The Theory of Motion of Objects in the Universe

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Abstract: Postulates that govern the motion of objects in the universe is presented. The paper presents the idea that number of objects defined here as reference mass, their geometry and color they emit or reflect is the fundamental cause of origination and occurrence of motion in the universe. The motion of objects in the universe is governed by newton's laws of motion that describes motion in terms of the absolute state of an object and cause of motion (interpreted as force), while also governed by Einstein 's special theory of relativity for objects moving at high speed. This paper will explain the importance of objects themselves and makes a proposition that the motion that exists between the objects in the universe is based on the fundamental nature of mutual existence of objects. It is critical to understand the evolution of motion between objects and then the nature of motion and its causes. The number of reference masses, their geometry, light emission or reflection are more fundamental than the force that acts on the masses. This paper will be first of series of papers, that will explain the nature of objects, their behavior in terms of motion as well as the fundamental nature of universe that is governed by the behavior of objects.

Keywords: reference mass, motion, rotation, revolution, magnitude

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1 Introduction

Motion of objects has always baffled and continues to baffle the scientific community right from the days Johannes Kepler, Galileo walked on Earth or may be even before. What startled me was the sudden idea that flashed in my mind where I imagined myself revolving around a perfectly spherical object that emits or reflects single color of the spectrum of light in the free space and all I could deduce was there was no motion of any form being observed. This is the defining idea of this entire paper and provides for some critical observations. Whether we describe the planetary motion of objects, or objects moving on the earth's surface, we have always ignored the geometry of object itself as well as how the objects together behave while motion occurs.

Euclidean geometry formulates many relationships in the form of axioms for static objects but does not try to describe the motion resulting from the structure or geometry of objects. Another important observation that is worth considering is why most of the celestial objects are near spherical or tend towards forming a spherical structure. Why do we find such behavior in the universe that the objects are attracted and compressed eventually to form a spherical shape? Does such behavior of objects in free space relate to motion as a cause effect process? Such critical observations need to be probed and addressed. Just citing that there exists something between objects and naming it as "force" really does not tell us much about the behavior of universe; nonetheless Newton's laws of gravitation does great work in quantifying the relationship through mathematical model. I believe we have so ignored the geometry of objects, their light emitting or reflecting behavior in defining the motion.

We describe the motion of objects using the inertial and non-inertial frames or co-ordinate systems by placing the co-ordinate system on the object and then develop the Galilean relativistic frames of reference to describe the relative motion between the objects [1]. Even Einstein's theory of special and general relativity which consider the speed of light as part of system, simply ignore the geometrical structure and color of objects in defining the relativistic nature of motion. We will explore the fact that how geometry of objects actually results in the origination of dimensions of co-ordinate system in the frame of reference.

Rarely do we find the perfect spherical objects in the free space. But for building our proposition we can relax this fact and consider that there exist perfect spherical objects that emit same color of light. However, as we move further in the discussion, we will explore that even the non-spherical objects whose different parts emit or reflect different color actually show same behavior as perfect sphere. Moreover, we cannot ignore mystery of nature with the fact that such spheres might exist everywhere in the universe but hidden from human limits of observation [2]. Just like we assume perfect frictionless surface to describe the frictional force, we can make the assumption of existence of perfect sphere in this discussion.

2 Reference Mass

To define the postulates that govern the motion of objects in the free space, it is important to first define the “reference mass”. A reference mass is a perfectly spherical, frictionless object either emitting or reflecting single color in the spectrum of light, irrespective of its size. An observer and certain objects display dual characteristics of being a single reference mass at times and multiple reference mass at other times which will be explored later.

The reference mass may be a inertial or gravitational masses [3] based on what kind of motion is observed between the reference masses.

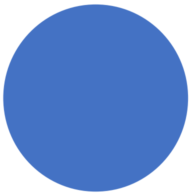

Fig. 1 A Reference mass in space

3 Postulates that Govern the Motion

Postulate 1: Motion in the free space does not exist when there are no reference masses in the universe.

