New Dark Matter Cosmology.

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Date: June 5 2012

Abstract.

This paper presents a set of equations, as well as further derivations and calculations, to present dark matter in an alternative cosmology. The alternative is: The Universe did not start with the Big Bang, but is a recalculated Double Torus Universe of dark energy and dark matter. The calculations within this framework show a dark matter-particle, which has the shape of a smallest possible Double Torus, and has a constant diameter of $R \approx 0.712 \times 10^{-22}$ [m] at where it exists. At this length the lowest acceleration for Newton gravity becomes a dark matter-acceleration; the Newton force then changes into a lowest dark matter force. This paper shows both forces are embedded in a united 'new dark energy force'. In the transition of Newton gravity to dark matter gravity, the new dark energy force has a value of 10^{-116} kg^4s^2. Accordingly another calculation reveals this force is a 'force to recalculate space-time itself'. Further calculations also enable to mark dark matter mass with a value of ≈ 2.8 keV/c^2. Again accordingly the dark matter-density (in kg/m) is ≈ 71 gram per 1 million-km (≈1/149 the distance to the sun, or more than three times the distance from Earth to Moon). The dark energy force uses extra time-arrows from an under-laying time-domain of conventional space-time'. This directly gives evidence to the perception gravity is not fundamental. In general this paper relates dark matter mass, new dark energy force and the level where Newton gravity and dark matter meet each other; specifically in that level space-time is recalculated. Moreover an alternative perception of the Higgs-field is given, related to this recalculation.

Dark Matter, MOND and TeVes.

In this paper my set of equations for a new dark energy force is used to mark dark matter. The same set of equations has already been used for my calculation of the faster-than-light neutrinos[1]. Despite the heavy battle in the media about this issue, my results leaded to a different conclusion for the 'truth' about of 'violating or not' Einstein's Relativity. However, the battle is not finished yet. My set of equations defines and calculates the configuration of possible violations. In a similar way my set of equations enables a calculation for a new and sharper identification of dark matter-mass.

Looking to 'old' perspective of measurements of the lowest limit of the Newton acceleration[3, 4] at 5×10^{-14} ms^{-2}, my calculation reveals a lower limit for accelerations of dark matter at a value of 1.76×10^{-14} ms^{-2}. However, new in this result is my calculation based on a gravitational issue, while the original measurements were performed with the mechanical restoring of the Newton force. So, to verify my calculations in experiments, it is necessary to verify them with gravity-effects.

Also in respect to dark matter my set of equations goes beyond the 1986-MOND theory[2]. MOND (Modified Newtonian dynamics) hypothetically predicts an understanding of the flat velocity-curve in spiral galaxies at a characteristic acceleration of $a_0 = 1.2 \times 10^{-10}$ ms^{-2}. This value is in the same range as the Pioneer Satellites 10 and 11, launched long ago in the 1970s, which are now far away outside

the solar system: These satellites seem to decelerate with the value of 9 x 10^{-10} ms^{-2}. This value seemed to match with values corresponding to an accelerated space-expansion. Also photons seem to decelerate by this cosmological redshift . Therefore the MOND-theory needs no dark matter for balancing (other) globular galaxies. Even an alternative for the MOND-theory, in the form of a non-relativistic theory with vectors and tensors (TeVes[6]), does not need dark matter to explain gravitational lensing (Bullet Cluster). Yet other several astronomical observations tend to accept dark matter, including Earth-lab-research-projects on dark matter. There are signs for the real existing of dark matter, but hard evidence is not yet found. Why is it so hard to find it? Why is the evidence also still in a contradictive situation?

To answer these questions my set of equations, and derived calculations, become relevant. They strengthen the evidence, that dark matter is unexpectedly different from what was thought earlier in all the experiments and observations. This will be explained in this paper extensively by the properties of the set of equations. However, before starting that, I feel free to make a comparison with the battle of the faster-than-light neutrinos. Faster-than-light neutrinos would violate Einstein's Relativity. However, two different experiments, OPERA and ICARUS battled for this evidence. During this battle a psychological resistance was also remarked. It blocked the possibility that Einstein's Relativity could be part of a new cosmological model, instead of the Big Bang. However, the battle remained focused on Big Bang Relativity. That's what happened with the MOND-theory too. MOND and TeVes tried to prevent dark matter to be real, because it might threaten Relativity.

