Fundamental constants

Constant Name	*Symbol*	*Numerical Value*	*Δ*	*Units*
Bohr magneton	μ_B	9.274 009 68 x 10^{-24}	20	J T^{-1}
Boltzmann constant	k_B	1.380 6488 x 10^{-23}	13	J K^{-1}
Electric constant	ε_o	8.854 187 817… x 10^{-12}	-	F m^{-1}
Electron g factor	g_e	2.002 319 304 361 53	53	-
Electron mass	m_e	9.109 382 91 x 10^{-31}	40	kg
Elementary charge	e	1.602 176 565 x 10^{-19}	35	C
Fine structure constant	α	7.297 352 5698 x 10^{-3}	24	-
Magnetic constant	μ_o	4π x 10^{-7}	-	H m^{-1}
Planck's constant	h	6.626 069 57 x 10^{-34}	29	J s
Planck's constant/2π	$\hbar$	1.054 571 726 x 10^{-34}	47	J s
Proton mass	m_p	1.672 621 777 x 10^{-27}	74	kg
Proton-electron mass ratio	m_p / m_e	1 836.152 672 45	75	-
Rydberg constant	R_∞	10 973 731.568 539	55	m^{-1}
	$R_\infty hc / e$	13.605 692 53	30	eV
Speed of light in vacuum	c	299 792 458	-	m s^{-1}

The "Δ" quoted is the absolute value of the uncertainty in the last two digits of the quoted numerical value corresponding to one standard deviation from the numerical value given. Hence, for example, the possible values of Planck's constant within one standard deviation of the best estimate shown lie between 6.626 069 28 and 6.626 069 86 J s.

The speed of light in vacuum has been chosen to have the exact value shown because the meter is now defined as the length of the path traveled by light in vacuum during the time interval of 1/299 792 458 of a second. The magnetic constant (also known as the permeability of free space) is chosen to have the value shown because it is an arbitrary constant that arises from the choice of the system of units and the electric constant (also known as the permittivity of free space) then follows from it and the (chosen) velocity of light because, by definition, $c = 1/\sqrt{\varepsilon_o \mu_o}$, so all three of these quantities have no uncertainty by definition. The Bohr magneton is $\mu_B = e\hbar / 2m_e$. The fine structure constant is $\alpha = e^2 / 4\pi\varepsilon_o c\hbar$.

These values are the CODATA Internationally recommended values as of 2010. Reference http://physics.nist.gov/cuu/Constants/index.html .

SI units

We list here most of the major SI base and derived units. For a full list, see http://physics.nist.gov/cuu/Units/units.html .

SI base units

Base quantity	Name	Symbol
length	meter	m
mass	kilogram	kg
time	second	s
electric current	ampere	A
thermodynamic temperature	kelvin	K

SI derived units

Derived quantity	Name	Symbol	In terms of other SI units	In terms of SI base units
frequency	hertz	Hz	-	s^{-1}
force	newton	N	-	$m \cdot kg \cdot s^{-2}$
pressure, stress	pascal	Pa	N/m^2	$m^{-1} \cdot kg \cdot s^{-2}$
energy, work, quantity of heat	joule	J	$N \cdot m$	$m^2 \cdot kg \cdot s^{-2}$
power, radiant flux	watt	W	J/s	$m^2 \cdot kg \cdot s^{-3}$
electric charge, quantity of electricity	coulomb	C	-	$s \cdot A$
electric potential difference, electromotive force	volt	V	W/A	$m^2 \cdot kg \cdot s^{-3} \cdot A^{-1}$
capacitance	farad	F	C/V	$m^{-2} \cdot kg^{-1} \cdot s^4 \cdot A^2$
electric resistance	ohm		V/A	$m^2 \cdot kg \cdot s^{-3} \cdot A^{-2}$
electric conductance	siemens	S	A/V	$m^{-2} \cdot kg^{-1} \cdot s^3 \cdot A^2$
magnetic flux	weber	Wb	$V \cdot s$	$m^2 \cdot kg \cdot s^{-2} \cdot A^{-1}$
magnetic flux density	tesla	T	Wb/m^2	$kg \cdot s^{-2} \cdot A^{-1}$
inductance	henry	H	Wb/A	$m^2 \cdot kg \cdot s^{-2} \cdot A^{-2}$

SI Prefixes

Factor	Name	Symbol
10^{24}	yotta	Y
10^{21}	zetta	Z
10^{18}	exa	E
10^{15}	peta	P
10^{12}	tera	T
10^{9}	giga	G
10^{6}	mega	M
103	kilo	k
10^{2}	hecto	h
10^{1}	deka	da

Factor	Name	Symbol
10^{-1}	deci	d
10^{-2}	centi	c
10^{-3}	milli	m
10^{-6}	micro	μ
10^{-9}	nano	n
10^{-12}	pico	p
10^{-15}	femto	f
10^{-18}	atto	a
10^{-21}	zepto	z
10^{-24}	yocto	y