Review of Internal Inconsistencies in GRT and Comparisons to MTG

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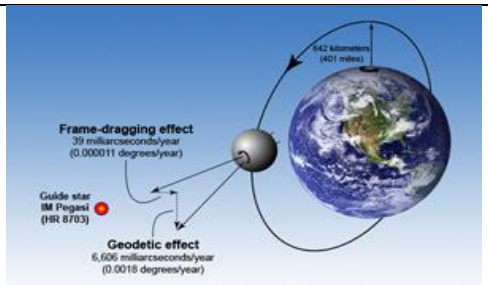
Abstract

This paper is mostly philosophical in its nature thus avoiding many equations and computations, which casual readers do not necessarily understand. Paper investigates and compares side by side in detail assumptions with their logical consequences and resulting internal inconsistencies in both; the General Relativity Theory (GRT) and the Metric Theory of Gravity (MTG). It is found that the GRT has many such internal inconsistencies, which have to be corrected by unusual and difficult to believe assumptions that are not backed up by a typical experience one encounters in a real life, while the MTG avoids such problems. For the readers who are interested in proofs of discussed findings the paper provides internet links to papers where such proofs are available. The key differences between the GRT and MTG theories are: the gravitational mass dependence on velocity, the nature of "empty" space, the finite or infinite size of the Universe, the existence of Black Holes (BH) with their Event Horizons (EH), the creation of Universe by the Big Bang (BB), and the relation between the Cosmic Microwave Background Radiation (CMBR) temperature, and the Hubble constant that characterizes the velocity of receding Galaxies.

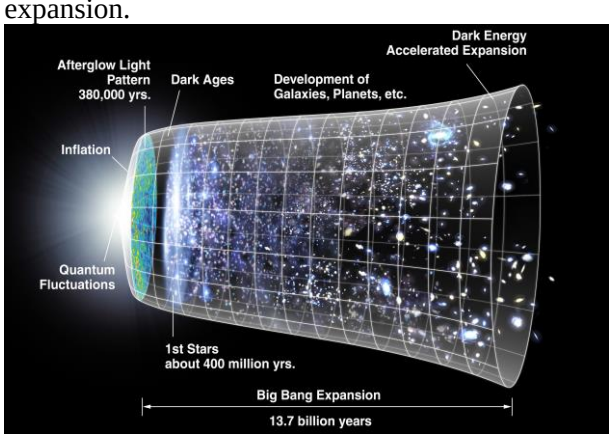
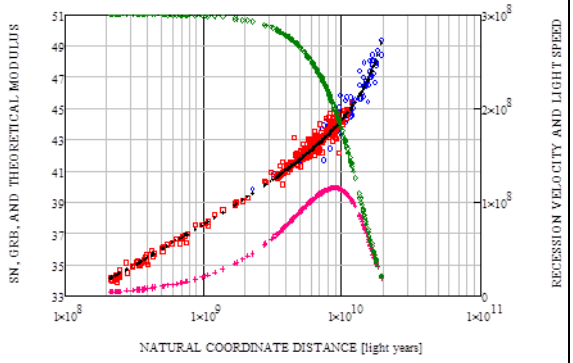
1. Comparison table of GRT and MTG theories

It is helpful to organize the theory assumptions and statements with their consequences into a table so that the differences can easily be observed and compared. This is provided below:

	General Relativity Theory	**Metric Theory of Gravity**
1	From experiments conducted by Eötvös in 1889 it was concluded that the inertial mass of a body is identical to its gravitational mass [1]. This identity is carried over to the Special Relativity Theory (SRT) and further to the GRT and it is assumed to be independent of velocity: $m_i(v)=\frac{m_o}{\sqrt{1-v^2/c^2}}$, $m_i(v)=m_g(v)$, where m_o is the rest mass and c the speed of light in a vacuum (empty space).	Assuming that the SRT describes the reality correctly it is not too difficult to derive, using moving timing devices (clocks), one powered by the gravitational force and the other by the electrical force, that the following relations are true[2]: $m_i(v)=\frac{m_o}{\sqrt{1-v^2/c^2}}$, and $m_g(v)=m_o\sqrt{1-v^2/c^2}$, where again m_o is the rest mass and c the vacuum light speed.
2	Based on this equivalence principle, sometimes called the Einstein's Weak Equivalence Principle (WEP), it is, therefore, necessary to consider photons as moving massive quasi particles in a vacuum without any medium. The wave-particle duality is thus extended into photons and the force of gravity is affecting the photon trajectory. The photon rest mass must be zero in order to understand that the gravitational mass is finite. This is the second problem of the theory that must be eliminated by an ad hoc claim.	Because the gravitational mass of any particle is reduced by the velocity it is clear that photons cannot behave as massive quasi particles. Photons are quantized energy waves similar to phonons observed in solids, which are moving in a medium that supports their propagation with a velocity c [3]. Photons are not affected by the force of gravity. The gravity affects the curvature of space-time (medium) and the photons thus follow the geodesic lines in this curved space-time.

