THE RECIPROCAL TRANSFORMATION BETWEEN ALPHA AND OMEGA CONDITION OF THE STEADY STATE UNIVERSES AND EXERCISING THE HOLLOW SUPER MASSIVE BLACK HOLES

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Abstract
In the previous paper ref 1 the group symmetric relation of $(24^3 \times \sqrt{2} \times 6)^2 = 1.375941\ 10^{10}$ *years for the age of the universe was stated and not derived. Further also the reciprocal transformation of one year is 8677 or 5 x 1728 = 8640 hours, as it seems as a group symmetric number and determining the time scale of a galaxy around a super massive black hole was used, which was not understood and let alone derived. This will be remedied here in par 1.*

Another subject also treated in ref 1 was the initial condition, apparently generating the super massive black holes in time sequence for an initial macro mass of $M_{40} = 4.4587\ 10^{40}$ *kg compromising the entire universe. The state of these BH from* M_{35} *to* M_{40} *consequently releasing superfluous dark matter as galaxy matter, was not checked provided these BH states where really possible from the view of the weak gravity condition for the intermediating dark matter medium. This is remedied in par 2.*

The appendix shows some work from around 2017, about the LIGO gravity wave detection of colliding black holes.

Par 1 Derive the steady state age from the number of galaxies in the universe

Strange as it may be, but for a steady state universe is valid that if the initial condition is a sequence time string of black holes then it includes the end condition too. It means that what we observe as past as faraway galaxies, it is also the present to future because we observe galaxies recently generated far away from us.

Every nearly steady state galaxy is supposed to be occupied by a super massive black hole which initially originated from $M_{40} = 4.4587\ 10^{40}$ kg about 20 billion solar masses. In the derivation the reciprocal transformation of one yr = 8640 hrs is used.

The first transformation is $24^3 \times \sqrt{2} \times 6 = 1.17300\ 10^5$ hrs and has to be expressed in years but shows here to be in hours. It has to be a consequence of the reciprocal transformation. In the previous paper *ref 1* the number galaxies per universe was derived $1.412266\ 10^{11}$ galaxies.

Take the spatial space for $1.17300\ 10^5$ yrs giving $(1.1730\ 10^5)^3 = 1.868014\ 10^{11}$ yrs.
Divide by the number of galaxies $1.868014\ 10^{11} / 1.412266\ 10^{11} = 1.322707$ yrs /galaxy
While $(1.097710)^3 = 1.322707$ and $1.097710 = 1.031563^3$ giving $1.031563^2 = 1.064122$
The last factor is not a ratio but in yrs corresponding to 1.06122 x 1728 = 1838.803 yrs. Apparently equivalent as a sequence time ratio for neutron rest mass to m_e ,the electron mass. It is only due to the steady state the age as a constant that this time equivalent should be valid. Everything is group symmetric related, so also the 1838.684 ratio for the neutron. Or expressed as the dark matter medium as to be behave as a qubit quantum state.

Second check
A similar scaling seems to be valid for the reciprocal transformation. Again take a special time cube space in yrs $8640^3 = 6.449725\ 10^{11}$ divide by the number of galaxies:

$$6.440725\ 10^{11} / 1.412266\ 10^{11} = 4.566933 / 3 = 1.522311 / 1.5 = 1.014874$$

While 1.014874 corresponds to the genuine monster deviation of $1.002453^6 = 1.014812$. the small error has to be due to some kind of truncation in the used constants of nature. Again this result is only allowed due to the steady state condition in the age of the universe.

The cubic power of 8640 is way out compared to the group symmetric number of the age of $1.375941\ 10^{10}$ yrs. The ratio: $6.449725\ 10^{11} / 1.375941\ 10^{10} = 46.87501$
Meaning that $6.45\ 10^{11}$ yrs determines the virtual contracted space of all universes together and not the age per universe. In comparison to the alpha or initial condition in hours is:

$$1.412266\ 10^{11} \times 27.7128 = 3.913784\ 10^{12} \text{ hrs}$$

For above explanation of steady state it should be allowed that the number $3.9138\ 10^{12}$ should be valid also in the time scale of years. With $(\sqrt{3})^7 = 46.76537$ giving deviation for 46.87501 of 1.002344 which is close enough to 1.002453.

This result determines that instead of 8640 yrs per galaxy only 8640 /46.87501 = 2396.256 yrs are the cubic dimensions of spatial space around a galaxy where the nearly 24 hundred light years correspond to about the present-day nucleus of galaxy matter.

The result can be reasoned reverse, namely the supposition that 2400 yrs per galaxy allow the age of the universe as 2400 yrs times the number of galaxies consequently stating that this is also the omega end condition for the universes which was the aim of exercise.

So in this manner the reciprocal transformation of 8640 hrs for one year is as well a group symmetric number as a jump transformation for the initial steady state of atoms or proton/ electron to the time age of the nucleus for a galaxy $\{(\sqrt{3})^7\}^{1/3} = 3.602810$ and $3.602810 \times 2396.256 = 8633.255$ yrs. So indirectly the jump transformation as a whole determines the age of universe multiplied by the number of galaxies. The jump transformation should correspond to the inflationary period scientifically accepted in astronomy. The jump transformation can be understood as that in one year of 8677 (8640) hours the state of dark matter/ baron-quark mass has been reached while simultaneously the space expansion for the galaxy nucleus was reached in 2400 yrs.

Par 2 The momentum balance between gravity and angular momentum for the hollow black holes

The exercise is to show the validity of the momentum balance for the weak gravity condition between the angular and gravity momentum even for a super massive black hole. In the solar calculations *ref 2* at present-day it was discovered that the dark matter radius of the mediating medium for angular momentum coincided with the outer radius in equivalence to a string of electrons subjected to the radial gravity momentum. So the equivalence became the equality to calculate the steady state condition for dynamic gravity generation between the momentum for gravity and angular momentum. The equality is:

$$g\ h/c\ N = m_e\ 2\pi\ c/\sqrt{\lambda}\ R$$

The gravity force g is at outer radius of the sun, m_e the electron, $\sqrt{\lambda}$ is the square root of the event because the macro mass M is split in dynamics coherent alternation in to $\sqrt{M}$ as per Sacharov's law of dark matter induction. The parameter (h/c) is the gravity force equivalent to the angular momentum. N is the number of mediating atoms (corresponding electrons) in coherence forming the dark matter cells of $\sqrt{\lambda}$ –frequency.

