



LECTURE COURSE IN THE QUANTUM UNIVERSE RESEARCH SCHOOL

Winter Term 2024/2025

Experimental Astroparticle Physics

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Course Description:

In this course we will present an overview on Astroparticle Physics with emphasis on **experimental** and **observational** techniques. The main themes of the lecture will be

- The high-energy universe: high-energy particle acceleration and propagation.
- The multi-messenger universe: combining the observation of charged particles, photons, neutrinos, and gravitational waves to explore compact objects like black holes and neutron stars.
- The early universe: possible origin of particle dark matter
- The dark universe: searching for dark matter particles and dark matter waves
- Detection of neutrinos from the sun, from celestial objects, from cosmic rays
- Production and detection of neutrinos from reactors and beam dumps
- Neutrino oscillation and the mass of neutrinos

Prerequisites:

Recommended: Some background knowledge in Astrophysics and Particle Physics.

Literature:

- Reading material will be provided, mostly original papers and reviews
- During the exercise, participants will be offered to present a talk or write a review on a selection of current research topics.

Date and Place:

Thu, 9:00–10:30, SR 3114, Notkestraße 9
Fri, 12:30–14:00, SR 3114, Notkestraße 9

Problem Classes:

Thu, 10:45–12:15, SR 3114, Notkestraße 9

Starting on:

17 October 2024
