Lecture 3
Reminders

1. Quiz 1 Due Today at 11:59PM.
Scientific Notation for Small Numbers
Count from the position just to the left of the decimal place always being 0.

\[ 0.00012 = 1.2 \times 10^{-4} \]

\[ 320 = 3.2 \times 10^2 \]

See the textbook for units and conversions

AU: Astronomical Unit—Mean distance between the earth and sun
Units of Measurement I

- speeds measured in km/s:
  \[ 1 \text{ km/s} \approx 2200 \text{ miles per hour} \]
- light year: about 0.3 parsecs
- Celestial Sphere
Magnitudes: measure of brightness of stars Logarithmic scale that corresponds to the way your eyes perceive variations in brightness. First defined by Hipparchus. Change of 1 magnitude corresponds to a change in brightness by a factor of 2.512. Change of 5 magnitudes corresponds to a change in brightness by a factor of 100. The scale goes the wrong way. Brighter stars have *smaller* magnitudes than dimmer stars. Really bright stars have *negative* magnitudes.
Apparent Magnitudes in Night Sky
Ancient Constellations
Modern Constellations

- Alpheratz
- Andromeda
- Pegasus
  - Great square of Pegasus
Star Names

The brighter stars in a constellation are usually given Greek letters in order of decreasing brightness.

In Orion β is brighter than α, and κ is brighter than η. Fainter stars do not have Greek letters or names, but if they are located inside the constellation boundaries, they are part of the constellation.

α Orionis is also known as Betelgeuse.

β Orionis is also known as Rigel.
Projection on the Sky

What you see in the sky

Nearest star

Farthest star

Earth

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Angular Size
3-D View

3D Big Dipper
Outline: Where are we headed?

- The earth rotates on its axis once a day
- The earth revolves around the sun once a year
- The moon revolves around the earth once a month
- The other planets revolve around the sun with various periods
- THE BIG QUESTION: What does all this motion look like to us sitting in Norman, OK?
Celestial Sphere
View of the Sky Depends on Latitude

North celestial pole

Zenith

Latitude 90°
60 Degrees North

Zenith

North celestial pole

Latitude 60°
30 Degrees North
Equator
30 Degrees South

South celestial pole

Zenith

Latitude –30°
Angular Distance in the Sky

Astronomers measure distance across the sky as angles.
Determining Angular Size

- **Full Moon**: 0.5°
- **Sun**: 0.5°
- **Tip of Little Fingers**: 1°
- **Middle Three Fingers**: 4°
- **Full Fist**: 10°