

# Quantum Universal Gravitation

## **Summary.**

Quantum Universal Gravitation (QUG) is part of Autodynamics (AD), which is a New Paradigm in Physics. It covers the Microcosm to the Macrocosm and provides New Perspectives of Historical import to well-known concepts. This was made possible after correcting a misconception in the Lorentz transformation.

The Quantum part is found in Le Sage's ultra-mundane particle, championed by Luis de Broglie as the Graviton, and now dubbed Pico-Graviton in AD.

The Universal Part is got by elevating the Energy Absorption-Mass Decay action (EA-MD) to a Universal Law. This changes Thermodynamics and Celestial Mechanics to yield a Perpetual Universe in Constant Evolution. AD explains what Newton and Einstein explain but also what they cannot: The Creation of Motion, the Allais Anomaly, the Moon Receding from the Earth, Pioneer 10/11 Slowdown, the Non-Propagation Velocity of Gravitation, the Non-Existent "Principle of Equivalence," and more.

## **Introduction.**

Applying EA-MD to Gravitation, and accepting the Pico-graviton as a primeval particle absorbed my matter, Gravitation has a Mechanism or Machinery, which explains Gravity as a force that Pushes not one of Attraction <sup>1</sup>

This new concept drove AD to a new Celestial Mechanics, which creates motion that explains the Perihelion Advance of Planets, Satellites and precession of all Binary Stars in addition to the aforementioned.

## **The Creation Of Motion.**

Newton's Classical Static Celestial Mechanics is transformed in AD. The increasing body mass and the composition of increasing forces is transformed to an increasing orbital velocity, what we call perihelion advance or precession.

**The Pioneer Slowdown.** (*PIRT-2003 Proceeding of International Scientific Meeting, July, page292*)

Autodynamics' Quantum Universal Gravitation postulates that Pico-Graviton <sup>2</sup> absorption by all stellar bodies in the Universe causes gravitational force, or gravitational acceleration. AD has proved that this extra gravitational force results in a planet accelerating along its orbital motion, without changing the distance, otherwise known as planetary perihelion advance and precession of binary stars.

Setting X as the fraction that divides  $M_{\odot}$ , gives the increasing mass per time unit.  
X is:

---

<sup>1</sup>.- Newton never talk about attraction. Newton talk only about two bodies gravitating one with respect to the other, adding: *That Gravity should be innate, inherent, and essential to matter, so that one body may act upon another at a distance through a vacuum, without the mediation of anything else, by and through which their action and force may be conveyed from one to another, is to me so great an absurdity, that I believe no man who has in philosophical matters a competent faculty for thinking, can ever fall into it.*

U. J. Balis, in 1997, a researcher at Harvard, working with AD as a Cosmological Quantum Universal Gravitation, found that the Graviton has a mass equal to  $8.08 \cdot 10^{-82}$  kg, a density equal to  $6.7 \cdot 10^{53}$  particles/m<sup>3</sup> and a propagation velocity equal to 27 c.

<sup>2</sup>.- R. L. Carezani, Autodynamics. *Fundamental Basis for a New Relativistic Mechanics*. ISBN 0-9665533-1-4, 1999 Edition, SAA, 801 Pine Ave. # 211, Long Beach, CA. 90813. USA

$$X^{\frac{4}{t+2}} \left(1 + \frac{1}{X}\right) = \left[ \frac{(t+2)\Phi}{2G \sqrt{\frac{M_{\odot}}{r^{3.719472}}}} \right]^{\frac{2}{t+2}} \quad (\text{A})$$

t = time,  $\Phi$  = angular displacement, G = gravitational constant,  $M_{\odot}$  = solar mass, r = radio or distance

The FORCE that causes the planet's PERIHELION ADVANCE is also responsible for the SPACE-CRAFT'S SLOW-DOWN<sup>3</sup>

Newton's equations are:

$$F = m a \quad (1) \quad F = \text{force, } m = \text{mass, } a = \text{acceleration}$$

$$F = m M_{\odot} G / r^2 \quad (2) \quad M_{\odot} = \text{Solar mass, } G = \text{Gravitational constant, } r = \text{radius or distance}$$

These equations are used to calculate the bodies' motions in the Solar System and beyond.

Autodynamics' equations are

$$F' = m' a' \quad (3), \quad F' = m' M'_{\odot} G / r'^2 \quad (4), \quad \text{The } ['] \text{ means "increasing"}$$

From (1) and (2) we have:  $a = M_{\odot} G / r^2$  (5) From (3) and (4) we have:

$$a' = M'_{\odot} G / r'^2 \quad (6) \quad \text{Dividing (6) by (5), } a'/a = (M'_{\odot} G / r'^2) / (M_{\odot} G / r^2) = M'_{\odot} / M_{\odot} \quad (7)$$

But  $M'_{\odot} = M_{\odot} + M_{\text{oin}}$  (8),  $M_{\text{oin}}$  = Solar mass increment

$$\text{Equation (7) is written: } a' = a [(M_{\odot} + M_{\text{oin}}) / M_{\odot}] \quad (9), \quad a' = a (1 + M_{\text{oin}} / M_{\odot}) \quad (10)$$

The term  $M_{\text{oin}} / M_{\odot}$  represents the increasing acceleration, an insight developed by AD, which distinguishes it from Classical Mechanics.

