UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Theory of Condensed Matter II

2021-1-F1701Q082

Aims

Introduction to Advances Condensed Matter Physics: topological effects on the electronic structure of solids and superconductivity

Contents

Integer Quantum Hall Effect, Topological Effects, Superconductivity

Detailed program

1. Topological effects
    - Berry phase
    - Ahronov-Bohm effect
    - Berry Curvature
    - Topological quantization of Hall conductivity
    - Topological insulators
    - Weyl semimetals
2. Superconductivity
    - Type I and II superconductors
    - Electrodynamics
    - Theory of Landau Ginzburg
    - Josephson effect and SQUIDS

    - Quantum bits
3. Microscopic theory of superconductivity
    - Hamiltonian BCS
    - Electromagnetic response

Prerequisites

electromagnetism, quantum mechanics, solid state physics

Teaching form

Lectures

Textbook and teaching resource

Textbook

Girvin S.M & Yang K. Modern Condensed Matter Physics – Cambridge University Press

Semester

II semester

Assessment method

oral examination

Office hours

at the end of the lessons or by appointment