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

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Abstract.

In version-1 for the first time an announcement was made in this paper to have found fundamental evidence for the flyby-anomalies of six satellites earlier investigated by John Anderson and co-workers of the Jet Propulsion Laboratory (JPL) in Pasadena USA. The central part of this theoretical evidence exists of a 'dark matter flow' being the cause of a velocity-change for satellites during their 'flyby' along the earth. A formula is given to calculate the velocity-change caused by the dark matter flow. 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. Version-2 replaces version-1, because I read about new investigation of GPS satellites, which predict dark matter surrounding the earth-equator. In version-2 I cleared an expression without an effect on the original end-result of version-1 and I extended it with the calculation of the energy satellites are feeling from dark matter around the earth-equator. Version-3 makes much better clear that satellites can be used to calculate the dark energy density flow around the earth-equator from the perspective of a new cosmological model: The Double Torus Universe.

Introduction.

The anomalies in the velocity of six investigated satellites 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 satellite-velocities appear to increase with some mm/s in a hyperbolic orbit. A list of the velocity-changes is also given in the wikipedia[1].

However**,** Anderson went public. In an article published by 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 space-crafts 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 is: A *(new found) 'dark matter constant flow' is the cause; it can calculate the velocity-change of satellite-flyby depending on their hyperbolic orbit*.

Dark energy force formula in a new cosmological framework.

The evidence for the velocity-change in flyby satellites 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-satellite-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:

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

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 cosmology 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 as we observe in Big Bang cosmology.

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

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

segments:

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

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

Segment (a)

:

This is a volume-stream of dark matter, or also called ‘dark matter flow’:

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

Segment (b)

This is the light-impulse (squared) is 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 Planck-holes in vacuum.

I only use segment (a) for showing the evidence for the flyby-satellite-velocity-change, because it comprehends the ‘dark matter flow’ and giving extra-gravity to the flyby satellites and giving them a velocity-change.

How does the dark matter affect the satellite flyby.

Segment (a) shows how the ‘dark matter flow’ from the ‘dark energy force formula’ is correlated to the Anderson et al. formula in the following manner:.

$$\frac{1}{\frac{1}{2} mcO_e} = \frac{2\frac{1}{mO_e}}{c} = \frac{\Delta v}{v} \qquad (3)$$

Such that:

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

which results in Anderson's empirical formula:

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

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 wikipeidia [2].

According to equation (3) follows:

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

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

This dimension can be transformed:

$$\left[\frac{s}{m^3}\right] = \left[\frac{s}{m^3} \cdot \frac{kg\frac{m^2}{s^2}}{kg\frac{m^2}{s^2}}\right] = \left[\frac{Js}{m^4 N}\right] \tag{8}$$

The dimension expresses a *dark matter quantum-spin [Js] per force in [N] and affecting a dark matter torus geometry of* $[m^4]=[m^2].[m^2]$.

The speed-increment at 'perigee', the way Anderson and his co-workers call it, for the six satellite's in their research, has been different. It reaches from the smallest detected to the largest detected extra velocity **Δv.** So**,** I took the smallest and the largest extra velocity-values to establish firstly the range of dark matter mass, as follows:

Related to the the Anderson-team their extra velocity of
0.008±0.004 mm/s >Δv< 7.21±0.07 mm/s

leads to equation (7):

$$\frac{2}{7.28\text{x}10^{-3}\text{x}\ \ 2.61227\text{x}10^{-70}} \geq \text{m}_{\text{dm}} \leq \frac{2}{0.004\text{x}10^{-3}\ \text{x}\ \ 2.61227\text{x}10^{-70}}$$

$$0.105\text{x}10^{73} \geq \text{m}_{\text{dm}} \leq 191.404\text{x}10^{73}$$

From this follows the calculation:

$$\frac{1}{2}\text{m}_{\text{dm}}\text{cO}_{\text{e}} \leq \frac{1}{2}\text{x}191.404\text{x}10^{73}\text{x}3\text{x}10^{8}\text{x}2.61227\text{x}10^{-70}$$

and

$$\frac{1}{2}\text{m}_{\text{dm}}\text{cO} \leq 0.105\text{x}10^{73}\text{x}3\text{x}10^{8}\text{x}2.61227\text{x}10^{-70}$$

From this follows:

$$0.8\text{x}10^{11} \geq \frac{1}{2}\text{m}_{\text{dm}}\text{cO}_{\text{e}} \leq 750\text{x}10^{11}\left[\text{kg}\frac{\text{m}^3}{\text{s}}\right] \qquad (9)$$

Dimensionally representing the ‘dark matter flow’ to be a *“volume-stream of dark matter*“.

