Rheinland-Pfälzische Technische Universität Kaiserslautern Landau

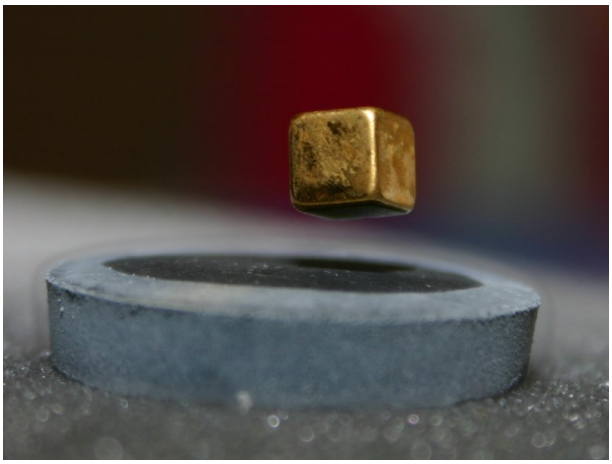
Winter Term 2025/2026

Superconductivity

Thursdays, 08.15 @ 46-270; First Lecture 23.10.2025

Contents:

- **Phenomenology:**
  Introduction, critical temperature, Meissner-Ochselfeld effect, type I and type II superconductor, thermodynamic properties, London theory, flux quanta
- **Ginzburg-Landau Theory:**
  Wave function of superconductivity, inhomogeneous superconductor, Ginzburg-Landau equations, coherence length, critical magnetic fields, magnetization curves, interaction between flux quanta, critical current
- **Bardeen-Cooper-Schrieffer Theory:**
  Josephson effects, Feynman theory, SQUID, Cooper problem, Jellium model of electron gas, Coulomb interaction, lattice vibrations, electron-phonon interaction, BCS ground state, energy gap, excited states, finite temperature, Gorkov derivation of Ginzburg-Landau theory



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