

Revision Sheet

- What are apparent and absolute magnitude? What are luminosity and brightness?
- $m - M = 5 \log d - 5$.
- HR diagram - spectral types, main sequence, dwarfs, giants, supergiants.
- Stellar Evolution tracks - be able to write down the evolution of a low and high mass star, including things like the helium flash, planetary nebula, double shell burning, reason for leaving the main sequence, red giant stage.
- Differences in upper and lower main sequence stars including differences in nuclear burning.
- Why high mass stars on the main sequence spend less time on the main sequence.
- Star formation: Jeans mass and Jeans density. Maximum temperature attained by a contracting body of mass M : why does this explain the lower limit in mass to the main sequence?
- Free-fall time
- Adiabaticity.
- Hydrostatic equilibrium - be able to derive this.
- The Virial theorem: $2E_{KE} + E_{GR} = 0$ and its implications. This is for a non-relativistic gas.
- Virial theorem for a relativistic gas.
- Pressure in an ideal gas, pressure in a degenerate relativistic and non-relativistic gas. What is the "quantum concentration"?
- Degeneracy.
- For a photon gas what is the pressure called - what is this derived from?
- How do radiation and gas pressure compare as a function of mass?
- Equations of hydrostatic equilibrium, mass continuity, energy generation radiative energy transport, equation of state, opacity to calculate models of stellar structure.
- What is the Saha ionization equation? Why can it be used to explain the spectral sequence which is basically a temperature sequence?

- What is heat transport by radiation, by convection? The condition for the onset of convection. If Convection occurs how should the luminosity at a radius r be treated?
- Why does the ideal gas equation and Virial theorem explain the stability of main sequence stars?
- Why do upper main sequence stars start burning He less explosively than lower main sequence stars. Why is the "Helium flash" a runaway process? Why do electrons become degenerate first?