

Laurea Specialistica in Scienze Fisiche
a.a. 2003-04
Astrofisica II
Titolare: Prof. S. N. Shore

Programma.

NB: *Astrofisica I* is not a pre-requisite for this course, *no previous background to astrophysics will be assumed.* Lectures will (with apologies) be in English. The purpose of the course is to introduce you to fundamental radiative and fluid processes in cosmic environments.

- Radiative processes (e.g. continuum and line formation, opacity, scattering processes); radiative transfer and radiative equilibrium; plasma processes and radiative coupling to cosmic plasmas
- Hydrodynamics and MHD of astrophysical relevance
- Radiation by high energy particles (synchrotron, inverse Compton scattering, gyrosynchrotron)
- Acceleration processes related to cosmic hydrodynamics.
- Environments to be surveyed along the way will include nova and supernova ejecta; mass accreting systems in binaries and active galaxies; interstellar medium.

Some suggested readings:

Carroll, B. W. and Ostlie, D. A. 1996, *An Introduction to Modern Astrophysics* (Reading: Addison-Wesley)
Landau, L. and Lifshitz, E. M. 1987, *Fluid Mechanics, 2nd Ed.* (Oxford: Pergamon) (or Italian equivalent)
Mihalas, D. and Milihalas, B. 2000, *Foundations of Radiation Hydrodynamics* (NY: Dover Books)
Shore, S. N. 1992, *An Introduction to Astrophysical Hydrodynamics* (San Diego: Academic Press)
Shore, S. N. 2003, *The Tapestry of Modern Astrophysics* (NJ: J. Wiley)
Shu, F. H. 1992, *The Physics of Astrophysics (vol.s 1,2)* (Sacramento: Univ. Science Books)

Readings from *Ann. Rev. Fluid Mech.*, *Ann. Rev. Astron. Ap.*, *Rev. Mod. Phys.*, *J. Fluid Mech.*, *J. Quantitative Spectr. Radiative Transfer*, among others, will be involved; papers and reviews will be used for discussion and exercises. Also note: separate seminar on astrophysical topics will take place on Friday afternoons during the semester and continuing into the next semester.