

CONSTANTS OF NATURE

Constant	Symbol	Elementary form	Alternate form	MKS value	EM value
Fundamental					
Planck length	l_p	l_p		1.616 255 x 10 ⁻³⁵ <i>m</i>	
Planck mass	m_p	m_p		2.176 434 x 10 ⁻⁸ <i>kg</i>	
Planck time	t_p	t_p		5.391 247 x 10 ⁻⁴⁴ <i>s</i>	
Planck charge	q_p	t_p		5.391 247 x 10 ⁻⁴⁴ <i>s</i>	1.875 546 x 10 ⁻¹⁸ <i>C</i>
Composite					
Planck momentum	p_p	$\frac{l_p m_p}{t_p}$	$m_p c$	6.524 786 <i>kgms⁻¹</i>	
Planck energy	E_p	$\frac{l_p^2 m_p}{t_p^2}$	$m_p c^2$	1,956,081,000 <i>kgm²s⁻²</i>	
Planck's constant	\hbar	$\frac{l_p^2 m_p}{t_p}$	$l_p p_p, E_p t_p$	1.054 571... x 10 ⁻³⁴ <i>kgm²s⁻¹</i>	
Gravitational constant	G	$\frac{l_p^3}{m_p t_p^2}$	$\frac{l_p}{m_p} c^2$	6.674 30 x 10 ⁻¹¹ <i>m³kg⁻¹s⁻²</i>	
Speed of Light	c	$\frac{l_p}{t_p}$	c	299,792,458 <i>ms⁻¹</i>	
Elementary charge	e	$t_p \sqrt{\alpha}$		4.605 448 x 10 ⁻⁴⁵ <i>s</i>	1.602 177 x 10 ⁻¹⁹ <i>C</i>
Electric constant	ϵ_0	$\frac{t_p^4}{4\pi l_p^3 m_p}$	$\frac{1}{4\pi F_p c^2}$	7.315 968 x 10 ⁻⁶³ <i>s⁴kg⁻¹m⁻³</i>	8.854 188 x 10 ⁻¹² <i>Fm⁻¹</i>
Magnetic constant	μ_0	$4\pi \frac{l_p m_p}{t_p^2}$	$4\pi F_p$	1.520 851 x 10 ⁴⁵ <i>kgms⁻²</i>	1.256 637 x 10 ⁻⁶ <i>NA⁻²</i>
Vacuum Impedance	Z_0	$4\pi \frac{l_p^2 m_p}{t_p^3}$	$4\pi \frac{E_p}{t_p}$	4.559 397 x 10 ⁵³ <i>kgm²s⁻³</i>	376. 730 314 Ω
Voltage potential	V_p	$\frac{l_p^2 m_p}{t_p^3}$	$\frac{E_p}{t_p}$	3.628 253 x 10 ⁵² <i>kgm²s⁻³</i>	1.042 940 x 10 ²⁷ <i>V</i>
Current potential	I_p	$\frac{t_p}{t_p}$		1	3.478 873 x 10 ²⁵ <i>A</i>
Inductance potential	L_p	$\frac{l_p^2 m_p}{t_p^2}$	E_p	1,956,081,000 <i>kgm²s⁻²</i>	1.616 255 x 10 ⁻⁴² <i>H</i>
Mag inductance potential	B_p	$\frac{m_p}{t_p^2}$	$\frac{p_p}{l_p t_p}$	7.488 021 x 10 ⁷⁸ <i>kgs⁻²</i>	2.152 428 x 10 ⁵³ <i>T</i>
Conductance potential	G_p	$\frac{t_p^3}{l_p^2 m_p}$	$\frac{t_p}{E_p}$	2.756 147 x 10 ⁻⁵³ <i>s³kg⁻¹m⁻²</i>	3.335 641 x 10 ⁻² <i>S</i>
Impedance potential	Z_p	$\frac{l_p^2 m_p}{t_p^3}$	$\frac{E_p}{t_p}$	3.628 253 x 10 ⁵² <i>kgm²s⁻³</i>	29.979 25 Ω
Capacitance potential	C_p	$\frac{t_p^4}{l_p^2 m_p}$	$\frac{t_p^2}{E_p}$	1.485 907 x 10 ⁻⁹⁶ <i>s⁴kg⁻¹m⁻²</i>	1.798 326 x 10 ⁻⁴⁵ <i>F</i>