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Research Article

# Genesis, Dynamics and the Fate of the Solar System

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## Abstract

The pursuit for the essence of gravity brought a graphical model for radiant cold-heat versus distance and mathematical models for the planets' axial tilt, orbital and axial period of rotation out of the Sun's radiant heat and the distance therefrom which in turn brought the following results:- The Solar system is held and driven by cryo-thermodynamics. The Solar system's Genesis Line is supported by North-South opposing sources of radiant cold to form the points of static equilibrium upon which the Solar system was molded in the dark. The constituents of the Solar system should realign themselves on the Genesis Line after the death of the Sun such that the dead Sun, the Black Giant, remains resting at the address which a black giant inhabited upon the failed metamorphosis of the Sun. The death of just one of the cold sources will cause the crashing of the Solar system into the dead source, the Dumping Hole, upon the push of the survived cold source. The nature of the Dumping Hole's gravity is like that of the Black Giant in that it is a perishable result of a push instead of a pull to the effect that the Newton's law of gravitation contradicts the Newton's 1$^{st}$ law of motion. The Dumping Hole is massive distinguishing itself from a pair of black holes of immense pulling gravity which chased one another for a merger to produce gravitational waves upon collision. Radiant cold will neutralize the Sun's radiant heat upon a head-to-head collision. The Sun's heat of decaying strength with distance pushes outwards to cause the orbiting direction of the planets to be divided into prograde and retrograde depending upon the strength of the reaching-out resisting cold which provides the canvas for the planets to roll upon. Mathematically, the planets' prograde orbital period depends solely upon the Sun's push whereas the planets' axial period of rotation therefrom is heavily influenced by the resisting greenhouse effect factor to the effect that Venus and Uranus exhibits retrograde axial rotation whereas the Martian Phobos and the Neptunian Triton exhibits retrograde orbiting direction upon the very same greenhouse effect factor. Imaginable is the navigation in the direction of flow of the cold streams to reach the Solar system from the outer Cosmos whereas reaching the cold sources requires harnessing of the resisting cold stream. A narrow genesis line greatly determines planet-less as well as binary star systems.

## Keywords

Black Hole, Gravitation, Solar System, Sun, LIGO, Gravitational Wave, Tanzania, Climate Change

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## 1. Background, Methods and Approaches

With its center at the Sun, via nuclear fusion reactions, the Solar system is primarily engaged in processes to produce heat which gets radiated in the form of light, ultraviolet and infrared radiations [12]. The Solar system is also engaged in secondary processes of transmutation of matter especially in the planets which are geologically active like Earth as well as engaged in processes of mass and heat transfer within and perhaps beyond the Solar system boundaries [12].

Because of the Solar system's state of being dynamic in terms of the planets' motion around the Sun as well as in terms of the Sun's axial rotation and the planets' axial rotation, there are two laws of physics to lead the description of the Solar system dynamics, namely: the Newton's first law of motion which states that "a body shall continue to keep its state of rest or uniform motion in a straight line unless that body gets compelled to change that state by external forces acting thereupon" [12]; and the Newton's law of gravitation which states that "there exists a force between the Sun and a planet, the two Partners, which is directly proportional to the product of the masses of the two Partners and directly proportional to the inverse square of the distance between the centers of the masses of the two Partners" [8, 9, 12].

Because of the nature of the Sun's heat to be transmitted by radiation, it is the Maxwell's electromagnetic theory which briefly describes the Sun's radiant heat, so: "radiant energy consists of two components oscillating in phase, i.e.: an electric and a magnetic field" [2-7, 10-12]. Radiant heat transfer can take place across an absolute vacuum [2-7, 10-12]. The unit of total radiant-heat emissivity is given in watt per square meter [2-7, 10-12].

Quite of recent in 2015, LIGO (for Laser Interferometer Gravitational-Wave Observatory) claimed to have detected a gravitational wave originating from a binary black hole merger [1]. LIGO claims the existence of numerous pairs of gigantic black holes of immense gravity in the Cosmos which could get into a stage of inspiral and merger and finally into a stage of ringdown of the resulting black hole [1]. Out of the LIGO's occult, an ambition was conceived to seek the genesis of the Solar system, the dynamics and the ultimate fate thereof as well as to seek the essence of gravity.