For the black hole condition the electron rest mass has to be replaced by the mediating mass of the proton and electron, the coherent state of degeneration of atoms in general converting from the normal state to the one in conjugation. The axial force of as well the strong as the weak force within proton and electron respectively represent to two opposite acceleration vector components of the pseudo vector cells making supposedly conjugation with the electric charge possible. In fact conjugation is defined as a charge swap of a particle maintaining the same spin.
The validity of the conjugation is expressed in the substitution equality for the mediating mass:

$$1 / 1837.153 + 1/250.8082 = 1 /220.6808 \qquad \text{(related to the electron rest mass)}$$

With 1837.153 the H atom rest mass, 250.8082 the mediating mass and 220.6808 the conjugated state of the atom in terms of the mediating medium. The mediating is: $m_m^2 = \frac{1}{4}\, m_{at}\ 137.037$. With 137.036 the reciprocal fine structure of the electron with respect to the Fermi spin.

Apply the Hartree potential of the H atom: $4.35975\ 10^{-18}$ Joule rel (2.1)
Divide by 4π for correction to the magnetic equivalence of the potential: $3.4694\ 10^{-19}$ Joule with respect to the quantum flux of $\phi = h/2e$.
Take the mediating mass ($m\ c^2$):

$$250.8082 \times 9.109\ 10^{-31}\ c^2\ (1.136500 - 1) = 2.80150\ 10^{-12} \text{ Joule}$$

Determining the additional energy for conjugation. With $250.8082 / 220.6808 = 1.136520$

The ratio between the normal state and conjugation is: $2.80150^{-12} / 3.4694\ 10^{-19} = \underline{8.0749\ 10^6}$
This ratio seems great enough to execute coherent conjugation and further be treated in par 3.

As before in dynamic gravity generation, the mediating dark matter medium, the macro mass is separated into two or three atomic states subjected to the square root rule of the event wave length controlling the electromagnetic energy drive. One of the fast states relaxates to the inertia condition of the atoms while the other becomes active. Both states subjected to the product rule of the two or three states due to the division of the macro mass in part of $\surd$M. The fast states are due magnetic Lamb shift excitation coherent in such a manner that the dark matter state behaves as a rigid rotor.

Here in this paper only the equivalence condition for momentum is exercised. The dynamics with respect to the square root rule for the number of mediating atoms in coherence is not considered but discussed in par 4 ‘comments’.

Par 3 The actual momentum calculations for the hollow black holes in general

In this paragraph one finds the scaling calculations for three super massive black holes and the one for the solar mass with event 1500 m and contracted to 6000 m which turns out too small to make life internally possible but solar contraction to 3000 km internally and 6000 km outside is certain able within reach. The contraction to 4 times the event radius is valid for all black holes.

All black holes consisting of degenerated dark matter in coherence have a minimum outer radius of 4 λ with λ the event wavelength and 2λ the inner radius. At the event radius internally the electromagnetic interference for the sphere is generated maintaining the loss less or nearly lossless dynamics of alternation between the mediating ultra fast coherent states. It seems likely the incident propagation of to and from the 2λ radius is always 45° with respect to either side of an outgoing radius from the centre.

It is only due to the BH calculations for M_{40} that as well as the conversion energy due to conjugation together with the requirement of 4λ outer radius turned out to be the proper choice to set up the BH parameters for the hollow super massive black holes.

The calculation of the momentum balance between gravity and angular momentum:

$$g\ h/c\ N = 251 \times 9.109\ 10^{-31}\ 2\pi / \surd\lambda\ \ R^n$$

Most times the dark matter radius R can be n = 1 or n = 2. Only for Earth by trial and error turned out n = 5 for the fast rotation or echo distance of the dark matter frequency.
This impulse frequency has to be in equilibrium to the inertia rotation of the BH macro mass:

$$\tfrac{1}{2}\ M\ (1 - \tfrac{1}{4})\ c^2 = 10/4\ M\ \omega^2\ (16\ \lambda^2 + 4\lambda^2)$$

Where $(16\ \lambda^2 + 4\lambda^2)$ inertia momentum of a hollow sphere. Knowing the M and λ , the cycle frequency ω can be calculated.

Used constants:
All parameters as macro masses and others are derived in *ref 1*
$G = 6.67233\ 10^{-11}$ (m^3/kg sec^2) $c = 2.997246\ 10^8$ m/sec $c^2 / G = 1.34\ 6378\ 10^{27}$
Uncertainty condition $h/c = 2.2100\ 10^{-42}$ $\mu_o = 1.25664\ 10^{-6} = 4\pi\ 10^{-7}$

The hollow super massive black hole M_{40}

$M_{40} = 4.4587\ 10^{40}$ kg $\quad \lambda = 3.3116\ 10^{13}$ m $\quad g = GM/\lambda^2 = 2.713\ 10^3$ m/sec^2

$2\pi\ c/\sqrt{\lambda} = 327.\ 23$ cycles/sec $\quad \lambda^3 = 3.3632\ 10^{40}$ m^3

Number of mediating atoms: $\quad N_o = 4.4587\ 10^{40} /250.8082 \times 9.109\ 10^{-31} = 1.95162\ 10^{68}$

$\sqrt{N_o} = 1.3970\ 10^{34}$ Sacharov's law as maximum separation for dynamics.

Momentum equality:

$g\ h/c = 5.9952\ 10^{-39}$ N $= 250.8082 \times 9.109\ 10^{-31} \times 327.23 \times 3.3116\ 10^{13} = 2.4757\ 10^{-12}$

$N = 4.1295\ 10^{26}$ Accelerated mediating cells converting into angular momentum.

The first trial calculation was with truncated figures as 251 and 5.1 10^{-7} which had to be corrected as follows:

Hartree magnetic equivalence based on Lamb shift of $\lambda = 5.06016\ 10^{-7}$ m per H atom, *see above rel (2.1):*

$3.4696\ 10^{-19}\mu_o = B^2\ \lambda \quad \sqrt{(4.36\ 10^{-25} / (5.06016\ 10^{-7})^3\ \}} = 2.377\ 10^{-22}$ B $\quad (2.405\ 10^{-22})$

With B the magnetic induction per cubic metre. Applied to fully magnetized mass:

$\mu_o\ M\ c^2 = B^2\ \lambda^3 \quad 5.0334\ 10^{51} = B^2\ 3.632\ 10^{40} \quad B_{max} = 3.723\ 10^5$ Tesla

So $\quad 2.377\ 10^{-22}/N = B \quad$ with $\quad B_{max} = 3.723\ 10^5$ T $\quad N = 1.5663\ 10^{27}$ mediating cells

The conversion ratio for conjugation is $\underline{8.0749\ 10^6}$ making:

$1.3970\ 10^{34} / 1.5663\ 10^{27} = 8.9191\ 10^6 \quad$ ratio: 1.050973^2

$1.050973 /1.050818 = 1 /1.000148$

$1.5663\ 10^{27} /4.1295\ 10^{26} = 3.793 /4 = 1 /1.054587 \quad 1.054587 /1.050818 = 1.003586$

May be farfetched: $\quad \sqrt{1.002453} = 1.001225 \quad 1.001225^3 /1.003586 = 1.00094$

The ratio 144 /137.036 = 1.050818 is from the internal time sequence of three μ-pseudo vector neutrinos of the electron determining the reciprocal fine structure constant.

