UNIVERSITY OF CALIFORNIA, SANTA BARBARA
Department of Physics

Physics 233 **Presentation I (Due Fri. Feb 28)** Winter 2014

In this assignment, you will gain more exposure to the breadth of astrophysical problems where the concepts studied in this class have been applied to obtain physical insight. You will also have an opportunity to practice your oral communication skills. (There's an twelve-fold return on your time investment since you get to listen to the other presentations.)

Read the paper titles on the next page(s). Choose a title that sounds interesting. Many other topics are possible, so please come see me to discuss other options if you have a particular interest.

Claim one of the papers as your own by signing your name on the sign-up sheet (posted on my office door).

Read the paper. Consider the following questions:

- What is the astrophysical significance of the paper? Since 7 minutes is not a lot of time, focus on one main idea or question. You don't need to be comprehensive. (Part of the excercise is to pick out the relevant point; please see me if you are having trouble with this.)
- How did the authors use physics of diffuse gases in their analysis? It would be ideal to work through at least some aspects of the argument quantitatively. You need to be very clear about the argument; pretend you are the referee of the paper.
- What conclusion was reached?

Prepare a 1 page handout summarizing your review of the paper. Think of this as a 'cheat-sheet' that your fellow students could use to understand the technique and the result without actually reading the paper. You may include a second page with figures, tables, and references. *Send Professor Martin an electronic copy so that she can post it for the class on or before February 28th.*

Prepare a 7 minute oral presentation. Divide your time among the three bullets listed above. You can use the blackboard or powerpoint; choose the medium that will best convey your message. Remember that the other students have not read the paper. You want to explain the paper using the material covered in class as the starting point. *Note: if using the projector, please test your laptop with the projector ahead of time.*

SUGGESTED TOPICS FOR PRESENTATION

1. PRECISION MEASURES OF THE PRIMORDIAL ABUNDANCE OF DEUTERIUM, Cooke, R. et al., 2014, ApJ, 781, 31.
2. TOWARD AN UNDERSTANDING OF THE SYSTEMATIC UNCERTAINTIES IN DERIVING THE PRIMORDIAL HELIUM ABUNDANCE FROM HII REGION OBSERVATIONS, Skillman et al., 1998 Space Science Reviews 84, 105 (Also use Kunth & Sargent 1983, ApJ, 273, 81 as needed).
3. QSO ABSORPTION SYSTEMS DETECTED IN NE VIII: HIGH-METALLICITY CLOUDS WITH A LARGE EFFECTIVE CROSS SECTION, Meiring, J. D. et al. 2013, ApJ, 767, 49.
4. THE DISTRIBUTION OF THERMAL PRESSURES IN THE DIFFUSE, COLD NEUTRAL MEDIUM OF OUR GALAXY. II. AN EXPANDED SURVEY OF INTERSTELLAR C I FINE-STRUCTURE EXCITATIONS, Jenkins & Tripp 2011, ApJ, 734, 65.
5. SUPPRESSION OF STAR FORMATION IN THE GALAXY NGC 253 BY A STARBURST-DRIVEN MOLECULAR WIND, Bolatto, A. D. 2013, Nature, 499, 450.
6. CHARGE-EXCHANGE EMISSION IN THE STARBURST GALAXIES M82 AND NGC3256, Ranalli, P., arXiv:1203.0941.
7. CARBON MONOXIDE IN THE COLD DEBRIS OF SUPERNOVA 1987A, Kamenetzky, J. et al. 2013, ApJ, 773, 34
8. DUST PRODUCTION AND PARTICLE ACCELERATION IN SUPERNOVA 1987A REVEALED WITH ALMA, Indebetouw, R. 2014, ApJ, 782, 2.
9. VARYING [C II]/[N II] LINE RATIOS IN THE INTERACTING SYSTEM BR1202-0725 AT Z = 4, Decarli et al. 2014, ApJ, 782, 17.
10. THE WARM IONIZED MEDIUM IN THE MILKY WAY AND OTHER GALAXIES, Mathis, J. S. 2000, ApJ, 544, 347
11. THE GALACTIC ABUNDANCE GRADIENT, Shaver, P. A. et al. 1983, MNRAS, 204, 53. (See also the textbook on temperature measurements from radio line and continuum measurement.)
12. THE GLOBAL SCHMIDT LAW IN STAR-FORMING GALAXIES, Kennicutt, R. C., Jr. 1998, ApJ, 498, 541 (See the textbooks on the relation between Q and H-alpha.)
13. RADIATIVE TRANSFER IN A CLUMPY UNIVERSE: THE COLORS OF HIGH-REDSHIFT GALAXIES, Madau, P. 1995, ApJ, 441, 18.

