INTRODUCTION:

According to famous Greek mythology, the world is carried and moved by the giant Titanic Atlas on his shoulders.

Even today, by the 21st century, do we have a better theorization to explain the lateral dynamic stability of a planet in its orbital motion around the Sun?

Newtonian mechanics explains explicitly how the radial orbital position of a planet is dynamically decided by balance of the two forces such as; the **Gravitational Attraction** (towards the gravity source) and **Centrifugal Force.** (away from the gravity source)

But what is so far unexplained?

1. The lateral force(**motive force**) in support of orbital motion, and
2. The **buffering force** to balance the motive force in order to maintain uniformity in orbital motion.

People never bothered of an **orbital motive force** regarding planetary motion because of the erroneous concept that, 'space is a vacuum medium which is **free of friction** against motion'. Therefore they thought that planets have ever been orbiting and also some of them are rotating around themselves too, so as they were tossed somehow at the origin of the universe.

But scientists of the mediatory period seem to have understood that the space is occupied by a certain **medium which should have a density** and a pressure too. But they were unable to figure them out.

However the logic says motion in the space must definitely be **resistive** if it is occupied by a medium. That is because a stock of medium mass is always **dragged** by the moving body. And in support of the logic, we could observe, manmade satellites come down and collapse upon Earth ultimately by losing the designed speed gradually in face of the **space medium resistance**. Unless the medium was resistive, they should have been orbiting forever without coming down.

Similarly in support of the **orbital motive force**, Scientists have observed that rotation of Earth gives some support for the satellites which orbit in the same **direction of the planet's rotation**. In that phenomenon, a satellite which orbits from **East to West** must come down sooner to hit upon the ground while the one who orbits from **West to East** stays longer in due orbital position.

The phenomenon which creates the **orbital motive force** upon planets was introduced by the **Theory of Gravity Deviation** (Space Dynamics- V2/2009) such as the lateral force on planets due to **spinning of the gravity source;** the Sun.
That is simply, the gravitational wave transmitted from the sun have got a lateral velocity too in the rotating direction of Sun. Therefore when it reaches the Earth the resultant direction is deviated by an angle which can be derived as shown in the figure-02. Therein the **orbital motive force** on the planet is explained.

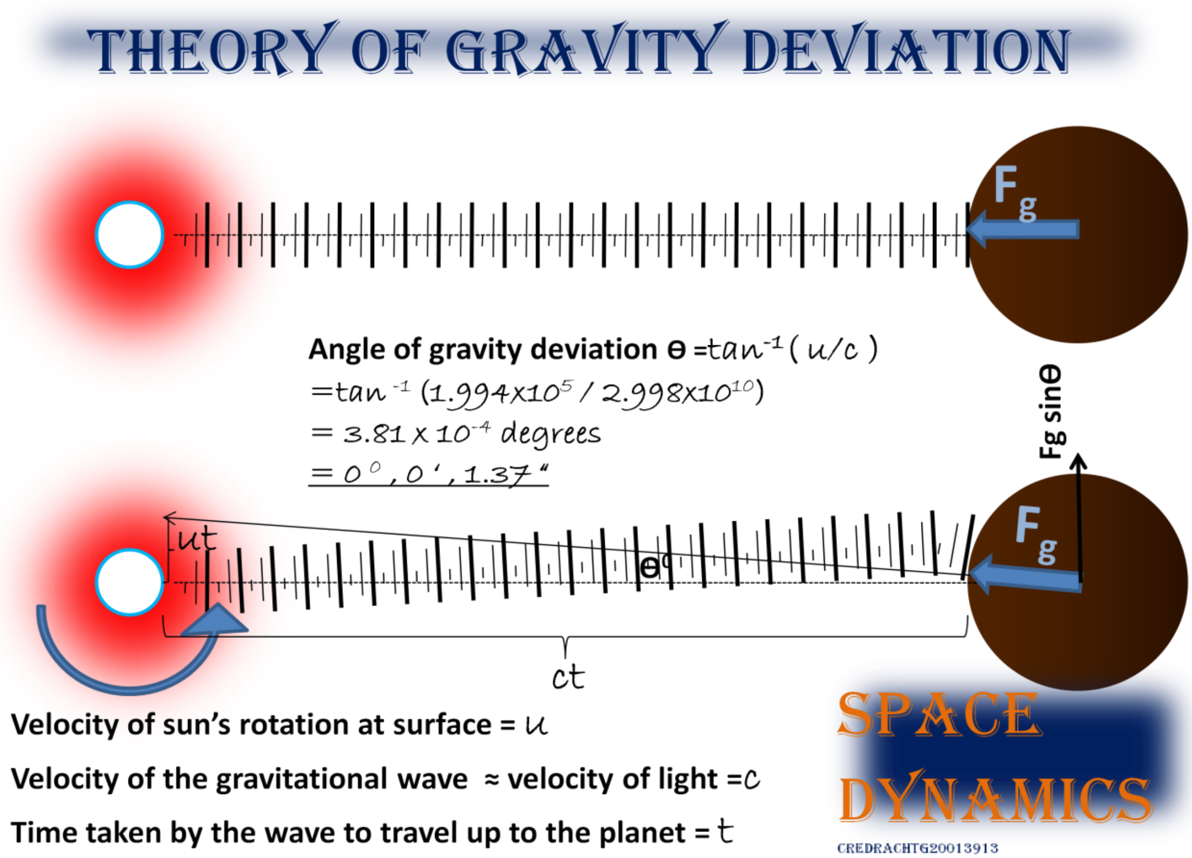


FIGURE-01

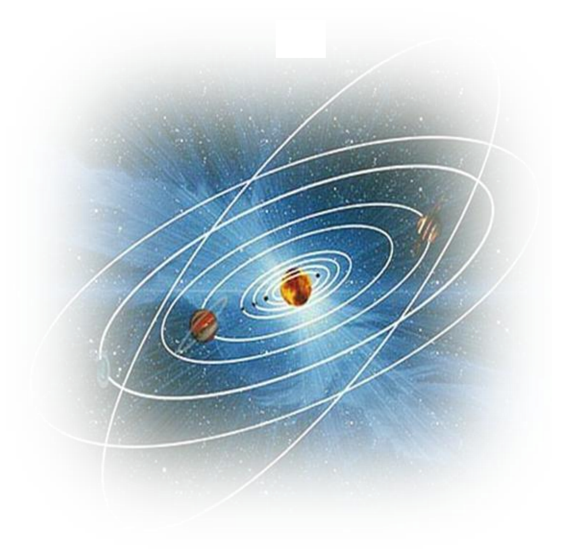
It also gives the important message that our planetary system could not orbit unless the gravity source –Sun- were a spinner.(for more details, please refer space dynamics –V2/2009 for mechanism of gravity, gravitational wave , static work done of gravity and theory of gravity deviation.)

This experimental technical monograph is aimed to introduce mainly the **two forces** which ought to be in balance to establish the dynamic stability of planets in orbital motion about the Sun such as;

1. The lateral force component applied due to '**Gravity Deviation'** of the spinning Gravity Source-Sun. [the reader must pay attention herein upon the reality that, any non spinning gravity source cannot have natural orbiting objects around itself. It is proven by the non spinning planets in our solar system which don't posses moons.]
2. The other force introduced herein is the **'Space Resistance'** applied against motion of planets by the space medium

In addition to that, case study calculations on dynamic stability in orbital motion of each planet, starting from **Mercury** to **Pluto**, is furnished in this report.

Dynamic Stability in bi-orbital motion of the Moon is not addressed in this technical monograph because of the complexity of its calculations [moon is driven by the **combined motive forces** of both Earth and the Sun as well]



Ultimately the most important parameter, **Density of the Space Medium**- ρ_o is mathematically derived at each planet and to the explorer's astonishment it was exhibited that the medium density of the solar system has a **gradual increment** towards the Sun.

Readers could recollect that the 'Density of the Space Medium' had been worked out in the former monograph '**SPACE DYNAMICS Volume-1/2009** such as;

$\rho_o = 4.773 \times 10^{-4}\ g/cm^3$.

In that analysis we have worked upon the hypothesis that, a **Hydrogen atom** (*as Astrologists explain, the origin of the universe should be out of a thick cloud of hydrogen gas*) is born by expansion of a **Neutron.** (*dark matter has to be identified as a densely packed mass of neutrons*), being exposed to the high **pressure** of the space medium.

That was a quite different of an approach for deduction of ρ_o,the density of space medium. But surprisingly the figure derived herein under the different concept of '**Space Medium Resistance**' too is found to tally with the former figure. Besides that a gradual variation of medium density towards Sun, was also observed in the mathematical deductions executed from Mercury to Pluto.

