Physics B1

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Pressure at the center of a stellar black hole:

$$P_S = \frac{E_Y}{4/3.\pi.R^3} = \frac{3M.c^2}{4\pi.R^3} \text{....;..... } .M = c^2 G^{-4/3} \text{.....;.... } ..R = G^{-1/3}$$

$$G = 8.02 \times 10^{-11} m^{-3}$$

$$P_S = \frac{3.c^4}{4\pi.G^{1/3}} = 4.5 \times 10^{36}\, Pa$$

Degeneracy pressure of the neutron:

$$P_N = \frac{6\pi^2 hc}{x_N{}^4} = 3.9 \times 10^{36}\, Pa$$

$$P_N = \frac{m_N c^2}{4/3.\pi(x_N/2\pi)^3} = \frac{6\pi^2 m_N c^2}{x_N{}^3} = \frac{6\pi^2 hc}{x_N{}^4}$$

Any black hole with the radius:

$$P_{BH} = \frac{3c^4}{4\pi.R^2 G}$$

Energy:

$$E_Y = Mc^2 = c^4 G^{-4/3} = 2.34 \times 10^{47}\, J$$

Angular momentum:

$$H = Mc.2\pi.R = 2\pi.c^3 G^{-5/3} = 1.14 \times 10^{43}\, Js$$

Rotational frequency:

$$f = \frac{E_Y}{H} = 2.06 \times 10^4\, Hz = \frac{c}{2\pi.G^{-1/3}}$$

$$P_S = \rho.g.h$$

$$\rho = \frac{3c^2 G^{-1/3}}{4\pi} .....;.... ...g = c^2 G^{1/3} ......;... ....h = G^{-1/3}$$

$$\Leftrightarrow .... P_S = \frac{3c^4}{4\pi.G^{1/3}}$$

Pressure at the center of any star or planet:

$$P_S = \frac{3GM^2}{4\pi.R^4}$$

Electron neutrino degeneracy pressure:

$$P_{S\nu} = \frac{6\pi^2 m_\nu w_\nu^{\ 2}}{S^{3/2}} = \frac{6\pi^2 h^2}{q_e S^3} = 2.3\times10^{55} Pa$$

Singularity black hole (longitudinal photons may prevent the formation of any singularity):

$$P_{S\nu} = \frac{3GM^2}{4\pi.R^4} = 2.3\times10^{55} ......\Leftrightarrow$$

$$......\Leftrightarrow .....R^2 = \frac{3c^4}{4\pi.GP_{S\nu}} ....\Leftrightarrow .....R = 10^{-6} m$$

Equivalent transversal photon with the neutrino energy:

$$q_e \sqrt{S} cx = h.......\Leftrightarrow ....x = 10^{-6} m$$

New formulae:

$$Pn = C_{SH} \rho T$$

P – Pressure; n = 3; C_{SH} -- Specific heat capacity; ρ -- Density; T – Temperature

$$Px^3 = 6\pi^2 k_B T$$

x -- Compton wavelength; k_B -- Boltzmann constant

My physics abbreviations convention:

R_{TH} -- Thermal resistance; R_E -- Electric resistance; R_Y -- Resistivity; t – Time; n – Number; D, L, x -- Distance, wavelength; ε -- Permittivity; Area; C – Capacitance; E_{NT} -- Entropy; k_B, k_B' -- Boltzmann constant; Volume; G – Gravitational constant; f -- Frequency; v,V,c – Speed; B – Magnetic field; A – Magnetic vector potential; R_M -- Magnetic resistance; C_{IRC} -- Circulation; q_m, Q_m, Φ_M -- Magnetic charge or flux; R_{YM} -- Magnetic resistivity; d_M -- Magnetic dipole moment; d_E -- Electric dipole moment; R_m -- Mass resistance; a,g – Acceleration; ρ_{IM} -- Mag. current density; E – Electric field; I_{ND} -- Inductance; V_m -- Mass voltage or potential; P_G -- Gravitational potential; I_M -- Magnetic current; V_E -- Electric voltage or potential; ρ -- Density; μ -- Permeability; E_{DF} -- Electric displacement field; Φ_E -- Electric flux; C_{SH} -- Specific heat capacity; q_e, Q_e -- Electric charge; m, M – Mass; ρ_{IE} -- Electric current density; H_M -- Magnetic field strength; M_{AG} -- Magnetization; V_M -- Magnetic voltage; I_E -- Electric current; V_{ISC} -- Viscosity; I_m -- Mass current; $p,.p_M$ -- Momentum, magnetic momentum; h – Planck constant; H – Angular momentum; T_M -- Magnetic tension; P_S -- Pressure; ρ_{EY} -- Energy density; T – Temperature; T_S -- Surface tension; F – Force; E_Y -- Energy; I -- Intensity; P_W -- Power.

Gravitational constant: $G = 8.02 \times 10^{-11} m^{-3}$

Earth mass:

$$GM_T = 3.986 \times 10^{14} .... \Leftrightarrow .... M_T = 4.97 \times 10^{24} kg$$

Sun mass:

$$GM_S = 1.327 \times 10^{20} .... \Leftrightarrow .... M_S = 1.66 \times 10^{30} kg$$

Stellar black hole mass:

$$M_{BH} = c^2 G^{-4/3} = 2.6 \times 10^{30} kg$$

Exact value of the gravitational constant

$$G_A = \left(\frac{h^2}{3ck_{B2}{}^3} \right)^{3/2} = 8.01849255 \times 10^{-11} m^{-3}$$

$$G_B = \left(\frac{3x_P{}^4}{4\pi\varepsilon_0 k_B{}^2} \right)^3 = 8.01849115 \times 10^{-11} m^{-3}$$

Corrected Boltzmann constant:

$$k_{B2} = k_B \left(1 - \frac{\pi^3 \alpha^2}{2} \right) = 1.37951027 \times 10^{-23} m^2$$

$$E_{YP} = 1.50327731 \times 10^{-10} J \ldots\ldots; \ldots\ldots x_P = \frac{\sqrt{h^2c^2 - SE_{YP}{}^2}}{E_{YP}}$$

$$S = 1.91210097 \times 10^{-34} m^2 \ldots\ldots; \ldots \ldots\ldots x_P = 1.32133734 \times 10^{-15} m$$

$$E_Y = hf = h\frac{w}{x} \ldots\ldots\ldots\ldots ; \ldots\ldots\ldots w = \frac{cx}{\sqrt{S + x^2}}$$

$$E_Y = \frac{hc}{\sqrt{S + x^2}}$$

G – Gravitational constant; h – Planck constant; c – Light speed constant;
k_B -- Boltzmann constant; x_P -- Proton Compton wavelength;
ε_0 -- Vacuum permittivity; $\pi = 3.1415927$; α -- Fine structure constant;
E_{YP} -- Energy of the proton; S – Saraiva constant; f – Frequency; w – Wave speed.