Note first trial calculation pointed to this scaling and looked better adapted.

The division by four suggests 4 times the event state.

So shown is that all stated parameters are in some agreement with the determined macro mass in *ref 1.*

Further elaboration is not continued because M_{40} cannot be too common in our cosmos.

Reminder

The initial super massive white radiator of M_{40} relaxates to galaxies having a super massive BH in which the state of the dark matter also consisting of barons around the BH is in equilibrium with the event horizon which is within the 4λ-boundary of the BH.

The super massive black hole M_{37}

$M_{37} = 7.273\ 10^{37}$ kg $\quad \lambda = 5.4019\ 10^{10}$ m $\quad g = G\ M/\lambda^2 = 1.66302\ 10^6$ m/sec^2

Vol $= \lambda^3 = 1.5763\ 10^{32}$ m$^3 \quad 2\pi\ c/\sqrt{\lambda} = 8.1027\ 10^3 \quad$ times $251 \times 9.109\ 10^{-31} = 1.8526\ 10^{-24}$

$1.8526\ 10^{-24} \times \lambda = g\ h/c = 3.675\ 10^{-36}$ N $\quad N = 2.723\ 10^{22}$

$1.8526\ 10^{-24} \times \lambda^2 = 3.675\ 10^{-36}$ N $\quad N = 1.4709\ 10^{33}$

$N_o = 7.237\ 10^{37} /251 \times 9.109\ 10^{-31} = 3.181\ 10^{65} \quad \sqrt{N_o} = 5.6401\ 10^{32} \quad N(\lambda^2) > \sqrt{N_o}$

Magnetic energy volume for M_{37}:

$M\ c^2\ \mu_o = B^2$ vol $\quad 6.2105\ 10^{48} = B^2 \times 1.5773\ 10^{32} \quad B = 2.2823\ 10^8$ T

B per m^3: $\quad 2.405\ 10^{-22} = B/N \quad N = 9.490\ 10^{29}$ So $N < \sqrt{N_o}$

Extend above to outer radius of 4λ then $g' = g/16$ and $\lambda' = 4\ \lambda$

$3.675\ 10^{-36}\ N' = 1.8526\ 10^{-24} \times 64\ \lambda \quad N' = 1.743\ 10^{24}$

$B = 2.405\ 10^{-22}\ N' = 419.2$ T $\quad$ Closed hollow cube torus: vol $= (64 - 8)\lambda^3 = 56\ \lambda^3$

$B^2/\mu_o\ 56\ \lambda^3 = 1.234\ 10^{45} < M\ c^2$ Joule.

Re do above for $\sqrt{N_o}$:

$3.6753\ 10^{-36} \times 5.6401\ 10^{32} = 1.8526\ 10^{-24}\ \lambda'^2 \quad \lambda'^2 = 1.119\ 10^{21} \quad \lambda' = 3.345\ 10^{10}$ m

Where λ' < λ which is allowed because 2λ < λ'< 4λ and resides in the spherical thick shell of dark matter. So the dark matter radius λ' allows frequency doubling.

The super massive black hole M_{35}

$M_{35} = 1.18645\ 10^{35}$ kg $\lambda = 8.812\ 10^7$ m $g = 1.0194\ 10^9$ m/sec^2

$g\,h/c = 2.253\ 10^{-33}$ $251 \times 9.109\ 10^{-31} \times 2\pi c / \sqrt{\lambda} = 4.587\ 10^{-23}$

$N_o = 5.1893\ 10^{62}$ $\sqrt{N_o} = 2.278\ 10^{31}$ $\lambda^3 = 6.843\ 10^{23}$ m^3

Momentum equality:

$2.253\ 10^{-33}\ N = 4.587\ 10^{-23}\ \lambda^2$ $N = 1.581\ 10^{26}$

Take the constant magnetic induction per m^3: $2.405\ 10^{-22} = B / N$ $B = 3.802\ 10^4$ T

Re do above momentum balance for λ'= 4λ , dark matter thickness of hollow sphere 2λ :

$(2.253\ 10^{-30} / 16) \times N' = 4.587\ 10^{-23} \times 4\ \lambda^2$ $N' = 64 \times 1.581\ 10^{26} = 1.012\ 10^{28}$

$N' < \sqrt{N_o}$ $B^2/\mu_o\ 56\ \lambda^3 = 4.41\ 10^{40}$ Joule torus volume: $(64 - 8)\lambda^3$

Again frequency doubling is possible. No magnetic flux conservation applied. Torus geometry is lossless to outside 'world'.

Calculate the inertia rotation frequency:

$3/8\ M\ c^2 = 10/4M\ \omega^2\ (24\lambda^2)$ $\omega = 0.27$ cycles per sec

Compared to $(c / 4\lambda)^2 = 1.51\ 10^{-10}$ sec or 6.6 2 G Hz of the fast impulses generated by dm rotor which is contracted in the dynamics of the coherent cells of 2λ layer inside outer radius of 4λ.

Earth contracted to a hollow black hole

$M = 2\ 10^{30}$ kg $\lambda = 1500$ m $g = G\ M/\lambda^2 = 5.931\ 10^{13}$ m/sec^2 $g\,h/c = 1.311\ 10^{-28}$

$\omega = 2\pi\ c/\sqrt{\lambda} = 4.871\ 10^7$ cycles /sec $251 \times 9.109\ 10^{-31}\ \omega = 1.114\ 10^{-20}$

$N_o = 2\ 10^{30} / 251 \times 9.109\ 10^{-31} = 8.748\ 10^{57}$ $\sqrt{N_o} = 9.353\ 10^{28}$

The magnetic induction constant per m^3 for $\sqrt{N_o}$:

$2.405\ 10^{-22} = 9.353\ 10^{28}\ B_{max}$ $B_{max} = 2.250\ 10^7$ Tesla

$B_{max}^2 / \mu_o \times 1500^3 = 1.351\ 10^{30}$ Joule torus volume multiply by 56

Note, not applied magnetic flux conservation for torus expansion.

