# The Scalar model of the field of the gravity.

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The Scalar model of the field of the gravity is designed as alternative FROM. In weak floor all calculations comply with drawn near result FROM. In strong floor model will with observed fact, gives the possible explanation bright heat radio sources, variable stars, stars with long life beside massive black holes. The Nature enumerated object has a no explanations within the framework of FROM. Collapse within the framework of model greatly differs from Collapse in FROM, he does not collide with correlation of the uncertainties and does neither turn nor one physical value in infinity. The Model gives the checked forecast.

PACS: 52, 53

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## 1. The source postulates.

The Model is a mathematical effect three source postulates:

1. The Velocity of the light does not depend on parameter of the field of the gravity.
2. Pulse of the photon under vertical fall is changed in accordance with law of the worldwide gravity

$$\frac{d}{dt}\left(\frac{h\nu}{c}\right)=\frac{4\pi GM\left(h\nu/c^2\right)}{S} \qquad (1\text{-}1)$$

or

$$\frac{d}{dt}\left(\frac{\nu}{c}\right)=\frac{d\nu}{dR}=\frac{4\pi GM\left(\nu/c^2\right)}{S}$$

In denominator is made change $R^2 \Rightarrow S/4\pi$. In this case tension of the field

$$E_G=\frac{4\pi GM}{S} \qquad (1\text{-}2)$$

will remain proportional density power line and in strong floor, where $R^2 \neq S/4\pi$ .

The Third postulate is formulated on base of the analysis conclusion from (1-1) and experimental data.

The Main conclusion from (1-1) consists in exponential dependency of the energy of the photon, from potential.

$$\nu = \nu_0 \exp\left(-\frac{\varphi}{c^2}\right) \qquad (1\text{-}3)$$

$$\varphi = \int_{\infty}^{R} \frac{4\pi GM}{S} dR$$

$$\nu / \nu_0 = \exp(-\Phi) \qquad (1\text{-}4)$$

Non-dimensional potential is incorporated $\Phi = \varphi / c^2$

The Attitude $\nu / \nu_0 = z$ presents itself red offset for photon, going from area with potential $\Phi$ in area with zero potential. The Got equation (1-4) means the refusal of notions "horizon event". The Exponential dependency to energy from potential brings about that that under any differences potential field of the gravity, photon, flying to vertical direction, will not squander whole its energy (fig. 1.)

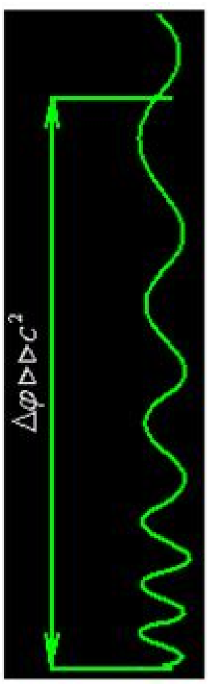



Fig. 1

The Dependency of the frequency from potential means the corresponding to dependency of the move of time from potential.

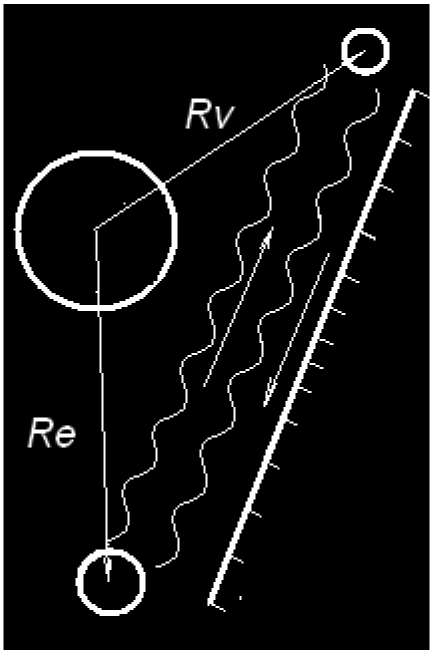
$$\frac{dt_0}{dt} = \exp(-\Phi) \qquad (1\text{-}5)$$

From (1-5) is seen that in potential pit time goes slowly, than in the field of with zero potential.

We Use the received result for estimation of the delay of the signal, passing вблизи Sun in the known experiment. Radio signal moved to Venus and reflected was taken on the Land (fig. 2.). Accounting delay (Exhibit 1)

$$\delta t = \frac{r_g}{c} \ln \frac{R_e R_v}{\rho^2} \qquad (1\text{-}6)$$

turned out to be exactly in two times less experimental. So not difficult was expect that not only time slows its run, but also in such proportions lengthens the track to account of the change the spatial scale. So the third postulate (1-7) means that vector of the small displacement in real space with coordinate $dx, dy, dz$ lengthens to vector of the same displacement in flat space with coordinate $dx_0, dy_0, dz_0$ in such number once, in what is slowed time.




$$\frac{dx}{dx_0}=\frac{dy}{dy_0}=\frac{dz}{dz_0}=\frac{dt_0}{dt}=\exp(-\Phi) \qquad (1\text{-}7)$$

The Factor of the transformation logistical to name the local scale factor since within the framework of model scale factor has same nature and is connected with averaged by potential of Universe.

Taking the third postulate has allowed to get the correct decisions for effect Einstein and Shapiro. (Exhibit. 1)

$$\beta=-c\frac{d\delta t}{2d\rho}=\frac{2r_g}{\rho} \qquad (1\text{-}8)$$

$$\delta t=\frac{2r_g}{c}\ln\frac{R_eR_v}{\rho^2} \qquad (1\text{-}9)$$

Fig. 2

The Equation (1-7) links the metrics real space with well known metrics flat space through potential.

For reception of the metrics real space necessary to find the spatial description of the potential.

