

Constants and astronomical quantities:

Speed of light	$c = 3 \times 10^{10} \text{ cm s}^{-1}$
Planck's constant	$h = 6.626 \times 10^{-27} \text{ erg s}$
Gravitational constant	$G = 6.67 \times 10^{-8} \text{ cm}^3 \text{ g}^{-1} \text{ s}^{-2}$
Stefan-Boltzmann's constant	$\sigma = 5.67 \times 10^{-5} \text{ g s}^{-3} \text{ K}^{-4}$
Boltzmann's constant	$k = 1.38 \times 10^{-16} \text{ erg K}^{-1}$
Mass of the Sun	$M_{\odot} = 1.99 \times 10^{33} \text{ g}$
Surface temperature of the Sun	$T_{\odot} = 5800 \text{ K}$
Mass of a hydrogen atom	$M_H = 1.67 \times 10^{-24} \text{ g}$
Mass of an electron	$m_e = 9.11 \times 10^{-28} \text{ g}$
Astronomical unit	$1 \text{ AU} = 1.496 \times 10^{13} \text{ cm}$
Parsec	$1 \text{ pc} = 3.26 \text{ ly} = 3.086 \times 10^{18} \text{ cm} = 206,265 \text{ AU}$
1 Jy	$10^{-23} \text{ erg s}^{-1} \text{ cm}^{-2} \text{ Hz}^{-1}$
Conversion Kelvin (K) to Celsius (C)	$T[\text{K}] = T[\text{C}] + 273$
Conversion Celsius (C) to Fahrenheit (F)	$T[\text{F}] = \frac{9}{5}T[\text{C}] + 32$
1 radian	$206,265 \text{ arcseconds}$

Useful equations:

$$\lambda_{max} = \frac{0.29cmK}{T} \text{ Wien's Law and } F = \sigma T^4 \text{ Stefan - Boltzmann Law}$$

$$B_{\nu} = \frac{2h\nu^3}{c^2} \frac{1}{e^{h\nu/kT} - 1} \text{ Planck Function}$$

$$T_b = \frac{\lambda^2 S_{\nu}}{2k\Omega} \text{ Brightness Temperature}$$

$$K.E. = 3/2kT \text{ (per particle) and } V = \sqrt{(3kT/m)} \text{ (average velocity of particle)}$$

$$\theta = 1.02\lambda/D \text{ (in radians) resolution for diameter or baseline length, } D$$

$$V = \frac{\lambda_{obs} - \lambda_0}{\lambda_0} c \text{ doppler velocity}$$

$$\nu_G = \frac{eB}{2\pi m} = 2.8 \frac{B}{\text{Gauss}} \text{ MHz gyro frequency}$$

$$\nu_c = 1.5\gamma^2 \nu_G \text{ synchrotron characteristic frequency}$$

$$\text{Synchrotron Lifetime} = \frac{16.4yr}{B^2\gamma} \text{ where } B \text{ is in Gauss}$$

$$T_b(s) = T_{back}(s_0)e^{-\tau_{\nu}(s)} + T_{emit}(1 - e^{-\tau_{\nu}(s)}) \text{ radiative transfer}$$

$$\tau(\nu) = 8.235 \times 10^{-2} \nu^{-2.1} T_e^{-1.35} EM \text{ free-free optical depth}$$

$$EM = \int n_e^2 ds \text{ emission measure}$$

$$RM = 812 \int B n_e ds \text{ rad m}^{-2} \text{ rotation measure}$$