Level: Master

Course title: Selected unsolved problems in astrophysics

Status: elective

ECTS: 8

Requirements:

Learning objectives

The goal of this course is to give students insight into open questions and hot research topics in astrophysics, which will help them later in choosing the area of research where in which they want to obtain a PhD.

Learning outcomes

After the completion of this course students will be familiarized with cutting edge research in the field of astrophysics. They will be able to read scientific papers with critical cruitiny. Students will be given a taste of current open questions and hot topics. Through their work on the term paper they will be familiarizet with the most up to date research related to a specific topic which will help them to easily join research teams.

Syllabus

Theoretical instruction

Dark matter; Dark energy; Inflation; Primordial lithium problem; Population III stars; Deuterium; Neutrino astrophysicas and open questions; Origin and acceleration of untra high energy cosmic rays; Extra gallactic gamma ray background origin; Galactic gamma ray excesses; Gamma ray bursts; Extrasollar planets and life beyond Earth; Interplanetary missions; Modeling supernova explosions; Gravitational waves.

Practical instruction

In order for students to better adopt freshly learned concepts a lot of attention will be given to practical exercises and problem solving by applying physical laws and models on astrophysical systems, which will be of help in completing homework problem sets and help students prepare for written part of the exam.

Term paper

The goal of assigning a term paper is to provide students a deeper introduction into a specific topic chosen by them. Students will have to search the literature on their own, after which they have to write a short description of the topic where they have to present the key points and what they learned about the topic. An important part of the term paper assignment will be making and delivering an in-class presentation of the term paper topic, in order to help improve their presenting skills as well as to share the knowledge about a certain topic with fellow students.

Weekly teaching load				Other:
Lectures:5	Exercises:3	Other forms of teaching:2	Student research:	