By trial and error, take $R_5 = 6000^5 = 7.776\ 10^{11}$ as frequency multiplier for the dark matter radius.

$1.311\ 10^{-28} / 16\ N_5 = 1.14\ 10^{-20}\ R_5$ $N_5 = 1.057\ 10^{28} < \sqrt{N_o}$

Ratio $N_5 / \sqrt{N_o} = 8.847$ $1.5465^5 = 8.847$ $1.5465 / 1.5 = 1.0310$ $(1.0310^2 \times 1728)$

Again $2.405\ 10^{-22} = 1.057\ 10^{28}\ B'$ $B' = 2.543\ 10^6$ Tesla $B' < B_{max}$ Earth mass is about the minimum macro mass for a black hole. The deviation of 1.0310^2 multiplied by the quark cell is allowed especially since the sun is the smallest black hole in nature also accepted in relativistic physics.

Calculate Earth's condition of size of radius 610^6 m for the sun as hollow coherent degenerated mass

$g = 3.707\ 10^6$ m/sec^2 $g\,h/c = 8.192\ 10^{-36}$

$8.192\ 10^{-36}\ \sqrt{N_o} = 1.114\ 10^{-20}\ R^2$ $R^2 = 6.88\ 10^{13}$ $R = 8.293\ 10^6$ m $> 610^6$ m

For $R = 6\ 10^6$ m then $N' = 4.896\ 10^{28}$ mediating cells $< \sqrt{N_o}$

Also B_{max} is allowed

$B_{max}^2 / \mu_o\ (6\ 10^6)^3 = 8.70\ 10^{40} < (1.8\ 10^{47} = M\ c^2)$ Joule

So it shows that the contraction of the dark matter radius to the fifth power is highly unlikely. To prove that only the 2nd power for the dm radius is valid in general is more difficult.

Par 4 Comments

Why is the classification for the supper massive black holes between M_{40} and M_{35} not based on $M_{35}' = c^3 / G$ with the event of λ having the value of c in meters? The ratio M_{35}' / M_{35} is about 3.4. The reason is that the number of galaxies is based on M_{40} which would give a shift of 3.4 in macro mass. This in turn would influence the number of galaxies while this number was this discovered to correlate with the qubit number of 2^{40} per meter for the electron. *See ref 1.*

Further analyses are needed to show the super massive black holes of the same mass are coupled between the universes which should be a consequence of the line density between the BH-states $M/\lambda = c^2/G$, of course determined in higher order approximation for gravity waves as feedback energy exchange.

In the above paragraphs the first step of the validity for the weak gravity condition for black holes has been shown. The dynamics, Sacharov's square root law, of the dark matter rigid rotors due to atomic coherent magnetization, has not yet been in planted. For normal gravity situations the electron is driving the coherent states of the rigid rotors consisting of the ultra fast mediating dark matter. The dynamic parameters then are: $\sqrt{2}$, $\sqrt{3/2}$, $\sqrt{4/3}$ compromising the square root frequencies of the event wave length and the angular momentum up to the square power of these numbers for energy. In total a matrix of nine elements in which combinations for the escape velocity and the boundary condition can be made. *Ref 3.* Due to the conservation of angular momentum and magnetic flux conservation the hollow structure of the huge macro masses, the spontaneous contraction to the super massive black holes can be expected. For the conjugated state of these masses the dynamic matrix of the nine parameters is guessed to be: $\sqrt{3/2}$, $\sqrt{4/3}$, $\sqrt{1.136520}$. The last is the mediating mass ratio of 250.8082 / 220.6808 as mentioned above. Apparently the huge masses generate a preference for the two conjugated states in the BH, namely $(\sqrt{1.5})^{1/3} = 1.144714$

$1.144714 / 1.13652 = 1.007209$ and $1.15700 / 1.144714 = 1.008723$

The fine structure constant: $(1 + 1/137.036) = 1.007297$ making 1.007209 sufficient close enough.This all has to be sorted out in the near future.
Keep in mind the dynamics of the square root law does not affect the inertia state of the atoms in the macro mass generating gravity.

References
Ref 1: https://vixra.org/abs/2309.0046 Genesis completed! The steady state qubit universes.

Ref 2: https://vixra/abs/2305.0078 Exercises on dark matter mediation for the solar parameters.

Ref 3: https://gravitation-levitation-physics.org Exercises 11 to 13

APPENDIX

The appendix is an exercise between normal and conjugated gravity. The last defined having a direction of acceleration as the opposite of normal gravity. These exercises were around 2017 instigated when the LIGO gravity wave interferometer the collision of two black holes monitored. The pseudo vector treatment of black holes consisting of a inner and outer event horizon looked promising. The inner horizon having opposite gravity to the outer one. These exercises gave insight to the classification of the smaller black holes as well to the super massive ones. The gravity model was dynamic and one state of the degenerated mass of dark matter was conjugated with respect to the normal state. The model always had a neutral force free radius between both the events. The classification was due to the consequence that the inner BH radius could never be zero. In the following the scaling calculations are given. Even as this BH model is not realistic, the fact that the inner horizon could not go to zero provided the classification also observed for black holes in astronomy.

Beginning the appendix without changing the numbers of the paragraphs

Par 3.1 Derivation of the reciprocal parameters. Pseudo vector inversions

The power reduction for the pseudo vector cells is based on four parameters between Planck's constants and the two constants of the electron which are reduced to the two constants of the line density of momentum. Note [ ] brackets for analysis of dimensions in this paragraph.
First step

$m_{pl} / \lambda_{pl} = 1.346685\ 10^{27}$ and $m_e / \lambda_e = 3.754028\ 10^{-19}$ [kg/m]
$m_{pl} / \lambda_e = 2.248442\ 10^4$ [kg/m]

While m_q / λ_q is the reciprocal line density of quarks derived from m_{pl} / λ_e .
Because $1.346685\ 10^{27} / 2.248442\ 10^4 = 2.663804\ 10^{18}$ [kg/m] the reciprocal of (m_e / λ_e)

$m_{pl} = 5.456035\ 10^{-8}$ $m_e = 9.109462\ 10^{-31}$ [kg]
$\lambda_{pl} = 4.051453\ 10^{-35}$ $\lambda_e = 2.426583\ 10^{-12}$ [m]
Ratio $m_{pl} / m_e = R_{22} = 5.989415\ 10^{22}$ For proof, see Bk1 chap 3

