

1.8 Precession

PRE-LECTURE READING 1.8

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

VIDEO LECTURE

- Precession¹ (14:00)

SUPPLEMENTARY NOTES

Conditions for Top Precession

- Top must be non-spherical
- Top must be under the influence of an external force
 - The rotation axis of the top cannot be parallel or perpendicular to the force (i.e., the top must be tipped).

Earth's and the Celestial Sphere's Long-Term Motion

- Earth is only very mildly non-spherical, so it precesses very slowly compared to its rotation.
 - Earth rotates 360° every sidereal day.
 - Earth's rotation axis precesses 360° every 26,000 tropical years.
- Because of precession, Earth's rotation axis points toward the sun 20 minutes earlier in its orbit each year.
 - Consequently, Earth's seasons, and hence its tropical year, begin 20 minutes earlier than they would if there was no precession (e.g., if Earth were perfectly spherical).
 - Consequently, after 13,000 years, it is, e.g., northern hemisphere winter where it used to be northern hemisphere summer in Earth's orbit.
- Because of precession of Earth's rotation axis, the north celestial pole moves, by 20 arcseconds each year.
 - Consequently, Polaris is not always close to the north celestial pole, and hence is not always the pole star.

ASSIGNMENT 1

Do Question 7.

¹<http://youtu.be/kSYINr8uKB8>