The current understanding of dark matter evaluates the experimental detection of gravitational lensing of large objects behind massive clusters of galaxies. Just the same is applicable on dark matter being part of galaxy-masses itself. The fact the lowest Newton acceleration of 5 x 10^{-14} ms^{-2} stretches beyond MOND's 10^{-10} ms^{-2}, gives a strong credence for dark matter to exist. My set of equations, however, reveal a new possible identification. My calculations are directly related to the role of gravity in a wider cosmological setting.

The New cosmological Model is mathematically describing the universe did not start with the Big Bang. Instead the universe is proposed to be a Double Torus of dark energy and dark matter[5]. Such a universe recalculates space-time by two extra time directions from below the Planck scale. In such a universe the established space time (Relativity) is depended on a more advanced time-process; this is acting on the indivisibility of quantum entanglement. Within that framework, gravity is not fundamental. Fundamental is: Dark matter and Dark energy related to a new dark energy force in the Double Torus Universe.

At this point I start my set of equations, as I have used in other papers too.

Set of equations.

PART 1:

$$F_{de} = \pm k_{de} m^3 \left[(kgm)^3 \frac{N}{s} \right]$$

$$F_{de} = darkenergy - force - formula$$

$$k_{de} = \frac{c^5 O_e}{2G} \left[J \frac{m^2}{s} \right] \equiv \left[\left(kg \frac{m^3}{s} \right) \frac{m}{s^2} \right]$$

$$k_{de} = accelerated - mass - volume - flow$$

$$c = lightspeed$$

$$O_e = (Plancklength)^2$$

$$G = gravitational - Newton - const.$$

$$m^3 = m_{vm} . m_{dm}$$

$$index - vm = visible - mass$$

$$index - dm = dark - matter - mass$$

$$k_{de} \left[\frac{\left(kg \frac{m^3}{s} \right) \frac{m}{s^2}}{\left(kg \frac{m^3}{s} \right)} \right] \Rightarrow F_{de} = \left[\frac{m}{s^2} \right] . m_{vm} [kg] . (m_{dm})^2 \left[kg^2 \right]$$

$$F_{de} = k_{de} m_{vm} [N] . (\pm m_{dm})^2 \left[kg^2 \right]$$

$$with$$

$$g = k_{de}$$

$$F_{de} = mg [N] . (\pm m_{dm})^2 \left[kg^2 \right]$$

$$F_{de} \equiv F_G [N] . (\pm m_{dm})^2 \left[kg^2 \right]$$

$$F_{de} = \langle gravity - force \rangle \otimes \langle darkmatter \rangle = \langle darkenergy - force \rangle$$

$$F_G = mg = G \frac{Mm}{R^2} [N]$$

The first meaning of this part is to clear a new dark energy force is a universal force, which proves gravity is not fundamental. The second meaning is, I need this part to rewrite the set of equations with the Newton's constant G at the surface of a new geometry: A Double Torus.

PART 2:

I start with rewriting the dimensional form:

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

$$\left[\frac{1}{G}(kgm)^3\frac{N}{s}\right]=\left[\left(\frac{1}{G}kg\right).kg.kg.m^3\frac{N}{s}\right]=\left[\frac{m^3}{s^2}.kg.kg.m^3\frac{N}{s}\right]=\left[m^3.\left(kg\frac{m}{s^2}\right).kg.m^2\frac{N}{s}\right]=$$

$$\left[m^3.N.\left(kg\frac{1}{s}\right)m^2N\right]=\left[m^3\left(\frac{1}{G}kg\right)\frac{1}{s}\langle Gm^2\rangle N^2\right]=\left[m^3.\frac{m^3}{s^2}\frac{1}{s}\langle Gm^2\rangle N^2\right]=\left[\frac{m^3\langle Gm^2\rangle m^3}{s^3}N^2\right]$$

From this follows:

$$F_{de}=\pm\frac{c^5O_e}{2G}m^3\left[(kgm)^3\frac{N}{s}\right]\Rightarrow F_{de}=\frac{c^5O_e}{2}m^3\left[\frac{m^3\langle Gm^2\rangle m^3}{s^3}N^2\right]$$

G is now expressed as a dimensional surface, like also mass is expressed as space and force. The directions of the force (the '+' and '-' signs) is expressed inclusive as [N^2].