The Equation (1-7) can be recorded in vector form since all components of the vector change pro rata.

$$\frac{d\vec{R}}{d\vec{R}_0}=\frac{dt_0}{dt}=\exp(-\Phi) \qquad (1\text{-}12)$$

Since derivative (1-12) grows with depth of the potential pit, that equidistant spheres or orbits for external watcher are packed down on measure of the approximation to the gravity source (Fig. 3)

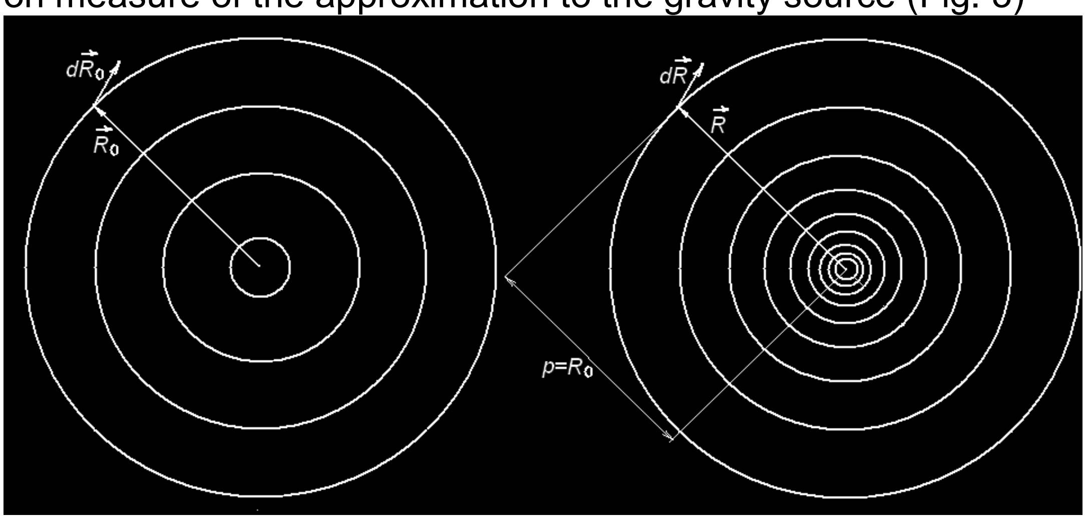



Fig. 3 Equidistant spheres in flat and real space.

For determination of the length of the circular orbits shall notice that in flat coordinate system aiming parameter is a radius of the orbit $R_0$, but length of the orbit $L = 2\pi R_0$. In real space orbit is measured by more short standard of the length and therefore gains multiplier equal scale factor

$$L = 2\pi R_0 \exp(-\Phi) \tag{1-13}$$

Surface of the sphere accordingly multiplies on square of the scale factor.

$$S = 4\pi R_0^2 \exp(-2\Phi) \tag{1-14}$$

## 2. Potential

Substituting (1-14) in formula for tension of the field (1-2), shall get

$$E_G = \frac{MG}{R_0^2} \exp(2\Phi) \tag{2-1}$$

We shall solve equation (2-1) for potential considering that

$$E_G = \frac{c^2 d\Phi}{dR_0} \frac{dR_0}{dR} = c^2 \frac{d\Phi}{dR_0} \exp(\Phi) \tag{2-2}$$

shall get equation for potential

$$\exp(-\Phi) d\Phi = \frac{MG}{c^2} \frac{dR_0}{R_0^2} = r_m \frac{dR_0}{R_0^2} \tag{2-3}$$

Incorporated indication $r_m = \frac{GM}{c^2} = \frac{r_g}{2}$ (2-4)

$r_m$ - Comfortable name is the mass radius. Such name reflects the single parameter, with which is linear bound mass radius - a mass. The Index $_m$ also reminds that $r_m$- minimum importance to which strives under collapse efficient radius of the star.

Integrating (2-3), shall get

$$\exp(-\Phi) = 1 + \frac{r_m}{R_0} \tag{2-5}$$

$$\Phi = -\ln\left(1 + \frac{MG}{R_0 c^2}\right) = -\ln\left(1 + \frac{r_m}{R_0}\right) \tag{2-6}$$

The Got formula for potential with equation (1-7) gives the description of the metrics real space.

Substituting in (2-1) metric expression (2-5), shall get for the tension of the field expression, on the form complying with equations of Newton.

$$E_G = \frac{MG}{(R_0 + r_m)^2} = \frac{MG}{R_{Eff}^2} \tag{2-7}$$

Surface of the sphere and length of the orbit also get simple expressions

$$S = 4\pi (R_0 + r_m)^2 = 4\pi R_{Eff}^2 \quad (2\text{-}8)$$

$$L = 2\pi (R_0 + r_m) = 2\pi R_{eff} \quad (2\text{-}9)$$

In all expressions efficient radius is defined as amount

$$R_{Eff} = R_0 + r_m \quad (2\text{-}10)$$

3. Collapse.

The Presence of the constant value in expression for efficient radius brings about final limiting importances of all features of collapsing object. The Volume strives to value.

$$V \cong \frac{4}{3}\pi {r_m}^3 \quad (3\text{-}1)$$

Interesting note that volume not proportional mass collapsing object, but grows pro rata mass in the third degree. So limit average density under collapse (3-2) back proportional square of the mass.

$$\mu_{av} \lhd \frac{3c^2}{4\pi G {r_m}^2} \quad (3\text{-}2)$$

Change the scale factor under collapse brings about that that big mass can not have big density. So hypothesis of the big blast not compatible with proposed by model.

The Phenomena of Removing of galaxies finds other explanation within the framework of model. The Dialect briefly, the Universe is found in late stage collapse. Herewith observed Removing of galaxies is connected with growing of the scale factor. Coming from modern belief about density of the Universe and expecting that Universe was formed from more rarefying material, shall calculate the velocities an usual moving the galaxies to the centre of Universe disregarding rotations our Universe.

The Distance of the galaxy from the centre of Universe $R = zR_0$;

$z$ - Scale factor.

Resulting velocity with provision for change the scale factor

$$V = R_0 \frac{dz}{dt} + z\frac{dR_0}{dt} = R_0 \frac{dz}{dt} + \frac{dR}{dt} \quad (3\text{-}3)$$

For estimation we shall take $\frac{dz}{dt}$ for edge of Universe, supposing that to centre of Universe this value not will powerfully change

$$\begin{aligned} \frac{dz}{dt} &= \frac{d}{dt}\left(1 + \frac{r_m}{R_0^0}\right) = r_m \frac{d}{dt}\left(\frac{1}{R_0^0}\right) = r_m \frac{dR}{dt}\frac{dR_0^0}{dR}\frac{d}{dR_0^0}\left(\frac{1}{R_0^0}\right) = -r_m \frac{dR}{dt}\frac{dR_0^0}{dR}\frac{1}{R_0^{02}} = \\ &= -r_m \frac{dR}{dt} z^{-1} \frac{1}{R_0^{02}} \approx c\left(\frac{R_0^0}{r_m + R_0^0}\right)\frac{r_m}{R_0^{02}} = \frac{r_m c}{R_0^0 (r_m + R_0^0)} \end{aligned} \quad (3\text{-}4)$$

$$V = \frac{R_0}{R_0^0}\frac{r_m c}{\left(r_m + R_0^0\right)} + \frac{dR}{dt} = R\frac{r_m c}{\left(r_m + R_0^0\right)^2} + \frac{dR}{dt} = \upsilon_z + \upsilon \qquad \text{(3-5)}$$

Here $R_0^0$ - an aiming parameter of the external border of Universe.
On supposed late stage of collapse so