Apart from the ambition to study the essence of gravity as stated above, there are 6 features of the Solar system which also co-attracted attention to prompt this study, namely: the Sun rotates about its axis with a sidereal rotation period of 25.05 days at the Sun's equator [12], the state of Mercury and the Moon as well as the state of the Plutonian Charon to be tidally locked to their masters [12], the retrograde orbiting direction of the Martian Phobos and the Neptunian Triton as well as their noteworthy state of being close to their masters nearly to be locked in a synchronous rotation [12], the state of Pluto and its moon Charon to behave as if they were a binary system for the barycenter of their orbits not to lie within either body [12], the state of extreme low temperatures at the North and South pole of most of the planets including Earth when a planet reaches at the perihelion and at the aphelion respectively [12], the state of the planets' paths to be elliptic and eccentric [12].

Because there is every reason to believe that the Sun as well as the planets cannot cause their own axial rotation out of their own gravitational pull as it is provided by the Newton's law of gravitation, the plausible assumption is that the Sun's energy is co-responsible for the push to cause motion for its planetary objects.

Because there is every reason to believe that cold reaches the Solar system also as radiant-cold in the form of electromagnetic waves, the plausible assumption as to the genesis of the Solar system is that there exists a system of two cold sources of unknown origin and unknown mechanism of cold generation one at far infinity in the North and the other at far infinity in the South to the effect that these cold sources are pumping cold at a decaying rate in watt per square meter to the effect that the two streams of cold travelling therefrom coincidentally collide head-to-head to create a line of points of static equilibrium at $\sum F=0$ such that the conditions for static equilibrium so created at $\sum F=0$ would be as if the two streams were resolvable forces in a statically determinate structure [8. 9, 12].

The procedure to enable the confrontation with the primary challenge is to seek mathematical models which support the assumption that the Solar system is held and driven by cryo-thermodynamics as illustrated in figure 1.

It should further be assumed that the Sun was molded out of intruding galactic dust of a star-forming viability otherwise a black giant equivalent to a dead star could have evolved at the address of the Sun to the effect that planets and their moons evolved out of non-star-forming galactic dust. It should be assumed further that there had existed dynamics on the Genesis Line at the points of $\sum F=0$ in the form of cyclones and whirlwinds to bring about a spheroid of the young Sun as well as spheroids of the planets and moons before the Sun got its fully-fledged heat pump to the effect that the Sun's axial rotation is inherent. It should get assumed also that the revolution of the planets around the Sun started soon after the heat pump of the Sun had gained steam. It should get assumed also that the dynamic equilibrium of Mercury to Pluto is dominated by the heat push from the Sun such that their orbiting direction is prograde (vide figure 1) whereas the dynamic equilibrium of any planet beyond the orbit of Pluto is dominated by the push of the cold from the cold sources to the effect that their orbiting direction and their axial direction of rotation is retrograde such that the Sun shall rise from the West to set in the East on such planets to oppose the prograde raising of the Sun from the East to set in the West on Mercury to Pluto. The last assumption will be that planets and their natural satellites roll on the canvas under which the canvas provider should be the cold push for prograde dynamic equi-

librium and vice versa for retrograde dynamic equilibrium whereas the prograge-pause will mark the region for binary systems of the sort similar to the system of Pluto and its moon Charon.

