ON GRAVITATION

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ABSTRACT: This paper describes the process of gravitation in terms of an inflow process of matter into material bodies, with a rate over time corresponding to Hubble's cosmical constant, H. The source of this flux is the thermal radiation in space of 2.7 K, known as the background radiation of space.

SOME HISTORICAL FACT

Newton was one of those men who understood that celestial objects were effected by an invisible force, the same force which attracts earth-bounded objects to the surface of the earth. With the aid of astronomical data for planets and stars, he formulated the gravitational law of force between massed objects. It is given by the relation :

$$F = M1.M2.G/D^2$$

The formula asserts that the attracting force between two objects is in direct proportion to the product of their masses and in inverse proportion to the square of the relative distance between them, multiplied by a cosmic constant, G, the gravity constant, determined by Newton himself on an empirical basis.

Commonly, we experience the force of gravity as a very strong force by comparison with other force effects known in nature. However, in fact, the force of gravity is the weakest force of them all. If we, for instance, compute the force developed on the same piece of matter, firstly in respect to the gravitational force and then in respect to the electrostatic force actuated at the same distance, we will find a large discrepancy. With the purpose of elucidating this fact, we may make a small calculation of the force relationship between these two kind of forces. We take two electrons as our reference masses. Using Coulomb's law of force we get :

$$Fe = \frac{e^2}{4.Phi.Eo.D^2} = \frac{(1.602E-19)^2}{4.Phi.8.85E-12.D^2} = 2.3x10^{-28}/D^2$$

where we are making use of the MKS system of units. From Newton's law of gravity, we have :

$$Fg = \frac{me^2.G}{D^2} = \frac{(9.106E-31)^2 . 6.67E-11}{D^2} = 5.53x10^{-71}$$

Hence the relation between these two forces is :

$$Fe/Fg = 2.3\times10^{-28} / 5.53\times10^{-71} = 4\times10^{42} \quad \text{approximately}$$

What is known, Newton himself never suggested any origin and cause for the force of gravity. He accepted that this force was of cosmical nature, an action-at-a-distance, activated by some unknown physical mechanism inherent in the nature of matter. In spite of all efforts since the days of Newton, this deep secret of nature still remains unsolved.

A remarkable property of the G-force is that this force does not seem to be activated by any properties of matter unless the matter content: as for example, chemical structure, heat, mass density, electrical or magnetic charge, state of aggregation (solid, liquid or gaseous states), content of energy, state of motion, and so on. Only the matter content together with the relative distance between bodies actuates the gravity force.

But there have been speculations about other factors which may supersede these facts. For some years ago Roland von Eötvös' experiment of 1889 regarding the true equivalence between "heavy" and "inertial" mass was repeated and there was reported some small discrepancies. However, up to now, these results have not been finally confirmed.

There exist also speculations that the gravitational force is not constant according to time. For instance, Dirac's theory of 1938 contains such a supposition, but no experiments have confirmed it as yet.

In modern physics one tries to connect particle physics with the existence of different kinds of forces existing in the physical world, including the force of gravity. The idea is that the gravity force is caused by intermediating particles, gravitinos, in a similar way to that in which photons create electromagnetical interacting forces. Not even these theories have proven successful.

And at last, Einsteins' general theory of relativity, which include the gravitation, described only as a curvature in the space time, hence any active force at all. Perhaps this theory describes gravitation in a more proper and exact mathematical way than Newton's theory, but it does not in any way explain gravity as a physical phenomenon.

THE NEW THEORY Common background

One important reason why the riddle of gravity has not yet been finally solved is perhaps that the gravity process is of a very complex nature and

where so many other things in fundamental physics are involved in its final solution.
Our basic idea is that the force emanates from a free thermal or electromagnetic field in space, disturbing elementary particles in "ordinary matter" by an inflow process. We identify this field as the thermal background radiation at 2.7 °K and the rate of inflow equal to the Hubble constant, H, with an approximate value of 3x10E18 s^-1.
Also involved as a base hypothesis is that light is made up of pure particles having mass, meaning that all of Newton's fundamental laws work on them. That means that light hitting the surface of a particle will create impact forces as well as even thermal energy on them.
It will here be accentuated, that there is not the impact force from the free thermal field which directly causes the gravity force. The base potential which creates the enormous gravity forces is actuated by the vacuum itself with a pseudo material mass density of 1/Eo (see ref. 7 ....).

