Telescopes 2

10/19/2009
Opening Discussion

- Have you seen anything astronomy related in the news?
- What did we talk about last class?
- Doppler demo.
- Grades from rooms?
Impact of the Atmosphere

- Light pollution
  - Human made light scatters around the atmosphere just like sunlight.

- Turbulence
  - Air bends light. This makes stars twinkle.
  - Adaptive optics techniques can minimize this.

- Non-transmission
  - Some wavelengths just don't get through.
Adaptive Optics

**CFHT Adaptive Optics Bonnette & Monica**

Double star, separation=0.276"
Seeing=0.7" @ 0.5mic

Magnitude=10.7
Strehl Ratio=30%

H band, Integration=40 sec
Maximum likelihood

Uncorrected

Closed Loop

Closed Loop + Deconvolution

March 29th 1996
Telescopes in Space

• To get past the problems of the atmosphere we occasionally put telescopes into space.
Telescopes for Non-Visible Light

• Visible light isn't the only wavelength of light that we use in astronomy.
• We build telescopes to observe other parts of the spectrum as well.
• With the exception of radio and some near-IR, these have to go into space.
Infrared Telescopes

- Can be built just like visible light telescopes.
- Near-IR can be done on mountain top telescopes.
- SOFIA is an IR telescope on a plane.
- Spitzer did far-IR. Needed to be chilled.
UV Telescopes

• Most of this can be done with optical type instrumentation, but none can be done from ground.

• Several space UV telescopes have been launched.
  • FUSE – does UV spectrometry
  • GALEX – is doing a UV survey of the whole sky
  • Hubble
X-ray Telescopes

- Because these go through most materials, they are very hard to focus.
- Use grazing incidence mirrors to focus them.
- Require telescope to be in space.
Gamma-Ray Telescopes

- Virtually impossible to focus because they penetrate materials.
- Telescopes just try to pinpoint where they come from.
- Swift telescope also has x-ray and visible instruments for gamma ray bursts.
Interferometry

- Interferometry is a technique to combine signals from multiple telescopes to boost angular resolution.
Minute Essay

- Do you have any questions?
- Second midterm next class.
- Review session in Halsell (hopefully HAS 228) beginning at 3:30pm.
- Public talk tomorrow night at 7:30pm here for EC.