Dark Matter Formula For Fundamental Calculation Of Satelite Flybys In Hyperbolic Orbits.

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Abstract.

For the first time an announcement is made in this paper to have found fundamental evidence for the flyby-anomalies of six satelites earlier investigated by John Anderson and coworkers of the Jet Propulsion Laboratory (JPL) in Pasadena USA. The central part of this theoretical evidence exists of a 'dark matter impuls flow' being the cause of a velocity-change for satelites during their 'flyby' along the earth. A formula is given to calculate the velocity-change caused by dark matter. Also a dark matter constant is suggested. The origin of the evidence is related to a 'dark energy force formula', which is a new force in a new proposed cosmological model describing dark energy and dark matter in a double torus geometry (TTM). Originally the 'dark energy force formula' is discovered by an independent cosmologist and E-ingenieur, Dan Visser from Almere, the Netherlands. Then afterwards a few 'papers' have been published in the vixra-archive since September 1 2009 in colaboration with mathematician and physicist Christopher Forbes (UK). These 'papers' could be considered as 'pre-exercises' in awaiting for a more robust mathematical framework for the new proposed double torus cosmological model.

Introduction.

The anomalies in the velocity of six investigated satelites in a flyby along the earth are not yet solved by current physics. The original research is published in Phys. Rev. Lett. 100, 091102 (2008) – Published March 3, 2008 by the authors John D. Anderson, James K. Campbell, John E. Ekelund, Jordan Ellis, and James F. Jordan.

Their abstract reported anomalous orbital energy-changes were observed during six Earth flybys by the Galileo, NEAR, Cassini, Rosetta, and MESSENGER spacecraft. These anomalous energy-changes were consistent with an empirical prediction-formula, which is proportional to the total orbital energy per unit mass and which involves the incoming and outgoing geocentric latitudes of the asymptotic spacecraft velocity-vectors.

Many scientists have analysed these anomalies, but none of them has a concrete answer to why this is happening. John Anderson himself suggested that it might be due to the unknown phenomenon of dark energy-dark matter. The satelite-velocities appear to increase with some mm/s in a hyperbolic orbit. A list of the velocity-changes is also given in the wikipidea[1].

Moreover, Anderson went public. In an article published by the the planetary society[2] is written: "All this led Anderson and his colleagues to conclude that the flyby anomaly was not a fluke related to the unique conditions of the Galileo spacecraft and its trajectory, but a consistent effect influencing the speed of spacecrafts flying by our planet. Suggestions that it was caused by General Relativity's "frame dragging" (known as the

"Lense-Thirring effect") led nowhere, when Anderson's calculations showed that the actual velocity change was too large to be explained by this phenomenon. But if the flyby anomaly was real, as data suggested, and if General Relativity had nothing to do with it, then what? What is the cause of the flyby anomaly?

The answer: A *(new found) 'dark matter constant' is the cause; it can calculate the velocity-change of satelite-flybys depending on the hyperbolic orbit*.

Dark energy force formula in a new cosmological framework.

The evidence for the velocity-change in flyby satelites along the earth is correlated to a segment of my theoretical derived 'dark energy force formula'. This formula is generally implemented in a new double torus cosmological Model, of which several papers have been published in the vixra-archive[3] since September 1 2009.

Several implications have been worked out afterwards. At a certain point these papers could be considered as 'pre-exercises' in awaiting for a hard and robust mathematical framework to support the new cosmological model. Yet, further development does not withdraw the importance of the 'dark energy force formula'.

For the first time this formula could be related to a practical (empirical) research, serving a segment of the 'dark-formula' to calculate the flyby-satelite-velocity changes. Also the Pioneer 1 and 2 velocity-change could be explained by the 'introduced dark matter constant in this 'paper'. There is no fundamental difference between these anomalies, although such is suggested in other publications.

My original 'dark energy force formula' (only with the "-" sign) is:

$$F_{de} = -\frac{c^5 O_e}{2G} m^3 \left[(kgm)^3 \frac{N}{s} \right] \qquad (1)$$

However, as the related vixra papers to this subject make clear, my formula appeared to be also a result in a generally derived mathematical equation, described by Mathematician and Physicist Christopher Forbes (UK). In the resulting pre-exercised double torus cosmological model of dark energy and dark matter the $\mathbf{F_{de}}$ appeared to have also a "+" sign. The $+\mathbf{F_{de}}$ expands a dark matter torus and the $\mathbf{-F_{de}}$ contracts the dark matter torus, of which the latter is enclosed and intertwined by the dark energy torus. The $+\mathbf{F_{de}}$ generates the accelerated expansion we observe in the big bang cosmology.

