

## **Basic Aspects of Superconductivity (超导物理)**

July 11 – 22, 2016

Week 21: M, W, F

Week 22: M, T, W., Th., F

Time: 10 – 11:40 am

Place: Seminar Room, 12<sup>th</sup> floor, Physics Building, SJTU

### **Instructor**

Prof. Tony Leggett

SJTU office: Physics 1201

Email: [aleggett@illinois.edu](mailto:aleggett@illinois.edu), [ajleggett@sjtu.edu.cn](mailto:ajleggett@sjtu.edu.cn)

### **Recitation Instructors**

Prof. Hang Zheng

Prof. Ying Liu

### **Teaching Assistant**

Mr. Libin Wen

Mr. Jiaming He

### **Outline**

Together with the “Experimental Superconductivity” course, this 1-credit course will cover basic aspects of superconductivity. The course is intended for physics and physics related majors who have taken general physics and other core physics courses at Shanghai Jiao Tong University (SJTU), typically towards the end of their junior year. However, highly qualified students at the end of their sophomore year may also benefit, in which case an in-person interview by a physics faculty member will be conducted before the student can be allowed to sign up for the course. A list of topics to be covered in this course is found below in the *Course Calendar*.

### **Reference books**

1. C. Kittel, Introduction to Solid State Physics, 8th Ed., John Wiley & Sons, Inc., 2005.
2. A. J. Leggett, Lecture Notes on Superconductivity.

**Office hours:** 9-10 am Wednesdays

### **Grading**

The numerical grade will be determined by the following distribution:

Homework: 40%

Term paper: 60%

### Organization

- 1) You are expected to read materials to be discussed in class before the lectures. Topics to be discussed in each class are listed in the class calendar.
- 2) Homework set and the term paper must be turned in on time to receive full credits.
- 3) All class activities will be conducted in English, including the term paper.
- 4) The term paper subjects will be provided.

### Course Calendar:

Date	Contents	Homework/tasks
Week 1	Monday, 7/11. Introduction to phenomenological theories of superconductivity (Prof. Hang Zheng) Wednesday, 7/13. Introduction to microscopic theory of superconductivity (Prof. Hang Zheng) Friday, 7/15. Introduction to the course, Prof. Leggett's lectures, and term paper subjects (Prof. Ying Liu)	- Homework Set #1 (due Monday, 7/18) - Outline for the term paper (due Monday, 7/18)
Week 2	Monday, 7/18. Experimental survey and Cooper pairs Tuesday, 7/19. BEC and superconducting state wave functions Wednesday, 7/20. BCS theory Thursday, 7/21. Exotic superconductivity Friday, 7/22. Josephson effect	- Term paper (due Monday, 7/25)