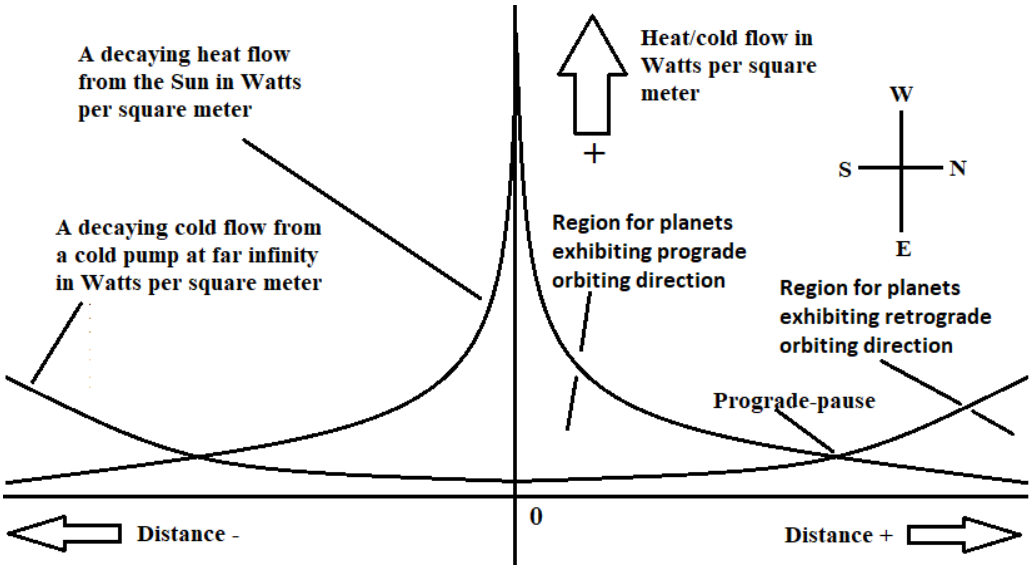


***Figure 1.*** *Model of a cryo-thermodynamics-driven Solar system.*

## 2. Dependency of the Planets' Orbital Period Upon the Sun's Emissive Power

It should get assumed that the Sun's total emissive power in watt per square meter is directly proportional to the Sun's mass divided by its surface area (a.k.a. the Sun's surface gravity). The Sun's surface gravity must be calculated out of the data from table 1.

***Table 1.*** *Mass of the Planets of the Solar System [12].*

| Planet | Mass (kg) | Diameter (km) | Mean Distance from Sun (km) |
|---|---|---|---|
| Sun | $1.9885 \times 10^{30}$ | 1,391,400.0 | 0 |
| Mercury | $3.3000 \times 10^{23}$ | 4,879.4 | 57,909,175 |
| Venus | $4.8700 \times 10^{24}$ | 12,104.0 | 108,208,930 |
| Earth | $5.9800 \times 10^{24}$ | 12,756.0 | 149,597,890 |
| Mars | $6.4200 \times 10^{23}$ | 6,787.0 | 227,936,640 |
| Jupiter | $1.9000 \times 10^{27}$ | 142,800.0 | 778,412,020 |
| Saturn | $5.6900 \times 10^{26}$ | 120,660.0 | 1,426,725,400 |
| Uranus | $8.6800 \times 10^{25}$ | 51,118.0 | 2,870,972,200 |
| Neptune | $1.0200 \times 10^{26}$ | 49,528.0 | 4,498,252,900 |
| Pluto | $1.2900 \times 10^{22}$ | 2,300.0 | 5,906,376,200 |

Since the natural log of the planets' orbital period for the planets from Mercury to Pluto happens to dovetail with the natural log of the inverse of the Sun's surface gravity incident to the planets from Mercury to Pluto, then the planet's orbital period can be calculated as follows:

$$\omega(S_{Planet}) = \exp\left(\ln\left(\bar{M}_{Sun}\left(\frac{3504372}{S_{Planet}}\right)^{1.515}\right)^{-1} + 26.726441870435\right) \quad (1)$$

Where $\omega$ is the planet's orbital period in Earth days,

$S_{Planet}$ is the planet's mean distance from the Sun in $km$,

$\bar{M}_{Sun}$ is the Sun's surface gravity on the Sun's surface in $kg/m^2$.

The results out of equation (1) are astonishingly good in Table 2.

