Treo Model of Gravitation Verified Outside Solar System

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Abstract

As we observed in treo model of gravitation [9] that any body of 'm' unit masses exert a load of m^2 unit mass pressure on space matrix at it gravitational centre, which is supported by formation of a reacting gravitational sphere (kinetic coloumn of fourth dimension) formed by space matrix, and have equal number of (m^2) gravitons.

This central load dilutes gradually on space matrix outside gravitational sphere, as 2 M (=2MG) free treos mass pressure load is exerted, on its each one layer of gravitational field, where this load spreads (or distance from gravitational centre of body), equally on each of 2n-1 apex bound treos along Reduced Compton wave length of matter wave in its orbit. Thus it exerts a **load r a** on each apex bound treo, where it is **supported by equal number of v^2 kinetons in each reacting sub kinetic coloumn,** which neutralize this load.

After study of positioning pattern of all planets in 2 dimensional deformation of gravitational field in our solar system and also verifying this energy

distribution pattern in gravitational fields of all 'four outer planets' (by studying positions of their satellites)[8a] we found the same pattern when **we move outside of our solar system.**

The Earth like seven planets, were discovered by Gillon et al on 22 feb 2017, with the help of Spitzer space telescope, which were orbiting around an ultra-cool red dwarf star named as Trapist 1; present at 39.6 light years away in constellation Aquarius.

Analysis of Data [15] of seven planets of Trapist 1 (1b, 1c,1d,1e,1f,1g,1h), will be done according to treo model, to confirm the proposed quantum model of gravitation, outside our solar system.

(A) Mass of Star Trappist 1 in Kg

According to given data, *the mass of star is 0.0802 (+- 0.0073) of that of Sun or 84 times mass of Jupiter*, [15]

(a1) Mass of Trappist 1 is 0.0802 then the mass of our Sun = Mass of Sun in Kg × 0.0802 = 1.989×10^{30} Kg × 0.0802 = **159.51×10^{27} Kg**

(a2) Mass of Trappist 1 is approximately = Mass of Jupiter in Kg × 84 times = $1.8986 \times 10^{27} \times 84$ = **159.4824×10^{27} Kg**

The 159.51×10^{27} Kg mass of star is contained in spherical three-dimensional deformation of gravitational field of the star, which forms **spherical body of this star.**

(B).Mass of star Trappist 1 in terms of free treos

According to proposed model one Kg mass is made up of 1.580852×10^{94} energy particles (Free Treos) [9d]

Number of energy particles forming mass energy of Trappist 1 = 159.51 × 10_{27} Kg × 1.580852 × 10^{94} energy particles in one KG = **252.161750 × 10^{121}** energy particles (Free treos) forms Trappist 1

(C) Mass of star Trappist 1 in term of unit masses

According to treo model One unit mass have S^2 or 3.4405427169 × 10^{86} energy particles as free treos.

252.161750 **×** 10^{121} is number of free treos as mass energy in star /3.4405427169 **×** 10^{86} free treos in one unit mass. = **73.291272 × 10^{35} unit masses** in Trappist1Star.

(D) Distance of all 7 baby bodies in bound treo layers.

[According to provided data of distance in AU 10^{-3}; 11.11, 15.21, 21.44, 28.17, 37.1, 45.1, 63 (+- 13 to 26)]

1 AU = Distance of Sun from Earth = 0.9257897548 × 10^{46} bound treo layers of Space matrix from Sun, in Gravitational field (coloumn) of Sun.

(1b) Distance of first planet of Trappist 1b calculated in terms of bound treo layers = 11.11 × 10^{-3} AU = 11.11 × 10^{-3} × 0.9257897548 × 10^{46} = **1.0285524 × 10^{44} bound treo layers from star Trappist 1**

Distance of other planets of Trappist -1 (1c,1d,1e,1f,1g,1h)

(1c) 15.21 × 10^{-3} AU × 0.9257897548 × 10^{46} = **1.408126 × 10^{44} Bound treo layers**

(1d) 21.44 × 10^{-3} AU × 0.9257897548 × 10^{46} = **1.984893 × 10^{44} Bound treo layers.**

(1e) 28.17 × 10^{-3} AU × 0.9257897548 × 10^{46} = **2.607949 × 10^{44} Bound treo layers**

(1f) 37.10 × 10^{-3} AU × 0.9257897548 × 10^{46} = **3.434679 × 10^{44} Bound treo layers**

(1g) 45.01×10^{-3} AU $\times$ $0.9257897548 \times 10^{46}$ = **4.166979×10^{44} Bound treo layers**

(1h) 63×10^{-3} AU $\times$ $0.9257897548 \times 10^{46}$ = **5.832475×10^{44} Bound treo layers**

(E) Number of bound treo layers in gravitational sphere (four-dimensional deformation) of star Trappist 1

According to treo model, the gravitational sphere of any 'n' unit masses cosmic body has 'n' number of bound treo layers.

