APPENDIX A

Physical Constants

Speed of light	$c = 2.99 \times 10^{8}\,\mathrm{m\,s^{-1}}$
Gravitational constant	$G = 6.67 \times 10^{-11}\,\mathrm{m^{3}\,kg^{-1}\,s^{-2}}$
Planck's constant	$\hbar = 1.05 \times 10^{-34}\,\mathrm{J\,s}$
Boltzmann's constant	$k_B = 1.38 \times 10^{-23}\,\mathrm{J\,K^{-1}}$
Radiation constant	$\alpha = \pi^2 k_B^4/15\hbar^3 c^3 = 7.565 \times 10^{-16}\,\mathrm{J\,m^{-3}\,K^{-4}}$
Proton mass	$m_p = 1.6726 \times 10^{-27}\,\mathrm{kg}$
Neutron mass	$m_n = 1.6749 \times 10^{-27}\,\mathrm{kg}$
Electron mass	$m_e = 9.11 \times 10^{-31}\,\mathrm{kg}$
Proton mass–energy	$m_p c^2 = 938.3\,\mathrm{MeV}$
Neutron mass–energy	$m_n c^2 = 939.6\,\mathrm{MeV}$
Electron mass–energy	$m_e c^2 = 0.511\,\mathrm{MeV}$
Free neutron half–life	$t_{1/2} = 940\,\mathrm{s}$
Thomson cross–section	$\sigma_e = 6.652 \times 10^{-29}\,\mathrm{m^2}$

Conversion Factors

Parsec	$1\,\mathrm{pc} = 3.09 \times 10^{16}\,\mathrm{m}$
Year	$1\,\mathrm{yr} = 3.156 \times 10^{7}\,\mathrm{s}$
Electron volt	$1\,\mathrm{eV} = 1.602 \times 10^{-19}\,\mathrm{J}$
Joule	$1\,\mathrm{J} = 1\,\mathrm{kg\,m^2\,s^{-2}}$
Solar mass	$1\,\mathrm{M_\odot} = 1.989 \times 10^{30}\,\mathrm{kg}$
keV as a temperature unit	$1\,\mathrm{keV} = 1.1605 \times 10^{7}\,\mathrm{K}$