

COSMOLOGY 566: COSMOLOGICAL AND ASTROPHYSICAL AND CONSTRAINTS ON FUNDAMENTAL PHYSICS

Syllabus:

This advanced graduate course is intended for students with some basic knowledge of general relativity, quantum field theory and particle physics. Mastery of these areas will not be expected and some treatments of these topics will be developed during the course depending upon the background of the students in the course. The point of the course will be to discuss how cosmology and astrophysics can be used to constrain particle physics. Topics to be discussed will include some subset of: distance-redshift relations and dark energy, mass density, clustering and dark matter, direct and indirect detection of dark matter; low energy scattering, X-Rays and Cosmic Rays, stellar evolution and dark matter and neutrino physics, BBN and baryon density and neutrino physics, signatures of phase transitions: monopoles, topological defects, CMB, gravitational waves, proton decay and baryogenesis, CMB and Inflation, extra dimensions.