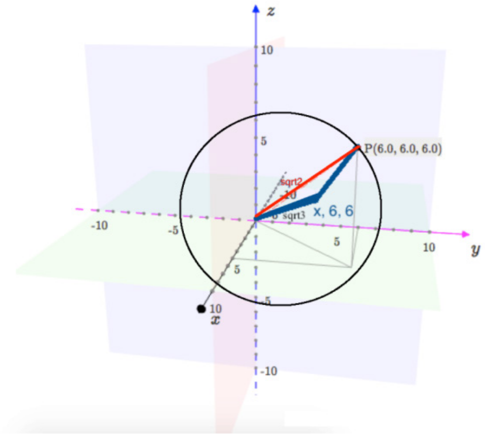


Figure 1. Scalar sphere

Calculation of G at Long Distances via Scalar True Value

The values for MOND discovered by Milgrom [1] could be arrived at using this method. At long distances a motional gradient through time appears and affects our observations of gravity much in the same way a black hole affects space. Here $\sqrt{3}$ is used because time has a consistent arbitrary value within observations.

$$\sqrt{3} \cdot x = x^{-\sqrt{3}}$$
$$\log \sqrt{3} + \log x = -\sqrt{3} \log x$$
$$x = 0.818$$
$$p = 0.818mv$$
$$F = 0.818ma = \frac{0.818GMm}{r^2}$$
$$G_T = 5.45606\text{x}10^{-11} m^3 kg^{-1} s^2$$
$$Range : G_T = 5.45606\text{x}10^{-11} m^3 kg^{-1} s^2 - 6.6741\text{x}10^{-11} m^3 kg^{-1} s$$
$$Difference : 1.214\text{x}10^{-11} m^3 kg^{-1} s^2$$

Correction of ΔG to correct for the difference. The denominator r^2 reduces to r at high values in Newton's law of universal gravitation.

Modelling Space Expansion and Size via Scalar True Value

Considering the scalar true value 0.818G in Newtonian mechanics, a time unit of 0.818/second can be applied generally as a base universal time rate.

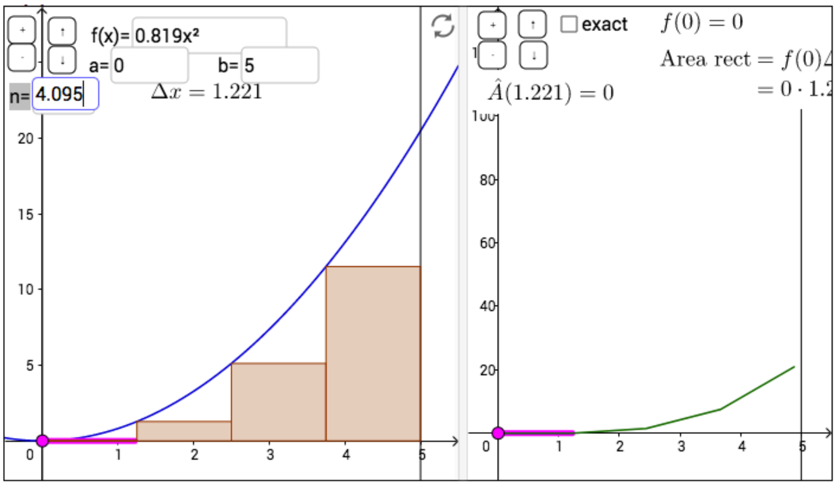


Figure 2. Time constraint

Figure 2 displays the Riemann sum of the graph $f(x) = 0.819x^2$. It represents the constraint on time vis-a-vis the scalar true value of time. For every second light travels, one can imagine an object travelling 0.819/second. The areas under the curve to the left each represent a bit of observed information in this scenario and, when summed, represent expanding physical space. Black holes physically maintain this curve (see *mechanism*). $\Delta x = 1.221001$ indicates a curvature with the potential for maximum spread of variability with limited spatial translation. The b-value and relative n-value represent 10x the strength of everything within and considering the graph's display of bits of information moving in all directions would be a detectable remnant of the big bang at 10^nx the energy of a gravitational wave.