***Table 2.*** *Orbital period for the Planets of the Solar System [12].*

| Planet | Orbital Period in Earth Days/Years (given) | Orbital Period in Earth Days/Years (calculated) |
|---|---|---|
| Mercury | 87.97 | 86.73 |
| Venus | 224.70 | 223.61 |
| Earth | 365.26 | 365.26 |
| Mars | 686.98 | 691.32 |
| Jupiter | 11.86 (EY) | 4443.98 (12.16 EY) |
| Saturn | 29.46 (EY) | 11127.96 (30.46 EY) |
| Uranus | 30,685.00 (84.00 EY) | 32099.92 (87.88 EY) |
| Neptune | 60,190.00 (164.80 EY) | 63379.89 (173.51 EY) |
| Pluto | 247.92 (EY) | 95750.60 (262.14 EY) |

In order to lend dimensions of emissive power to the Sun's surface gravity in equation (1), the speed of heat emission on the Sun's surface must be considered, thus:

$$E_{Sun} = \lambda \bar{M}_{Sin} \tag{2}$$

Where $E_{Sun}$ is the Sun's total emissive power in watt per square meter,

$\lambda$ is the Sun's emissive heat escape factor in watt per kg, equals to 1watt per kg [2-7, 10, 11],

In terms of the Sun's emissive power, equation (1) can be re-written as follows:

$$\omega(S_{Planet}) = \exp\left(\ln\left(E_{Sun}\left(\frac{3504372}{S_{Planet}}\right)^{1.515}\right)^{-1} + 26.726441870435\right) \tag{3}$$

## 3. Dependency of the Planet's Axial Period of Rotation on the Sun's Emissive Power

By virtual of the retrograde rotation of Venus and Uranus [12], by virtual of the retrograde orbiting direction of the Martian moon Phobos and the Neptunian moon Triton [12] and by virtual of the Newton's 1st law of motion which states that a body shall keep its state at rest or motion in a straight line unless it gets compelled by external forces acting otherwise [12], it makes sense to take it for granted that the prograde orbiting of the planets is a result of the push from the Sun as shown in section 2 above against the push of the cold which acts as a canvas for planets to roll on. Either, it makes sense also to take it for granted that there exists a drag force against the planets' rolling on the canvas on the account of the greenhouse effect to the effect that the retrograde rotation of Venus and Uranus is justified and to the effect that the retrograde orbiting direction of Phobos and Triton is also justified since the orbit of these moons is below the synchronous altitude, that is to say, they are very close to their masters for their prograde orbiting direction to have been reversed by the drag winds.

On the aforesaid rolling of the planets on the canvas, the planets' period of rotation can be calculated as follows:

$$f = \frac{D\omega(\Delta T)^2 \varepsilon}{2S_{Planet}} \tag{4}$$

Where $f$ is the planet's axial period of rotation in Earth days,

$D$ is the planet's diameter in $km$,

$\Delta T$ is the mean temperature difference between the planet's dayside and the leeside in Kelvin,

$\varepsilon$ is the drag force constant: $1/K^2$ [2-7, 10, 11],

The "how" of calculating $\Delta T$ takes the assumption that $\Delta T$ is related to the planet's axial tilt via the greenhouse effect factor [2-7, 10, 11], the GHEF, thus:

$$\Delta T = \frac{GHEF}{\theta} \tag{5}$$

Where $GHEF$ is the greenhouse effect factor in Kelvin times angular degrees,

$\theta$ is the planet's relative axial tilt in angular degrees.

Since the GHEF for Mercury must be the less than that of the Jupiter for Mercury's lack of atmosphere and for Mercury's diurnal climate, it makes sense to assume that the Mercury's relative axial tilt is in error and for the purpose of this section of the study therefore the Mercury's relative axial tilt shall be taken to be 0.017 (half of the given value of 0.034 - [12]). The values of $\Delta T$ and GHEF are provided in table 3 below.

