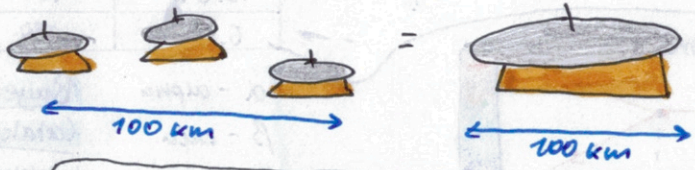
Exploring Starlight

the earth's atmosphere blocks almost all of radiation in EM spectrum apart from visible light and radio waves: the optical and radio windows
some IR can be detected at high altitudes
↳ only optical and radio and ~~visible~~ optical telescopes should be located at sea level

Aperture Synthesis:

- multiple radio telescopes at different sites linked electronically to study same radio wave source
- converts array of telescope into one large telescope with aperture equivalent to largest distance between individual telescopes



Large aperture to achieve the best possible resolution of astronomical sources of radio waves

Most radio telescopes have a large concave dish that reflects radio waves to a focus
an aerial ~~coaxial~~ converts radio waves into electrical signals
the longer the wavelength the worse the resolution

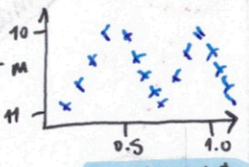
space telescopes are the best but are very expensive to construct, launch and maintain

optical telescopes are sited on mountains due to high altitude, less light pollution and air is dry and steady so no turbulent atmosphere

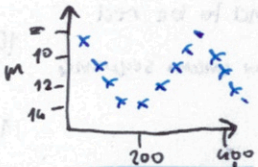
waveband	key discoveries
radio	quasars, structure and rotation of our galaxy, pulsars, protoplanetary discs, jets from black holes, SETI
IR	protostars, interstellar dust and molecular clouds, 'hotspots' on moons
UV	corona and chromosphere structures of young stars
X-ray	active galaxies, accretion discs surrounding black holes, supernova remnants
gamma rays	gamma ray bursts in distant galaxies

Variable Stars - some change brightness due to physical quantity e.g. size (physically pulsate) while others vary due to the changes in amount of light reaching us

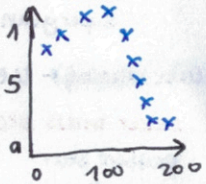
Light Curve - graph of apparent magnitude against time



short-period

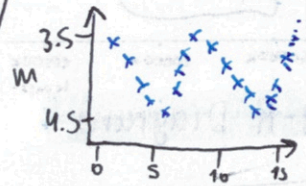


long period



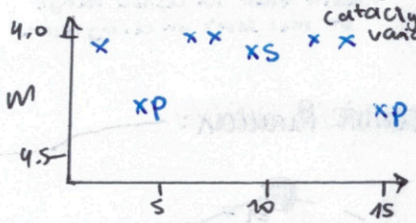
Supernovae

↓
cataclysmic variable



Cepheid Variable - class of giant yellow stars that expand and contract regularly

↓
determining period of cepheid variable, astronomers can deduce its absolute magnitude and use distance-modulus equation to calculate distance



eclipsing binary

P - secondary moves in front of primary

S - primary moves in front of secondary

star groups e.g. binary stars and clusters are gravitationally bound to each other

star trail photographs can be used to determine the length of a sidereal day

most modern astronomical observations are recorded using digital sensors that convert light into electrical signals, which can then be processed and stored as data files