

# Reason for the elliptical motion of planets around the star during revolution

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**Abstract**— In the astronomy section, till date the real cause for the motion of the planets in the elliptical form is not accurately. So, I am here to give a grand practical model that can explain the real cause for real elliptical motion of planets around the stars along with the inclinations on their elliptical planes with respect to one another.

**Index terms**— Planets' motions, Kepler's laws, revolution, circular and elliptical motions, and Gravitational forces.

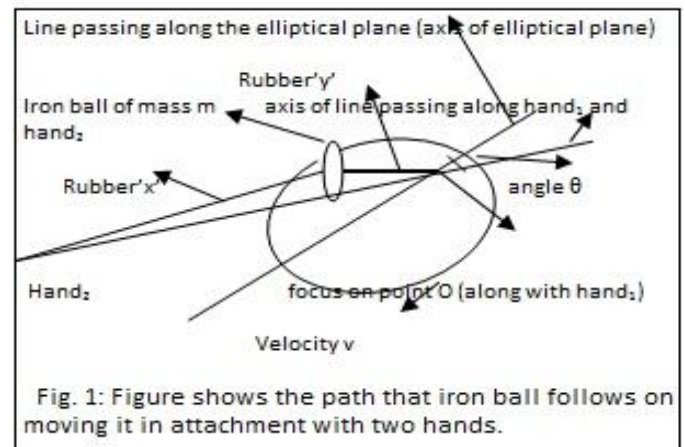
## 1 INTRODUCTION

In astronomy, the concept of planets movement was originated from the time of great scientist Galileo who said for the first time that planets are not stationary but continuously rotating and revolving around the sun, then after other scientists and philosophers announced more about the planets movements. Kepler, Newton, Einstein are the well known persons who had devoted to present out the reality of space beside the earth. Kepler had illustrated the way of paths those planets follow, i.e. the elliptical paths. Newton said that those paths tracing phenomenon or orbiting around the sun is because of gravitational force exertion between planets and the sun. Einstein tried to show that the path traced by planets is due to space-time curvature through his more complex postulate "the General theory of relativity". These all personalities are more concerned about how the planets movement but no one is there to give the accurate or more fixed reason to the question- why the planets move in elliptical path though it is preferred to have circular paths? It is said that the reason is because of the gravitational interactions between planets and the sun, along with other celestial bodies. But this reason is not sufficient to explain the more approached reality. So, it is eager matter to approach across the reality. Here, I am giving a grand practical model that describes the real cause for the orbits of planets to be in elliptical form from a simple experiment.

## 2 BODY

let us take a spherical iron ball whose two adjacent sides are attached with two rubbers of same material but with different lengths and different thickness. Let 'x' be one of the rubber with its length longer but thinner than the next rubber 'y' whose length be shorter but is thicker than 'x'. It means 'x' is longer but is thinner and 'y' is shorter but thicker. Now let us try to move the iron ball with help of

those rubbers by catching the ends of rubbers such that one hand with rubber 'x' is kept as stationary and the next hand with rubber 'y' allows the iron ball to move in circular form but on doing so the path traced will not be circular one rather it will become elliptical one, such that the plane passing from the positions of two hands makes certain angle say  $\theta$  with the plane passing from elliptical path of the iron ball as shown in the figure below.



In this figure what we can absorb is that the path traced by the iron ball is elliptical in attachment with two hands but if we remove rubber x, path traced will be circular one. What I deserve to show is that when there is presence of two hands, the path will be elliptical and in presence of hand<sub>1</sub> path will be only circular. And the important thing we can absorb is that the focus of the elliptical plane is lying at point O exactly at hand<sub>2</sub>, will be just outside not in the centre of elliptical centre. It means that focus is directed away from elliptical center with respect to hand<sub>1</sub>. Let us illustrate the real fact occurring at this process of movement. When we allow the iron ball to move with the help of rubber 'y' only, it will try to follow the circular path but due to continuous attachment with rubber 'x' it will now trace the path which will be elongated towards left

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parts of hand<sub>2</sub> but gets squeeze towards right parts finally attaining the continuous elliptical path making hand<sub>2</sub> as the point of focus O.

Let us enter to our main concerned point now. I am linking this model to describe the real fact for the movement of satellites around the planets, movement of planets around the stars and so on. In the above process of movement if we assume hand<sub>1</sub> as star (say sun), hand<sub>2</sub> as planet(say earth) and iron ball as the satellite (say moon), rubber x will become the gravitational force of attraction between sun and moon and rubber y will become the gravitational force of attraction between earth and moon. And further more the angle  $\theta$  will act as the angle that the orbital plane of moon makes with orbital plane of earth. Same process can be assumed to the movement of earth acting hand<sub>1</sub> as galactic centre and hand<sub>2</sub> as sun. So, a continuous chain can be elaborated upon to infinity. But the fact we have to notice is that the squeezed parts and elongated parts are just interchanged to one another in real case of planets movement. I mean, the focus of the elliptical plane in real case is found directed towards the sun in movement of moon around the earth and towards the galactic center in the movement of planets around the sun. It is so, because, the gravitational force of attraction between two masses will get reduced in apart from one another and get increased on coming nearer according to Newton's law of gravitation .i.e.  $F = GMm/r^2$ . But in above process though the rubbers used are similar as the gravitational force of attractions between the masses, the elasticity of this kind of materials (rubbers) get increased with elongation of their lengths due to greater strain that disobeys the hooks law, so there will be more tension acting in the iron ball on elongation of rubbers and less on the contraction of rubbers. Thus, the position of focus on above model is just altered in comparison to the real case of planets and satellites as shown in figure below.

phenomenon follows. If we go through such classical two body phenomenon we can't give the reason for existence of the inclination of elliptical planes with reference to the other elliptical planes and furthermore, we can't have reason of elliptical motions. Thus, the revolution of moon is due the mutual force of attraction between sun and earth, revolution of earth is due to mutual force of attraction between sun and galactic center and so on.

### REFERENCES

- [1] "Raymond A. Serway, John W. Jewett, Jr. " Physics for scientists and Engineers ,volume-2(6th Edition)
- [2] "Britannica online Encyclopedia"
- [3] "R. MURUGESHAN, Er. KIRUTHIGA SIVAPRASATH" Modern Physics (16th Edition) S.CHAND AND COMPANY LTD.
- [4] "Answers.com"
- [5] D.S. MATHUR, "Mechanics"(2nd edition) S.CHAND AND COMPANY LTD.

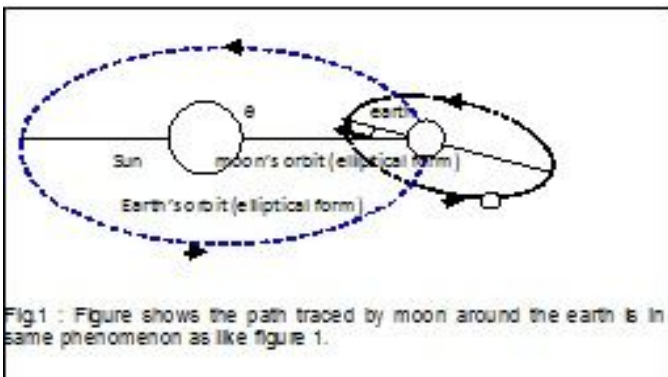


Fig.1 : Figure shows the path traced by moon around the earth is in same phenomenon as like figure 1.

### 3 CONCLUSION

Till now, we are assuming that the elliptical path is due to two body gravitational force of attractions only but to approach in reality this above model can easily demonstrate the process that the entire revolution