

Fundamental Physical Constants — Non-SI units

Quantity	Symbol	Value	Unit	Relative std. uncert. u_r
electron volt: (e/C) J	eV	$1.602\,176\,462(63) \times 10^{-19}$	J	3.9×10^{-8}
(unified) atomic mass unit: $1\text{ u} = m_{\text{u}} = \frac{1}{12}m(^{12}\text{C})$ $= 10^{-3}\text{ kg mol}^{-1}/N_{\text{A}}$	u	$1.660\,538\,73(13) \times 10^{-27}$	kg	7.9×10^{-8}
Natural units (n.u.)				
n.u. of velocity: speed of light in vacuum	c, c_0	299 792 458	m s^{-1}	(exact)
n.u. of action: reduced Planck constant $(\hbar/2\pi)$ in eV s	\hbar	$1.054\,571\,596(82) \times 10^{-34}$ $6.582\,118\,89(26) \times 10^{-16}$	J s eV s	7.8×10^{-8} 3.9×10^{-8}
n.u. of mass: electron mass	m_e	$9.109\,381\,88(72) \times 10^{-31}$	kg	7.9×10^{-8}
n.u. of energy in MeV	$m_e c^2$	$8.187\,104\,14(64) \times 10^{-14}$ 0.510 998 902(21)	J MeV	7.9×10^{-8} 4.0×10^{-8}
n.u. of momentum in MeV/c	$m_e c$	$2.730\,923\,98(21) \times 10^{-22}$ 0.510 998 902(21)	kg m s^{-1} MeV/c	7.9×10^{-8} 4.0×10^{-8}
n.u. of length $(\hbar/m_e c)$	λ_{C}	$386.159\,2642(28) \times 10^{-15}$	m	7.3×10^{-9}
n.u. of time	$\hbar/m_e c^2$	$1.288\,088\,6555(95) \times 10^{-21}$	s	7.3×10^{-9}
Atomic units (a.u.)				
a.u. of charge: elementary charge	e	$1.602\,176\,462(63) \times 10^{-19}$	C	3.9×10^{-8}
a.u. of mass: electron mass	m_e	$9.109\,381\,88(72) \times 10^{-31}$	kg	7.9×10^{-8}
a.u. of action: reduced Planck constant $(\hbar/2\pi)$	\hbar	$1.054\,571\,596(82) \times 10^{-34}$	J s	7.8×10^{-8}
a.u. of length: Bohr radius (bohr) $(\alpha/4\pi R_{\infty})$	a_0	$0.529\,177\,2083(19) \times 10^{-10}$	m	3.7×10^{-9}
a.u. of energy: Hartree energy (hartree) $(e^2/4\pi\epsilon_0 a_0 = 2R_{\infty}hc = \alpha^2 m_e c^2)$	E_{h}	$4.359\,743\,81(34) \times 10^{-18}$	J	7.8×10^{-8}
a.u. of time	\hbar/E_{h}	$2.418\,884\,326\,500(18) \times 10^{-17}$	s	7.6×10^{-12}
a.u. of force	E_{h}/a_0	$8.238\,721\,81(64) \times 10^{-8}$	N	7.8×10^{-8}
a.u. of velocity (αc)	$a_0 E_{\text{h}}/\hbar$	$2.187\,691\,2529(80) \times 10^6$	m s^{-1}	3.7×10^{-9}
a.u. of momentum	\hbar/a_0	$1.992\,851\,51(16) \times 10^{-24}$	kg m s^{-1}	7.8×10^{-8}
a.u. of current	$e E_{\text{h}}/\hbar$	$6.623\,617\,53(26) \times 10^{-3}$	A	3.9×10^{-8}
a.u. of charge density	e/a_0^3	$1.081\,202\,285(43) \times 10^{12}$	C m^{-3}	4.0×10^{-8}
a.u. of electric potential	E_{h}/e	27.211 3834(11)	V	3.9×10^{-8}
a.u. of electric field	E_{h}/ea_0	$5.142\,206\,24(20) \times 10^{11}$	V m^{-1}	3.9×10^{-8}
a.u. of electric field gradient	E_{h}/ea_0^2	$9.717\,361\,53(39) \times 10^{21}$	V m^{-2}	4.0×10^{-8}
a.u. of electric dipole moment	ea_0	$8.478\,352\,67(33) \times 10^{-30}$	C m	3.9×10^{-8}
a.u. of electric quadrupole moment	ea_0^2	$4.486\,551\,00(18) \times 10^{-40}$	C m^2	4.0×10^{-8}

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Quantity	Symbol	Value	Unit	Relative std. uncert. u_r
a.u. of electric polarizability	$e^2 a_0^2 / E_h$	$1.648\,777\,251(18) \times 10^{-41}$	$\text{C}^2 \text{m}^2 \text{J}^{-1}$	1.1×10^{-8}
a.u. of 1 st hyperpolarizability	$e^3 a_0^3 / E_h^2$	$3.206\,361\,57(14) \times 10^{-53}$	$\text{C}^3 \text{m}^3 \text{J}^{-2}$	4.2×10^{-8}
a.u. of 2 nd hyperpolarizability	$e^4 a_0^4 / E_h^3$	$6.235\,381\,12(51) \times 10^{-65}$	$\text{C}^4 \text{m}^4 \text{J}^{-3}$	8.1×10^{-8}
a.u. of magnetic flux density	$\hbar / e a_0^2$	$2.350\,517\,349(94) \times 10^5$	T	4.0×10^{-8}
a.u. of magnetic dipole moment ($2\mu_B$)	$\hbar e / m_e$	$1.854\,801\,799(75) \times 10^{-23}$	J T^{-1}	4.0×10^{-8}
a.u. of magnetizability	$e^2 a_0^2 / m_e$	$7.891\,036\,41(14) \times 10^{-29}$	J T^{-2}	1.8×10^{-8}
a.u. of permittivity ($10^7 / c^2$)	$e^2 / a_0 E_h$	$1.112\,650\,056... \times 10^{-10}$	F m^{-1}	(exact)