Fundamental Physical Constants — Extensive Listing

Quantity	Symbol	Value	Unit	Relative std. uncert. u_r
		UNIVERSAL		
speed of light in vacuum	c, c_0	299 792 458	m s^{-1}	exact
magnetic constant	μ_0	$4\pi \times 10^{-7}$	N A^{-2}	
		$= 12.566\,370\,614... \times 10^{-7}$	N A^{-2}	exact
electric constant $1/\mu_0 c^2$	ϵ_0	$8.854\,187\,817... \times 10^{-12}$	F m^{-1}	exact
characteristic impedance of vacuum $\mu_0 c$	Z_0	376.730 313 461...	Ω	exact
Newtonian constant of gravitation	G	$6.674\,08(31) \times 10^{-11}$	m^3 kg^{-1} s^{-2}	4.7×10^{-5}
	$G/\hbar c$	$6.708\,61(31) \times 10^{-39}$	$(\text{GeV}/c^2)^{-2}$	4.7×10^{-5}
Planck constant	h	$6.626\,070\,040(81) \times 10^{-34}$	J s	1.2×10^{-8}
		$4.135\,667\,662(25) \times 10^{-15}$	eV s	6.1×10^{-9}
$h/2\pi$	$\hbar$	$1.054\,571\,800(13) \times 10^{-34}$	J s	1.2×10^{-8}
		$6.582\,119\,514(40) \times 10^{-16}$	eV s	6.1×10^{-9}
	$\hbar c$	197.326 9788(12)	MeV fm	6.1×10^{-9}
Planck mass $(\hbar c/G)^{1/2}$	m_P	$2.176\,470(51) \times 10^{-8}$	kg	2.3×10^{-5}
energy equivalent	$m_P c^2$	$1.220\,910(29) \times 10^{19}$	GeV	2.3×10^{-5}
Planck temperature $(\hbar c^5/G)^{1/2}/k$	T_P	$1.416\,808(33) \times 10^{32}$	K	2.3×10^{-5}
Planck length $\hbar/m_P c = (\hbar G/c^3)^{1/2}$	l_P	$1.616\,229(38) \times 10^{-35}$	m	2.3×10^{-5}
Planck time $l_P/c = (\hbar G/c^5)^{1/2}$	t_P	$5.391\,16(13) \times 10^{-44}$	s	2.3×10^{-5}
		ELECTROMAGNETIC		
elementary charge	e	$1.602\,176\,6208(98) \times 10^{-19}$	C	6.1×10^{-9}
	e/h	$2.417\,989\,262(15) \times 10^{14}$	A J^{-1}	6.1×10^{-9}
magnetic flux quantum $h/2e$	Φ_0	$2.067\,833\,831(13) \times 10^{-15}$	Wb	6.1×10^{-9}
conductance quantum $2e^2/h$	G_0	$7.748\,091\,7310(18) \times 10^{-5}$	S	2.3×10^{-10}
inverse of conductance quantum	G_0^{-1}	12 906.403 7278(29)	Ω	2.3×10^{-10}
Josephson constant[1] $2e/h$	K_J	$483\,597.8525(30) \times 10^{9}$	Hz V^{-1}	6.1×10^{-9}
von Klitzing constant[2] $h/e^2 = \mu_0 c/2\alpha$	R_K	25 812.807 4555(59)	Ω	2.3×10^{-10}
Bohr magneton $e\hbar/2m_e$	μ_B	$927.400\,9994(57) \times 10^{-26}$	J T^{-1}	6.2×10^{-9}
		$5.788\,381\,8012(26) \times 10^{-5}$	eV T^{-1}	4.5×10^{-10}
	μ_B/h	$13.996\,245\,042(86) \times 10^{9}$	Hz T^{-1}	6.2×10^{-9}
	μ_B/hc	46.686 448 14(29)	m^{-1} T^{-1}	6.2×10^{-9}
	μ_B/k	0.671 714 05(39)	K T^{-1}	5.7×10^{-7}
nuclear magneton $e\hbar/2m_p$	μ_N	$5.050\,783\,699(31) \times 10^{-27}$	J T^{-1}	6.2×10^{-9}
		$3.152\,451\,2550(15) \times 10^{-8}$	eV T^{-1}	4.6×10^{-10}
	μ_N/h	7.622 593 285(47)	MHz T^{-1}	6.2×10^{-9}
	μ_N/hc	$2.542\,623\,432(16) \times 10^{-2}$	m^{-1} T^{-1}	6.2×10^{-9}
	μ_N/k	$3.658\,2690(21) \times 10^{-4}$	K T^{-1}	5.7×10^{-7}
		ATOMIC AND NUCLEAR		
		General		