It gives us some important clues such as;

i. The space medium density is dropped towards **away from the Sun** and,

ii. The medium density is also dropped **away from the Galactic Center**.

Medium pressure too must exhibit a similar variation as per the relation
$\mathbf{P_0 = \frac{1}{2} \rho_0 c^2}$ (pl ref 'Space Dynamics/volume-1/2009' for proof of the relation)

Besides all that, the universal equation derived in this letter for **Space Medium Resistance** must be of immense importance for **Aeronautic Engineering** too, because the exact resistive force in the space, against motion of satellites and spacecrafts can be deduced explicitly by the equation.

DESCRIPTIVE ANALYSIS:

01. Lateral force component of 'Gravity Deviation' by the Spinning Source and the force of 'Medium Resistance' which are at equilibrium to explain Dynamic Lateral Stability in Orbital Motion of planets.

1- THE EQUATION FOR MEDIUM RESISTANCE:

1. ***Medium Resistance Vs effective cross sectional area of the moving body –[A_c]***

   Resistance against motion becomes high if the frontal cross sectional area of the body is big. Therefore resistance $\mathcal{R}$ is directly proportionate to $\mathcal{A}_c$

2. ***Medium Resistance Vs effective surface area of the moving body- [A_S]***

   Moreover surface area is not even considered in calculations by analysts but it shares a big contribution to resistance against motion. In case of a moving planet in the space, resistance becomes high if the planet surface is uneven and rough with high raised solid obstacles. There is a big difference between **actual area** and the **theoretical area** of a land. Theoretical area is the **plan area** of a land and it is always lesser than the actual area because actual area is comprised with hilly, sloppy and all shapes of irregularities exist in the land.

If you reduce the **theoretical land** from the **actual land** then the area you get is entirely of the **projections**. Also, one half of that total projected area must stand out from the land to disturb the passing medium flux in motion. Therefore that area can be deduced such as;

Effective surface area $A_s = 1/2$ (actual area A'' -theoretical area A')

$$A_s = 1/2 (A'' - A');$$

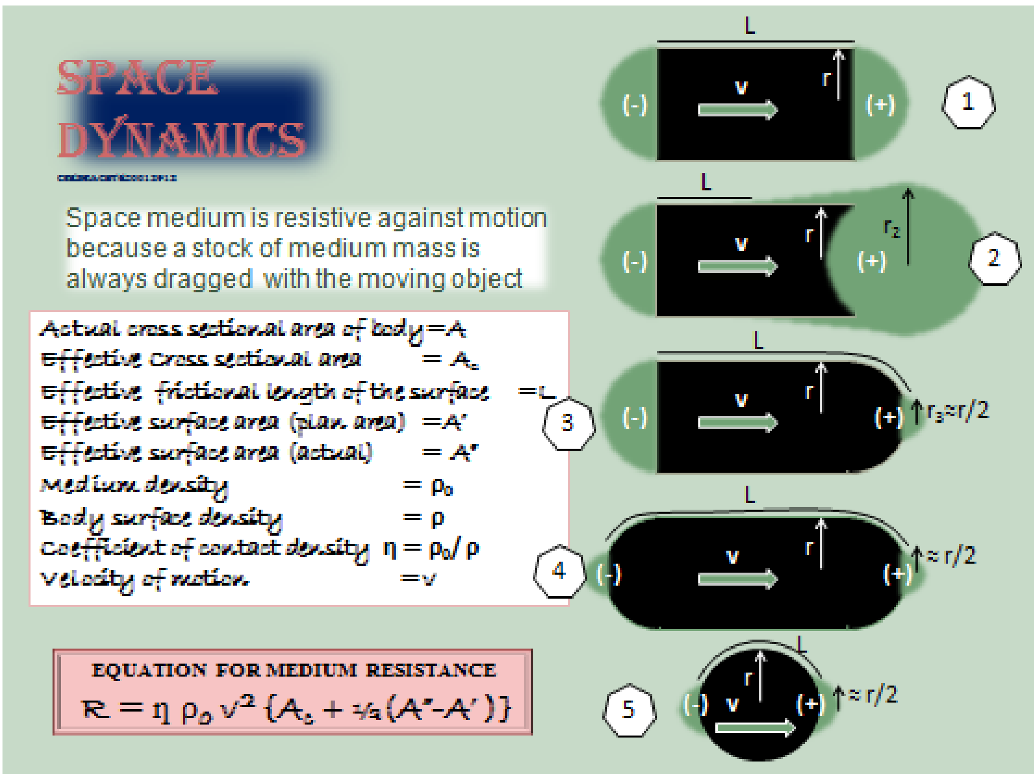


FIGURE-02

- As shown in the figure-02, **body shape** of a moving object decides almost everything of the medium resistance against motion. Therefore designers must pay their attention for these fluid dynamic factors in designing their aircrafts, satellites, space crafts and submarines etc.
- **Effective radius** r, to calculate effective cross sectional area, A_c has to be deduced carefully because it varies with the shape of the body face. In the 1st case as shown in the figure-02, a cylindrical object with flat end faces is moved. The medium mass profile heaped upon the frontal face is responsible to create nearly a half of the total resistive force. The other half of the force is applied at the back of the moving body due to

negative pressure. Besides that the surface length 'L' has to be considered for frictional force against motion.

- In the 2nd case, the resistance has been increased due to the odd shape of the body face, because the effective radius of the pressure profile becomes bigger.

- In the 3rd case, only the frontal face has been designed to reduce the resistance and therefore the effective radius has been reduced nearly to half. But the resistance from the back has not been reduced.
- As shown in the 4th case of figure-02, both front and back faces have been designed to reduce the resistance effectively. But it is observed that a bigger surface area has been exposed for friction.
- A globe is shown in the 5th case and it is the best shape for lesser resistance, among all the shapes considered.

3. *Medium Resistance Vs density of the medium- [ρ_0]*

A stock of **media mass** is always **dragged** by the moving body. It indicates that a **momentum** is always **transferred** to the medium by the moving body. The transfer of momentum per second is the **impulsive force** on the body which is ultimately recognized as the **resistance.**

Therefore the medium resistance- R is directly proportionate to the medium density ρ_0 and if the medium is denser the resistance too becomes high.

4. *Medium Resistance Vs velocity of the moving body- [V]*

Pressure of any fluid at motion is given by the known expression such as;

$$P = 1/2 \ \rho_0 V^2$$

If any obstacle of effective area A is put there to disturb a moving flux of medium mass, then the impulsive force upon that obstacle- $F = 2A(1/2 \ \rho_0 V^2) = A \ \rho_0 V^2$.

(Effective area has been **doubled** because a positive pressure is developed in front of the moving body while a negative pressure too is developed at the back.)

In contrary, when the obstacle is moving through the static medium, then the same force as derived above is applied against the moving body and it is recognized by us as the **medium resistance**.

Therefore by combination of the so far deduced realities the expression for medium resistance can be derived such as; $R = k A \rho_0 V^2$. Where k is a constant and

A_e = effective cross sectional area + effective surface area

$$A_e = A_c + A_s$$

$$A_e = A_c + 1/2(A'' - A')$$

Therefore resistance can be derived from $R = k A \rho_0 V^2$

$$R = k \rho_0 V^2 \{A_c + 1/2(A'' - A')\}$$

5. ***Medium Resistance Vs density of the surface material of the moving body-[ρ]***

By now the equation seems being formed but still the most important parameter, the **surface density** of the moving body- ρ, has not been considered. Then the constant k in the above expression must represent for that parameter but it must have no units. Most probably it must be a ratio and let's name it as;

'Contact Constant of surface materials' $\eta = (\rho_0 / \rho)$.

In case $\rho_0 = \rho$, $\eta = 1$ and that is practically proofed to be correct. For an instant, iron has the greatest frictional resistance against iron itself and that's why the both railway lines and wheels are made of the same material.

In case $\rho_0 = 0$, $\eta = 0$ and the resistance R too becomes zero. It exhibits the reality because there is no resistance in the space for motion if the medium density was zero. But unfortunately the space medium has a density and therefore any motion in the space become resistive.

In case ρ is very high, then the ratio $\eta \approx 0$ and resistance become zero. That is also proven in reality that, projection of denser energy particles such as Gama rays travels far without having a considerable resistance to stop it.

By now the **universal equation for medium resistance** has been formed to use such as;

❖ $$R = \eta \rho_0 V^2 \{A_c + 1/2(A'' - A')\}$$

2- THE ORBITAL MOTIVE FORCE ON PLANETS:

In consideration of planetary dynamics, the radial stability was well explained by the Newtonian mechanics but orbital stability has yet to be explained if the space medium is resistive.

