Properties of Stars

Elementary Astronomy
Lecture 3

Location

- Already did part of this!
- Right Ascension, Declination are two of the dimensions...
- What's the third?

Distance!

- This is one of the hardest things to find in astronomy. No, really. It is.
- Celestial objects have different brightnesses, INTRINSICALLY
- Sometimes they are faint because they are faint. Sometimes they are faint because they are far away.

4 Main Distance Methods

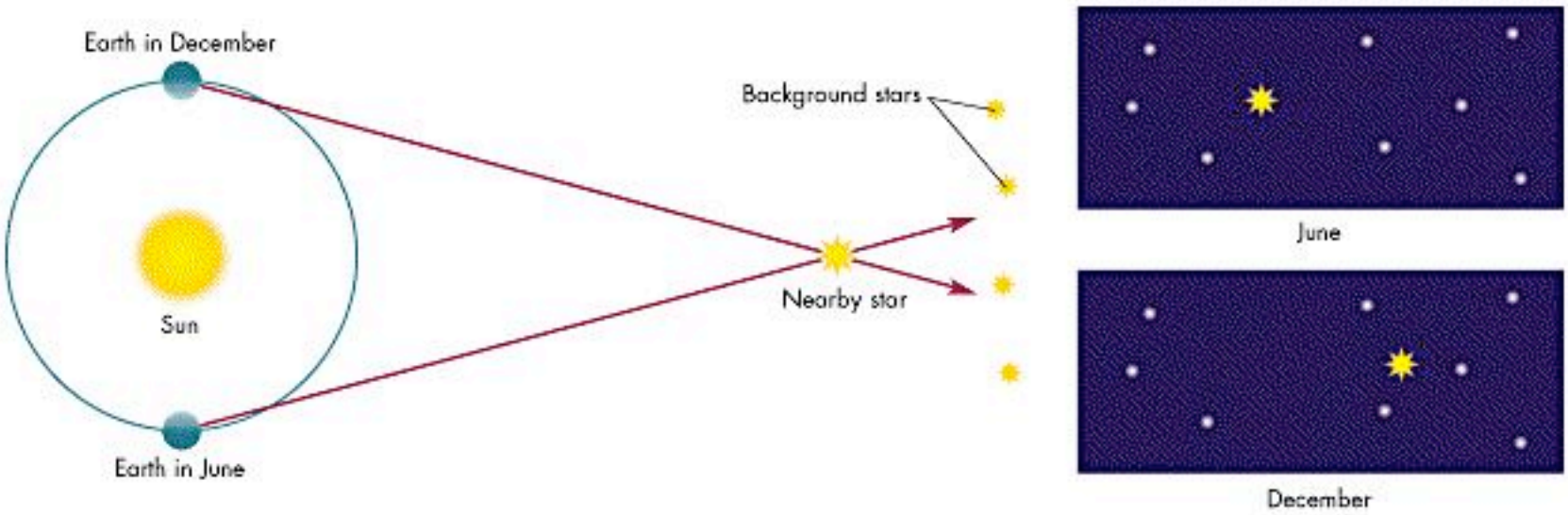
- Radar
- Parallax
- Standard Candles
- Hubble Law

Radar

Radar, II

- good for solar system distances
- several tens of light minutes
- out to Saturn, more or less

Parallax


Earth in December
Background stars
Sun
Nearby star
Earth in June
June
December

Parallax, II

- D(parsecs)=1/p(“)
  - where 1 parsec=3.26 light years
  - p is in arcseconds (1/3600 degree)
  - good to almost one million parsecs (Mpc)

Standard Candle

- Size: assume all objects of a particular type (spiral galaxies, say, or elliptical galaxies) are the same size
- Brightness: assume all objects of a particular type (Cepheid variable stars, say, or Lyra-type variables) are the same brightness
- Good to a few million parsecs (Mpc)

Hubble Law

- (More detailed discussion in ~week 13)
- Universe is expanding
- More distant objects move away faster
- By measuring how fast they go, we can find out how far away they are!
- Good for most distant objects---up to billions of parsecs!

