Internal Seminar

Distribution of spins in random field XY models

Rajiv G Pereira

TIFR, Hyderabad

XY models with randomly oriented fields have been studied in the context of superconductors, antiferromagnets and so on, whereas XY models with random crystal fields have been used widely to model and study physical systems such as amorphous magnets. In this talk we shall consider: 1) Infinite range XY model with random fields (XY-RF) and 2) Infinite range XY model with random crystal fields (XY-RCF). In both the cases we restrict to the scenario where the (crystal) fields are of equal magnitude but are oriented along random directions, distributed uniformly over a circle.

In particular, we will examine the distribution of spins in the zero temperature limit for both these models. In the case of the XY-RF there is a first order phase transition, and the spins are distributed within a cone in the ordered phase, and are distributed over a circle in the disordered phase. Whereas, in the case of the XY-RCF, there is no phase transition and the spins are distributed within a cone, which widens with the strength of the crystal field.

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Seminar Hall