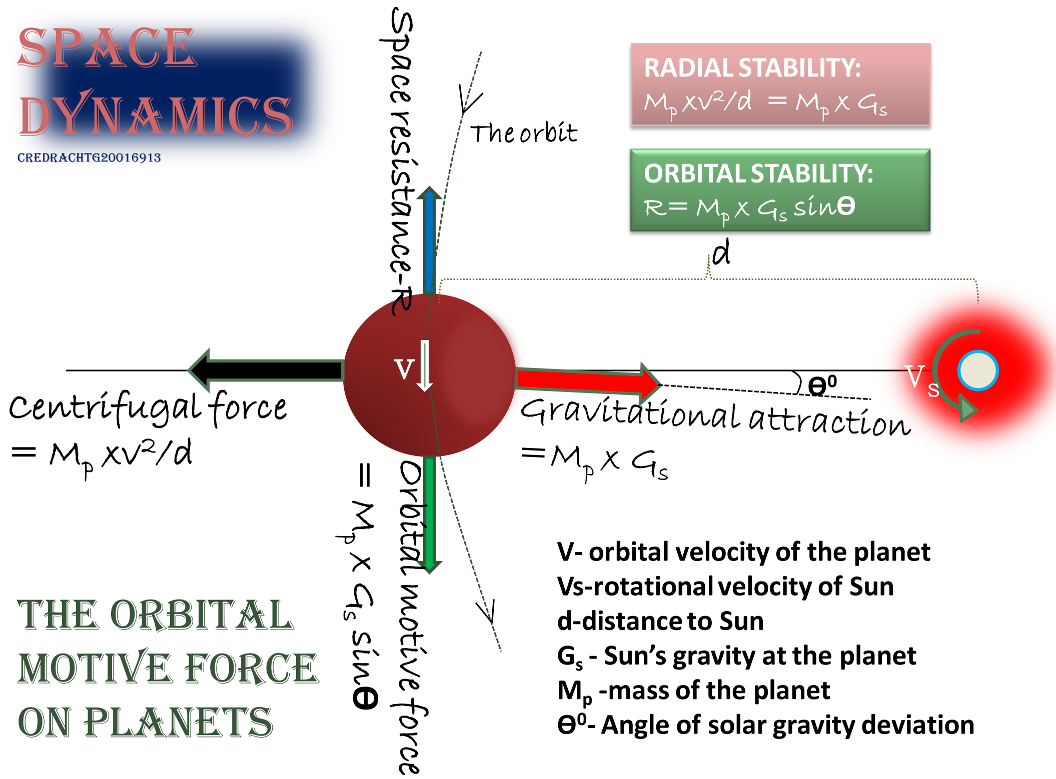


FIGURE-03

As shown in the figure-03, lateral force component by the deviated solar gravity (**M_p x G_s sinΘ**) is applied on planets to move in the orbit against space resistance.

Orbital motive force- $F_m = M_p \times G_s \sin\Theta$

By now the mathematical expressions to derive the two lateral forces upon a planet are ready for the analysis but before going to case studies we have to get clear the two main facts such as;

1. What is the surface area of a planet could be considered for **frictional resistance**? (*It is our practical experience that, nearly ¼ th of the cross sectional area of a globe is responsible for the direct medium resistance.*)

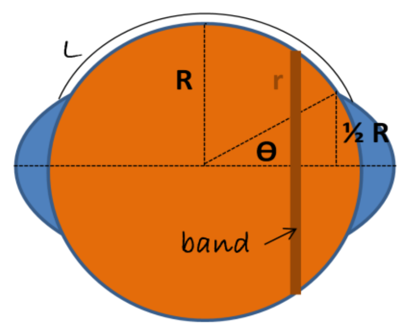
Area of the band $= 2\pi r(R\delta\Theta) = 2\pi R\sin\Theta\,(R\delta\Theta)$

$= 2\pi R^2 \sin\Theta\,\delta\Theta$

Surface area for resistance $= 2\pi R^2 \int_{\pi/6}^{\pi/2} (\sin\Theta\,\delta\Theta)$

$= 1.73(\pi R^2)$

$A' = 1.73\,(A)$................(1)



2. What is the **actual surface area A"?** It should be comprised with all the topographical **irregularities** on the surface of a planet.

   Surface of a planet must be formed with lots of unevenness such as, craters, mountains, rocky projections etc. In addition to such common features, our planet Earth possess **high rising buildings** too which is worth considering on **frictional resistance** against motion. (This matter has to be addressed separately for Environmentalist's attention because '**Global Slowing**' and due **Departing of Moon** seem to have some direct bearing upon the phenomenon).

   However for simplicity in calculations only a common surface for all the planets is considered in this calculations and the **Pyramid Approach** is applied herein for calculation of the **effective area for surface friction**.

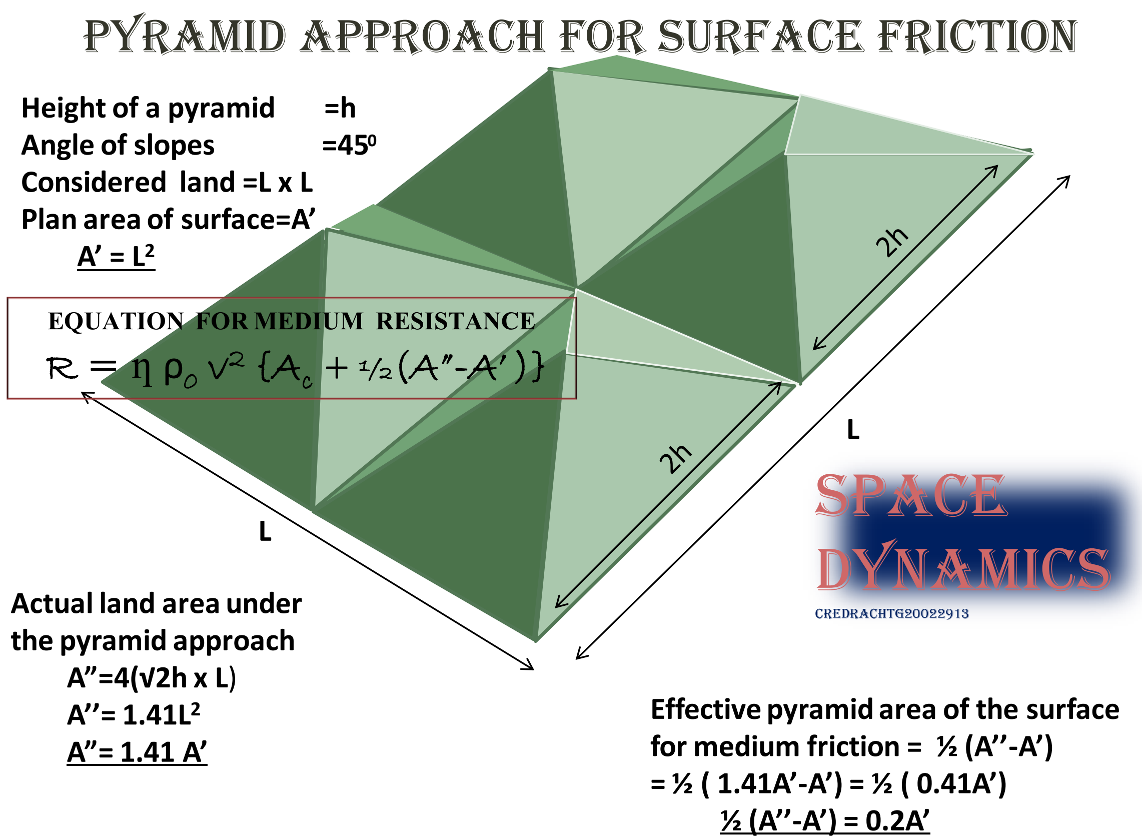


FIGURE-04

What is friction?

As shown in the figure-04, the effective pyramid area for surface friction is derived as 0.2 A', where A' is the plan area of the surface. And ultimately what we have to understand is, **Friction** is not due to cohesion between surfaces but due to '**how much of land stands against motion**'. If the two surfaces are solid, the friction is the force to shear cut of all the pyramids which stands against moving. But in our consideration, one surface is solid and the other is fluidic and therefore friction is born as the force due to change of momentum of the moving fluid.

As derived above in the equation-(1), gives; **A' = 1.73 (A)…………….(1)** where A is the total cross sectional area of the planet.

