The Value Of Gravitational Quanta

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1. Introduction:-

Consider two bodies A and B separated by distance r. Assume that body A is large solid sphere having radius R_s. Another body B is a point mass or very small as compared to A. Let M be the mass of Body A and m be the mass of body B as shown in figure 1.

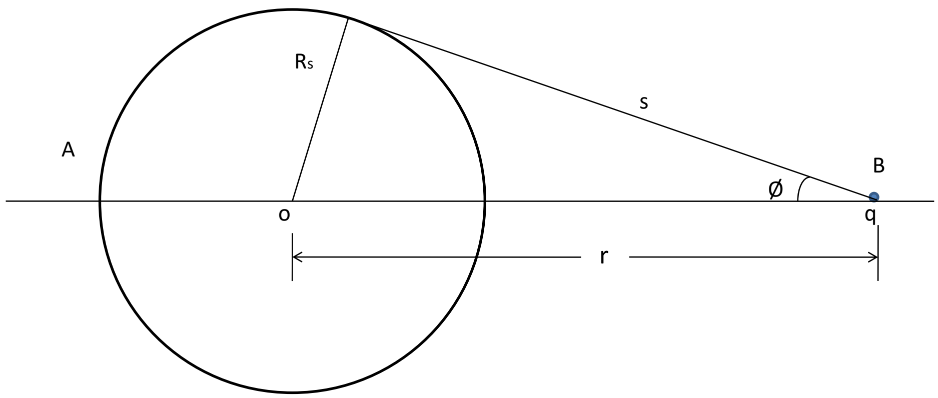

Figure : 1

According to the theory of quantum gravity, the force of gravity between any two bodies is given by

$$F_q = \frac{G_s M m}{r^2} + G_q M m \left(1 - \frac{1}{5} \sin^2 Ø \right)$$

2. Quantum Gravitational field:-

Each elementary particle of matter produces gravitational field all around itself in the form of a large and finite number of lines of force spreading in all directions. These spreading lines of force constitute the gravitational field. The lines of force are distributed evenly in the space. The distribution of lines of force is spherical in geometrical sense. The lines of force are spreading outwards in all directions.

Line of force is the basic element of gravitational field. Line of force is the smallest or least quantity of gravitational force. This is called quantum line of force or gravity. The quantum lines of gravity propagate through the space without any medium. The propagation of quantum lines of gravity in space is instantaneous.

The gravitational force is attractive only. When two distinct bodies interact with each other by gravity, then the force exerted on each other is attractive only. Along the quantum line of gravity the value of force remains constant in space and time. Each elementary particle produces only finite number of lines of force. It is not possible to produce infinite number of lines of force. The smallest value of force exerted by quantum line of gravity is called gravitational quanta

The gravitational force is exerted by one body upon another body at a distance through gravitational field. The gravitational force is exerted instantaneously. The action is similar to the entanglement of charged particles. There is no lag between time of change in gravitational force at one body and time of change in gravitational force experienced by another body at a distance. All gravitational force interactions are mediated through quantized gravitational field.

3. **Gravitational force at very large distances:-**

In this section we will discuss the gravitational force between two bodies at very large distances. We assume that each atom generates the n number of gravitational quanta in all direction. At very large distances of order of galactic diameter, normally only one gravitational quanta of each atom of body A will reach the other atom of other body B. In case of gravitational interaction of only two atoms, the quantum gravitational force will be only due to single gravitational quanta. This force is given by equation given below.

$$F_q = \frac{G_s M m}{r^2} + G_q M m \left(1 - \frac{1}{5} \sin^2 Ø \right)$$

where

M = Mass of larger particle or body
m = Mass of smaller particle or body
r = Distance between two elementary particles or bodies
G_s = Gravitational constant for spherical distribution
G_q = Gravitational constant for quantum invariability
$\sin Ø = R_s / r$

In case gravitational interaction of only two atoms, the mass of single atom is taken into consideration. We assume following values for calculation of value of single gravitational quanta. We assume that one kg mass of a matter consists of 10^{23} atoms approximately. Hence mass of each atom is 1×10^{-23} kg approximately.

M = Mass of atom = 1×10^{-23} kg
m = Mass of atom = 1×10^{-23} kg
r = Distance between two elementary particles or bodies
G_s = Gravitational constant for spherical distribution = 6.67×10^{-11} Nm^2/Kg^2
G_q = Gravitational constant for quantum invariability = 1.48×10^{-51} N/Kg^2

The gravitational force due to spherical distribution i.e. G_sMm / r^2 is infinitesimally small. The effect due to this force is very small and negligible. The value of sinØ is very small and negligible. After taking into consideration these facts, the quantum gravitational force is given by

$$F_q = \frac{G_sMm}{r^2} + G_qMm\left(1 - \frac{1}{5}\sin^2Ø\right)$$

$$= 0 + G_qMm\left(1 - 0\right)$$

$$F_q = G_qMm$$

$$= 1.48 \times 10^{-51} (1 \times 10^{-23} \times 1 \times 10^{-23})$$

$$F_q = 1.48 \times 10^{-97} \text{ N} \qquad (1)$$

The quantum gravitational force is proportional to number of lines of force interacting between two bodies. Let N1 be Number of lines of force of body A interacting with body B. Also N_2 are number of lines of force of body B interacting with body A. The force exerted by single gravitational quanta is q.

$$F_q \propto N \check{q} \cos Ø$$

N = Number of lines of force of each atoms of body A interacting with each atom of body B

= Number of lines of force of each atom of body B interacting with each atom of body A

$$F_q \propto (A_1n_1)(A_2n_2)\check{q}$$

A_1 = Number of atoms of body A

A_2 = Number of atoms of body B

At very large distances , the value of n is equal to 1

$$n_1 = n_2 = 1$$

$$\cos Ø = 1$$

Let K be constant of proportionality, then Fq is given as below,

$$F_q = K (A_1) (A_2) ǩ$$

We will assume value of K is equal to 1, then for gravitational interaction of only two atoms, A_1 must be equal to 1. Also A_2 must be equal to 1. Therefore,

$$A_1 = A_2 = 1$$

Putting these values in equation , We get

$$F_q = ǩ \qquad (2)$$

From equation 1 and 2, we get

$$^{-} ǩ = 1.48 \times 10^{-97} \text{ N}$$

From the calculation it is derived that, the smallest value of force exerted by quantum line of gravity called gravitational quanta, ǩ , is equal to 1.48×10^{-97} N