Fundamental Physical Constants — Universal constants

Quantity	Symbol	Value	Unit	Relative std. uncert. $u_{\rm r}$
speed of light in vacuum	c	299 792 458	m s^{-1}	exact
vacuum magnetic permeability $4\pi\alpha\hbar/e^2c$	μ_0	$1.256\,637\,062\,12(19) \times 10^{-6}$	N A^{-2}	1.5×10^{-10}
$\mu_0/(4\pi \times 10^{-7})$		$1.000\,000\,000\,55(15)$	N A^{-2}	1.5×10^{-10}
vacuum electric permittivity $1/\mu_0 c^2$	ϵ_0	$8.854\,187\,8128(13) \times 10^{-12}$	F m^{-1}	1.5×10^{-10}
characteristic impedance of vacuum $\mu_0 c$	Z_0	$376.730\,313\,668(57)$	Ω	1.5×10^{-10}
Newtonian constant of gravitation	G	$6.674\,30(15) \times 10^{-11}$	m^3 kg^{-1} s^{-2}	2.2×10^{-5}
	$G/\hbar c$	$6.708\,83(15) \times 10^{-39}$	$(\mathrm{GeV}/c^2)^{-2}$	2.2×10^{-5}
Planck constant*	h	$6.626\,070\,15 \times 10^{-34}$	J Hz^{-1}	exact
		$4.135\,667\,696\ldots \times 10^{-15}$	eV Hz^{-1}	exact
	$\hbar$	$1.054\,571\,817\ldots \times 10^{-34}$	J s	exact
		$6.582\,119\,569\ldots \times 10^{-16}$	eV s	exact
	$\hbar c$	$197.326\,980\,4\ldots$	MeV fm	exact
Planck mass $(\hbar c/G)^{1/2}$	$m_{\rm P}$	$2.176\,435(24) \times 10^{-8}$	kg	1.1×10^{-5}
energy equivalent	$m_{\rm P}c^2$	$1.220\,890(13) \times 10^{19}$	GeV	1.1×10^{-5}
Planck temperature $(\hbar c^5/G)^{1/2}/k$	$T_{\rm P}$	$1.416\,785(16) \times 10^{32}$	K	1.1×10^{-5}
Planck length $\hbar/m_{\rm P}c = (\hbar G/c^3)^{1/2}$	$l_{\rm P}$	$1.616\,255(18) \times 10^{-35}$	m	1.1×10^{-5}
Planck time $l_{\rm P}/c = (\hbar G/c^5)^{1/2}$	$t_{\rm P}$	$5.391\,245(60) \times 10^{-44}$	s	1.1×10^{-5}

* The energy of a photon with frequency ν expressed in unit Hz is $E = h\nu$ in J. Unitary time evolution of the state of this photon is given by $\exp(-iEt/\hbar)|\varphi\rangle$, where $|\varphi\rangle$ is the photon state at time $t = 0$ and time is expressed in unit s. The ratio $Et/\hbar$ is a phase.