

Physics 211A-Solid State Physics
Professor Ivan K. Schuller
Fall 2007

General

- Experimental Point of View
- Phenomenological
- Single Electron, no manybody
- No Lengthy Calculations

Subject Matters

- 1.- Structure (X-ray, neutron, electron, light- elastic scattering)
- 2.- Phonons (light, neutrons, X-ray-inelastic scattering)
- 3.- Thermodynamics-Specific heat-Phonons
- 4.- Electrons- Specific heat, resistivity
- 5.- Band Structure
- 6.- Magnetotransport-Hall effect, magnetoresistance, open orbits, etc.
- 7.- Semiconductors- intrinsic, extrinsic
- 8.- Magnetism- diamagnetism, paramagnetism, antiferromagnetism, ferromagnetism
- 9.- Superconductivity- Phenomenology, type I and type II

Books (General references, more to come during the quarter)

- a) C. Kittel, Introduction to Solid State Physics, J. Wiley, 6th edition and above
- b) A. Guinier, X-Ray Diffraction, W. H. Freeman and Co
- c) H. P. Klug & L. E. Alexander, X-Ray Diffraction Procedures, Wiley Interscience. NY
- d) J. M. Ziman, Principle of the Theory of Solids, Cambridge University Press
- e) J. M. Ziman, Electrons and Phonons, Clarendon Press
- f) C. Kittel, Quantum Theory of Solids, John Wiley and Sons
- g) P. G. de Gennes, Superconductivity of Metals and Alloys, W. A. Benjamin
- h) M. Tinkham, Introduction to Superconductivity, McGraw Hill
- i) D. C. Mattis, The Theory of Magnetism Made Simple, World Scientific

Homework, test and projects

Weekly Homework

Final project-Report and talk

(takes about 1 month to research. The early starters do better)

Classes

Mo, W, F-9:30-10:50, Mayer Room-MH5301