

Lecture 7

Preliminary list of topics

Various ways to construct a mean-field theory.

(1) $H_{\text{eff}} = \sum_{i \sim n} \langle s_i \rangle = z \langle s \rangle$ \rightarrow formulas
for a single spin in magnetic field.

(2) $s_i = \langle s_i \rangle + (s_i - \langle s_i \rangle)$
assume that $|\langle s_i \rangle| \gg |s_i - \langle s_i \rangle|$
formally

(3) The Ising model on a fully connected graph.

(4) Bogolyubov approach based on:

$$F \leq F_0 + \langle \mathcal{H} - \mathcal{H}_0 \rangle,$$