***Table 3.*** *Calculated values of $\Delta T$ for the planets of the Solar system against the values of the empirical values of the GHEF.*

| Planet | Calculated $\Delta T$ value in Kelvin | Empirical values of GHEF in Kelvin times angular degrees | GHEF order (dimensionless) | Relative axial tilt in angular degrees (given) |
|---|---|---|---|---|
| Mercury | 125.8511 | 2.1394 | 9 | 0.017 (assumed versus 0.034) |
| Venus | 139.0540 | 24,662.6174 | 1 | 177.36 |
| Earth | 8.0134 | 187.8283 | 4 | 23.439 |
| Mars | 10.0153 | 252.2854 | 3 | 25.190 |
| Jupiter | 1.0201 | 3.1929 | 8 | 3.130 |
| Saturn | 0.9851 | 26.3317 | 7 | 26.730 |
| Uranus | 1.6220 | 158.5829 | 5 | 97.770 |
| Neptune | 1.4235 | 40.3135 | 6 | 28.320 |
| Pluto | 19.0372 | 2,332.6281 | 2 | 122.530 |

Venus' atmosphere is extremely dense composed of 96.5% carbon dioxide and 3.5% nitrogen [12]. The atmosphere of Mars is about 1% of Earth's but consisting of about 96% carbon dioxide whereas Earth's atmosphere has about 78% nitrogen, 21% oxygen and a minute amount of carbon dioxide [12]. Although tenuous, the Pluto's atmosphere consists of the greenhouse gas methane although not quantified [12]. Methane molecules account for 2.3% of the Uranus's atmosphere by molar fraction in the altitude below the methane cloud deck at the pressure level of 1.3 bar (130 kPa). With a seemingly coldest troposphere ranging from 320 K (47 ℃; 116 ℉) at the base at −300 km to 53 K (−220°C; −364 °F) at 50 km, Uranus's atmosphere also contains 2.3% methane by volume [12]. Neptune's atmosphere is 80% hydrogen and 19% helium at high altitudes with a trace amount of methane [12]. Out of this data, the order of the GHEF in table 3 is somewhat justified.

Out of equation (4), the calculated periods of axial rotation for the Solar system are as provided in Table 4 below.

***Table 4.*** *Planets' period of axial rotation in the Solar System [12].*

| Planet | Period of Rotation in Earth Days (given) | Period of Rotation in Earth Days (calculated) |
|---|---|---|
| Mercury | 58.7000 | 58.6999 |
| Venus | 243.0000 | 242.9997 |
| Earth | 1.0000 | 0.9999 |
| Mars | 1.0259 | 1.0258 |
| Jupiter | 0.4135 | 0.4134 |
| Saturn | 0.4395 | 0.4394 |
| Uranus | 0.7187 | 0.7186 |
| Neptune | 0.6713 | 0.6712 |
| Pluto | 6.3900 | 6.3899 |

| Planet | Period of Rotation in Earth Days (given) | Period of Rotation in Earth Days (calculated) |
|---|---|---|
| the Moon | 29.530589 | 29.5302 |

## 4. Dependency of the Planets' Axial Tilt on Temperature

In order to derive the dependency of the planets' axial tilt on temperature the 1st plausible assumption is that the driving force for the axial tilt must be the maximum temperature difference between the dayside and leeside, the $\Delta T_{Max}$, which is most likely experienced when the planets reach their aphelion and the perihelion points on the ground that the orientation of the tilt remains parallel to the line connecting the locus of the aphelion and the perihelion points on the 2D planets' path. The 2nd assumption to consider is that Mercury must be having the greatest $\Delta T_{Max}$ in the Solar system for its close proximity to the Sun, for its lack of atmosphere and for its diurnal climate. The surface temperature of Mercury is reported to range from 100 to 700 K [12] thus its $\Delta T_{Max}$ can be taken to be 600 K. The 3rd assumption to consider is that Mercury's absolute axial tilt must complete a circle to be the biggest in the Solar system for the simple reason that its observed relative axial tilt of 0.034 angular degrees is too small to be accounted for by its $\Delta T_{Max}$ of 600 K.

Thus, if a linear relationship between absolute axial tilt and $\Delta T_{Max}$ is assumed, then the planets' $\Delta T_{Max}$ as a function of planets' axial tilt can be calculated as follows:

$$\Delta T_{Max} = m\phi \tag{6}$$

Where $\Delta T_{Max}$ is the real planet's maximum temperature difference in Kelvin.

$m$ is a constant of proportionality in Kelvin per angular degrees, equals to (600 / 360.017).

$\phi$ is the planet's absolute axial tilt in angular degrees.