$$G = 8.01849 \times 10^{-11} m^{-3}$$

$$G = \left(\frac{h^2}{3ck_{B2}{}^3} \right)^{3/2} = 8.01849255 \times 10^{-11} m^{-3}$$

Proton Compton wavelength:

$$x_P{}^4 = \frac{4\pi\varepsilon_0 h\sqrt{k_B}}{3\sqrt{3c}\left(1-\frac{\pi^3\alpha^2}{2}\right)^{3/2}} \ldots\ldots\Leftrightarrow\ldots\ldots x_P = 1.3213742\times10^{-15}\,m$$

$$E_Y = \frac{hw}{x}\ldots\ldots\ldots;\ \ldots\ldots\ldots\ w = \frac{cx}{\sqrt{S+x^2}}$$

Proton energy:

$$E_{YP} = \frac{hc}{\sqrt{S+x_P{}^2}} = 1.50323627\times10^{-10}\,J = 938.246383 MeV$$

Mass of the proton:

$$m_P = \frac{hf_P}{w_P{}^2} = \frac{h\sqrt{S+x_P{}^2}}{cx_P{}^2} = 1.67275947\ \times10^{-27}\,kg$$

Einstein energy:

$$\Delta E_Y = m_P c^2 = 938.349131\ MeV$$

Wave speed:

$$w_P = \frac{cx_P}{\sqrt{S+x_P{}^2}} = 2.99776009\times10^8\,m/s$$

$$\Delta w_P = c - w_P = 1.64142440\ \times10^4\,m/s$$

Magnetic momentum

The usual magnetic dipole moment is only a momentum:

$$\mu_B = \frac{q_e c x_e}{4\pi} = 9.27400576 \times 10^{-24}$$

$$\mu_e = \frac{q_e c x_e}{4\pi}\left(1 + \frac{\alpha}{2\pi}\right) = 9.28477668 \times 10^{-24}$$

$$\mu_B = \frac{m_e c}{4\pi}\frac{x_e^{\ 2}}{k_{B2}} = \frac{m_e c^2}{2B_e}$$

$$B_e = \frac{4\pi . q_m}{x_e^{\ 2}} = 2\pi . c\frac{k_{B2}}{x_e^{\ 2}} = 4.414 \times 10^9 T$$

$$\mu = \frac{1}{2} q_e R.v$$

Electric dipole moment of the electron:

$$d_e = \frac{q_e x_e}{2\pi} = 6.187 \times 10^{-32} Cm..(= kg)$$

Magnetic dipole moment of the electron:

$$d_M = \frac{2\alpha}{\pi} q_m x_e = 2.331 \times 10^{-29} Weber.meter$$

$$q_m = \frac{h}{2q_e} = \frac{k_{B2} c}{2}$$

Mass of the electron:

$$m_e = \frac{q_e k_{B2}}{x_e} = 9.10938505 \times 10^{-31} kg..(= Cm)$$

$$k_{B2} = k_B\left(1 - \frac{\pi^3 \alpha^2}{2}\right)$$

Kilogram = Coulomb.meter

Boltzmann constant = square meter

$$\frac{d_M}{d_e} = 4\alpha \frac{q_m}{q_e} = 4\alpha \frac{h}{2q_e^{\,2}} = Z_0 = \sqrt{\frac{\mu_0}{\varepsilon_0}}$$

$$\frac{\mu_B}{d_e} = \frac{c}{2} ....;.........\frac{\mu_B}{d_M} = \frac{1}{2\mu_0}$$

$$d_M = 2\mu_0\mu_B ....;.........\mu_B = \frac{1}{2} c d_e$$

Nichrome resistance of 500W

Power and voltage:

$$P_W = 500W ....;.........V_E = 220V$$

Temperature:

$$T = \frac{V_E^{\,2}}{2} = 2.42 \times 10^4 S = 535.3^o C$$

Current and resistance:

$$I_E = \frac{P_W}{V_E} = 2.273A ....;.........R_E = \frac{V_E}{I_E} = 96.8\Omega$$

Electric and magnetic fields:

$$E = \frac{V_E}{l} ....;.........B = \frac{\mu_0 I_E}{2R}$$

Speed of the electrons:

$$v_e = \frac{E}{B} = \frac{V_E R_E}{2} = \frac{2RR_E}{l\mu_0} = 1.065 \times 10^4 m/s$$

$$\begin{cases} V_E = \dfrac{4R}{l\mu_0} \\ R_E = \dfrac{1}{4Rl} \end{cases} \Leftrightarrow .... \begin{cases} l = \dfrac{1}{\sqrt{V_E R_E \mu_0}} = 6.113m \\ R = \dfrac{1}{4}\sqrt{I_E \mu_0} = 4.23 \times 10^{-4} m \end{cases}$$

$$R_Y = R_E \frac{\pi . R^2}{l} = 8.9 \times 10^{-6} \Omega m ....; : .... R_{Y25} = 10^{-6} \Omega m$$

$$R_Y = R_{Y25} (1 + 4 \times 10^{-4} \Delta T) ..... \Leftrightarrow ...... \Delta T = 2.13 \times 10^4 S = 510^\circ C$$

$$T = 535^o C ....;......510 = 535 - 25$$

$$S = \left(\frac{\alpha^2 k_{B2}}{6 \varepsilon_0} \right)^2 = 1.91210097 \times 10^{-34} m^2$$

Surface temperature of the sun:

$$T_S = 6.4 \times 10^7 S = 5800 \, K = 5600^\circ C$$

Center temperature:

$$T_C = 25 T_S = 1.6 \times 10^9 S = 13000 \, K = 13000^\circ C$$

Sun:

$$\frac{G M_S T_R}{R_S{}^2} = 2c$$

G – Gravitational constant; M_S -- Sun mass; $T_R = 25D$ -- Sun period; R_S -- Sun radius; c – Light speed.

