

## Physics 522: The Interstellar Medium in Our Galaxy and Elsewhere

The goals of this course are to describe the physical processes that determine the properties and behavior of interstellar matter, and to discuss some of the techniques used to observe it. We will apply the results not only to aspects of our galaxy, the Milky Way, but also to other galaxies, particularly those with active nuclei, and also the study of the intergalactic medium.

The following books will be useful and will be on reserve in the Math, Physics, and Astronomy library:

*Physical Processes in the Interstellar Medium*, L. Spitzer, Wiley-Interscience.

*Physics of the Galaxy and Interstellar Matter*, H. Scheffler and H. Elsässer, Springer-Verlag

*Astrophysics of Gaseous Nebulae and Active Galactic Nebulae*, D. Osterbrock, University Science Books

*Radiative Processes in Astrophysics*, G.B. Rybicki and A.P. Lightman, Wiley

*The Physics of Astrophysics Vol. 1- Radiation* and

*The Physics of Astrophysics Vol. 2- Gas Dynamics*, both by Frank H. Shu, University Science Books

*Radio Astronomy*, J. Krauss, McGraw-Hill (but, also privately reprinted)

The books by Spitzer and Scheffler and Elsässer are excellent. I have used both in the past but they are unfortunately out of print. If you can get used copies through amazon.com or other means, do so. The two volumes of *The Physics of Astrophysics* are excellent and worth getting as reference material if you continue in astronomy.

### Administrative details:

Instructor: M. Simon, ESS 452, Phone: 632-8226, Email: Michal.Simon@sunysb.edu, Office hours, Thursdays, 9-11 AM, and other times by appointment.

Grading: The course will be graded on the basis of problem assignments (50%), mid-term examination (20%), and a final examination (30%). Students may work together on the problem assignments if they find the collaborations mutually beneficial. Students may not collaborate on the examinations. The exams will be closed book, open notes.

If you have a disability that may impact your ability to carry out the assigned course work, I urge you to contact the staff of the Disability Support Service office (128 Educational Communications Center, 632-6748). They will review your concerns, and determine with you what accommodations are necessary and appropriate. All information and documentation of disability is confidential.

AST 522 - SYLLABUS - SPRING 2005

- Week 1. ISM Overview, Radiative Transfer
- Week 2. Interstellar Dust : Extinction, Scattering, Polarization, Composition
- Week 3. Atomic Gas in the ISM : Optical, UV, and Radio Observations
- Week 4.
- Week 5. Molecular Gas in the ISM : IR and Radio Observations.
- Week 6.
- Week 7. Ionized Gas in the ISM
- Week 8.
- Week 9. Distribution of Mass in the Milky Way
- Week 10. Distribution of Stars in the Milky Way
- Week 11. Introduction to Gas Dynamics
- Week 12. Galactic Dynamics
- Week 13. Cosmic Rays and Magnetic Fields
- Week 14. Heating and Cooling of the ISM