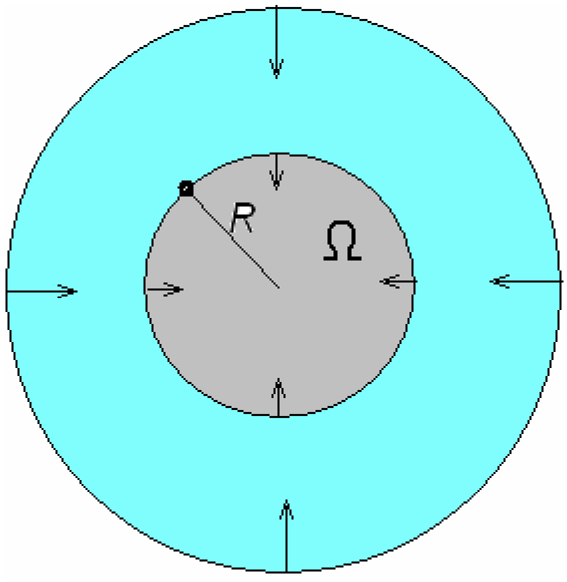



Fig.4

$$V = R\frac{c}{r_m} + \frac{dR}{dt} = \upsilon_z + \upsilon \qquad \text{(3-6)}$$

Here $\upsilon = \frac{dR}{dt}$ - usual velocity of the rapprochement of the galaxies.
The Expression (3-7) presents the velocity of removing, conditioned by change the scale factor $z$ or scale velocity.

$$\upsilon_z = \left(c/r_m\right)R \qquad \text{(3-7)}$$

The Factor $H_z = c/r_m$ shall name scale constant.
Distribution usual velocities shall involve with potential created by ball by radius $R$ (Fig.4)

$$\varphi \approx -\frac{MG}{R} \approx -\frac{4\Omega R^3 G}{R} \approx -4\Omega G R^2 \qquad \text{(3-8)}$$

$$\upsilon = -\sqrt{-2\varphi_{Act}} = -\sqrt{-8\Omega G}R \qquad \text{(3-9)}$$

Substituting known value $\Omega = 10^{-26} kg/m^3$ shall get the expression.

$$\upsilon = -\sqrt{8\Omega G}R = -2.26 * 10^{-18} R \qquad \text{(3-10)}$$

New constant

$$H_\upsilon = -\sqrt{8\Omega G} = -2.26 * 10^{-18} c^{-1} \qquad \text{(3-11)}$$

we shall name the usual velocities constant. Hereinafter, considering that resulting removing galaxies is connected with change $z$ , we shall write constant of Hubble as amount of usual - and scale - constant.

$$H = H_z + H_\upsilon = 2.3 * 10^{-18} c^{-1} \qquad \text{(3-12)}$$

Thence $H_z = (2.3 + 2.26)10^{-18} = 4.56 * 10^{-18} c^{-1}$ (3-13)

Shall Calculate some parameters of Universe.
From (3-7) shall get

$$r_m \approx \frac{c}{H_z} \approx \frac{3 * 10^8}{4.56 * 10^{-18}} \approx 0.657 * 10^{26} m \qquad \text{(3-14)}$$

$$M_U = r_m \frac{c^2}{G} = 0.657*10^{26} \frac{9*10^{16}}{6.67*10^{-11}} \approx 0.89*10^{53} kg \qquad (3\text{-}15)$$

Got value not powerfully differs from modern estimation, thereby, made suggestion about late stage collapse quite not rough.

The Detours from law Hubble can be conditioned as drawn near by description usual velocities, which approach to velocities of the light under $R \approx c / (2.26*10^{-18}) \approx 1.3*10^{26}$ so and spottiness of the global potential and since Universe is not sphere.

You will Return to formula (3-2) according to which average density strives to limit $\mu_{av} \triangleleft \frac{3c^2}{4\pi G r_m^{\ 2}}$. We shall Value density, which can be reached for limit by Oppengeymer - Volkov, forming beside 3,5 masses Sun. The Estimation shows that density will not be able to превысить density atomic kernel done on 6. Such comparatively rarefied substance already not capable to withstand the gravity pressure since nucleus power is short acting.

. If mass of the star limit Chandrasekhar less that average density under коллапсе must was превысить density atomic kernel. However such stars change in white dwarves. Between named limit, the star change in neutron star. Thereby, does not exist the interval of the masses, in which average density under collapse has become more then density of atomic kernel.

We shall consider the effects, resulting from existence of the final limit gravity pressures (Exhibit 2).

$$P_{g_{\max}}(r_m) \approx \mu_{av} c^2 \qquad (3\text{-}16)$$

What shows the calculation (Exhibit 2) exist the condition to in process of collapse counter pressure, conditioned by heating of collapsing object, has превысило the gravity pressure. The Heating of the object is conditioned by absorption of the external radiation, which power increases in $z^2$ once. Herewith in $z$ once increases the energy a photon and in $z$ once decreases time of the absorption from for decelerations of time in potential pit. Since under collapse grows unlimited, that nearby stars capable warm object before the temperature, under which pressure of the radiation will stop collapse.

$$P_v \approx \frac{\sigma T^4}{c} = \mu_{av} c^2 \qquad (3\text{-}17)$$

Temperature of the stop will form (Exhibit 2)

$$T_{Bal} = 2.16*10^{12} / \sqrt{N_\oplus} \qquad (3\text{-}18)$$

Here $N_\oplus = M / M_\oplus$ non-dimensional mass.

So at $z = 10^9$ object, mass $M = 6.8*10^{10} M_{\oplus}$ becomes warm before the temperature $T \approx 10^7 K^0$, and his spectrum is displaced in range of radio waves, (Exhibit 3) and will have an intensity corresponding to to brightness temperature $T_{Br} = 10^{16} K^0$. Exactly such bright radio waves sources
with heat spectrum observe the astronomers.
The Drawing 5 illustrates the mechanism of the arising the spectrum bright radio waves sources to account of the offset of the heat spectrum in range of radio waves.

