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solah@comline.com
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Equivalence Principle in the Kinetic Universe

Abstract

According to Wikipedia, the Equivalence Principle[1] is the hypothesis that the observed equivalence of Gravitational and Inertial mass is a consequence of nature. We acknowledge that mass is mass, but our preliminary data indicates that we should investigate some of the details.

In the Kinetic Model, Ether rules the Universe.
Summary Ether data is on page 4.

Equivalence Principle: Kinetic Mass equals Gravitational Mass.

There is an entire gravity theory built upon this statement.

The good people at the Tower of Pisa attempted to prove that a small mass falls at the same speed as a large mass. Air resistance made their experiment inconclusive. The question was settled by laboratory experiments in vacuum and the problem was put to rest by a declaration that Kinetic Mass equals Gravitational Mass. Drop tests proved that Gravitational Mass equals Gravitational Mass.

Let us inspect the equations:

$$\text{Kinetic:}\quad F = m \times a \qquad \text{Gravitational:}\quad F = G \times \frac{M \times m}{r^2} = g \times m$$

Kinetic Force is straight forward, it involves a mass and a known acceleration. Gravitational Force is an action at distance by another Mass and the equation requires a fudge factor G or g. This fudge-factor is a measured value. General Relativity says that it is possible for this acceleration to occur without any force being applied to the object[1] and this subject is beyond the expertise of the author.

On 2022 September 14 the French Aerospace Lab. Onera delivered the latest results of their Microscope Mission[2]. They compared a Titanium alloy object and a Platinum alloy object in drop tests. The results of the experiment showed that the acceleration of one alloy's fall differed from the other by no more than one part in 10^{15}. We have not been able to determine the shape of the object at this time and we cannot evaluate the test setup. We congratulate the people at the French Aerospace Laboratory for their successful experiment.

We would like to suggest that in their follow-up experiment they use either ball-shaped objects or cylinder-shaped objects with the same height and with the appropriate diameter. Density and size of horizontal cross-section may be critical factors in a drop test.

Our contribution to this subject

This paper is to report on our calculations regarding Kepler's Third Law. We should not be surprised if the above-mentioned fudge-factor is also a function of the density of matter of mass *m*. Data reveals that denser matter with a smaller cross-section reacts with a "diminishing return" to gravity. This could be the result of non-linearity or saturation.

From Wikipedia, Kepler's third law[3] states: The ratio of the square of an object's orbital period with the cube of the semi-major axis of its orbit is the same for all objects orbiting the same primary Mass. This ratio is ~7.5E-06.

We are interested in comparing the ratio of the seven planets to Saturn's ratio, the planet with the lowest density to find any correlation with the density of the planets.

R and T data for each planet was obtained from Wikipedia. Verified on 2024-1-24.

Planet	Density kg/m^3	Semi-major Axis R in AU	Orbit T in Days	Position
Mercury	5,427	0.387104	87.96910	1
Venus	5,243	0.723338	224.70100	2
Earth	5,514	1.000000	365.25636	3
Mars	3,934	1.523679	686.98000	4
Jupiter	1,260	5.203805	4332.59000	5
Saturn	687	9.582546	10755.70000	6
Uranus	1,270	19.191243	30688.50000	7
Neptune	1,638	30.070000	601695.00000	8

Table 1. Planet Data from Wikipedia

Table 2 lists 8 Planets in order of increasing density. Saturn is our standard because Saturn has the lowest density. All other planets require more time to complete a full orbit around the Sun than predicted by their T^2/R^3 value. Slower orbital speed is required because the actual 'gravitational pull' by the Sun is less than the nominal value, meaning their gravitational mass is smaller than their kinetic mass. The gap is small, about 0.6 % to 0.7 %, but consistent for both planet groups according to their density.

Planet	Density	T^2 Ratio	T Ratio	Position
Saturn	687	1.0000000000	1.0000000000	6
Jupiter	1,260	1.0142053595	1.0067084750	5
Uranus	1,270	1.0134619535	1.0063862159	7
Neptune	1,638	1.0136452467	1.0064785620	8
Mars	3,934	1.0147829852	1.0073643756	4
Venus	5,243	1.0141109663	1.0067995067	2
Mercury	5,427	1.0147307394	1.0073384433	1
Earth	5,514	1.0141076947	1.0070291429	3

Table 2. T Ratio vs Planet Density

There is a small discrepancy in the order of T ratios. This discrepancy could be caused by the variation of density within each planet. Some with uniform density throughout and others with denser central core.

In the Kinetic Universe Gravity is created with Kinetic energy

The process is described in our paper Gravity[4]. In a few words: Ether[5] surrounds the Sun, transfers some of its kinetic energy to the Sun's mass, and creates an energy gradient in Ether, causing an Ether flow from all directions toward the Sun's center. This flow of Ethons will collide with the Atoms of Earth, pushing Earth toward the Sun. There are large but limited number of Atoms in a volume of Earth and there are a large but limited number of Ethons in a volume of Ether flow. At some point non-linearity flattens the curve. This Model would readily explain the variations shown in Table 2.

Preliminary Ether Data

Ether is a monatomic super-gas consisting of tiny balls of matter we call Ethons that fills every part of the Universe.

Imagine Helium Atoms under high pressure in a giant balloon, but three orders of magnitude smaller.

Density of Ether	20 mg / m^3
Pressure of Ether	1 terapascal
Average velocity of Ethons	1.5 c m/s
Mass of individual Ethons	2.696E-37 kg
Mass of Electron	9.109E-31 kg
Mass of Nucleon	1.674E-27 kg

References:

1 Wikipedia: Equivalence Principle. Extensive description of the basic idea and the three equivalence principles: Weak EP, Einstein EP and Strong EP.
2 French Aerospace Lab. Onera, mission *Microscope* to investigate the Weak EP
3 Wikipedia: Kepler's laws of planetary motion
4 Gravity, General Science Journal, paper by Steve Olah
5 Ether, General Science Journal, paper by Steve Olah