

Deflection of rays of light in space

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On modern notions, the substance of the Universe exists and develops in vacuum which in different concepts the various role is playing. Researches of vacuum proceed during many last decades, starting from "Dirak sea" and finishing by the inflationary theory. On the basis of a hypothesis of a nature of vacuum, the opportunity of an experimental confirmation of the vacuum theory on supervision of a deflection of rays of light by the Sun is considered.

Any theory is fair in the event that its consequences prove to be true on experience. So was with many known theories, including theory RT after Einstein. This was a duly and necessary stage in physics and is confirmed with numerous experiments. Its essential element was representation of gravitation as a curvature of space, which can be described by various metrics (geometry of space). According to a curvature of space by stars, galaxies rays of light deflected by gravitation. Astronomical observations have excellent confirmation of this geometrical concept. Artificiality OTO till now raises the doubts, a dissatisfaction at a part of researchers. It is necessary to find a physical explanation to the observably phenomena and in general to a nature of gravitation. The author stated a hypothesis about a nature of gravitation [1]. It is based on research of electric components of vacuum structure and further it is added by a component as a magnetic continuum. In such kind the physical vacuum represents the environment of electromagnetic waves propagation; birth's of substance at entering into it the necessary energy; the environment of formation of electron "the allowed orbits" in atoms, wave properties of particles etc.

Speed of light is not a constant in a space. It makes the basic difference of the theory of vacuum from the theories of A.Einstein. On the basis of astronomical observation and the theory of structure of vacuum [1] the following formula for dependence of speed of light on acceleration of a gravity is offered:

$$c_g = c_o \sqrt{1 - \left(\frac{\alpha^{-1}}{r}\right)^2 \frac{g}{4\pi E_\sigma S}}, \quad (1)$$

where:

$\alpha^{-1} = 137,0359895$ - return value of constant for thin structure of radiation,

$r = 1,39876 \cdot 10^{-15}$ m - dipole distance of electric components of structure of vacuum,

g [m /s²] - local acceleration of a gravity,

$E_\sigma = 0,77440463 [a^{-1}m^3s^{-3}]$ - Specific electric polarization of vacuum,

$S = 6,25450914 \cdot 10^{43} [a.s.m^{-4}]$ - Deformation polarization of vacuum.

Knowing the speed of light measured in conditions of the Earth as **2.99792458 .108** m/c, we shall define the speed under the formula

(1) in a free space as $c_0=2.997924580114694 \cdot 10^8$ m/s. It differs from terrestrial speed of light a little bit and is defined the accuracy within 9 marks after a point. At the further specification of terrestrial speed of light there will be a change of the specified value for a free space. From the wave theory of light it is known, that the factor of refraction at transition from the environment with speed c_0 on space with speed c_e is equal

$$n = \frac{c_0}{c_e} = \frac{\sin(i_o)}{\sin(90^\circ + i_e)} = \frac{1}{\cos(i_e)} \quad (2)$$

The angle of falling of a beam to a normal of a surface of the Sun is equal in our case $i_o = 90^\circ$. For an estimation of value of a deflection of light beam of the Sun it is possible to consider two models of propagation of light.

- 1) Model of refraction of light at transition from "empty" half space into half space with solar acceleration of a gravity of 273,4 m / c². Naturally, this elementary model will give obviously incorrect result, namely: according to the given factor of refraction the angle is determined as

$$i_e = \arccos\left(\frac{c_e}{c_0}\right) = \arccos\left(\sqrt{1 - \frac{\alpha^{-2} g}{r^2 4\pi E_\sigma S}}\right) * 2,062648 \cdot 10^5 = 13,53'' \quad (2)$$

- 2) For more exact model it is necessary to apply a differential - integral method, proceeding from function of propagation of a beam, in a field increasing up and falling down under the law 1/R² gravitational potential of the Sun. The help has come completely unexpected from seismology. In seismology the problem of definition of a course of a beam of elastic waves in the Earth from a source (earthquake, underground nuclear explosion) on a surface and its angle of an output(exit) down to the opposite side of the Earth is solved. The angle of an output(exit) also will be that required analogy of a deflection(rejection) the Sun of a beam from a source or on the sphere including an orbit of the Earth, or at a great distance from the Sun. In seismology there is a simple formula for definition of a angle of an output(exit) of a seismic wave [2] through constant parameter of a given beam

$$p = \frac{R_0}{V(R)} \cos(i) = const [s] \quad (3)$$

where R_0 - radius of the Earth, $V(R)$ - Function of speed of elastic waves depending on distance (radius from the center of the Earth), i - A angle of an exit. Dimension of a constant is equal to second. We shall transform the seismological formula for space distances and speeds of light:

$$i = \arccos\left(\frac{c_0}{R} \sqrt{1 - \frac{\alpha^{-2} 1}{r_e^2} \frac{GM_s}{R^2 4\pi E_\sigma S}}\right) \cdot const \cdot 2,062648 \cdot 10^5 \quad (4)$$

M_s - mass of the Sun, R - variable radius of sphere in which center there is a Sun, determined **along** a beam up to a light source which beam is taking place in immediate proximity from the Sun; 2,062648.10⁵ - translation a radian of a angle into seconds.