Number of bound treo layers in gravitational sphere of star Trappist 1;
73.291272×10^{35} unit masses are in Trappist 1 star = thus 73.291272×10^{35} bound treo layers ≈ (120 meter) form gravitational sphere of this star Trapist 1

(F) Position of baby bodies

In two-dimensional deformation of gravitational field of star Tappist 1

According to treo model ***First baby body*** *(Planet or Satellite) of any cosmic body (star or Planet) condenses at* ***10^{4th} quantum level of gravitational field of parent body.***

This distance from parent body to first baby body can be calculated in bound treo layers by formula (number of bound treo layers in gravitational sphere of Star × square of $10^{4\ th}$ quantum level)

In Support of the treo model, *similar to first planet of Sun i.e. Mercury (and also similar to presence of First Satellite of all four outer planets) the*
First planet of Trappist 1 is also found condenses at **0.3746166×10^4 quantum level**, and its distance from parent star can be calculated according to proposed formula.

Distance of First planet of Trappist 1 from parent star = 73.29127247611 × 10^{35} bound treo layers are in its gravitational sphere × $(0.3746166 \times 10^4)^2$ = 1.028552 × 10^{44th} bound treo layer from centre of Trappist 1.

According to treo model the gravitational sphere of any 'n unit mass cosmic body' have n layers in its gravitational sphere, which together supports its total n^2 unit mass load at its gravitational centre.

The gravitational (coloumn) field of any cosmic body is formed by union of n graviton coloumns, (in which 2n-1 graviton coloumns of 2n-1 gravitons each supporting one unit mass) are present at periphery of n layered gravitational sphere of this n unit mass cosmic body.

Compton wave length of all matter waves (2n-1 × π), in these 2 × (73 × 10^{44})-1 graviton coloumns together unite to form orbit of planet, placed at this planetary quantum level.

Or

The circumference of this planetary orbit (Reduced Compton wave length of matter wave of this planetary orbit × 2 π) as we can omit -1 from equation being very small.

(G) Circumference of ORBITS.

(RC wave length of matter wave of this planetary orbit;
Or Distance of planet from star in bound treo layers; Or radius of its gravitational coloumn up to particular planet × 2 π.) [8b]

(Circumference of orbit or Compton wave length of orbit of first planet 1b) = 1.028552 × 10^{44} Bound treos is RC wave length of matter wave in orbit × 2 π = 6.465184 × 10^{44} bound treos.

Similarly -

(1c) 1.408126 × 10^{44} RC wave length ×2 π = **8.851079 × 10^{44} bound treos**

(1d) 1.984893 × 10^{44} RC wave length × 2π = **12.476471 × 10^{44} bound treos**

(1e) 2.6079495 × 10^{44} RC wave length × 2π = **16.392826 × 10^{44} bound treos**

(1f) 3.4346795×10^{44} RC wave length $\times 2\pi =$ **21.589416×10^{44} bound treos**

(1g) 4.1669795×10^{44} RC wave length $\times 2\pi =$ **26.192443×10^{44} bound treos**

(1h) 5.832475×10^{44} RC wave length $\times 2\pi =$ **36.661272×10^{44} bound treos**

(G) Gravitational kinetic energy in orbits.

Number of kinetons (total Kinetic energy) in any one sub kinetic coloumn, which are present at each apex bound treo in matter wave of orbit, is calculated as v^2 (where $v^2 = MG/r$)

[We will study the gravitational field of Star Trappist 1 with the EXAMPLE OF CALCULATIONS IN ORBIT OF FIRST PLANET MERCURY IN SOLAR SYSTEM as per treo model –

a. *Kinetic energy in each sub kinetic coloumn in the orbit of Mercury is calculated = Em = v^2 (according to Newton's formula $v^2 = MG/r$) = MG of Sun is $3.145233887 \times 10^{124}$ free treos/$0.3583722239 \times 10^{46th}$ bound treo layers i.e. r distance of Mercury from Sun = $8.776444393 \times 10^{78}$ kinetons or v^2 kinetons are in each v layered sub kinetic coloumn which is present at each apex bound treo and form one matter wave in orbit of Mercury.*

b. *2MG mass pressure of Sun is exerted in any one direction, which gets equally distributed at 2n-1 apex bound treos, and is supported by total kinetic energy (by v^2 kinetons from each 2n-1 kinetic coloumns), at distance r (or n bound treo layers from sun) by common matter wave present in the orbit of mercury.*

c. *This kinetic energy v^2 in each kinetic coloumn is generated by space matrix in response to load of body (r × a) at this apex bound treo*