Then from equation (3) follows the inverted value of this dark matter volume-stream in order to determine the quotient of the satellite extra orbit-velocity and the satellite orbit-velocity itself, as follows:

$$1.25\text{x}10^{-11} \geq \frac{1}{\frac{1}{2}\text{m}_{\text{dm}}\text{cO}_{\text{e}}} = \frac{\Delta\text{v}}{\text{v}} \leq 0.0013\text{x}10^{-11} \qquad (10)$$

The dimensions also has to be inverted:

$$\left[\frac{1}{\text{kg}}\frac{\text{s}}{\text{m}^3}\right] \tag{11}$$

Rewritten follows:

$$\left[\frac{1}{\text{kg}}\frac{\text{s}}{\text{m}^3}\right]=\left[\frac{1}{\text{kg}}\frac{\text{s}}{\text{m}^3}.\frac{\text{kg}\frac{\text{m}^2}{\text{s}^2}}{\text{kg}\frac{\text{m}^2}{\text{s}^2}}\right]=\left[\frac{\text{Js}}{\text{m}^4\text{Nkg}}\right] \tag{12}$$

So now follows:

$$1.25\text{x}10^{-11}\geq\frac{\Delta\text{v}}{\text{v}}\left[\frac{\text{Js}}{\text{m}^4\text{Nkg}}\right]\leq 0.0013\text{x}10^{-11} \tag{13}$$

So here I have a dark matter quantum-spin in [Js] per [kg] and per force [N] and per dark matter torus geometry [m^4]. Compared to equation (8) now also per kg, because v is involved. This is a deeper dimension, because in current accepted dimensions (delta v / v) would be dimensionless. The deeper dimension occurs because of formulations in a new cosmological model: The Double Torus Universe, comprehending the new dark energy force formula as mentioned in equation (1). In practice the dark matter quantum-spins, which surrounds the earth equator, will cumulate by the satellite's orbiting velocity (v) into a torus geometry of dark matter energy-density FLOW. This adds extra gravity to the earth-gravity giving the satellites an extra velocity in [mm/s].

That gives the end-equation:

$$1.25\text{x}10^{-11}.\text{v}\geq\Delta\text{v}\left[\frac{\text{J}}{\text{m}^3}\frac{1}{\text{Nkg}}\right]\leq 0.0013\text{x}10^{-11}.\text{v} \tag{14}$$

Wherein delta v is a dark energy-density flow, because cumulated quantum-spins speed forward. That is a flow of energy! A flow of dark energy-density! Equation (14) enables to calculate the dark matter energy-density in a hyperbolic orbit affected by fluctuations of the dark matter energy-density flow surrounding the earth equator during the path-of-earth-flyby-satellites through space-time. This can also be imagined for the satellites leaving the solar-system, like Pioneer 1 and 2. The process is similar, although earlier the press mentioned it was not. Also these satellites are hold back by extra gravity caused by a dark matter energy-density flow in the solar-system.

So, in this specific calculation the dark matter fluctuations are due to variations in the dark matter torus surrounding the earth-equator. According to equation (14) I estimate the AVERAGE dark matter quantum-spin at:

$$\frac{(1.25+0.0013).10^{-11}}{2} = 0.62565\text{x}10^{-11}\left[\frac{\text{Js}}{\text{m}^4\text{Nkg}}\right]$$

So, that means for a satellite-orbit velocity of v = 40.000 km/s the result is:

$$0.62565\text{x}10^{-11}\left[\frac{\text{Js}}{\text{m}^4\text{Nkg}}\right].4\text{x}10^{7}\left[\frac{\text{m}}{\text{s}}\right] = 2.5\text{x}10^{-4}\left[\frac{\text{J}}{\text{m}^3}\right] \text{ per N and per kg}$$

Which is a dark matter energy-density flow. This adds gravity to the satellites feeling already the earth's gravity !!! And which translates into extra velocity.

Conclusion.

The dark matter energy-density flow is $2.5\text{x}10^{-4}\left[\frac{\text{J}}{\text{m}^3}\right]$ per N and per kg for a satellite at 40.000 km/s in earth-orbit. With this theory the dark matter-density around the equator can be calculated by satellites in general.

References.

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