

# Analysis of the Physical Mechanism of Inertial Centrifugal Force Generation with the Newton Bucket Experiment

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**Abstract**

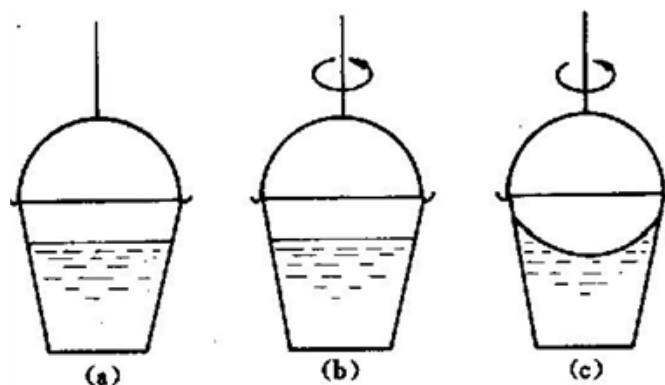
*This paper analyzes Newton's bucket experiment with a new view of the ether and concludes that the reason why the surface of the water in the rotating bucket is concave is not caused by the rotation of the water in the bucket with respect to the absolute space of the universe as Newton thought, nor is it caused by the rotation of the water in the bucket with respect to the entire starry background as Mach thought, but the rotation of the water in the bucket with respect to the energy (ether) field of the earth. Through the analysis of Newton's bucket experiment, this paper also obtained the physical mechanism of the inertial centrifugal force, that is, "the inertial centrifugal force acting on an object is generated by the object moving in a circle in a flat space-time". According to the physical mechanism of the inertial centrifugal force, the following inferences can be drawn: the inertial centrifugal force of the artificial earth satellite moving around the earth does not come from the motion of the artificial Earth satellite around the earth, but from the circular motion of the artificial Earth satellite in the energy (ether) field of the sun; and the inertial centrifugal force of the planet moving around the sun does not come from the planet moving around the sun, but from the planet moving in a circle in the galactic energy (ether) field.*

**Keywords:** Newton Bucket Experiment, Inertial Centrifugal Force, Absolute Space, Mach

**1. Introduction**

The Newton bucket experiment is an experiment conducted by Isaac Newton to prove the existence of absolute space. Newton described the experiment this way: "If a bucket is suspended by a long rope, and the bucket is rotated until the rope is tight, then water is poured into the bucket. For the moment, the water and the bucket are still. Then let go of the bucket, and it began to spin under the torque of the rope. At first, the bucket is rotating and the water in the bucket is not rotating with it, the water surface is flat. But as the bucket gradually transmits its motion to the water, the water also begins to spin, and the water gradually leaves the axis of rotation and rises along the wall of the bucket, making the surface of the water concave.

- a) Hang a bucket on a long rope, rotate the bucket many times to tighten the rope, and then add water to the bucket and make the bucket and the water static. The water surface is flat at this time.
- b) Release the bucket, and it begins to spin under the torque of the rope. At first, the bucket is rotating and the water in the bucket is not rotating with it, the water is flat.
- c) After the bucket has been rotating for some time, the surface of the water becomes concave because of the friction of the bucket to rotate the water together. When the water rotates at the same speed as the bucket, the water is not rotating with respect to the bucket. But the surface of the water remains concave.



The key to the bucket experiment is to reveal that there are two states in which the bucket and the water in the bucket are relatively still. The first state: before the rope is relaxed, "the bucket and the water in the bucket are relatively still, and the water surface is flat"; The second state: After the rope has been relaxed for some time, "the water and the bucket are relatively still again, and the water surface is concave". In both states, there is relative stillness between the water and the bucket, but the shape of the water surface is different, the former is flat and the latter is concave. This led Newton to wonder.

Here are the different explanations between Newton and Mach.

1. Newton's explanation: Newton believed that there is an absolutely static space in the universe, and the water is flat only when the water in the bucket does not rotate with respect to this absolute space, otherwise it is concave.

2. Mach's explanation: More than a hundred years later, E. Mach (1838-1916) proposed a different explanation than Newton's. Mach's explanation is that if the water in the bucket doesn't rotate with respect to the entire starry background, the water surface is flat; when the water rotates relative to the starry background, the water surface is concave.

## 2. Discussions

The authors believe that the surface of the spinning water is concave because of centrifugal force acting on the spinning water. The next question is how does this centrifugal force come about? Or what is the physical mechanism of centrifugal force? Here is the author's analysis: Because on the Earth's surface, for the motion of water in a bucket, the Earth ether can be regarded as an absolute frame of reference [1]. Although the ether of the earth is evenly distributed on the spherical surface with the center of the earth as the center of the spherical surface, that is, the density of ether (energy) on the same spherical surface is the same, the density of ether (energy) between different spherical surfaces is different. But in the local space inside the bucket, the Earth's ether can be seen as a flat space-time with the same density of ether (energy) everywhere. Therefore, the author believes that "the inertial centrifugal force acting on an object is generated by the circular motion of the object in a flat space-time." The authors further argue that: "Objects moving in a circle in flat space time cause a redistribution of the etheric density within the object, i.e. the closer the point is to the center of the circle, the higher the etheric (energy) density, and the higher the density of the ether(energy), the greater the pressure of the ether(energy). As a result, space-time within the object forms an etheric (energy) density gradient decreasing along the radius of rotation from the center of the circle to the far outside. Each of the microscopic particles (nuclei, electrons) that make up the object in such space-time experiences a force that points away from the center of the circle along the radius of rotation. The inertial centrifugal force of an object is the resultant force of the ether pressure on all the microscopic particles of the object. Inertial centrifugal force is a real force, which is essentially the same as all other forces, and is the resultant force of pressure generated by the

ether (energy) that makes up space-time. The higher the etheric (energy) density of space-time, the greater the resultant etheric pressure. It can be seen that an object moving uniformly on a surface of equal energy density in curved space-time will not generate inertial centrifugal force. Therefore, the concave surface of the water in the rotating bucket is not caused by the rotation of the water in the bucket with respect to the absolute space of the universe, as Newton thought, nor by the rotation of the water in the bucket with respect to the entire starry background, as Mach thought, but by the rotation of the water in the bucket with respect to the ether of the Earth.

According to the above physical mechanism of centrifugal force, we can draw the following inferences:

1. The inertial centrifugal force of the artificial Earth satellite or the moon moving around the Earth comes from the circular motion of the artificial Earth satellite or the moon in the solar ether. The Earth ether does not generate inertial centrifugal force for artificial Earth satellites or the moon, because the Earth ether is curved space-time, while the satellite or the moon is moving on the equal energy density surface of the Earth ether.
2. Geostationary satellites are able to stay stationary above the Earth because they are moving relative to the solar ether at the same angular speed as the earth's rotation.
3. The inertial centrifugal force of the planets moving around the Sun comes from the planets moving in circles in the ether of the galaxy. The solar ether does not generate inertial centrifugal force for the planets, because the solar ether is curved space-time, and the planets move on the equal energy density surface of the solar ether.
4. The inertial centrifugal force of the sun's motion around the galactic center comes from the sun's circular motion in the cosmic background ether. The galactic ether does not generate inertial centrifugal force on the Sun, because the galactic ether is curved space-time, and the sun moves on the equal energy density surface of the galactic ether.

## References

1. Wang, J. A. (2019). The modification of special relativity. *Journal of Modern Physics*, 10, 1615-1644.

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