INERTIA AND GRAVITY

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Abstract: We argue that inertial mass and gravitational mass are identical because inertia is simply self-gravity. We further suggest that by analogy with the photon, the graviton has mass zero.

Suppose a very large physicist decided that the planet Earth should be treated as a particle – the "earthon". The earthon has very high inertia because of its self-gravity. At the other extreme, a very small physicist, working at Plank scale – 10^(-35) meters – would have the same conclusion about particles like electrons and quarks, whose immense relative size would cause them to interact with their own gravitons.

In short, inertia is the result of self-gravity, and inertial mass is equal to gravitational mass because they derive from the same process: gravity; self-gravity in one case, external gravity in the other.

Consider now the photon and the postulated graviton. The photon is the carrier of the electromagnetic force, but it has zero electric charge, and does not itself experience the electromagnetic force. (For example, a beam of light can pass through an intense magnetic field with no effect on either the light or the field.)

By analogy, the graviton should have zero net mass, and should not itself experience gravity. We argued in an earlier paper that mass can be positive or negative, just as charge can be positive or negative, magnetic poles can be north or south, etc.

In current models, a zero mass particle has no properties of any kind, and simply does not exist. In our model, however, it can be a composite particle, with equal amounts of positive and negative mass (matter and unmatter). If each part has spin 1, then the graviton is a zero mass, spin 2 particle.

This would provide an intuitively natural basis for gravitation: "source" mass (the sun, for example) would emit an endless series of gravitons in random directions. The emissions would probably occur in pairs to avoid a spin change in the emitting matter. Since the gravitons have zero mass, this could continue indefinitely with no change to the sun, as observed.

We will leave for later a model of the interaction with the "distant" mass (the Earth, for example), except to say that the gravitons must continue in a straight line forever.

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