Therefore we can simplify our expression as; ½(A"-A') =0.2 A' =0.2x1.73 A = **<u>0.346 A</u>**

Similarly the total resistance for motion on a planet can be deduced from the universal equation for Resistance, such as;

$$R = \eta\, \rho_0\, V^2 \{A_c + 1/2(A''-A')\}$$

For a planet, $A_c = \pi(R/2)^2 = 0.25\,(\pi R^2) = 0.25A$;

Therefore $R_p = \eta\, \rho_0\, V^2 \{0.25A + 0.346A\}$

❖ $R_p = \eta\, \rho_0\, V^2\, (0.596A)$

By now we can start our analysis for dynamic orbital stability of planets.

02. Case study with typical calculations for dynamic equilibrium in 'Orbital Motion' of planets in the Solar System

1. **<u>Orbital Stability of Mercury:</u>**

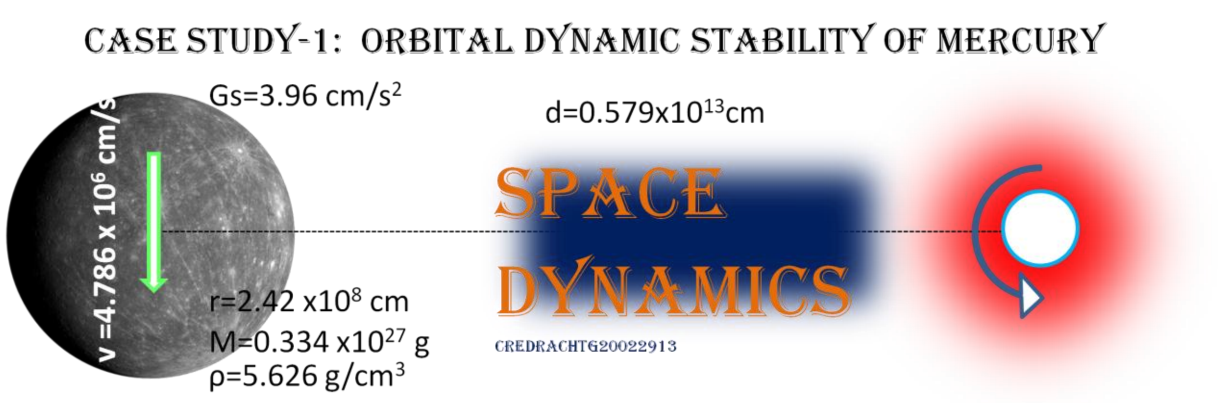


FIGURE-05

<u>Known data</u>:

Mass of Sun=1.991×10^{33} g

Gravitational constant=6.668×10^{-8}

Mean Distance to Sun=0.579×10^{13} cm

Mass of Mercury, m=0.334×10^{27} g

Solar gravity at Mercury Gs=3.96 cm/s2

Angle of solar gravity deviation= ϴ

ϴ= $(3.81 \times 10^{-4})^{O}$

ϴ =0^0, 0', 1.37" (ref. figure-01/page-2)

<u>Deductions</u>:

Calculations:

Orbital motive force on Mercury:-

F_m =m G_s sin Θ =(0.334 x 10^{27} g)(3.96 cm/s^2)(sin 0^0, 0', 1.37")

F_m= 8.785 x 10^{21} dynes

Medium resistance against motion:- $R_p = \eta\, \rho_0 V^2 (0.596A)$

Contact constant of surface materials $\eta = (\rho_0 / \rho)$. (pl ref page-7)

Cross sectional area of the planet A = л(2.42 x 10^8cm)^2 =1.839 x10^{17}

Density of Mercury ρ = mass/volume =5.626 g/cm^3

Therefore medium resistance on Mercury R_p= $(\rho_0 / \rho)\, \rho_0$ x v^2(0.596A)

= $(\rho_0 / 5.626)\, \rho_0$ [4.786 x 10^6 cm/s)^2 x0.596(1.839 x 10^{17})

R_p = 7.99 x10^{29} ρ_0^2

For lateral stability in orbital motion; $F_m = R_p$

7.99 x10^{29} ρ_0^2= 8.785 x 10^{21}

ρ_0=1.05 x 10^{-4} g/cm^3

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Discussion:

(The result stands for the density of the space medium at Mercury, the closest planet to the Sun. let's compare it with the figure ρ_0 *= 4.773 x* 10^{-4} *g/cm*^{3} *that had been derived by a different analysis as published in 2009. It says the important fact that medium density at the galactic centre is nearly four times bigger than that about the center of our solar system.)*

2. **Orbital stability of Venus:**

CASE STUDY-2: ORBITAL DYNAMIC STABILITY OF VENUS

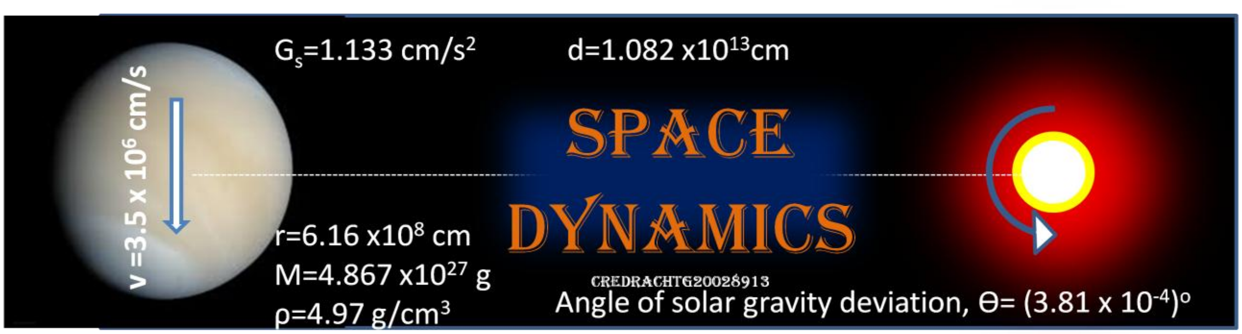

FIGURE-06

Calculations:

Orbital Motive Force on Venus:-

$$F_m = m\, G_s \sin \Theta = (4.864 \times 10^{27}\ g)(1.133\ cm/s^2) \times \sin(3.81 \times 10^{-4})^0$$

$$\underline{\mathbf{F_m = 3.664 \times 10^{22}\ dynes}}$$

Medium Resistance against motion:- $R_p = \eta\, \rho_0\, V^2\, (0.596A)$

Contact Constant of surface materials $\eta = (\rho_0 / \rho)$. (pl ref page-7)

Cross sectional area of the planet $A = \pi(6.16 \times 10^8 cm)^2 = 1.192 \times 10^{18}$

Density of Venus ρ = mass/volume $= 4.97\ g/cm^3$

Therefore medium resistance on Venus $R_p = (\rho_0 / \rho)\, \rho_0 \times v^2 (0.596A)$

$$= (\rho_0 / 4.97)\, \rho_0\ [3.5 \times 10^6\ cm/s)^2 \times 0.596(1.192 \times 10^{18})$$

$$\underline{R_p = 1.751 \times 10^{30}\, \rho_0^2}$$

For lateral stability in orbital motion; $\underline{F_m = R_p}$

$$1.751 \times 10^{30}\, \rho_0^2 = 3.664 \times 10^{22}$$

$$\rho_0 = 1.446 \times 10^{-4}\ g/cm^3$$

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Discussion:

*The result stands for the density of the space medium at Venus, the 2nd planet from Sun. Both Mercury and Venus as well, are **Non Productive** planets. They don't have a significant rotation about themselves and don't posses Moons. But Venus has a different surface features because it possess a thick atmosphere. Therefore the effective cross section area 'A' of the planet must be a bit bigger than the theoretical area and hence the figure ρ_0 should be a bit lower than the above value.*

3. **Orbital stability of Earth:**

CASE STUDY-3: ORBITAL DYNAMIC STABILITY OF EARTH

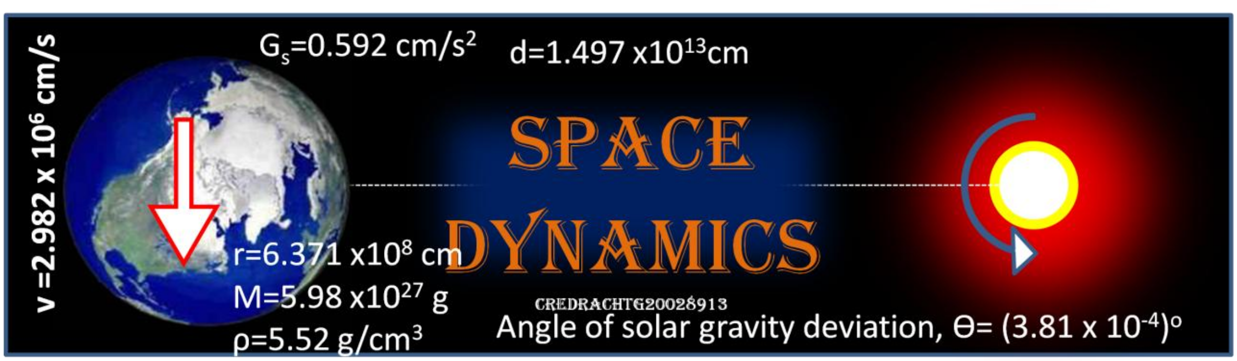

FIGURE-07

Calculations:

Orbital Motive Force on Earth:-

F_m =m G_s sin ϴ =(5.98 x 10^{27} g)(0.592 cm/s^2)x sin(3.81 x 10^{-4})^0

F_m= 2.354 x 10^{22} dynes

Medium Resistance against motion:- $R_p = \eta \rho_0 V^2 (0.596A)$

Contact Constant of surface materials $\eta = (\rho_0 / \rho)$. (pl ref page-7)

Cross sectional area of the planet A = л(6.371 x 10^8cm)^2 =1.275 x10^{18}

Density of Earth ρ = mass/volume =5.52 g/cm^3

Therefore medium resistance on Earth R_p= $(\rho_0 / \rho)\, \rho_0$ x v ^{2}(0.596A)

= $(\rho_0 / 5.52)\, \rho_0$ [2.982 x 10^6 cm/s]^2 x 0.596(1.275 x 10^{18})

R_p = 1.224 x10^{30} ρ_0^2

For lateral stability in orbital motion; $F_m = R_p$

1.224x10^{30} ρ_0^2= 2.354 x 10^{22}

ρ_0=1.386 x 10^{-4} g/cm^3

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Discussion:

The result stands for the density of the space medium at Earth, the 3rd planet from Sun. Ours is the 1st ***Productive Planet*** *from Sun and it has a significant rotation about the geomagnetic polar axis. A productive planet must have a considerable magnetic field, an atmosphere and at least a single Moon orbiting around. (pl ref-**Earth Mechanism/Space Dynamics/2011**) Earth too, has a thick atmosphere and therefore the effective cross section area 'A' of the planet must be a bit bigger than the theoretical area and hence the figure ρ_0 should be a bit lower than the above value.*

4. **Orbital stability of Mars:**

CASE STUDY-4: ORBITAL DYNAMIC STABILITY OF MARS

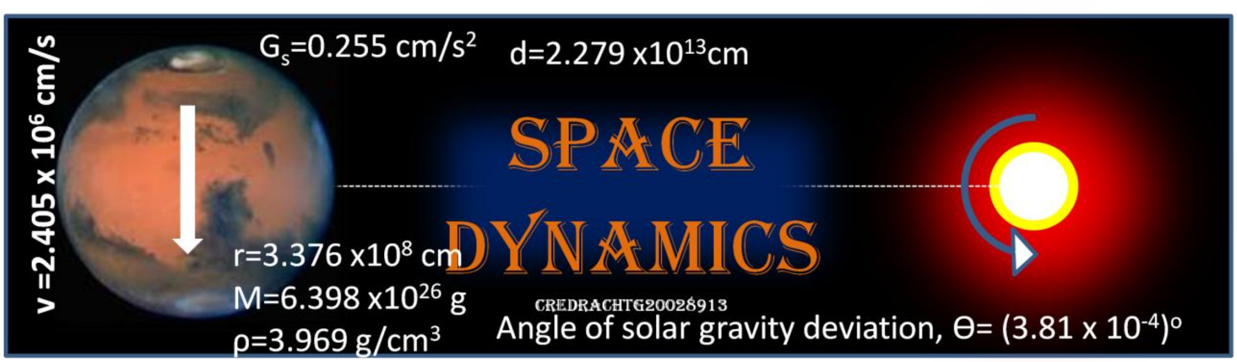

FIGURE-08

Calculations:

Orbital Motive Force on Mars:-

$F_m = m\ G_s \sin \Theta = (6.398 \times 10^{26} g)(0.255\ cm/s^2) x \sin(3.81 \times 10^{-4})^0$

$\underline{\mathbf{F_m = 1.084 \times 10^{21}\ dynes}}$

Medium Resistance against motion:- $R_p = \eta\ \rho_0\ V^2\ (0.596A)$

Contact Constant of surface materials $\eta = (\rho_0 / \rho)$. (pl ref page-7)

Cross sectional area of the planet A = $\pi(3.376 \times 10^8 cm)^2 = 3.58 \times 10^{17}$

Density of Mars ρ = mass/volume =3.969 g/cm^3

Therefore medium resistance on Mars $R_p = (\rho_0 / \rho)\ \rho_0 \times v^2 (0.596A)$

$= (\rho_0 / 3.969)\ \rho_0\ [2.405 \times 10^6\ cm/s]^2 \times 0.596(3.58 \times 10^{17})$

$\underline{R_p = 3.109 \times 10^{29}\ \rho_0^2}$

For lateral stability in orbital motion; $\mathbf{F_m} = R_p$

$3.109 \times 10^{29}\ \rho_0^2 = 1.084 \times 10^{21}$

$\rho_0 = 5.904 \times 10^{-5}\ g/cm^3$

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Discussion:

The result stands for the density of the space medium at Mars, the 4^rd planet from Sun. Mars had been a ***Productive Planet*** *in the past and it might have undergone a serious change. It doesn't have a considerably strong magnetic field at present.*

Planetary magnetism *is born due to the inner* ***spherical vortex of charged particles*** *and accordingly, the hard crust too is magnetized. But whenever the vortex is faded out, then only the weak permanent magnetic field in the crust is remained. (pl ref-***Earth Mechanism/Space Dynamics/2011***)*

However Mars is a lost world and it has been ***slowing down in spinning****. As per the theory of* ***Gravity Deviation****, Moons are driven by spinning of the planets and when spinning is slowing, moons should come down to settle upon the planet. With all evidences, the moon 'Phobos' is on the way accelerating to meet his dead mother.*

However the value of medium density, as derived $\rho_0 = 5.904 \times 10^{-5}\ g/cm^3$ *, seems realistic enough because Mars doesn't have a thick atmosphere at present.*

5. Orbital stability of Jupiter:

CASE STUDY-5: ORBITAL DYNAMIC STABILITY OF JUPITER

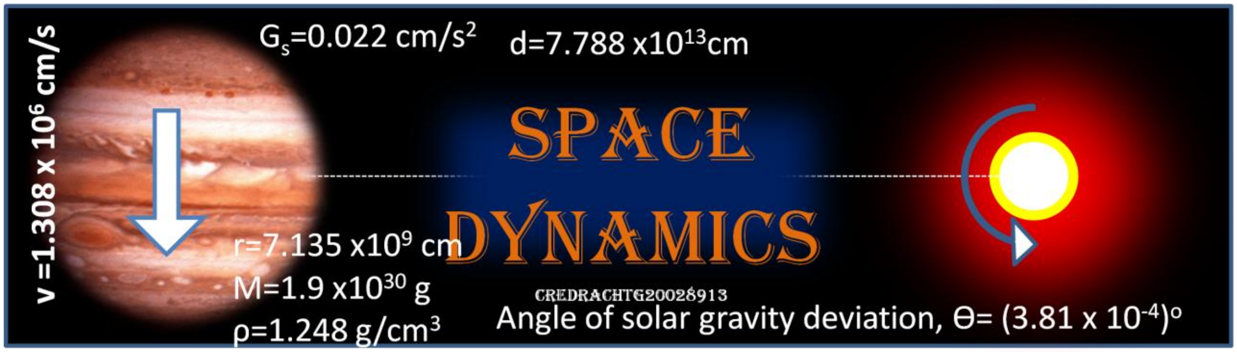

FIGURE-09

Calculations:

Orbital Motive Force on Jupiter:-

F_m =m G_s sin Ө =(1.9 x 10^{30}g)(0.022 cm/s^2)x sin(3.81 x 10^{-4})^0

F_m= 2.779 x 10^{23} dynes

Medium Resistance against motion:- $R_p = \eta\, \rho_0\, V^2\, (0.596A)$

Contact Constant of surface materials $\eta = (\rho_0 / \rho)$. (pl ref page-7)

Cross sectional area of the planet A = л(7.135 x 10^9cm)^2 =1.599 x10^{20}

Density of Jupiter ρ = mass/volume =1.248 g/cm^3

Therefore medium resistance on Jupiter R_p= $(\rho_0 / \rho)\, \rho_0$ x v ^{2}(0.596A)

= $(\rho_0 / 1.248)\, \rho_0$ [1.308 x 10^6 cm/s]^2 x 0.596(1.599 x 10^{20})

