

NAT'L INST. OF STAND & TECH
A11106 693128

NIST
PUBLICATIONS

CODATA recommended (2005)
values of the fundamental
physical constants/values from
P.J. Mohr and B.N. Taylor

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2002 CODATA RECOMMENDED VALUES OF THE FUNDAMENTAL CONSTANTS OF PHYSICS AND CHEMISTRY NIST SP 959 (Apr/2005)

Values from: P. J. Mohr and B. N. Taylor, *Rev. Mod. Phys.* **77**, 1 (2005). The number in parenthesis is the one-sigma (1σ) uncertainty in the last two digits of the given value.

Quantity	Symbol	Numerical value	Unit
Speed of light in vacuum	c, c_0	299 792 458 (exact)	m s^{-1}
Magnetic constant	μ_0	$4\pi \times 10^{-7}$ (exact)	N A^{-2}
Electric constant $1/(\mu_0 c^2)$	ϵ_0	$8.854 187 817 \dots \times 10^{-12}$	F m^{-1}
Newtonian constant of gravitation	G	$6.6742(10) \times 10^{-11}$	$\text{m}^3 \text{kg}^{-1} \text{s}^{-2}$
Planck constant	h	$6.626 0693(11) \times 10^{-34}$	J s
$h/(2\pi)$	\hbar	$1.054 571 68(18) \times 10^{-34}$	J s
Elementary charge	e	$1.602 176 53(14) \times 10^{-19}$	C
Fine-structure constant $e^2/(4\pi\epsilon_0\hbar c)$	α	$7.297 352 568(24) \times 10^{-3}$	
Inverse fine-structure constant	α^{-1}	137.035 999 11(46)	
Rydberg constant $\alpha^2 m_e c/(2h)$	R_∞	10 973 731.568 525(73)	m^{-1}
Bohr radius $\alpha/(4\pi R_\infty)$	a_0	$0.529 177 2108(18) \times 10^{-10}$	m
Bohr magneton $e\hbar/(2m_e)$	μ_B	$927.400 949(80) \times 10^{-26}$	J T^{-1}

Quantity	Symbol	Numerical value	Unit
electron mass	m_e	$9.109\,3826(16) \times 10^{-31}$	kg
proton mass	m_p	$1.672\,621\,71(29) \times 10^{-27}$	kg
proton-electron mass ratio	m_p/m_e	1836.152 672 61(85)	
Avogadro constant	N_A, L	$6.022\,1415(10) \times 10^{23}$	mol ⁻¹
Faraday constant $N_A e$	F	96 485.3383(83)	C mol ⁻¹
molar gas constant	R	8.314 472(15)	J mol ⁻¹ K ⁻¹
Boltzmann constant R/N_A	k	$1.380\,6505(24) \times 10^{-23}$	J K ⁻¹
Stefan-Boltzmann const. $\pi^2 k^4/(60\hbar^3 c^2)$	σ	$5.670\,400(40) \times 10^{-8}$	W m ⁻² K ⁻⁴
magnetic flux quantum $h/(2e)$	Φ_0	$2.067\,833\,72(18) \times 10^{-15}$	Wb
Josephson constant $2e/h$	K_J	$483\,597.879(41) \times 10^9$	Hz V ⁻¹
von Klitzing constant h/e^2	R_K	25 812.807 449(86)	Ω
electron volt (e/C) J	eV	$1.602\,176\,53(14) \times 10^{-19}$	J
(unified) atomic mass unit $\frac{1}{12}m(^{12}\text{C})$	u	$1.660\,538\,86(28) \times 10^{-27}$	kg

A more extensive listing of constants is available in the reference given above and on the NIST Physics Laboratory Web site physics.nist.gov/constants.