M 3^ DT (1)

where is M is magnitude of motion, D is change in the distance between the reference masses and T is the time taken for change in the distance between reference masses. 3^ is symbol for “does not exist”. Time ‘T’ is taken as multiplicative factor because the more time an object spends in the motion, the more it has survived against gravitational decay.

Postulate 2: Motion exist in the free space but in an indeterminate state when only a single reference mass exist in the universe. If that reference mass is an observer, she displays characteristics of a single reference mass.

M 3 DT (2)

where is M is magnitude of motion, D is change in the distance between the reference masses and T is the time taken for change in the distance between reference masses. 3 is symbol for the state of “exists but indeterminate”.

Postulate 3: Linear motion in the free space originates when there are two reference masses in the universe. In this case the observer still behaves as a single reference mass even though he is not a frictionless, perfect spherical object. As in the below figure, the observer simply exhibits the characteristics of a single reference mass and there is linear motion between the two reference masses. Motion in the form of rotation does not exist here because even if the sphere rotates around its own axis, such motion is unobserved, since the sphere is frictionless perfect sphere that emits or reflects one color of light spectrum.

$$M = DT \tag{3}$$

where is M is magnitude of motion, D is change in the distance between the reference masses and T is the time taken for change in the distance.

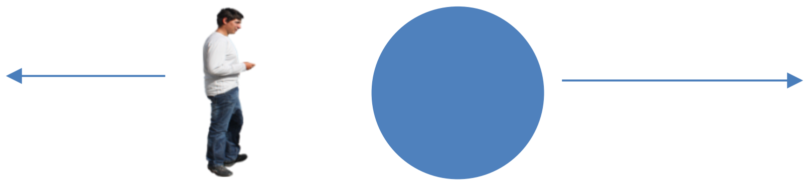

Fig. 2 Two reference masses in space resulting in linear motion

Postulate 4: Motion in the form of revolution and rotation originates in the space when there are at least three reference masses in the universe.

$$M = RT \tag{4}$$

where T is time for one complete rotation or revolution and R is the outer circumference of the sphere in case rotation and circumference of path traversed in case of revolution.

Case 1: Observer still shows the characteristics of a single reference mass. However, the reference mass which the observer is observing is now a package of multiple reference masses since it is now reflecting different colors in the spectrum. If the sphere rotates around its own axis, observer can observe the existence of such motion since the sphere is now a package of multiple reference masses. Suppose the Sphere was a single reference mass, i.e., a frictionless, perfect spherical object, emitting or reflecting single color in the spectrum of light, then the observer would not have witnessed any rotation of the sphere.

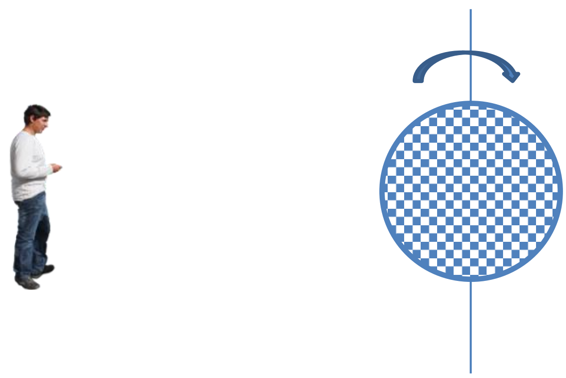

Fig. 3 Three reference masses in space resulting in rotation or revolution

The observer can also revolve around the sphere with the sphere being static at its axis. Motion in the form of revolution comes to existence because we have a sphere which is package of multiple reference masses. If we had perfect, frictionless sphere emitting/reflecting single color, then the observer would not have observed the existence of motion in the form of revolution.