R_p = 1.306 x10^{32} ρ_0^2

For lateral stability in orbital motion; $F_m = R_p$

1.306 x10^{32} ρ_0^2= 2.779 x 10^{23}

ρ_0=4.612 x 10^{-5} g/cm^3

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Discussion:

*The result stands for the density of the space medium at Jupiter, the 5th planet from Sun. Jupiter is of the **highest productivity** in the planetary system. Density of Jupiter,* 1.248 g/cm^3 *, gives us the wrong information that the planet must be entirely a liquid giant. But a productive planet must be a **hollow glob** with an inner dynamic organization called **spherical vortex of charged particles** and that's why we get a low figure for the planet's density. The mantel must be hard enough and at least of the density of **magma**. (pl ref- Theory of Inverted Gravity and formation* *of Hollow Globes/2012). However the above result exhibits that the medium density is at a gradual drop outwards from Sun.*

6. Orbital stability of Saturn:

CASE STUDY-6: ORBITAL DYNAMIC STABILITY OF SATURN

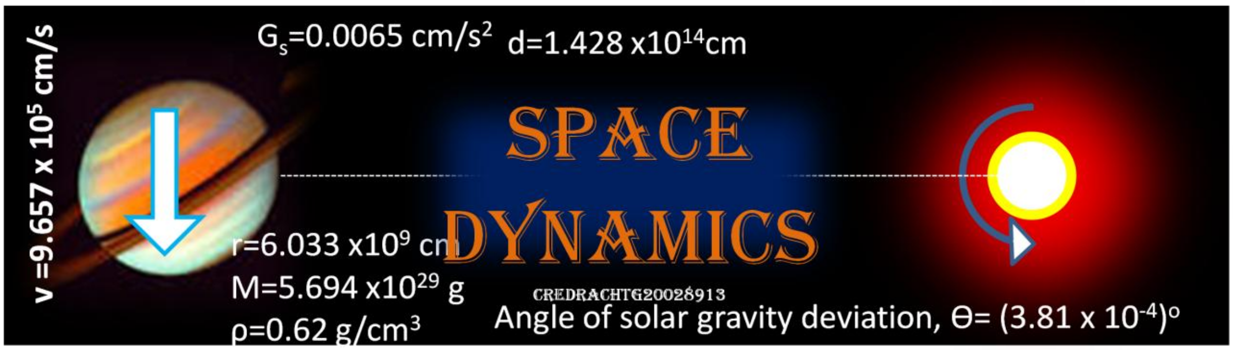


FIGURE-10

Calculations:

Orbital Motive Force on Saturn:-

$F_m = m\ G_s \sin \Theta = (5.694\text{x } 10^{29}\text{g})(\ 0.0065\text{ cm/s}^2)\text{x } \sin(3.81 \text{ x } 10^{-4})^0$

$\underline{F_m = 2.461\text{x } 10^{22} \text{ dynes}}$

Medium Resistance against motion:- $R_p = \eta\ \rho_0\ V^2\ (0.596A)$

Contact Constant of surface materials $\eta = (\rho_0 / \rho)$. (pl ref page-7)

Cross sectional area of the planet A = $\pi(6.033 \text{ x } 10^9\text{cm})^2 = 1.143 \text{ x}10^{20}$

Density of Saturn ρ = mass/volume =0.62 g/cm^3

Therefore medium resistance on Saturn $R_p = (\rho_0 / \rho)\ \rho_0 \text{ x } v^2(0.596A)$

$= (\rho_0 / 0.62)\ \rho_0\ [9.657 \text{ x } 10^5 \text{ cm/s}]^2 \text{ x } 0.596(1.143 \text{ x } 10^{20})$

$\underline{R_p = 1.024 \text{ x}10^{32}\ \rho_0}^2$

For lateral stability in orbital motion; $F_m = R_p$

$1.024 \text{ x}10^{32}\ \rho_0^2 = 2.779 \text{ x } 10^{23}$

$\rho_0 = 5.2 \text{ x } 10^{-5} \text{ g/cm}^3$

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

Discussion:

*The result stands for the density of the space medium at Saturn, the 6th planet from Sun. Saturn is of the second **highest productivity** in the planetary system. Density of Jupiter,0.62 g/cm^3, gives us the wrong information that the planet must entirely be made of liquids and gases. But a productive planet must essentially be a **hollow glob** and **t**he mantel must be hard enough to* *possess a* ***magma shell*** *of high density. (pl ref- Theory of Inverted Gravity and formation of Hollow Globes/2012). However realistically the above result must be a bit lower because Saturn surface must be more gassy than that of Jupiter and hence actual cross sectional area 'A' must be a bit higher than the theoretical value.*

7. **Orbital stability of Uranus:**

CASE STUDY-7: ORBITAL DYNAMIC STABILITY OF URANUS

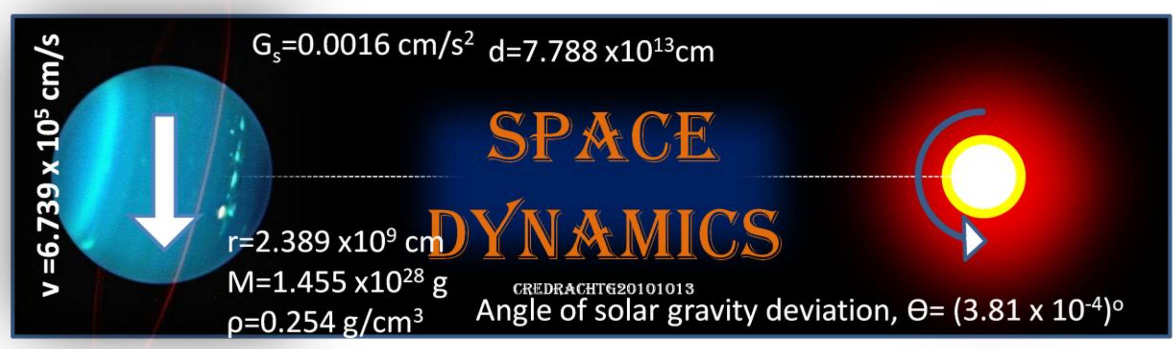


FIGURE-11

Calculations:

Orbital Motive Force on Uranus:-

$F_m = m\, G_s \sin \Theta = (1.455 \times 10^{28} g)(0.016\ cm/s^2) \times \sin(3.81 \times 10^{-4})^0$

$F_m = 1.548 \times 10^{20}$ dynes

Medium Resistance against motion:- $R_p = \eta\, \rho_0\, v^2\, (0.596A)$

Contact Constant of surface materials $\eta = (\rho_0 / \rho)$. (pl ref page-7)

Cross sectional area of the planet A = $\pi(2.389 \times 10^9 cm)^2 = 1.793 \times 10^{19}$

Density of Uranus ρ = mass/volume =0.254 g/cm^3

Therefore medium resistance on Uranus $R_p = (\rho_0 / \rho)\, \rho_0 \times v^2 (0.596A)$

$= (\rho_0 / 0.254)\, \rho_0\ [6.739 \times 10^5\ cm/s]^2 \times 0.596(1.793 \times 10^{19})$

$R_p = 1.91 \times 10^{31} \rho_0^2$

For lateral stability in orbital motion; $F_m = R_p$

$1.91 \times 10^{31} \rho_0^2 = 1.548 \times 10^{20}$

$\rho_0 = 2.846 \times 10^{-6}$ g/cm^3

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

Discussion:

The result stands for the density of the space medium at Uranus, the 7th planet from Sun. It shows that the medium density is at a gradual drop, outwards from Sun.

