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The mass of the Milky Way galaxy

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1. Abstract

On the Basis of tabular values of the gravitational constant. The calculated mass of the nucleus of the milky way galaxy. The numerical value of the gravitational constant is determined by the mass of the nucleus of the milky way galaxy Abstract: Based on the tabular value of the gravitational constant, the mass of the Milky Way galaxy is calculated. Based on the physical meaning the gravitational constant, and the coincidence with the calculated on the surface Of the Sun, the mass of the Milky Way galaxy is calculated. gravitational constant on the surface of the Sun, the mass of the galaxy The Milky Way.

2. Keywords:

Gravitational constant, The core of the galaxy, The core mass of the Galaxy, Physical meaning of the gravitational constant, Gravitational constant on the surface of the Sun, The mass of the galaxy The Milky Way.

3. Gravity in the center and on the surface of the Sun

Let the Sun be in the empty space of the universe (on the “edge“The universe). In the center of the Sun we introduce a spherical coordinate system At the beginning of the coordinate system, we place the proton p. Wave fronts of a high-frequency gravitational field re-emitted by matter The suns fall on the proton p within the solid angle of 4π.When the wave front interacts with a proton p, the energy of the proton p becomes indeterminate for some time, according to the principle Heisenberg uncertainties Δε*Δt ≥ h/(2π) ; where h is Planck’s constant, Δε is the uncertainty of the proton energy over time Δt . When a wave front passes through a proton, it re-emits excess energy into the surrounding space in the form of a spherically symmetric gravitational wave. Calculate the gravitational energy incident on a proton p within a solid angle of 4π in one second. The number of protons in one cubic meter of the Sun’s matter is equal to n = p/m = M/(V*m) where p is the density of the Sun’s matter, M is the mass of the Sun, V is the volume of the Sun, m is the rest mass of the proton. Let us isolate an elementary volume dV inside the surface of the Sun at a distance R from the proton p . With d V = $R^2 \sin\theta$ d θ d φ d R Fig. The number of protons in the volume d V is equal to d N = n d V = $\frac{M}{V*m} R^2 \sin\theta$ d θ d φ d R. In one second, volume d V re-emits gravitational energy in the amount of Δε*d N = $\frac{M*h}{2\pi m V} R^2 \sin\theta$ d θ d φ d R ; where π = 3.14. The energy incident the proton p from the entire volume of the Sun in one second $\varepsilon_p = \frac{M h r r}{8 \pi m V} \iiint \sin\theta \, d\theta \, d\varphi \, dR$; where $0 \le R \le R_0$; $0 \le \theta \le 4\pi$; $0 \le \varphi \le 2\pi$; R_0 - is the radius of the Sun. The Sun $V = \frac{4}{3} \pi R^3$. r- is the radius of the proton. or $\varepsilon_p = \frac{3}{32} \frac{M h r r}{\pi \pi m R} \frac{M h r r}{} \iiint \sin\theta \, d\theta \, d\varphi \, dR$ After solving the integral , we get $\varepsilon_p = \frac{3 M h r r}{8 \pi m R_0 R_0}$; Select a small region in the vicinity of the proton p space free from the matter of the sun. Let’s put two protons p_1 and p_2 in this cavity at a distance R from each other. Each of the protons p_1 and p_2 in one second, it re-emits of gravitational energy within of 4π. Energy gets from proton p_1 to proton p_2 $\varepsilon = \frac{\varepsilon_p \pi r r}{4\pi R R} = \frac{3 M h r r r r}{32 \pi m R_0 R_0 R R}$; m is the rest mass of the proton. In the last expression R is the distance between the test protons p_1 and p_2. The pulse received in one second $\Delta p = \frac{\varepsilon}{c} = \frac{3 M h r r r r}{32 \pi m c R_0 R_0 R R}$; where c is the speed of light in vacuum. The force of attraction $\frac{3 M h r r r r}{32 \pi m c R_0 R_0 R R}$ p_1 and p_2 is defined as F = Δp . (Δt =0). Substitute $\frac{3 M h r r r r}{32 \pi m c R_0 R_0 R R} = \gamma \frac{m m}{R R}$ gravitational constant at the center the Sun. Hence $\gamma = \frac{3 M h r r r r}{32 \pi m m m c R_0 R_0}$; Substitute the values of the quantities, we get the coefficient of gravity in the center of the Sun $\gamma = 2.9256 * 10^{-10}$ $н*м^2*кг^{-2}$ Let’s calculate the coefficient of gravity on the surface of the Sun. Let the center of the Sun S be located on the OZ axis of the spherical coordinate system at a distance R_0 from its origin (Fig.2). R_0 is the radius the Sun, M is the mass of the Sun. Let’s put a test proton at the beginning a spherical coordinate system on the surface of the Sun . Select inside The elementary volume of the Sun dV = $R^2 \sin\theta$ d θ d R The number of protons in one cubic meter of the Sun n = $\frac{p}{m} = \frac{M}{V*m}$; where p is the density of the substance the Sun, M is the mass of the Sun, V is the volume of the Sun, m is the rest mass of the proton. The number of protons in the dV volume is equal to d N = n d V = $\frac{M}{V*m} R^2 \sin\theta$ d θ d φ d R In one second, the volume d V re-emits gravitational energy in the amount of Δε*d N = $\frac{M*h}{2\pi m V} R^2 \sin\theta$ d θ d φ d R ; where π = 3.14. Where Δε is taken from the Heisenberg uncertainty ratio Δε*Δt ≥ h/(2π) ; where h is Planck’s constant, Δε is the uncertainty of the proton energy over time Δt . At Δt = 1 sec. we take Δε = h/(2π). The energy the test proton in one second from the volume d V is equal to $\frac{\Delta\varepsilon \, dN \, \pi r r}{4 \pi R R}$ The energy incident the proton p from the entire volume of the Sun in one second $\varepsilon_p = \frac{M h r r}{8 \pi m V} \iiint \sin\theta \, d\theta \, d\varphi \, dR$; where $0 \le R \le 2R_0$; $0 \le \varphi \le 2\pi$; After calculating the integral, we get $\varepsilon_p = 3 \left(1 - \frac{\sqrt{2}}{2}\right) \frac{M h r r}{4 \pi m R_0 R_0}$; Now let there be two test protons on the surface of the Sun with the re-emission energies of ε_p. The ene de on pr n de of proton p1 will be defined as $\varepsilon = \frac{\varepsilon p \pi r r}{4\pi R R} = \frac{3}{32}(1 - \frac{\sqrt{2}}{2})\frac{M h r r r r}{\pi m R_0 R_0 R R}$; In the last expression , R is the distance between the ial ived by proton p_2 in one second $\Delta p = \frac{\varepsilon}{c} = \frac{3}{32}(1 - \frac{\sqrt{2}}{2})\frac{M h r r r r}{\pi m c R_0 R_0 R R}$; where c is the speed of light in vacuum. n p ns p_1 and p_2 is defined as F = Δp. Or $\frac{3}{32}(1 - \frac{\sqrt{2}}{2})\frac{M h r r r r}{\pi m c R_0 R_0 R R} = \gamma \frac{m m}{R R}$; where γ is $\frac{3}{32}(1 - \frac{\sqrt{2}}{2})\frac{M h r r r r}{\pi c m m m R_0 R_0}$ he surface of the Sun. Hence

