

The Doppler Effect

Physics

Why an approaching source sounds higher, and the astronomical version.

Observed frequency shifts according to the relative motion between source and observer.

$$\Delta\lambda/\lambda \approx v/c \cdot \text{valid for } v \ll c$$

Source approaching

Higher frequency, blueshift

Source receding

Lower frequency, redshift

Galaxies

Evidence for expansion.

Almost all redshifted

THE COMMON MISTAKE

✗ **Thinking the source's frequency changes**

✓ **Only the observed frequency changes**

The source emits at a constant frequency. Its motion changes how the wavefronts arrive at the observer.

Cosmological redshift is not strictly Doppler: space itself expands, stretching the wavelength in transit.