

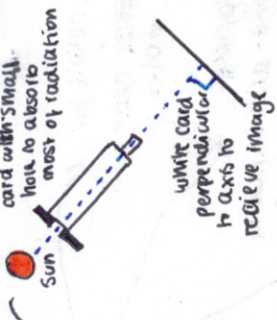
Sunspots - cooler areas of photosphere corresponding to strong localized magnetic fields that inhibit upward motion of convective solar material and prevent it from reaching the photosphere

the rotational period of the sun is longer closer to the poles

rotational period $\frac{T}{\Delta t} = \frac{360^\circ}{\Delta \lambda}$ - difference in longitude
Time interval

the sun can be imaged at different wavelengths:

- e.g. UV, - where gases are very hot (light give view of atmosphere)
- Visible range - see sunspots clearly
- H-alpha - fine structures of convection currents and ejections of hot gas sunspots too

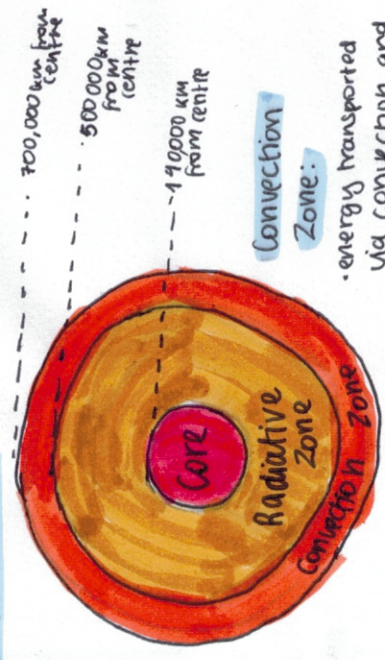


Telescopic Projection:

1. To avoid damaging the telescope optics, place piece of card with hole up to 2cm diameter in front of objective
2. A larger card shades the image better, giving a better contrast
3. Set telescope to point to sun and project image onto a piece of card placed at right angle to axis of telescope
4. Obtain very clean bright images

Solar Astronomy

Sun's Interior:



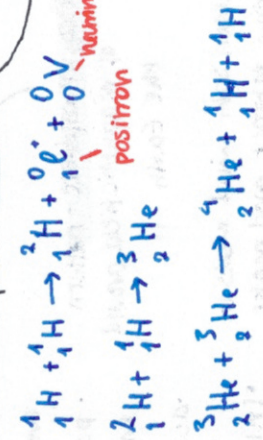
The Core:

- 15 million K
- gaseous but very dense
- thermonuclear reactions

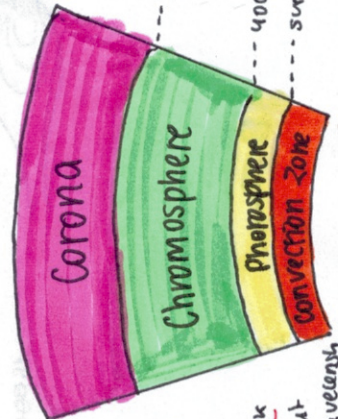
The Radiative Zone:

- energy transported out by radiation
- energy emitted by core is X-rays and gamma but it gets absorbed and re-emitted multiple times
- takes about 170,000 years for the energy to be transported through it
- most energy re-emitted in visible region of sun
- outer edge: 1.5 million K
- density decreases

The Proton-proton chain:



Sun's Atmosphere:



Corona:

- very hot ionized gas
- up to 2 million K
- not enough to also emit X-rays
- visible during eclipse
- it can be imaged in other parts of spectrum

Chromosphere:

- low density
- 6000K - 20,000K
- hydrogen emit light of its wavelength
- red and typically only visible at solar eclipses

Prominence - very hot ionized gas trapped by magnetic fields, loops

Solar Mass ejection - prominence that has broken away

Spicule - jets of gas emanating from photosphere to chromosphere

Photosphere:

- outer shell of sun
- visible outline of sun
- radiation emitted into space here in form of visible light, IR, UV and X-rays
- temp: 4000-6000K
- has sunspots

Convection Zone:

- energy transported via convection and much faster
- there are convection currents
- region of hotter gas expands as it rises and travels outwards
- the density is very low
- about 5800K