However, now in this particular case of flyby-satelite-velocity-change this can be applied as follows: $+\mathbf{F_{de}}$ expands spacetime hyperbolically (in the dark matter torus), ergo: the flyby-satelites with a hyperbolic orbit get a velocity-change. Eliptcal orbits can only be affected by the $\mathbf{-F_{de}}$.

In order to derive the end-equation (13), equation (1) can be splitted in three

segments (2):

$$F_{de} = \pm\left\langle \frac{1}{2} mcO_e \right\rangle . \left\langle (mc)^2 \right\rangle . \left\langle \frac{c^2}{G} \right\rangle \left[(kgm)^3 \frac{N}{s} \right] \quad (2)$$

$$\left\langle \frac{1}{2} mcO_e \right\rangle \left[kg \frac{m^3}{s} \right]$$

Segment (a)

This is a volumestream of dark matter, or also called 'dark matter impuls flow', correlated to dark matter.

$$\left\langle (mc)^2 \right\rangle \left[(kg \frac{m}{s})^2 \right]$$

Segment (b)

This is the lightimpuls (squared) correlated to visible matter.

$$\left\langle \frac{c^2}{G} \right\rangle \left[\frac{kg}{m} \right]$$

Segment (c)

This is the maximum mass density correlated to black holes (segment c).

I only use segment (a) for showing the evidence for the flyby-satelite-velocity-change, because it comprehends the 'dark matter impuls flow' giving extra-gravity to the flyby satelites and giving them a velocity-change.

Photograph 1: Dan Visser, Almere, the Netherlands, in 2008, with his 'dark energy force formula formula' (with only the "-"sign for F_{de}), for which the idea of a double torus universe started in September 1 2009. All the 'papers' afterwards published are 'pre-exercises', which had been called the Twin-Tori cosmological Model (TTM), which will possibly evolve to the *TRIPLE Torus Topology,* wherein *a third torus* purily will be used as a mathematical aid to shape the theoretical physics of the double torus. This trajectory

is prepared by Christopher Forbes (UK)- no photograph available-.

How does dark matter affect the satelite flyby.

Segment (a) shows how the ‘dark matter impuls flow’ from the ‘dark energy force formule’ is correlated to the Anderson et al. (empirical) formula.

$$\frac{1}{\frac{1}{2}mcO_e} = \frac{2\frac{1}{mO_e}}{c} = \frac{\Delta v}{v} \tag{3}$$

Such that

$$\frac{1}{mO_e} = \omega R\left(\cos\varphi_i - \cos\varphi_0\right) \tag{4}$$

which results in Anderson’s empirical formula:

$$\frac{\Delta v}{v} = \frac{2\omega R\left(\cos\varphi_i - \cos\varphi_0\right)}{c} \tag{5}$$

Wherein ω is the angular-speed of the earth and R the radius of the earth, and wherein Δv is the satelite’s velocity-change and v the satelite’s velocity. Anderson’s empirical formula could also to be found in the wikipidea [2].

According to equation (3) follows:

$$\frac{2}{mO_e} = \Delta v \tag{6}$$

$$m_{dm} = m = \frac{2}{\Delta v O_e}\left[\frac{s}{m^3}\right] \tag{7}$$

The dimension can be transformed:

$$\left[\frac{s}{m^3}\right]=\left[\frac{s}{m^3}.\frac{kg\frac{m^2}{s^2}}{kg\frac{m^2}{s^2}}\right]=\left[\frac{Js}{m^4N}\right]$$

This is a *dark matter quantum spin [Js] per force [N] affecting a dark matter torus geometry [m^4].*

The speed-increment at ‘perigee‘, as Anderson and his co-workers call this, for the six satelite’s in their research has been different, reaching from the smallest detected to the largest detected extra velocity **Δv.** I took the smallest and the largest extra velocity-values to establish a range for the dark matter mass, as follows:

0.008±0.004 mm/s >Δv< 7.21±0.07 mm/s

This leads to:

$$\frac{2}{7.28x10^{-3}x\ \ 2.61227x10^{-70}}\geq m_{dm}\leq\frac{2}{0.004x10^{-3}\ x\ \ 2.61227x10^{-70}}$$

$$0.105x10^{73}\geq m_{dm}\leq 191.404x10^{73}$$

From this follows the calculation for the ‘dark matter impuls flow‘:

$$\frac{1}{2}m_{dm}cO_e\leq\frac{1}{2}x191.404x10^{73}x3x10^{8}x2.61227x10^{-70}$$

and

$$\frac{1}{2}m_{dm}cO\geq 0.105x10^{73}x3x10^{8}x2.61227x10^{-70}$$

From this follows:

$$0.8x10^{11} \leq \frac{1}{2} m_{dm} cO_e \leq 750x10^{11} \left[kg \frac{m^3}{s} \right] \quad (8)$$

The ‘dark matter impuls flow’ is a *“volume-stream of dark matter“*.

Then from equation (3) follows, inverting this dark matter volume-stream, in order to determine the quotient of the extra velocity and the velocity:

$$1.25x10^{-11} \leq \frac{1}{\frac{1}{2} m_{dm} cO_e} = \frac{\Delta v}{v} \leq 0.0013x10^{-11} \quad (9)$$

The dimensions could also be inverted:

$$\left[\frac{1}{kg} \frac{s}{m^3} \right] \quad (10)$$

From this follows:

$$\left[\frac{1}{kg} \frac{s}{m^3} \right] = \left[\frac{1}{kg} \frac{s}{m^3} . \frac{kg \frac{m^2}{s^2}}{kg \frac{m^2}{s^2}} \right] = \left[\frac{Js}{m^4 Nkg} \right] \quad (11)$$

$$1.25x10^{-11} \leq \frac{\Delta v}{v} \leq 0.0013x10^{-11}$$

The dimension of the Anderson-result is practical expressed in terms velocity-correlation to dark matter, but the dimension is:

$$\frac{\Delta v}{v} \left[\frac{Js}{m^4 Nkg} \right] \quad (12)$$

We here have a dark matter quantumspin in [Js] per [kg] per force [N] per dark matter torus geometry [m^4]. In practice the summerizing of quantumspins result is a velocity in [mm/s], because every quantumspin is the motor of rotation.

From this follows the final equation:

$$1.25\text{x}10^{-11}.\text{v} \leq \Delta\text{v} \leq 0.0013\text{x}10^{-11}.\text{v} \qquad (13)$$

With equation (13) every satelite in a hyperbolic orbit is affected by fluctuations of dark matter-density along the path-of-earth and path-of-earth-flyby-satelites through spacetime. This can also be applied on the satelites leaving the solar-system, like Pioneer 1 and 2. This is a similar process, although earlier the press mentioned it was not.

The "+" dark energy force in the new framework for the new double torus cosmological model expands the dark matter torus, which is a synonym-dynamic for accelerated space-expansion in the big bang cosmology. This generates less dark matter density. The "-" dark energy force contracts the dark matter torus, generating a larger dark matter-density. It is this dynamical process at small scale that manifests in vacuum.

So, the dark matter fluctuations are due to variations of the in principle constant dark matter-density. The 'variations' are caused by dark energy, which is indicated as three dimensional time in the new cosmological model, and stands in relationship with my 'dark energy force formula'.

According to equation (12), I estimate the **dark matter constant** on:

$$\frac{(1.25+0.0013).10^{-11}}{2} = 480\text{x}10^{-11}\left[\frac{\text{Js}}{\text{m}^4\text{Nkg}}\right]$$

being a quantumspin in [Js] per [kg] per force [N] and per dark matter torus geometry [m^4].

Conclusion.

For the first time a practical verification of flyby-satelites and dark matter has been made, theoretically and fundamentally based on a new cosmological double torus model. A dark matter constant of 480 x 10^{-11} is calculated, being a quantumspin in [Js] per [kg] per force [N] and per dark matter torus geometry [m^4], with as a result six velocity-changes of earth satelite flybys in the research of Anderson et al. For every other *future satelite-flyby* with a certain velocity (v), the velocity-change (Δv) can now be predicted (calculated) by a complete new approach based on a *dark matter equation*.

References.

1 http://en.wikipedia.org/wiki/Flyby_anomaly
2 http://www.planetary.org/news/2008/0228_Researchers_Investigate_New_Cosmic.html
3 'Pre-exercises' of the double torus cosmological model, called TTM are:

http://www.vixra.org/abs/0909.0005 ; September 1 2009; Authors: Dan Visser, Cristhopher Forbes, Keith Lees, titled: “A Short Article On A Newly Proposed Model Of Cosmology“.
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