As mentioned in part 1 the dark energy force (gravity-force x dark-matter) belongs in a new geometry. So, what I say is: "The established Holographic Principle is not limited to a surface enclosing a space-volume, but should be extended to a surface related to the Double torus space-volume. General mathematical equations has already described this in 2009, as follows:

$\int (\alpha x^2+\beta x+\gamma)\, dx = k,\ k \in R,$

$\int (0)dx = k,\ k \in R$

$\int (\alpha x^2+\beta x+\gamma)\, dx = \int 0\, dx$

$\alpha x^2+\beta x+\gamma=0,$

$\alpha=G,\ \beta=0,\ \gamma=-¼\ c^4\ (\text{h-bar})^2\ m^6\ G$

$x=\pm ½\ c^5\ m^3\ G^{-1}\ (L_{planck})^2$

the x is my original dark energy force formule..

The general expression (13) can also be written as:

$\int (\alpha(F_{de})^2 + \gamma)\, dx = k,\quad k \in R$

$\alpha = G\ (\approx 6.67 \times 10^{-11}\ N\ m^2\ kg^{-2})$

$\gamma = -¼\ c^4\ (\text{h-bar})^2\ G\ M^6\ \ (\approx 10^{-61}\ M^6)$

For $\{\alpha(F_{de})^2+\gamma=0\}$ follows $F_{de} = \pm ½\ c^5\ M^3\ G^{-1}\ (L_{planck})^2$

Notice how my original dark energy formula from my thought-experiment in 2004 emerge from this mathematics.

The mathematical equations were described by **Christopher Forbes** (UK) and his colleague Keith Lees (UK). Both scientists assigned me to their publications http://vixra.org/abs/0909.0005 and http://vixra.org/abs/0910.0016 . The Y in the equations is the amount of dark energy. The shape of the Double Torus is described in http://vixra.org/abs/1101.0096. The Double Torus Universe exists of

an outer torus of dark energy torus embedding and intertwining an inner dark matter torus. Visible mass is just effect of interactions in the dark (see fig. 1).