*('r' or distance from gravitational center × 'a' or *diluted mass pressure of body at this distance.)*

d. ***This explains action – reaction mechanism of space matrix:*** *when r × a is action of load on space matrix at this apex bound treo = v^2 is reaction of local space matrix at this point by which form one sub kinetic coloumn.*

This calculation can also be done by Newton's equations (MG = r v^2 and MG = r^2 a). r a = v^2 which also explains action reaction mechanism by this equation ***ra =v^2****, at any point in any gravitational field.*

**(in equation, a = MG/r^2. 'a' is Newton's acceleration, or Einstein's Slope of deformation, or 'diluted mass pressure of central load of body at this distance according to treo model.)*

In the orbit of Mercury in gravitational field of Sun this action reaction mechanism can be visualized, ra = v^2
('r' or 0.3583722239 × 10^{46} × a' or 24.31965189 × 10^{32} free treos = 8.776444393 × 10^{78} free treos) = (*8.776444393 × 10^{78} kinetons or v^2 kinetons)*

e. Orbital speed of planet in its orbit is always equal to frequency of matter wave in this orbit. *]*

Similarly v^2 is gravitational kinetic energy in each sub kinetic coloumn of matter wave in orbit of first planet 1b **of Trappist 1= MG/r**

(1b) 252.161750 × 10^{121} free treos is mass of star in free treos i.e.
MG/1.028552 × 10^{44} (or r) = 24.5161 × 10^{78} kinetons.

Calculation of V^2 (i.e. gravitational kinetic energy present in each sub kinetic coloumn of matter wave in orbit) at other planets of Trapist 1

(1c) 252.161750 × 10^{121} free treos/1.408126 × 10^{44} (or r) = 17.907609 × 10^{78} kinetons (v^2 kinetons) (1d) 252.161750 × 10^{121} free treos/1.984893 × 10^{44} (or r) =12.704046 × 10^{78} kinetons (v^2 kinetons)

(1e) 252.161750 × 10^{121} free treos/2.607949 × 10^{44} (or r) = 9.668965 × 10^{78} kinetons (v^2 kinetons)

(1f) 252.161750 × 10^{121} free treos/3.434679 × 10^{44} (or r) = 7.341637 × 10^{78} kinetons (v^2 kinetons)

(1g) 252.1617503 × 10^{121} free treos/4.16697968 × 10^{44} (or r) = 6.051427406361 × 10^{78} kinetons (are v^2 kinetons)

(1h) 252.1617503 × 10^{121} free treos/5.83247545 × 10^{44} (or r) = 4.22340868872 × 10^{78} kinetons (are v^2 kinetons)

(H) Orbital speed of planets

ACCORDING TO TREO MODEL Frequency of matter wave at any n^{th} quantum level = Number of quanta load at each apex bound treo = number of bound treo layers in any one sub kinetic coloumn = **Orbital speed (Number of bound treos per second) of planet.**

Frequency =$\sqrt{v^2}$ = v = frequency of matter wave = **orbital speed of planet in orbit** (is calculated both in bound treo distance per sec. and in Km per sec)

(1b) Orbital speed of first planet of Trappist 1 in bound treo distance per sec and in Km per sec

(24.5161 × 10^{78} kinetons)$^{0.5}$ = v = 4.951373 × 10^{39} bound treo layers in each sub kinetic coloumns/0.618724203 × 10^{38} bound treos in one Km length = **80.00255253 Km per sec**

Orbital speed of all other six planets in bound treo distance and also in Km

(1c) (17.907609 × 10^{78} kinetons)$^{0.5}$ = v = 4.231738 × 10^{39} bound treo distance per sec/0.618724203 × 10^{38} bound treos in one Km length = **68.3945768 Km per sec**

(1d) $(12.704046 \times 10^{78}$ kinetons$)^{0.5}$ = v = 3.564273×10^{39} bound treo distance per sec/$0.618724203 \times 10^{38}$ bound treos in one Km length =
57. 6068139 Km per sec