Pioneer's slowdown acceleration is  $8.5 \text{ cm/s}^2$ , and taking the Solar Mass as  $1.9891 \cdot 10^{33} \text{ g}$ , one increment of  $1.690735 \cdot 10^{26} \text{ g}$  eliminates the spacecraft's slow-down.

Really, the slowdown does not exist. Its value is a consequence of the small failure in Newton's equation. Using AD's Celestial Mechanics any slowdown exist.

### ***The Allais Anomaly.***<sup>4</sup>

The Allais anomaly is the phenomenon observed by M. Allais<sup>5</sup> in 1959: Foucault pendulum changes its angular displacement during a Solar Eclipse. Allais also observed the same phenomenon, although he didn't have the precision to be absolutely sure, whether the pendulum's period had decreased. The phenomenon seems magical because neither Newton's nor Einstein's Gravitation explains the phenomenon. The mystery endures because nothing less than a precise alignment between the Sun, Moon and Earth will do for the effect to be observed. When a similar but merely close alignment happens once a month, the phenomenon doesn't manifest.

AD explains the angular variation during the Eclipse as a lateral force created by a composition of forces due to the bodies aligning to produce the eclipse.

<sup>3</sup>.- J. D. Anderson et al. "Indication, from Pioneer 10/11, Galileo, and Ulysses Data, of an Apparent Anomalous, Weak, Long-Range Acceleration." At <http://xxx.lanl.gov> code gr-qc/9808081 28 Aug. 1998. Phys. Rev. Lett. 81, 2858(1998).

<sup>4</sup>.- *Storm in Physics*, R. L. Carezani, Edited by SAA, 2005, ISBN 0-9665533-4-9, Chapter 5, page 109.

<sup>5</sup>.- M. Allais, *Aero Space Engineering*, Set. 1959, p. 46-52; Oct. 1959, p. 51-55; Nov. 1959 p. 55; C.R.A.S (Fr.), 247, 1958, p. 1428. The Allais observation involves a pendulum's period variation and angular deviation.

AD also explains the increasing gravity, calculating a value equal to  $3.418 \cdot 10^{-3} \text{ cm/s}^2$ .

AD also gives correct values when the phenomenon happens once each month, as observed at Harvard University <sup>6</sup> using a Torsion Pendulum. Newton's value is way off the experimental value. <sup>7</sup> General Relativity has neither Mechanism nor Equation to calculate it.

### ***The Moon Receding from Earth.***

The Spacecrafts Pioneer 10/11, experienced Extra Gravitational Tugs equivalent to  $8.5 \cdot 10^{-8} \text{ cm/s}^2$ . It is known that the three-body problem has no mathematical solution. Considering the Sun-Earth as the system, the Moon is the third body falling in the Sun's direction. Of course, the Moon cannot fall suddenly in the Sun's direction because the Earth retains it within its gravitational field under a constant increasing distance, the equivalent to the Moon falling in the Sun's direction.

A simple proportion will give the acceleration using the solar mass increment per second

$$a = (2.0475 \cdot 10^{16} * 8.5 \cdot 10^{-8}) / (2.5757 * 6.4617 \cdot 10^{25}) = 1.045 \cdot 684 \cdot 7 \cdot 10^{-17} \text{ cm/s}^2 \quad (2)$$

2.0475  $10^{16}$  is value  $I_s$  and 6.4617  $10^{25}$  is value  $I_c$  in Table 1, footnote 2, page 212.

To find the distance traveled by the Moon we will use the equation:  $d = \frac{1}{2} a t^2$  (3)

Taking  $3.1558 \cdot 10^9$  seconds in a century, in 2.5757 centuries there is  $8.128394 \cdot 06 \cdot 10^9$  seconds. Replacing this value and  $a$  from equation (2), in equation (3):

$$d_1 = 345.446 \text{ cm} \quad (4)$$

The value measured by NASA covers 30 years, that is, we need to calculate the distance 30 years before.

$$257.57 - 30 = 227.57 \text{ year} \quad (5)$$

Repeating the calculation, there are  $7.1815406 \cdot 10^9$  seconds in 227.57 years. With this value the distance is

$$d_2 = 269.66 \text{ cm} \quad (6)$$

The difference between (4) and (6) gives:

$$d_{30} = 75.78 \text{ cm} \quad (7)$$

The Moon has increased by this distance from the Earth in 30 years. The difference of  $114^8$ , equal to 38 cm, is explained and calculated by Newton's tidal force.<sup>9</sup> But the tides will decrease with distance, and the "falling" and increasing "pulling," even though very slow, will increase with time.

We don't know if Mercury and Venus had satellites in the past but if they had they lost them due to the Sun's extra gravitational force. The same will happen with the Moon in a very distant future.

