

Module: Elective Advanced Lectures: BCGS Courses

Module No.: physics70d

Course:



Physics of Detectors (E/A)

Course No.:

Category	Type	Language	Teaching hours	CP	Semester
Elective	Lecture	English	3	4	ST

Requirements for Participation:

Preparation:

Nuclear Physics I, Quantum Mechanics

Form of Testing and Examination:

Part of the obligatory courses for area of specialisation Nuclear and Particle Physics, separate oral examination is possible exceptionally.

Length of Course:

1 semester

Aims of the Course:

Study detection methods of experimental techniques in nuclear and particle physics.

Contents of the Course:

- Interaction of electrons and charged heavy particles in matter
- Coherent effects: Cherenkov and transition radiation
- Interaction of gamma-radiation in matter
- Detection of neutral particles: neutrons and neutrinos
- Measurement of 4-momentum in particle physics
- Ionisation detectors: Bragg chamber, avalanche detectors
- Position sensitive detectors: drift chambers, time-projection chamber
- Anorganic and organic scintillators
- Energy detection, calorimeter and shower detectors
- Semiconductor detectors
- Position sensitive Si detectors (strip-, pixel-detectors)
- Ge detectors
- Low background measurements
- Lifetime measurements
- Mössbauer Spectroscopy
- Basic principles of analogue and digital signal processing

Recommended Literature:

A script or slides of the course will be distributed during the course.

R. Leo, Techniques for Nuclear and Particle Physics Experiments

K Kleinknecht, Detektoren für Teilchenstrahlung

G.F. Knoll, Radiation Detection and Measurement