*The planet belongs to the group of **productive planets** in the planetary system and it has more than six moons in possession. But Density of Uranus,* 0.254 g/cm^3 *, gives us the wrong information that the planet must entirely be made of gases. But a productive planet must essentially be a **hollow glob** and **t**he mantel must be hard enough to possess a **magma shell** of high density. (pl ref- Theory of Inverted Gravity and formation of Hollow Globes/2012).*

8. **Orbital stability of Neptune:**

CASE STUDY-8: ORBITAL DYNAMIC STABILITY OF NEPTUNE

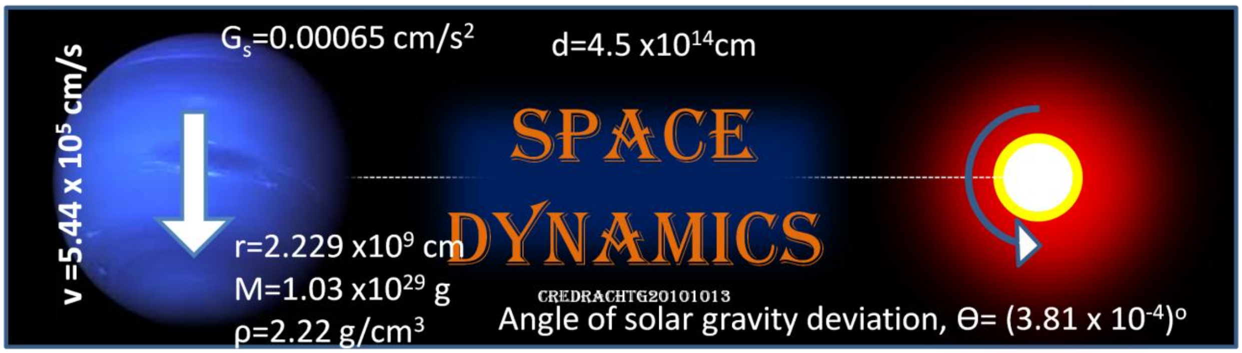


FIGURE-12

Calculations:

Orbital Motive Force on Neptune:-

F_m =m G_s sin ϴ =(1.03x 10^{29}g)(0.00065 cm/s^2)x sin(3.81 x 10^{-4})^0

F_m= 4.451x 10^{20} dynes

Medium Resistance against motion:- $R_p = \eta\, \rho_0\, V^2\, (0.596A)$

Contact Constant of surface materials $\eta = (\rho_o / \rho)$. (pl ref page-7)

Cross sectional area of the planet A = л(2.229 x 10^{9}cm)^2 =1.56 x10^{19}

Density of Neptune ρ = mass/volume = 2.220 g/cm^3

Therefore medium resistance on Neptune R_p= $(\rho_0 / \rho)\, \rho_0$ x v ^{2}(0.596A)

= $(\rho_0 / 2.22)\, \rho_0$ [5.44 x 10^5 cm/s]^2 x 0.596(1.56 x 10^{19})

R_p = 1.23 x10^{30} ρ_0^2

For lateral stability in orbital motion; **F_m=** R_p

1.23 x10^{30} ρ_0^2= 4.451 x 10^{20}

ρ_0=1.89 x 10^{-5} g/cm^3

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

Discussion:

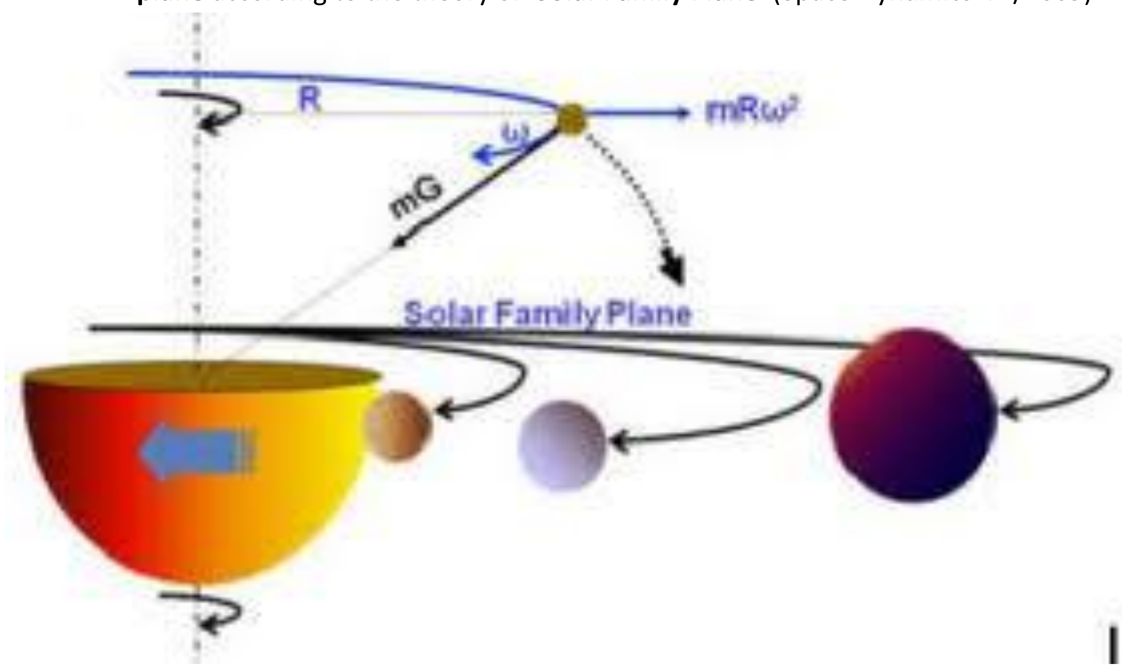
The result stands for the density of the space medium at Neptune, the 8th planet from Sun. It shows that the medium density is at a gradual drop, outwards from Sun.

*The planet belongs to the group of **productive planets** in the planetary system.*

Orbital stability of Pluto-Charon Couple Planet:

Data & deductions:

1. Pluto-Charon is a '**Couple Planet**' because the barycenter of the combined rotary system doesn't lie within any of the bodies
2. Pluto-Charon couple is '**Non Productive'** because they are not rotated by a magnetic field
3. Other four small moons of Pluto are just gravity gathered alien objects
4. The retrograde rotation and its direction can be explained explicitly by the theory of '**Space Medium Resistance**'(pl expect a separate technical monograph to explain Pluto dynamics)
5. Though the orbital plane of the Pluto-Charon couple had been tilted by born (most probably Pluto was born by an **off equatorial bang**, which could have taken place at a **magnetic reversal** of Neptune), it is being settling gradually to the **solar equatorial plane** according to the theory of '**Solar Family Plane**' (Space Dynamics-V2/2009)



6. Just like Mars, the lost world in the solar system, the Pluto-Charon couple too is not stable at present and being undergone a transition age.
7. The couple planet should become a single planet in future due to **Newtonian gravity** itself when rotational velocity is dropped against '**Space Medium Resistance'**. The present rotation of the couple is not sustainable because there is no magnetic field to support the dying rotation.

8. Without having a magnetic field Sun cannot activate the electromagnetic motor in Pluto and therefore the rotation could be held up in future. Without spinning Pluto cannot maintain satellites orbiting about because no **orbital motive force** is generated. Under such circumstances, Charon should join Pluto with all other small moons to combine. Not only Charon but other four small moons too should come down gradually to Pluto to settle ultimately as a single unit.
9. However the **'Pluto-Charon couple'** has to be considered as a **non productive developing planet** in our solar system. Therefore '**dwarf planet'** is the best name to address Pluto.

CASE STUDY-9:
ORBITAL DYNAMIC STABILITY OF PLUTO-CHARON COUPLE PLANET

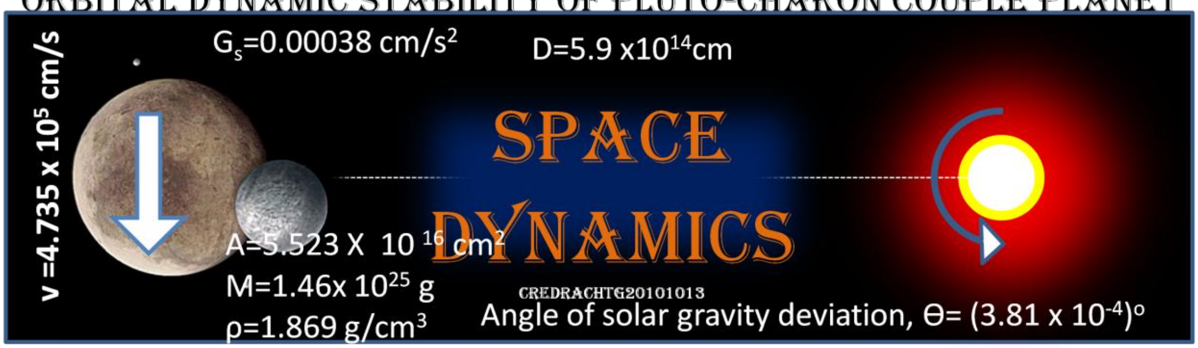


FIGURE-13

__Calculations:__

Orbital Motive Force on Pluto-Charon Couple Planet:- $F_m = m\, G_s \sin \Theta$

Mass of the couple, m= 1.46×10^{25}g

$F_m = m\, G_s \sin \Theta = (1.46 \times 10^{25} g)(0.00038\ cm/s^2) \times \sin(3.81 \times 10^{-4})^0$

__$F_m = 3.689 \times 10^{16}$ dynes__

Medium Resistance against motion:- $R_p = \eta\, \rho_o\, V^2\, (0.596A)$

Contact Constant of surface materials $\eta = (\rho_o / \rho)$. (pl ref page-7)

Cross sectional area of the couple planet A = $л(1.18 \times 10^8 cm)^2 + л\,(6.05 \times 10^7)^2$

$= 5.523 \times 10^{16}\ cm^2$

Mean density of the couple ρ = total mass/total volume =1.869 g/cm^3

Therefore medium resistance $R_p = (\rho_0 / \rho)\, \rho_0 \times v^2 (0.596A)$

$= (\rho_0 / 1.869)\, \rho_0\ [4.735 \times 10^5 \text{ cm/s}]^2 \times 0.596 (5.523 \times 10^{16})$

$\underline{R_p = 3.956 \times 10^{27}\, \rho_0^2}$

For lateral stability in orbital motion; $F_m = R_p$

$3.956 \times 10^{27}\, \rho_0^2 = 3.689 \times 10^{16}$

$\rho_0 = 3.05 \times 10^{-6}$ g/cm^3

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Discussion:

The result stands for the density of the space medium at Pluto, the 9th planet from Sun. It exhibits that the medium density is at a gradual drop, outwards from Sun.

