

THE PRINCIPLE OF INDUCTION FOR THE MEDIUM OF DARK MATTER BASED ON  
SAKHAROV'S QUANTUM LAW

Derivation of the substitution principle for spherical symmetry

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*Abstract*

*By using Einstein's presentation of the event horizon for Newton's law gravity is arranged as the induction law for the medium of ultra fast and light dark matter consisting of pseudo vector cells and based on Sakharov's law of quantum mechanics. Derived are the substitution transformations of the coherence length of the dark matter cells and applied to the mediating mass between electron and proton. The implications of the dark matter wavelength to the event momentary state of a macro mass as a dynamic parameter for gravity generation is also subjected to a product rule to the inertia of the macro mass.*

*Par 1 The law of gravitational induction for the intermediate medium*

For an intermediate medium in which the maximum velocity always is below the light velocity  $c$ , the gravitational induction law can be valid. The induction is the extraction of entangled energy in the medium around a macroscopic mass  $M$ . If the atoms in  $M$  are spread over infinity then the stored energy of the medium is balanced to the electromagnetic energy in the individual atoms. So the maximum contraction of the medium up to  $c$  velocity around  $M$  is the event horizon given by

$$\lambda c^2 = G M \quad \text{according to Einstein with } \lambda \text{ the event radius. (Schwarzschild)}$$

Applied is the uncertainty condition for momentum

$$m_\lambda = h/(c \lambda)$$

Giving:  $m_\lambda M = h c / G = m_{pl}^2$  Sakharov's relation (1.1)

with  $m_{pl}^2 = hc / G$  Planck's mass and  $G$  the universal constant of gravity.

So  $m_\lambda M = \frac{1}{2} m_{pl}^2$  if the maximum velocity is  $\frac{1}{2} c_{eff}$ , the effective velocity due to acceleration in the medium up to a projected end velocity of  $\frac{1}{2}\sqrt{2}c$ .

The above supposition is that a free moving medium without electromagnetic intervention never reaches the  $c$  velocity. Therefore an effective velocity  $\frac{1}{2}c_{eff}$  pointing to a projected end velocity of  $\frac{1}{2}\sqrt{2}c$  due to acceleration of a pseudo vector cell. So it seems that only at least pairs of cells can reach the  $c$  state within electrons or atoms. Taking the consequence of this supposition means that the work or labour for the external pseudo medium is proportional to  $\frac{1}{4}c^2$  while the entangled energy in the medium points to  $\frac{3}{4}c^2$ . See (ref.1)

Applying the inductive law for any radius  $R$  around the gravity source according to Newton's law of gravity is:

$$m_v M = \frac{1}{2} \beta_v m_{pl}^2 \quad (1.2)$$

With  $\beta_v = v/c$   $\frac{1}{2} v^2 / c^2 = \lambda / R$  and  $\lambda c^2 = G M$   
Then eliminate  $R$  and  $\lambda$  from  $m_v \beta_v R = h / c$  (1.3)

So the gravitational induction seems to be valid for any radius around the mass  $M$ . In other words quantum mechanical induction for a spherical radius is the reason why possibly the substitution principle can be applied around a gravity source.

*Par 2 The ad hoc postulation of the substitution principle for gravitational induction*

The ad hoc condition for gravity induction is that the tangential velocity  $v_b$  is equal to the radial velocity  $v_g$  at any radius  $R$  giving:  $\{abs(v_b) = abs(v_g)\}$  subjected to the uncertainty condition. From this condition and the definition of the substitution principle it is possible to derive the two entanglement transformations needed to understand the spherical quantum induction process of the

intermediate medium. The reversed manner is mathematically complicated, namely to prove that the tangential and radial velocity are equal at R knowing the transformation relations and as a consequently giving the centripetal force of a point mass in a circular orbit.

Firstly note that the tangential velocity is constant at a spherical surface and  $4\pi$  is the integration constant for the surface in a spherical coordinate system of angular coordinates  $\varphi$  and  $\theta$  for the z-direction. Then the tangential velocity has to be inversely proportional to  $R^2$  of the surface with R the radius to the g-source.

What one has to show is that there exists a transformation  $R^2 = \lambda R_{lin}$  to be consistent with the inverse proportionality of the tangential velocity.  $R_{lin}$  represents coherence of the dm medium along this radius. The real R is the entangled state which is proportional to  $R_{lin}$  the coherence parameter.