Numerical symmetry:

[kg/m]	ratio	[kg/m]
$1.346685\ 10^{27}$	$5.989415\ 10^{22}$	$2.248442\ 10^4$

Division of the line density m_{pl} / λ_{pl} by R_{22} gives m_{pl} / λ_e while R_{22} divided by m_{pl} / λ_e gives the numerical reciprocal of the electron density but it is dimensionally a line density. Note,
Proven in Ref 1 Bk1 chap 2 in the cubic vector of $\sqrt{2}$ and the relation to the electron density of
$\delta_e = 1.002490 \text{ x } (\sqrt{2})^3 \text{ x } 2.248442\ 10^4$ [kg /m^3]

Second step
Numerically Planck's line density determines the ratio of the event radius to BH mass.
Apply the static BH expression of 3.1:
$M_{54} / L_{coh} = c^2 / G = m_{pl} / \lambda_{pl}$ $M_{54} \sim L_{coh} \text{ x } L_{coh}$
(~) equality due to vector product according to the definition of time coherence in par 3.1.
Or $M_{tot} = M_{54} = N_{coh}\ L_{coh}$ M_{tot} is product of N_{coh} Planck's filaments. See cover.

$M_{45} / L_{cross} = c^2 / G$ $M_{45} \sim R_{22} \text{ x } R_{22}$ giving L_{cross}
Ratio R_{22} converted to a vector length allowed, by taking '*step one'* for granted.
Ratio $M_{54} / M_{45} = 5.055493\ 10^8 = L_{coh} / L_{cross}$

Now all numerical values are derived in the dimension of a length. See also definition at cover.
$L_{coh} = 1.346685\ 10^{27}$ $L_{cross} = 2.663804\ 10^{18}$ $L_G = 5.055493\ 10^8$ [m]

Postulation of the absolute vector density for the pseudo matter holes
The critical mass exactly corresponding to the dimensions of a Schwarzschild hole or static BH is:
$M_{pl} / R_{pl}^3 = \delta_{pl}$ making $M_{pl} = R_{pl}^4$ by applying rel 3.1 par 3.0.
$M_{pl} = 1.487148\ 10^{36}$ [kg] $R_{pl} = 1.104304\ 10^9$ [m] $(R_{pl})^3 = 1.346685\ 10^{27}$ m
Making $\delta_{pl} = 1.104304\ 10^9$ [kg/m^3] the effective density for the onset of the calculation of any alternating spinning pseudo matter black hole.
This shows that the one radius of a static BH represents three equal pseudo vector components each of different nature. So the components of spin, external acceleration and precession determine the coherent pseudo matter internally. Such a hole can only exist provided the three components are different and meet an opposing acceleration determined by – G.

Par3.2 The simplified interference model for coherent pseudo vector matter

The two matter states of R_{pl} and R_G are always in opposing each other due to the polarities of G. With respect to the coherent photon state of the horizons the composed normal pseudo cells occupy R_{pl} state for 180^o, the other 180^o is for conjugated matter, similarly for the R_G occupation. The basic phase shift for R_e is 90^o in relation to R_{pl} or R_G representing the angular momentum vector, the vector cross product. The basic photon phases for the quarks is 120^o and for the lepton cells 180^o. The whole composed state of pseudo vectors is the simplified interference model representing the overall boundary conditions between inner and outer c-horizons and synchronized by phase interference.

Table 2

Coherent lengths (m)

	$L_{un} = 1.346685\ 10^{27}$		$L_{cross} = 2.663804\ 10^{18}$		$L_G = 5.055493\ 10^{8}$	
	R_{pl}		R_e		R_G	(m)
3^{rd} rt.	$1.104304\ 10^9$	sq.rt.	$1.632116\ 10^9$		$5.055493\ 10^8$	
	δ_{pl}		δ_{pe}		δ_G	(kg/m^3)
	$1.104304\ 10^9$		$5.055493\ 10^8$		$5.269131\ 10^9$	

This table is worked out in detail in chap 4.

The three parameters in the 2nd row of table 2 are chosen to be respectively δ_{pl} , δ_{pe} and δ_G the densities in different situations of expansion and compression of the pseudo vector hole with densities defined according to rel 3.2. It means that the scalar vector product is represented by the densities. The densities have the ratios between them

$$\delta_{pl} /\delta_{pe} = 2.184360 \qquad \delta_{pl} /\delta_G = (2.184360)^2 \qquad (3.3)$$

$$R_e/ R_{pl} = 1.477958 \qquad R_{pl} /R_G = (1.477958)^2 = A^2$$

Note, the ratio A = (1.477958) is a ratio and here $A^2 = 2.184360$

Obviously these ratios are fundamental for the interference between the two opposing conjugated c-boundaries, event horizons. Apparently no higher densities in the pseudo vector matters are possible for such an oscillation system, see the discussion in chap 4.

Introduce the effective c-radius for the pseudo hole $R_c = R_{pl}$

Define R_G and R_e in the reversed order to their densities.

$R_G = A\,R_c$ and $R_e = (1/A^2)R_c$ according to δ_{pl} , δ_{pe} and δ_G .

$R_G > R_c = R_{pl} > R_e$ inverse proportional to $\delta_G < \delta_{pl} < \delta_{pe}$

For interference of opposite G's then R_G and R_{pl} are acting simultaneously in opposing directions in which the effective R_c is not moving. One region always operates in a low density pseudo vector mixture of cells while the other is the high density region.

$R_G – R_c$ low region $R_c – R_e$ high density. These are the two opposing radial paths for simultaneous expanding or compression.

Further detailed knowledge of the pseudo cell patterns is not needed in the proof of gravity wave exchange.

The intervals of $(R_G – R_c)$ and $(R_c – R_e)$ are synchronized to each other which require effective propagation velocities within the composed pseudo matter, always below c and as to be shown below the effective neutrino cell velocity which is the geometric mean of (½√2 c) becoming ½ c.

In low density the propagation is faster than in the high density region, both result in the same effective refraction index of n_{ref} .

$$R_G – R_c = (A – 1) \qquad R_c – R_e = 1 – (1/A^2)$$

$$(R_G – R_c)/(R_c – R_e) = (A – 1)/\{1 – (1/A^2)\} = n_{ref}$$

$$A = 1.477958 \qquad n_{ref} = (A + 1)/A^2 = 1.134409 \qquad (3.4)$$

This n_{ref} is a vector volume refraction index. The index in one vector direction is:

$$n_l = (1.134409)^{1/3} = 1.042933 \qquad (3.5)$$

These theoretical constants of n_{ref} and A representing the composed pseudo vector matter, are used in the next paragraph analysing the gravitational wave signal.