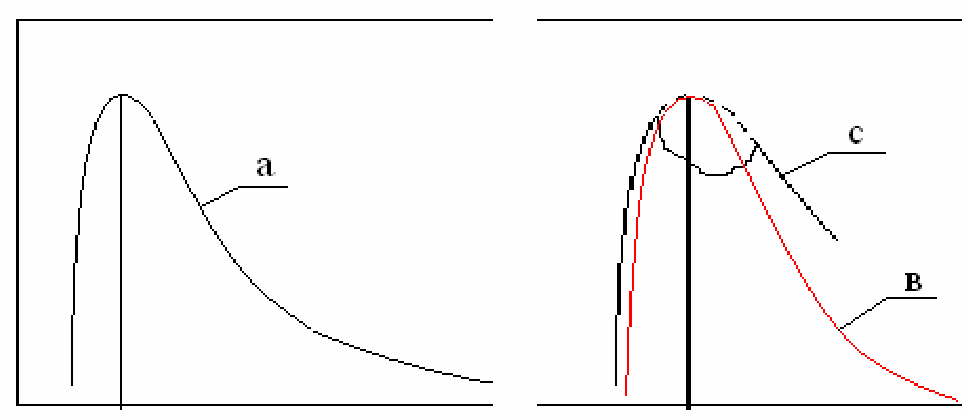



Fig.5
a - a heat spectrum; в - a heat spectrum displaced in radio region;
c - a typical spectrum of radio waves source.
The Difference experimental spectrum from accounting is explained being present reason of the increase the width of the spectrum and absorption in surrounding ambience.

We shall pay attention to variable stars. Their features to brightness, speakers and spectrum well with picture reversible collapse. Really, at compression variable stars her spectrum gets the red offset, but at expansion - violet and this will with corresponding to change the potential to surfaces. Duration of the submersion in potential pit corresponds to the accumulation to energy and explains the correlation to brightness flash since period between flash. For detailed explanation of the mechanism reversible collapse see it is necessary to comprise of consideration rotation stars.

## 4. Infinity paths of photon.

Big importance for understanding the nature bright радиоисточников has a fact of existence инфинитных path photon in strong floor.

For moving on circular Orbit, the centripetal speedup must be equal tension of the field

$$\frac{c^2}{R_0 + r_m} = \frac{MG}{(R_0 + r_m)^2} \qquad (4\text{-}1)$$

after transformations we get correlation

$$1 = \frac{r_m}{R_0 + r_m} \qquad (4\text{-}2)$$

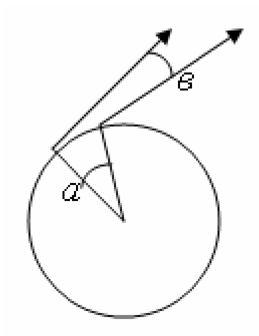


Fig. 6

which is executed only under. This signifies that circular orbits for photon in central field does not exist.

The Form path possible to understand at corner of the tumbling of the pulse when moving the photon on short area of the circular path. (The Rice.6) Incrementation radial pulse is a product of power acting on photon for time of the motion on length of the arc Fig.6 $\Delta P = \frac{h\nu}{c^2}\frac{MG}{R_{Eff}^2}\frac{R_{Eff}\alpha}{c}$ (4-3)

$$\beta = \frac{\Delta P}{P} = \alpha \frac{r_m}{R_{Eff}} \qquad (4\text{-}4)$$

Consideration in wave description brings about the same result that confirms correctness to models (the fig. 7).

$$\frac{dl}{dR_0} = c\frac{d\tau}{dR_0} = c\frac{d}{dR_0}\left(t\left(1+\frac{r_m}{R_0}\right)^{-1}\right) = ct\frac{1}{z^2}\frac{r_m}{R_0^2} = \frac{c\tau r_m}{zR_0^2} = \frac{c\tau}{R_0 + r_m}\frac{r_m}{R_0} = \alpha\frac{r_m}{D}$$

$$\beta = \frac{dl}{dR} = \frac{dl}{dR_0}\frac{dR_0}{dR} = \alpha\frac{r_m}{R_0}\left(1+\frac{r_m}{R_0}\right)^{-1} = \alpha\frac{r_m}{R_{Eff}}$$

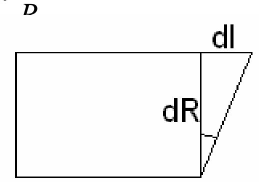
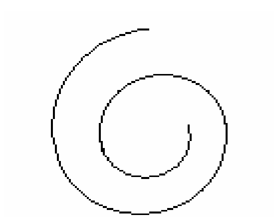



Fig.7



From (4-4) is seen that path of the photon is of the form of dispersing spirals. (ris.8) Any orbit of photon flown with surfaces of the star infinity. From red offset

Fig.8

$$z = \frac{\nu}{\nu_\infty} = \exp(-\Phi) \qquad (4\text{-}5)$$

the stars with deep potential are perceived as "black holes".

## 5. The Black holes and their satellites.

The Additional acknowledgement to models is an explanation of long existence of the stars - satellites beside massive black holes[2]. The Gradient of the field in the field of their findings not too great.

$$\frac{dE_G}{dR} = \frac{dE_G}{dR_0}\frac{dR_0}{dR} = \frac{2MG}{\left(R_0 + r_m\right)^3\left(1 + r_m/R_0\right)} \quad (5\text{-}1)$$

In the field of, where $R_0 \gg r_m \approx 2*10^{11} m$

$$\frac{dE_G}{dR} \approx \frac{2MG}{R_0^3} \quad (5\text{-}2)$$

For "black hole" in the centre of the nebulas Andromeda, the mass which forms $2{,}8*10^{38} kg$, gradient to tension on distance of the half of the light year forms $3{,}5*10^{-19}\sec^{-2}$. For comparison, field of the gravity of the Moon has a gradient beside surfaces of the Land $4{,}5*10^{-14}\sec^{-2}$. Signifies, tidal mechanism does not disturb long existence of the stars - satellites.

The Influence of the mechanism of the radiation гравитационных waves интереснее to consider for stars - satellites, which orbit has an aiming parameter $R_0 \lhd\lhd r_m$, since intensity гравитационного radiations proportional $\omega^6$. From (6-1) shall get

$$\frac{dE_G}{dR} = \frac{2MGR_0}{r_m^4} \quad (5\text{-}3)$$

Signifies at $R_0 \Rightarrow 0$ field practically uniform, for massive black holes particularly. So tidal mechanism does not disturb long existence of the stars - satellites and on deep orbit.

We shall Calculate frequencies of the satellite.

On circular Orbit centripetal speedup is a tension of the field $\frac{\upsilon_{\text{sat}}{}^2}{R_{Eff}} = \frac{MG}{R_{Eff}^2}$ consequently $\upsilon_{sat}{}^2 = c^2\frac{r_m}{R_{Eff}}$ so at $R_0 \lhd\lhd r_m$ attitude $\frac{r_m}{R_{Eff}} \approx 1$ and we shall get $\upsilon_{sat} \approx c$. If aiming parameter $R_0 \lhd\lhd r_m$ that velocities of the stars - satellites close to velocities of the light (Exhibit 4). Period of the stars - satellites referencing for all orbits

$$\mathrm{T} \approx \frac{2\pi r_m}{c} = 2\pi\frac{GM}{c^3} \quad (5\text{-}4)$$

$$\omega = c/r_m \quad (5\text{-}5)$$

So for black hole in nearby galaxy $\mathrm{T} \approx 4.3*10^3\sec \quad \omega = 1{,}5*10^{-3}$

Gravity radiation under such frequency allows to exist the stars - satellites around $\tau$ ~30 million years at local time or $\tau_0 = z\tau$ for terrestrial watcher. Since this very big time that great probability of the finding stars - satellites. Got importance's for frequency and period are local. For watcher on the Land frequency will decrease in $z$ once.

