Why some celestial bodies are potent in having orbital bodies and not all?

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Abstract

All planets have satellites as orbital bodies except for Mercury and Venus. No plausible reason is distinguishable from the existing dynamics of orbital bodies. Ultimately the phenomenon of having or not having orbital bodies is left to chance. There are more than 300 satellites natural satellites attached to different planets but interesting enough not a single satellite has an orbital body (say, sub-satellite). It is further interesting that more than 150 asteroids are known to have small companion moons, and some have two moons. Hence, one can't attribute to the mass factor of a celestial body for having orbital body. It is seen the satellites don't rotate with respect to their concern planet. It is also seen the planets Mercury and Venus not having a satellite rotate slowly. Hence, one can infer that a non-rotating or slowly rotating celestial body can't have an orbital body. The present orbital dynamics don't have any bearing with the rotation of the celestial body; thereby it fails to predict the probability of having orbital body. However, in the new fluid dynamics model a rotating celestial body has a spinning extra nuclear space structure that helps in changing the direction of centripetal velocity due to radial acceleration by gravity in tangential direction which enables conservation of angular momentum. An orbital body experiences centripetal force due to gravity and centrifugal for due to orbital motion. For stable orbital bodies the gravititational attraction is fully neutralised by the centrifugal force for which reasonable spinning velocity of space fluid is absolutely necessary. A non-rotating/ slowly-rotating celestial body can't have an appropriate spinning velocity of its associated extra nuclear space structure, thereby the orbital bodies of a non-rotating celestial body experience a dominating gravity and is gravitated. It is for this reason the non-rotating or slowly rotating celestial bodies below a critical speed are not potent. The paper describes the fact with reference to diagram.

Keywords: celestial body, satellite and sub-satellite, rotating and or slowly rotating, orbital motion and revolution.

Introduction

Evaluation of the speed of rotation of orbital bodies about their own axis is beyond the scope of dynamics; ultimately it is left to the chance. Further, there is no

connection between revolution and rotation. But it is noticed; the satellites of all planets have **one rotation per revolution. How can we justify this remarkable matching?**

The state of rotation of an orbital body is expressed relative to distant star whose influence on the orbital body is negligible. The sun being the primary interacting body in the solar system the rotation of planet need to be characterized relative to the sun. Similarly, the planet being the primary interacting body in a planet-system, the rotation of satellites of a planet need to be characterized relative to the planet. It is well known that one hemisphere of the moon is always visible from the earth. Remaining on the earth we do not see the other hemisphere of the moon. Hence the moon does not rotate relative to the earth i.e. one face of the moon is always facing towards earth. When the moon makes one revolution, it makes one epicycle rotation per revolution with respect to distant stars. The earth being the nucleus of earth-moon system has the scope to explain how one given face of the moon locked up with the earth. The preferential gravity may prevail due to local mascon (mass concentration) on the earth-facing side of the moon. On the other hand, characterizing the rotational motion of moon with respect to distant stars doesn't help to justify why the moon makes one rotation per revolution with respect to distant stars without significant gravitational interaction with distant stars. The phenomenon of one rotation per revolution is common to all satellites in the solar system without any exception. Hence, it cannot be a coincidence.

At present, a celestial body having or not having an orbital body depends purely on chance. No definite answer is available as to why Mercury and Venus do not have a satellite when all other planets have? It is also seen, not a single satellite has an orbital body (sub-moon) [1] even when many asteroids have orbital bodies.

Discussion

Examining the facts of reality of the solar system, this author found a bearing that a non-rotating or slowly rotating celestial body is impotent to retain an orbital body. A rotating celestial body has a spinning extra nuclear space structure that influences the motions of orbital body. The space is a physical medium unlike the Newtonian concept of empty space, therefore has a role on the dynamics of orbital body. The physical space is the interlinking medium among celestial bodies, therefore, plays a major role in the dynamics of orbital bodies. For a hypothetical celestial body of zero mass i.e. in the absence of gravity and the centrifugal force, the celestial body floats in the space fluid and moves with the space fluid, being suspended in it. But in reality an orbital body posses mass and experiences both gravity and centrifugal force. Gravity of central body causes the orbital body to produce centripetal acceleration and the centrifugal force produces centrifugal acceleration. But when centrifugal force becomes equal to gravity

the celestial body floats in the space medium without centripetal or centrifugal acceleration. A floating celestial body experiences drag-force from the moving space medium which causes motion of the celestial body. The massive celestial body would require much longer time to approach the velocity of the moving space medium due to inertia of mass.