fine-structure constant $e^2/4\pi\epsilon_0\hbar c$	α	$7.297\,352\,5664(17) \times 10^{-3}$		2.3×10^{-10}
inverse fine-structure constant	α^{-1}	137.035 999 139(31)		2.3×10^{-10}
Rydberg constant $\alpha^2 m_e c/2h$	R_∞	10 973 731.568 508(65)	m^{-1}	5.9×10^{-12}
	$R_\infty c$	$3.289\,841\,960\,355(19) \times 10^{15}$	Hz	5.9×10^{-12}
	$R_\infty hc$	$2.179\,872\,325(27) \times 10^{-18}$	J	1.2×10^{-8}
		13.605 693 009(84)	eV	6.1×10^{-9}
Bohr radius $\alpha/4\pi R_\infty = 4\pi\epsilon_0\hbar^2/m_e e^2$	a_0	$0.529\,177\,210\,67(12) \times 10^{-10}$	m	2.3×10^{-10}
Hartree energy $e^2/4\pi\epsilon_0 a_0 = 2R_\infty hc = \alpha^2 m_e c^2$	E_h	$4.359\,744\,650(54) \times 10^{-18}$	J	1.2×10^{-8}
		27.211 386 02(17)	eV	6.1×10^{-9}
quantum of circulation	$h/2m_e$	$3.636\,947\,5486(17) \times 10^{-4}$	m^2 s^{-1}	4.5×10^{-10}

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Quantity	Symbol	Value	Unit	Relative std. uncert. u_r
	h/m_e	$7.273\,895\,0972(33) \times 10^{-4}$	$m^2\ s^{-1}$	4.5×10^{-10}
		Electroweak		
Fermi coupling constant[3]	$G_F/(\hbar c)^3$	$1.166\,3787(6) \times 10^{-5}$	GeV^{-2}	5.1×10^{-7}
weak mixing angle[4] θ_W (on-shell scheme)				
$\sin^2\theta_W = s_W^2 \equiv 1 - (m_W/m_Z)^2$	$\sin^2\theta_W$	$0.2223(21)$		9.5×10^{-3}
		Electron, e^-		
electron mass	m_e	$9.109\,383\,56(11) \times 10^{-31}$	kg	1.2×10^{-8}
		$5.485\,799\,090\,70(16) \times 10^{-4}$	u	2.9×10^{-11}
energy equivalent	$m_e c^2$	$8.187\,105\,65(10) \times 10^{-14}$	J	1.2×10^{-8}
		$0.510\,998\,9461(31)$	MeV	6.2×10^{-9}
electron-muon mass ratio	m_e/m_μ	$4.836\,331\,70(11) \times 10^{-3}$		2.2×10^{-8}
electron-tau mass ratio	m_e/m_τ	$2.875\,92(26) \times 10^{-4}$		9.0×10^{-5}
electron-proton mass ratio	m_e/m_p	$5.446\,170\,213\,52(52) \times 10^{-4}$		9.5×10^{-11}
electron-neutron mass ratio	m_e/m_n	$5.438\,673\,4428(27) \times 10^{-4}$		4.9×10^{-10}
electron-deuteron mass ratio	m_e/m_d	$2.724\,437\,107\,484(96) \times 10^{-4}$		3.5×10^{-11}
electron-triton mass ratio	m_e/m_t	$1.819\,200\,062\,203(84) \times 10^{-4}$		4.6×10^{-11}
electron-helion mass ratio	m_e/m_h	$1.819\,543\,074\,854(88) \times 10^{-4}$		4.9×10^{-11}
electron to alpha particle mass ratio	m_e/m_α	$1.370\,933\,554\,798(45) \times 10^{-4}$		3.3×10^{-11}
electron charge to mass quotient	$-e/m_e$	$-1.758\,820\,024(11) \times 10^{11}$	$C\ kg^{-1}$	6.2×10^{-9}
electron molar mass $N_A m_e$	$M(e), M_e$	$5.485\,799\,090\,70(16) \times 10^{-7}$	$kg\ mol^{-1}$	2.9×10^{-11}
Compton wavelength $h/m_e c$	λ_C	$2.426\,310\,2367(11) \times 10^{-12}$	m	4.5×10^{-10}
$\lambda_C/2\pi = \alpha a_0 = \alpha^2/4\pi R_\infty$	$\bar{\lambda}_C$	$386.159\,267\,64(18) \times 10^{-15}$	m	4.5×10^{-10}
