

**Fundamental Physical Constants — Frequently used constants**

Quantity	Symbol	Value	Unit	Relative std. uncert. $u_r$
speed of light in vacuum	$c, c_0$	299 792 458	$\text{m s}^{-1}$	exact
magnetic constant	$\mu_0$	$4\pi \times 10^{-7}$ $= 12.566\,370\,614\dots \times 10^{-7}$	$\text{N A}^{-2}$ $\text{N A}^{-2}$	exact
electric constant $1/\mu_0 c^2$	$\epsilon_0$	$8.854\,187\,817\dots \times 10^{-12}$	$\text{F m}^{-1}$	exact
Newtonian constant of gravitation	$G$	$6.673\,84(80) \times 10^{-11}$	$\text{m}^3 \text{kg}^{-1} \text{s}^{-2}$	$1.2 \times 10^{-4}$
Planck constant	$h$	$6.626\,069\,57(29) \times 10^{-34}$	$\text{J s}$	$4.4 \times 10^{-8}$
$h/2\pi$	$\hbar$	$1.054\,571\,726(47) \times 10^{-34}$	$\text{J s}$	$4.4 \times 10^{-8}$
elementary charge	$e$	$1.602\,176\,565(35) \times 10^{-19}$	$\text{C}$	$2.2 \times 10^{-8}$
magnetic flux quantum $h/2e$	$\Phi_0$	$2.067\,833\,758(46) \times 10^{-15}$	$\text{Wb}$	$2.2 \times 10^{-8}$
conductance quantum $2e^2/h$	$G_0$	$7.748\,091\,7346(25) \times 10^{-5}$	$\text{S}$	$3.2 \times 10^{-10}$
electron mass	$m_e$	$9.109\,382\,91(40) \times 10^{-31}$	$\text{kg}$	$4.4 \times 10^{-8}$
proton mass	$m_p$	$1.672\,621\,777(74) \times 10^{-27}$	$\text{kg}$	$4.4 \times 10^{-8}$
proton-electron mass ratio	$m_p/m_e$	1836.152 672 45(75)		$4.1 \times 10^{-10}$
fine-structure constant $e^2/4\pi\epsilon_0\hbar c$	$\alpha$	$7.297\,352\,5698(24) \times 10^{-3}$		$3.2 \times 10^{-10}$
inverse fine-structure constant	$\alpha^{-1}$	137.035 999 074(44)		$3.2 \times 10^{-10}$
Rydberg constant $\alpha^2 m_e c/2h$	$R_\infty$	10 973 731.568 539(55)	$\text{m}^{-1}$	$5.0 \times 10^{-12}$
Avogadro constant	$N_A, L$	$6.022\,141\,29(27) \times 10^{23}$	$\text{mol}^{-1}$	$4.4 \times 10^{-8}$
Faraday constant $N_A e$	$F$	96 485.3365(21)	$\text{C mol}^{-1}$	$2.2 \times 10^{-8}$
molar gas constant	$R$	8.314 4621(75)	$\text{J mol}^{-1} \text{K}^{-1}$	$9.1 \times 10^{-7}$
Boltzmann constant $R/N_A$	$k$	$1.380\,6488(13) \times 10^{-23}$	$\text{J K}^{-1}$	$9.1 \times 10^{-7}$
Stefan-Boltzmann constant $(\pi^2/60)k^4/\hbar^3 c^2$	$\sigma$	$5.670\,373(21) \times 10^{-8}$	$\text{W m}^{-2} \text{K}^{-4}$	$3.6 \times 10^{-6}$
Non-SI units accepted for use with the SI				
electron volt ( $e/C$ ) J	eV	$1.602\,176\,565(35) \times 10^{-19}$	J	$2.2 \times 10^{-8}$
(unified) atomic mass unit $\frac{1}{12}m(^{12}\text{C})$	u	$1.660\,538\,921(73) \times 10^{-27}$	kg	$4.4 \times 10^{-8}$