Case 2: Suppose instead of a sphere, let's consider two observers in the space, with one observer rotating around his own axis, while other observer observing that motion. Since we have at least three reference masses here, with static observer exhibiting the characteristics of a single reference mass and the rotating observer as a package of multiple reference masses, we can observe the existence of rotation motion. If in the place of rotating observer, we had perfect, frictionless sphere emitting/reflecting single color, then the static observer would not have observed the existence of motion in the form of revolution.

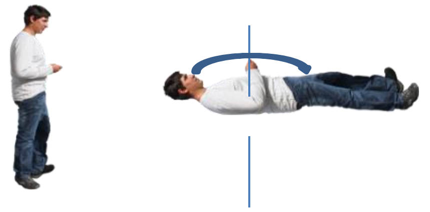

Fig. 4 Three reference masses in space resulting in rotation or revolution

we can also see that there is an existence of motion in the form of revolution when the observer revolves around the axis of another observer held static.

4 Geometry, Light and Motion

It is clear that a perfect, frictionless sphere emitting/reflecting single color behaves as a single reference mass. An observer, however, shows dual nature of single reference mass at times and package of multiple reference masses at other times as discussed in the previous session. But what about a solid cylinder emitting/reflecting single color as in the below figure. The observer who is looking at the cylinder cannot observe any rotational motion; so, we still have only two reference masses here – observer and the cylinder. This should deduce the below important postulate.

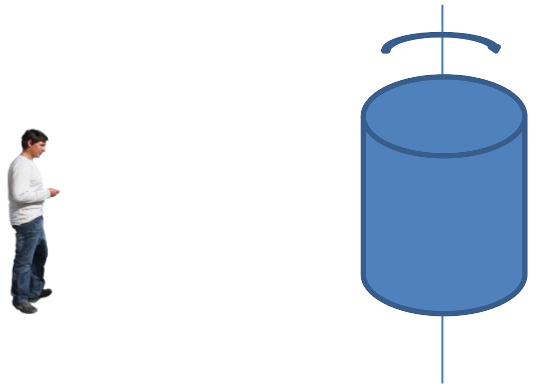

Fig. 5 Solid cylinder as single reference mass

Postulate 5: If one divides a hollow object into infinitesimal number of segments perpendicularly to its axis of rotation ‘X’, then we should get a perfect circle at any point ‘dx’ on the axis whose entire surface should reflect or emit single color and if we divide the solid object into infinitesimal number of segments perpendicularly to its axis of rotation say ‘X’, then we should get a perfect circular plane/disk at any point ‘dx’ on the axis whose entire surface should reflect or emit single color. Such an object will behave as a single reference mass relative to its axis X and rotation of such reference mass is not observed by the observer.

Let V be the volume of the solid object and let X be the axis of rotation and x be the length of the axis which is within the top and base of the object. If we differentiate/divide the volume of the object perpendicularly to its axis X into infinitesimal parts that results in a circular plane/disk whose entire surface reflects or emits single color, then such a solid object will behave as a single reference mass relative to its axis X and rotation of such reference mass is not observed by the observer. As is the case with below solid cylinder. Note that radius of all such disks equal to each other at different points dx on X in case of solid cylinder but are not equal in case of other objects such as sphere.