classical electron radius $\alpha^2 a_0$	r_e	$2.817\,940\,3227(19) \times 10^{-15}$	m	6.8×10^{-10}
Thomson cross section $(8\pi/3)r_e^2$	σ_e	$0.665\,245\,871\,58(91) \times 10^{-28}$	m^2	1.4×10^{-9}
electron magnetic moment	μ_e	$-928.476\,4620(57) \times 10^{-26}$	$J\ T^{-1}$	6.2×10^{-9}
to Bohr magneton ratio	μ_e/μ_B	$-1.001\,159\,652\,180\,91(26)$		2.6×10^{-13}
to nuclear magneton ratio	μ_e/μ_N	$-1838.281\,972\,34(17)$		9.5×10^{-11}
electron magnetic moment				
anomaly $\lvert\mu_e\rvert/\mu_B - 1$	a_e	$1.159\,652\,180\,91(26) \times 10^{-3}$		2.3×10^{-10}
electron g-factor $-2(1 + a_e)$	g_e	$-2.002\,319\,304\,361\,82(52)$		2.6×10^{-13}
electron-muon magnetic moment ratio	μ_e/μ_μ	$206.766\,9880(46)$		2.2×10^{-8}
electron-proton magnetic moment ratio	μ_e/μ_p	$-658.210\,6866(20)$		3.0×10^{-9}
electron to shielded proton magnetic				
moment ratio (H_2O, sphere, 25 °C)	μ_e/μ'_p	$-658.227\,5971(72)$		1.1×10^{-8}
electron-neutron magnetic moment ratio	μ_e/μ_n	$960.920\,50(23)$		2.4×10^{-7}
electron-deuteron magnetic moment ratio	μ_e/μ_d	$-2143.923\,499(12)$		5.5×10^{-9}
electron to shielded helion magnetic				
moment ratio (gas, sphere, 25 °C)	μ_e/μ'_h	$864.058\,257(10)$		1.2×10^{-8}
electron gyromagnetic ratio $2\lvert\mu_e\rvert/\hbar$	γ_e	$1.760\,859\,644(11) \times 10^{11}$	$s^{-1}\ T^{-1}$	6.2×10^{-9}
	$\gamma_e/2\pi$	$28\,024.951\,64(17)$	$MHz\ T^{-1}$	6.2×10^{-9}
		Muon, μ^-		
muon mass	m_μ	$1.883\,531\,594(48) \times 10^{-28}$	kg	2.5×10^{-8}
		$0.113\,428\,9257(25)$	u	2.2×10^{-8}
energy equivalent	$m_\mu c^2$	$1.692\,833\,774(43) \times 10^{-11}$	J	2.5×10^{-8}
		$105.658\,3745(24)$	MeV	2.3×10^{-8}
muon-electron mass ratio	m_μ/m_e	$206.768\,2826(46)$		2.2×10^{-8}
muon-tau mass ratio	m_μ/m_τ	$5.946\,49(54) \times 10^{-2}$		9.0×10^{-5}
muon-proton mass ratio	m_μ/m_p	$0.112\,609\,5262(25)$		2.2×10^{-8}

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Quantity	Symbol	Value	Unit	Relative std. uncert. u_r
muon-neutron mass ratio	m_μ/m_n	$0.112\,454\,5167(25)$		2.2×10^{-8}
muon molar mass $N_A m_\mu$	$M(\mu), M_\mu$	$0.113\,428\,9257(25)\times10^{-3}$	kg mol^{-1}	2.2×10^{-8}
muon Compton wavelength $h/m_\mu c$	$\lambda_{C,\mu}$	$11.734\,441\,11(26)\times10^{-15}$	m	2.2×10^{-8}
$\lambda_{C,\mu}/2\pi$	$\bar{\lambda}_{C,\mu}$	$1.867\,594\,308(42)\times10^{-15}$	m	2.2×10^{-8}
muon magnetic moment	μ_μ	$-4.490\,448\,26(10)\times10^{-26}$	J T^{-1}	2.3×10^{-8}
to Bohr magneton ratio	μ_μ/μ_B	$-4.841\,970\,48(11)\times10^{-3}$		2.2×10^{-8}
to nuclear magneton ratio	μ_μ/μ_N	$-8.890\,597\,05(20)$		2.2×10^{-8}
muon magnetic moment anomaly				