14. C II ABSORPTION IN DAMPED LYa SYSTEMS. I. STAR FORMATION RATES IN A TWO-PHASE MEDIUM, Wolfe, A. M. et al., 2003, ApJ, 593, 215. (See also C II* Absorption in Damped Lya Systems. II. A New Window on the Star Formation History of the Universe, 2003 ApJ 593, 235.)

15. CLASSIFICATION PARAMETERS FOR THE EMISSION-LINE SPECTRA OF EXTRAGALACTIC OBJECTS, Baldwin, J. A., Phillips, M. M., & Terlevich, R. 1981, PASP, 93, 5

16. THE HOST GALAXIES AND CLASSIFICATION OF ACTIVE GALACTIC NUCLEI, Kewley, L. J. et al. 2006, MNRAS, 372, 961

17. CENTRAL STAR TEMPERATURES OF LOW-EXCITATION PLANETARY NEBULAE, Kaler, J. B. & Jacoby, G. H. 1991, ApJ, 372, 215 (See also textbook on Zansta and Stoy techinques for measuring the stellar temperature.)

18. COSMIC-RAY HEATING OF THE INTERSTELLAR GAS, Field, G. B., Goldsmith, D. W., & Habing, H. J., 1969, ApJ, 155, 149. (This is the classic reference on the two-phase ISM.)

19. A THEORY OF THE INTERSTELLAR MEDIUM - THREE COMPONENTS REGULATED BY SUPERNOVAE..., McKee, C. F. & Ostriker, J. P., 1977, ApJ, 218, 148 (This is the classic reference on the 3-phase ISM.)

20. OPTICAL PROPERTIES OF INTERSTELLAR GRAPHITE AND SILICATE GRAINS, Draine, B. T. & Lee, H. M. 1984, ApJ, 285, 89

21. THE NEAR-INFRARED CONTINUUM EMISSION OF VISUAL REFLECTION NEBULAE, Sellgren, K. 1984, ApJ, 277, 623. (The importance of temperature fluctuations for the mid-infrared emission of the interstellar medium was first realized in this paper.)

22. PHOTODISSOCIATION REGIONS. I. BASIC MODEL, Tielens, A. G. G. M. & Hollenbach, D. 1985, ApJ, 291, 722. See also ch 9 of Tielen's textbook as needed.

23. COMPOSITE INTERSTELLAR GRAINS, Mathis, J. S. & Whiffen, G., 1989, ApJ, 341, 808

24. FAR-INFRARED AND SUBMILLIMETER EMISSION FROM GALACTIC AND EXTRAGALACTIC PHOTODISSOCIATION REGIONS, Kaufman, M. J. et al., 1999, ApJ, 527, 795. See also ch 9 of Tielen's textbook as needed. (This paper describes diagnostics analogous to the BPT diagrams but for HI regions instead of HII regions.)

25. THE DUST CONTENT AND OPACITY OF ACTIVELY STAR-FORMING GALAXIES, Calzetti, D. et al. 2000, ApJ, 533, 682 (This extinction curve is assumed to hold for most high-redshift galaxies.)