$$\gamma = \frac{3}{32}(1 - \frac{\sqrt{2}}{2})\frac{M h r r r r}{\pi c m m m R_0 R_0}; \qquad (1)$$

Substitute the values of the quantities, we get the gravity coefficient (gravitational constant) on the surface of the Sun (r- is the radius of the proton). $\gamma = 8.572 * 10^{-11}$ н*м²*кг⁻²

4. Calculate The Mass Of The Milky Way Galaxy

Formula (1) is good with a tabular value $\gamma = 6.672*10^{-11}$ нм²кг⁻². From here, mentally, the Milky Way galaxy can be represented as a homogeneous huge star with a radius of H. The density of which is equal to the density of the Sun. Let About the center of the core of the Milky Way galaxy. R_0 is the radius of the globular region of the galaxy centered at point O and mass M. The solar system is located at a distance of H + R from the center of the galaxy (Fig. 1). We introduce the system coordinates so that the center of the core O is on the z axis at a distance H from the origin of the coordinate system. Let's put a test proton at the beginning of the system coordinates to the point o. The galactic core determines the distribution of the gravitational constant within the galaxy. The gravitational constant is no longer constant inside the galaxy. The farther away from the center of the galaxy, the smaller it is. The mass of the Galactic core is determined in terms of the gravitational constant inside the Solar system (table value).

