

A Table showing Key Physical Constants							Issue 5.0										
Key Constants		Definitions	Equation	value	units	dimensions	cgs - esu	value	units	dimensions	cgs - emu	value	units	dimensions			
speed of light	c		defined	2.9979E+08	metres/sec	LT ⁻¹	c _{SI} × 10 ²	2.9979E+10	cm/sec	LT ⁻¹	c _{SI} × 10 ²	2.9979E+10	cm/sec	LT ⁻¹	l		
permeability free space	μ ₀	flux density / field strength	4π × 10 ⁻⁷	1.2566E-06	henry/metre	MLI ⁻² T ⁻²	l × c _{cgs} ⁻²	1.1127E-21	stathenry/cm	T ² L ⁻²	l	1.0000E+00	dimensionless	M ⁰ L ⁰ T ⁰	c _{cgs} ⁻²		
Plank's constant	h	a unit of "action"	measured	6.6261E-34	joule-sec	ML ² T ⁻¹	h _{SI} × 10 ⁷	6.6261E-27	erg-sec	ML ² T ⁻¹	h _{SI} × 10 ⁷	6.6261E-27	erg-sec	ML ² T ⁻¹	l		
haitch bar	ħ		h/2π	1.0546E-34	joule-sec	ML ² T ⁻¹	h _{cgs} /2π	1.0546E-27	erg-sec	ML ² T ⁻¹	h _{cgs} /2π	1.0546E-27	erg-sec	ML ² T ⁻¹	l		
gravitational constant	G	From f _g = Gm ₁ m ₂ /r ²	measured	6.6743E-11	N-m ² /kg ²	L ³ M ⁻¹ T ⁻²	G _{SI} × 10 ³	6.6743E-08	dyne-cm ² /g ²	L ³ M ⁻¹ T ⁻²	G _{SI} × 10 ³	6.6743E-08	dyne-cm ² /g ²	L ³ M ⁻¹ T ⁻²	l		
Avogadro's Constant	N _A	exact value if kg redefined	defined ?	6.0221E+23	mol ⁻¹	M ⁰ L ⁰ T ⁰	N _A	6.0221E+23	mol ⁻¹	M ⁰ L ⁰ T ⁰		6.0221E+23	mol ⁻¹	M ⁰ L ⁰ T ⁰	l		
Ryberg constant (measured)	R _c /c _l	photon wavenumber	measured	1.0974E+07	metres ⁻¹	L ⁻¹	2π ² (m _e e ⁴ /ch ³)	1.0974E+05	cm ⁻¹	L ⁻¹	c _{SI} × 10 ⁻²	1.0974E+05	cm ⁻¹	L ⁻¹	l		
Faraday's constant	F	charge on one mol.	measured	9.6485E+04	coulombs	IT	e _{SI} × 10 ⁻¹ c _{cgs}	2.8926E+14	statcoulombs	M ^{1/2} L ^{1/2} T ⁻¹		9.6485E+03	abcoulomb	M ^{1/2} L ^{1/2}	c _{cgs}		
proton rest mass	m _p		measured	1.6726E-27	kilogram	M	m _{p SI} × 10 ³	1.6726E-24	grams	M	m _{p SI} × 10 ³	1.6726E-24	grams	M	l		
neutron rest mass	m _n		measured	1.6749E-27	kilogram	M	m _{n SI} × 10 ³	1.6749E-24	grams	M	m _{n SI} × 10 ³	1.6749E-24	grams	M	l		
Hubble's constant	H ₀		measured	7.0800E+01	km/sec/megaparsec												
Derived Constants																	
permittivity free space	ε ₀	charge density / field strength	l + μ ₀ c ²	8.8542E-12	farad/metre	I ² T ⁴ M ⁻¹ L ⁻³	l	1.0000E+00	dimensionless	M ⁰ L ⁰ T ⁰	l × c _{cgs} ⁻²	1.1127E-21	abfarad/cm	T ² L ⁻²	c _{cgs} ⁻²		
charge of electron	e	fundamental but derived	F/N _A	1.6022E-19	coulomb	IT	e _{SI} × 10 ⁻¹ c _{cgs}	4.8032E-10	statcoulombs	M ^{1/2} L ^{1/2} T ⁻¹	e _{SI} × 10 ⁻¹	1.6022E-20	abcoulomb	M ^{1/2} L ^{1/2}	c _{cgs}		
Coulomb's constant	k _e	From f _e = k _e Q ₁ Q ₂ /r ²	1/4πε ₀	8.9876E+09	newton-metre ² /coulomb ²	ML ³ I ² T ⁻⁴	l	1.0000E+00	dimensionless	M ⁰ L ⁰ T ⁰	c _{cgs} ⁻²	8.9876E+20	cm/abfarad	L ² T ⁻²	c _{cgs} ⁻²		
Ampere's constant	k _m	From f _m = k _m I ₁ I ₂ /L/r	μ ₀ /2π	2.0000E-07	newton/ampere ²	MLI ⁻² T ⁻²	2 × c _{cgs} ⁻²	2.2253E-21	dynes/statampere ²	T ² L ⁻²	2	2.0000E+00	dimensionless	M ⁰ L ⁰ T ⁰	c _{cgs} ⁻²		
electron rest mass	m _e	need to resolve	2Rh/cα ²	9.1094E-31	kilogram	M	m _{e SI} × 10 ³	9.1094E-28	grams	M	m _{e SI} × 10 ³	9.1094E-28	grams	M	l		
reduced (intracule) mass	m _r		m _p m _e /(m _p +m _e)	9.1044E-31	kilogram	M											