$\lvert\mu_\mu\rvert/(e\hbar/2m_\mu)-1$	a_μ	$1.165\,920\,89(63)\times10^{-3}$		5.4×10^{-7}
muon g-factor $-2(1+a_\mu)$	g_μ	$-2.002\,331\,8418(13)$		6.3×10^{-10}
muon-proton magnetic moment ratio	μ_μ/μ_p	$-3.183\,345\,142(71)$		2.2×10^{-8}
		Tau, τ^-		
tau mass[5]	m_τ	$3.167\,47(29)\times10^{-27}$	kg	9.0×10^{-5}
		$1.907\,49(17)$	u	9.0×10^{-5}
energy equivalent	$m_\tau c^2$	$2.846\,78(26)\times10^{-10}$	J	9.0×10^{-5}
		$1776.82(16)$	MeV	9.0×10^{-5}
tau-electron mass ratio	m_τ/m_e	$3477.15(31)$		9.0×10^{-5}
tau-muon mass ratio	m_τ/m_μ	$16.8167(15)$		9.0×10^{-5}
tau-proton mass ratio	m_τ/m_p	$1.893\,72(17)$		9.0×10^{-5}
tau-neutron mass ratio	m_τ/m_n	$1.891\,11(17)$		9.0×10^{-5}
tau molar mass $N_A m_\tau$	$M(\tau), M_\tau$	$1.907\,49(17)\times10^{-3}$	kg mol^{-1}	9.0×10^{-5}
tau Compton wavelength $h/m_\tau c$	$\lambda_{C,\tau}$	$0.697\,787(63)\times10^{-15}$	m	9.0×10^{-5}
$\lambda_{C,\tau}/2\pi$	$\bar{\lambda}_{C,\tau}$	$0.111\,056(10)\times10^{-15}$	m	9.0×10^{-5}
		Proton, p		
proton mass	m_p	$1.672\,621\,898(21)\times10^{-27}$	kg	1.2×10^{-8}
		$1.007\,276\,466\,879(91)$	u	9.0×10^{-11}
energy equivalent	$m_p c^2$	$1.503\,277\,593(18)\times10^{-10}$	J	1.2×10^{-8}
		$938.272\,0813(58)$	MeV	6.2×10^{-9}
proton-electron mass ratio	m_p/m_e	$1836.152\,673\,89(17)$		9.5×10^{-11}
proton-muon mass ratio	m_p/m_μ	$8.880\,243\,38(20)$		2.2×10^{-8}
proton-tau mass ratio	m_p/m_τ	$0.528\,063(48)$		9.0×10^{-5}
proton-neutron mass ratio	m_p/m_n	$0.998\,623\,478\,44(51)$		5.1×10^{-10}
proton charge to mass quotient	e/m_p	$9.578\,833\,226(59)\times10^{7}$	C kg^{-1}	6.2×10^{-9}
proton molar mass $N_A m_p$	$M(p), M_p$	$1.007\,276\,466\,879(91)\times10^{-3}$	kg mol^{-1}	9.0×10^{-11}
proton Compton wavelength $h/m_p c$	$\lambda_{C,p}$	$1.321\,409\,853\,96(61)\times10^{-15}$	m	4.6×10^{-10}
$\lambda_{C,p}/2\pi$	$\bar{\lambda}_{C,p}$	$0.210\,308\,910\,109(97)\times10^{-15}$	m	4.6×10^{-10}
proton rms charge radius	r_p	$0.8751(61)\times10^{-15}$	m	7.0×10^{-3}
proton magnetic moment	μ_p	$1.410\,606\,7873(97)\times10^{-26}$	J T^{-1}	6.9×10^{-9}
to Bohr magneton ratio	μ_p/μ_B	$1.521\,032\,2053(46)\times10^{-3}$		3.0×10^{-9}
to nuclear magneton ratio	μ_p/μ_N	$2.792\,847\,3508(85)$		3.0×10^{-9}
proton g-factor $2\mu_p/\mu_N$	g_p	$5.585\,694\,702(17)$		3.0×10^{-9}
proton-neutron magnetic moment ratio	μ_p/μ_n	$-1.459\,898\,05(34)$		2.4×10^{-7}
shielded proton magnetic moment (H_2O, sphere, 25 °C)	μ'_p	$1.410\,570\,547(18)\times10^{-26}$	J T^{-1}	1.3×10^{-8}
to Bohr magneton ratio	μ'_p/μ_B	$1.520\,993\,128(17)\times10^{-3}$		1.1×10^{-8}
to nuclear magneton ratio	μ'_p/μ_N	$2.792\,775\,600(30)$		1.1×10^{-8}
proton magnetic shielding correction				
