

Planck units

Planck units have profound significance for theoretical physics since they elegantly simplify several recurring algebraic expressions of physical law by nondimensionalization

The universal constants that Planck units, by definition, normalize to 1 are:

gravitational constant, G ,

reduced Planck constant, \hbar ,

speed of light in a vacuum, c ,

Coulomb constant, $(4\pi\epsilon_0)^{-1}$ (sometimes k_e or k), and

Boltzmann constant, k_B (sometimes k).

c electromagnetism and special relativity, G general relativity and Newtonian gravity, \hbar

quantum mechanics, ϵ_0 electrostatics, k_B statistical mechanics and thermodynamics

communication with extraterrestrial
intelligence would have to employ such a
system of units in order to be understood

"God's units"



Max Karl Ernst Ludwig Planck (ur. 23 kwietnia 1858 w Kilonii, zm. 4 października 1947 w Getyndze, Nobel z fizyki, 918) – niemiecki fizyk, autor prac z zakresu termodynamiki, promieniowania cieplnego, energii, dyspersji, optyki, teorii względności, a przede wszystkim teorii kwantów

Quantity	Expression	Metric value	Name
Length (L)	$l_P = \sqrt{\frac{\hbar G}{c^3}}$	$1.616 \times 10^{-35} \text{ m}$	Planck length
Mass (M)	$m_P = \sqrt{\frac{\hbar c}{G}}$	$2.176 \times 10^{-8} \text{ kg}$	Planck mass
Time (T)	$t_P = \sqrt{\frac{\hbar G}{c^5}}$	$5.3912 \times 10^{-44} \text{ s}$	Planck time
Temperature (Θ)	$T_P = \sqrt{\frac{\hbar c^5}{G k_B^2}}$	$1.417 \times 10^{32} \text{ K}$	Planck temperature
Electric charge (Q)	$q_P = \sqrt{\frac{\hbar c}{k_e}}$	$1.876 \times 10^{-18} \text{ C}$	Planck charge