Stellar black hole:

$$\frac{GMT}{R^2} = 2\pi . c$$

Earth:

$$g_T T_T = c$$

g_T -- Earth acceleration; $T_T = 365.25D$ -- Earth period.

$g_S T_R = 2 g_T T_T$; g_S -- Sun acceleration.

Angular momentum:

$$H = Mv2\pi.R.......... ;......... ..G = 8.02\times 10^{-11} m^{-3}$$

Sun:

$$H_S = \frac{M\,4\pi^2 R^2}{25\,Days} = \frac{1.664\times 10^{30} 4\pi^2 (7\times 10^8)^2}{25\,Days} = 1.49\times 10^{43}$$

Stellar black hole:

$$H_{BH} = 2\pi.G^{-5/3}c^3 = 1.135\times 10^{43}$$

Magnetic and electric fields of a visible photon:

$$f = 5\times 10^{14} Hz........ \Leftrightarrow .... x = 6\times 10^{-7} m$$

$$B = \frac{4\pi.q_m}{x^2} = 7.23\times 10^{-2} T$$

$$E = \frac{\pi.q_e}{\alpha\varepsilon_0 x^2} = 2.164\times 10^7 V/m......;... .....E_Y = hf = 3.3\times 10^{-19} J$$

$$E_Y = \frac{1}{2} m_E E.......\Leftrightarrow .....m_E = 3.062\times 10^{-26} kg$$

$$E_Y = \frac{1}{2} m_B B^2.......\Leftrightarrow ....m_B = 1.263\times 10^{-16} kg$$

$$\frac{m_E}{m_B} = \frac{4\pi.\alpha\varepsilon_0 h^2}{q_e{}^3 x^2} = \alpha^{4.5}.......\Leftrightarrow ......x = 5.982\times 10^{-7} m$$

Pioneer anomaly II

Kelvin temperatures are wrong. As Kelvin temperature is higher than the real one, the calculated radiation pressure is higher than the real pressure, so it seems that there's an acceleration to the Sun.

Distance:

$$D = 40 \times 1.5 \times 10^{11} = 6 \times 10^{12}\, m$$

Real temperature at the sun surface:

$$T = \sigma.5800^4 = 6.4 \times 10^7\, S \quad ; \qquad \sigma = 5.67 \times 10^{-8}$$

Local temperature:

$$6.4 \times 10^7 (7 \times 10^8)^2 = T_S (6 \times 10^{12})^2 .... \Leftrightarrow .... T_S = 0.87\, S$$

Wrong Kelvin temperature:

$$T_S = \sigma.T_K{}^4 .... \Leftrightarrow .... T_K = 62.61K$$

$$\Delta T = 61.74$$

Pressure:

$$P_S = \frac{T}{c} .... \Leftrightarrow ...... \Delta P_S = \frac{1}{c} 61.74 = 2.06 \times 10^{-7}\, Pa$$

Acceleration:

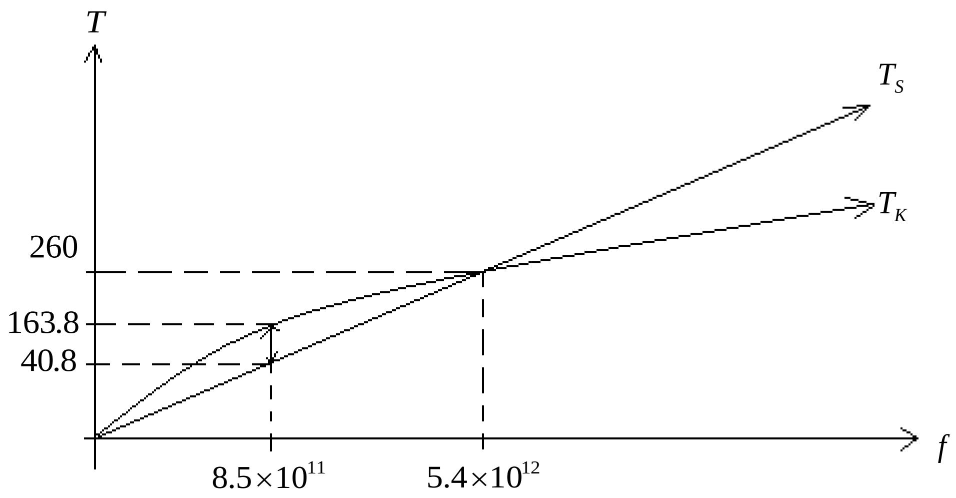
$$P_S = \frac{mg}{A} ..... \Leftrightarrow ..... \Delta g = \Delta P_S \frac{A}{m} .....;..... A = 1m^2 .....;..... m = 258kg$$

$$\Delta g = 2.06 \times 10^{-7} \frac{1}{258} = 8 \times 10^{-10}\, ms^{-2}$$

$$\Delta g = 1.3 \times 10^{-11} \left(\frac{3.14 \times 10^{25}}{D^2} - \frac{1.53 \times 10^8}{\sqrt{D}} \right)$$

$$D = 20\, AU .. \Leftrightarrow .. \Delta g = 1.1 \times 10^{-9} ......;... ..... D = 60\, AU .. \Leftrightarrow .. \Delta g = 6.6 \times 10^{-10}$$

Saraiva's and Kelvin's temperatures



T_S -- Saraiva or true temperature; T_K -- Kelvin or wrong temperature;

$$T_S = \frac{h}{k_B} f \ldots\ldots\ldots;\ldots\ldots T_K = \sqrt[4]{\frac{h}{\sigma . k_B}} f^{1/4}$$

Absolute hot (temperature of the matter):

$$T = \frac{h^2}{{k_B}^2 m} \ldots\ldots;\ldots\ldots m = q_e \sqrt{S} \ldots\ldots;\ldots\ldots T = 10^{15} S = 3.7\times10^5 K$$

Nichrome resistance more formula

Length and radius of the conductor:

$$\begin{cases} V_E = \dfrac{2R}{l\mu_0} \\ R_E = \dfrac{1}{2Rl} \end{cases} \Leftrightarrow \ldots\ldots\ldots \begin{cases} l = \dfrac{1}{\sqrt{V_E \mu_0 R_E}} = 6.11m \\ R = \sqrt{\dfrac{V_E \mu_0}{4R_E}} = 8.45\times10^{-4} m \end{cases}$$

