Syllabus - PY 541 - Fall 2007

Instructor - Professor W. Klein

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Weeks 1-2 Thermodynamic equilibrium including postulate of maximum entropy, thermodynamic potentials and stability conditions.

Weeks 3-5 Statistical entropy and the Boltzmann distribution including the quantum and classical descriptions, the concept of statistical entropy and irreversibility and the growth of entropy.

Weeks 6-9 Applications of the canonical and grand canonical ensembles including the introduction of simple models both classical and quantum, discussion of fluctuations, phases, phase coexistence, correlation functions.

Weeks 10-11 Phase transitions including critical phenomena, broken symmetry, mean field theory and Landau theory.

Weeks 12-13 Quantum statistics including Bose-Einstein and Fermi-Dirac statistics, ideal Fermi and Bose gasses, black body radiation and the Debye model of solids.