

2.6 Tycho and Kepler

PRE-LECTURE READING 2.6

- *Astronomy Today*, 8th Edition (Chaisson & McMillan)
- *Astronomy Today*, 7th Edition (Chaisson & McMillan)
- *Astronomy Today*, 6th Edition (Chaisson & McMillan)

VIDEO LECTURE

- Tycho and Kepler¹ (21:16)

SUPPLEMENTARY NOTES

Tycho Brahe (1546-1601)

- See Tycho Brahe².
- Geo-heliocentrist (Earth at center, sun orbits Earth, planets orbit sun)
- Best pre-telescopic astrometer
- *Astrometry* (not astronomy) is the practice of accurately measuring positions (right ascensions and declinations) of astronomical objects in the sky. Tycho could do this to arcminute accuracy.
- With accurate astrometry, Tycho:
 - Found that the supernova of 1572 had no measurable parallax, using a baseline of a fraction of Earth's diameter. (For a mathematical treatment of parallax, see Measuring the Astronomical Unit.) This implied that the supernova was significantly farther away than the moon, contradicting the geocentric idea that everything beyond the moon's sphere is eternal and unchanging.
 - Similarly found that the comet of 1577 had no measurable parallax, implying that it too was significantly farther away than the moon, again contradicting this geocentric idea.
 - Compiled the most accurate catalogue of planetary positions to date. Kepler would later use these data to develop and test his own, heliocentric ideas.

Johannes Kepler (1571-1630)

- See Johannes Kepler³.
- Heliocentrist

¹<http://youtu.be/dMnSL4jk5tU>

²http://en.wikipedia.org/wiki/Tycho_Brahe

³http://en.wikipedia.org/wiki/Johannes_Kepler

- Theorist/mathematician
- Tycho's assistant
- Used Tycho's catalogue of planetary positions, primarily after Tycho's sudden death by mercury poisoning, to develop and test Kepler's Laws of Planetary Motion
- Wrote *Astronomia Nova*⁴ (*New Astronomy*), which includes Kepler's first two laws (1609)
- Wrote *Harmonices Mundi*⁵ (*The Harmony of the World*), which includes Kepler's third law (1619)
- Wrote *Tabulae Rudolphinae*⁶ (*The Rudolphine Tables*), which includes a star catalogue and planetary tables based in part on Tycho's observations (1627)

⁴http://en.wikipedia.org/wiki/Astronomia_nova

⁵http://en.wikipedia.org/wiki/Harmonice_Mundi

⁶http://en.wikipedia.org/wiki/Rudolphine_tables