

Study Guide for Midterm Exam. Astronomy & Astrophysics I

Angular Resolution of the Eye and Telescopes

- Dependence on Diffraction theory

- Astronomical "Seeing"

- S/N in astronomical detectors

Blackbody Radiation from Stars

- Wien's Law

- Stefan-Boltzmann Law

- Color Temperature, Flux and Luminosity

Parallax and Distance

Magnitude and Absolute Magnitude

Spectral Type

- Stellar surface Temperature

- Absorption Lines (conditions of formation)

Line Profiles

- Natural, Pressure, Thermal, Rotational

Binary Stars

- Spectroscopic binaries

- Masses from RV curves

- Sizes from Eclipse duration

Hertzsprung-Russell Diagram

- Be able to plot it, with order of magnitude labels

- Know all the major features

- Explain the slope of the main sequence

Estimate the pressure at the center of the Sun

Apply the Virial Theorem to estimate the temperature deep in the Sun

Know the Proton-Proton Chain

Formulae:

Hydrostatic Equilibrium $\frac{dP_r}{dr} = -\frac{GM_r\rho_r}{r^2}$

Mass Distribution $\frac{dM_r}{dr} = 4\pi r^2 \rho_r$

Magnitudes $m_1 - m_2 = -2.5 \log_{10} \frac{f_1}{f_2}$

$$m - M = 5 \log_{10} D_{pc} - 5$$

Kepler's Law $(M_A + M_B) \sin^3 i = \frac{P(v_A^{obs} + v_B^{obs})^3}{2\pi G}$

$$(M_A + M_B) \sin^3 i = \frac{4\pi^2}{GP^2} (a_A \sin i + a_B \sin i)^3$$