Laurea Specialistica in Scienze Fisiche
a.a 2006-2007
Cosmologia e Astrofisica Galattica
Titolare: Prof. S.Shore

Programma.

(Insegnero` il corso in inglese ma la discussione (domande, ecc.) sara` in una forma di italiano (provero` come sempre).)

1. The Basis of the Distance Scale: The fundamental calibrators from a Galactic viewpoint

2. Galactic structure and dynamics

    Interstellar Medium (and intergalactic medium)

    Equations of stellar hydrodynamics, galactic rotation curves, structure of galaxies (ellipticals, spirals, irregular), tidal interactions, active galactic nuclei (AGNs), galaxy evolution.

3. Larger scale structure in the universe

    Groups, clusters, and superclusters of galaxies

    X-ray emission processes, evidence for dark matter, gravitational lensing, evolution of galaxies in clusters.

4. Cosmological kinematics and observational calibrations

    Redshift, Hubble expansion law, distance scale, funmdamental observational parameters, K-correction and evolution corrections.

5. Relativistic physical cosmology

    Friedmann-Robertson-Walker (FRW) metric and prediction of expansion, equation of state, cosmic background radiation (COBE, Boomerang, WMAP), larege scale structure formation and evolution, re-ionization and the Gunn-Peterson effect, Sunyaev-Zeldovich effect, Sachs-Wolff effect.

6. Inflation and Dark Matter

Basic properties of all inflationary models, the cosmological constant, dark matter searches.

N.B. Although Astrofisica 1,2 are NOT required, the notes are available on the website (astro.df.unipi.it/SAA/) and some background will be assumed. Lectures will (with continued apologies) be in English.

Some suggested readings:

Collins, P. D. B., Martin, A. D., and Squires, E. J. 1989, Particle Physics and Cosmology (NY: J. Wiley)

Peacock, J. A. 1999, Cosmological Physics (Cambridge: Cambridge Univ. Press)

Peebles, P. J. E. 1993, Principles of Physical Cosmology (Princeton: Princeton Univ. Press)

Shore, S. N. 2003, The Tapestry of Moden Astrophysics (NJ: J. Wiley) (Mainly Chapters 7 and 8, although some material from Ch. 6 will be used -- ISM)

Weinberg, S. 1972, Gravitation and Cosmology (NY: J. Wiley)

Required readings: papers and reviews in situ

Exercises will be give in lecture for additional background including analysis of cosmologically interesting observational data.