The rotating sun has a spinning extra nuclear space structure that produces orbital motion of planets. Likewise, the rotating planet with spinning extra nuclear structure produces the orbital motions of satellites. When the orbital body approaches the velocity of adjacent fluid, the relative velocity becomes zero thereby both drag force and resistance to motion become zero. A non-rotating celestial body has a non-spinning extra nuclear space structure. If the non-rotating celestial body has an orbital body then the orbital body will experience resistance to orbital motion from the stationary space fluid and would slow down the velocity of the orbital body. Under the reduced orbital velocity, gravity would dominate over the centrifugal force which would cause centripetal acceleration of the orbital body and ultimately would fall on to the central gravitating body in a spiral path. Hence, any non-rotating celestial body with non-spinning extra nuclear space structure is impotent in retaining an orbital body. The celestial bodies rotating at slow speed have slowly spinning extra nuclear space structure that renders almost the same effect as the non-rotating celestial body. The non-rotating satellites with respect to their planet and slowly rotating Mercury and Venus don't have orbital body which establishes the fluid dynamics model of solar system.

For a dominating gravity the orbital body would have centripetal acceleration and for dominating centrifugal force it would have centrifugal acceleration. When gravity is equal to centrifugal force the net acceleration in radial direction becomes zero under zero gravity condition. Mercury and Venus have slow rotation about their axes and all satellites don't rotate with respect their planet, therefore, the associated extra nuclear space structure does not spin. Thus, any external body captured by the non-rotating or slowly rotating orbital body would lose its speed in a non-spinning extra nuclear space structure and ultimately meet the central body by gravitation. It is for this reason they don't have any orbital body. The effect of spinning and non-spinning extra nuclear space structure may be examined from the fuel consumption of artificial satellites in retaining the satellite in specific orbit while orbiting eastward and westward.

It is interesting to note that even some asteroids are potent in keeping orbital bodies of their own as they have appropriate rotational speed about their own axis. More than 150 asteroids are known to have a small companion moon (orbital body), and some have even two moons [2]. Table-1 shows the slow rotation period of Mercury and Venus for which they don't have satellite. Table-2 shows the list of some asteroids those have orbital body.

Table-1[3]

Planet Name	Rotation Period (hours)	Number of Satellites
Mercury	1407.5	0
Venus	5832.5	0
Earth	23.9	1
Mars	24.6	2
Jupiter	9.9	95
Saturn	10.7	146
Uranus	17.2	27
Neptune	16.1	14

Table-2[4],[5],[6],[7]

Asteroid Name	Rotation Period (Hours)	Moon Name	Year of Discovery	Discoverer(s)
243 Ida	4.63	Dactyl	1993	Galileo spacecraft team
45Eugenia	5.70	Petit-Prince	1998	W. J. Merline et al.
87 Sylvia	5.18	Romulus	2001	M. E. Brown, J.-L. Margot
87 Sylvia	5.18	Remus	2004	F. Marchis et al.
107 Camilla	4.84	S/2001 (107) 1	2001	J. L. Margot et al.
22 Kalliope	4.15	Linus	2001	M. E. Brown, J.-L. Margot
93 Minerva	6.00	Aegis	2009	F. Marchis et al.
379 Huenna	6.65	S/2003 (379) 1	2003	F. Marchis et al.
216 Kleopatra	5.38	Alexhelios	2008	F. Marchis et al.

216 Kleopatra	5.38	Cleoselene	2008	F. Marchis et al.
762 Pulcova	5.84	S/2000 (762) 1	2000	W. J. Merline et al.
130 Elektra	5.22	S/2003 (130) 1	2003	W. J. Merline et al.
130 Elektra	5.22	S/2014 (130) 1	2014	B. Yang et al.
3749 Balam	2.80	S/2002 (3749) 1	2002	J. C. Veillet
11351 Leucus	440	S/2003 (11351)	2003	Mauna Kea Team
121 Hermione	5.55	S/2002 (121) 1	2002	F. Marchis et al.
283 Emma	6.68	S/2003 (283) 1	2003	F. Marchis et al.
243 Lotis	5.28	S/2001 (243) 1	2001	W. J. Merline et al.

