Thought-experiment provides a formula for “dark energy force”.

Author: Dan Visser, ingE and independent cosmologist, Almere, the Netherlands, who derived a “thought-experiment“ to reveal a “dark energy force-formula”, which seems to fit in a new cosmological model, the “double torus universe of dark energy and dark matter“, also named the “Twin-Tori Model (TTM)”.

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Abstract.

First this: The “dark energy force formula“ is used in three theoretical papers, which introduce a new cosmological model, named the Twin-Tori Model (TTM). This paper, however describes the introduction of my “thought-experiment“, which produced this “dark energy force formula”, in retroperspective. To explain this: The “thought-experiment is dating back to April 4 2004. Then it was published April 4 2010 on my website [1]. Since then I made some text-modifications without altering the original mathematical (word) content. The point is, the formula was used by PhD-mathematics and -Physics, Christopher Forbes (UK) and his colleague, with whom, in co-authorship, three “papers” were published about the TTM in the viXra-archive[1]. These “papers” describe a “double torus universe of dark energy and dark matter“. So, this “thought-experiment” is the original paper in a step up to the TTM and submitted exclusively for viXra. The “thought-experiment” is a “way of logic-thinking" about “scaling away” from each other two black holes (small and large) under conditions of having a kind of entanglement with an observer, in order to receive evaporation-information simultaneously from both black holes. The result was my “dark energy force formula“, which seems to be a force in a higher order universe, the TTM.

Introduction.

I “scaled away” from each other two differently sized black holes, a small and a large one, in order to obtain an equal amount of evaporation-radiation from both in order to make a simultaneous detection possible by one observer. Both black holes would be entangled in the mind of the observer. The evaporation-radiation exists of Hawking-radiation, which is related to $S=\frac{1}{4}A$; S is the entropy and A the amount of Planck-surfaces. The Hawking-radiation is thermic, but has to releave at some point the information of the disappeared structures in a statistical way. According to a “paper of R. Bousso“, S is equal or smaller than ¼ A, also within black holes.

Quantumdynamics demands that information can never been lost in the universe, even after having been disappearing in black holes (unitarity). Although this “unitarity“ is acknowledged, it is a paradox among some scientists. However, new mathematics in loopquantumgravity also postulates that the forces in the atom forbid the forming of singularities (a singularity is just a infinite small point with an infinite large energy). This means that “fundamental information” should be maintained in the universe. However, whether this “unitarity” is a paradox or not, it is not primarly relevant for this thought-experiment. The purpose was to “scale-away” black holes in “time” by a kind of entangelment through evaporation-radiation that reaches the observer. This kind of “thought-experiment“ serves a new dynamical action, which I called: "dark energy force". This kind of “dark energy force” might reveal subquantum-information as a “fundamental information” that can never been lost. (“sub”in this sense means, information from below the Plancklevel). I a later stage of the development of the TTM I called this "i-formation" (“i” means induced). The “induced-formation” suggests a “formation” of new space-structures based on an “induced” dynamic from a deeper level of space, which enables quantumdynamics to be less uncertain.

The “dark energy force” is different from “negative pressure”, caused by the gravitational pull of mass in an open space. Nevertheless the dark energy force is anti gravitational and its mass is defined as - m. Mass in black holes is +m, which is attractive mass. Reason: “Scaling-away” suggests an anti-gravitational dynamic, thus expansion, and hence could be a force to power the accelerated expansion of the universe, although according to a different kind of principle. The only fundamental way to measure “scaling away” black holes, is by "temperature" !! We are also used to do this with light. Every lightwave has its own typical temperature. However, Hawking-radiation is rather difficult to observe. So, I used a typical "thought-experiment", which exists of a "refined’ chance-principle" by a penetrated look into both black holes at the same time, and then connect the “refined chance-principle” to "temperature" for the whole system.

