Is Motion One Of The Three Eternal Properties of Atoms? I.E. Are The Three Properties Shape, Size, and MOTION?

Post by “Martin” of April 15, 2026 at 7:39 AM

Here is my comment to Patrikios' thought experiment:
Placing the object outside Earth’s gravity would not be enough because then it could be in the Sun's gravity. Placing it outside the Sun’s gravity would still not be enough because then it could be in the gravity of the Milky way.
We might find a point between two galaxies at which the gravitational forces of both galaxies cancel out each other and where the gravity of further away galaxies is too small to be significant for a reasonably long time of observation.
We can define a frame of reference there at which the object would stay at rest once placed there without initial speed in that frame of reference. (There is a logical circle in it because the definition of an inertial frame of reference is that an object without external force keeps moving with its initial speed, i.e. stays at its place if initially at rest.)
If we want to move that object, we need to apply a force to accelerate it. The proportionality constant between force and acceleration is the inertial mass. (I would not call that "potential for movement".)
If we place the object in a gravitational field, the gravitational mass of the object is the proportionality constant between the force on the object and the gravitational field strength.
Gravitational mass and inertial mass are conceptionally different. We have defined our system of measurement units such that both masses are measured in the same units.
In a system, in which the units are not the same, the two types of masses are proportional to each other but not identical, which makes the conceptional difference more obvious. This is an ongoing topic of research into the foreseeable future. Physicists keep designing new experiments to test the proportionality between gravitational mass and inertial mass with ever increasing measurement accuracy.