$1-\mu'_p/\mu_p$ (H_2O, sphere, 25 °C)	σ'_p	$25.691(11)\times10^{-6}$		4.4×10^{-4}

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Quantity	Symbol	Value	Unit	Relative std. uncert. u_r
proton gyromagnetic ratio $2\mu_p/\hbar$	γ_p	$2.675\,221\,900(18) \times 10^{8}$	$s^{-1}\,T^{-1}$	6.9×10^{-9}
	$\gamma_p/2\pi$	$42.577\,478\,92(29)$	MHz T^{-1}	6.9×10^{-9}
shielded proton gyromagnetic ratio $2\mu'_p/\hbar$ (H_2O, sphere, 25 °C)	γ'_p	$2.675\,153\,171(33) \times 10^{8}$	$s^{-1}\,T^{-1}$	1.3×10^{-8}
	$\gamma'_p/2\pi$	$42.576\,385\,07(53)$	MHz T^{-1}	1.3×10^{-8}
		Neutron, n		
neutron mass	m_n	$1.674\,927\,471(21) \times 10^{-27}$	kg	1.2×10^{-8}
		$1.008\,664\,915\,88(49)$	u	4.9×10^{-10}
energy equivalent	$m_n c^2$	$1.505\,349\,739(19) \times 10^{-10}$	J	1.2×10^{-8}
		$939.565\,4133(58)$	MeV	6.2×10^{-9}
neutron-electron mass ratio	m_n/m_e	$1838.683\,661\,58(90)$		4.9×10^{-10}
neutron-muon mass ratio	m_n/m_μ	$8.892\,484\,08(20)$		2.2×10^{-8}
neutron-tau mass ratio	m_n/m_τ	$0.528\,790(48)$		9.0×10^{-5}
neutron-proton mass ratio	m_n/m_p	$1.001\,378\,418\,98(51)$		5.1×10^{-10}
neutron-proton mass difference	$m_n - m_p$	$2.305\,573\,77(85) \times 10^{-30}$	kg	3.7×10^{-7}
		$0.001\,388\,449\,00(51)$	u	3.7×10^{-7}
energy equivalent	$(m_n - m_p)c^2$	$2.072\,146\,37(76) \times 10^{-13}$	J	3.7×10^{-7}
		$1.293\,332\,05(48)$	MeV	3.7×10^{-7}
neutron molar mass $N_A m_n$	$M(\mathrm{n}), M_n$	$1.008\,664\,915\,88(49) \times 10^{-3}$	kg mol^{-1}	4.9×10^{-10}
neutron Compton wavelength $h/m_n c$	$\lambda_{C,n}$	$1.319\,590\,904\,81(88) \times 10^{-15}$	m	6.7×10^{-10}
$\lambda_{C,n}/2\pi$	$\bar{\lambda}_{C,n}$	$0.210\,019\,415\,36(14) \times 10^{-15}$	m	6.7×10^{-10}
neutron magnetic moment	μ_n	$-0.966\,236\,50(23) \times 10^{-26}$	J T^{-1}	2.4×10^{-7}
to Bohr magneton ratio	μ_n/μ_B	$-1.041\,875\,63(25) \times 10^{-3}$		2.4×10^{-7}
to nuclear magneton ratio	μ_n/μ_N	$-1.913\,042\,73(45)$		2.4×10^{-7}
neutron g-factor $2\mu_n/\mu_N$	g_n	$-3.826\,085\,45(90)$		2.4×10^{-7}
neutron-electron magnetic moment ratio	μ_n/μ_e	$1.040\,668\,82(25) \times 10^{-3}$		2.4×10^{-7}
neutron-proton magnetic moment ratio	μ_n/μ_p	$-0.684\,979\,34(16)$		2.4×10^{-7}
neutron to shielded proton magnetic moment ratio (H_2O, sphere, 25 °C)	μ_n/μ'_p	$-0.684\,996\,94(16)$		2.4×10^{-7}
neutron gyromagnetic ratio $2\|\mu_n\|/\hbar$	γ_n	$1.832\,471\,72(43) \times 10^{8}$	$s^{-1}\,T^{-1}$	2.4×10^{-7}
	$\gamma_n/2\pi$	$29.164\,6933(69)$	MHz T^{-1}	2.4×10^{-7}
		Deuteron, d		
deuteron mass	m_d	$3.343\,583\,719(41) \times 10^{-27}$	kg	1.2×10^{-8}
		$2.013\,553\,212\,745(40)$	u	2.0×10^{-11}
energy equivalent	$m_d c^2$	$3.005\,063\,183(37) \times 10^{-10}$	J	1.2×10^{-8}
