

Abstract

Random field Ising model is a canonical example to study the effect of disorder on long range order. In 70's, Imry-Ma predicted that in the presence of weak disorder, the long-range order persists at low temperatures in three dimensions and above but disappears in two dimensions. In this talk, I will review mathematical development surrounding this prediction, and I will focus on recent progress on exponential decay (joint with Jiaming Xia) and on correlation length in two dimensions (joint with Mateo Wirth). In addition, I will describe a recent general inequality for the Ising model (joint with Jian Song and Rongfeng Sun) which has implications for random field Ising model.