MATHEMATICAL DERIVATION

With the help of Stefan Boltzmann's law, we begin by converting this mechanical impact energy of the thermal field, colliding with elementary particles in matter, to entities of mechanical energy according to:

1) $$dP/dA = T^4.S$$

where S is Stefan Boltzman's constant, T is absolute temperature in space, dA is the interaction area of the target, dP is the thermal or mechanical effect developed on the target. If the inflowing amount of matter from the cosmical field per unit time is denoted by the symbol, dm , and the velocity by which this matter interacts with an elementary particle is denoted as , v, we can compute the mechanical energy generated by the inflowing matter as:

2) $$dp= 1/2.(dm/dt).v^2$$

We suppose here that the interaction velocity of the inflow is lower than the limit velocity of light, c, in this case Newton's formula for kinetic energy is valid. The common hydromechanical formula for a material inflow over area, dA , as function of the flowing density, qf, velocity, v , and time , t , is given by:

3) $$dm = v.qf.dA.dt$$

We insert the result of 3) into 2) and obtain:

4) ==========

$$dP/dA = 1/2.qf.v^3$$

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We combine 4) with 1), obtaining:

5) ==========

$$qf = 2.T^4.S/v$$

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Now we have an expression that provides relations between the mass density, qf , of the thermal field, T , as a function of the interacting velocity, v, and Stefan Boltzman's constant, S.

The next step is to find a process by which the inflow matter from the thermal field reacts with elementary particles in "solid matter". Mass in "normal solid matter" mainly consist of protons and neutrons, the mass content of all electrons being negligible in this context. It is therefore here natural to state that the interacting velocity, v, is equal to, or nearly equal to, the spinning velocity of a proton and that this inflow matter will create disturbances in the spinning movement of these fundamental particles, causing a slowing down effect on them.

Hence, each hit of a randomly inflowing electromagnetic particle from the field (a photon) in the first step will cause a disturbing effect on the form of a retardation of the spinning movements and as a secondary effect, an absorbing of matter into the particle as a consequence of change in balance between particle and the surrounding vacuum space (space with density 1/Eo = 1x10e11 kg/m^3 , see ref.7)

Further, this absorption of matter will create a corresponding absence of matter around the body and this effect is spread in the vicinity, disturbing another mass body situated at some distance from it by a pushing effect.

Our hypothesis is that a mass quantity of, dmt , is absorbed by a body of mass, m ,during time, dt. During time, T, the absorbed mass constitutes the mass of the body by itself, hence the time where the body has doubled its own mass.

6) ==========

$$dt/T = dmt/m$$

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We designate the relation 1/T by the symbol R, representing that the frequency by which the mass body doubles its mass content in the gravitational field. This gives:

7) ==========

$$R = dma/(m.dt)$$

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Out hypothesis now is that R corresponds to Hubble's cosmical constant, H , having the same definition, namely the dimension of frequency 1/t or s^-1 . The retardation effect of spin movements in matter in relation to the amount of the inflowing matter from the thermal field and the mass content of the particle itself, gives:

8) ==========

$$dmt/mp = dv/v = H.dt$$

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where we denote the rest mass of a proton by mp and the retardation of velocity derivative as, dv . Using out inflow mass formula (3), we put the absorbed mass dmt equal to :

9) ==========

$$dmt= qf.Ap.v.dt$$

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Combining (9) with (8) gives :

10) ==========

$$H.dt = qf.Ap.v.dt/mp$$

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which can be rewritten as:

11) ==========

$$qf = H.mp/(Ap.v)$$

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Now we have found two expressions, (11,5) for the thermal field mass density, denoted by , qf . We combinde these two expressions and solve out the interesting velocity, v , out from it:

12) ==========

$$v = SQRT(2.T^{4}.S.Ap/(H.mp)$$

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The last step is to deduce Newton's gravitational law of force. We make use of our hypothesis of the absorption effect in matter. Our base hypothesis is, that matter is absorbed at a rate, R, equivalent to the Hubble constant, according to (7) above.

We begin by computing the total inflow of matter to a body with a total weight content of matter M1 and having the total interacting area of A1. By our mass flowing formula:

13) ==========

$$dM1 = qx.A1.t.v$$

==========

which is in agreement with the inflow formula (7,8), giving:

14) ==========

$$M1.H.t = qx.A1.t.v$$

==========

From this result we can calculate the inflow density very near the limiting area of M1, giving :

15) ==========

$$qx = M1.H/(A1.v)$$

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However, this mass density will decline as a function of distance. The inflowing mass will be spread over an inflowing area at distance D,

equal to Ad = 4.Phi.D^2, giving the field mass density at distance, D:

16) ============================

$$qD = qx.A1/Ad = M1.H/(v.Ad)$$

============================

where Ad = 4.Phi.D^2 .

