

31.5: Some Useful Constants for Astronomy (Appendix E)

Table 31.5.1: Physical Constants

Name	Value
speed of light (c)	2.9979×10^8 m/s
gravitational constant (G)	6.674×10^{-11} m ³ /(kg s ²)
Planck's constant (h)	6.626×10^{-34} J-s
mass of a hydrogen atom (M_H)	1.673×10^{-27} kg
mass of an electron (M_e)	9.109×10^{-31} kg
Rydberg constant (R_∞)	1.0974×10^7 m ⁻¹
Stefan-Boltzmann constant (σ)	5.670×10^{-8} J/(s·m ² deg ⁴) ¹
Wien's law constant ($\lambda_{\max}T$)	2.898×10^{-3} m K
electron volt (energy) (eV)	1.602×10^{-19} J
energy equivalent of 1 ton TNT	4.2×10^9 J

Table 31.5.2: Astronomical Constants

Name	Value
astronomical unit (AU)	1.496×10^{11} m
Light-year (ly)	9.461×10^{15} m
parsec (pc)	3.086×10^{16} m = 3.262 light-years
sidereal year (y)	3.156×10^7 s
mass of Earth (M_{Earth})	5.974×10^{24} kg
equatorial radius of Earth (R_{Earth})	6.378×10^6 m
obliquity of ecliptic	23° 26'
surface gravity of Earth (g)	9.807 m/s ²
escape velocity of Earth (v_{Earth})	1.119×10^4 m/s
mass of Sun (M_{Sun})	1.989×10^{30} kg
equatorial radius of Sun (R_{Sun})	6.960×10^8 m
luminosity of Sun (L_{Sun})	3.85×10^{26} W
solar constant (flux of energy received at Earth) (S)	1.368×10^3 W/m ²
Hubble constant (H_0)	approximately 20 km/s per million light-years, or approximately 70 km/s per megaparsec

Footnotes

¹deg stands for degrees Celsius or kelvins

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