

Course Syllabus
PHY 6937 Superconductivity and Superfluidity
Spring 2014

Lectures: Mon-Wed-Fri 12:20 p.m. – 1:10 p.m. (HCB 217) starting Monday, Jan 6

Instructor: *Oskar Vafek*

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Office hours: by appointment (NHMFL)

This is a one semester advanced graduate level course. Its aim is to introduce concepts and theoretical techniques for the description of superconductors and superfluids. This course is a natural continuation of the "many-body" course PHY5670 and will build on the logical and mathematical framework introduced therein. The course will cover a range of topics, such as the connection between the phenomenological Ginzburg-Landau and the microscopic BCS theory, Migdal-Eliashberg treatment of phonon mediated superconductivity, unconventional superconductivity, superfluidity in ^4He and ^3He , and Kosterlitz-Thouless theory of two dimensional superfluids.

Prerequisites:

PHY5670 QUANTUM MANY-BODY PHYSICS

PHY5524 STATISTICAL MECHANICS

PHY5645 QUANTUM MECHANICS A

PHY5246 THEORETICAL DYNAMICS

PHY5346 ELECTRODYNAMICS A

PHY5646 QUANTUM MECHANICS B

Recommended Literature:

The instructor will follow his own notes compiled from several books.

Reference texts:

- J. R. Schrieffer, *Theory Of Superconductivity*
- M. Tinkham, *Introduction to Superconductivity*
- R.D. Parks, *Superconductivity* vols. 1 and 2
- J. B. Ketterson and S. N. Song, *Superconductivity*
- NSF Boulder Summer School on Superconductivity (<http://boulder.research.yale.edu/Boulder-2000/summerschool.html>)

Evaluation of Performance:

The course grade will be based on the class participation and homeworks.

The grade dividing lines are subject to adjustments at the end of the course. Tentatively the required score for A and A- is at least 88%, the dividing line between B- and C+ is 70%, the C range is between 50% and 70%, and scores less than 50% correspond to D or F.

ADA Statement:

Students with disabilities needing academic accommodation should: (1) register with and provide documentation to the Student Disability Resource Center (SDRC), and (b) bring a letter to the instructor from SDRC indicating your needed academic accommodation. Please do this during the first week of class. Honor Code Students are expected to uphold the Academic Honor Code published in the Florida State University Bulletin and the Student Handbook. The Academic Honor System of Florida State University is based on the premise that each student has the responsibility to (1) uphold the highest standards of academic integrity in the students own work, (2) refuse to tolerate violations of academic integrity in the university community, and (3) foster a high sense of integrity and social responsibility on the part of the university community