# Numeric Table - Codata 2014

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|---|---|---|
| **BASIC DATA** | | |
| $c = 299792458$ m s$^{-1}$ | $h = 6.62607008\text{x}10^{-34}$ J s | $G = 6.6729195742\text{x}10^{-11}$ m$^3$ kg$^{-1}$ s$^{-2}$ |
| **STATIONARY PARTICLE - PLANCK BLACK HOLE** | | |
| Planck time $t_p$ | $(\pi h G/c^5)^{1/2}$ | $2.39501996\text{x}10^{-43}$ s |
| Planck mass $M$ | $h/t_p c^2$ | $3.0782613\text{x}10^{-8}$ kg |
| Quantized Planck mass $M_0$ | $Mt_p^{1/2}$ | $1.5064685\text{x}10^{-29}$ |
| Planck impedance $Z_p$ | $(M_0/\hbar)^{1/2}$ | 377.95661178 |
| Planck permittivity $\varepsilon_p$ | $1/Z_p c = (M_0/2\pi M)^{1/2} = (t_p/4\pi^2)^{1/4}$ | $8.825459981\text{x}10^{-12}$ |
| Planck charge $Q$ | $M(4\pi\varepsilon_p G)^{1/2}$ | $2.6481162\text{x}10^{-18}$ |
| **ROTATING PARTICLE - INITIAL ELECTRON STATE** | | |
| Toroid ratio unitary charge squared/unitary time $w_u$ | $16\pi^4 Q_u^2/t_u$ | 1558.54545654 |
| Fine structure $\alpha_0$ | $(w_u t_p)^{1/2}/Q$ | $7.295873083\text{x}10^{-3}$ |
| Charge $e_0$ | $(w_u t_p/\alpha_0(2-\alpha_0))^{1/2} = Q/(2/\alpha_0-1)^{1/2}$ | $1.60233847\text{x}10^{-19}$ |
| Mass $m_b$ | $M_0(\alpha_0/2)^{1/2}(1-\alpha_0/2)^{3/8}$ | $9.08632983\text{x}10^{-31}$ |
| **RELATIONS AMONG CONSTANTS** | | |
| vacuum fine structure constants | $\alpha^3-2\alpha^2+w_u t_p/2\varepsilon_0 hc = 0$ | $\alpha = 7.29735256653\text{x}10^{-3}$<br>$\alpha_n = -7.27082333397\text{x}10^{-3}$<br>$\alpha_{sv} = 1.999973470767$ |
| Newton's $G$ with current data | $8\hbar c^3(\alpha^2(2-\alpha)/\mu_0 w_u)^2$ | $6.6729195334\text{x}10^{-11}$ |
| **ELECTRON DATA** | | |
| Permittivity $\varepsilon_0$ | $(Q\alpha_0/\alpha)^2/2(2-\alpha)hc$ | $8.85418781762\text{x}10^{-12}$ |
| Charge $e$ | $(w_u t_p/\alpha(2-\alpha))^{1/2} = M(2\pi\varepsilon_0\alpha G)^{1/2}$ | $1.6021766257\text{x}10^{-19}$ |
| electron fine structure constants | $\alpha^2-2\alpha+w_u t_p/e^2 = 0$ | $\alpha = 7.29735256653\text{x}10^{-3}$<br>$\alpha_s = 1.99270264743$ |
| Mass $m_e$ | $M_0(\alpha/2)^{1/2}(\alpha/\alpha_0)^{12}((1-\alpha/2)(2-\alpha)/(2-\alpha_0))^{3/8}$ | $9.10938361\text{x}10^{-31}$ |
| Gravitational force $F_g = Gm_e^2$ | $t_p\hbar c\alpha(\alpha/\alpha_0)^{24}((1-\alpha/2)(2-\alpha)/(2-\alpha_0))^{3/4}$ | $5.5372467\text{x}10^{-71}$ |
| Electric force $F_e = e^2/4\pi\varepsilon_0$ | $Q^2\alpha/8\pi\varepsilon_p = GM^2\alpha/2$ | $2.307077527\text{x}10^{-28}$ |
| Force ratio $F_g/F_e$ | $t_p(\alpha/\alpha_0)^{24}((1-\alpha/2)(2-\alpha)/(2-\alpha_0))^{3/4} = (2/\alpha)(m_e/M)^2$ | $2.40011297\text{x}10^{-43}$ |
| Bohr magneton $\mu_B$ | $(Q\hbar/M_0)(\alpha_0/\alpha)^{13}(1-\alpha_0/2)^{1/8}((2-\alpha_0)/(2-\alpha))^{1/4}/(2-\alpha)$ | $9.274010023\text{x}10^{-24}$ |
| Rotational speed $u_e$ | $c(1-\alpha/2)^{1/2}$ | $c-5.47422614\text{x}10^5$ |
| Compton wavelength $\lambda_c$ | $\pi GM^2/m_e c^2$ | $2.42631023676\text{x}10^{-12}$ |
| Base gyromagnetic frequency $f_e$ | $e/2\pi m_e = (Q/\pi M_0)(\alpha_0/\alpha)^{13}(1-\alpha_0/2)^{1/8}((2-\alpha_0)/(2-\alpha))^{1/4}/(2-\alpha)$ | $2.799249\text{x}10^{10}$ |
| **MAGNETIC PROPERTIES** | | |
| Magnetic field ratio $B_e/B$ | $\mu_0 f_e e/2\lambda_c = \alpha/2\pi$ | $1.16140973245\text{x}10^{-3}$ |
