

## Some Relations Between Physical Constants

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Most of the following numerical relationships were found by me in the year 1991, while a few in 1994. I leave registered here to make it easier to return to the theme of Eletrogravitational Unification at most favorable time, with some of these relationships in mind (some = are probably  $\approx$ ). Meanwhile, I leave it available to the public, if it is useful. The units were omitted in most case. Some corrections made in 2017.

$$1. \frac{Ke}{G} \approx \frac{151}{7}$$

$$2. KG \approx \frac{3}{5}$$

$$3. \frac{1}{KG} \approx 1 + 10^{10} G$$

$$4. \frac{1}{Gc} \approx 50$$

$$5. \frac{K}{c} \approx 30$$

(obtained by 2. and 4.)

$$6. \frac{\sqrt{e}}{G} \approx 6$$

$$7. \frac{uec}{G} \approx \frac{151}{21} \approx \frac{Ke}{3G}$$

$$8. uec = 10 c e \approx \frac{Ke}{3}$$

(charge of electron in e.s.u. or statC)

$$9. \frac{K}{c^2} = 10^{-7}$$

(this is a definition)

$$10. \frac{m_p c^2}{2} \approx 1.12 G \approx \frac{\sqrt{5}}{2} G$$

$$11. \frac{8\pi}{c^3} \approx 557 m_n$$

$$12. \frac{m_e c^2}{2} \frac{G}{Kh} \approx 0.5$$

$$13. \frac{h}{k_{Boltz}} \approx (\sqrt{3} - 1) G$$

$$14. \frac{m_p c^2}{2} / r_B \approx \sqrt{2}$$

$$15. \frac{G}{h} = \frac{A}{6}$$

16.  $\frac{\hbar}{2m_p} \approx \pi \cdot 10^{-8}$
17.  $Gm_p \approx 2Ke^2\delta, \delta = 4.57 r_B$
18.  $\left(\frac{m_e}{m_p}\right)^3 \approx 3 r_B$
19.  $E_{gr} \approx F_{el} \delta, \delta = 9.14 r_B$  (equivalent to 17.)
20.  $\frac{Gm_p^2}{r} = \frac{5\hbar^3}{2m_p r^2}, r = 10^{-11} m$   
 $\Rightarrow G = \frac{5\hbar^3}{2m_p^3 r}$
21.  $\frac{Grav}{Weak} \approx \frac{2}{3} m_e$  (*Grav*:  $0.6 \times 10^{-36}$ , *Weak*:  $0.1 \times 10^{-5}$ )
22.  $\frac{Grav}{Eletr} \approx \frac{h}{8}$  (*Eletr*:  $\frac{1}{137} \approx 0.0073$ )
23.  $\frac{m_p}{m_{Earth}} \approx \frac{1}{4} \hbar^{3/2}$
24.  $F_{Earth-Sun} \approx 5 \hbar^{-1.3}$
25.  $Ke^2 \approx 5 (Gm_p)^{3/4}$
26.  $\frac{1}{2} mv^2 \approx \frac{Ke^2}{r}$
27.  $m_p + \frac{m_e}{\sqrt{1-\frac{v^2}{c^2}}} = m_n$
28.  $m_p c \approx 3 e$
29.  $\frac{8\pi^2}{\mu_0} \approx \frac{c}{4} = \left(\frac{m_e}{\hbar}\right)^2$  (instead of 8 a better value is 9.5)
30.  $\frac{\hbar^2}{2m} \nabla^2 \Psi + (E - V)\Psi = 0$   
 $\Rightarrow \nabla^2 \Psi + \frac{c}{4} v^2 \Psi = 0$  ( $m = m_e$ )

Another relationship, which most calls my attention, refers to the difference between the charge of the electron and the proton, based on an old theory of Eletrogravitational Unification that I created<sup>[1]</sup>, is as follows:

$$e - p \approx 8.376 \times 10^{-55}$$

$$\frac{e-p}{e} \approx 5.228 \times 10^{-36}; \hbar = 6.6260754 \times 10^{-34};$$

$$\frac{e-p}{e} \cdot \frac{1}{h} \approx 0.00789 = 7.89 \times 10^{-3} \approx \frac{1}{126.742} \approx \frac{1}{127} \approx \alpha,$$

where  $\alpha$  is the fine-structure constant:

$$\alpha = \frac{1}{4\pi\epsilon_0} \frac{e^2}{\hbar c} = \frac{\mu_0}{4\pi} \frac{e^2}{\hbar c} = K \frac{e^2}{\hbar c} = \frac{1}{2\epsilon_0} \frac{e^2}{\hbar c} \approx 7.29735 \times 10^{-3} \approx \frac{1}{137.036}.$$

The recommended values of these constants you may see in [2] or [3].

### Reference

1. Godoi, Valdir M. S., *A Unificação Eletrogravitacional do Ponto de Vista Clássico*, Boletim do Instituto de Matemática e Física da Universidade Federal de Goiás, nº 15, ano 7, novembro (1992). Available in [http://gsjournal.net/Science-Journals/%7B\\$cat\\_name%7D/View/5690](http://gsjournal.net/Science-Journals/%7B$cat_name%7D/View/5690) (2015) and <http://www.vixra.org/abs/1407.0192> (2014).
2. Peter J. Mohr, David B. Newell, Barry N. Taylor, CODATA Recommended Values of the Fundamental Physical Constants: 2014, available in <https://arxiv.org/pdf/1507.07956.pdf> (2015).
3. <https://physics.nist.gov/cuu/Constants/index.html>.