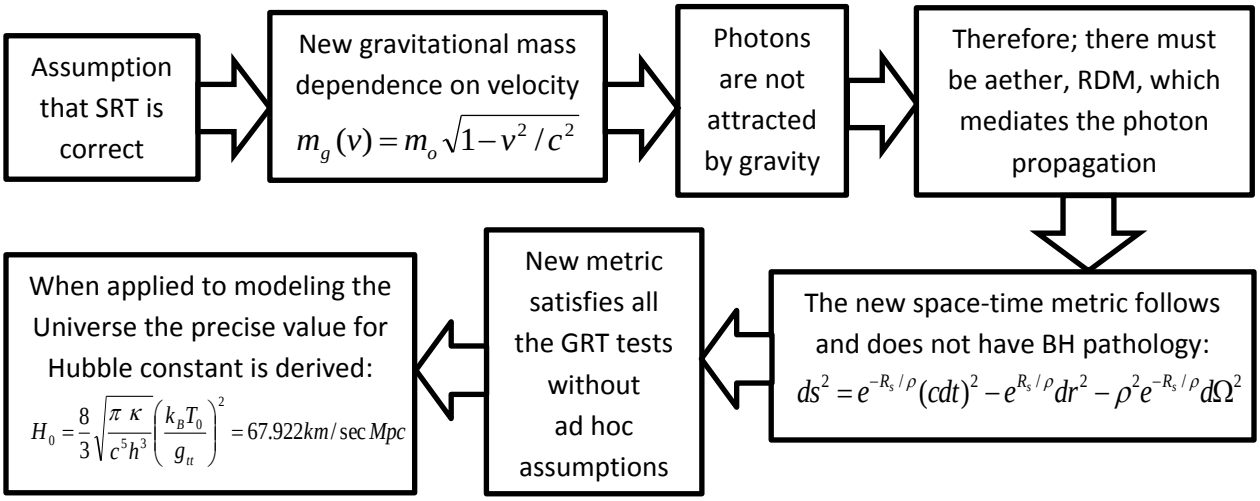
3	Because the space-time is not a material entity in GRT, it is empty and thus can be infinitely large or constantly expanding without requiring any additional mass or energy to accomplish this task. The mass and energy were provided from an unknown source at the initial BB creation of the Universe. The laws of physics were suspended at the BB explosion. The Galaxies are receding perhaps even with increasing velocity together with the underlying space-time carrying this initial BB energy. Therefore, there is a beginning of time and thus also perhaps an end.	In MTG theory the space-time is a massive entity that provides the medium for propagation of photons. It must, therefore, be finite in size. The infinitely large massive entity would generate an infinite internal pressure everywhere, which is not acceptable. Universe has no beginning and no end it exists for eternity, and the Galaxies are moving in this medium, Dark Matter (DM), as impurities in a crystal. No BB has occurred, it is not needed. The medium, DM matter, is Repulsive (RDM) to visible matter (impurities), but is attractive to self.
4	The GRT has derived a space-time metric for a centrally gravitating massive body from ad hoc proposed Einstein's field equations: $R_{jk} - \frac{1}{2} R_{(c)} g_{jk} = 0$ were the right hand side was set to zero (empty space). The solution is the well-known Schwarzschild metric: $ds^2 = (1-R_s/r)(cdt)^2 - (1-R_s/r)^{-1} dr^2 - r^2 d\Omega^2$ with its obvious singularity problem at the Schwarzschild radius: $R_s = 2\kappa M/c^2$. This leads to a third ad hoc postulate that BHs exist and have EHs at R_s. This is a mathematical artifact that does not reflect reality.	In MTG the space-time metric for a centrally gravitating massive body is derived from motion of test particles in the field of the gravitating body that must satisfy the contravariance rule of tensor calculus and the conservation of angular momentum[4, 5]: $ds^2 = e^{-R_s/\rho}(cdt)^2 - e^{R_s/\rho} dr^2 - \rho^2 e^{-R_s/\rho} d\Omega^2$ where the variable ρ is defined as: $d\rho = \sqrt{g_{rr}}\, dr = e^{R_s/2\rho} dr$. There is no singularity and no coordinate pathology at the EH. There are no ad hoc assumptions, only that the space is a deformable material entity (it is, therefore, not empty).
5	When the Schwarzschild metric is used to compute the planets' circular orbit proper time, the formula is equal to Kepler-Newton formula without the speed of light included in it: $t_{os} = 2\pi\sqrt{r^3/\kappa M}$	In the MTG theory the formula includes the speed of light: $t_{oh} = 2\pi\sqrt{\rho^3/\kappa M + \rho^2/c^2}$ as it should. Only for *c* tending to infinity it becomes equal to Kepler-Newton case.
6	By linearizing Einstein's field equations for the weak gravitational fields many scientists derive equations similar to Maxwell field equations of Electromagnetic field theory (EMT). By analogy from these equations it is again postulated in an ad hoc fashion that the so called Gravito-Magnetic (GM) field produced by the moving massive bodies exists causing an orbiting gyroscope precession. Such effect has been purportedly detected by the gravity probe B experiment. There are two components of this precession: 1. The geodetic precession caused by the curved space-time of Earth's gravity. 2. The frame dragging of empty space that the GRT claims exists and is caused by the Earth rotation.	 It can easily be shown, assuming again that the SRT is correct, that the frame dragging component of precession does not exist [6].

