THE WEIZMANN INSTITUTE OF SCIENCE
FACULTY OF MATHEMATICS AND COMPUTER SCIENCE
Geometric Functional Analysis and Probability Seminar

Room 290C ,Ziskind Building
on Thursday, Jan 18, 2018at 13:30

Oren Louidor (Technion) and Alexander Glazman (Tel Aviv).--

Double Seminar

Abstract:

Oren Louidor (Technion)
Title: Dynamical freezing in a spin-glass with logarithmic correlations.
Abstract: We consider a continuous time random walk on the 2D torus, governed by the exponential of the discrete Gaussian free field acting as potential. This process can be viewed as Glauber dynamics for a spin-glass system with logarithmic correlations. Taking temperature to be below the freezing point, we then study this process both at pre-equilibrium and in-equilibrium time scales. In the former case, we show that the system exhibits aging and recover the arcsine law as asymptotics for a natural two point temporal correlation function. In the latter case, we show that the dynamics admits a functional scaling limit, with the limit given by a variant of Kolmogorov's K-process, driven by the limiting extremal process of the field, or alternatively, by a super-critical Liouville Brownian motion. Joint work with A. Cortines, J. Gold and A. Svejda.

Alexander Glazman (Tel Aviv)
Title: Level lines of a random Lipschitz function
Abstract: We consider the uniform distribution on Lipschitz functions on the triangular lattice, i.e. all integer-valued functions which differ by 0 or 1 on any two adjacent vertices. We show that with a positive probability such a function exhibits macroscopic level lines. Instead of working directly with Lipschitz functions we map this model to the loop $O(2)$ model with parameter $x=1$. The loop $O(n)$ model is a model for a random collection of non-intersecting loops on the hexagonal lattice, which is believed to be in the same universality class as the spin $O(n)$ model.
A main tool in the proof is a positive association (FKG) property that was recently shown to hold when $n \ge 1$ and $0<x\le\frac{1}{\sqrt{n}}$. Though the case $n=2$, $x=1$ is not in the FKG regime, it turns out that when loops are assigned one of two colours independently the marginal on loops of either of the colours does satisfy the FKG property. The colouring of loops allows to view the loop $O(2)$ model with $x=1$ as coupling of two percolation configurations. Studying each of them independently and using the XOR operation we establish existence of macroscopic loops, i.e. level lines in the original setting.
(Based on a joint work with H. Duminil-Copin, and I. Manolescu)