In Table 5 below: the values of planets' absolute axial tilt against the calculated $\Delta T_{Max}$ under which the Martian $\Delta T_{Max}$ is relatively greater that Earth's most likely because of the Martian diurnal climate.

***Table 5.*** *Calculated $\Delta T_{Max}$ values for the planets of the Solar system in the order of descending tilt [12].*

| Planet | Absolute axial tilt in angular degrees (given) | Calculated $\Delta T_{Max}$ value, Kelvin |
|---|---|---|
| Mercury | 360.017 | 600 |
| Venus | 177.36 | 295 |
| Earth | 23.439 | 39 |
| Mars | 25.190 | 41 |
| Jupiter | 3.130 | 5 |
| Saturn | 26.730 | 44 |
| Uranus | 97.770 | 162 |
| Neptune | 28.320 | 47 |
| Pluto | 122.530 | 204 |
| the Moon | 6.687 to orbit plane | 11 |

## 5. Dependency of the Planets' Elliptic Path on Temperature

By taking for granted that the hottest period of the year on Earth is experienced when Earth reaches the aphelion against the period of the year when Earth reaches the Equinoxes and the perihelion, the Earth's distance from the Sun can be calculated as a function of mean dayside temperature to produce an eccentric elliptic orbit as follows:

$$S_{Elipse}(T) = S_{Mean} + \Delta S\left(\frac{T}{T_{Max}}\right) \quad (7)$$

Where $S_{Ellipse}(T)$ is the Earth's distance from the Sun in km as a function of Earth's mean dayside temperature.

$S_{Mean}$ is the Earth's mean distance from the Sun in km.

$\Delta S$ is the Earth's specific ellipse factor in km.

$T$ is the Earth's locus-dependent mean dayside temperature in Kelvin.

$T_{Max}$ is the maximum Earth's mean dayside temperature in Kelvin with reference to the Earth's position at the aphelion.

As a function of the Earth's angular displacement and the Earth's mean dayside temperature, the locus of a Earth can be derived out of equation (7) as follows:

$$\vec{S}_{Elipse}(\beta,T) = \left(S_{Mean} + \Delta S\left(\frac{T}{T_{Max}}\right)\right)\left(\cos(\beta)\right)_i + \left(S_{Mean} + \Delta S\left(\frac{T}{T_{Max}}\right)\right)\left(\sin(\beta)\right)_j \quad (8)$$

Where $\vec{S}_{Ellipse}(\beta,T)$ is the locus of Earth as a function of the Earth's angular displacement and the Earth's mean dayside temperature.

$\beta$ is the Earth's angular displacement in angular degrees relative to the horizontal line cutting through the aphelion through the perihelion.

$\vec{I}$ is a unit vector in the horizontal axis in the I-J plane.

$\vec{J}$ is a unit vector in the vertical axis in the I-J plane.

Since Earth gets relatively closer to the Sun when Earth gets at the equinoxes [8, 9, 12], since Earth gets relatively far away from the Sun when Earth gets at the extreme points at the aphelion and at the perihelion [8, 9, 12], it can conclusively be said that the waves of Sun's radiant heat will be neutralized by the North-South waves of radiant cold if and only if a head to head collision takes place between the two. The rest of the planets of the Solar system are expected to be subjected to the same phenomenon which causes elliptic orbits.

## 6. Position of Pluto Versus the Prograde-pause

Pluto is assumed to be very close to the prograde-pause for the simple reason that besides being the outermost planet from the Sun, its 5 moons happen to be tidally locked, namely: Charon, Styx, Nix, Kerberos, and Hydra in order of distance from Pluto. Noteworthy, Pluto exhibits a binary system with its innermost moon Charon [12].