03. Variation of Space Medium Density within the Solar System

	Mercury	Venus	Earth	Mars	Jupiter	Saturn	Uranus	Neptune	Pluto-Charon couple
Distance from Sun (cm)	0.579×10^{13}	1.082×10^{13}	1.497×10^{13}	2.279×10^{13}	7.788×10^{13}	1.482×10^{14}	$2,872 \times 10^{14}$	4.50×10^{14}	5.90×10^{14}
Density of the planet (g/cm^3)	5.626	4.97	5.52	3.96	1.249	0.62	0.254	2.220	1.869
Space Medium Density at the planet (g/cm^3)	1.05×10^{-4}	1.446×10^{-4}	1.386×10^{-4}	5.904×10^{-5}	4.612×10^{-5}	5.2×10^{-5}	2.846×10^{-6}	1.89×10^{-5}	3.05×10^{-6}

The above tabulation shows the gradual drop of medium density outwards from the Sun. Medium density at Pluto, ρ =**3.05 x 10^{-6}**, can be considered as the medium density nearly at the end of our solar system. Also it is the density in the Galaxy in the peripheral region of our solar system and also density must be gradually increased towards the Galactic Center. Similarly pressure too is varied as per the equation

$\mathbf{P= \frac{1}{2} \rho c^{2}}$ where C-is the velocity of light. (pl ref 'Space Dynamics-V1/2009).

Therefore medium pressure at Earth= ½ ($1.386 \times 10^{-4} g/cm^3$)($2.998 \times 10^{10} cm/s$)^2

= **6.228×10^{16} dynes/cm^2**

It is so high that nearly 10^{10} times bigger than atmospheric pressure (=1.031×10^6 dynes/cm^2) . But we cannot feel that high pressure because medium particles easily penetrate biotic bodies. But atoms of any element can sustain against this huge pressure because of their spherical shape and strong **atomic skin boundary**. (pl ref 'theory of skin boundary of matter'-Space Dynamics-V1/2009)

04. Bubbling Galactic Space

'Galactic Sphere' is surrounded by a highly tensioned naturally formed bubble shaped **skin boundary** of the same medium particles.

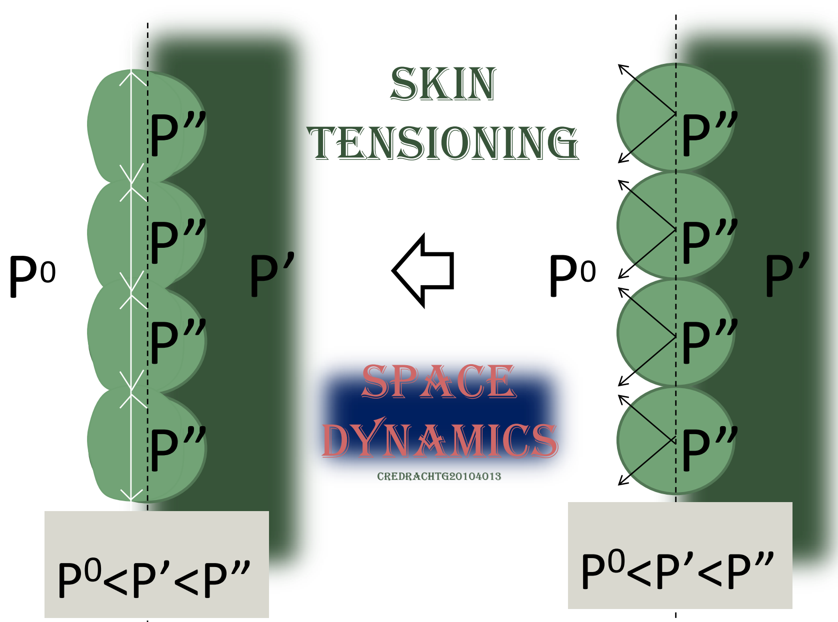

FIGURE-14

Pressure in the **absolute vacuum** must be **zero** and therefore boundary particles are compressed tightly against one another creating a highly tensioned skin. (pl ref '**Theory of Skin Boundary of Space Particles**'-Space Dynamics-V1/2009)

Theory of Bubbling Universe:

*Any isolated volume of **space medium** in the **absolute vacuum** is bounded by a highly tensioned **skin** made up of the same medium particles.*

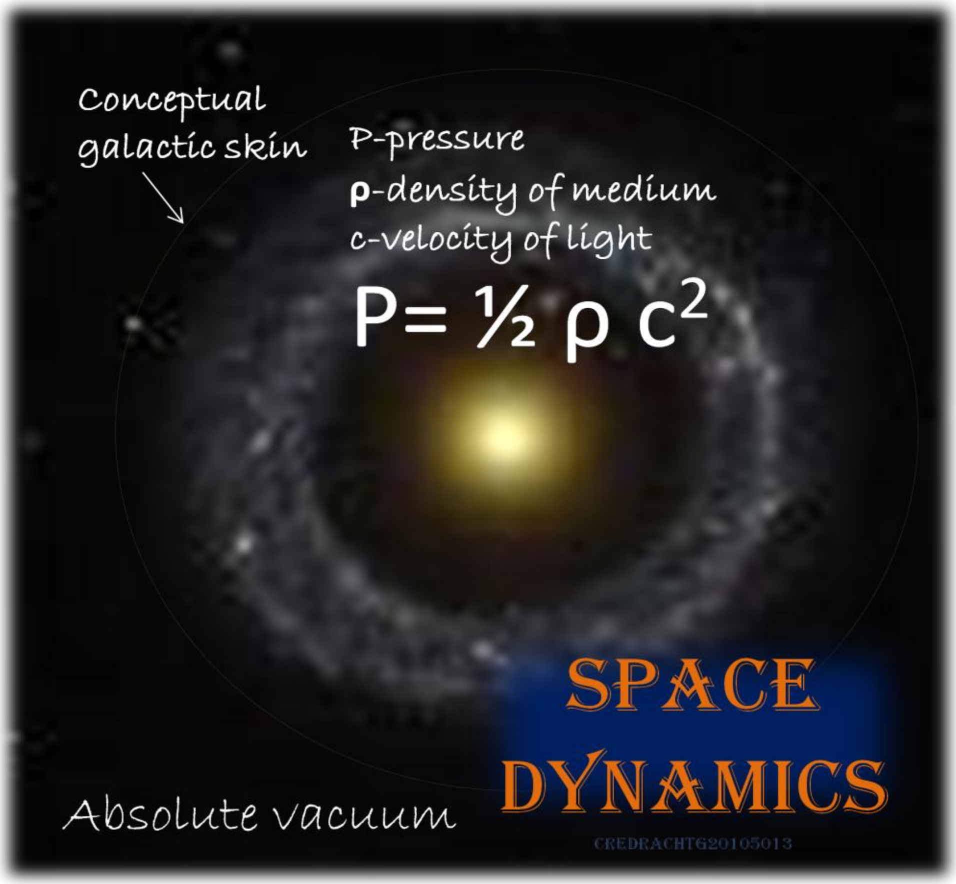

FIGURE-14

05. Conclusion

Therefore any galactic mass must be covered by an invisible **bubble shaped skin** which can easily be penetrated by any **rays** of energy particles such as light, heat, Gama etc. But any kind of **waves** cannot be transmitted between Galaxies because the space medium is not continued in to the **absolute vacuum** beyond the **Galactic Boundaries**.

END

(Any novel idea, concept or theory introduced in this experimental technical monograph is freely exposed for the world public to test and adopt in any researches, inventions and applications on behalf of coexistence of the global ecosystem and human civilization.)

Cyril H Thalpe Gamage

08th Oct 20013

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