For solid cylinder,

$$\frac{dV}{dx} = \pi r^2 \qquad (5)$$

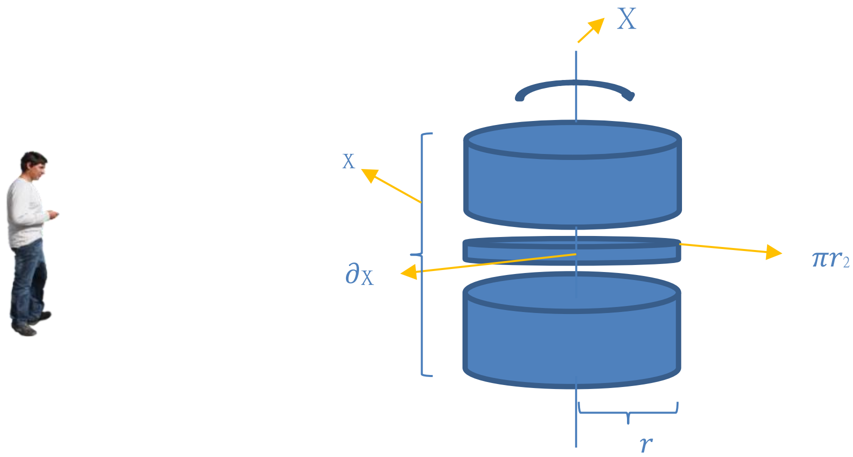

Fig. 6 Solid cylinder as single reference mass

If the disk at point dx emits different color at different points on its surface, then the solid cylinder will behave as package of multiple reference masses and rotation of solid cylinder around its axis X is observed by the observer.

Let V’ be the volume of the hollow object and let X’ be the axis of rotation and x’ be the length of the axis which is within the top and the base bounds of the object. If we differentiate the volume of the object perpendicularly to its axis X’ that results in a circular ring whose entire surface reflects or emits single color, then such a hollow object will behave as a single reference mass relative to its axis X’ and rotation of such reference mass is not observed by the observer. As is the case with below hollow cylinder. Note that radius of all such rings equal to each other at different points dx on X in case of hollow cylinder but not equal in case of other objects such as sphere.

For hollow cylinder,

$$\frac{dV'}{dx'} = 2\pi r' \qquad (6)$$

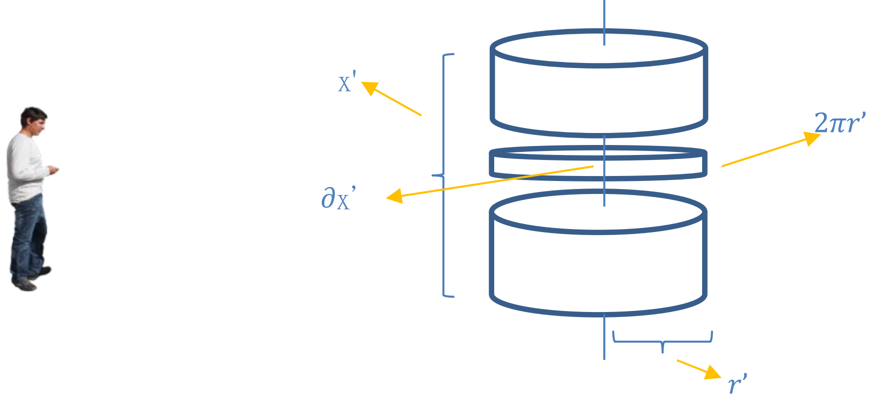

Fig. 7 Hollow cylinder as single reference mass

If the ring at point dx emits different color at different points on its surface, then the hollow cylinder will behave as package of multiple reference masses and rotation of hollow cylinder around its axis X is observed by the observer.

If the solid or hollow cylinder is rotated around its axes X that is perpendicular to its height x, then it would behave not as a single but as a package of multiple reference since the postulate 5 does not hold; hence the rotation motion is observed. If a solid cylinder is considered as shown in the below figure, differentiating the volume of the solid cylinder perpendicularly to its axis of rotation X does not result into a circular plane/disk but a rectangle whose area equals height x and length m. As a result, the observer will observe the solid cylinder rotating.