Take Newton's law:  $g(R) = G M / R^2$  with  $\lambda c^2 = G M$   
 Normalize to c as work or labour:  
 $g(R) R_{lin} = \frac{1}{2} c^2$   
 Eliminate  $g(R)$   $(G M / R^2) R_{lin} = \frac{1}{2} c^2$   
 Giving:  $\frac{1}{2} R^2 = \lambda R_{lin}$  *the 1<sup>st</sup> entanglement transformation* (2.1)

Secondly define the substitution principle. Two momentum vectors  $R_g$  and  $R_b$  in fig 4 represent the uncertainty condition for the momentum which are respectively the radial and the tangential direction with respect to the g-source.

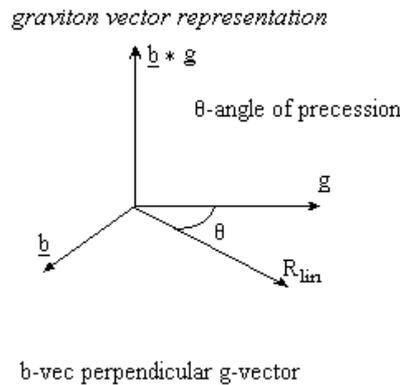


Fig 1

Then according to fig 1:

Define:  $R_g = R_{lin} \cos \theta$  and  $R_b = R_{lin} \sin \theta$   
 $m_{sub} v_{sub} = m_g v_g + m_b v_b$  then  $1 / R_{sub} = 1 / R_g + 1 / R_b$  (2.2)

And  $m_{lin} R_{lin} = h/c$   $m_{sub} v_{sub} R_{sub} = h m_v R = h/v$   $m_\lambda \lambda = h/c$

Introduce again Newton's velocity distribution:

With  $R^2 = \lambda R_{lin}$   $\beta_v^2 = v^2 / c^2 = 2 \lambda / R$   $\text{mod } v = \underline{v_b} = \underline{v_g}$   $\underline{v_b} \times \underline{v_g} = \underline{0}$  (2.3)  
 $v^4 / c^4 = 4 \lambda^2 / R^2$   $v^4 / c^4 = 4 \lambda / R_{lin}$  (2.4)

With a guess of the 2<sup>nd</sup> transformation:  $\lambda^2 = R_{sub} R_{lin}$  and elimination of  $\lambda$  in (2.3):  
 $v^4 / c^4 = 4 R_{sub} / \lambda$  (2.5)

Obvious elimination of  $v^4 / c^4$  gives:  $\lambda^2 = R_{sub} R_{lin}$   
 Check for self consistency:  $v^4 / c^4 = 4 \sqrt{(R_{sub} / R_{lin})}$  by elimination in (2.4) the  $\lambda$  parameter given by 2.6.

The 2<sup>nd</sup> entanglement transformation  $\lambda^2 = R_{sub} R_{lin}$  is correct. (2.6)

In case  $\lambda = R_{\text{sub}}$  then a contradiction to above (2.3) to (2.6)

Take the 2<sup>nd</sup> power of  $R^2 = \lambda R_{\text{lin}}$  and elimination of  $\lambda$  with  $\lambda^2 = R_{\text{sub}} R_{\text{lin}}$   
 $R^4 = R_{\text{sub}} R_{\text{lin}}^3$  (2.7)

The 4<sup>th</sup> power in R shows that two transformations of entanglement are needed to generate our spherical symmetric reality. Further if  $\lambda$  is constant then the substitution angle  $\theta$  is constant for every radius R.

In the sense of physics the 2<sup>nd</sup> entanglement transformation  $\lambda^2 = R_{\text{sub}} R_{\text{lin}}$  is interesting due to it spans the entire spherical volume around the gravity source because it is independent of R meaning  $R_{\text{sub}}$  and  $R_{\text{lin}}$  suggest to be the summation of all R's between  $\lambda$  and infinity. However also  $R^4$  relation in (2.7) is also interesting in case one considers  $S^2 = R^4$  as an atomic cross section used to explain coulomb charge induction into a string of quantum magnetic flux of  $\phi = h/2e$  driven by the mediating fast medium always in coherence for gravity generation. (ref 2)

*Par 3 Derivation of the mediating mass. Applications of the laws of gravitational induction.*

Apply the relations between electrostatic energy and mass energy of a particle. For the electron and the proton is valid:

$$m_e c^2 > e^2 / (2\epsilon_0 r_e) \quad m_p c^2 > e^2 / (2\epsilon_0 r_p) \quad (3.1)$$

Defining:  $r_e / \lambda_e = r_p / \lambda_p = e^2 / (2\epsilon_0 hc) = \alpha$  (the fine structure constant)  
 the condition solely valid for the dark matter medium.