In historical perspective energy was observed as going from warm to cold areas, but in modern times “lost information” was defined as stored at the surfaces of event-horizons of black holes. More "lost-information" inevitably would lead to a higher entropy (S). Hawking derived this as $S=4(pi)m^2$, where (m) is the mass of the black hole. This can be re-written, as follows: The surface of a globe is $A=4(pi)r^2$, with $r=2m$, where r is the radius of the event-horizon. The result beomes $A=4(pi).(2m)^2=16(pi)m^2$. Comparing this with $S=4(pi)m^2$, we find **S=1/4 A** (where A is the amount of Planck surfaces). However, entropy must be without dimensions, so (S) must be divided by the elementary Planck-surface O_e.

Meanwhile the event-horizon of a black hole becomes smaller, due to the evaporation of its surface. Small black holes evaporate faster and more intensively than large ones. The temperature of the blackhole (T_s) is proportional to the gravity of a black hole: $T_s \sim F_z \sim m/r^2 \sim m/m^2 \sim (1/m)$.

Starting my "thought-experiment".

I took the following *product:*

[a light-way (ct) from myself up to the light-horizon of a black hole] x [the distance ($s = 0{,}5\ r_s$) from the light-horizon up to the event-horizon of the black hole in order to "observe" the evaporation of two black holes simultaneously (large and small) through a kind of entanglement within the observer].

It is not possible to look beyond the light-horizon of a black hole, but still there must be an unknown chance to observe this and even more deeper. This "chance" starts at (ct).(s) / (ct) + (s). However, within a black hole the total of comparable chances is (ct) + (s) = 1, so the chance will be (ct).(s). This could carry out "more detailed chances" than is known from quantum mechanics.

Therefore I relate the "temperature" to this chance (ct).(s):

$$T_s \sim ct \cdot 0.5\ r_s \qquad (1)$$

However, this chance must be also combined with $T_s \sim 1/m$ to connect with the temperature of a black hole as a complete physical system. The result is:

$$T_s \sim (ct.\ 0.5\ r_s).\ 1/m$$

From this follows:

$$ct \sim (2\ m/r_s).\ T_s$$

From this follows:

$$ct \sim 2.\ (1/2.c^2/G)\ .\ T_s$$
$$ct \sim c^2/G\ .\ T_s \qquad (2)$$

According to $S=4(pi)m^2$, the entropy S at the surface of a black hole is proportional to m^2. This means as soon as two equally sized black holes form one black hole, the event-surface becomes 2x larger, while the mass only increases with a factor $2^{1/2}$. I call this effect 1, which propagates $(2 - 2^{1/2})\ m = 1.4\ m$. This affects (ct) to the observer.

Intermezzo:

On the other hand this effect leads to a specific analysis of dark energy and dark matter. I call this: effect 2. I take the ratio of the black hole surface A and the black hole mass m, defined as A/m. This ratio A/m is constant for as well a single black hole as for two black holes put together. According to the afore effect 1, the ratio becomes larger with a factor 1.4, only if the two black holes are put together. Compared to the original ratio then follows: 1.4 (A/m) - A/m = 0.4 =40%. This 40% had to escape via the black hole surface, leaving behind 60% in the larger black hole. The escaping energy must be dark energy with an anti-gravitational property. So, an anti-gravitational dark energy 40/60 = 2/3 stays connected to the combined black holes. Consequently 1/3 must be identified as dark matter with a gravitational property.

Conclusion: The basic ratio of darke energy / dark matter is defined as 2 : 1. This means basicly 66% is dark energy and 33 % is dark matter. The fact that nowadays 73% dark energy is observed (calculated) and 23% dark matter (observed and calculated) is due to an unkwown dynamic in the big bang. This includes that the big bang also might be part of another cosmological model.

