Module: Elective Advanced Lectures: Observational Astronomy

Module No.: astro840

Course: The Cosmic Microwave Background

Course No.: astro8405

Category	Type	Language	Teaching hours	CP	Semester
Elective	Lecture with exercises	English	2+1	4	WT

Requirements for Participation:
Some basic knowledge of electrodynamics and thermal physics, and some experience with Python programming. No prior course-work on cosmology is necessary.

Preparation:

Form of Testing and Examination:
Weekly exercise classes, after successful evaluation of which a final oral exam at the end of the semester

Length of Course:
1 semester

Aims of the Course:
This course intends to give the students a modern and up-to-date introduction to the science and experimental techniques relating to the Cosmic Microwave Background (CMB). No prior knowledge of cosmology is assumed; rather, the course introduces the necessary concepts in the class, and partly depends on the mandatory cosmology course that is taught in parallel. The aim is to make the students interested in the vast field of CMB research, which continues to be one of the richest source of information about our Universe.

Contents of the Course:
Roughly 14 lectures, covering the four main topics of (i) CMB thermal spectrum, (ii) CMB temperature anisotropies and their cosmological significance, (iii) CMB polarization and the search for primordial gravitational waves, and (iv) CMB foregrounds and component separation techniques. There will be weekly exercise classes, some of which involve simple programming and plotting.

Recommended Literature:
Appropriate references are provided during the lectures.