Cause of one rotation per revolution of satellites

All satellites are seen to have one rotation per revolution. Different theories are proposed to justify this. The much talked about the 1:1 spin-orbit resonance for all satellites has the weakness that the synchronization at other whole number spin orbit ratios are also feasible. Thus, the feasibility of 1:2, 2:3, etc. cannot be ruled out. The fact that all satellites of all planets has 1:1 spin-orbit ratio casts doubt on the existing hypothesis/theory. The invariant 1:1 spin-orbit ratio is feasible only when there is stronger attraction of planet to specific hemisphere of satellite where other spin-orbit ratios are ruled out.

The dynamics of rotation and the dynamics of revolution don't have a visible bearing to establish one rotation per revolution. The satellites of a planet are housed in the extra nuclear space structure of planets, thus having direct interaction with the planet. Therefore, it is necessary to express the rotation of satellites relative to their respective planet. Examining the rotation of moon with respect to the earth, one given face of the moon remains always facing towards the earth implying the moon does not rotate with respect the earth. This is not the case only for the moon of the earth. All satellites don't rotate with respect to their planet. The features of earth moon system are known in greater detail therefore the author has analysed the earth moon system for one rotation per revolution of moon. If one face of the moon always faces the earth then one has to look for stronger preferential attraction from the earth facing hemisphere of the moon than that of the far side of the moon. Gravity is the only known interaction

among celestial bodies. Stronger gravitational attraction implies greater mass concentrations on the earth facing hemisphere of the moon. We notice large number of circular Maria on the earth facing hemisphere (Fig.1).

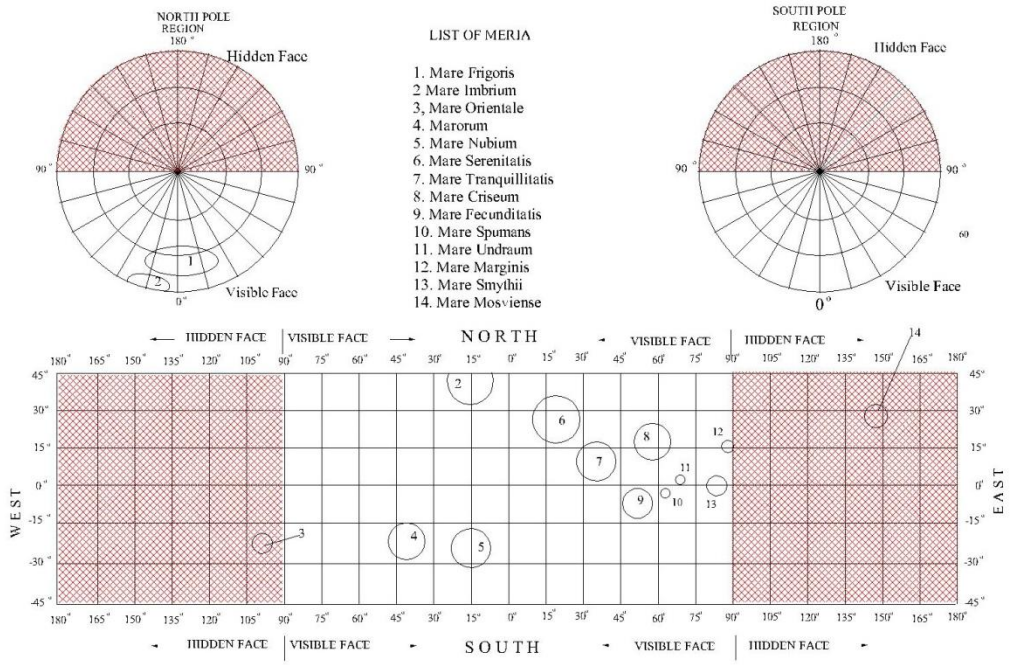

Fig.1 LOCATION OF CIRCULAR MARIA ON THE SURFACE OF THE MOON

The circular Maria on the moon is associated with mass concentrations, or mascons, that create positive anomalies in the moon's gravitational field. It is reported that the circular Maria are formed by a combination of impacts from cosmic debris and volcanic activity producing mascons below circular Maria. It becomes obvious why the hemisphere containing Maria remain facing towards the earth. The fact may be visualized batter from the following experimental observation.