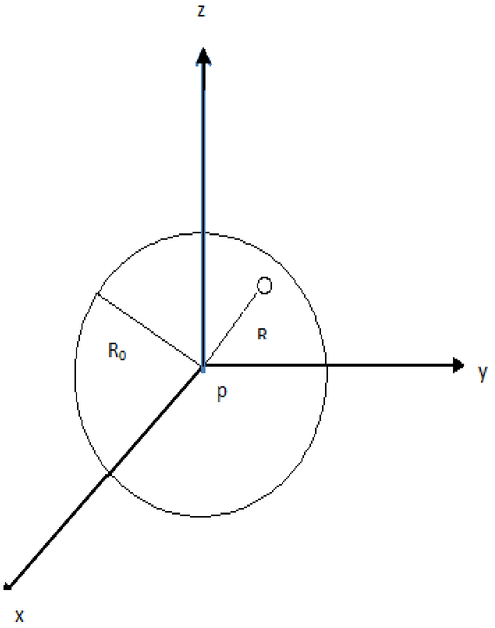

Figure 1

5. The Basic Part

Let the center of the nucleus of the galaxy O. The radius of the ball region of the galaxy is R_0. The mass of a galaxy M. The Solar system is at a distance H from the center of the galaxy (fig.1.1.). We introduce a coordinate system. To the center of the kernel was on the z axis at a distance H from the beginning of the coordinate system. Place a test proton in the origin of the coordinate system at point p. In inside the ball volume. $dV = R^2 \sin r\, d\theta\, d\varphi\, dR$ $\frac{\rho}{}$ $\frac{M}{}$ The number of protons in one cubic meter inside the ball $n = \frac{\rho}{m} = \frac{M}{V * m}$; where V – the volume of a sphere of radius R_0, m is the mass of a proton, ρ is the density substance inside the ball, M – mass of the substance inside the vl. The number of protons inside the volume dV is equal to $dN = \frac{M}{V * m} R^2 \sin\theta\, d\theta\, d\varphi\, dR$ The volume one second, emits gravitational energy in the amount of $\Delta\varepsilon * dN = \frac{M h}{2\pi m V} R^2 \sin\theta\, d\theta\, d\varphi\, dR$; where Δε taken from Heisenberg's uncertainty principle: $\Delta\varepsilon * \Delta t = \frac{h}{2\pi}$; Take Δt = 1 second, then $\Delta\varepsilon = \frac{h}{2\pi}$.

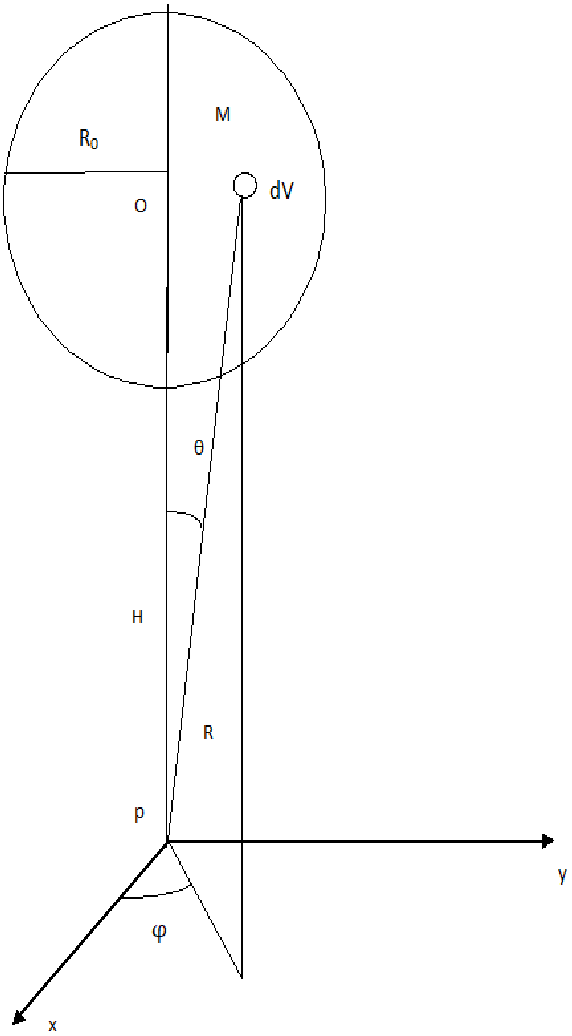

Figure 1.1

The energy of the incident proton p per second from the Volume dV is equal to $\Delta\varepsilon * dN \frac{\pi rr}{4\pi RR}$; where r – the radius of the proton ($r = 1.5 * 10^{-15}$ m); $\pi = 3.14$. R – the distance from the volume dV before the beginning of the coordinate system. The energy of the incident proton p. 1 second of the entire volume of a sphere

