

A consequence of special relativity is the equivalence of mass and energy via $E=mc^2$. Evidence to support this exists in the existence of radioactivity, fusion, fission, Nuclear Bombs etc.

Special relativity threw up some problems with Newtonian gravity. Newton had conceived instantaneous transmission of force, but the special theory said no signal could travel faster than the speed of light. Neither was Newtonian gravity from invariant under the new set of transformations in special relativity connecting inertial frames.

$$x' = \frac{x - vt}{\sqrt{1 - v^2/c^2}}$$

$$u' = \frac{u - v}{1 - uv/c^2}$$

$$t' = \frac{t - \frac{v}{c^2}x}{\sqrt{1 - v^2/c^2}}$$

A standing problem was the advance in the perihelion of Mercury orbit around the Sun by about forty three seconds of arc per century. Newtonian theory predicted the orbit be fixed in space. To overcome these, Einstein spent seven years developing the general theory of relativity. He solved the problem of the causality of gravitational and inertial mass using the equivalence principle. The behaviour within a local