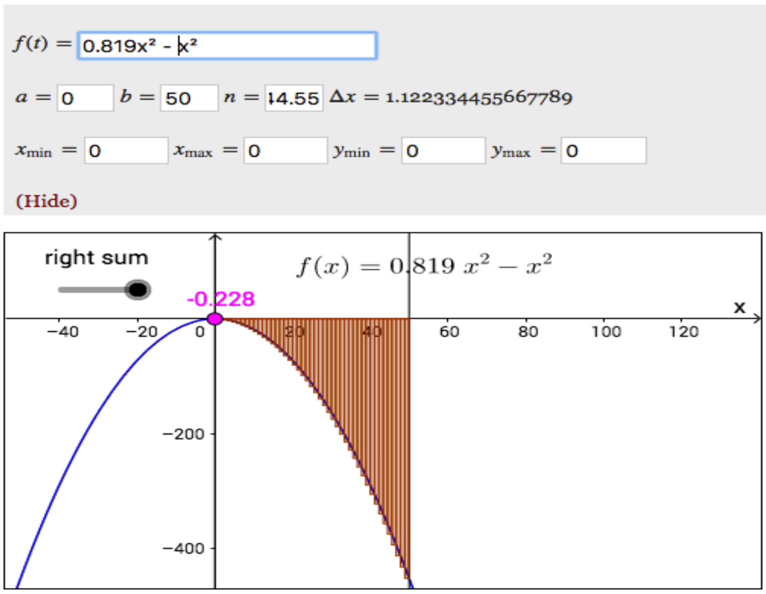


Figure 3. Black hole relative to time constraint and speed of light

Figure 3 displays the Riemann sum for the effects of a black hole on time relative to the universal time constraint. Here 0.891 is used as the differential between the b-value and relative n-value because it allows for the most curvature of space with $\Delta x = 1.122334455667789001$. It adds with 0.819 to equal 1.71 and forms the ideal curvature $\sqrt{3}$ using the curvature equation below that provides maxima. This implies that black holes maintain efficient entropy.

$$a+\sum_{n=1}^{\infty}\frac{f^n a}{n!}\left(x-a\right)^n \quad Scalable(1.013, 1.0013, etc.)$$
$$a+\sum_{n=1}^{\infty}\frac{f^n a}{n!}\left(1.13a-a\right)^n \tag{1}$$

where a is the value in question and $1.13x = x + 0.1x + \left(\sqrt{3}-\sqrt{2}\right)\left(0.1\right)x$

$$1.71+\sum_{n=1}^{\infty}\frac{f^n 1.71}{n!}\left(\left(1.013\right)\left(1.71\right)-1.71\right)^n = \sqrt{3}$$

Method 2: Scaled Equation for Newton's Universal Gravitation

The ideal observed curvature near and within a black hole of 1/0.891 approaches the value for $\sqrt[3]{1-e+\pi}$ which represents a gravitational bit of information inserted into the universe by a black hole. The cube root refers to the fact that bits of information are cubic for representational purposes as well as for existence in a spatially 3d world. The -e is the net slowing of time in the universe due to black holes**.** The +pi is the negative volume inserted into the universe (see *mechanism*)**.** 1/0.891 relates to $\sqrt[3]{1-e+\pi}$ via the curvature equation.

$$\left(1/0.891\right)+\sum_{n=1}^{\infty}\frac{f^n\left(1/0.891\right)}{n!}\left(\left(1.13\right)\left(1/0.891\right)-\left(1/0.891\right)\right)^n = \left(\sqrt[3]{1-e+\pi}\right)^2$$

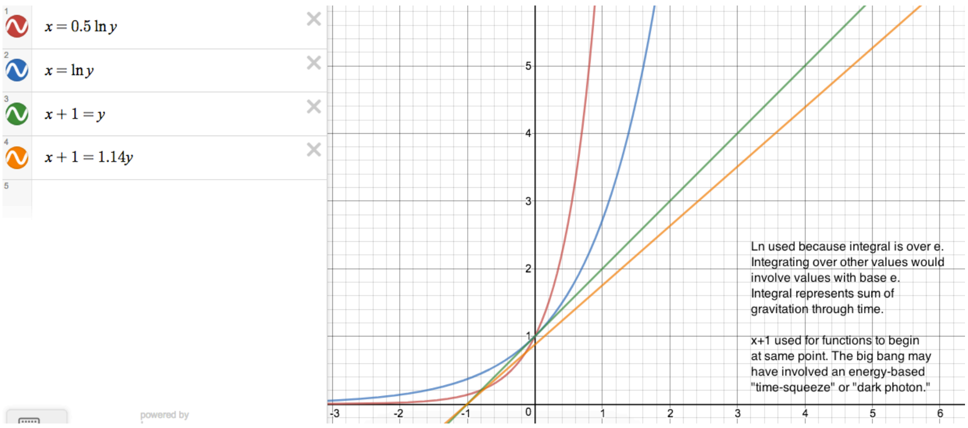
$\left(\sqrt[3]{1-e+\pi}\right)^2$ is the maximum range of the curved path at a given point along 1/0.891.

