ASTR 535 Lecture Notes

Jon Holtzman

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course website: http://astronomy.nmsu.edu/holtz/a535

Properties of light, magnitudes, errors, and error analysis

Light

Wavelength regimes:

- gamma rays

- x-rays

- ultraviolent (UV)

  - near: 900–3500 Å
  - far: 100–900 Å

  The 900 Å break is because of the Lyman limit at 912 Å. This is where neutral hydrogen is ionized, so the universe is largely opaque to wavelengths shorter than this.

- visual (V): 4000–7000 Å (note that 'V' is different from 'optical', which is slightly broader: 3500–10000 Å. The 3500 Å cutoff is due to the Earth's atmosphere being opaque to wavelengths shorter than this).

- IR

  - near: 1–5 μ (1–10 μ in online notes)
  - mid: (10–100 μ)
  - far: 5–100 μ (100–1000 μ)

- sub-mm 500–1000 μ

- microwave

- radio

Quantities of light:

- Intensity (I) [erg s^{-1} Ω^{-1} ν^{-1}]

- Surface Brightness (SB)

- Flux (F)

- Luminosity (L)

Magnitudes and photometric systems

Observed fluxes and the count equation

Errors in photon rates

Noise equation: how do we predict expected errors?

Error propagation

Determining sample parameters: averaging measurements

Random errors vs systematic errors