

Organizer: Hao Wu (THU), Xinyi Li (PKU), Hui He (BNU).

Speaker: Linxiao Chen

Affiliation: University of Helsinki

Title: Phase transition in the Ising model on a random 2D lattice

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Abstract:

The Ising model is one of the first statistical mechanics models known to have a non-trivial phase transition in two dimensions. On regular lattices, this phase transition has been extensively studied. In this talk I will present an annealed Ising model on a random 2D lattice, introduced first in the Physics literature as a model of quantum gravity in 2D. We will see that the partition function of this model is exactly solvable. We show that this model has a phase transition at a unique temperature by examining its free energy, its critical exponents, and the scaling limit some interface lengths. In particular, the result confirms the physical intuition that a random lattice coupled to a non-critical Ising model has a geometry similar to a uniform random lattice with an instance of Bernoulli percolation on it. I will also discuss how the phase transition takes place in the near-critical window.

Based on arxiv:1806.06668, arXiv:2003.09343 and a joint work in progress with Joonas Turunen.