From these values one can see that the scalar sphere $\sqrt{3}$ multiplier, a corresponding scalar true value and ΔG are replaceable in the Newtonian context with $1-e^{1-e}$ and e^{1-e}, the former being precisely between the logarithmic distribution of $\sqrt{2}$ and 2 and the latter juxtaposing resolution with physical meaning.

$$F_g = \frac{e^{1-e}G^2 m_1 m_2}{r}\int\frac{1}{Gr^2}dr \tag{2}$$

The integral which represents observed gravitation can be integrated from lne to e to provide the approximate rate of gravitational information transfer through time. This value is presented in units of $1/m^5kgs^2$ and is definite at 9.47×10^9, representing units of universal expansion coinciding with the age of the creation of earth in years. This indicates the nature of Newtonian gravity as entirely dependent on distance-limited and time-limited observations as explained with the scalar true value. It is also commensurate with the idea of momentum transferring to dark energy within a black hole (see *cosmology*).

The time rate of observable momentum actualized from universal expansion is represented by the indefinite integral rate constant at 1.498×10^{10}. This coincides with half the speed of light when scaled by 0.01, the same scaling factor used for bits of information. The time rate is important considering that while observations are limited to c as the speed limit with a constant speed, the absolute speed limit of the universe before the big bang according to a non-arbitrary time frame would be $\sqrt{2}$ c or ~(e/2)c. As will be described in the cosmology section, the geometric bending of light within a black hole described by the curvature equation bends c towards $\sqrt{2}$ c via the curvature equation that equates to 1.14c. The difference between c-1.14c and c-$\sqrt{2}$ c is commensurate with doubling the limit of 0.5lny towards that of lny as shown in Figure 4.



Red: Limit is theoretical maximum speed limit of universe.
Blue: Limit is timeframe of maximum gravitational information transfer.
Green: Actual information transfer (speed of light). Shifts to orange via curvature equation.
Orange: Actual maximum speed limit of universe.

Figure 4. Distance vs. time graph

The scaling factor of the curvature equation is related to the differences in resolution presented by this mathematical model. The resolutions are each represented by 0.1 and in ascending order are the scalar sphere, the choice of $\sqrt{3}$ for scalar distributions, the addition of a spatial variation range of 0.819-0.891 for gravity, the 'map' wherein the scaled Newtonian equation is employed and gravitational phenomena occur, the observed universe of classical measurements, and the universe as observed from the speed and wave nature of light.

Cosmology: "Dark Matter" as the Result of Entropic Relativity amidst Large Galactic Masses

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 of these sheets would represent dark matter while the middle sheet would contain stars and an extremely prominent black hole. This is ultimately an efficient and efficiently permutable system much in the same way as a quantum system.

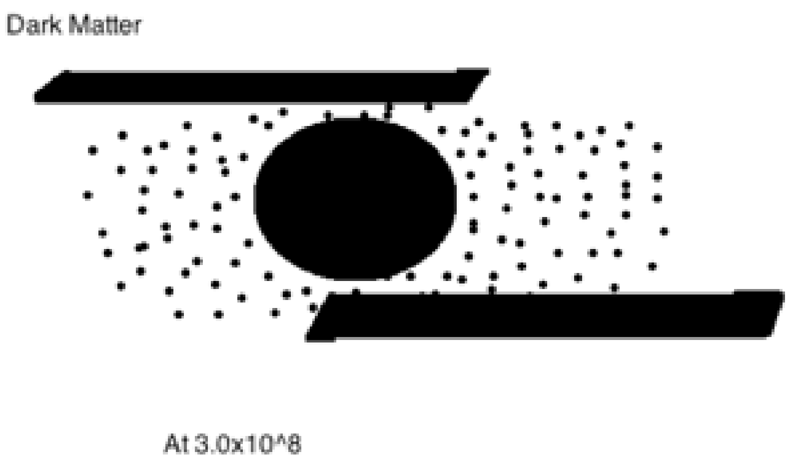


Figure 5. Dark matter at the speed of light

Dark matter, seen in Figure 5 as two of three sheets at the speed of light and energy of a radio wave, accrues around galactic masses to prevent spinoff as specified by Richmond [2]. 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, with its own G value, where dark matter is measured in terms *proportionally related* to the speed of the observer. As will be explained this is ultimately the efficient result of equilibrating the net flow of entropy in response to light and black hole gravitation in the universe.