Another mass body M2 situated at the point, D , because of the absorbed mass , M1, will be effected by a negative inflow since M1 steals mass from M2. We compute this negative inflow to :

17) ======================================

$$dM2 = qD.A2.t.v \quad ; \quad A2 = (M2/mp).Ap$$

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where A2 is the total interacting area of M2. We multiply both sides by, v, giving:

18) ==========================

$$dM2.v = qD.A2.t.v^2 = F.t$$

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Using the results of (16,17) gives :

$$F = qD.A2.v^2 = M1.H/(v.Ad).A2.v^2 = M1.H/(v.Ad).(M2/mp)).Ap.v^2 =$$

$$(M1.M2/D^2).(H.Ap.v/(4.Phi.mp)) \quad \text{or}$$

19) ==================================

$$F = (M1.M2/D^2). (H.Ap.v/(4.Phi.mp)$$

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Comparing this result with Newton's gravitation law of force, we can identify the expression within the parentheses as Newton's gravity constant, G . Hence:

20) ==========

$$G = (H.Ap.v/(4.Phi.mp))$$

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The proton, being of torus form, having a radius of Rp gives the proton interacting area equal to Ap = 2.Phi.Rp.2.Ph.Rp, giving :

21) ==========

$$Ap = 4.Phi^{2}.Rp^{2}$$

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Our hypothesis is, that electrons and protons have the SAME INHERENT MASS DENSITY, giving the proton radius:

21) ==========

$$Rp = (Mp/me)^{1/3}.re$$

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We make a summary of important formulae that have been obtained, from which the gravity constant G, can be calculated:

22) ==========

$$Rp = re.(Mp/me)^{1/3}$$

$$Ap = 4.Phi^{2}.Rp^{2}$$

$$v = T^{2}.(2.S.Ap/(H.mp))^{1/2}$$

$$G = H.Ap.v/(4.Phi.mp)$$

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where:

$S = 5.6703 \times 10^{-8}$	Stefan Boltzman's constant
$T = 2.7\ ^{o}K$	Thermal background radiation temperature
$re = 2.8179380(70) \times 10^{-15}\ m$	Classic electron radius
$me = 9.109534/47) \times 10^{-31}\ kg$	Electron rest mass
$c = 2.99792458(1.2) \times 10^{8}\ m/s$	Limit velocity of matter
$mp = 1836.15152(70) \times me$	Proton rest mass
$G = 6.6720(41) \times 10^{-11}$	Newton's gravity constant
$H = 3 \times 10^{-18}$	Hubble constant (approximative)

On inserting given parameters, the following table is obtained :

INSERTED VALUES		CALCULATED VALUE OF G -11 TO BE COMPARED WITH 6.6720×10^{-11}
T ^{o}Kelvin	Hx10^{-18} s	G kg^{-1} m^{2} s^{-2} in the MKS(A) unit system
2.7	3.0	5.0×10^{-11}
2.7	5.26 *	6.67×10^{-11}

* The exact value of the Hubble constant is not known. New indications point in the direction that H is larger than E-18, see ref. 5 and 6.

THE COSMICAL DOPPLER RED SHIFT FROM DISTANT CELESTIAL OBJECTS.

The idea that the gravity process is founded on an inflowing process in ordinary matter is here based on an interacting process with mainly elementary particles of protons and neutrons. It is not clear that the process can be applied to all sorts of matter, for instance light particles such as photons, but if we suppose that the gravity process is the same for all kinds of matter, some old classical problems of cosmology can be solved in an attractive way.

Such old problems are: the red shift from distant celestial objects, Olber's paradox ;
the creation of new matter in a steady state universe.

The cosmological red shift from very distant celestial objects can then be interpreted as s slowing down effect of light travelling long distances (using the model of light as being a wave of matter, not a *wave in a light-bearing aether).

The wave-length of the travelling wave is constant but the frequency varies in time with the slowing down effect on the light velocity ; hence :

23) ==========

$$f1 = w/c \quad ; \quad f2 = w/c'$$

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where c' = c-dc. This gives a small shift in frequency of light to:

24) ==========

$$df = f1 - f2 = fo.(1 - c/c');$$

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The original mass of the outflowing photon from the source has the mass , m , and during the flight time , t , this mass has increased by an entity , dm. The mass impulse is supposed to be constant with time, giving:

25) ==========

$$m.c = (m+dm).c' \quad ; \quad c'/c = m/(m+dm) = 1+dm/m$$

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Using our definition of Hubble's constant, H=R, as in (7), this gives:

26) ==========

$$c'/c = dm/m = (dm/m)/t = 1+H.t$$

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and according this with result of (24):

27) ==========

$$df = - f0.H.t$$

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which shows a frequency Doppler shift of long travelling light from distant celestial objects as resulting from a slowing down effect on light.

In the Hubble formula for cosmical red shift as a function of distance (time, t, is transformed to distance by d = c.t), a shift in frequency of light, as here calcualted, is replaced with an equivalent shift in wavelength. But that makes no difference in measurements made by spectrometers.

Stretching this idea we can see the process by which new matter in the universe is continuously created by an inflow process from vacuum matter. During each period of about 10-15 billions of years, the mass in a body (the earth for example) has doubled its content; during the following period the original mass would have increased by four times its initial value (a logarithmic mathematical function).

By the same process, long travelling light outburts from distant stars and galaxies will decline in time, losing their inherent energy. What remains is only a common electromagnetic noise which we now observe as the common background thermal radiation of 2.7 °K.

Hence, this is the common link of distant interaction between celestial objects, resulting in the process of gravitation as here briefly described.

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