PHYS-2018: Great Ideas in Science
Astronomy Module Project, Fall 2007

Students will break up into 4 groups and present an oral presentation and submit a term paper that contains a minimum of 6 pages and due on **December 4, 2007**. **Your oral presentations are to last no longer than 30 minutes!** The group will lose points if you go over that time limit and individuals are not to talk *fast* to try and get every time in on time. Practice your talk first to make sure you don't go over. The topic of your project is to be one of the topics presented below. In order to get students to interact with others in the class for which they have not yet interacted, the 4 groups will be:

- **Group 1:** Joseph Brewer, Christine Brown, Taylor Hartly, Haley Klimecki, Jessica Smith, Sharat Vallurupalli. (Presentation on 12/4.)
- **Group 2:** Jessica Hooper, Ryen Lapham, Alexander Munjal, Kristian Provchy, Tony Ragle, Whitney Trotter. (Presentation on 12/4.)
- **Group 3:** Noelle Brown, Avani Javer, Tori Justus, Jennifer Lamine, Sharon Latham, Katherine Schiermeyer. (Presentation on 12/6.)
- **Group 4:** Melanie Angles, Josh Courtney, Emily Garr, Petya Kovachka, Laura Lusk. (Presentation on 12/6.)

Let Dr. Luttermoser know which project your group will work on by November 13, 2007. Project topics to choose from (one per group, no duplicate projects):

1. Highlights and details of the COBE and WMAP missions.
2. Highlights and details on the Hubble Space Telescope Key Project to determine Hubble's constant.
3. Dark matter and dark energy, what are they and why are they needed.
4. Non-Newtonian Gravity (and I don't mean the General Theory of Relativity): What is it and how can it help?
5. Highlights and details of the Inflationary Model of the Universe.
6. The relationship between the Standard Model of Particle Physics and the creation of matter during the first 3 minutes of the Big Bang.

7. Why should life only flourish on planets surrounding Population I stars of spectral classes F through K?

8. The history and future of the Milky Way Galaxy.

9. The history and future of the Solar System.

10. Present 3 short science fiction stories of what would happen should (a) a black hole were to collide with the Sun, (b) a black hole was to pass through the inner solar system without colliding with anything, and (c) a black hole passes through the outer solar system and causes the planet Jupiter into an elliptical orbit which brings it within the inner solar system every 10 years. No more than 2 people to work on a single short story. All three short stories will then be combined into a single paper when the written report is submitted. Note that even though these are fiction stories you <u>will</u> need to get the science correct in them.

11. The evolution of the percentage of galaxy types over the history of the Universe.

12. The equation of state for stars, from normal gas through degenerate matter.

13. Any miscellaneous topic discussed in the astronomy module and approved by the instructor.