Matter within a black hole would be composed of many 2*3 grids of quarks alternating through time between their quark, antiquark and annihilation. Dark matter would involve only one quark alternating randomly and increasingly slowly between its quark and antiquark. Due to the infinitesimally small 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 contains all deleted universal entropy before that moment and the bottom layer contains all potential universal entropy, with a varying time vector incorporated within entropy itself.

An entropic deletion process occurs and is the result of black hole gravitation stripping all rest energy from mass itself. This manifests physically as the fact that universal mass remains constant while approximately 2/3 of universal energy is dark energy as claimed by Ade [3], the result of slowing momentum within a black hole.

Mechanism: **Gravity as Negative Volume**

Gravity is a consequence of the existence of light and black holes in a universe that maximizes the rate of entropy as physical processes are undertaken. As primordial stars emitted much high-energy electromagnetic radiation, thus vastly increasing the scope of time and limit of space in the universe, huge entropic dead-ends formed as the stars naturally died out. Black holes counteracted entropic dead-ends by offering a time gateway where mass-energy is stripped of all energy, thus eliminating entropy and reducing the rate of time to zero.

This can be understood from the rudiments of the universe and their relations. Assume that there is, initially, an abstract constant time adjustable only according to the speed and energy of the observer, the latter due to increasing quantum mechanical possibilities. Assume that the universe contains space, mass and entropy. Assume that a maximized rate of entropy is ideal. Entropy clearly depends on the speed and energy of the observer as well as universal mass/space. As such one can deduce that maximum entropy is some ratio of mass/space/time rate. The existence of much high-energy electromagnetic energy within a hugely enlarged universe would drastically lower this ratio as space increases without a commensurate mass increase.

Entropy is thus eliminated without disobeying conservation of mass via the black hole's uniform dt/dr gradient operating irrespective of motion and energy of the object, as shown in Figure 6. Consider a vector through space and time as velocity and a vector through mass and energy as entropy. Time varies inversely with velocity and proportionally to energy. In a black hole, however, time (vector) depends solely on space; mass, entropy, and time (scalar) are irrelevant. As an object enters the event horizon, time uniformly and continuously slows with position as mass transfers energy (−mass/entropy). A third property − density of the object − is also translated as a uniform dt/dr gradient forms. In this model a gravitational wave would occur as a disturbance in the collective mass of dark matter due to the increase (merging black holes) or appearance (merging binary system) of the entropic deletion process.

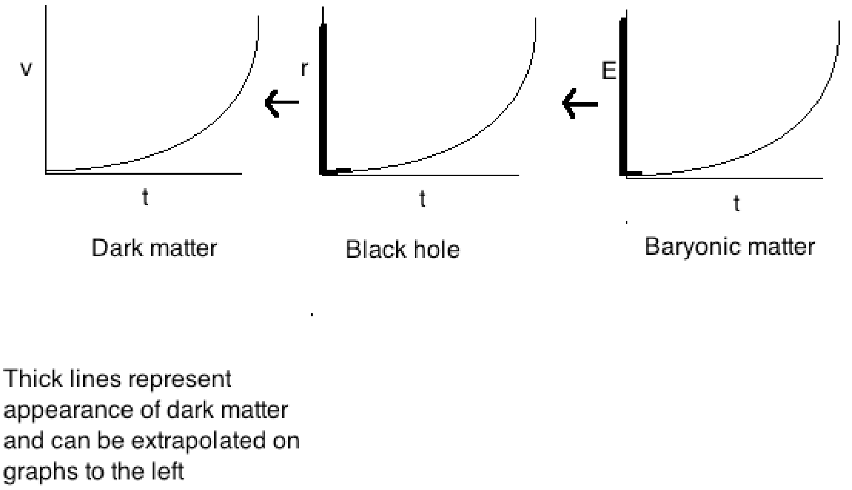


Figure 6. Rate of time relative to locally relevant physical quantities

The gravitational mechanism is displayed in Figure 7. Gravity in the universe is the result of the existence of light initially, black holes providing direction, dark energy providing magnitude and dark matter providing pressure. Spacetime might be a heterogeneous and rolling temperature gradient. In a black hole time would slow down with position as motion increases and energy decreases until some *efficient volume* is reached, after which motion would begin to decrease as energy decreases. Electromagnetic radiation would stretch and form a helix, reaching speeds of 1.14c, and begin to acquire a rod-like volume at a position in the black hole dependent on the energy of the radiation. The higher the energy, the later the volume would be acquired. All electromagnetic radiation would acquire a value of 0.87c at the singularity and then stop. One can arrive at these speeds by removing the spacetime metric tensor within black holes or using the curvature equation.