		$1875.612\,928(12)$	MeV	6.2×10^{-9}
deuteron-electron mass ratio	m_d/m_e	$3670.482\,967\,85(13)$		3.5×10^{-11}
deuteron-proton mass ratio	m_d/m_p	$1.999\,007\,500\,87(19)$		9.3×10^{-11}
deuteron molar mass $N_A m_d$	$M(\mathrm{d}), M_d$	$2.013\,553\,212\,745(40) \times 10^{-3}$	kg mol^{-1}	2.0×10^{-11}
deuteron rms charge radius	r_d	$2.1413(25) \times 10^{-15}$	m	1.2×10^{-3}
deuteron magnetic moment	μ_d	$0.433\,073\,5040(36) \times 10^{-26}$	J T^{-1}	8.3×10^{-9}
to Bohr magneton ratio	μ_d/μ_B	$0.466\,975\,4554(26) \times 10^{-3}$		5.5×10^{-9}
to nuclear magneton ratio	μ_d/μ_N	$0.857\,438\,2311(48)$		5.5×10^{-9}
deuteron g-factor μ_d/μ_N	g_d	$0.857\,438\,2311(48)$		5.5×10^{-9}
deuteron-electron magnetic moment ratio	μ_d/μ_e	$-4.664\,345\,535(26) \times 10^{-4}$		5.5×10^{-9}
deuteron-proton magnetic moment ratio	μ_d/μ_p	$0.307\,012\,2077(15)$		5.0×10^{-9}
deuteron-neutron magnetic moment ratio	μ_d/μ_n	$-0.448\,206\,52(11)$		2.4×10^{-7}
		Triton, t		

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Quantity	Symbol	Value	Unit	Relative std. uncert. u_r
triton mass	m_t	$5.007\,356\,665(62) \times 10^{-27}$	kg	1.2×10^{-8}
		$3.015\,500\,716\,32(11)$	u	3.6×10^{-11}
energy equivalent	$m_t c^2$	$4.500\,387\,735(55) \times 10^{-10}$	J	1.2×10^{-8}
		$2808.921\,112(17)$	MeV	6.2×10^{-9}
triton-electron mass ratio	m_t/m_e	$5496.921\,535\,88(26)$		4.6×10^{-11}
triton-proton mass ratio	m_t/m_p	$2.993\,717\,033\,48(22)$		7.5×10^{-11}
triton molar mass $N_A m_t$	$M(t), M_t$	$3.015\,500\,716\,32(11) \times 10^{-3}$	kg mol^{-1}	3.6×10^{-11}
triton magnetic moment	μ_t	$1.504\,609\,503(12) \times 10^{-26}$	J T^{-1}	7.8×10^{-9}
to Bohr magneton ratio	μ_t/μ_B	$1.622\,393\,6616(76) \times 10^{-3}$		4.7×10^{-9}
to nuclear magneton ratio	μ_t/μ_N	$2.978\,962\,460(14)$		4.7×10^{-9}
triton g-factor $2\mu_t/\mu_N$	g_t	$5.957\,924\,920(28)$		4.7×10^{-9}
		Helion, h		
helion mass	m_h	$5.006\,412\,700(62) \times 10^{-27}$	kg	1.2×10^{-8}
		$3.014\,932\,246\,73(12)$	u	3.9×10^{-11}
energy equivalent	$m_h c^2$	$4.499\,539\,341(55) \times 10^{-10}$	J	1.2×10^{-8}
		$2808.391\,586(17)$	MeV	6.2×10^{-9}
helion-electron mass ratio	m_h/m_e	$5495.885\,279\,22(27)$		4.9×10^{-11}
helion-proton mass ratio	m_h/m_p	$2.993\,152\,670\,46(29)$		9.6×10^{-11}
helion molar mass $N_A m_h$	$M(h), M_h$	$3.014\,932\,246\,73(12) \times 10^{-3}$	kg mol^{-1}	3.9×10^{-11}
helion magnetic moment	μ_h	$-1.074\,617\,522(14) \times 10^{-26}$	J T^{-1}	1.3×10^{-8}
to Bohr magneton ratio	μ_h/μ_B	$-1.158\,740\,958(14) \times 10^{-3}$		1.2×10^{-8}
to nuclear magneton ratio	μ_h/μ_N	$-2.127\,625\,308(25)$		1.2×10^{-8}
helion g-factor $2\mu_h/\mu_N$	g_h	$-4.255\,250\,616(50)$		1.2×10^{-8}
