3C36: Cosmology and Extragalactic Astronomy
Aims and Objectives

Prerequisites

This is a 3rd-year 'portmanteau' course designed to provide both an introduction to basic cosmological principles and a summary of selected topics in extragalactic astronomy. The only pre-requisites are basic mathematical skills (i.e., elementary calculus) and general familiarity with astronomical nomenclature and principles. Students will not normally have encountered General Relativity at the time they take this course, and the development of the material is therefore essentially non-GR, although GR results are introduced as necessary. (A subsequent GR-based cosmology course is available from the Maths Dept.)

Aims

∘To summarize the essential physics describing the evolution of the Universe;
∘To review the essential morphological, dynamical, and chemical properties of galaxies in the local Universe;
∘To introduce key ideas in the processes involved Active Galactic Nuclei.

Objectives

On succesful completion of the course, students should be able to:
∘ Describe the gross characteristics of evolution of matter and radiation in the Universe, including the formation of the microwave background and of the light elements;
∘Discuss the role of inflation in resolving several problems with the traditional Big Bang model;
∘ Describe how theory and observation lead to the inference of baryonic and non-baryonic dark matter on a variety of scales;
∘ Explain the evolution of chemical abundances, colours, and luminosity in isolated galactic systems;
∘ State the basic techniques used for determining Galactic and galactic dynamics, and explain the inferences drawn from those data;
∘ Describe a variety of techniques for estimating masses, and mass:light ratios, in clusters of galaxies;
∘ Summarize the taxonomic 'zoo' of active galaxies, and describe how their diverse morphological characteristics can be understood in the context of a simple unified model;
∘ Describe how the linear scales of broad-line systems can be estimated through reverberation mapping; and
∘ Explain the nature of the quasar luminosity function, how it evolves with time, and how selection effects can bias the results.