**Viewing the Sky**

**Meridian:** Line running North-South. Sun and stars reach their highest point on the meridian each day.

**Zenith:** Point directly overhead.
The Celestial Sphere

- North Celestial Pole
- North Pole
- Equator
- Celestial Equator
- South Celestial Pole
- South Pole

Polaris, the North Star
Measuring Angles

• Apparent distances in the sky are determined by measuring the angle between two objects.
• There are 360 degrees in a circle.
• Each degree split into 60 arcminutes
Finding latitude from the stars

• The angle between the North Star (Polaris) and the northern horizon is the same as the angle between the Earth’s equator and a person’s location on Earth (latitude).
The Ecliptic (Path of the Sun)

**Autumnal Equinox:**
Sun crosses Celestial Equator. (September 21)

**Winter Solstice:**
Sun at lowest point in sky for N. Hemisphere. (December 21)

**Summer Solstice:**
Sun reaches highest point in sky for N. Hemisphere. (June 21)

**Vernal Equinox:**
Sun crosses Celestial Equator. (March 21)
Coordinate Systems

- **Declination**: Degree north (+) or south (-) of the Celestial Equator.
• **Right Ascension**: Position east or west of the position of the Sun at the Vernal Equinox (like longitude).
  
  – Sky split into 24 hours such that 1 hour = 15°

The sky appears to rotate through one hour of RA every hour of time.
Precession

• Discovered by Hipparchus (~150 BC)
• Position of North Celestial Pole changes on Celestial Sphere over time.

• Earth’s spin axis points to different locations over time.
Precession

- **Wobble** due to tug of Moon and Sun on the Earth

http://earthobservatory.nasa.gov/Features/Milankovitch/
Precession

• One full precession period = 26,000 years.
  – Thuban = 3000 BC
  – Polaris = Present
  – Vega = 14,000 AD