The tidal locking of the 5 moons in a row here means that the axial period of rotation increases outwards from Charon to Hydra such that Hydra's period of axial rotation is of the magnitude matching its orbital period. Now, it is arguable as to whether the resistance to the rotations of that whole system of Pluto and its moons were due to the greenhouse effect on Pluto or is due to the push of the cold from the wildness to confirm the Pluto's close proximity to the prograde-pause. The mirror of equation (3) on the "ω = S" line provides an equation which may give some clue as to the behavior of the Pluto's system, thus:

$$\omega(S_{Planet}) = 3504372\left(\exp\left(\ln\left(S_{Planet}\right) - 26.726441870435\right)E_{Sun}\right)^{\frac{1}{1.515}} \quad (9)$$

If analogy is to be drawn from the Pluto-Charon binary system, if the assumption would hold that the Pluto-Charon binary system exists by virtual of the proximity of the prograde-pause to that system, then it can be said that the width of a genesis line must be narrow for a binary star system to emerge as well as for a planet-less star system to emerge although a narrow genesis line out of narrow cold sources of ultra-ultra-strength may lead to the formation of a star of extra-extra ordinarily big dimensions.

## 7. Discussion and Conclusion

Because the length of the Earth's solar day is reported to have slightly expanded relative to the day length during the 19th century to the effect that the day is longer by a value between 0 and 2 milliseconds [12], the Earth's greenhouse effect factor in equation (5) must have increased to cause the Earth's period of axial rotation to expand out of equation (4). Earth's axial tilt should be expected to increase in the long run given the prevailing man's driven greenhouse effect.

By taking for granted that radiant cold travels in the form of electromagnetic waves in the way radiant heat travels, by taking for granted that the waves of radiant cold will neutralize the waves of radiant heat upon a head-to-head collision, it can conclusively be said that:

(1) The waves of radiant cold travel parallel to the vertical axis in the x-y plane such that the sources of the cold are situated at far infinity at far North and at far South to the effect that the cold from the two said sources meet to create a horizontal genesis line, the Genesis Line, along which the molding of the infant Sun and the planets took place. The Genesis Line can be described to be the line along which the sum of the cold-generated forces is zero opposing each other such that the conditions of static equilibrium will be satisfied, that is: $\sum F=0$.

(2) If the Sun had failed to develop a fully-pledged heat pump it had remained a black giant. In the upshot, without the Sun or with the dead Sun, the Sun is resting

at a point of static equilibrium at ∑F=0 at the address of a black giant which should not be confused with a black hole [1]. The planets must realign themselves along the Genesis Line upon the death of the Sun; they may not necessarily crash into the dead Sun, the Black Giant.

(3) Towards the death of the Sun the distance must shrink between the Sun and the prograde-pause to the effect that the orbiting direction of planets shall progressively reverse from Pluto to Mercury. By inference, a narrow genesis line is among the decisive factors for a planet-less or binary star system without prejudicing the strength of the supporting cold sources thereof and the strength of the resulting star itself.

(4) Since the production of cold can be assumed to consume a perishable fuel the way the production of the heat does, the simultaneous death of both of the Solar system's supporting cold sources in the far North and in the far South will cause the address and the ultimate fate of the Solar system to be unknown whereas the death of just one of the cold source will cause the crashing of the Solar system into the dead cold source, the Dumping Hole, upon the push of the survived cold source. The existence of black holes [1] is a misconception as an object cannot concentrate gravity whatsoever on its own perpetual pull. In the upshot, gravity is a perishable result of a push instead of a pull thus the Newton's law of gravitation contradicts the Newton's 1st law of motion.

(5) The planets started orbiting the Sun upon the Sun's heat push soon after the development of the Sun's heat pump to the effect that the Solar system is cryo-thermodynamics-driven to the effect that the Sun is pushing the planets to roll on a cold-generated canvas in the case of the prograde orbiting direction and vice-versa in the case of the retrograde orbiting direction.

(6) A greenhouse-effect-driven force will act to oppose the rolling of planets on their canvases to the effect that the axial rotation of Venus and Uranus is retrograde. Either, the greenhouse-effect-driven force on Mars seems to be quite sufficient to reverse the orbiting direction of the moon Phobos for Phobos' orbit being below the synchronization orbit although the Mars' atmosphere is just 1% of Earth's whereas the orbiting direction of the Martian Deimos is prograde thus the Martian greenhouse-effect-driven force seems not to influence Deimos for Deimos' orbit being just above the synchronization orbit; The Neptunian Triton behaves in the same way.