### ***Non-Gravitational Velocity. (PIRT-2003 Proceeding of International Scientific Meeting, July, page 295)***

Even though there is profuse literature on Gravitational velocity, the question is: Does this Gravitational velocity exist? Newton's gravitational velocity is instantaneous, equivalent to infinite velocity, and his equation for Gravitation works perfectly. In Einstein's theory, which equates Space-Time Curvature to Gravitation, propagation velocity has no meaning. Contradicting himself, Einstein accepted that Gravitation propagates at Light velocity, which is postulated as the maximum velocity in the Universe. Autodynamics, a Quantum Relativistic Mechanics accepts the Graviton – Le Sage's ultra-mundane particle - as Gravitation's carrier and accepts the Graviton's velocity. With this, AD

<sup>6</sup>- Erwin J. Saxl and Mildred Allen, "1970 Solar Eclipse as "Seen" by a Torsion Pendulum," Phys. Rev. D3-4, 823(1971).

<sup>7</sup>- The complete paper will be published in the second edition of the Autodynamics book but actually could be found at [www.autodynamicsuk.org](http://www.autodynamicsuk.org)

<sup>8</sup>- NASA press release: "Apollo 11 experiment continues to return data." E-Mail from [JPLNews@pl.nasa.gov](mailto:JPLNews@pl.nasa.gov), Mon, 19 Jul 1999, 14:52:12-0700(PDT).

<sup>9</sup>- The AD explanation is different. The Sun-Moon increasing mass slowdown the Moon orbital velocity increasing even more the distance regarding centripetal force equal to centrifugal force. Due to its complexity, a detailed research is underway looking the two different interactions trying to determine if both of them apply or only the last one, given the increasing distance value. AD has the mechanism or machinery that explain the phenomenon, at least, qualitatively.

The tidal force is polemic due to the lack of apparent mechanism, even though AD give now it. Contrarily, it is known that: "Evidence continues to mount that the Moon formed when a Mars-size body plowed into Earth and blew debris into space – matter that accreted to form our lone satellite." The Planetary Report Vol. XIX # 4, page 20-21.

proves that Gravity is a-temporal, and is ubiquitous throughout the Universe without requiring a propagation velocity. This is consistent with Newton's infinite velocity.

Figure (Fig 1) is more eloquent than a wordy description.

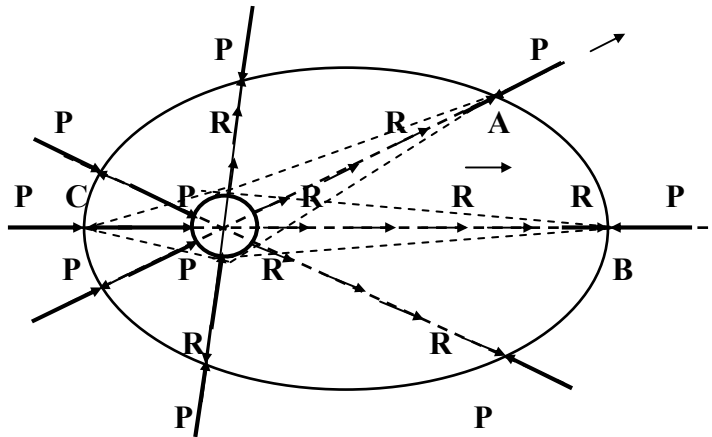


Fig. 1

Pico-Gravitons (P) travel throughout the Cosmos in all directions. P, falling in the Sun-Planet direction, after being partially absorbed, emerge as Residual Pico-Gravitons (R). At each point on the Planet's orbit (A, B, C etc.) coexist P and R permanently because the phenomenon happens constantly. That is, Gravitation permanently exists at all points in the Planet's orbit, without the need to travel from the Sun to the Planet. Of course, Gravitation at point B is smaller than at point A and C because R at point B is larger than at points A and C, etc. And so it goes, from the moment that the angle from point B to the Sun's diameter is smaller than the angles from A and B, as illustrated in Fig 1. So, at B position, R receives more gravitons from other directions than A and C because its angle is smaller. It is thus explained how Gravitation is inversely proportional to the distance power two.

### ***Thermodynamics.***

Since EA-MD is the fundamental Law of Universal Evolution, and in AD Gravitation plays an important roll, the Second Law of Thermodynamics changes to one of Constant Entropy because the energy absorption is constantly creating small Entropy.

### ***Principle of Equivalence Non-Existent.***

As Gravitation is Universal, all Systems are accelerated, and consequently, Inertial Systems don't exist. Einstein's Principle of Equivalence doesn't exist.<sup>10</sup>

### ***Future.***

The AD experiment<sup>11</sup> is essential to prove whether or not the Pico-Graviton is the carrier of Gravitation. If confirmed, developing new technologies to extract it from Matter will become of paramount importance. This will not only catapult the Human Race to the Stars, but also keep our Planet clean forever.

<sup>10</sup>.- *Storm in Physics*, SAA, ISBN 0-9665533-4-9, 2005, Chapter 19, page 281.

<sup>11</sup>.- Also see AD's DVD entitled "Gravity," by Franco Carrieri, SAA's Vice-President, London, UK, 2005, which could be get from SAA.