Magnetic field and mobility:

$$B = \frac{\mu_0 I_E}{2R} = \frac{1}{lR_E} = 1.7\times10^{-3} T \ldots\ldots;\ldots\ \ldots\mu = \frac{1}{B} = 590.5$$

Electric field:

$$E = \frac{V_E}{l} = \frac{V_E{}^2 \mu_0}{2R} = \frac{3}{4\pi.R^2 R_E{}^2} = 36.07V/m$$

Temperature:

$$T = \frac{V_E{}^2}{2} = \frac{HE}{2} = \frac{P_W}{4Rl} = 2.42 \times 10^4 S$$

The electric charge varies with the relative speed:

$$Q_e = \frac{Q_{e0}}{(1 - v^2/c^2)^{1/R}} ....;. .... R = 8.31447087 \ m^2$$

$$\frac{1m^2}{R} = 0.120272236 \ ....; : .... R = k_B N_A$$

Electric force on the electrons in a conductor:

$$F_E = \frac{V_E}{R_E{}^2} = 2.35 \times 10^{-2} N = n_e m_e g ....;......n_e = \frac{2l}{q_e R_E{}^2} = 8.14 \times 10^{15}$$

Acceleration:

$$g = \frac{V_E q_e}{2lm_e} = 3.166 \times 10^{12} ms^{-2}$$

$$v_e = gt........ \Leftrightarrow .... t = \frac{V_E R_E}{2g} = 3.36 \times 10^{-9} s = \frac{1m}{c}$$

Energy of the electrons:

$$E_{Ye} = \frac{1}{2} n_e m_e v_e{}^2 = \frac{lm_e V_E{}^2}{4q_e} = 4.2 \times 10^{-7} J$$

$$P_W = 4\frac{E_{Ye}}{t} = 500W \sim$$

Electric and magnetic dipole moments of the electron:

$$hf = \frac{d_E E}{2} + \frac{d_M H}{2}$$

$$d_E = \frac{q_e x_e}{2\pi} \ldots\ldots;\ldots\ldots d_M = \frac{2\alpha.q_m x_e}{\pi}$$

$$\frac{d_E}{d_M} = c\varepsilon_0$$

The electric charge varies with the relative speed II:

$$Qe = \frac{Qe_0}{(1 - v^2/c^2)^{0.1}} \ldots\ldots\ldots\ ;\ldots\ldots\ \ldots m = \frac{m_0}{(1 - v^2/c^2)^{0.5}}$$

$$\left(\frac{x_e^{\ 2}}{S}\right)^{2n} = \frac{1}{\alpha} \ldots\ldots\ \Leftrightarrow \ldots\ldots\ n = 0.101861309$$

Qe, Qe_0 -- Electric charge; v – Speed; c – Light speed constant; m, m_0 -- Mass;
x_e -- Electron Compton wavelength; $i\sqrt{S}$ -- Neutrino Compton wavelength;
α -- Fine structure constant;

All formulae with the electron Compton wavelength are not exact.

God’s laws are wrong!

True light speed constant (SI units)

$$\mu_0 = 4\pi.10^{-7} \ldots;\ldots\ q_e = 1.602176462 \times 10^{-19} \ldots;\ldots\ h = 6.62606876 \times 10^{-34}$$

$$\alpha = 1/\sqrt{137^2 + \pi^2}$$

$$k_B' = \frac{\mu_0 q_e}{2\alpha} \quad ; \quad k_B = k_B' / \left(1 - \frac{\pi^3 \alpha^2}{2}\right)$$

$$c = \frac{h}{q_e k_B'} = 2.99792423 \times 10^8\, m/s$$

$$\varepsilon_0 = \frac{1}{c^2 \mu_0} \text{.........;.......} S = \left(\frac{q_e \mu_0 \alpha}{12 \varepsilon_0} \right)^2$$

Superconductor condition

The molecules of a superconductor are black holes for electrons.

Resistivity -- $R_Y = 0\text{.......;.......}R_{YMIN} = \frac{1}{c}$

Orbital speed of the molecule:

$$\frac{Gm}{R} \geq c^2$$

Gravitational constant of the electron:

$$G = \frac{q_e^{\ 2}}{\alpha 4\pi.\varepsilon_0 m_e^{\ 2}} = 3.81 \times 10^{34} m^{-3}$$

$$\frac{m}{R} \geq \frac{c^2}{G} \text{.........; :.........} R^3 = \frac{3m}{4\pi.\rho}$$

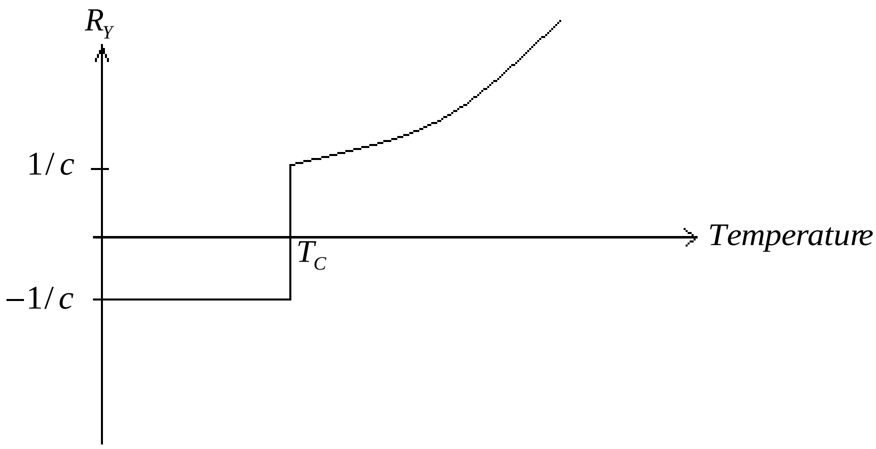
$$\Leftrightarrow \text{..........} m^2 \rho \geq 3.134 \times 10^{-54}$$

YBCO -- $m = 1.106 \times 10^{-24} kg\text{.......;.. ....} \rho = 6300\, kg/m^3$ **;** $T_C = 93S$

$$m^2 \rho \frac{T_C}{T} \geq 7.71 \times 10^{-45}$$

Josephson effect and superconductors

Negative resistivity in superconductors



Between the two states there's a supernova explosion.

