

**Modules:**

physics700 **Elective Advanced Lectures**  
 physics710 **Experimental Physics**  
 physics720 **Applied Physics**

**Course:**

## Introduction to neutron scattering (E/A)

**Course No.:**

Category	Type	Language	Teaching hours	CP	Semester
Elective	Lecture	English	2	3	ST

**Requirements:****Preparation:**

Basic knowledge in condensed matter physics

**Form of Testing and Examination:**

Oral examination

**Length of Course:**

1 semester

**Aims of the Course:**

Understanding of the basic concepts and techniques of elastic and inelastic neutron scattering experiments.

**Contents of the Course:**

The lecture introduces to the techniques of elastic and inelastic neutron scattering that can be used to determine the crystal or magnetic structure as well as the dispersion of nuclear or magnetic excitations.

Topics covered are

Crystal structures and reciprocal space

Neutron powder diffraction

Single-crystal diffraction

Structure refinements

Inelastic neutron scattering

Phonon dispersion

Magnetic excitations

Examples of current research (high-temperature superconductors, manganates with colossal magnetoresistivity, multiferroics)

Polarized neutron scattering

**Recommended Literature:**

Skriptum (available during the course)

S. W. Lovesey, Theory of Neutron Scattering from Condensed Matter, Oxford (1981)

G. E. Bacon, Neutron Diffraction, Oxford (1979)

Shirane, Shapiro and, Tranquada, Neutr. Scattering with a triple-axis spectrometer, Cambridge (2002)

Izyumov, Ozerov, Magnetic Neutron Diffraction Plenum (1970)

Marshall and Lovesey, Theory of thermal neutron scattering, Oxford (1971)

Squires, Introduction to the theory of Thermal Neutron scattering, Cambridge (1978)