The Sign for identification of the stars - satellites is an equality of the offsets of the frequency of the address $\omega_0 = \omega / z$ and frequencies of the radiation $\nu_0 = \nu / z$.

## 6. The gravity waves.

Scalar form potential allows expecting existence only longitude waves. Let there is indignation of the potential in space $\varphi(x)$ with coordinate $\chi$. Moving the chosenned volume by size $\Delta x$ occurs under the law Newton

$$\frac{d_2 \chi}{dt^2} = -\frac{d\varphi}{dx} \tag{6-1}$$

In accordance with (1-7) size chosenned area is changed on value

$$\chi(x + \Delta x) - \chi(x) = \Delta x \frac{-\phi}{c^2} \tag{6-2}$$

So that

$$\frac{\varphi}{c^2} = -\frac{d\chi}{dx} \tag{6-3}$$

and we get wave equation

$$\frac{1}{c^2} \frac{d_2 \chi}{dt^2} = \frac{d_2 \chi}{dx^2} \tag{6-4}$$

from which follows that gravity waves spread in space at the speed of light.

Calculation to intensities gravity waves (Exhibit 5) gives

$$I \approx \kappa \frac{GM^2 \omega^6 r_1^4}{c^5} \tag{6-5}$$

that complies with result FROM.

## 7. The Broughted flows.

Necessary to note that divergence of the vector in formula Ostrogradski $\oint_V div\vec{A}dV = \oint_S \vec{A}d\vec{S}$ gains the new sense in strong floor. She does not characterize density of the sources or sewer in strong floor. For instance, for stationary flow of the liquids on vertical pipe, number of the moths, running for second in different sections will be different from for differences of the move of time. At sources or sewers are absent. For the same reason in long vertical solenoid current in lower whorl more than in upper. Accordingly magnetic induction different in different sections of the solenoid. However formula Ostrogradski saves the former sense for brought flow equal usual flow, done on scale factor. The Similar conclusion is correct and for molded Grina and Stoksa. For brought flow

$$\oint_V div \frac{\vec{A}}{z} dV = \oint_S \frac{\vec{A}}{z} d\vec{S} \qquad (7\text{-}1)$$

8. Exhibits

Exhibit 1

The Delay radio signal in field Sun.(The Effect Shapiro)

Known experiment on passing radio signal from the Land to Venus and back close Sun has registered the delay of the signal, caused by influence of the field of the gravity Sun in accordance with FROM.

$$\delta t = \frac{2r_{gO}}{c} \ln \frac{R_e R_v}{\rho^2}$$

We shall Calculate same effect in our models. We shall Dispose begin coordinates in the centre of the star and shall match the free point M radius $R$ in real space (Fig.1) and radius $R_0$ in flat space.

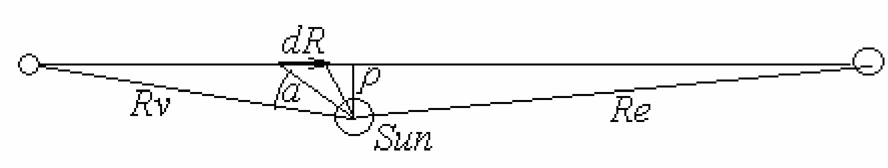



Fig. 1

In accordance with hypothesis about uniform compression space, elements of the length are bound by correlation

$$dR = dR_0 \exp(-\Phi)$$

For photon on each area exists correlation

$$ds^2 = c^2 d\tau^2 - \exp(-2\Phi)(dR_0)^2 = 0 \qquad (1)$$

In accompanying coordinate system so

$$d\tau = \frac{1}{c}\exp(-\Phi)\, dR_0$$

For external watcher

$$dt = \frac{1}{c}\exp(-2\Phi)\, dR_0$$

Let begin coordinates is located on ray in point nearest to Sun.

$\rho$ - a distance from the centre Sun before ray. Point with radius $\vec{R}$ - a vector shall put(deliver) in correspondence to corner

$$\alpha = \arccos\frac{\rho}{R}$$

herewith we shall get

$$dR_0 = \rho\frac{d\alpha}{\cos^2\alpha}; \qquad dR = \rho\frac{d\alpha}{\cos^2\alpha}\exp(-\Phi)$$

In accompanying coordinate system passing this area corresponds to time

$$d\tau = \frac{dR}{c} = \frac{\rho}{c}\frac{d\alpha}{\cos^2\alpha}\exp(-\Phi)$$

For terrestrial watcher passing this area corresponds to time

$$dt = d\tau\exp(-\Phi) = \frac{\rho}{c}\frac{d\alpha}{\cos^2\alpha}\exp(-2\Phi)$$

Substituting

$$\Phi = -\ln\left(\frac{MG\cos\alpha}{\rho c^2}+1\right)$$

we get

$$dt = \frac{\rho}{c}\frac{d\alpha}{\cos^2\alpha}\left(\frac{MG\cos\alpha}{\rho c^2}+1\right)^2 \approx \frac{\rho}{c}\frac{d\alpha}{\cos^2\alpha}\left(1+\frac{2MG\cos\alpha}{\rho c^2}\right)$$

In absence of the field of the gravity

$$dt_0 = \frac{\rho}{c}\frac{d\alpha}{\cos^2\alpha}$$

Delay of the signal

$$\delta t = \frac{\rho}{c}\frac{d\alpha}{\cos^2\alpha}\frac{2MG\cos\alpha}{\rho c^2} = \frac{2MG}{c^2 c}\frac{d\alpha}{\cos\alpha} = \frac{r_{g*}}{c}\frac{d\alpha}{\cos\alpha}$$

Considering that

$$\int_0^{\alpha_i}\frac{d\alpha}{\cos\alpha} = \ln\left|tg\left(\frac{\pi}{4}+\frac{\alpha_i}{2}\right)\right|$$

Where $\quad \alpha_i \approx \frac{\pi}{2} - \frac{\rho}{R_i} \qquad tg\left(\frac{\pi}{4}+\frac{\alpha_i}{2}\right) \approx \frac{R_i}{\rho}$

Considering double passage of the signal, definitively get

$$\delta t = \frac{2r_g}{c}\ln\frac{R_e R_v}{\rho^2} \qquad (2)$$

in full correspondence to with FROM

<u>Deflection of the ray in field of the gravity.(effect Einstein)</u>

Using formula (12-2) easy get corner of the deflection of the ray from correlation

$$\alpha = -c\frac{d\delta t}{2d\rho} = \frac{2r_g}{\rho} \qquad (3)$$

Here delay $\frac{\delta t}{2}$ is taken into account for one passage.

