

9.1.4.1: Physical Constants

Name	Symbol	Value	Unit
Number π	π	3.14159265358979323846	
Number e	e	2.71828182845904523536	
Euler's constant		0.577215664901532860606	
Elementary charge	e	$1.60217733 \cdot 10^{-19}$	C
Gravitational constant	G, κ	$6.67259 \cdot 10^{-11}$	$\text{m}^3 \text{kg}^{-1} \text{s}^{-2}$
Fine-structure constant	$\alpha = e^2/2hc\varepsilon_0$	$\approx 1/137$	
Speed of light in vacuum	c	$2.99792458 \cdot 10^8$	m/s (def)
Permittivity of the vacuum	ε_0	$8.854187 \cdot 10^{-12}$	F/m
Permeability of the vacuum	μ_0	$4\pi \cdot 10^{-7}$	H/m
$(4\pi\varepsilon_0)^{-1}$		$8.9876 \cdot 10^9$	$\text{Nm}^2 \text{C}^{-2}$
Planck's constant	h	$6.6260755 \cdot 10^{-34}$	Js
Dirac's constant	$\hbar = h/2\pi$	$1.0545727 \cdot 10^{-34}$	Js
Bohr magneton	$\mu_B = e\hbar/2m_e$	$9.2741 \cdot 10^{-24}$	Am^2
Bohr radius	a_0	0.52918	Å
Rydberg's constant	Ry	13.595	eV
Electron Compton wavelength	$\lambda_{Ce} = h/m_e c$	$2.2463 \cdot 10^{-12}$	m
Proton Compton wavelength	$\lambda_{Cp} = h/m_p c$	$1.3214 \cdot 10^{-15}$	m
Reduced mass of the H-atom	μ_H	$9.1045755 \cdot 10^{-31}$	kg
Stefan-Boltzmann's constant	σ	$5.67032 \cdot 10^{-8}$	$\text{Wm}^{-2} \text{K}^{-4}$
Wien's constant	k_W	$2.8978 \cdot 10^{-3}$	mK
Molar gasconstant	R	8.31441	$\text{J} \cdot \text{mol}^{-1} \cdot \text{K}^{-1}$
Avogadro's constant	N_A	$6.0221367 \cdot 10^{23}$	mol^{-1}
Boltzmann's constant	$k = R/N_A$	$1.380658 \cdot 10^{-23}$	J/K
Electron mass	m_e	$9.1093897 \cdot 10^{-31}$	kg
Proton mass	m_p	$1.6726231 \cdot 10^{-27}$	kg
Neutron mass	m_n	$1.674954 \cdot 10^{-27}$	kg
Elementary mass unit	$m_u = \frac{1}{12} m(^{12}_6\text{C})$	$1.6605656 \cdot 10^{-27}$	kg
Nuclear magneton	μ_N	$5.0508 \cdot 10^{-27}$	J/T
Diameter of the Sun	D_\odot	$1392 \cdot 10^6$	m

Name	Symbol	Value	Unit
Mass of the Sun	M_{\odot}	$1.989 \cdot 10^{30}$	kg
Rotational period of the Sun	T_{\odot}	25.38	days
Radius of Earth	R_A	$6.378 \cdot 10^6$	m
Mass of Earth	M_A	$5.976 \cdot 10^{24}$	kg
Rotational period of Earth	T_A	23.96	hours
Earth orbital period	Tropical year	365.24219879	days
Astronomical unit	AU	$1.4959787066 \cdot 10^{11}$	m
Light year	lj	$9.4605 \cdot 10^{15}$	m
Parsec	pc	$3.0857 \cdot 10^{16}$	m
Hubble constant	H	$\approx (75 \pm 25)$	$\text{km} \cdot \text{s}^{-1} \cdot \text{Mpc}^{-1}$

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