Due to the limit of (½ √2c) of the vacuum consisting of pseudo vector neutrinos, the overall pseudo matter is still subjected to the theory of special relativity. (A $¼c^2$ labour and ½ c^2 spin)
So in general for the pseudo cells: $m/m_o = 1/\{\sqrt{(1 - 0.25)}\}$ giving $m = 1.154700\ m_o$.

The first idea was to understand this factor of 1.154700 as the maximum volume refraction index valid in a non composed pseudo matter. Due to alternation of the pseudo matter in the black holes the above derived volume index of 1.134409 seems to be correct. It also means that the time momentum flux to the 3D phase space of time has not to be enhanced by a factor of say 1.154700. So according to Newton (½ M c^2) of spatial space is always fundamentally correct of which to time an energy flux of ½ Mc^2 disappears, all in accordance to general relativity theory, where M generates the 4D gravitational energy around spatial space.

Par 3.1 scaling calculation with respect to ½ √2c limit velocity and the absolute spin of 3/2 c^2.

The reciprocal of the constant ½√2 and the constant for the pseudo spin of quarks of 3/2 are fundamental constants in the pseudo vector analysis.
These are nearly exact with respect to ratio of A = 1.477958. Take:

$$(3/2)/1.477958 = 1.014913 \text{ and } 1.477958/\sqrt{2} = 1.045074$$

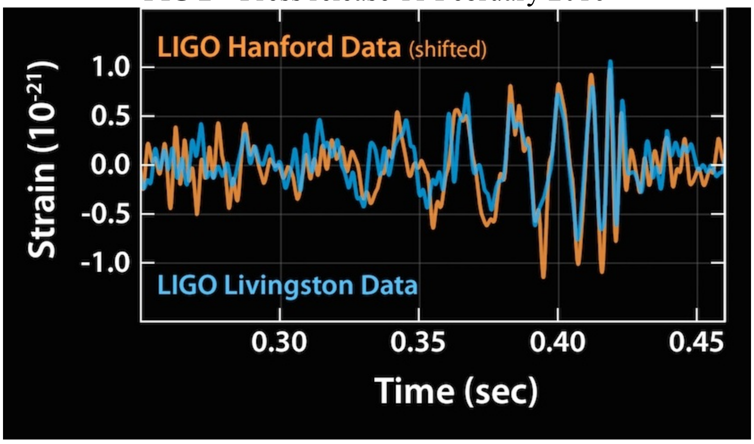
With

$$1.045412 = (1.014913)^3$$

The ratio $1.45412/1.045074 = 1.000323\ (-1) = 1/3093$ as deviation.

Par 4 The proof of equivalence between static 4D black holes and a spinning 3D pseudo vector black holes.

FIG 2 Press release 11 February 2016



Observed data from the figure. One Solar is 2 10^{30} kg, the mass of our Sun.
The two interferometer detectors show nearly coinciding signals with a difference of 7 msec due to the distance between the detectors.

1. The signal of implosion runs in 30 msec from 40 Hz to 250 Hz.
2. The signal of importance for the overall fused pseudo vector hole involves 7 peaks counted either plus or negative in the signal. The time interval is from 0.30 to 0.43 sec giving an overall difference of 130 msec.

The general relativity theory for non linear generation of gravity waves by colliding 4D- black holes determined from the implosion of the signal in increasing frequency, the incident masses of the black

holes as 29 and 30 solar and the final state as 62 with a dissipation of 3 solar in gravitational wave energy.

The coupling coefficient for the effective Riemann volume.
The Riemann volume even if it is much smaller than the actual pseudo matter hole, determines the mass loss of the pseudo hole in the conversion to 4D gravity waves. In case that the event horizon or c-radius R_c is much longer than the one of the 4D hole, it means that for the holes of 29 and 36 solar the wave interaction has an onset at R_c for the average mass of 63.5 solar. The Riemann volume is spherical symmetric for a static black hole.

Take the density $\delta_{pl} = 1.104304\ 10^9$ kg /m^3 as Newtonian density, table 2.

$$R_c = (1.27\ 10^{32} / 1.1043\ 10^9)^{1/3} = 4.863\ 10^7 \text{ m}$$

With a factor 4/3 π the spherical radius is: $R_c = 1.161\ 10^7$ m.

The final state of 62 en 3 solar gives the ratio of dissipation in gravity waves giving : 4.7244 %
So the Riemann volume coefficient can be defined as 1.047244 giving the universal conversion constant for a pseudo black hole mass into gravity waves.

1st Derivation
The theoretical derivation is shown in the previous paragraph. Take the ratios for the densities rel 3.5:

$$\delta_{pl} / \delta_{pe} = 2.184360 \qquad \delta_{pl} / \delta_G = (2.184360)^2$$

Obviously the quadratic relation is an indication for the resonance behaviour because the event horizon is inverse proportional to the density as assumed.
Determine the scaling coefficient: $(1.477958)^{1/8} = 1.050044$ $\quad (1.477958)^2 = 2.184360$

Relate to the quark spin of 3/2 c^2 and the limit velocity of pseudo vector neutrinos ½ √2 c according to par 3.1:

$$(3/2) / 1.477958 = 1.014913 \text{ and } 1.477958 / \sqrt{2} = 1.045074 = (1.014804)^3$$

Follow the 8th root scaling: $(1.045074)^{1/8} = \underline{1.005526} = 1.002759^2$
The effective calculated Riemann index is:

$$1.050044 / 1.002759 = 1.047157$$

Compare to 1.047244. The agreement is extreme good but not astonishing because the 4D black hole masses are calculated from the same signal.

Error assessment on the theoretical constants
Take A = 1.477958 and calculate:

$$A^{1/7} / A^{1/8} = 1.00700 \qquad A^{1/8} /^{1/9} = 1.005541$$

The error with above assessment is: $(1.005541 / \underline{1.005526})^8 = 1.000119$.

2nd Derivation
This calculation leads direct to the understanding of the effective Riemann index:
Take $m / m_o = 1/\{\sqrt{(1 - 0.25)}\}$ giving $m = 1.154700\ m_o$ $\quad$ ½ √2c factor.

$$1.154700 / \underline{1.005526} = 1.148354 = (1.047189)^3$$

It shows that this coefficient is vector volume related and to be associated to a hyper surface in 4D space time. Apparently in the derivations 1 and 2 the numeric values of 3/2, √4/3 and √2 plus its reciprocal are fundamental constants including the √3.