This is one more obvious correspondence to with FROM.
We shall Get ditto correlation for photon - a particle. For this shall calculate in the first approximations additional transverse pulse.

$$P_{\perp} = \int F_{\perp} dt$$

where; $F_{\perp} = \frac{MGh\nu}{\left(\frac{\rho}{\cos\alpha}\right)^2 c^2}\cos\alpha = \frac{MGh\nu}{\rho^2 c^2}\cos^3\alpha$ ; $dt = \frac{\rho}{c}\frac{d\alpha}{\cos^2\alpha}$

$$P_{\perp} = 2\frac{MGh\nu}{\rho c^3}\int_0^{\frac{\pi}{2}} \cos\alpha * d\alpha = \frac{4MGh\nu}{\rho c^3} = \frac{2r_g}{\rho}\frac{h\nu}{c}$$

whence

$$\alpha = \frac{P_{\perp}}{P} = \frac{2r_g}{\rho}$$

Thereby, alike result is received and in wave and in particle presentation.

Exhibit 2.

The Conditions of the stop collapse.

Maximum pressure in centre of the star shall value on formula

$$P = \int_0^R \mu E_G dR = \int_0^{R_0^0} \mu E_G z dR_0 \qquad (1)$$

where

$$E_G\left(R_{Eff}\right) = -\frac{GM}{R_{Eff}^2}$$

We shall Value mass of the ball on formula

$$M_{\left(R_{Eff}\right)} \approx 4\pi\mu_{av}\int_0^{R_0} R_0{}^2 z^3 dR_0$$

The Tension of the field in point of the calculation integral.

$$E_G = -\frac{GM}{R_{Eff}^2} = -\frac{4\pi G\mu_{av}}{R_{Eff}^2}\int_0^{R_0} R_0{}^2 z^3 dR_0$$

Considering increasing the module of the potential, but with him and factor to centre of the star, shall write inequality

$$E_G > \frac{4\pi G\mu}{R_0{}^2 z_0{}^2}\int_0^{R_0} R_0{}^2 z_0{}^3 dR_0 = \frac{4}{3}\pi R_0 z_0 G\mu$$

$z_0$ - it pertains to surfaces of the star

$R_0$ - an aiming parameter of the point inwardly stars.

Here in integral is made change $z \Rightarrow z_0$, to account what decreased the integral.

Estimation for pressure in centre of the star can be recorded so

$$P_g \approx \int_0^R \mu E_G dR \approx \int_0^{R_0^0} \mu E_G z dR_0 \approx \int_0^{R_0^0} \frac{4}{3}\pi R_0 z_0^2 G\mu^2 dR_0 \approx$$
$$\approx 4z_0^2 G\mu^2 \int_0^{R_0^0} R_0 dR_0 \approx 2z_0^2 G\mu^2 R_0^{02} \approx 2G\mu^2 R_{Eff}^2 \qquad (2)$$

it pertains to surfaces of the star.

For greater degrees of the compression when $r_m \gg R_0^0$ estimation looks else more simply

$$P_g \sim 4G\mu^2 r_m^{\ 2} \qquad (3)$$

We shall Substitute in (10-3) expression for from (9-7)

$$\mu_{av} = \frac{M}{V_m} = \frac{3M}{4\pi r_m^3} < \frac{c^2}{4Gr_m^{\ 2}} \qquad P_g \approx 4G\mu^2 r_m^{\ 2} \approx 4Gr_m^{\ 2}\left(\frac{3c^2}{4\pi Gr_m^{\ 2}}\right)^2 \approx \frac{c^4}{4Gr_m^2}$$

$$P_g \approx \mu_{av} c^2 \qquad (4)$$

$$P_g \approx \mu_{av} c^2 \approx \frac{c^4}{4Gr_m^{\ 2}} \qquad (5)$$

Consequently, limiting pressure back pro rata square of the mass For making the heat pressure of such value necessary kinetic energy of proton of the order $m_p c^2$. Protons with such energy will be at temperature

$$T \approx \frac{m_p c^2}{k} \approx \frac{1.67 * 10^{-27} 9 * 10^{16}}{1.38 * 10^{-23}} \approx 10^{13} K^0$$

The Light pressure $P_v \approx \frac{\sigma}{c} T^4$ under high temperature exceeds the heat pressure $P_T = nkT$. We shall Value the condition of the stop collapse light pressure.

$$\mu c^2 = \frac{\sigma}{c} T_{Bal}^4 \qquad (6)$$

$$T_{Bal} = \sqrt[4]{\frac{\mu c^3}{\sigma}} \qquad (7)$$

Average density $\mu$ collapsing stars does not exceed from density atomic kernel. $\mu \le \frac{2.8 * 10^{17}}{6} = 4.7 * 10^{16}$

So maximum temperature under which light pressure will stop collapse forms

$$T_{Bal}^{\max} = \sqrt[4]{4.7 * 10^{16} \frac{27 * 10^{24}}{5.7 * 10^{-8}}} = \sqrt[4]{22 * 10^{48}} = 2.16 * 10^{12} \qquad (8)$$

The more heavy black holes have smaller density and pressure so коллапс stops under smaller temperature.

If mass of the black hole forms $M = N_{\oplus} M_{\oplus}$ that $\mu \approx \frac{4.7*10^{16}}{N_{\oplus}^{2}}$ and temperature of the stop will form $T_{Bal} = 2.16*10^{12} / \sqrt{N_{\oplus}}$ (9)

In particular, under $N_{\oplus} = \left(2.6*10^{12} / 10^{7}\right)^{2} = 6.8*10^{10}$

$$T_{Bal} = 10^{7} K^{0}$$

In this case light pressure capable to stop collapse massive black hole at temperature $\sim 10^{7} K^{0}$

If this starry encirclement capable to warm heavenly body in zero potential before $T_{0} = 170 K^{0}$ (Exhibit 6) then for heating before required temperature $T = 2.16*10^{12} / \sqrt{N_{\oplus}} = 10^{7} K^{0}$ it will take

$$z = \left(\frac{T}{T_{0}}\right)^{2} = \frac{1}{N_{\oplus}}\left(\frac{2,16*10^{12}}{T_{0}}\right)^{2} = \left(\frac{10^{7}}{1,7*10^{2}}\right)^{2} \approx 10^{9}$$