Back to the effect 1, this results in:

$$ct \sim m.(2 - 2^{1/2}) \qquad (3)$$

Now both sides in expression (3) are divided by r_s (the schwarzschild-radius):
$ct/ r_s \sim (m/r_s).(2-2^{1/2})$ and because m/r_s can be rewritten in 1/2 (c^2/G), the result is:
$ct/ r_s \sim 1/2\ (c^2/G)\ .\ (2-2^{1/2})$
$ct/ r_s \sim c^2/G - (0.5\ .2^{1/2}).\ c^2/G$
$c^2/G \sim ct/ r_s + (0.5\ .\ 2^{1/2}).c^2/G$

substitution in 1.2 results in:

$$ct \sim \left\{ \frac{ct}{r_s} + \frac{(0.5\ .2^{1/2}).c^2}{G} \right\} .\ T_s$$

$$ct \sim \frac{T_s\ ctG + r_s\ T_s\ (0.5\ .2^{1/2}).c^2}{r_s\ G}$$

$$ct \sim \frac{2T_s\ ctG + r_s\ T_s\ c^2\ 2^{1/2}}{2r_s\ G}$$

$2\ r_s\ G\ ct \sim 2T_s\ ctG + r_s\ T_s\ c^2\ 2^{1/2}$
$2\ r_s\ G\ ct - 2T_s\ ctG \sim r_s\ T_s\ c^2\ 2^{1/2}$
$2t\ (r_s\ G\ c - T_s\ c\ G) \sim r_s\ T_s\ c^2\ 2^{1/2}$

$$2t \sim \frac{r_s\, T_s\, c^2\, 2^{1/2}}{r_s\, G\, c - T_s\, c\, G}$$

$$t \sim -\frac{r_s\, T_s\, c^2\, 2^{1/2}}{2\, G\, c\, (r_s - T_s\,)} \qquad (4)$$

This is time (t) to observe evaporation-radiation from both black holes. Whether this is a large or small black hole depends on r_s and T_s. For $r_s >> T_s$ (which is a large black hole) follows:

$$t \sim \frac{0.5\ c\ 2^{1/2}\ .T_s}{G}$$

The restriction means: $r_s = 2mG/c^2 >> T_s$, so, $m >> 0.5\ .\ (c^2/G)\ .\ T_s$.
But because $T_s \sim 1/m$ than follows $m >> 0.5\ .\ (c^2/G)\ .\ 1/m$.
So, than the restriction changes in :
$m^2 >> 0.5\ .\ (c^2/G)$ which means $m^2 >> 0.5\ \ .1.36\ \ .10^{27} >> 0.068\ .\ 10^{28}$
This means one sun-mass of 2.10^{30} [kg] imaginated as a blackhole, is a large black hole.
The time (t), with the restriction of $T_s \sim 1/m$, results in:

$$t \sim \frac{0.5\ c\ 2^{1/2}}{mG} \qquad (5)$$

The dimension is $[m/s]\ /\{[kg].[m^3/kg.s^2]) = [s/m^2]$.
So, to translate time in seconds (this means to enable observation in reality), a multiplication is necessary with the unity of a blackhole-surface, which is an elementary surface quantum O_e [m²]. From this follows:

$$t = \frac{0{,}5\ c\ 2^{1/2}}{mG}\ .\ O_e\ [s]$$

O_e can be replaced by $(L_{planck})^2 = hG/c^3$

$$t = \frac{0.5\ c\ 2^{1/2}}{mG}\ .\ \frac{hG}{c^3}\ [s]$$

From this follows:

$$\mathbf{t = 0.5\ .2^{1/2}\ .\ \frac{h}{mc^2}\ [s]} \qquad (6)$$

So here is the time to have a unknown chance of observing radiation of a large blackhole. This is determined by Planck's constant (h) and Einsteins energy E= mc². This was expected. Then the other restriction $r_s << T_s$.
Now I define time as (t'), because in principle, it is different from time (t).
Then starting again from formula (4):

$$t' \sim \frac{0.5\ c\ 2^{1/2}\ r_s\ T_s}{G\ (r_s - T_s\ )}$$

Now the case is: r_s is neglectable to T_s (a small black hole):

$$t' \sim \frac{0.5\ c\ 2^{1/2}\ r_s\ .T_s}{G\ .\ (-\ T_s\ )}$$

$$t' \sim -\ 0.5\ r_s\ .\ \frac{c\ 2^{1/2}}{G}$$

In this I substitute $r_s = 2mG/c^2$.

