

Department of Mathematics, BGU

BGU Probability and Ergodic Theory (PET) seminar

On Tuesday, April, 24 2018

At 11:00 – 12:00

In 201

Ron Peled (Tel Aviv University)

will talk about

A power-law upper bound on the decay of correlations in the two-dimensional random-field Ising model

Abstract: The random-field Ising model (RFIM) is a standard model for a disordered magnetic system, obtained by placing the standard ferromagnetic Ising model in a random external magnetic field. Imry-Ma (1975) predicted, and Aizenman-Wehr (1989) proved, that the two-dimensional RFIM has a unique Gibbs state at any positive intensity of the random

field and at all temperatures. Thus, the addition of an arbitrarily weak random field suffices to destroy the famed phase transition of the two-dimensional Ising model. We study quantitative features of this phenomenon, bounding the decay rate of the effect of boundary conditions on the magnetization in fi

nite systems. This is known to decay exponentially fast for a strong random
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eld. The main new result is a power-law upper bound which is valid at all
field strengths and at all temperatures, including zero. Our analysis proceeds
through a streamlined and quantified version of the Aizenman-Wehr proof. Sev-
eral open problems will be mentioned. Joint work with Michael Aizenman.