Selected Physical Constants[1]

Symbol	Quantity	SI value and unit name	Gaussian value and unit name	Relative uncertainty
c	speed of light in free space	$2.99\,792\,458\times10^{8}$ m/s	$2.99\,792\,458\times10^{10}$ cm/s	0 (value defined)
G	gravitation constant	$6.67\,43\times10^{-11}$ $m^3/kg\cdot s^2$	$6.67\,43\times10^{-8}$ $cm^3/g\cdot s^2$	$\sim10^{-4}$
$\hbar$	Plank constant	$1.05\,457\,16\times10^{-34}$ J·s	$1.05\,457\,16\times10^{-27}$ erg·s	$\sim5\times10^{-8}$
e	elementary electric charge	$1.60\,217\,64\times10^{-19}$ C	$4.80\,320\,4\times10^{-10}$ statcoulomb	$\sim3\times10^{-8}$
m_e	electron's rest mass	$0.91\,093\,82\times10^{-30}$ kg	$0.91\,093\,82\times10^{-27}$ g	$\sim5\times10^{-8}$
m_p	proton's rest mass	$1.67\,262\,16\times10^{-27}$ kg	$1.67\,262\,16\times10^{-24}$ g	$\sim5\times10^{-8}$
μ_0	magnetic constant	$4\pi\times10^{-7}$ N/A^2	-	0 (value defined)
ε_0	electric constant	$8.85\,418\,781\,7\times10^{-12}$ F/m	-	0 (defined as $1/\mu_0c^2$)
k_B	Boltzmann constant	$1.38\,065\,0\times10^{-23}$ J/K	$1.38\,065\,0\times10^{-16}$ erg/K	$\sim2\times10^{-6}$

Remarks:

1. The exact value of c was defined by an international convention in 1983, in order to extend the official definition of a second (as "the duration of 9,192,631,770 periods of the radiation corresponding to the transition between the two hyperfine levels of the ground state of the cesium-133 atom") to that of a meter. The selected values are back-compatible with the legacy definitions of the meter (initially, as the a 1/40,000,000-th part of the Earth equator's length) and the second (for a long time, as 1/(24×60×60)-th part of the Earth rotation period), within the experimental errors of these measures.

2. ε_0 and μ_0 are not really the fundamental constants; rather they define the SI system of units.

3. The Boltzmann constant can be called the "fundamental constant" only with big reservations, because its only role is to comply with the independent definition of a kelvin (as a temperature unit in which the triple point of water is exactly 273.15 K). If temperature is expressed in energy units k_BT (as is done in this lecture course), this constant disappears altogether.

4. The dimensionless "fine structure" constant α is numerically the same in any system of units:

$$\alpha \equiv \begin{Bmatrix} e^2/4\pi\varepsilon_0\hbar c \quad \text{in SI units} \\ e^2/\hbar c \text{ in Gaussian units} \end{Bmatrix} \approx 7.29\,735\,253\times10^{-3} \approx \frac{1}{137}.$$

[1] Numerical values adapted from the most recent (2006) NIST list, available online at http://physics.nist.gov/cuu/Constants/.