$$R_Y = \left(\left(KT^2 \right)^3 - \left(\frac{1}{c} \right)^3 \right)^{1/3} \ldots\ldots\ldots;\ldots\ldots K = \frac{1}{cT_C{}^2}$$

$$V_E = R_Y H$$

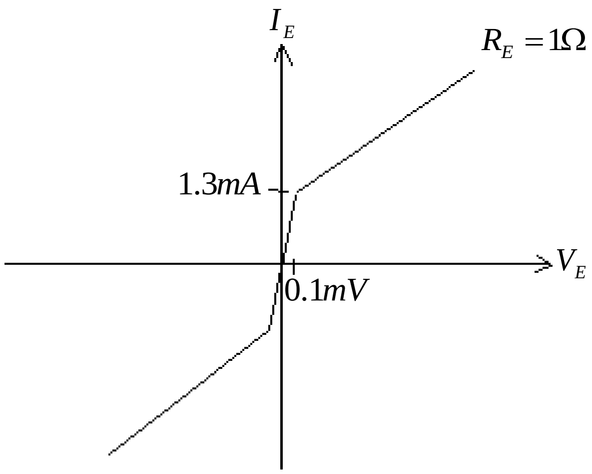
Minimum resistivity:

$$R_Y = 1/c = 3.34 \times 10^{-9} \Omega m$$

Frequency:

$$f = \frac{V_E = 1Volt}{q_m} = \frac{2q_e}{h} = 4.836 \times 10^{14} Hz$$

Josephson effect:

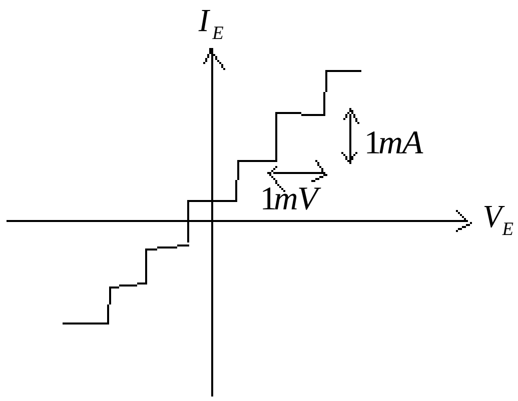


$$I_C = 1.3mA.......; :......V_C = 0.1mV .... \Leftrightarrow .... R_C = 7.7\times10^{-2}\Omega$$

Power:

$$P_W = R_C I_C^{\ 2} = 1.3\times10^{-7} W$$

AC effect:



The Josephson junctions detect the sun neutrinos and generate electricity.
The voltage at the DC state is not zero.

The temperature of the boiling point of liquid helium is 4.2 S , not Kelvin.

$$I_E = q_e f = \frac{q_e}{q_m} = 77.48\mu A$$

Other constants:

Gravitational constant:

$$G = \left(\frac{h^2}{3ck_B{}'^3} \right)^{3/2} = 8.01849255 \times 10^{-11} m^{-3}$$

Rydberg constant:

$$R\infty = 1.09737316 \times 10^7 m^{-1}$$

Electron Compton wavelength:

$$x_e = \frac{\alpha^2}{2R\infty} = 2.42630965 \ \times 10^{-12} m$$

Electron mass:

$$m_e = \frac{h}{cx_e} = 9.10938505 \ \times 10^{-31} kg$$

Bohr magneton (theoretical magnetic momentum of the electron):

$$\mu_B = \frac{q_e c x_e}{4\pi} = 9.27400576 \times 10^{-24}$$

Bohr radius:

$$R_B = \frac{x_e}{2\pi.\alpha} = 5.29177147 \times 10^{-11} m$$

YBCO -- $m^2 \rho = 7.71 \times 10^{-45}$ -- Superconductor at 93 S

IRIDIUM -- $m^2 \rho = 2.3 \times 10^{-45}$ -- Non superconductor at 315 S

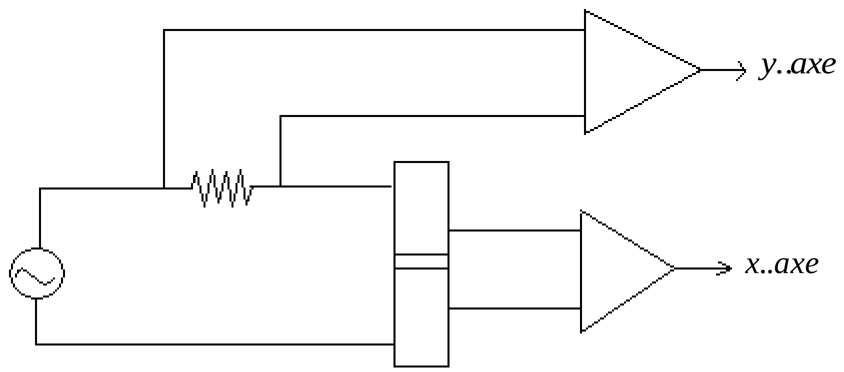
$$\frac{m^3 P T_C}{2\alpha.k_B T^2} \geq 2.3 \times 10^{-45}$$

m – Mass; P – Pressure; Tc – Critical temperature; alpha – Fine structure constant; Kb – Boltzmann constant; T – Temperature.

$A^2 \rho \geq 1.8 \times 10^9$; A – Mass number

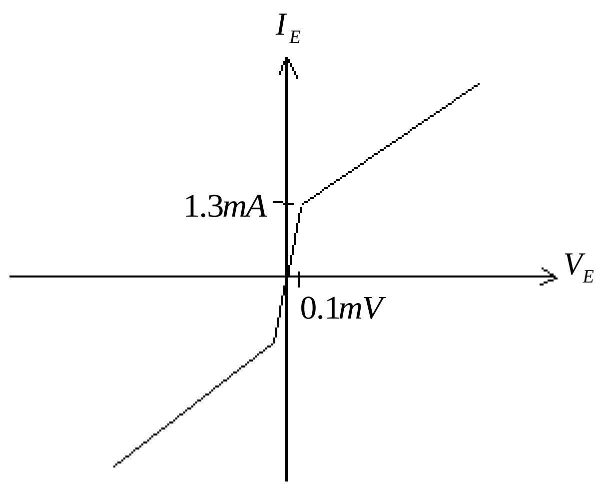
Josephson junctions:

It's impossible to measure, with a oscilloscope, a current without a voltage or a Supercurrent.



The only way of measuring a Supercurrent is with a ring of a superconductor where we measure the magnetic field.