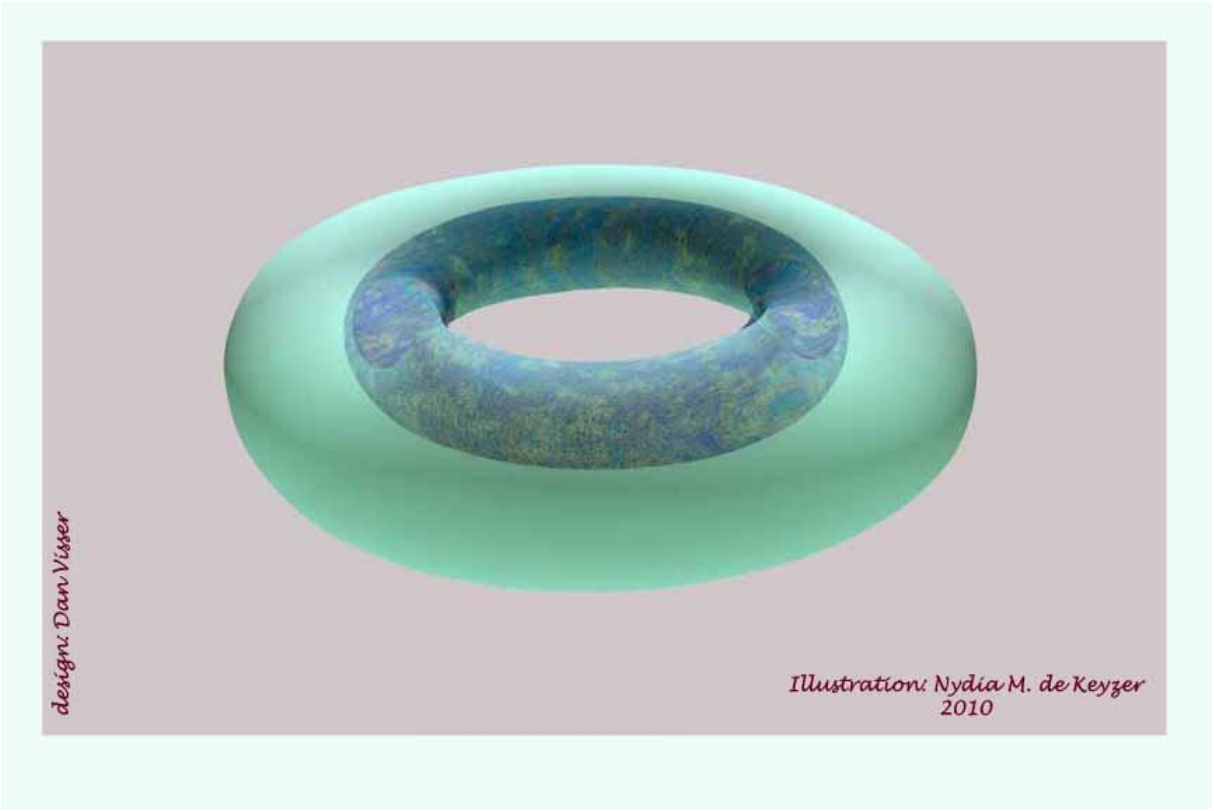

Fig.1: Double Torus Universe proposed by Dan Visser (independent cosmologist), Almere, the Netherlands.

I continue as in Part 1 with a split-up in gravity-force and dark matter force.

$$F_{de} = k'_{de} m^3 \left[\frac{m^3 \langle Gm^2 \rangle m^3}{s^3} N^2 \right]$$

$$k'_{de} = \frac{c^5 O_e}{2} \left[\frac{m^7}{s^5} \right] \equiv \left[\left(\frac{m}{s^2} \right)^2 \frac{m^5}{s} \right]$$

Just as in Part 1 a split-up in m_{vm} (visible mass) and m_{dm} (dark matter mass) is justified, in order to get gravity-force x dark matter.

$$F_{de} = k'_{de} m_{vm} m^2{}_{dm} \left[\frac{m^3 \langle Gm^2 \rangle m^3}{s^3} N^2 \right]$$

From this follows:

$$F_{de} = \pm\left\{\left(k'_{de}\right)^{\frac{1}{2}}\left[\frac{m}{s^2}\right].m_{vm}\left[kg \equiv \frac{Gm^3}{s^2}\right]\right\}.\left\{\left(k'_{de}\right)^{\frac{1}{2}}\left[\frac{m}{s^2}\right]m^2{}_{dm}\left[\frac{m^5}{s}\right]\right\}$$

$$m^2{}_{dm} = \left[m^2 m^2 \frac{m}{s}\right] \equiv \left[spinning - space - disc\right]$$

From this follows:

$$F_{de} \equiv F_G\left[N\right] \otimes \langle accelerated - spinning - space - disc \rangle$$

$$F_{de} \equiv F_G\left[N\right] \otimes \pm F_{dark-matter}\left[\frac{m^6}{s^3}\right] \equiv \left[\left(\frac{m^2}{s}\right)^3\right]$$

$$F_{de} \equiv F_G\left[N\right] \otimes \pm \langle the - spatial - \ flow - of \ - a - dark - matter - surface \rangle$$

The result is robust! It is telling the Newton gravity-force and the dark matter force cause (in two opposite directions) a force to hold together galaxies like a spinning space disc (turning left- or right).

However, the same logic could be applied on small particles, such as neutrinos. Hence that produce a smallest gravity-force and a smallest dark matter-force.

PART3:

The result of part 2 was:

$$F_{de} = \pm\left\{\left(k'_{de}\right)^{\frac{1}{2}}\left[\frac{m}{s^2}\right].m_{vm}\left[kg \equiv \frac{Gm^3}{s^2}\right]\right\}.\left\{\left(k'_{de}\right)^{\frac{1}{2}}\left[\frac{m}{s^2}\right]m^2{}_{dm}\left[\frac{m^5}{s}\right]\right\}$$

←----------a----------→

$$\left(k'_{de}\right)^{\frac{1}{2}} = \left(\frac{c^5\left(L_{pl}\right)^2}{2}\right)^{\frac{1}{2}} = 1.76x10^{-14}\left[\frac{m}{s^2}\right]$$

This is a factor 2.84 smaller than the lowest measured (restored) Newton acceleration (which was not gravitational measured) of 5 x 10^{-14} m/s^2, this is

To continue: For the particles in the Double Torus Universe follows:

$$F_{de} = \left(\downarrow \lim F_G\left[N\right]\right).\left\langle \pm\left(\downarrow \lim F_{dm}\left[\left(\frac{m^2}{s}\right)^3\right]\right)\right\rangle$$

←----------**a**----------→

where ←a→ is the lowest limit of dark matter force.