Under the law

$$\lambda_{\max} = \frac{2.9*10^{-3}}{2.16*10^{12} / \sqrt{N_{\oplus}}} = \frac{2.9*10^{-3}}{10^{7}} = 2,9*10^{-10} m$$

Displaced radiation will have

$$\lambda_{\mathrm{m}} = z\lambda_{\max} = \frac{2.9*10^{-3} 2.16*10^{12}}{T_{0}^{2}\sqrt{N_{\oplus}}} \quad (10)$$

$$\lambda_{\mathrm{m}} = z\lambda_{\max} = 10^{9} * 2.9*10^{-10} = 0.29 m$$

Thereby, maximum of the spectrum turned out to be in radio range. The Intensity of the spectrum in radio range corresponds to brightness a temperature $T_{br} = 10^{16} K^{0}$ in accordance with that that observe the astronomers.

It Is Seen from (10) that more light "black holes" dawn on more long wave. Follows to expect that at observation in the field of more long waves, for instance $\lambda_{\mathrm{m}} = z\lambda_{\max} = 3m$ amount radio sources will much more since be in this area get the sources with mass $M = 7*10^{8} M_{\oplus}$. On $\lambda_{\mathrm{m}} = 30m$, will shine the sources with mass $M = 7*10^{6} M_{\oplus}$

<u>Collapse solitary of the star.</u>

From condition of the balance with pressure of the radiation temperature stops

$$T_{Bal} = \sqrt[4]{2,21*10^{49} / N^{2}} = 2,16*10^{12} / \sqrt{N}$$

Assume, close to black hole of no other stars, and shall take into account only relic radiation, having temperature 2,725 $^{0}K$. Under коллапсе red offset z grows while lasts коллапс, unlimited. Accordingly power relic radiations absorbed by star grows pro rata $z^2$ and the temperature equivalent stove grows as $\sqrt[4]{z^2}=\sqrt{z}$. So temperature of the star not less then $T_{\min}=2.725\sqrt{z}$

For achievement of the temperature $T=2.16*10^{12}/\sqrt{N_\oplus}$ necessary to have

$$z=\left(\frac{T}{2.725}\right)^2=\left(\frac{2,16*10^{12}}{2.725\sqrt{N_\oplus}}\right)^2=0.63*10^{24}/N_\oplus$$

Under the law

$$\lambda_{\max}=\frac{2.9*10^{-3}}{T}=\frac{2.9*10^{-3}\sqrt{N_\oplus}}{2,16*10^{12}}=1.34*10^{-15}\sqrt{N_\oplus}$$

With provision for red offset

$$\lambda_{\max}z=1.34*10^{-15}\sqrt{N_\oplus}*0.63*10^{24}/N_\oplus=0.84*10^{9}/\sqrt{N_\oplus} \quad (11)$$

Even for over heavy black holes $M\sim10^{10}M_\oplus$

$$\lambda_{\max}z=0.84*10^{9}/\sqrt{N_\oplus}=0.84*10^{4}m$$

Thereby, the waves too much come to terrestrial watcher for registration of the length. So black holes, not having stars - satellites, does not manage to observe in own radiation.

## Exhibit 3.

### The Bright radio radiation sources with heat spectrum.

The Possible explanation get the powerful cosmic sources of the heat radiation in radio range. In offered to models, stars with big modulo potential provide the observed radiation.

Intensity of the radiation, expressed through number photon

$$N_{T,\nu}=2\pi\nu^2c^{-2}\left(\exp\left(\frac{h\nu}{kT}\right)-1\right)^{-1} \quad (1)$$

The Red offset $z$ brings about that, what is a number photon exists on frequency $\nu_{dis}=\nu/z$. So for reception of the displaced spectrum in brought formula necessary to change $\nu\Rightarrow z\nu_{dis}$.

Considering that interval of the frequencies $\Delta\nu$ at offset equal z grows shorter in z once, density photon on interval of the frequencies will increase in z once and formula of the distribution photon will gain type

$$N_{T,\nu_{dis}}=2\pi z^3\nu_{dis}{}^2c^{-2}\left(\exp\left(\frac{hz\nu_{dis}}{kT}\right)-1\right)^{-1} \quad (2)$$

Here offset $z$ there is in the third degree.
Considering also that time to far from surfaces of the source goes quicker in z once, density photon will be described by formula

$$N_{T,\nu_{dis}} = 2\pi z^2 \nu_{dis}{}^2 c^{-2}\left(\exp\left(\frac{hz\nu_{dis}}{kT}\right)-1\right)^{-1} \qquad (3)$$

in which once again in the second degree.
If expect $T=10^7 K^o$, then for hit of the maximum of the spectrum in radio range, necessary to $z=10^9$. For radio frequencies $h\nu \ll kT$, and formula (1) for area radio range takes type

$$N_{T,\nu} = 2\pi\nu^2 c^{-2}\frac{kT}{h\nu}$$

Herewith in formula of the displaced spectrum in the field of radio range $10^9 h\nu_{dis} \approx kT$ and formula (3) for radio range will get type

$$N_{T,\nu_{dis}} \approx 2\pi z^2 \nu_{dis}{}^2 c^{-2}$$

For reception on radio to frequency $\nu = \nu_{dis}$ in not displaced spectrum such density photon on single interval of the frequency as in displaced spectrum, happened to raise temperature before value $T_{Br}$ coming from equality

$$z^2 = \frac{kT_{Br}}{h\nu_{dis}}$$

$$T_{Br} = \frac{z^2 h\nu_{dis}}{k} = \frac{10^{18} h\nu/10^9}{k} = 10^9\frac{h\nu}{k} = 10^9 T \approx 10^{16}$$

Exactly such brightness temperature has observed radio sources.

<u>Exhibit 4. The Energy of the satellite.</u>

We shall Define the energy of the fcompanion(satellite) on circular орбите. The Centripetal speedup is a tension of the field $\frac{\upsilon^2}{R_{Eff}} = \frac{MG}{R_{Eff}^2}$ consequently $\upsilon^2 = c^2\frac{r_m}{R_{Eff}}$, or $\frac{\upsilon^2}{c^2} = \frac{r_m}{R_0 + r_m}$. For energy of the satellite we get the expression. $E_{sat} = \frac{mc^2}{\sqrt{1-\upsilon^2/c^2}} = \frac{mc^2}{\sqrt{\frac{R_0}{R_0+r_m}}}$

Considering what $\exp(-\Phi) = 1 + \frac{r_m}{R_0} = \frac{R_0 + r_m}{R_0}$ shall get

$$E_{sat} = mc^2\sqrt{\exp(-\Phi)} = mc^2\sqrt{z}$$

Let $m = 2*10^{30}$ $\exp(-\Phi) = 10^6$. Then $E_{\text{sat}} = 10^3 mc^2 = 2*10^{33} 9*10^{16} = 1.8*10^{50}$

On measure of the consumption to energy on radiation of the gravity satellite moves to orbits with more deep potential. Herewith his(its) relative mass is connected with potential by correlation

$$m_{\text{Re}l} = m\sqrt{\exp(-\Phi)} = m\sqrt{z}$$

For greater $z$ so satellite velocities close to $c$.