To be expected signal peaks, revolving 4D-holes, or volume oscillations of the ensemble for the composed pseudo vector matter hole.
Take for the composed ensemble the average of the two masses of 32.5 solar. Calculate the radius:

$$R_c = (32.5 \text{ x } 2\ 10^{30} / 1.143\ 10^9)^{1/3} = 3.890\ 10^7 \text{ x } \{1/(4/3\ \pi)\} = 9.2865\ 10^6 \text{ m.}$$

The 4D radius, event, is:

$6.5\ 10^{31} / 1.346685\ 10^{27} = 4.827\ 10^4$ m. $\quad$ With line density c^2/mod ($\pm$G) = $1.346685\ 10^{27}$ kg/m.

The geometric mean as effective radius for wave interaction is:

$$(9.2865\ 10^6 \text{ x } 4.826\ 10^4)^{1/2} = 6.695\ 10^5 \text{ m}$$

With 130 msec and maximum c- velocity the number oscillations could be:

$V_{130} = 0.130 \times 3\ 10^8 = 3.9\ 10^7$ m/sec as a radial inward directed velocity.

So $3.9\ 10^7 / 6.695\ 10^5 = 58.25$ vibrations.

Take instead of the c-velocity the effective velocity of a (½ c) which is the geometric mean of ½ √2 c. Due to vector symmetry of a cube volume the oscillations are organized in three independent perpendicular directions.
So at least a factor of 8 has to reduce the above calculated oscillations:

$58.25/8 = 7.281$

With the correction for the linear refraction index of 1.042933 which has to be a division.
See rel (10):

$7.281 / 1.0429 = 6.982$ truncated to 7 times error 0.3 %.

Conclusions.
Both above calculation confirm the equivalent statement for the alternating pseudo black holes and the general relativity theory for gravity waves of two colliding black holes. The onset of the 'chirp' is determined by the ½ c effective velocity of the pseudo coherent matter internally making the event radius of these pseudo holes much greater than actual sizes of the static 4D-holes which is due to mean of the dynamic density for pseudo matter internally.

The 8^{th} root scaling in the 1^{st} derivation can be associated to eight independent octants, degrees of freedom, involving composed pseudo matter at the centre of oscillation
Par 5 The inner and outer event horizon, c-radii for all alternating spinning black holes.

In the previous section par 3 it was assumed that the outward and inward going displacements of composed pseudo vector cells are synchronized interactions attuned by the volume refraction index. The leading effective density of cell matter between outer and inner boundaries, the c-radii is $\delta = 1.104304\ 10^9$ kg/m^3. These c-radii can be expressed with respect to the effective radius R_c for this density.

$R_{out} = 1.477958\ R_c \qquad R_{in} = R_c / (1.477958)^2$

For a mass M of the black hole:

$M / \delta = 4/3\pi\ (R_{out}^3 - R_{in}^3)$

$R_{out}^3 - R_{in}^3 = R_c^3\ \{(1.478)^3 - 1/(1.478)^6\} = 3.132445\ R_c^3 \qquad (3.7)$

For the largest super massive black hole of $M = 2\ 10^{40}$ kg one calculates $R_c = 1.113\ 10^{10}$ meter making R_{out} smaller than the static λ-horizon of 10^{13} m. For the Sun $M = 2\ 10^{30}$ kg then $R_c = 5.168\ 10^6$ m with a static horizon of λ =1435 m which is much smaller than R_{in} .

$3.132445 \times 4/3\pi\ R_c^3 = 2\ 10^{30} / 1.104309\ 10^9$ giving $R_c = 5.168\ 10^6$ m.

As well the outer as the inner event radius have a boundary layer of respectively 50 and 30 m in equilibrium to the external pseudo vector vacuum rapidly reducing from τ- ,μ- to e pseudo neutrinos according to calculations in chap 4.

The condition of maximum angular rotation energy is given by tangential velocity at the effective radius meaning the black hole is not a rigid rotor. The photon tangential velocity is at c for R_{out} and R_{in}.

$v^2 = \omega^2\ (R_{out}^2 - R_{in}^2) = \omega^2\ R_c^2\{1.478^2 - 1/(1.478)^4\} = 1.974778\ R_c^2$

$v = ½\ c / n_{lin}$ $\quad n_{lin}$ is linear refraction index using the maximum speed of ½√2c.

$¼\ c^2 / n_{lin}^2 = 1.974778\ \omega^2\ R_c^2 \qquad v = 1.02347\ 10^8 = \omega\ R_c \qquad n_{lin} = 1.042933.$

The tangential velocity is about 1/3 of the speed of light at R_c.

For the Sun ω = 19.8 cycles /sec at $R_c = 5.17\ 10^6$ m and for the largest super massive black hole of $2\ 10^{40}$ kg then $R_c = 1.1134\ 10^{10}$ m with $\omega = 1.0\ 10^{-2}$ cycles /sec. The λ-horizon of 10^{13} m is now larger than R_c and in comparison with the Sun where the horizon is smaller than R_c. The calculation is not relativistic corrected.

Note the classification for the range of pseudo holes is still valid, see chap 4. Although still strange the + G and – G to both sides of the shell of pseudo vector matter maintains the equilibrium between both event horizons. In the sense of physics the vector vacuum has to be in equilibrium by tunnelling through the c- boundaries of the event horizons.

Par2 The classification between small and super massive alternating black holes.

For a event horizon of $\lambda = 1.104304\ 10^9$ m and of equal density of $1.104304\ 10^9$ kg /m^3 the mass is $M = \lambda\ (c^2/G) = 1.487149\ 10^{36}$ kg or $7.436\ 10^5$ solar determining the minimum super massive black hole where c^2 /G is $1.346685\ 10^{27}$kg/m according to table 2. One solar is $2\ 10^{30}$ kg, the mass of our Sun. The event radius, horizon, of $5.055493\ 10^8$ m is the inner radius. The assumption is that an effective density higher than $1.104304\ 10^9$ kg/m^3 is not possible, although the radial density according to rel 2 chap 3 par 1 can be higher than the effective one. This is further worked out in par 4.1 and 4.2.

Following the 3rd power rule for the vector volume then a step down of $1.104304\ 10^9$ is a pseudo cell with event horizon of 1033.624 m at this density of $1.104304\ 10^9$ kg/m^3 results in a mass of M = $1.391966\ 10^{30}$ kg and by applying (2) $\delta = 1.26049\ 10^{21}$ kg/m^3 which cannot be valid. So to maintain the initial density of $1.104304\ 10^9$, one has to expand the radius, a second event radius of 1033.624 m. The calculation already derived in chap3 par 5.

