



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

Room 261 ,Ziskind Building
on Thursday, Jun 18, 2015
at 11:05

Amir Dembo
Stanford University

The Atlas model, in and out of equilibrium

Abstract:

Consider a one-dimensional semi-infinite system of Brownian particles, starting at Poisson (L) point process on the positive half-line, with the left-most (Atlas) particle endowed a unit drift to the right. We show that for the equilibrium density ($L=2$), the asymptotic Gaussian space-time particle fluctuations are governed by the stochastic heat equation with Neumann boundary condition at zero. As a by product we resolve a conjecture of Pal and Pitman (2008) about the asymptotic (random) fBM trajectory of the Atlas particle.

In a complementary work, we derive and explicitly solve the Stefan (free-boundary) equations for the limiting particle-profile when starting at out of equilibrium density (L other than 2). We thus determine the corresponding (non-random) asymptotic trajectory of the Atlas particle.

This talk is based on joint works with Li-Cheng Tsai, Manuel Cabezaz, Andrey Sarantsev and Vlas Sidoravicius.