Module: Elective Advanced Lectures: Modern Astrophysics

Module No.: astro850

Course: Radio and X-Ray Observations of Dark Matter and Dark Energy

Course No.: astro8503

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

Requirements for Participation:

Preparation:
Introductory astronomy and cosmology lectures

Form of Testing and Examination:
Written or oral examination, successful exercise work

Length of Course:
1 semester

Aims of the Course:
The student will learn how the phenomena of dark matter and dark energy are explored using radio and X-ray observations, from the largest down to galaxy scales.

Contents of the Course:
Introduction into the evolution of the Universe and the theoretical background of dark matter and dark energy tests, dark matter associated with galaxies, dark matter associated with galaxy clusters and superclusters, the cosmic microwave background (CMB), epoch of re-ionization, low-frequency radio astronomy, high-z supernovae, cosmic infrared background (CIB), precise distance measurements at cosmological distances, observational evidence for hierarchical structure formation, MOND vs. dark matter cosmology.

Recommended Literature:
Lecture notes will be provided