For solid cylinder,

$$\frac{dV}{dx} = (x)(m) \qquad (7)$$

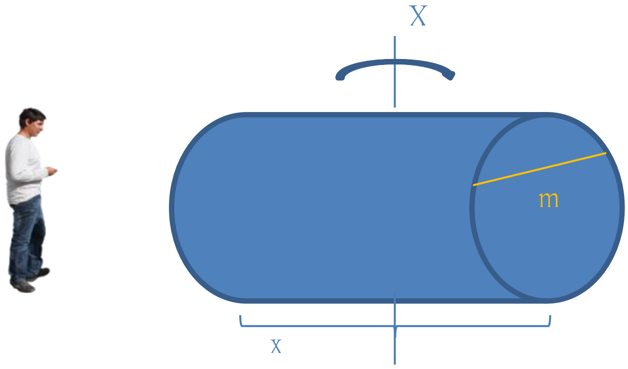

Fig. 8 Solid cylinder as a package of multiple reference masses

For non-spherical objects, the magnitude of the motion can now be defined as below where M is magnitude of motion, D is the distance traversed by the outermost point on the reference mass in rotation and T is the time taken for one complete rotation.

$$M=DT \qquad (8)$$

5 No Observer Systems

Even though observer is integral part of defining the motion, it is always possible to just remove the observer and define the previously discussed postulates without an observer.

Postulate 1: Motion in the free space does not exist when there are no reference masses in the universe.

$$M \ \text{3^} \ DT \qquad (9)$$

where is M is magnitude of motion, D is change in the distance between the reference masses and T is the time taken for change in the distance between reference masses. 3^ is symbol for “does not exist”. Time ‘T’ is taken as multiplicative factor because the more time an object spends in the motion, the more it has survived against gravitational decay.

Postulate 2: Motion exist in the free space but in an indeterminate state when only a single reference mass exist in the universe.

$$M \ 3 \ DT \qquad (10)$$

where is M is magnitude of motion, D is change in the distance between the reference masses and T is the time taken for change in the distance between reference masses. 3 is symbol for the state of “exists but indeterminate”.

Postulate 3: Linear motion in the free space originates when there are two reference masses in the universe. As in the below figure, there is linear motion between the two reference masses. Motion in the form of rotation does not exist here because even if the sphere rotates around its own axis, such motion is unobserved, since the sphere is frictionless perfect sphere that emits or reflects one color of light spectrum.

$$M = DT \qquad (11)$$

where is M is magnitude of motion, D is change in the distance between the reference masses and T is the time taken for change in the distance.

Fig. 9 Two reference masses in space resulting in linear motion

Postulate 4: Motion in the form of revolution and rotation originates in the space when there are at least three reference masses in the universe.

$$M = RT \quad (12)$$

where T is time for one complete rotation or revolution and R is the outer circumference of the sphere in case rotation and circumference of path traversed in case of revolution.

In the below figure, we have 3 reference masses where reference mass B and C are held together while A is static. B and C together rotate around the axis X that passes through Centre of C.

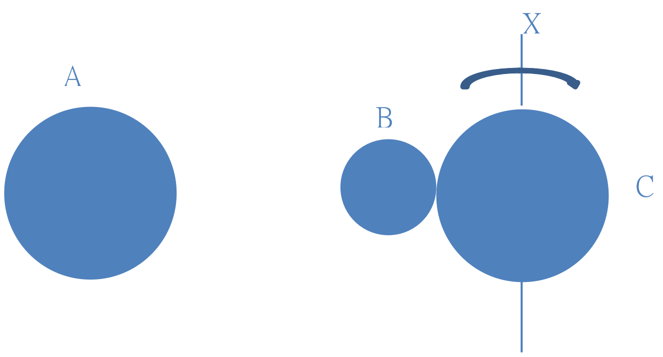

Fig. 9 Three reference masses in space resulting in linear motion.

6 Conclusion

Origination of motion, be it linear motion, rotation or revolution, is defined by the number of reference masses that exist in the space. An observer can exhibit dual characteristics of being a single reference mass as well as a package of multiple reference masses. Geometry of object as well as its light emission or reflection property defines whether the reference mass is a single reference mass or a package of multiple reference masses. A frictionless perfect solid or hollow sphere that emits or reflects single color in the spectrum of light is defined as single reference mass while non spherical objects also show the property of single reference mass. The propositions discussed here lay a solid foundation to develop the fundamental characteristics of motion further.

7 References

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