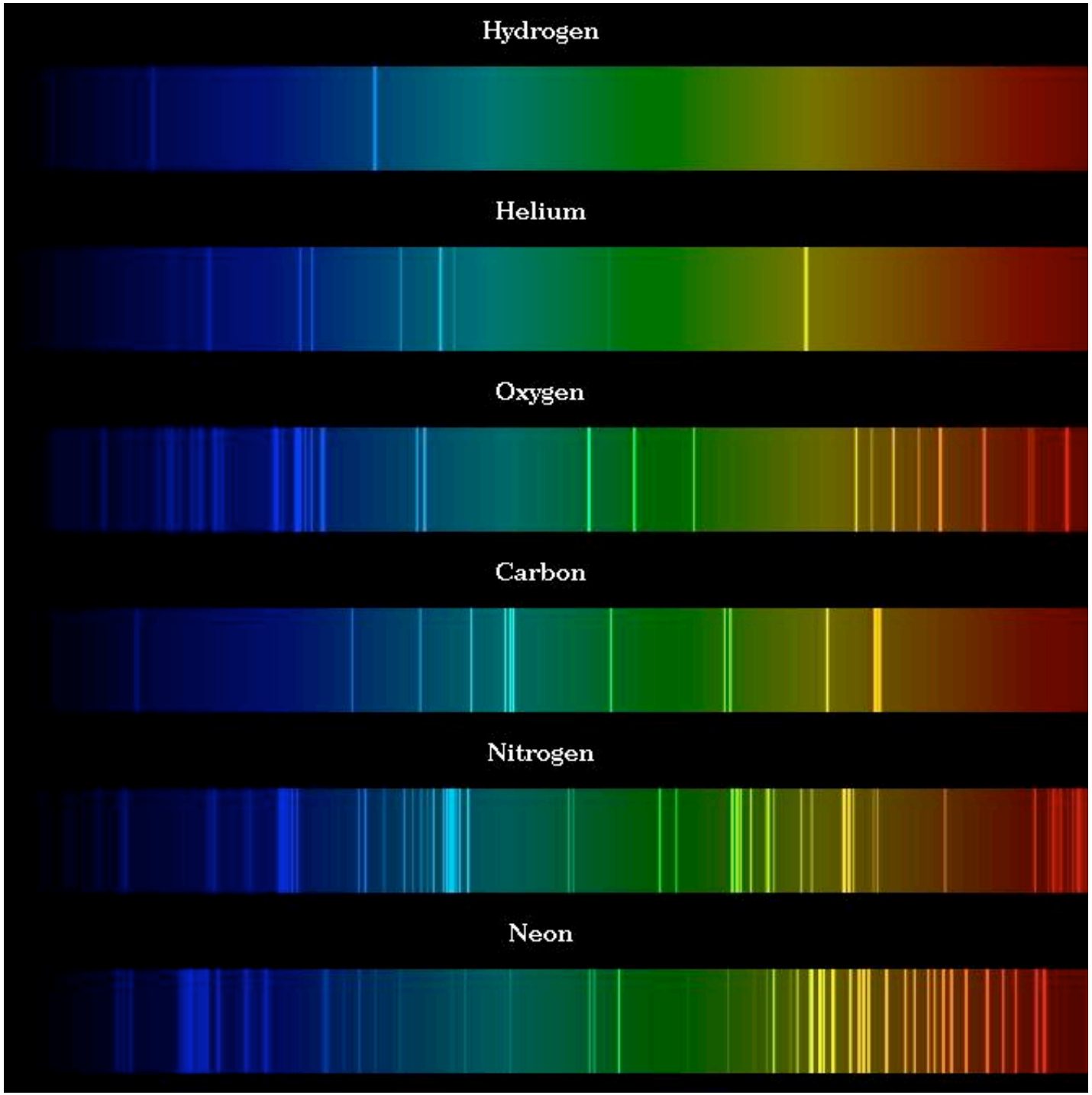
To sum up: 4 Main Distance Methods

- Radar
- Parallax
- Standard Candles
- Hubble Law

Composition

- How do we know that most of the Universe is made of Hydrogen?!

Spectral Lines (in the lab)



Absorption Lines (in stars)