The balance of force with the pseudo vectors:

$$f_e = e^2 / (2\epsilon_0 r^2) \quad \text{idem for } f_p$$

The acceleration of ( $a_x$ ) is constant with respect to the electron and proton So each  $a_e$  or  $a_p$ .

The derivation of the mediating mass with its two limits follows here. The uncertainty principle applied to the proton and electron defines the generalised Compton length:

$$m_e c \lambda_e = h \quad \lambda_e = h / (m_e c) \quad \lambda_p = h / (m_p c) \quad (3.2)$$

The self energy of the particles balanced against the potential energy of a unit electric charge is ( $\epsilon_0$  is the vacuum dielectric constant):

$$f_{ge} = G m_e M_e / \lambda_{ge}^2 = m_e a_e = G m_{pl}^2 / \lambda_{ge}^2 = hc / \lambda_{ge}^2 \quad (3.3a)$$

$$f_{gp} = G m_p M_p / \lambda_{gp}^2 = m_p a_p = G m_{pl}^2 / \lambda_{gp}^2 = hc / \lambda_{gp}^2 \quad (3.3b)$$

The relations ( $m_e M_e = m_{pl}^2$  and  $m_p M_p = m_{pl}^2$ ) follow the induction law.

So the balance of force determines the radii of ( $\lambda_{ge}$  &  $\lambda_{gp}$ ) with respect to the Compton length.

$$\begin{aligned} r_e / \lambda_e = \alpha & \quad \text{and} \quad \alpha \lambda_e = \lambda_{ge} \\ r_p / \lambda_p = \alpha & \quad \text{and} \quad \alpha \lambda_p = \lambda_{gp} \end{aligned}$$

Applying the conservation of angular momentum on above relations of ( $\lambda_{ge}$  &  $\lambda_{gp}$ ) and taking into account the half spin, one arrives at:

$$\lambda_m^2 = 1/4 \lambda_{ge} \lambda_{gp} \quad \text{so} \quad m_m^2 = m_e m_p / 4\alpha$$

The mediating mass is expressed in the proton and electron:

$$m_m^2 = m_p m_e / 4\alpha \quad \alpha = \text{fine structure constant.} \quad (3.4)$$

Hydrogen

$$M_H = 1837.153 m_e \quad (\alpha = 1/137.036) \quad \text{giving } m_m = 250.8082 m_e \quad m_e \text{ the electron mass.}$$

Helium

$$M_{He} = 1825.063 m_e \quad m_m (\text{He}) = 249.947 m_e$$

Subtract the electron mass from  $M_H$  or  $M_{He}$  to find the calculated  $m_m$ .

The generalised mediating mass of any neutral atom is the same expression but one divides the mass of the atom through the atom mass number for all neutrons and protons in the atom then giving the effective proton mass of the atom with respect to one electron. Apparently the generalised mediating mass is a vacuum constant which varies slowly over the range of atoms, about 1% while the effective proton mass of the atom varies about 2%.

#### *Comment*

The meaning of the generalised proton mass as feature of the ultra light dark matter should be understood for coherent gravity generation in a macro mass subjected to the magnetic quantum wavelength by the event wavelength of this macro mass in which the mediating mass plays a role between the exchange of radial and angular momentum at every radius R defined in par 1.

