

Quantity	symbol or definition	cgs	SI	numerical value
speed of light	c			299792458 m/s
Planck's constant	$h = 2\pi\hbar$			$6.626070040(81) \times 10^{-34}$ J s
elementary charge	e			$1.6021766208(98) \times 10^{-19}$ C
electron mass	m			$9.10938356(11) \times 10^{-31}$ kg
proton mass	M_p			$1.672621898(21) \times 10^{-27}$ kg
neutron mass	M_n			$1.674927471(21) \times 10^{-27}$ kg
permittivity of vacuum	$\epsilon_0 = \frac{1}{\mu_0 c^2}$			$8.854187817 \times 10^{-12}$ F/m
permeability of vacuum	μ_0			$4\pi \times 10^{-7}$ H/m
fine structure constant	α	$\frac{e^2}{\hbar c}$	$\frac{1}{4\pi\epsilon_0} \frac{e^2}{\hbar c}$	$7.2973525664(17) \times 10^{-3} \simeq \frac{1}{137.036}$
Rydberg constant	R_∞	$\frac{me^4}{4\pi\hbar^3c}$	$\left(\frac{1}{4\pi\epsilon_0}\right)^2 \frac{me^4}{4\pi\hbar^3c}$	$109737.31568508(65)$ cm ⁻¹
Bohr radius	a_0	$\frac{\hbar^2}{me^2}$	$4\pi\epsilon_0 \frac{\hbar^2}{me^2}$	$5.2917721067(12) \times 10^{-11}$ m
velocity	$v_0 = \alpha c$	$\frac{e^2}{\hbar}$	$\frac{1}{4\pi\epsilon_0} \frac{e^2}{\hbar}$	$2.18769126277(50) \times 10^6$ m/s
time	$\tau_0 = \frac{a_0}{v_0} = \frac{a_0}{\alpha c}$	$\frac{\hbar^3}{me^4}$	$(4\pi\epsilon_0)^2 \frac{\hbar^3}{me^4}$	$2.418884326509(14) \times 10^{-17}$ s
Hartree energy	$E_H = 2hcR_\infty = \frac{1}{4\pi\epsilon_0} \frac{e^2}{a_0}$	$\frac{me^4}{\hbar^2}$	$\left(\frac{1}{4\pi\epsilon_0}\right)^2 \frac{me^4}{\hbar^2}$	$27.21138602(17)$ eV
electric field	$\frac{1}{4\pi\epsilon_0} \frac{e}{a_0^2}$	$\frac{m^2 e^5}{\hbar^4}$	$\left(\frac{1}{4\pi\epsilon_0}\right)^3 \frac{m^2 e^5}{\hbar^4}$	$5.142206707(32) \times 10^{11}$ V/m
Bohr magneton	μ_B	$\frac{e\hbar}{2mc}$	$\frac{e\hbar}{2m}$	$9.274009994(57) \times 10^{-24}$ J/T
nuclear magneton	μ_B	$\frac{e\hbar}{2M_p c}$	$\frac{e\hbar}{2M_p}$	$5.050783699(31) \times 10^{-27}$ J/T

Table A.1: Characteristic atomic quantities. Numerical values of fundamental constants taken from CODATA (2014). Numbers in parentheses indicate uncertainty of last digits. The speed of light, permittivity, and permeability are exact definitions.

	J	eV	cm ⁻¹	Hz	K
1 J =	1	6.24×10^{18}	5.03×10^{22}	1.51×10^{33}	7.24×10^{22}
1 eV =	1.60×10^{-19}	1	8065	2.42×10^{14}	11600
1 cm ⁻¹ =	1.99×10^{-23}	1.24×10^{-4}	1	3.00×10^{10}	1.44
1 Hz =	6.63×10^{-34}	4.14×10^{-15}	3.34×10^{-11}	1	4.80×10^{-11}
1 K =	1.38×10^{-23}	8.62×10^{-5}	0.695	2.08×10^{10}	1

Table A.2: Conversion factors between energy units to three significant digits.