

**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