| Interaction between applied field $B$ and induced field $B_e$ | $(\delta_p\alpha/2\pi)(1-\delta_p\alpha/2\pi) = (\alpha/\alpha_m)^{13}-1$ | $1.16006087888\text{x}10^{-3}$ |
| Sensitivity to other physics $\delta_p$ | *presumed strong and weak interaction, other* | $1.64\text{x}10^{-8}$ |
| $\alpha$ variation due to magnetic interaction $\delta_\alpha$ | $(1+\delta_p\alpha/2\pi-(\delta_p\alpha/2\pi)^2)^{1/13} = \alpha/\alpha_m$ | 1.00008918770992486 |
| Fine structure in intrinsic magnetic moment $\alpha_m$ | $\alpha/\delta_\alpha$ | $7.2967017904\text{x}10^{-3}$ |
| Magnetic moment mass $m_m$ | $M_0(\alpha_m/2)^{1/2}(\alpha_m/\alpha_0)^{12}((1-\alpha_m/2)(2-\alpha_m)/(2-\alpha_0))^{3/8}$ | $9.09923639\text{x}10^{-31}$ |
| Magnetic moment charge $e_m$ | $(w_u t_p/\alpha_m(2-\alpha_m))^{1/2}$ | $1.6022478097\text{x}10^{-19}$ |
| Gyromagnetic ratio $\gamma_e$ | $e_m/m_m$ | $1.760859638\text{x}10^{11}$ |
| Magnetic moment $\mu_e$ | $(Q\hbar/M_0)(\alpha_0/\alpha_m)^{13}(1-\alpha_0/2)^{1/8}((2-\alpha_0)/(2-\alpha_m))^{1/4}/(2-\alpha_m)$ | $9.284764649\text{x}10^{-24}$ |
| Magnetic moment/Bohr magneton $\mu_e/\mu_B$ | $\gamma_e/(e/m_e) = (\alpha/\alpha_m)^{13}((2-\alpha)/(2-\alpha_m))^{5/4}$ | 1.00115965218091 |
| **ELECTRIC FIELD FROM GRAVITATIONAL VARIATION** | | |
| Materialization time $t_e$ | $h/m_e c^2$ | $8.09329979\text{x}10^{-21}$ |
| Gravitational change $\Delta g$ | $Gm_e/t_e$ | $7.51067992\text{x}10^{-21}$ |
| Electric field $e/4\pi\varepsilon_0$ | $\Delta g(M/Q)(\alpha_0/\alpha)^{23}(2/\alpha)^{1/2}((2-\alpha_0)/(2-\alpha))^{3/4}/(1-\alpha/2)^{1/4}$ | $1.43996454\text{x}10^{-9}$ |
| **DARK MATTER FROM SUPERLUMINAL SPEED AND IMAGINARY ELECTRON** | | |
| Superluminal speed $u_s$ | $c(1-\alpha_n/2)^{1/2}$ | $c+5.44440133\text{x}10^5$ |
| Quartic mean between $u_s$ and $u_e$ | $(u_s^4/2+u_e^4/2)^{1/4} \approx c$ | 299792457.9934 |
| Imaginary electron mass $m_{ei}$ | $M_0(\alpha_n/2)^{1/2}(\alpha_n/\alpha_0)^{12}((1-\alpha_n/2)(2-\alpha_n)/(2-\alpha_0))^{3/8}$ | $8.75164884\text{x}10^{-31}i$ |
| Imaginary electron charge $e_i$ | $(w_u t_p/\alpha_n(2-\alpha_n))^{1/2}$ | $1.5992616495\text{x}10^{-19}i$ |

## Calculation sequence

1) $G$ was first calculated with the equation giving $G$ in the previous page. This is the third constant of the basic data and the one used in the initial calculations.
2) After the initial electron data, the rotational speed was slowly decreased until the relationship $\varepsilon_0 = 1/\pi c^2 4x10^{-7}$ was satisfied. The term on the right is an exact quantity.
3) In order to get all quantities, the constant of gravitation $G$ was increased in steps and the slowdown speed was recalculated all the time until we get always the same permittivity $\varepsilon_0$. There will be a point where all parameters will fall within one standard deviation and actually they could be quite close to their nominal value.

## Outstanding point

- The constant of gravitation $G$, as given by Codata 2018, is about 9 standard deviations higher than the value used in this study. Although this latter value is close to the experiment performed by G. Rosi et al, http://arxiv.org/abs/1412.7954 the discrepancy has no easy explanation; there might be a difference between a quantum world involving the mentioned experiment and our macro-world where experiments are carried out with massive objects.