(7) The planets' orbits must be elliptic for the reduced Sun's heat push upon the effect of the heat-cold wave neutralization upon the head-to-head collision of those waves at the loci of the planets' Equinoxes. The degree of heat-cold wave neutralization is least when the planets reach the aphelion and the perihelion to the effect that Earth experiences the extreme heat in the Northern Hemisphere and in the Southern Hemisphere respectively when Earth reaches the aphelion and perihelion. Either, the planets' axial tilt is being attributed to the extreme temperature difference between the dayside and the leeside at the very same loci of Earth.

(8) The Earth's extreme cold at the Poles is induced by cold waves coming from far North and South as Earth does not own a cold engine at the Poles.

It will be possible to let a spacecraft reach another star system by navigating in the direction of flow of the cold stream which supports the targeted star system, whereas a spacecraft navigating in the counter direction to the flow of the cold stream may reach the source of the cold if and only if the spacecraft will be endlessly accelerating upon the support of the cold in terms of the fuel upon harnessing the resisting cold.

There is this question of a moon to be formed in place or to be captured? If it gets settled that the Genesis Line at ∑F=0 had existed in the dark before the Sun gained its fully-fledged heat pump to initiate the orbiting of its planets, it means that whirlwinds caused the molding of all planets and the majority of the moons into spheroids on the Genesis Line including the molding of the Sun itself to the effect that the Sun's axial rotation is inherent. The issue of a moon to have been molded in place or being captured afterwards does not arise because every moon must have been captured at kick-off. If the Sun had concentrated pulling gravity before kick-off, then everything else could have prematurely collided into the Sun thus gravity is a result of a push instead of a pull thus the Newton's law of gravity [8, 9, 12] contradicts the Newton's 1st law of motion [12].

## Abbreviations

| | |
|---|---|
| D | Planet's diameter, km |
| $E_{Sun}$ | Sun's total emissive power, watt per square meter |
| GHEF | Greenhouse effect factor, Kelvin times angular degrees |
| $\vec{I}$ | A Unit Vector in the Horizontal Axis in the I-J Plane, dimensionless |
| $\vec{J}$ | A Unit Vector in the Vertical Axis in the I-J Plane, dimensionless |
| LIGO | Laser Interferometer Gravitational-Wave Observatory, dimensionless |
| $\bar{M}_{Sun}$ | Sun's surface gravity on the Sun's surface, kg per square meter |
| $m$ | Constant of proportionality, (600 / 360.017) Kelvin per angular degrees |
| $S_{Ellipse}$ | Earth's distance from the Sun as a function of Earth's mean dayside temperature, km |
| $\vec{S}_{Ellipse}$ | Locus of Earth as a function of the Earth's angular displacement and the Earth's mean dayside temperature, km |

| | |
|---|---|
| $S_{Mean}$ | Earth's mean distance from the Sun, km |
| $S_{Planet}$ | Planet's mean distance from the Sun, km |
| T | Earth's mean location-dependent dayside temperature, Kelvin |
| $T_{Max}$ | Maximum Earth's Mean dayside Temperature with reference to Earth's position at the aphelion, Kelvin |
| ΔT | Mean temperature difference between the planets' dayside and the leeside, Kelvin |
| $\Delta T_{Max}$ | Real planet's maximum temperature difference between the dayside and the leeside, Kelvin |
| ΔS | Earth's specific ellipse factor, km |
| ε | Drag force constant, 1 / ( square Kelvin ) |
| $f$ | Planet's axial period of rotation, Earth days |
| ω | Planet's orbital period, Earth days |
| ϕ | Planet's absolute axial tilt, angular degrees |
| θ | Planets' relative axial tilt, angular degrees |
| β | Earth's Angular Displacement Relative to the Horizontal Line Cutting Through the Aphelion Through the Perihelion, Angular Degrees |
| λ | Sun's Emissive Heat Escape Factor, Watt Per kg (equals to 1 watt per kg) |

## Author Contributions

Charles Edward Ng'hwaya Masule is the sole author. The author read and approved the final manuscript.

## Conflicts of Interest

The author declares no conflicts of interest.

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