

PH4211 Statistical Mechanics

Revision class 2024

Foundations/basics

Entropy - fund postulate
Equilibrium
Boltzmann factor
Partition function
Indistinguishability - Gibbs paradox
Liouville's theorem / Second law - coarse graining

Interacting & phase transitions

Virial coefficients
1st and 2nd order transitions / cons and non-cons order parameter
Critical exponents
Liquid-gas / van der Waals
Guggenheim plot
Weiss ferromagnet - Curie-Weiss
Binary alloy
Landau theory
Ferroelectricity
Universality

Irreversibility / non-equilibrium

Brownian motion
Langevin equation -- friction!
fluctuations
Autocorrelation function
Onsager hypothesis

Brief coverage

Third Law

Not required

Quantum phase transitions
Superfluidity
Bose-Einstein condensation