ASTR 255: Introduction to Planetary Science

Meetings

Tuesdays and Fridays, 2:30-4pm, Engineering/Computer Science Building 128

Instructor

Dr. Samantha Lawler: lawler@uvic.ca
Office: Elliott 409 ("Herzberg Adjuncts" office)
Office hours: Tuesdays 1:30-2:30, Fridays 2-2:30, or by appointment

Textbook

Planetary Science by Cole & Woolfson, 2nd edition recommended

Evaluation

20% problem sets
20% midterm exam (in class, Friday Feb. 6)
25% final exam
25% term project (3% term paper draft, 15% term paper, 7% presentation)
10% class participation assignments

Course Outline

Planetary science is an incredibly broad field. The topics we cover in this course will be primarily driven by discussions of a few scientifically important published journal articles:

- *The Origin of Pluto's Peculiar Orbit* (Malhotra 1993). Planetary orbits, orbital energy and momentum, orbital resonances.
- *A Minimum-Mass Extrasolar Nebula* (Kuchner 2004). Planet formation theories, radiation, blackbody equation, orbital evolution of dust.
- *Melting of Io by Tidal Dissipation* (Peale et al. 1979). Tides, tidal evolution of orbits, tidal disruption, tidal energy and dissipation.
- *67P/Churyumov-Gerasimenko, a Jupiter Family Comet with a High D/H Ratio* (Altwegg et al. 2014). Meteorites, impacts and cratering, minerals, isotopes, radioisotopes and dating rocks.

- *Origin of the Late Heavy Bombardment Period of the Terrestrial Planets* (Gomes et al. 2005). Late Heavy Bombardment, planet migration, Solar System architecture.
- *The Occurrence and Mass Distribution of Close-in Super-Earths, Neptunes, and Jupiters* (Howard et al. 2010). Exoplanet detection techniques, properties and types of known exoplanets, detection biases.
- *Hot Nights on Extrasolar Planets: Mid-Infrared Phase Variations of Hot Jupiters* (Cowan et al. 2007). Planetary surfaces and atmospheres, albedo, phase functions.
- *Kepler 9: A System of Multiple Planets Transiting a Sun-Like Star, Confirmed by Timing Variations* (Holman et al. 2010). Keplerian orbits revisited, transit timing, resonances.