Ryberg constant	R		m _e e ⁴ /(ch ³ 8ε ₀ ²)	1.0974E+07	metres ⁻¹	L ⁻¹	2π ² (m _e e ⁴ /ch ³)	1.0974E+05	cm ⁻¹								
Ryberg constant	R		α ² /2λ _{ce}	1.0974E+07	metres ⁻¹	L ⁻¹	α ² /2λ _{ce}	1.0974E+05	cm ⁻¹								
Josephson constant	K _J		2e/h	4.8360E+14	hertz/volt	IT ² M ⁻¹ L ⁻²											
von Klitzing constant	R _K		h/e ²	2.5813E+04	ohms	ML ² I ⁻² T ⁻³											
Quantum Charge Ratio	h _e			4.1357E-15	joule-sec/coulomb	ML ² I ⁻¹ T ⁻¹		1.3795E-17									
electron rest energy	m _e c ²			8.1871E-14	joules	ML ² T ⁻²		8.1871E-07	ergs								
electron ^{charge} / _{mass}	e/m _e			1.7588E+11	coulomb/kg	ITM ⁻¹		5.2728E+17				1.7588E+07					
proton rest energy	m _p c ²			1.5033E-10	joules	ML ² T ⁻²											
proton ^{charge} / _{mass}	e/m _p			9.5788E+07	coulomb/kg	ITM ⁻¹											
neutron rest energy	m _n c ²			1.5053E-10	joules	ML ² T ⁻²											
Bohr radius	a ₀		4πε ₀ ħ ² /m _e e ²	5.2918E-11	metres	L	ħ ² /m _e e ²	5.2918E-09	cm	L	ħ ² /m _e e ² c ²	5.2918E-09	cm	L			
Bohr radius	a ₀		α /4πR	5.2918E-11	metres	L	α /4πR	5.2918E-09	cm	L	α /4πR	#REF!	cm	L			
Compton wavelength electron	λ _{ce}		h/m _e c	2.4263E-12	metres	L		2.4263E-10	cm								
Compton wavelength proton	λ _{cp}		h/m _p c	1.3214E-15	metres	L											
Compton (classical) radius	r _e		e ² /4πε ₀ m _e c ²	2.8179E-15	metres	L	e ² /m _e c ²	2.8179E-13	cm	L	e ² /m _e	2.8179E-13	cm	L			
Compton (classical) radius	r _e		α ² a ₀	2.8179E-15	metres	L	α ² a ₀	2.8179E-13	cm	L	α ² a ₀	#REF!	cm	L			
Plank charge	q _p		√(4πε ₀ hc)	1.8755E-18	coulombs												
Fine Structure Constant	α ⁻¹		4πε ₀ hc/e ²	1.3704E+02	dimensionless	M ⁰ L ⁰ T ⁰	hc/e ²	1.3704E+02									
	α ⁻¹		(hc/e ²)/k _e	1.3704E+02	dimensionless	M ⁰ L ⁰ T ⁰	the same because k _e = l										
	alternatively α ⁻¹	2π.Bohr radius/Compton wavelength		1.3704E+02	dimensionless	M ⁰ L ⁰ T ⁰		1.3704E+02	dimensionless	-	hc/e ²	#REF!	dimensionless				
	alternatively α ⁻¹	Compton wavelength/classical radius.2π		1.3704E+02	dimensionless	M ⁰ L ⁰ T ⁰		1.3704E+02	dimensionless	-	hc/e ²	#REF!	dimensionless				
	α			7.2974E-03	dimensionless	M ⁰ L ⁰ T ⁰		7.2974E-03	dimensionless			#REF!	dimensionless				
Gravitational coupling constant	α _G		(m _e /m _{pk})2	1.7518E-45													
electrostatic/ _{gravitational} force				2.2687E+46	dimensionless	M ⁰ L ⁰ T ⁰	e ² /Gm _p m _e	2.2687E+39	dimensionless								
electron-volt				1.7827E-36	kilograms												
Planck length	L _{pk}	√(Għ/c ³)		1.6163E-35	metres			1.6163E-33	cm	L		1.6163E-33	cm	L			
Plank time	t _{pk}	√(Għ/c ⁵)		5.3912E-44	seconds			5.3912E-44	sec	T		5.3912E-44	sec	T			
Plank mass	m _{pk}	√(ch/G)		2.1764E-08	kilograms			2.1764E-05	grams	M		2.1764E-05	grams	M			
Plank Mass in electron volts				1.2209E+19	giga electron-volts												
One astronomical unit	au			1.49598E+11	metres			1.49598E+13	cm	L		1.49598E+13	cm	L			
parsec		360 x 60 x 60 x au /2π		3.08568E+16	metres			3.08568E+18	cm	L		3.08568E+18	cm	L			
megaparsec				3.08568E+22	metres			3.08568E+24	cm	L		3.08568E+24	cm	L			