

Frequently used physical constants

Quantity	Symbol	Value	Unit
Universal			
Planck constant	$\hbar$	$1.055 \times 10^{-34}$	J s
$2\pi\hbar$	$h$	$6.626 \times 10^{-34}$	J s
in eV s	$h$	$4.136 \times 10^{-15}$	eV s
(unified) atomic mass unit	u	$1.661 \times 10^{-27}$	kg
Bohr magneton $e\hbar/2m_e$	$\mu_B$	$927.4 \times 10^{-26}$	J T <sup>-1</sup>
Boltzmann constant $R/N_A$	$k$	$1.381 \times 10^{-23}$	J K <sup>-1</sup>
electric constant $1/\mu_0 c^2$	$\epsilon_0$	$8.854 \times 10^{-12}$	F m <sup>-1</sup>
Joule in Hz $h$	J	$1.509 \times 10^{33}$	Hz $h$
eV	J	$6.242 \times 10^{18}$	eV
elementary charge	$e$	$1.602 \times 10^{-19}$	C
in CGS units	$e$	$4.803 \times 10^{-10}$	esu
electron mass	$m_e$	$9.108 \times 10^{-31}$	kg
Bohr radius $4\pi\epsilon_0\hbar^2/m_e e^2$	$a_0$	$0.5292 \times 10^{-10}$	m
Sodium			
mass in kg	$m$	$3.819 \times 10^{-26}$	kg
a.m.u.	$m$	22.99	a.m.u.
wavelength	$\lambda$	$589.2 \times 10^{-9}$	m
recoil frequency $\hbar k^2/2\pi m$	$\nu_r$	25.01	kHz
recoil velocity $\hbar k/m$	$v_r$	2.945	cm/s
linewidth	$\gamma/2\pi$	10.01	MHz
lifetime	$\tau$	$15.90 \times 10^{-9}$	s
capture velocity $\gamma/k$	$v_c$	5.90	m/s
Doppler velocity $\sqrt{\hbar\gamma/2m}$	$v_D$	29.47	cm/s
Cesium			
mass	$m$	133	a.m.u.
Rubidium			
mass	$m$	85.47	a.m.u.
Miscellaneous			
Silicon density	$m$	2.329	g cm <sup>-1</sup>