$\varepsilon_p = \frac{M h rr}{8\pi m V} \iiint \sin\theta d\theta d\varphi dR \underline{R_0}$ where $0 \leq \theta \leq \text{arctg}\,\theta$, $0 \leq \varphi \leq 2\pi$; $H - R_0 \leq R \leq H + R_0$; $\text{tg}\hat{\theta} = \frac{R_0}{H}$. In view of the smallness of the angle $\frac{3}{\hat{M} h rr}$ write $\text{arctg}\,\theta = \theta = \frac{}{H}$; After calculating the integral get $\varepsilon_p = \frac{16}{\pi m H H}$ Let on the edge of the Solar system. Far away from massive objects. There are two protons at a distance R from each other. Energy of $\frac{\pi rr}{}$ $\frac{3}{}$ $\frac{M h rrrr}{}$ the p_2 proton from the proton p_1 is equal to $\varepsilon = \varepsilon_p \frac{\pi rr}{4\pi RR} = \frac{3}{64} \frac{M h rrrr}{\pi m H H R R}$

The impulse received by the proton p_2 in one second is equal to $\Delta p = \frac{\varepsilon}{c}$

The force of attraction $\frac{mm}{}$ $\frac{3}{}$ $\frac{M h rrrr}{}$ the protons p_1 and p_2 is equal to $F = \Delta p = \gamma \frac{mm}{RR} = \frac{3}{64} \frac{M h rrrr}{\pi m c H H R R}$; where c – the speed of light in vacuum $\frac{64}{}$ $\frac{}{\pi\, mm\, mc H H}$ Weight of the Central region of the milky way galaxy $M = \frac{3}{}$ γ $h rrrr$; where γ the table value of the gravitational constant ($\gamma = 6.672 * 10^{-11}$ н m^2кг$^{-2}$). Take $H = 2.65 * 10^{20}$ м. then $M = 1.3 * 10^{53}$ кг.

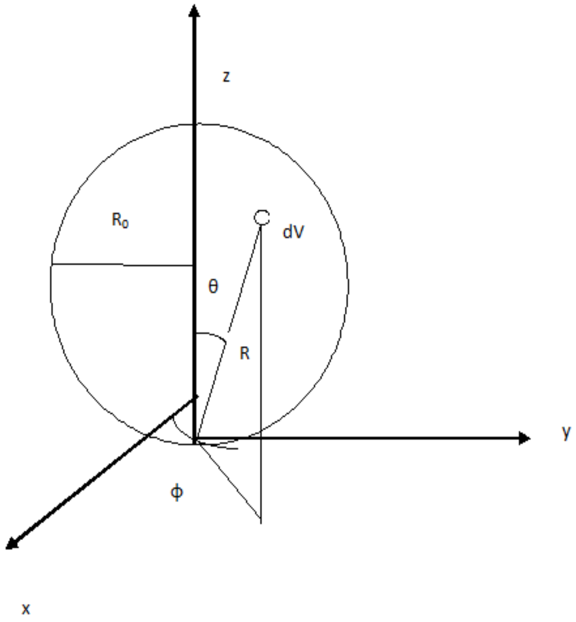

Figure 2

6. Conclusion:

The galactic core in the weight specifies a numeric value the gravitational constant inside the Solar system.

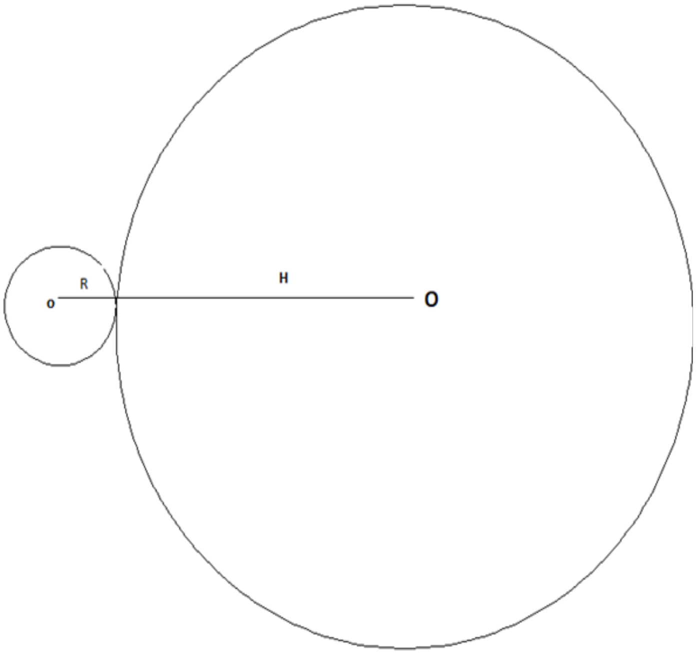

Figure 3: R the radius of the Sun. H +R the distance from the center of the Sun to the center of the galactic core.