ASTRON 449, Fall 2014 – Final Presentations

The final presentations will be held in class on November 18, 20, and 25 (the last three lectures). We will have three presentations per lecture. You should prepare for 20 minutes, which will leave ≈ 5 minutes for questions for each presentation. The goal of your presentation is for you to teach something to your classmates (and the instructor!). Therefore, you should select a topic that you will be able to understand well and cover in sufficient detail in 20 minutes. You can draw either from the scientific literature or from more advanced sections of your textbook that we did not cover in class. In the spirit of keeping presentations pedagogical, your presentation should be primarily black board-based. No Keynote or PowerPoint will be allowed. If you need to show figures, print and distribute handouts.

Following is a list of ideas with references. Note that I am not an expert on all these topics so you will have to do some research to decide whether a topic and the references below are at the right level for your presentation. Feel free to suggest a topic not included in the list. Your choice of topic can be inspired by your research, but make sure that you learn something new by going beyond what you already know. Since many students may be interested in the same topics, please email me a list of at least three topics that you are interested in, ranked by order of preference, by November 1st. Topics will be assigned on a first come-first served basis and I will confirm your presentation topic with you.

- Schwarzshild's orbit modeling method and application to breaking mass-velocity anisotropy degeneracy in black hole mass measurements (BT2, §4.7.2)
- Black hole mass measurements using gas dynamics: pros, cons, and prospects for the future (http://arxiv.org/abs/1301.7184)
- Origin of the NFW profile (http://arxiv.org/abs/1010.3723, http://arxiv.org/abs/1010.2539)
- Adiabatic contraction of dark matter halos (BT2 §4.6.1)
- Core creation in dark matter halos by stellar feedback (http://arxiv.org/abs/1106.0499)
- Foundations of the $N-$body method and chaos in $N-$body calculations (BT2 §4.7.1)
- Dark matter simulation by tessellation of the phase space distribution (http://arxiv.org/abs/1111.3944, http://arxiv.org/abs/1210.6652)
- Core collapse in globular clusters (BT2 §7.5.3)
- The Bahcall-Wolf solution for cusps in star clusters with a central black hole (http://adsabs.harvard.edu/abs/1976ApJ...209..214B, http://adsabs.harvard.edu/abs/1977ApJ...216..883B)
- The "too big to fail" problem of Milky Way satellites (http://arxiv.org/abs/1103.0007, http://arxiv.org/abs/1111.2048)
- Dynamical and lensing constraints on MACHOs (BT2 §8.2.2e)

- Constraints on the WIMP cross section from galaxy cluster mergers (e.g., the Bullet cluster; http://arxiv.org/abs/0704.0261)
- Expectations for detection of dark matter annihilation from $N-$body simulations (http://arxiv.org/abs/0809.0894, http://arxiv.org/abs/1209.5745)