

ASTRONOMY 597a – Exploring the High-Redshift Universe

Monday 11:15 a.m. - 12:05 p.m., 541 Davey Lab

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Office Hours: Tuesday & Thursday 2 - 3 p.m., or whenever you can find me in my office!

Web page:

<http://www.astro.psu.edu/users/caryl/a597> – I will place relevant course info on the web page. I will post weekly readings, presentations, interesting web links, etc, here. Check frequently!

Overview: In this one credit seminar, we will explore the observations of distant galaxies, and the constraints those observations place on models of galaxy formation and evolution. We will discuss outstanding problems in our understanding of galaxy formation and evolution, and discuss future telescope projects that will improve our understanding of these problems in the coming years.

Readings:

There will be weekly readings, posted on the course web site, from the primary literature. An excellent recent review article which provides an excellent starting point for this course is: “Observations of the High Redshift Universe” by Richard Ellis, Lecture notes from *First Light in the Universe*, Saas-Fee Advanced Course 36, <http://www.arxiv.org/abs/astro-ph/0701024>

Weekly Discussions:

Each of you will be responsible for leading one or two discussions during the course of the semester. Leading a weekly discussion will entail a 30 minute presentation, based on reading the primary literature, meant to summarize the status of our knowledge of the topic, point out outstanding questions, and promote discussion. The presentation will be followed by a discussion, in which the entire class is expected to participate. We will discuss outstanding questions on the topic, and ideas as to how the open questions can be addressed. In order to be prepared to actively participate, students will be expected to read several papers from the primary literature prior to each week’s discussion. Since this class only meets once a week, attendance is important! Please let me know if you will be missing class for any reason.

Final Paper: You will also be required to write a short (10 page) paper on a topic of your choosing. Your topic must be approved by me, and may be the same topic for which you lead the discussion. This paper should be a review of the current state of knowledge on the topic and will require you to significant research on the topic outside of what is presented in class. Papers should be written in LaTeX, using standard astronomical citation style. Figures and tables can (and probably should) be included, but do not count towards the 10 page limit.

Grading:

- Presentation/Discussion Leadership 35%
- Class participation: 25%
- Final Paper 40%

Integrity: This class follows the Integrity Policy of the Department of Astronomy & Astrophysics and the Eberly College of Science. Please read the full policy at: <http://www.astro.psu.edu/deptinfo/Astropolicy.html>. Infractions will be reported to the College Academic Integrity Committee and punished in accordance with policy.

Course Schedule:

- Jan. 22: Course information & Brief overview of Galaxies
- Jan. 29: Spectrophotometric Synthesis Models
- Feb. 5: Semi-Analytic Models
- Feb. 12: Intermediate Redshift Surveys ($z < 2$) & Evolution in Luminosity
- Feb. 19: Evolution in mass
- Feb. 26: Star-formation/metallicity history
- Mar. 5: Evolution of morphology, merger rate & galaxy sizes
- Mar. 19: Evolution in environmental effects (morphology-density relation, etc.)
- Mar. 26: Lyman-break galaxies
- Apr. 2: Ly α Emitters & Probing the Epoch of Reionization
- Apr. 9: N-body models of Galaxy Formation
- Apr. 16: Square Kilometer Array & Atacama Large Millimeter Array
- Apr. 23: Large Synoptic Survey Telescope & Thirty Meter Telescope (GMT/TMT)
- Apr. 30: James Webb Space Telescope