

Guidelines:

Each student is expected to prepare a term paper on a topic they have selected (topic suggestions are provided below). You are also encouraged to explore other topics, but please consult with me if you go this route. ***Topic selections should be submitted by October 7, in the form of an abstract emailed to dragomir@unm.edu.*** The abstract should be 100-200 words; it should describe the motivation for your topic choice and briefly outline the background.

As much as possible, I would like each student to choose a different topic. It may help to talk with your classmates in order to coordinate this.

The paper should be ~4000-5000 words (about 10 pages, including any figures) for students enrolled in PHYS 480, and ~6000 words (about 12 pages) *plus* figures for students enrolled in PHYS 581. The bibliography is in addition to these word limits and have no page limit. The paper should cover the background, give a detailed development of the topic, and give conclusions and a complete reference list. The style should be similar to that of a scientific review paper. ***Papers will be due November 18 and should be emailed to dragomir@unm.edu.***

Students will also give an in-class presentation on their topic, over the final two weeks of the semester. We will allocate about 20 minutes per student, including questions, so the presentation itself should last 10-12 minutes. I will ask each student enrolled in a couple of relevant questions (based partly on the paper) that you should be able to answer based on the material we covered in the course and your literature research for the paper. ***Students enrolled in PHYS 581 will be evaluated on their answers to these questions.*** The class is also encouraged to ask questions, but students will not be evaluated on their answers to these questions.

Additional pointers:

- If you are already doing research work in areas related to planetary astrophysics, try to choose a topic different from your research. The goal is for you to explore a new-to-you topic.
- The standard structure for such papers is: Introduction and background (these will make up the bulk of the paper), discussion, conclusion/summary, references. However, small deviations from this style are also fine. Figures can be incorporated through the text, or presented together at the end of the paper.
- Try to also include your own thoughts on what you read, not only summarize the literature. There is always room for your insights, particularly for topics on which there currently isn't consensus in the research community.
- I like to use the [ADS digital library](#) to search for papers. Once you find a couple of papers on your topic, it can help to find the papers on ADS and then check the papers that cite them (this information is available for every paper on ADS), to make sure you are up to date with the most recent work on the topic.

Possible topics:

The meter-size barrier in planetesimal formation

The solar birth environment

The "Nice Model" and the "Grand Tack"

Super Earths: stripped Neptunes or obese terrestrial planets?

The Earth's carbonate-silicate cycle and implications for exoplanet habitability

Survival of planets through late stages of stellar evolution

Pulsar planets

A Warm and Wet Early Mars?

Formation of Earth's Moon

Late Heavy Bombardment

The New Horizons mission revolutionized our view of Pluto in 2015 when the spacecraft flew less than 12,500 km from the dwarf planet's surface. Discuss key findings from the mission and prospects/directions for future investigations of Pluto.

Prospects for detecting life on Titan, Enceladus, Europa, Mars, or another world in the Solar System.

Resonances in multi-planet systems of exoplanets: what causes them? why are these Kepler exoplanet systems just outside first order MMR? TESS has been discovering some multi-planet systems by now too, does this "just outside of MMR" trend still hold for the TESS systems?

Why are hot Jupiters inflated?