Firstly looking separately at the dimensions of the dark matter force (←a→):

$$\left\langle \pm\left(\downarrow \lim F_{dm}\left[\left(\frac{m^2}{s} \right)^3 \right] \right) \right\rangle = \left\langle \pm\left(\downarrow \lim F_{dm}\left[\frac{m^3}{s^2}\frac{m^3}{s^2}s \right] \right) \right\rangle = \left\langle \pm\left(\downarrow \lim F_{dm}\left[\left(\frac{1}{G}kg \right)\left(\frac{1}{G}kg \right)s \right] \right) \right\rangle$$

From this follows a logical connotation for the dark matter force:

$$\pm \downarrow \lim F_{dm} = \pm \frac{\left(k'_{de}\right)^{\frac{1}{2}}}{G^2}\left(m_{dm}\right)^2\left[kg^2 s\right]$$

$$\pm \downarrow \lim F_{dm} = \pm \left(\frac{c^5\left(L_{pl}\right)^2}{2} \right)^{\frac{1}{2}} G^{-2}\left(m_{dm}\right)^2\left[kg^2 s\right]$$

Now I define a constant R, which transforms the lowest limit of the gravitational Newton force into the lowest limit of the dark matter force, as follows:

$$\xrightarrow{R}\left(\downarrow \lim F_G\left[N\right] \right) \Rightarrow \pm \downarrow \lim F_{dm} = \pm \left(\frac{c^5\left(L_{pl}\right)^2}{2} \right)^{\frac{1}{2}} G^{-2}\left(m_{dm}\right)^2\left[kg^2 s\right]$$

So, for:

$$R = G^{\frac{3}{2}} \frac{1}{\left(\frac{c^5\left(L_{pl}\right)^2}{2} \right)^{-\frac{1}{4}}} = G^{\frac{3}{2}} \left(\frac{c^5\left(L_{pl}\right)^2}{2} \right)^{\frac{1}{4}} = \left(\frac{c^5\left(L_{pl}\right)^2 G^6}{2} \right)^{\frac{1}{4}} \approx 0.712x10^{-22}[m]$$

Follows:

$$\left(\downarrow \lim F_G = G\frac{m_1 m_2}{R^2} \right) \Rightarrow \pm \downarrow \lim F_{dm} = \pm \left(\frac{c^5\left(L_{pl}\right)^2}{2} \right)^{\frac{1}{2}} G^{-2}\left(m_{dm}\right)_1\left(m_{dm}\right)_2\left[kg^2 s\right]$$

R is the constant diameter of the smallest Double Torus Dark Matter-particle.

Now the dark matter mass can be calculated too, at this value of R, at the edge of this transition:

$$\left(k'_{dm}\right)^{\frac{1}{2}} = g_{dm} = G\frac{m_{dm}}{R^2} = \left(\frac{c^5\left(L_{pl}\right)^2}{2} \right)^{\frac{1}{2}}$$

$$m_{dm}=\left(\frac{c^5\left(L_{pl}\right)^2}{2}\right)^{\frac{1}{2}}R^2G^{-1}=\left(\frac{c^5\left(L_{pl}\right)^2}{2}\right)^{\frac{1}{2}}\left\{\left(\frac{c^5\left(L_{pl}\right)^2G^6}{2}\right)^{\frac{1}{4}}\right\}^2G^{-1}$$

$$m_{dm}=\left\{\left(\frac{c^5\left(L_{pl}\right)^2}{2}\right)^{\frac{1}{2}}\right\}^2(G)^{\frac{6}{4}}G^{-1}$$

$$m_{dm}=\frac{c^5\left(L_{pl}\right)^2}{2}G^{\frac{1}{2}}=0.50538x10^{-32}kg$$

With 1 GeV/c^2 = 1.783×10^{-27} kg

$$m_{dm}=\frac{0.50538x10^{-32}}{1.783\times10^{-27}}=0.28x10^{-5}\mathrm{GeV}/\mathrm{c}^2$$

$$m_{dm}=2.8\mathrm{keV}/\mathrm{c}^2$$

Accordingly the dark matter mass-density is:

$$\Omega_{dm}=\frac{0.50538x10^{-32}kg}{0.712x10^{-22}m}=0.7098x10^{-10}\frac{kg}{m}=71\frac{g}{10^6km}=71$$ gram per million-km.

This 71 gram ≈ per 1/149 of the distance to the Sun, or more than three times the distance from Earth to Moon).

'Force below space-time'.