shielded helion magnetic moment (gas, sphere, 25 °C)	μ'_h	$-1.074\,553\,080(14) \times 10^{-26}$	J T^{-1}	1.3×10^{-8}
to Bohr magneton ratio	μ'_h/μ_B	$-1.158\,671\,471(14) \times 10^{-3}$		1.2×10^{-8}
to nuclear magneton ratio	μ'_h/μ_N	$-2.127\,497\,720(25)$		1.2×10^{-8}
shielded helion to proton magnetic moment ratio (gas, sphere, 25 °C)	μ'_h/μ_p	$-0.761\,766\,5603(92)$		1.2×10^{-8}
shielded helion to shielded proton magnetic moment ratio (gas/H_2O, spheres, 25 °C)	μ'_h/μ'_p	$-0.761\,786\,1313(33)$		4.3×10^{-9}
shielded helion gyromagnetic ratio $2\lvert\mu'_h\rvert/\hbar$ (gas, sphere, 25 °C)	γ'_h	$2.037\,894\,585(27) \times 10^{8}$	s^{-1} T^{-1}	1.3×10^{-8}
	$\gamma'_h/2\pi$	$32.434\,099\,66(43)$	MHz T^{-1}	1.3×10^{-8}
		Alpha particle, α		
alpha particle mass	m_α	$6.644\,657\,230(82) \times 10^{-27}$	kg	1.2×10^{-8}
		$4.001\,506\,179\,127(63)$	u	1.6×10^{-11}
energy equivalent	$m_\alpha c^2$	$5.971\,920\,097(73) \times 10^{-10}$	J	1.2×10^{-8}
		$3727.379\,378(23)$	MeV	6.2×10^{-9}
alpha particle to electron mass ratio	m_α/m_e	$7294.299\,541\,36(24)$		3.3×10^{-11}
alpha particle to proton mass ratio	m_α/m_p	$3.972\,599\,689\,07(36)$		9.2×10^{-11}
alpha particle molar mass $N_A m_\alpha$	$M(\alpha), M_\alpha$	$4.001\,506\,179\,127(63) \times 10^{-3}$	kg mol^{-1}	1.6×10^{-11}
		PHYSICOCHEMICAL		
Avogadro constant	N_A, L	$6.022\,140\,857(74) \times 10^{23}$	mol^{-1}	1.2×10^{-8}
atomic mass constant $m_u = \frac{1}{12}m(^{12}C) = 1$ u	m_u	$1.660\,539\,040(20) \times 10^{-27}$	kg	1.2×10^{-8}
energy equivalent	$m_u c^2$	$1.492\,418\,062(18) \times 10^{-10}$	J	1.2×10^{-8}
		$931.494\,0954(57)$	MeV	6.2×10^{-9}

Fundamental Physical Constants — Extensive Listing

Quantity	Symbol	Value	Unit	Relative std. uncert. u_{r}
Faraday constant[6] $N_{\mathrm{A}}e$	F	$96\,485.332\,89(59)$	C mol^{-1}	6.2×10^{-9}
molar Planck constant	$N_{\mathrm{A}}h$	$3.990\,312\,7110(18) \times 10^{-10}$	J s mol^{-1}	4.5×10^{-10}
	$N_{\mathrm{A}}hc$	$0.119\,626\,565\,582(54)$	J m mol^{-1}	4.5×10^{-10}
molar gas constant	R	$8.314\,4598(48)$	J mol^{-1} K^{-1}	5.7×10^{-7}
Boltzmann constant R/N_{A}	k	$1.380\,648\,52(79) \times 10^{-23}$	J K^{-1}	5.7×10^{-7}
		$8.617\,3303(50) \times 10^{-5}$	eV K^{-1}	5.7×10^{-7}
	k/h	$2.083\,6612(12) \times 10^{10}$	Hz K^{-1}	5.7×10^{-7}
	k/hc	$69.503\,457(40)$	m^{-1} K^{-1}	5.7×10^{-7}
molar volume of ideal gas RT/p				
$T = 273.15$ K, $p = 100$ kPa	V_{m}	$22.710\,947(13) \times 10^{-3}$	m^3 mol^{-1}	5.7×10^{-7}
Loschmidt constant $N_{\mathrm{A}}/V_{\mathrm{m}}$	n_0	$2.651\,6467(15) \times 10^{25}$	m^{-3}	5.7×10^{-7}
molar volume of ideal gas RT/p				
