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An Experiment to Prove or Disprove the Equivalence of Gravitational And Inertial Mass

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The following experimental description is based upon the self-movement theory of gravitation found at http://www.wbabin.net/physics/roscoe.pdf

According to the self-movement theory, gravitation occurs with reduced inertia. Therefore, the accelerations observed due to gravitation are the result of less force than equivalent inertial accelerations. The proof of this prediction will invalidate the so-called Weak Equivalence Principal, and prove the hypothesis of the self-movement theory of gravitation. The experiment is ideally performed in deep space, outside of the influence of any significant gravity field. However, I believe it is possible to test the theory on the Earth as well. The idea is to allow gravitation of a mass to occur normally, while applying an "equivalent" inertial force in the same direction. If the resulting acceleration exactly doubles, then gravitational and inertial mass is indeed equivalent. If it more than doubles, then the self-movement theory is proven.

A large sphere made of lead alloy or even better, a depleted uranium alloy is affixed to a pedestal some height from the floor. The larger this sphere, the better, since we want as large an effect as possible to ensure the gravitation is distinguishable to a high degree from noise. A similar sphere of double and triple this mass will be additionally beneficial, as explained below.

In the exact center of the sphere is a small hole milled out through the entire diameter of the sphere. The purpose of this hole is to allow a wire to be threaded through it. At no time can the wire be allowed to make contact with the sphere. The purpose of the wire will be revealed below.

An air track is positioned such that the target mass (a 1 kg mass attached to the carriage) has its center point exactly aligned with the center point of the large sphere. The air track will need to be of sufficient length to allow an appreciable acceleration rate to be achieved. Along the side of the air track are reference marks to allow determination of the acceleration of the small mass on the track. If a more accurate measurement method is available, then that may be used instead.

PART ONE

Set the smaller mass a fixed distance away on the air track and hold it in place. Let it go and record the acceleration of the mass as it moves along the air track. Knowing the mass and the observed acceleration of the smaller mass, use Newton's formula to determine the apparent force at work to achieve the observed acceleration. We are starting from the assumption that gravitational and inertial mass is equivalent. The validity or invalidity of this is what we are trying to test.

PART TWO

Attach the wire to the smaller mass, and reset the experiment. The other end of the wire will be attached to a device that will apply the exact amount of force over time, as computed in the previous step. Let the mass go and again, record the acceleration of the small mass on the track with the combined gravitational and inertial acceleration forces being applied.

If inertial and gravitational mass is equivalent, the resulting acceleration should be exactly double the acceleration observed from the first part of the experiment. If they are not, the resulting acceleration will be greater than twice the originally observed acceleration.

Because gravitation is a self-movement of matter, all of the acceleration observed is achieved with forces generated by the gravitating mass itself. The only role the large mass plays is to cause the necessary reaction upon the smaller mass. If the self-movement theory is correct, doubling or tripling the fixed mass, and performing both phases of the experiment for each mass change, will result in double and triple the measured *difference* between the gravitational and inertial mass of the smaller mass respectively.

NOTES

- It would be ideal if Part Two could be accomplished without a wire. The applied acceleration force would need to be extremely accurate.

- The air track is not exactly frictionless. A magnetically levitated rail *might* be better. I did not propose it because I am concerned with magnetic fields in this experiment. Because of my view of how magnetic fields interact with the same vacuum in which gravitons are propagating, it may invalidate the test.

- It may be possible to use the Earth's gravity with a mass in free-fall, if the details of how to precisely apply an additional inertial force in the direction of the fall, can be worked out. This would have the unfortunate disadvantage of removing the ability to test all facets of Part Two, namely the increase in the disparity between gravitational and inertial mass as the larger mass increases.