$$t' \sim -0.5\ .\ \frac{2mG}{c^2}\ .\ \frac{c\ 2^{1/2}}{G}$$

$$t' \sim -\ \frac{m\ 2^{1/2}}{c}\ [kg]\ /\ [m/s]\ =[(kg/m).s]$$

Again (t') must be expressed in seconds, but now for a small black hole.
So, it must be divided by *the dimension of massdensity [kg/m*]. But by what value?
The is this: a small black hole exists, when a Planckmass and light, are both present at the same time, so $(hc/G)^{1/2}$ [kg] . c [m/s] is actual. Moreover the Planckmass is defined at the Plancklength, so also (1/c). $(hG/c)^{1/2}$ .c [m.(m/s)] = $(hG/c)^{1/2}$ [(m/s).m] must be actual.
To get a volume [m^3] of a small blackhole per second, $(hG/c)^{1/2}$ [(m/s).m] must be taken per 1 m/s, or multiplied by 1 [s/m].

The reult is $(hc/G)^{1/2}$ [kg] / {$(hG/c)^{1/2}$ [(m/s).m] .1 s/m}]= $(hc/G)^{1/2}$. $(hG/c)^{-1/2}$ = c/G [kg/m]. So, to get the time (t') for a small black hole, there must be divided by c/G [kg/m], or multiplied by G/c [m/kg]. This will express (t') in seconds.

The result is:

$$t' = -\ \frac{m\ 2^{1/2}}{C}\ .\ G/c\ [s]$$

$$\mathbf{t' = - \frac{m\,G\,2^{1/2}}{c^2}\ [s]} \qquad (7)$$

Now the time to observe a small black hole is determined by G and c^2 , while m must be negative to get positive time. This defines my information-subpoint-particles in my darkfield, where -m is the returned-information of small black holes.
After having found two time-durations for observing a small and large blackhole, I introduce the duo-time factor, called DQT-factor, which means both time-durations will be connected. The 'Q' stands for a detailed chance below Quantumlevel.
I have found two times (t) en (t'), which connect to E x t' working opposite to E x t .

The result is:

$$DQT = - \frac{G\,2^{1/2}}{c^2} .\ m.\ 0.5\ .2^{1/2} .\ \frac{h}{mc^2}$$

This can be rewritten:

$$DQT= - \frac{G\,c\,2^{1/2}}{c^3} .\ m.\ 0.5\ .2^{1/2} .\ \frac{h}{mc^2}$$

This makes possible to replace (hG/c^3) [m^2] in O_e [m^2]. So than follows:

DQT= - m . O_e . c. $1/mc^2$

DQT= - O_e /c [m.s] (8)

Intermezzo: Could both times ever be equal to each other? No ! Accept in an empty universe, or a universe which hasn't started yet. I will show this:

$$- \frac{G\,2^{1/2}}{c^2} .\ m = 0.5\ .2^{1/2} .\ \frac{h}{E}$$

$$0.5\ .2^{1/2} .\ \frac{h}{mc^2} + \frac{G\,2^{1/2}}{c^2} .\ m = 0$$

$$\frac{0.5\ .2^{1/2} .\ h\ .\ c^2 + Gmc^2.\ 2^{1/2}}{c^2\ mc^2} = 0$$

$$\frac{c^2(0.5\ .2^{1/2} .\ h + Gm.)\ 2^{1/2}}{c^2\ mc^2} = 0$$

$$\frac{2^{1/2}\,(0.5h + Gm^2)}{mc^2} = 0$$

With the restriction of $Gm^2 >> 0.5h$, or let us say $Gm^2 >> hc$, or $m^2>>hc/G$, or $m^2>> m^2_{Planck}$ this is giving the following derivation:

$$\frac{2^{1/2}\,Gm^2}{mc^2} = 0$$

$$\frac{2^{1/2}\,Gm^2}{mc^2} = 0$$

$$\frac{G\,2^{1/2}}{c^2} \,.\, m = 0$$

This can only be for m = 0. Thus only both times can be equal if there are no masses. This means both times are only equal for small black holes, which loose all their radiation. Under these circumstances there are no blackholes to give radiation.
And in the other case:

$$\frac{2^{1/2}\,(0.5h + Gm^2)}{E} = 0 \text{ , with } Gm^2 << 0{,}5h\text{, follows:}$$

$$\frac{0.5\,.2^{1/2}\,.\,h\,[J.\,s]}{E\,[J]} = 0\,[s]$$

In this expression there is energy E in the dimension [J], so in the expression $0.5\,.2^{1/2}.\,h$ [J. s] = 0 only the time can be 0. If E=0 and the time is finite, than the result would be infinite, but that is not the case, it is 0. So “the time dimension must be = 0”, and that means the universe had not yet started. *Anyway this also proves that the universe had a finite energy before it started***.**