The Josephson junctions detect the sun neutrino Cooper-pairs and generate electric power. The neutrinos are the magnetic monopoles.



$$P_W = 1.3 \times 10^{-7} W \ldots\ldots \Leftrightarrow \ldots\ldots E_Y = 811.4 GeV$$

$$E_Y = \frac{q_m{}^2}{\pi\mu_0 R} \ldots\ldots\ldots \Leftrightarrow \ldots\ldots\ldots R = \frac{3}{5}\sqrt{S}$$

$$\Delta E_Y = \frac{q_m{}^2}{\pi\mu_0} \log R.\Delta R \ldots\ldots; \ldots\ldots \Delta R = 1m$$

$$\Leftrightarrow \ldots\ldots\ldots \Delta E_Y = -2.66 \times 10^{-4} eV$$

At a Josephson junction, how did the Supercurrent starts?
It's needed some energy. Where did it come from?

Speed of the magnetic vacuons:

$$v_M = \frac{q_m}{\pi.R^2} \ldots\ldots\ldots; \ldots\ldots\ldots B = v_M$$

Speed of the electric vacuon:

$$v_E{}^2 = \frac{q_e}{\alpha\varepsilon_0 4\pi.R^2} \ldots\ldots\ldots; \ldots\ldots\ldots .E = v_E{}^2$$

$$B = \frac{\Phi_M}{\pi.R^2} \ldots\ldots\ldots; \ldots\ldots\ldots E = \frac{\Phi_E}{\alpha 4\pi.R^2}$$

$$2k_B' c^2 = v_E{}^2 4\pi.R^2 \ldots\ldots\ldots \Leftrightarrow \ldots\ldots\ldots E = 2\pi.c^2 \frac{k_B'}{x^2}$$

$$q_m = \frac{k_B' c}{2} = v_M \pi.R^2 \ldots\ldots\ldots \Leftrightarrow \ldots\ldots\ldots B = 2\pi.c \frac{k_B'}{x^2}$$

Speed of the gravity II:

There's only one force – the electric force. The gravity is the electric force between a great number of electric dipoles.

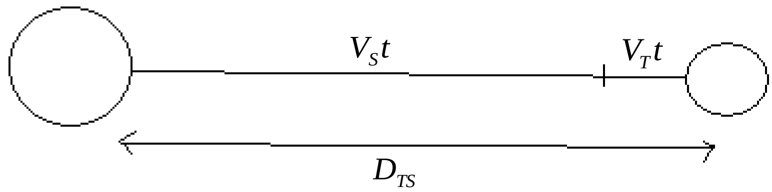
$$x = \sqrt{c^2 t^2 - S} \ldots\ldots\ldots; \ldots\ldots\ldots ..V = \frac{dx}{dt} = \frac{c^2}{w}$$

x – Compton wavelength; c – Light speed constant; t – Period; S – Saraiva's constant;
V – Speed of the force; w – Wave speed.

$$mw^2 = \frac{hc}{\sqrt{S}} .... \Leftrightarrow .... .V = 7.5\times10^{20}\sqrt{m}$$

m – Mass; h – Planck constant.

Earth-Sun:



$$V_S \geq\geq V_T$$

$$t = \frac{D_{TS}}{V_S} ....;. .... D = V_T t = V_T \frac{D_{TS}}{V_S}$$

$$D = \sqrt{\frac{M_T}{M_S}} D_{TS} = 2.6\times10^8 m$$

Accelerations:

$$g_T = g_S$$

$$\frac{GM_T}{D^2} = \frac{GM_S}{D_{TS}{}^2} ....\Leftrightarrow ....D = \sqrt{\frac{M_T}{M_S}} D_{TS}$$

$$V_S = 7.5\times10^{20}\sqrt{M_S} = 1.06\times10^{36} m/s$$

$$V_T = 7.5\times10^{20}\sqrt{M_T} = 1.84\times10^{33} m/s$$

The forces have no aberration because the interaction happens at an intermediate position, so both bodies have an equal delay. Also the gravity speed is much greater than light speed.

Thermal electric resistance of nichrome with 500 Watt

$$I = EH = T = V_E^{\ 2}/2 = 2.42\times 10^4 S = 808K......;... ....V_E = 220Volt$$

$$P_W = 500W = \frac{V_E^{\ 2}}{R_E}....\Leftrightarrow ...R_E = 96.8\Omega......;.....I_E = 2.273A$$

$$E = \frac{V_E}{l}........;......H = \frac{I_E}{2\pi.R}$$

$$\Leftrightarrow ....Rl = \frac{P_W}{\pi.V_E^{\ 2}}$$

$$B = \frac{\mu_0 I_E}{2R}.......;.......\frac{E}{B} = v_e = \frac{V_E R_E}{2} \quad \Leftrightarrow ......l = \frac{4R}{V_E\mu_0}$$

$$R = \frac{1}{2}\sqrt{\frac{P_W\mu_0}{\pi.V_E}} = 4.77\times 10^{-4} m$$

$$l = 2\sqrt{\frac{P_W}{\pi.\mu_0 V_E^{\ 3}}} = 6.7m$$

The dark matter doesn't exist

Solar system:

Sun mass: $M_S = 2\times 10^{30} kg$

Total mass of the solar system: $M_T = 2.003\times 10^{30} kg$

The total mass is at the center.

$$v(R) = \sqrt{\frac{GM_S}{R}}$$

The radius increase, the mass remains constant, so the speed of rotation decrease.~

Milky way:

Central black hole mass: $M_H = 8.6 \times 10^{36} kg$

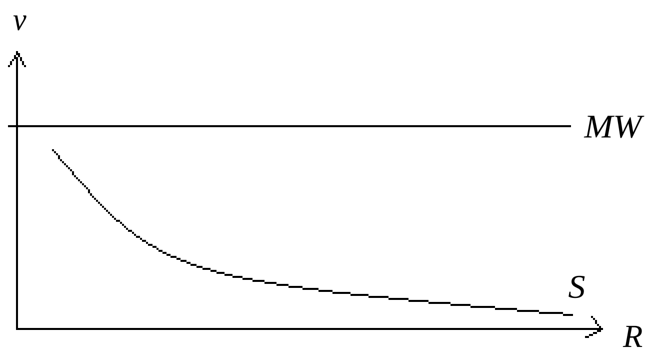
Total mass of the galaxy: $M_G = 10^{42} kg$