(1e) $(9.668965 \times 10^{78}$ kinetons$)^{0.5}$ = v = 3.109495×10^{39} bound treo distance per sec/$0.618724203 \times 10^{38}$ bound treos in one Km length =
50.256559 Km per sec

(1f) $(7.341637 \times 10^{78}$ kinetons$)^{0.5}$ = v = 2.709545×10^{39} bound treo distance per sec/$0.618724203 \times 10^{38}$ bound treos distance in one Km =
43.792452 Km per sec

(1g) $(6.051427 \times 10^{78}$ kinetons$)^{0.5}$ = v = 2.459964×10^{39} bound treo distance per sec/$0.618724203 \times 10^{38}$ bound treos distance in one Km =
39.758651 Km per sec

(1h) $(4.223408 \times 10^{78}$ kinetons$)^{0.5}$ = v = 2.055093×10^{39} bound treo distance per sec/$0.618724203 \times 10^{38}$ bound treos distance in one Km =
33.21500 Km per sec.

(I) Time required by planet to complete its one orbit,

(revolution time of each plant as calculated in seconds and in Earth's day)

(Circumference of orbit in bound treo distance/speed of planet in bound treo distance per sec)

and

(also in one Earth's day, where one Earth day = 60 sec × 60 minutes × 24 hour = 86400 sec)
(1b) 6.465184×10^{44} bound treos is circumference of orbit/ 4.951373×10^{39} bound treo distance per sec = 1.305735×10^{5} Sec/86400 sec in a day = **calculated/ Actual 1.51 earth day**.

(1c) 8.851079×10^{44} bound treos is circumference of orbit/ 4.231738×10^{39} bound treo distance per sec = 2.09159408855 Sec/86400 sec in a day = **calculated/ Actual 2.42 day.**

(1d) 12.476471×10^{44} bound treos is circumference of orbit/ 3.564273×10^{39} bound treo distance per sec = 3.500428×10^{5} Sec/86400 sec in a day = **(calculated 4.04 day) Actual 4.05141day.**

(1e) 16.392826×10^{44} bound treos is circumference of orbit/ 3.109495×10^{39} bound treo distance per sec = $5.271859 \times 10_{5}$ Sec/86400 sec in a day = **(calculated 6.06 day) Actual 6.101689 day.**

(1f) 21.589416×10^{44} bound treos is circumference of orbit/ 2.709545×10^{39} bound treo distance per sec = 7.96791×10^{5} Sec/86400 sec in a day = **(calculated 9.1 day) Actual 9.222 day**

(1g) 26.192443×10^{44} bound treos is circumference of orbit/ 2.459964×10^{39} bound treo distance per sec = 10.647486×10^{5} Sec/86400 sec in a day = **(calculated 12.35 day) Actual 12.32 day**

(1h) 36.661272×10^{44} bound treos is circumference of orbit/ 2.055093×10^{39} bound treo distance per sec = 17.83922×10^{5} Sec/86400 sec in a day = **(calculated 20.62 day) Actual 20.647 day**

(The discrepancy in calculated values and observed values is due to gravitational effect of other planets on orbital speed of observed planet.)

(J) Kinetic energy ratio of planets

Planets of Trappist 1 are placed in *s, p, d, f* sub shells according to their <u>calculated kinetic energy ratio with first planet $v^2$1b</u>. (1b) 24.5161×10^{78} kinetons (or v^2**1b** kinetons is gravitational kinetic energy of first planet 1b in its orbit) = *s1*

Ratio of Kinetic energy in first planet compared with kinetic energy in orbits of other planets gives a ratio $V^2$1b/n^2 at n^{th} planetary quantum level

(This ratio of $V^2 1b/v^2$ kinetic energy in orbit of other planets of Trappist 1 is same as conventional value of energy distribution levels in *s,p,d.f.* atomic orbits).

(1c) 24.5161×10^{78} kinetons/17.907609×10^{78} kinetons = **1.369** = s_1

(1d) 24.5161×10^{78} kinetons/12.704046×10^{78} kinetons = **1.929** = p_1

(1e) 24.5161×10^{78} kinetons/9.668965×10^{78} kinetons = **2.535** = p_2

(1f) 24.5161×10^{78} kinetons/7.341637×10^{78} kinetons = **3.339** = p_3

Second quantum level

(1g) 24.5161×10^{78} kinetons/6.051427×10^{78} kinetons = ¼ of s1= **4.051292 = s_2**

(1h) 24.5161×10^{78} kinetons/4.223408×10^{78} kinetons = ¼ of s1 = **5.804813 = s_2**

Conclusion

The treo model of gravitation is verified outside solar system.

