

Nuclear and Particle Physics

Module No.: MN-P-SP-Nuc, MN-P-PN-Nuc, MN-P-WaMa

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Course: Physics of Detectors

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Category	Type	Language	Teaching Hours	CP	Semester
Core Course	Lecture	English	2	3	SuSe

Requirements for participation:

Nuclear Physics I, Quantum Mechanics

Type of module examinations:

One oral examination at the end of the module

Duration of the course:

1 semester

Aims of the course:

Study of 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 analoge 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