The mass increase with the radius, so the speed remains constant.

$$v(M,R) = \sqrt{\frac{GM(R)}{R}}$$

$$\frac{M(R)}{R} = 4.1 \times 10^{21} C \quad ; \quad \rho(R) = \frac{9.67 \times 10^{20}}{R^2} kg/m^3$$

$$v(M,R) = 5.2 \times 10^5 m/s$$



True Absolute Zero Temperature

Abstract – The usual absolute zero value is wrong. Kelvin scale is also wrong.

$$T = 0^o C ....; .... .P_S = 10^5 Pa$$

$$H_2 --m = 2.016 \times 1.66 \times 10^{-27} kg.......;.. .....\rho = 0.09 kg/m^3$$

$$T_S = \frac{P_S .m}{\rho .k_B} = 270 S.... \Leftrightarrow .....0^o C = 270 S = 263 K$$

$$T_S = \sigma .T_K{}^4 ....;.......\sigma = 5.67 \times 10^{-8}$$

$T^{o}C$	-263	-133	-3	0	$+15$	$+100$
T_K	0	130	260	263	278	363
T_S	0	16.2	260	270	339	984

$$0^{o}S = -263^{o}C$$

$$T = 0^{o}C.......;..\ ......P_S = 10^{5}\,Pa$$

Ammonia – $m = 17.0....;.....\ .\rho = 0.77.......\ \Leftrightarrow\ ....T_S = 270\,S$
Argon -- T = 270S ; Benzene – T = 270S ; $CO_2..--..268\,S$; CO – 270S; $He--..270S$; Methane – 269S; $Ne--270S$; Ozone – 270S; $H_2O--270\,S$; Xenon – 270S; Air – 269S.

Volumetric Thermal Expansion

Gases:

$$\Delta V = V_0 \frac{\Delta T_K}{T_\alpha} \qquad ; \qquad T_\alpha = \frac{1}{\alpha} = T_K$$

$$\Delta V = V_0 \frac{\Delta T_K}{T_K}.........\ \Leftrightarrow\ ....V = V_0(\log T_K + C).....\ \Leftrightarrow\ .....C = -4.7$$

$$V = V_0......\ \Leftrightarrow\ ....T_K = 300\,K$$

$$V = V_0(\log T_K - 4.7)$$

$$V = 0.......\ \Leftrightarrow\ ....T_K = 110.4K$$

$$T = 300K = 459.27S.......;......T_K = \left(\frac{T_S}{\sigma}\right)^{1/4}$$

$$\Delta T_K = \frac{T_S^{-3/4}}{4\sigma^{1/4}}\Delta T_S$$

$$\Leftrightarrow\ ....\Delta V = V_0 \frac{\Delta T_S}{4T_S}$$

Water expansion:

$$T_\alpha = \frac{3.7\times10^{16}}{T_K^{\ 5.2}}........\Leftrightarrow ....\Delta V = \frac{V_0}{2.7\times10^{16}} T_K^{\ 5.2} \Delta T_K$$

$$\Leftrightarrow ....V = \frac{V_0}{2.3\times10^{17}} (T_K^{\ 6.2} + 2.27\times10^{17})$$

$$V = V_0 .... \Leftrightarrow .... T_K = 313.55K$$

Copper expansion:

$$\frac{\Delta V}{V_0} = \frac{\Delta T_K}{T_\alpha} .... and .... T_\alpha = 2.44\times10^4 - 8T_K$$

$$V = -\frac{V_0}{8}\left[\log\left(2.44\times10^4 - 8T_K\right) - 18\right]$$

Correct sun surface temperature

$$T_S = \sigma(5778)^4 = 6.32\times10^7 S$$

There's no sun corona problem.

Intensity and temperature

$$I = \sigma T_K^{\ 4} ....;.......I = fT_S ....and.......f = 1Hz$$

$$\Leftrightarrow ....T_S = \sigma T_K^{\ 4}$$

$$I = \frac{\Delta T_S}{\Delta t}$$

Milky way mass, radius and density

$$\frac{M(R)}{R} = 4.1\times10^{21}C\ldots\ldots;\ldots\ldots\rho(R) = \frac{138}{R}kg/m^3$$

Electron relativistic factor:

$$\left(1-\frac{w_e{}^2}{c^2}\right) = \frac{S}{x_e{}^2} = 3.248\times10^{-11}$$

Longitudinal particles:

$$\left(1-\frac{x^2}{S}\right) = \frac{2\Delta x}{\sqrt{S}} = \frac{S}{x_e{}^2} \qquad \Leftrightarrow \ldots\ldots\Delta x = \frac{S^{3/2}}{2x_e{}^2} = 2.25\times10^{-28}m$$

$$mwx = h\ldots\ldots;.\ \ldots\ldots w = \frac{cx}{\sqrt{S+x^2}}$$

$$m = \frac{\sqrt{2}h\sqrt{\Delta x}}{cS^{3/4}} = m_e\ldots\ldots;\ldots\ldots w = \frac{h}{m_e\sqrt{S}} = 5.26\times10^{13}m/s$$

Graviton:

$$\left(1-\frac{f^2}{f_M{}^2}\right) = \frac{S}{x_e{}^2}\ldots\ldots;\ldots\ldots f^2 = f_M{}^2 - 2f_M\Delta f$$

$$\Delta f = \frac{c\sqrt{S}}{x_e{}^2} = 7.042\times10^{14}Hz$$

$$mwx = h\ldots\ldots;\ \ldots\ldots mw^2 = \frac{hc}{\sqrt{S}}$$

$$m = \frac{h}{2S\Delta f} = \frac{hx_e{}^2}{2S^{3/2}c} = 2.46\times10^{-15}kg$$

$$mx^2 = \frac{h\sqrt{S}}{c}\ldots\ldots\Leftrightarrow\ldots\ldots x = \sqrt{2}\frac{S}{x_e} = 1.1\times10^{-22}m$$

$$w = c\sqrt{\frac{2S}{x_e{}^2}} = 2.42\times10^3 m/s$$

Transversal particles:

$$\left(1-\frac{w^2}{c^2}\right)=\frac{S}{x_e{}^2}\ldots\ldots\Leftrightarrow\ldots\ldots\Delta w=\frac{S.c}{2x_e{}^2}=4.87\times10^{-3}=\Delta w_e$$

