Current Topics II

「High Temperature (Room Temperature?) Superconductivity」

Instructor:　Prof. Stewart Gregory Randall (University of Florida)
June 19, 26, July 3,10
8:50-10:20 10:30-12:00
Room：E310

Course Objective:
An introduction to current topics on HIGH TEMPERATURE SUPERCONDUCTIVITY /PREDICTION AND EXPERIMENT in condensed matterscience is given in this lecture course.
The course will cover the fundamental principles of SUPERCONDUCTIVITY and how to PREDICT T_c, and discuss recent discoveries of (almost) ROOM TEMPERATURE SUPERCONDUCTIVITY (T_c up to 260 in LaH_{10} superhydride) under HIGH PRESSURE.

Contents:
1)　Introduction to Superconductivity – conventional, Bardeen Cooper Schrieffer, electron-phonon coupling
2) History of the Search for Ever Higher Temperature Superconductivity, from 1975 to today (A15 structure Nb_3Ge and Nb_3Si; cuprates; new structures only stable at high pressure).
3) The theories of predicting the Superconducting Transition Temperature, T_c: McMillan formula (1968), Allen and Dynes formula (1975), Eliashberg theory, L. Boeri, W. Pickett
4) Superconductivity at Pressures up to 200 GPa (2 megabar):　H_3S, LaH_{10}, . . .

Doctor course and Master Course Students in Graduate School of Science
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Office Hours:
Beginning part of the 2nd, 3rd, and 4th week lectures can be used to answer questions from previous lectures