Interesting consider the effects, resulting from natural suggestion that black hole is formed from lived stars possessing moment amount motion. All settling on star material on late stage of the shaping the black hole these satellites. The Moment amount motion satellite provides their zero gravity. The Star, which the main mass is accumulated to account of the absorption satellite, revolves at the speed of, which compensates power to gravity. Collapse of such stars will be quite intelligent. Possible that variable stars capable to come out of collapse due to rotation and increasing the temperature.

<u>Exhibit 5. The Power of the radiation of the waves of the gravity.</u>

Let two bodies of the equal mass $M$ revolve around the general center of gravity on circular orbit by radius $r_1 = r/2$. where $r$ - a distance between body. A total potential have On distance $R \gg r_1$ in $\sqrt{R^2 + r_1^2} \approx R$ approach the weak field will

$$\varphi = -MG\left(\frac{1}{R + r_1 \sin\alpha \sin\omega(t - R/c)} + \frac{1}{R - r_1 \sin\alpha \sin\omega(t - R/c)}\right)$$

or after transformations

$$\varphi \approx -\frac{2MG}{R}\left(1 + \frac{r_1^2 \sin^2\alpha \sin^2\omega(t - R/c)}{R^2}\right) \qquad (1)$$

where $\alpha$ - a corner between direction of the moment of the system two celestial tell and direction of the radiation. Constant part of potential

$$\overline{\varphi} = -\frac{2MG}{R} \qquad (2)$$

presents itself usual field of the still source on far cry.

Variable part of potential

$$\tilde{\varphi} \approx \overline{\varphi} \frac{r_1^2}{R^2} \sin^2 \alpha \sin^2 \omega(t - R/c) \qquad (3)$$

We shall Calculate field in wave zone where

$$R \approx cnT = cn \frac{2\pi}{\omega} \qquad (4)$$

$$\tilde{\varphi} \approx \overline{\varphi} \frac{r_1^2 \omega^2}{4\pi^2 n^2 c^2} \sin^2 \alpha \sin^2 \omega(t - R/c) \qquad (5)$$

Tension on far cry

$$E_G \approx -\frac{d\tilde{\varphi}}{dR} \approx \frac{\overline{\varphi} r_1^2 \omega^3}{4\pi^2 n^2 c^3} \sin^2 \alpha \sin 2\omega(t - R/c) \qquad (6)$$

Density to energy

$$W \approx kE_G^2 = k \frac{\overline{\varphi}^2 r_1^4 \omega^6}{16\pi^4 n^4 c^6} \sin^4 \alpha \sin^2 2\omega(t - R/c) \qquad (7)$$

For averaging on time we shall take into account that average

$$(\sin^2 x)_{Avt} = 0.5$$

Density of the flow

$$S = \overline{W}c \approx k \frac{\overline{\varphi}^2 r_1^4 \omega^6}{32\pi^4 n^4 c^5} \sin^4 \alpha$$

with substitution $k = -\frac{1}{8\pi G}$ and $\overline{\varphi} = -\frac{2MG}{R}$

$$S \approx -\frac{1}{8\pi G} \frac{4M^2 G^2}{R^2} \frac{\overline{\varphi}^2 r_1^4 \omega^6}{32\pi^4 n^4 c^5} \sin^4 \alpha$$

definitively

$$S \approx -\frac{M^2 G \omega^6 r_1^4}{R^2 64\pi^5 n^4 c^5} \sin^4 \alpha \qquad (8)$$

where

$$\omega = \sqrt{\frac{MG}{4r_1^3}} \qquad (9)$$

We shall Calculate integral on sphere by radius $R$, where element of the spherical belt $ds = 2\pi R^2 \sin \alpha d\alpha$

$$I \approx -\frac{GM^2 \omega^6 r_1^4}{32\pi^4 n^4 c^5} 2\int_0^{\frac{\pi}{2}} \sin^5 \alpha d\alpha = -\frac{1}{30\pi^4 n^4} \frac{GM^2 \omega^6 r_1^4}{c^5} \qquad (10)$$

or substituting $r_1 = r/2$ , shall get

$$I \approx \kappa \frac{GM^2 \omega^6 r_1^4}{c^5}$$

Got expression differs from corresponding to expressions provided in [1] (str.455 problem 1.) by constant factor,

$$\kappa = -\frac{1}{480\pi^4 n^4}$$

which contains the free parameter and can be normalized in accordance with observed data.

Interesting value the intensity of the radiation for satellite of the black hole in M31.
We shall Place $r \approx r_m = 2*10^{11} m$ , mass of the satellite shall place

$$M \approx 10^{30} kg$$

$$I \approx -6{,}4 \frac{6{,}67*10^{-11}*10^{60}\left(1.5*10^{-3}\right)^{6}\left(2*10^{11}\right)^{4}}{243*10^{40}} = -3.2*10^{36}$$

Exhibit 6. The Section of the absorption photon by black hole.

As it is shown in p. 4, all started with surfaces of the star photons have spiral, endless paths.

$$\frac{d\beta}{d\alpha} = \frac{GM}{c^2 R_{Eff}} = \frac{r_m}{R_{Eff}} = \frac{r_m}{R_0 + r_m}$$

Under greater corners $\gamma = \alpha - \beta$ brought equality is executed approximately. In limit $\gamma \Rightarrow \pi/2$. For determination of the aiming parameter, under which photon leaves in area low potential, limit estimation

$$\frac{d\gamma}{d\alpha} = 1 - \frac{r_m}{R_0 + r_m} = \frac{R_0}{R_0 + r_m} = \frac{1}{z} = \frac{\pi/2}{2\pi} = \frac{1}{4}$$

$$z\left(R_0\right) = 4 = 1 + \frac{r_m}{R_0}$$

$$R_0 = r_m / 3$$

$$s \approx r_m^2 / 3$$


The List of the literature:

[1] L.D. Landau, E.M.LIFSHIC, t.2, Theory of the field, Moscow, "Science", 1988.

[2] http://elementy.ru/news/164824