The number of unit masses (Planck's masses) by which any body is made of decides the number of Planck least lengths (bound treo layers) in radius of its gravitational sphere, which form around its gravitational centre. [8c]

The (M^2) Gravitons in its gravitational sphere supports the equal load of square number of unit masses of this body, at its gravitational centre, while total gravitational kinetic energy v^2 in any one concentric layer in its matter wave, can support twice the mass of body (2M). [9b]

The frequency of the matter wave in orbit, decides the orbital speed of baby body in orbit (where circumference of this orbit is 2 RC wave length of this matter wave × pi). The gravitational centre of baby body moves as weight less symbolic point mass (as load of baby body on space matrix is already neutralized by its own gravitational field), and that is why all baby bodies irrespective of their different individual masses moves at the speed which is only decided by (and reciprocal to) its distance of baby body from its parent body [$\boldsymbol{v} = \sqrt{}$ (MG/ **r**)]. [9c]

Thus the body and its exerted load at its gravitational centre and also its load on surrounding space matrix (space- time- energy) are supported by each individual successively bigger concentric one (Bound treo) layer in its gravitational field, by total gravitational kinetic energy in this layer.

First baby bodies of any parent body is placed at its 10^{4th} gravitational field quantum level and all other baby bodies are placed according to gravitational kinetic energy levels v^2 in their orbits.

Bibliography

(1) Higgs, peter; 1964, ***Broken symmetries and the masses of gauge bosons*****,** Physical review letters13 (16) 508-509.

(2) Y. Valdimirov, N. Mitskievich & J. Horsky, 1987 ***Space Time Gravitation***, Mir publication.

(3) M. Kaku & J. Thomson, 1997, ***Beyond Einstein***, Oxford university press

(4) Higgs, peter; 1964, ***Broken symmetries and the masses of gauge bosons*****,** Physical review letters13 (16) 508-509.

(5) Lee Smolin; (2014). ***Positive energy in quantum gravity,*** phys.rev d 90 no.4 p 1– 3

(6) V. F. Mukhanov, (2005), '**Physical foundations of cosmology.'** Cambridge University Press. pp. 58–. ISBN 978- 0-521-56398-7.

(7) Ashok Saxena.2005, ***Inside a Wave****, paper cover book* (India), Manas Prakashan. Page number 192, (Copy right no. L-36882/2010/19-11-2010)

(8) Ashok Saxena; *2015 "****Our universe and how it works; (Quantum gravitation and Fifth dimension)*** (India) hard copy ISBN 978-93-5235- 003-2 (Manas Prakashan) 2016 (a)

page 238-245 (b) page 60: e-book, ISBN 978-93-5235-065-0 Book baby.

(9) Ashok Saxena; 2020 ***"Treo Model of Structure and Working of Universe (Cosmic code)",*** (INDIA) ISBN 978-1-64828-887-6 paper back, Notion press, (9a) 46-50 (9b) 214 (9c) 237 (9d) 212: 2020 e- book ISBN 978-164828888-3 (Notion press). Copy right application no, L-94591/2020.

(10) ***Graph of gravitational kinetic energy and Position of planets (baby bodies of Sun),*** Copy right reserved via copy right number L-36883/2010/19-11-2010. copy right office

(11) R Genzel; 2010 '***The Galactic Centre massive black hole and nuclear star cluster'*** arXiv: 1006.0064 Pdf.

(12) Kipping, David, 2018, ***Predicting the orbit of TRAPPIST 1*****,** research notes of the American Astronomical Society, 2 (3):136.Arxiv:1807.10835ס. Bib code: 2018RNAAS.2.136 K. Doi :10.3847/2515-5172/aad6e8.

(13) Lara,Patricia: Cordero –Tercero, Guadalupe; Allen,Christine (2020). "***The reliability of the Titus- Bode relation and its implication for the search of exo-planets***" arXiv,2003.05121 [astro-ph. EP.

(14) Ivan Kotliarov (21 June 2008) ***"The Titus- Bode law Revisited but not revived"*** arXiv, 0806.3532 [Physics. Space-ph].

(15) Michael Gillon, Amaury H.M.J. triaud, Dipier queloz, 2017 ***Seven temperate terrestrial planets around nearby ultra cool dwarf star TRAPPIST 1***, *Nature* 542, 456–460.