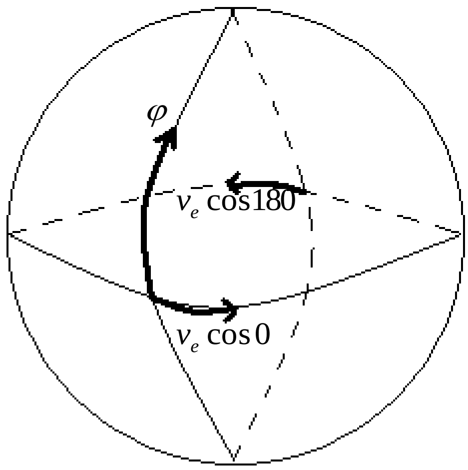
Flyby anomaly:

$$\frac{a}{R}=1.566\times10^{-2}\sqrt{\cos\varphi_1-\cos\varphi_2}\ldots\ldots\ldots;\ldots\ldots\ldots\frac{\pi}{137}=2.3\times10^{-2}$$

Near -- $a/R=1.2\times10^{-2}$

Galileo -- $a/R=9.3\times10^{-3}$

Roseta -- $a/R=2.77\times10^{-3}$



Maximum a/R --- $\frac{a}{R}=1.566\times10^{-2}\sqrt{2}=2.2\times10^{-2}\approx\frac{\pi}{137}$

Gravitational constant value

We don't know what is the correct value:

$$G' = \left(\frac{h^2}{3ck_B'^3}\right)^{3/2} = 8.01849255 \times 10^{-11} m^{-3}$$

$$G = \left(\frac{h^2}{3ck_B{}^3}\right)^{3/2} = 7.98874659 \times 10^{-11} m^{-3}$$

$$k_B' = k_B\left(1 - \frac{\pi^3\alpha^2}{2}\right)$$

Stellar black holes:

Stellar black holes have a polar electric field.

$$g_C = g_G = c^2 G^{1/3} = 3.87 \times 10^{13} ms^{-2}$$

$$E = \frac{Q_e}{4\pi\varepsilon_0 G^{-2/3}} = 1.67 \times 10^3 V/m......;... ...B = \frac{E}{c} = 5.6 \times 10^{-6} T$$

$$B = \frac{\mu_0 I_E}{2R} = \frac{\mu_0 f}{2G^{-1/3}} = \frac{\mu_0 c}{4\pi.G^{-2/3}}$$

$$E = \frac{c^2 G^{-1/3}}{2\pi.R_0}.......\Leftrightarrow ......R_0 = 2 \times 10^{16} m$$

Earth:

$$B = f\frac{R^2}{R_0} = 6 \times 10^{-5} T........\Leftrightarrow ......R_0 = 8 \times 10^{12} m$$

$$v = \frac{E}{B} = 465.41 m/s.......\Leftrightarrow ....E = 2.8 \times 10^{-2} V/m$$

$$Q_e = \frac{2BR.t}{\mu_0} = 5.3 \times 10^{13} C$$

$$E = \frac{x_e Q_e}{4\pi\varepsilon_0 L R^2} = 2.8 \times 10^{-2} ....;.. ..... L = 1m$$

$$V_E = 2.8 \times 10^{-2} Volt$$

Stellar black holes:

$$F = Eq_e = m_e g .... \Leftrightarrow .... g = 2.94 \times 10^{14} ms^{-2}$$

$$EY = FR = m_e g G^{-1/3} = \frac{1}{2} m_e v^2 \qquad \Leftrightarrow ......v = 1.17 \times 10^9 m/s$$

Thermal resistivity and resistance

Material	R_{YTH}	T	$\Delta T / l$
Cu	2.6×10^{-3}	418 S	1.1 S/m
Au	3.2×10^{-3}	418 S	1.3
Ni	1.1×10^{-2}	447 S	4.9
H_2O	1.7	418 S	711.0
Air	41.7	315 S	1.3×10^4
Ar	58.8	447 S	2.6×10^4

$$R_{TH} = \frac{\Delta T}{P_W} ....;. .... P_W = I.Area = T.Area$$

$$R_{TH} = \frac{\Delta T}{T.Area} = R_{YTH} \frac{l}{Area}$$

$$R_{YTH} = \frac{\Delta T}{T.l} ....;....... \frac{\Delta T}{l} = cons\tan t$$

R_{TH} -- Thermal resistance; R_{YTH} -- Thermal resistivity; T – Temperature;

l – Length.

Thermal resistance quantum

$$R_{THQ} = \frac{3h}{\pi^2 k_B{}^2 T} = \frac{\Delta T}{Area.T}$$

$$\frac{\Delta T}{Area} = \frac{3h}{\pi^2 k_B{}^2} = 1.06 \times 10^{12}$$

$$Te = x_e{}^2 c^4 = 4.76 \times 10^{10} S$$

$$R_{THQ} = \frac{\Delta T}{Area.Te} = 22.3\Omega$$

Thermal resistance:

$$R_{TH} = \frac{\Delta T}{P_W} = L^{-1} V^{-1} = 22.3\Omega$$

Thermal voltage:

$$V_{TH} = \sqrt{\Delta T} = LV^2$$

Thermal current:

$$I_{TH} = \frac{P_W}{\sqrt{\Delta T}} = L^2 V^3$$

Thermal charge:

$$Q_{TH} = I_{TH}.t$$

Quantum of thermal charge:

$$q_{TH} = q_e / 2\alpha = 1.1 \times 10^{-17} C$$

$$I_{THQ} = q_{TH}.f_e = 1.36 \times 10^3 A$$

$$V_{TH} = \sqrt{\Delta Te} = I_{TH}.R_{TH} = 3 \times 10^4 Volt \quad \Leftrightarrow \ldots.\Delta Te = 9.15 \times 10^8 S$$

$$P_W e = \frac{\Delta Te}{R_{TH}} = 4.1 \times 10^7 W$$

$$\frac{\Delta Te}{Area} = 1.06\times10^{12}\ldots\ldots\Leftrightarrow\ldots\ldots Area = 8.6\times10^{-4}\,m^2$$

$$\frac{\Delta Te}{Area.Te} = 22.3\ldots\ldots\Leftrightarrow\ldots\ldots Te = 4.77\times10^{10}\,S$$

$$P_W e \approx {x_e}^3 c^5 = 3.46\times10^7\,W$$

$$Te \approx {x_e}^2 c^4 = 4.76\times10^{10}\,S$$