	Measured	Predicted
Geodetic precession (mas)	6602 ± 18	6606
Frame-dragging (mas)	37.2 ± 7.2	39.2

7	It is generally claimed that the GRT has been experimentally verified by the following tests and observations: 1. Michelson Morley interferometer experiment claims that medium (aether) does not exist [7] because the ether was not detected. 2. Observation of Mercury perihelion advance. However, the recent and more accurate observations slightly deviate from the theory predictions. 3. Light bending formula for the light trajectory around massive bodies has an ad hoc assumption in its derivation that cannot be found and justified anywhere in the standard physics. 4. Gravitational redshift.	All these observations or tests are consistent with MTG, however several fatal errors have been found in the GRT formula derivations. 1. MMX neglected to account for the centrifugal force of Earth's rotation [8], which prevents the aether detection. 2. Similar formula is obtained for Mercury perihelion advance but is using a more accurate expression with ρ instead of r. 3. A fatal error was found in the GRT derivation of light bending formula [9]. The MTG formula is similar but using ρ instead of r. It is, therefore, more accurate and agrees with observations. 4. Similarly as in #2, a more accurate formula is derived.
8	Recent observations in astronomy [10] suggest the existence of an Attractive Dark Matter (ADM) surrounding Galaxies. This is again a new ad hoc theoretical development that is not the part of the GRT or BB theories.	MTG assumes that the DM is repulsive to visible matter. The repulsion effect causes a natural depletion of RDM around massive bodies that is appearing as the ADM [11].
9	The GRT theory predicts the dependence of recession velocity of Galaxies on the distance form Earth, but not the speed of light. Ad hoc postulate proposes Universe with accelerating expansion. 	 The MTG theory predicts the recession velocity of Galaxies (purple +), the speed of light (green symbols), and the GRB explosions (black ·) depending on the distance from Earth, all in excellent agreements with observations.
10	There is no formula that the GR and the BB model can offer for the value of the Hubble constant. There is no relation between the Hubble constant and the temperature of the CMBR, these are considered as independent parameters. Additional reference where the critique of the GRT is easily found is by using the following internet links [15, 16].	Because the MTG is a closed system model of the Universe (finite size) it is possible to derive the relation between the Hubble constant and the temperature of the CMBR [12]. Additional refereed papers describing the consequences of MTG theory can be found on internet [13, 14].

In order to more easily follow the chain of reasoning in deriving and justifying the correctness of MTG theory, the flow chart of findings and their consequences is shown below:

2. MTG theory reasoning flow chart



3. Conclusions

The key differences that have been identified between the GRT and MTG theories are: the gravitational mass dependence on velocity, the nature of the "empty" space, the finite size of the Universe that does not continue to expand, the nonexistence of Black Holes (BH) with their Event Horizons (EH), the creation of Universe by the Big Bang (BB) from nothing, and the relation between the Cosmic Microwave Background Radiation (CMBR) temperature, and the Hubble constant that characterizes the velocity of receding Galaxies in dependence on a distance from Earth.

It is interesting that the MTG theory relies only on one assumption, which is the correctness of SRT theory. All other findings and conclusions follow directly and uniquely from this assumption without any additional postulation of ad hoc principles that GRT needs to explain found observations. Both theories rely on the model of deformable space-time, but GRT has no material entity in its space-time, so what is deformed, only the non-material coordinates? This is a difficult concept to accept.

There are many additional conclusions that the MTG theory derives that agree with observations and cannot be predicted by the GRT, for example; the correct calculation of planetary orbital time, the fact that the receding Galaxies explode when they approach the outside border of the Universe and their central masses generate the Gamma Ray Bursts (GRBs) detected here on Earth. The MTG theory also accurately predicts the duration of these GRB explosions. According to GRT the Galaxies' receding velocity increases, presumably without limit exceeding the speed of light This is not so in MTG theory. The worst blunder of GRT, however, is the prediction of Frame Dragging Effect that was purportedly detected by the Gravity Probe B experiment. Unfortunately a large amount of money was spent on this experiment and it can be shown by elementary means, assuming again that the SRT is correct, that the effect cannot exist.

As the technology develops and the accuracy of observations improves it is becoming progressively obvious that the GRT cannot be sustained any longer and needs to be modified or abandoned all together. Sooner this fact is recognized and accepted by the mainstream physicists the better. It is unfortunate that the universities do not teach or allow any discussion of these obvious problems that have been identified in the GRT, some of them a long time ago, and graduate "scientists" that are brainwashed by the GRT and are not capable of seeing the truth or any other theory that is supported by experiments and observations. Unfortunately, this indoctrination is not without consequences and may not also be without cost as we can see on the Gravity Probe B experiment case.

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