There is a question on a constant in this formula. It can be resolved on the basis of global fundamental constants, well known to a science. The skilled value of a angle of a deflection [3] makes 1,75". On the basis of this value it is determined, that

$const = \Delta t_{Const} (M_x R_{sun}^2 / M_{sun} R_x^2) / (\pi \cdot 137,0359)^2$. Number π и return value of the thin structure constant are fundamental constants of our modern world. Number $\Delta t_{Const} = 1[s]$ is necessary for entering dimension. The ratio $M_x R_{sun}^2 / M_{sun} R_x^2$ - It is entered for all possible masses in the universe and their radii how it is accepted in astronomy: to result all masses and there radii in solar parameters.

Speed of light is considered also fundamental value. The conclusion follows, that 1 second as the accepted unit of measurements of time can be ranked as fundamental value. Therefore it can be not shown in the formula of the constant. Dependence of a angle of a deflection of a ray of light is given by the Sun depending on distance up to its source.

Have received full conformity with the exact skilled data. Curiously,

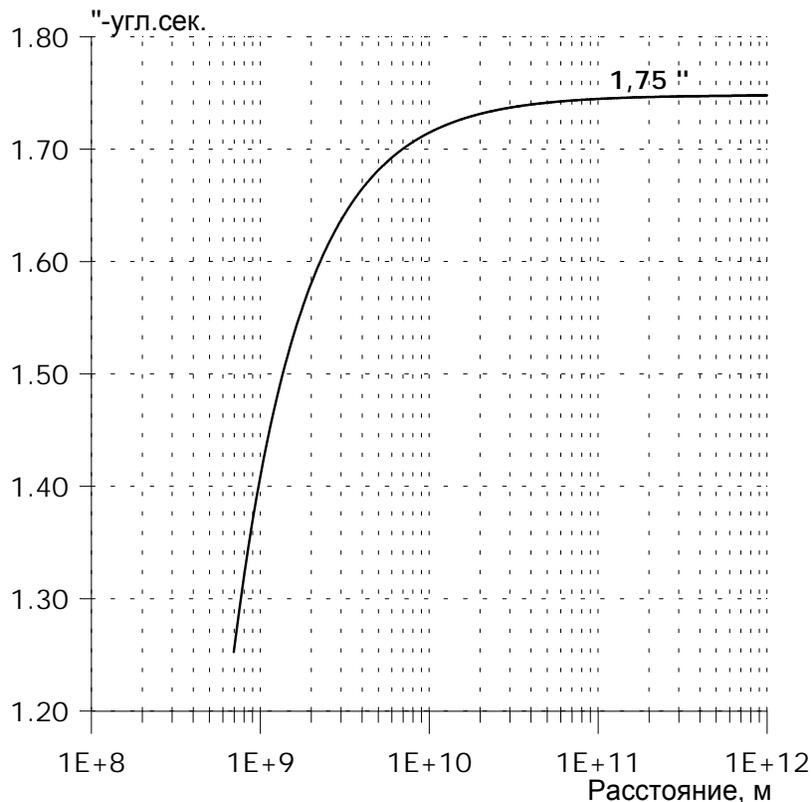


Fig.1 Dependence of a angle of a deflection of a ray of light the Sun from Distances up to a source along a line which are taking place near to the Sun.

that at moving a source inside of the sphere adequate to a trajectory of the Earth, the angle of a deflection of a beam the Sun decreases under the diagram of figure. To a prediction of the given theory it is possible to relate that the ray of light on a surface of the Sun or close will deviate a source only on 1,25 ".

$$g = \frac{GM}{R^2 \sqrt{1 - \frac{2GM}{c^2 R}}} \quad \text{Here} \quad R_g = 2 \frac{MG}{c^2}$$

Schwarzschild GR Solution: . Here R_g - it is the Schwarzschild Radius or gravitational radius. A deflection of a

ray of light $i = 4 \frac{MG}{c^2 R} = 1.7461085$ ", where R - The aim distance equal, for example, to radius of the Sun.

The formula (1) gives: $i = 1.746054$ ". **A difference is only in 5-th mark.**

The conclusion

1. In GR and in the theory of vacuum there are identical experimental confirmations.
2. GR is faster the geometrical theory added with the law of gravitation of Newton.
3. The theory of vacuum has in the basis only physical approach, which have allowed to open gravitation as polarization of vacuum at the presence of masses which influenced an attraction by structure of vacuum under laws of Faraday induction.
4. GR has exhausted itself in opportunities of development of physics, the theory of vacuum has opened an opportunity of research of vacuum as the natural space and opens the ways for progress of physics and the technologies connected to properties of vacuum.

The literature

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