$T = 273.15$ K, $p = 101.325$ kPa	V_{m}	$22.413\,962(13) \times 10^{-3}$	m^3 mol^{-1}	5.7×10^{-7}
Loschmidt constant $N_{\mathrm{A}}/V_{\mathrm{m}}$	n_0	$2.686\,7811(15) \times 10^{25}$	m^{-3}	5.7×10^{-7}
Sackur-Tetrode (absolute entropy) constant[7]				
$\frac{5}{2} + \ln[(2\pi m_{\mathrm{u}} k T_1/h^2)^{3/2} k T_1/p_0]$				
$T_1 = 1$ K, $p_0 = 100$ kPa	S_0/R	$-1.151\,7084(14)$		1.2×10^{-6}
$T_1 = 1$ K, $p_0 = 101.325$ kPa		$-1.164\,8714(14)$		1.2×10^{-6}
Stefan-Boltzmann constant				
$(\pi^2/60)k^4/\hbar^3 c^2$	σ	$5.670\,367(13) \times 10^{-8}$	W m^{-2} K^{-4}	2.3×10^{-6}
first radiation constant $2\pi hc^2$	c_1	$3.741\,771\,790(46) \times 10^{-16}$	W m^2	1.2×10^{-8}
first radiation constant for spectral radiance $2hc^2$	$c_{1\mathrm{L}}$	$1.191\,042\,953(15) \times 10^{-16}$	W m^2 sr^{-1}	1.2×10^{-8}
second radiation constant hc/k	c_2	$1.438\,777\,36(83) \times 10^{-2}$	m K	5.7×10^{-7}
Wien displacement law constants				
$b = \lambda_{\max} T = c_2/4.965\,114\,231...$	b	$2.897\,7729(17) \times 10^{-3}$	m K	5.7×10^{-7}
$b' = \nu_{\max}/T = 2.821\,439\,372...\,c/c_2$	b'	$5.878\,9238(34) \times 10^{10}$	Hz K^{-1}	5.7×10^{-7}

[1] See the "Adopted values" table for the conventional value adopted internationally for realizing representations of the volt using the Josephson effect.

[2] See the "Adopted values" table for the conventional value adopted internationally for realizing representations of the ohm using the quantum Hall effect.

[3] Value recommended by the Particle Data Group (Olive *et al.*, 2014).

[4] Based on the ratio of the masses of the W and Z bosons $m_{\mathrm{W}}/m_{\mathrm{Z}}$ recommended by the Particle Data Group (Olive *et al.*, 2014). The value for $\sin^2\theta_{\mathrm{W}}$ they recommend, which is based on a particular variant of the modified minimal subtraction ($\overline{\mathrm{MS}}$) scheme, is $\sin^2\hat{\theta}_{\mathrm{W}}(M_{\mathrm{Z}}) = 0.231\,26(5)$.

[5] This and all other values involving m_τ are based on the value of $m_\tau c^2$ in MeV recommended by the Particle Data Group (Olive *et al.*, 2014).

[6] The numerical value of F to be used in coulometric chemical measurements is $96\,485.3251(12)$ $[1.2 \times 10^{-8}]$ when the relevant current is measured in terms of representations of the volt and ohm based on the Josephson and quantum Hall effects and the internationally adopted conventional values of the Josephson and von Klitzing constants $K_{\mathrm{J}-90}$ and $R_{\mathrm{K}-90}$ given in the "Adopted values" table.

[7] The entropy of an ideal monoatomic gas of relative atomic mass A_{r} is given by $S = S_0 + \frac{3}{2}R\ln A_{\mathrm{r}} - R\ln(p/p_0) + \frac{5}{2}R\ln(T/\mathrm{K})$.