

PH4211 Statistical Mechanics Revision 2021

As discussed in live session - Tuesday 16th March.

Fundamentals

Conditions for equilibrium
Boltzmann factor
Partition function
Classical Statistical Mechanics
Ideal gas

Non-ideal gas

2nd virial coefficient
Various models
vdW treatment
Scaling - corresponding states

Phase transitions

Liquid-gas transition
Weiss ferromagnet
Landau theory
 2nd order — ferromagnet
 1st order — ferroelectric
Binary alloy
Critical exponents
Universality

Fluctuations and dynamics

Fluctuations — $1/\sqrt{N}$ rule
Autocorrelation function
Onsager hypothesis
Brownian motion
Langevin equation