Par 3.1 The instability parameter for coherent pseudo vector matter in black holes.

Now introduce the 3rd parameter for the conserved momentum fluxes of $1.346685\ 10^{27}$ and of $2.663804\ 10^{18}$ kg/m. {Momentum flux due to multiplication by (± c) of c^2 /G}. It is Planck's representation as a ratio to m_e of $p = (\lambda_e /\lambda_{pl})^{1/4} = 286.2874 \times 1728 = 4.967094\ 10^5$. It is the parameter for the absolute break down of all particles, which is about twice the value of Higgs of 142.6940 x 1728 with 1728 the conserved quark cell in expanded 3D-space.

The 4th power of p gives $5.989407\ 10^{22}$ can be an energy density of the black hole cell. Apply chap 2 par 1 rel 2:

$$\lambda^2\ \delta = 1.346685\ 10^{27} \quad \text{giving:} \quad \lambda^2 = 2.248444\ 10^4 \text{ and } \lambda = 149.9480 \text{ m.}$$

Consequently this corresponds to a minimum dipole length or event horizon which can be combined to 796.626 m giving the density of $5.055493\ 10^8$ kg/ m^3 and it has to be related to effective density of $1.1043\ 04\ 10^9$ kg/m^3, the last is the mid parameter for the conserved parameters between $1.632116\ 10^9$ and $5.055493\ 10^8$ according to the table 2.

To confirm the choice of Planck's representation, take the square root of $(\lambda_e /\lambda_{pl})$ and compare to $1.632116\ 10^9$ giving the ratio: $2.447326\ 10^{11} / 1.632116\ 10^9 = 149.9480$.
Consequently the cubic density of $(149.9480^3 = 3.371495\ 10^6)$ could be the minimum volume for the maximum of a small black hole with event of $3.371495\ 10^6$ m. Just because 149.9480 always is able to decompose in either 29.99 or 49.983 neutral pseudo cells. The mass of this black hole is $M = 4.540342\ 10^{33}$ kg or 2270 solar. Just above the observation of 2000 solar. Any dipole length as event horizon longer than $3.372\ 10^6$ m cannot pass this limit.

An instability criterion for a black hole can be either a square power or a square root for the vector or dipole alignment. So the square power of $1.104304\ 10^9$ m event horizon is equal to the square root of $M = (1.104304\ 10^9)^4$ kg. It determines a minimum for the super massive black holes.
The minimum for black holes is clear and $1033.624 \times 1.346685\ 10^{27} = 1.391965\ 10^{30}$ kg (table 2 par 2)
In conclusion the range for the small black holes has to be between $1.392\ 10^{30}$ and $4.540\ 10^{33}$ kg.

Note: The spontaneous formation of super massive BH seems to be limited by the minimum condition for super massive holes. This suggests that during the evolution of our cosmos the limited condition was active in the epoch of quasar formation, matter to conjugated matter suggesting the formation of super massive holes. Beyond the threshold of the maximum of 2270 solar the super massive black holes could exist according to the expression:

$M/\delta = 4/3\pi\,(R_{out}^3 - R_{in}^3) = 3.132\ R_c^3$

Par 3.2 The range of super massive Black holes.
The range for the super massive black holes begins with the minimum event horizon of $1.104304\ 10^9$ m and M of $1.487149\ 10^{36}$ kg but the maximum comes from another consideration for the same density of $1.104304\ 10^9$ kg/m^3.

The average mass of all the galaxies overall is:

$1.346685\ 10^{27} \times 2.03037\ 10^{14} = 2.724392\ 10^{41}$ kg.

The line density of $2.032037\ 10^{14}$ (kg/m) comes from the initial condition for the expansion of pseudo matter in our cosmos which is not calculated here, see ref 2 . The maximum mass of the black hole is about $2.72\ 10^{40}$kg or $13.6\ 10^9$ solar. Namely $2.72\ 10^{41}$ has to be divided by the same factor of approximate ten as already mentioned and to be discussed in par 5.The horizon of this black hole is $2.02\ 10^{13}$ m and the density about 3.3 kg/m^3 about 3 times 1 bar, the density of air.
Note a black hole of $12.8\ 10^9$ solar has been observed. In chap 3 par 6 the maximum mass for a galaxy is calculated to be $M_{gal}(10) = 1.736\ 10^{41}$ kg a slight difference.

In conclusion: Two categories of black holes can be distinguished. Only due to the interference symmetry between the opposing directions of the propagation of composed pseudo cells, the two horizons in the alternating black hole can be understood..

The neutron decay time.
Since it is known that the alternating super black holes defined by general relativity theory are equivalent to the alternating black holes consisting of coherent pseudo vector matter, the alternation of the exterior event horizon transforms empty space in extremely low 4D-gravity waves. This has apparently repercussions for the neutron which is marginal stable in the surrounding e-neutrino pseudo vacuum. The neutron decay time is a special case because the neutron is the only particle which has to be marginal stable in a pseudo vector vacuum. Any gravity field impulses should influence its decay time. An old question finally to be resolved. The neutron decay time is around 11.3 minutes. So calculate the black hole mass giving this instability.
Start with a cubic symmetry.

$(A_1^3 - A_2^3)\ 1.104304\ 10^9 = M$ One is the density and $\Delta = (A_1 - A_2) = 11.3 \times 60 \times c$

$3A_1 A_2 \Delta - M/\ 1.104304\ 10^9 = 0$ $A_1A_2 = A^2$

$M = 8.2175\ 10^{38}$ kg or $4.1\ 10^8$ solar. $A = 1.104304\ 10^9$

As mentioned the maximum super massive black hole is $2.724392\ 10^{40}$ kg. The super massive of minimum mass of the black hole ($1.104304\ 10^9 \times 1.346685\ 10^{27} = 1.4187149\ 10^{36}$ kg. Giving a geometric mean for mass of $1.966\ 10^{38}$ multiplied by $(4/3\pi) = 4.18877$ giving $8.235\ 10^{38}$ kg. So accurate to less than 1%. The decay time of the neutron is around the mean for the super massive black holes as a consequence of the 4D-gravitational waves passing through the pseudo vector vacuum.

In other words the statistic distribution of all super massive black holes determines a deviation in the decay time of the neutron. So it is not really a half value problem of radioactive decay. The static deviation has to be reflected in the observation for the deviation of the neutron. The statistic deviation is $\sqrt{135.6} = 11.6$, neglecting dimensions, for the population of super massive black holes.