Consider a wooden ball suspended by a fine nylon thread. One face of the said wooden ball has some iron nails. Now apply a torque to the wooden ball to rotate freely. The setup has provision to revolve around the axis as shown in figure (Fig.2). Then introduce one end of a permanent magnet along the axis of revolution such that the magnetic pole (say, the North Pole) remains in the plane of revolution. The nails on the ball would experience pull from the magnet. The wooden ball would slow down its speed of rotation with respect to North Pole of the magnet and finally stop its rotation by keeping the nailed face of the wooden ball facing towards North Pole of the magnet. Now revolve the wooden ball around the pole of the magnet by manipulating the handle. It would be seen that the face containing the iron nails would always face towards the pole of the magnet irrespective of the angular position of revolution. The wooden ball though doesn't rotate with reference to North Pole of the magnet but it makes one

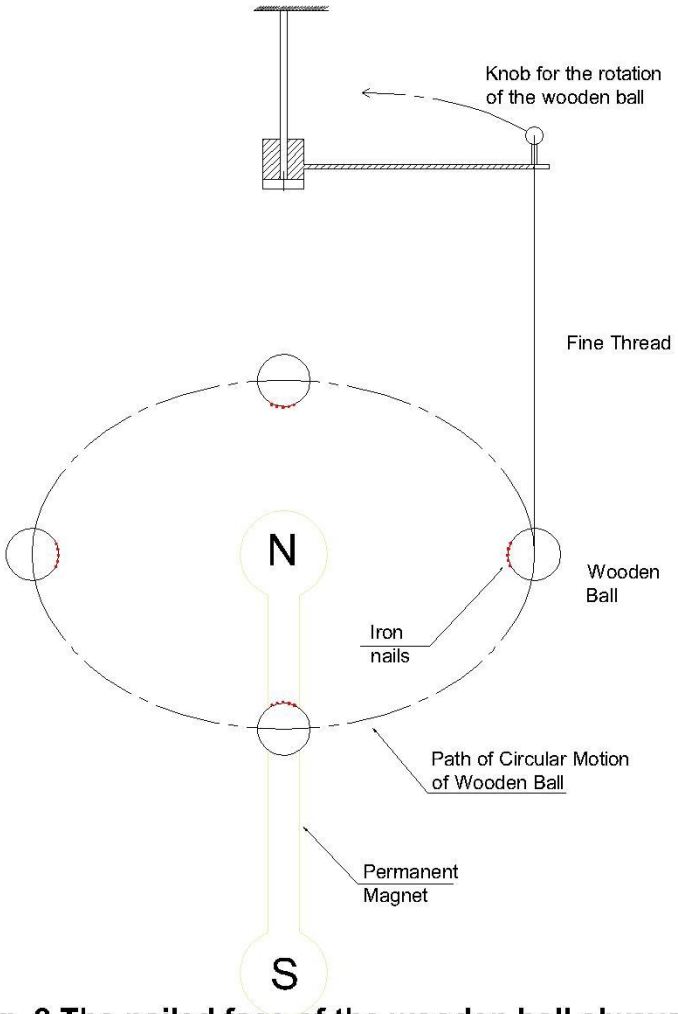

Fig.-2 The nailed face of the wooden ball always faces the north pole end of magnet at different position of its circular motion

rotation per revolution with reference to the walls of the room. The present description of gravitational interlocking of one face of the satellite may undergo change with better explanation of newly described celestial charge interaction [8].

Conclusion

The fluid dynamics model of solar system accurately predicts which celestial body can have orbital bodies. Such a prediction is not possible without the role of spinning space fluid medium. The fluid dynamics model is also useful in justifying various motions of celestial bodies in solar system that includes many less known motions. It is expected that a perfection of fluid model would be helpful in throwing light to many dark areas of galactic dynamics and the dynamics of atomic system.

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