TECHNISCHE UNIVERSITÄT DRESDEN

IFMP Institut für Festkörper- und Materialphysik

Im Rahmen der Wahlpflichtfachausbildung im physikalischen Vertiefungsgebiet

Elektronische Eigenschaften von Festkörpern

wird im Wintersemester 2019/2020 folgende Vorlesung angeboten:

Solid State Spectroscopy

(lectures will be given in English)

Prof. Dmytro Inosov, Prof. Jochen Geck

WO?	**REC/D016 (PHY/D016)**
WANN?	**Montags 5. DS (14:50 - 16:20 Uhr)**
	Erste Vorlesung: 14.10.2019
FÜR WEN?	**Physikstudierende ab dem 6. Fachsemester, Doktoranden**

Topics covered in this lecture course

- **Applications of spectroscopic methods in condensed-matter physics**
  — static and dynamic properties of solids; classification of spectroscopic methods.
- **Some basic notions from quantum mechanics in solid-state physics**
  — second-quantization notation; elementary excitations in solids; superconductivity.
- **Spectroscopy with electromagnetic radiation**
  — Optical spectroscopy; Raman spectroscopy.
  — X-ray absorption spectroscopy (XAS, XAFS, XMCD); X-ray fluorescence.
  — Resonant and non-resonant inelastic X-ray scattering.
- **Spectroscopy with electrons and positrons**
  — Photoelectron spectroscopy (XPS), angle-resolved photoemission (ARPES).
  — Electron energy loss spectroscopy (EELS); positron annihilation spectroscopy.
- **Quantum oscillations**
  — de Haas – van Alphen (dHvA) spectroscopy.
- **Neutron spectroscopy**
  — Polarized and non-polarized inelastic neutron scattering (INS); neutron spin-echo.
- **Spectroscopy using local magnetic probes**
  — Muon spin relaxation (μSR);
  — Nuclear magnetic resonance (NMR);
  — Mössbauer spectroscopy.
- **Tunneling and point-contact spectroscopy**
  — Point-contact and Andreev reflection spectroscopy;
  — Scanning tunneling microscopy and spectroscopy (STM, STS).