Now I continue:
Both times can not be equal to each other. It always demands a DQT-factor to be a product, which gives an unknown chance to observe the radiation after a time (t') and (t), for a small and large blackhole. I subsitute the DQT-factor in the product of energy and time: $U = (E \times t)\,.\,(E \times -t') = E^2\,.\,t.-t' = E^2.\,DQT = E^2\,.\,-O_e/c\;[J^2.m.s] = [(J.s)^2.m/s]$.
Those two forms of "energy x time", symbolize the 100 % unknown chance of observing a large and small blackhole simultaneously. This co-existence of two different blackholes in

one moment, means: Obtaining an energy (U) for one black hole, for which (U) has to be divided by 2, as follows:

$U = 0.5 \,.\, E^2 \,.\, - O_e /c = E^2 \,.\, - O_e /2c$ [J².m.s] =[(J.s)².m/s]

The energy (U) is a temporal energy from below quantumscale, because the source of the energy is orinormally from inside the black hole. Therefore (U) has anti-gravitational features. Thus, to get a real presentation of the new energy, I have to accept the existence of E and U together at "the same time".
In other words: The Cosmos exists of having a chance to be involved with Einstein's energy and the returned information from an unknown energy force. This is resulting in the next equation:

$U_u = E \,.\, U = mc^2$ [J]. $E^2 \,.\, - O_e /2c$ [J².m.s]

This introduces:
My dark energy force formula:
$\mathbf{U_u = - 0.5 \,.\, E^2 \,.\, mcO_e}$ **[J³. m.s] = [(J.s)³.m/s²] = [(kg)³.m⁷/s⁵]** (9)

In this formula $E^2= E^2_{kin} + E^2_0$ is embedded. There is also a dark matter impuls (mc) as part of a dark matter flow (1/2 mc O_e) [kg.(m³/s)]. In total the sign is "-", which means there is a repulsive gravitational property: dark energy force.

The dimension [(J.s)³.m/s²] shows a three dimensional spin (J.s), which accelerates (m/s²). This represents a force in a torus geometry of dark energy and dark matter.

Moreover, my formula can be be rewritten furthermore in:

$U_u = -0.5 \,.\, E^2 \,.\, mcO_e$ [(kg)³.m⁷/s⁵]
$U_u = -0.5\, m^3c^5O_e$ [(kg³.(m³/s)] . 1 [m⁴ /s⁴]
$U_u = -0.5\, m^3c^5O_e$ [(kg³.(m³/s)] . 1/G [N] (10)

From this follows:

dark energy force formula:
$U_u = - (c^5O_e /2G) \,.\, (m)^3$ [(kg.m)³.N/s] (11)

Here c is the lightspeed, G is the Newton-constant, $O_e = (L_{planck})^2$ and m is mass.
Control of the dimensions:

$\{[m^5/s^5] \,.\, [m^2]\} / \{[m^3] / [kg.s^2]\}\ [kg^3] = \{[kg^3]. [m^7/s^5]\} \,.\, \{[kg.s^2] / [m^3]\} = [kg^3].$
$\{[kg] \,.\, [m^4/s^3]\} = [kg^3]. \{[kg] \,.\, [m/s^2]. [m^3/s] = [kg^3]. N \,.\, [m^3/s] = [kg^3 \,.\, m^3] \,.\, [N/s] =$
$\mathbf{[(kg \,.\, m)^3] \,.\, (N/s)]}$

“Thought-experiment and formulas” are designed and owned by Dan Visser, Almere, Netherlands, First published on April 10, 2004 in my website [1]

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