$$c+\sum_{n=1}^{\infty}\frac{f^{n}c}{n!}\left(1.13c-c\right)^{n}=1.14\text{c}$$

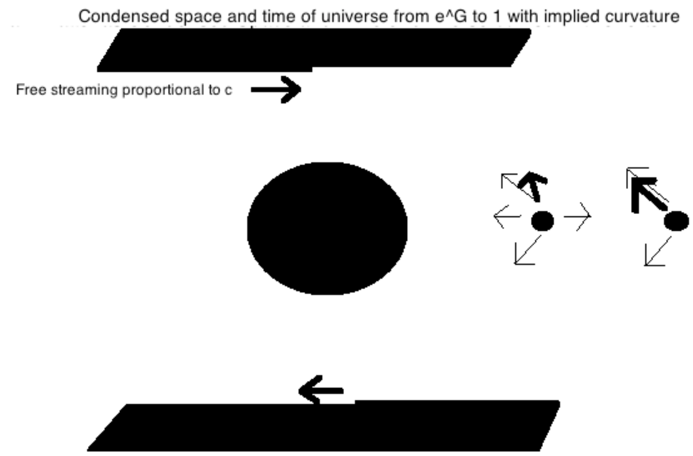


Figure 7. Gravitational Mechanism

Conclusion

From these ideas combined, one can formulate the following theory:
I. There are four dimensions within a thermodynamically-processed quantum universe
1 – A point in space infinitesimally small. It is found in nature as dark matter in all resolutions.

2 – The inertial frame, which moves alongside the point according to a time scale that becomes relative to both energy and motion.
3 – The three spatial dimensions that affect the inertial frame.
4 – Entropy – both scalar (through time) and vector (through space).
II. Uncertainty is caused by the information processing ability of the observer and randomness.
III. The contents of the universe operate according to binary combinations that can only be measured fully at impossibly high energy levels and low speeds.
IV. The entropic deletion process at the interface of dark matter and baryonic matter can only be measured at impossibly high speeds and energies. This process is nonetheless responsible for gravity and the maximum speed of light at 1.14c.
V. Considering points (III) and (IV), one can deduce that quantum mechanical possibilities increase as an action is taken according to the energy of the observer elevating and according to the speed of the observer decreasing.
VI. Within this framework, curvature in observable space via a dt/dr gradient can be mediated via a scalar true value. This provides a mathematical solution to MOND and a broad mathematical overview for universal expansion. A scalar bit with a range of spatial variation between 0.819–0.891 can be envisioned while information is transferred at 3600/50 arcseconds (50c being the information transfer limit).
VII. Utilizing e as a factor of universal expansion, one can formulate a more general Newtonian Equation of Universal Gravitation for the most basic spatial variation.

References

1. Milgrom, M. "A modification of the Newtonian dynamics - Implications for galaxies". Astrophysical Journal. 270: 371–389. (1983). Retrieved 20 December 2017.
2. Richmond, M., Using the virial theorem: the mass of a cluster of galaxies. (2007). Retrieved August 30, 2017.
3. Ade, P. A. R.; Aghanim, N.; Armitage-Caplan, C.; et al. (Planck Collaboration), C.; Arnaud, M.; Ashdown, M.; Atrio-Barandela, F.; Aumont, J.; Aussel, H.; Baccigalupi, C.; Banday, A. J.; Barreiro, R. B.; Barrena, R.; Bartelmann, M.; Bartlett, J. G.; Bartolo, N.; Basak, S.; Battaner, E.; Battye, R.; Benabed, K.; Benoît, A.; Benoit-Lévy, A.; Bernard, J.-P.; Bersanelli, M.; Bertincourt, B.; Bethermin, M.; Bielewicz, P.; Bikmaev, I.; Blanchard, A.; et al. "Planck 2013 results. I. Overview of products and scientific results – Table 9". Astronomy and Astrophysics. (22 March 2013). Retrieved August 30, 2017.