For $R\approx0.712x10^{-22}[m]$ the Newton gravitational-force changes into the dark matter-force.

This changes the dark energy force in a duplo-dark energy force-expression, only with a +sign, as follows:

$$F_{de}=\left(\downarrow\lim F_{dm}\left[\left(\frac{m^2}{s}\right)^3\right]\right)^2$$

This means:

$$F_{de}=\left(\downarrow\lim F_{dm}=\frac{\left(k'_{de}\right)^{\frac{1}{2}}}{G^2}\left(m_{dm}\right)^2\right)^2\left[\left(kg^2s\right)^2\right]$$

$$F_{de} = \downarrow \lim F_{dm} = \frac{k'_{de}}{G^4}\left(m_{dm}\right)^4 \left[kg^4 s^2\right]$$

$$F_{de} = \frac{c^5\left(L_{pl}\right)^2}{2G^4}\left(m_{dm}\right)^4 = \left(0.163923229x10^{14}\right).\left(0.50538x10^{-32}\right)^4 \approx 10^{-116}[kg^4 s^2]$$

As you can see, the new dark energy force F_{de} becomes a 'force affecting the vacuum' in space-time and Relativity. This means the force is acting in an under-laying region of conventional space-time'. Clearing this, I refer to the vacuum energy-density from the Einstein equations, which theoretically must exist of 10^{120} Planck-units. However, that is not practical reality, because we are not hitting against a hard wall of energy: The vacuum appeared to be transparent and thin.

So, an expansion-force balances the vacuum to a lower energy-density, with at least a factor 10^{-120}. However, the new dark energy force, from the alternative cosmology of the Double Torus, leaves behind a substantial amount of vacuum energy (10^4), much larger than the '0' defined in conventional dark energy frameworks with Einstein's cosmological constant. Einstein's cosmological constant is held to enable the acceleration of conventional space-time expansion, but the acceleration given by the new dark energy force also points to another process: Recalculation of space-time itself. It is giving space-time the properties we are familiar with. So, the dark energy force directly gives evidence for the perception that familiar space-time is not what we think space-time is. According to the calculations in this paper, space-time exists after the combination of dark energy and dark matter. That combination uses two extra time arrows in addition to the one time-arrow of the Big Bang, and which is defined in the set of equations in this paper and former papers.

The new dark energy force also explains the 'flow' of a spatial-surface-sphere of dark matter. Astronomers detected such a flow [7], but is not understood quite well. This paper hopefully gives a contribution to a better understanding by the introduction of the afore mentioned new cosmological concept.

An alternative Higgs-field perception.

The calculation of the dark energy force $F_{de} \approx 10^{-116}[kg^4 s^2]$ dimensionally shows a four dimensional mass field, multiplied by (which means 'affected by') the two extra time-arrows from below the Planck-scale. So, this field is not affected by the one-time-arrow, which is usual in the Big Bang Cosmology. In other words: At the transition of visible matter to dark matter, and vice versa, this dark energy force could easily be the source for the existence of the Higgs-field in the conventional Big Bang Cosmology. Reason: Because it generates a residue of 10^4 kg^4s^2. But then for the same reason it is simultaneously clear, that it represents a recalculation-mechanism: Two time-arrows from below the Planck-scale additionally act on elementary particle to get mass and to change that mass. In former papers I pointed to a Higgs field being a limited Boson Surface (LBS-Higgs). This is still actual by the afore mentioned formulations.

New Insights in dark matter and its new cosmology.

This whole paper might open-up a new insight in how the combination of dark energy force and dark matter can be used for velocities that violate Relativity. The accelerations are smaller than in conventional frameworks. It opens-up the perception, that escaping from space-time, with its light-

speed limit, becomes a real possibility. However, then it is necessary to acknowledge a universe in another cosmological setting. For a lot of physicists this is yet too controversial, but that's because they hold on to the Big Bang, for whatever reasons may be, in my opinion mostly because of conservatism and fear to lose their status quo.

I feel free to make the suggestion here the only way out is: Imagination of another universe. That enables to travel from galaxy to galaxy by new technical principles of recalculating relativistic space-time. We need to develop a new cosmological framework and technological spin offs. Such is needed strongly, because the Andromeda galaxy will collide with the Milky-way in the far future, after about 4 billion years. Then also our Sun starts to expand increasingly fast to capture the Earth in its hot sphere. We have to move timely.

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