Introductory Astronomy

Week 1 – Positional Astronomy

Clip 3 – The Local View

Local Coordinates

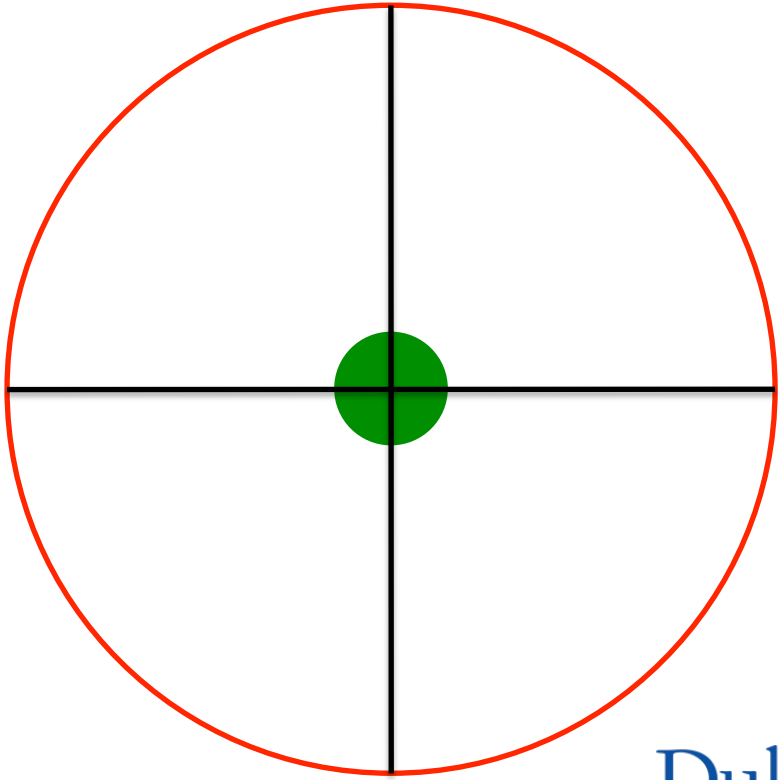
- To find a star, need to know what direction to look. Use
  - Altitude: angle above horizon
  - Zenith Angle: angle from Zenith 90°-Altitude
  - Azimuth: angle from North
- Glossary:
  - Zenith: directly overhead
  - Horizon:
  - Local Meridian

Local View

- To an observer on Earth sky appears to rotate about celestial pole
- Pole appears North (South) at an altitude equal to Latitude

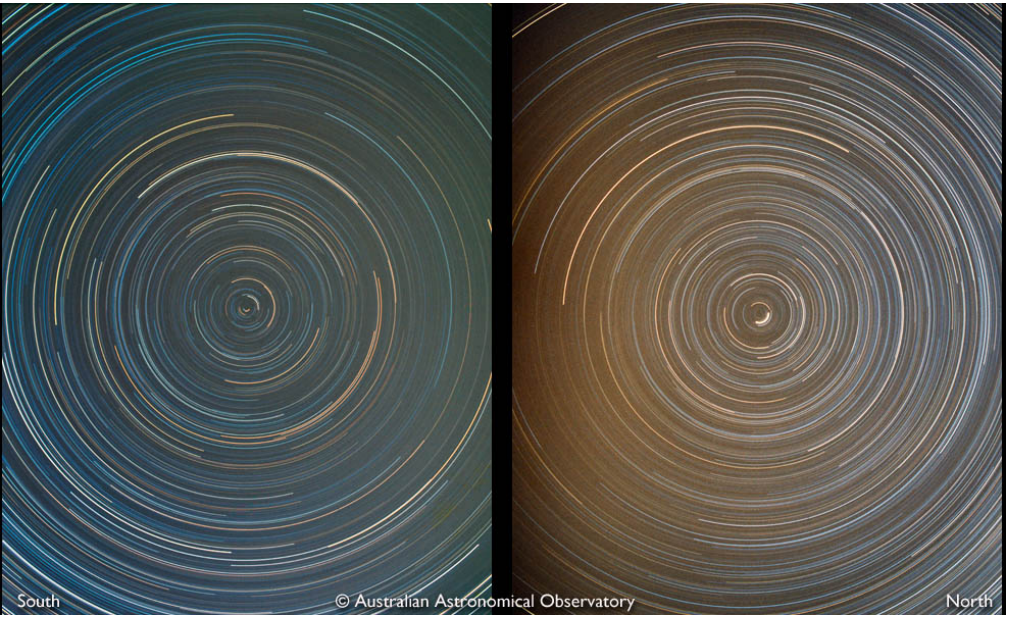
  Azimuth = 0° (180°)

  Altitude = Latitude
- Can use stars to navigate!



What We Can See

- As sky rotates about celestial pole stars near North (South) pole never set (circumpolar)
- Stars near South (North) celestial pole never visible
- Stars near celestial equator rise, move West across sky, and set


South
© Australian Astronomical Observatory
North


© Australian Astronomical Observatory

Sidereal Time

- Zenith at Decl = Latitude
  RA = Sidereal Time
- Sidereal Time is celestial meridian coinciding with local meridian
- Changes with time: 24 sidereal hours = One full rotation of Earth
- Can use stars to measure time! In one (sidereal) hour Celestial sphere shifts by one hour of RA
- Changes with longitude at 1h/15°

Summary: Finding A Star

- Star is highest at meridian crossing when sidereal time is its RA
- At this time Zenith angle is |Decl-Latitude|

  Altitude is 90° - Zenith angle

  Azimuth is 0° if Decl > Latitude

  180° if Decl < Latitude
- To find star earlier/later, rotate East/West by 15°/h
- Need to know how to tell sidereal time

Credits

- Sky Simulation: Starry Night http://www.starrynight.com/
- Astronomy Animations: University of Nebraska-Lincoln Astronomy Education Group http://astro.unl.edu/
- Star Trail Photos: Australian Astronomical Observatory http://www.aao.gov.au/images/