#### *Par 4 Discussion of Sakharov's quantum law for the derivation of dark matter induction*

Sakharov's energy balance for 'photons', apparently separated electric charge and magnetic energy, represents the coherence of matter in case a macroscopic mass M is compressed to the event horizon of  $\lambda$ . These dark matter 'photons' have no zero mass but have to be matched to the electromagnetic energy of the event wavelength. So apply Sakharov's law of the ultra fast medium

$$\text{with } \begin{matrix} m_\lambda M = m_{pl}^2 \\ \lambda = h / (m_\lambda c) \end{matrix} \quad \text{but also} \quad \begin{matrix} \lambda c^2 = G M \\ m_{pl}^2 = h c / G \end{matrix} \quad (4.1)$$

Sakharov's induction law is the impulse of momentum of dark matter and in the sense of mathematics a equality.

$$\sqrt{m_\lambda} M = m_{pl}^2 / \sqrt{m_\lambda} \quad (4.2)$$

Although the  $\sqrt{m_\lambda}$  term seems impossible, the left hand side is the part of the exchange of photon energy and the right hand side the impulse part of dark matter. Dark matter is defined as the intermediate medium between matter carried by electric charge generating photons virtual or real. The coherent 'photons' in rel 3.1 seem to be virtual and imaginary as a supposition. This external medium of dark matter, ultra fast and ultra light, around a gravity generating source M is a dynamic induction process and a reaction to the electric charged matter. The proof will be published shortly.

The induction law of Sakharov seems to be simple enough that the involved physics can only be understood by common sense reasoning. Apparently no other theoretical options are available to explain the impact of the parameter  $\sqrt{m_\lambda}$  or  $\sqrt{m_{um}}$ .

The induction impulse condition is given by:

$$m_{sq} M_{sq} = m_{pl}^2 \quad M / \sqrt{\lambda} = M_{sq} \quad \text{or} \quad m_{sq} \sqrt{M} = m_{pl}^2 \quad (4.4)$$

while  $\sqrt{m_\lambda}$  is not allowed because  $(\sqrt{h})$  cannot be and  $m_{sq}$  defined as  $m_{sq} = h / (c \sqrt{\lambda})$

$M_{sq}$  is not trivial but not further discussed here while  $\sqrt{M}$  can be synchronised or in coherence to the definition of  $m_{sq}$ .

The intermediate medium has to comply to this condition which is not an energy balance but the crossover of the induction parameters  $m_\lambda$  and  $m_{sq}$  with  $m_{ext} = \sqrt{m_\lambda}$  the quant of coherent dark matter in exchange to M with the induced mass  $M_{sq}$  "seen" by the medium of dark matter. The dark matter condition has to be  $\sqrt{m_\lambda} = h / (c \sqrt{\lambda})$  as the only option which means that a nonlinear interaction happens then based on the derived substitution principle. See par 2. So  $\sqrt{m_\lambda}$  cannot be  $\sqrt{\{h / (c \sqrt{\lambda})\}}$ .

Above consideration determines that coherent gravity generation has to a dynamic process of alternation which Sakharov's law already stated. Apparently split M into two groups of atoms where  $M = N m_{at}$  and  $\sqrt{M} = \sqrt{N}$ . Or more sophisticated, use the mediating mass  $m_m$  as the go between the electron and the proton or generalised proton determined by the medium. For the square root of the event one needs to find a manner of exchange. But in any case if  $\sqrt{\lambda}$  is not equal to  $m_{sq1}$  and  $m_{sq2}$  but a close induction loop can be constructed between  $\lambda_{sq1}$  and  $\lambda_{sq2}$  either that or eventually a third  $\lambda_{sq3}$  is needed. Consequently the product rule for exchange between  $M_{sq1}$  and  $M_{sq2}$  is required.

$$(\sqrt{M} - M_{sq1})M_{sq2} = (\sqrt{M} - M_{sq2})M_{sq1}$$

Where  $\sqrt{M}$ ,  $M_{sq1}$  and  $M_{sq2}$  are either to be expressed in either the number of generalised protons or the mediating state of  $m_m$ . Due to electric charge induction converted into magnetic quanta of  $\phi = h/2e$  this dynamic process in synchronisation could in theory work. With  $M_{sq1} = N_{sq1} m_m$  as is  $M_{sq2}$  .(ref 2)

#### References

- Ref 1: <https://vixra.org/abs/2304.0227> Derivation of the cosmic energy balance for an ultra light and fast pseudo vector medium for dark matter
- Ref 2: To be published. Coherent induction of coulomb charge for magnetic flux strings by the ultra fast and light dark matter medium

Website: <https://gravitation-levitation-physics.org/>

Website: <https://universal-creation.org/>

Metaphysics due to the impact of the mediating medium of dark matter on humanity.

<https://vixra.org/abs/2302.0135> Provisional proof between Planck's parameters to the giant groups symmetries of Monster, Baby monster and Fischer 24.

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