

Physics of 2D Materials

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ECTS credits: 6

Language of instruction: English

Examination: written exam

Description:

This course is a research oriented introduction to a rapidly expanding theme in condensed matter. We present several aspects of this contemporary field including fundamental questions, materials, techniques and applications. Six basic lessons cover the physics of graphene, 2D chalcogenides, cuprates and oxide interfaces with regard to quantum Hall and topological effects, 2D superconductivity, BKT transitions and applications. These are followed by three or four in-depth seminars on chosen topics.

Plan of the course:

1. Introduction, history and overview
2. Oxide interfaces, 2D Superconductivity,
3. BKT transitions, HiTc superconductors and devices
4. The physics of Graphene
5. Dichalcogenides: Fundamentals and applications
6. Quantum and Spin Hall effects

Followed by three or four seminars on topics such as, angle resolved photoemission spectroscopy, scanning tunneling microscopy and spectroscopy, overview of electronic structure of 2D materials and topological considerations in 2D Materials.