

**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	$G$	$6.674\,28(67) \times 10^{-11}$	$\text{m}^3 \text{kg}^{-1} \text{s}^{-2}$	$1.0 \times 10^{-4}$
Planck constant	$h$	$6.626\,068\,96(33) \times 10^{-34}$	$\text{J s}$	$5.0 \times 10^{-8}$
$h/2\pi$	$\hbar$	$1.054\,571\,628(53) \times 10^{-34}$	$\text{J s}$	$5.0 \times 10^{-8}$
elementary charge	$e$	$1.602\,176\,487(40) \times 10^{-19}$	$\text{C}$	$2.5 \times 10^{-8}$
magnetic flux quantum $h/2e$	$\Phi_0$	$2.067\,833\,667(52) \times 10^{-15}$	$\text{Wb}$	$2.5 \times 10^{-8}$
conductance quantum $2e^2/h$	$G_0$	$7.748\,091\,7004(53) \times 10^{-5}$	$\text{S}$	$6.8 \times 10^{-10}$
electron mass	$m_e$	$9.109\,382\,15(45) \times 10^{-31}$	$\text{kg}$	$5.0 \times 10^{-8}$
proton mass	$m_p$	$1.672\,621\,637(83) \times 10^{-27}$	$\text{kg}$	$5.0 \times 10^{-8}$
proton-electron mass ratio	$m_p/m_e$	1836.152 672 47(80)		$4.3 \times 10^{-10}$
fine-structure constant $e^2/4\pi\epsilon_0\hbar c$	$\alpha$	$7.297\,352\,5376(50) \times 10^{-3}$		$6.8 \times 10^{-10}$
inverse fine-structure constant	$\alpha^{-1}$	137.035 999 679(94)		$6.8 \times 10^{-10}$
Rydberg constant $\alpha^2 m_e c/2h$	$R_\infty$	10 973 731.568 527(73)	$\text{m}^{-1}$	$6.6 \times 10^{-12}$
Avogadro constant	$N_A, L$	$6.022\,141\,79(30) \times 10^{23}$	$\text{mol}^{-1}$	$5.0 \times 10^{-8}$
Faraday constant $N_A e$	$F$	96 485.3399(24)	$\text{C mol}^{-1}$	$2.5 \times 10^{-8}$
molar gas constant	$R$	8.314 472(15)	$\text{J mol}^{-1} \text{K}^{-1}$	$1.7 \times 10^{-6}$
Boltzmann constant $R/N_A$	$k$	$1.380\,6504(24) \times 10^{-23}$	$\text{J K}^{-1}$	$1.7 \times 10^{-6}$
Stefan-Boltzmann constant $(\pi^2/60)k^4/\hbar^3 c^2$	$\sigma$	$5.670\,400(40) \times 10^{-8}$	$\text{W m}^{-2} \text{K}^{-4}$	$7.0 \times 10^{-6}$
Non-SI units accepted for use with the SI				
electron volt: $(e/C) \text{ J}$	$\text{eV}$	$1.602\,176\,487(40) \times 10^{-19}$	$\text{J}$	$2.5 \times 10^{-8}$
(unified) atomic mass unit $1 \text{ u} = m_{\text{u}} = \frac{1}{12} m(^{12}\text{C})$ $= 10^{-3} \text{ kg mol}^{-1}/N_A$	$\text{u}$	$1.660\,538\,782(83) \times 10^{-27}$	$\text{kg}$	$5.0 \times 10^{-8}$

P. J. Mohr, B. N. Taylor, and D. B. Newell (2007),

"The 2006 CODATA Recommended Values of the Fundamental Physical Constants"

(Web Version 5.0). This database was developed by J. Baker, M. Douma, and S. Kotochigova.

Available: <http://physics.nist.gov/constants>

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