

Advanced Relativity and formula $E = mc^2$

Amrit Sorli & Davide Fiscaletti

In Advanced Relativity (AR) energy of space (quantum vacuum) is the fundamental energy of the universe. Matter is structured energy of quantum vacuum. A given particle or massive body diminishes is structured energy of space (quantum vacuum). As universal space is infinite, energy of space (quantum vacuum) E_{qv} is infinite too:

$$E_{qv} = \infty \quad (1).$$

Each particle or massive body is structured energy of quantum vacuum, we can write following formula:

$$\Delta E_{qv} = E = mc^2 \quad (2).$$

Energy density in the centre of given particle or massive body is diminished exactly for the amount of energy that is contained in the particle or massive body:

$$\Delta E_{qv} = (\rho_{PE} - \rho_{qvE}) \cdot V = E = mc^2 \quad (3),$$

where ρ_{PE} is Planck energy density and ρ_{qvE} is the energy density of quantum vacuum in the centre of the elementary particle or massive body, V is the volume of particle or massive body.

Out of formula (3) we can get:

$$\frac{(\rho_{PE} - \rho_{qvE}) \cdot V}{c^2} = m \quad (4),$$

where m is the mass and represents the amount of energy of quantum vacuum which is structured in a given particle or massive body. Higher energy density of quantum vacuum is pushing towards the centre of a given particle or massive body where energy density is lower. This difference between outer and inner energy density generates inertial mass and gravitational mass of a given particle or massive body. Mass m of a given particle or massive body is the amount of energy we measure with inertial mass m_i or gravitational mass m_g . It is valid:

$$m = m_i = m_g \quad (5).$$

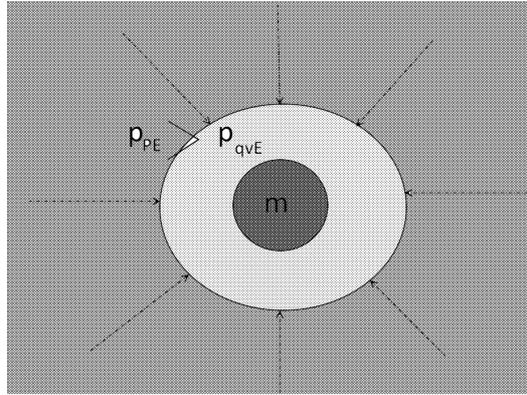


Figure 1: Origin of inertial mass and of gravitational mass

In the formula $F_g = \frac{m_1 \cdot m_2 \cdot G}{r^2}$ we can see that mass m_1 and mass m_2 have origin in diminished energy density of quantum vacuum inside of a given material objects.

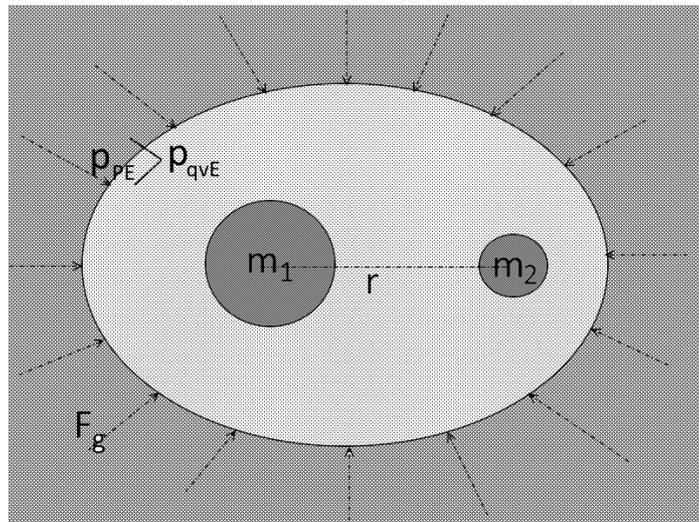


Figure 2: Origin of gravity

Gravity force is pushing together material objects m_1 and m_2 . There is no hypothetical graviton that would carry attraction force between material objects.