Berlin Leipzig Seminar
Analysis/probability theory
Third Meeting Winter Term 2005/06

Jointly organized by the University of Leipzig, the Max-Planck Institute Leipzig, and the Technical University Berlin

Date:

Friday, 16 December 2005

Venue:

Technical University Berlin, Institute for Mathematics, Str. des 17. Juni 136, 10623 Berlin
Room MA645

Program:

10:30–11:30: **Kostja von Renesse (Technical University Berlin)**
Stochastic heat equation in Wasserstein space as generalized Fleming-Viot process

11:40–12:40: **Tom Schmitz (ETH Zurich)**
Ballistic diffusions in random environment

14:00–15:00: **Francesco Caravenna (University Zurich)**
A renewal theory approach to periodically inhomogeneous polymer models

Everybody is welcome to attend.

Wolfgang König, University of Leipzig

Abstracts:

von Renesse: *Stochastic heat equation in Wasserstein space as generalized Fleming-Viot process*

A stochastic perturbation of the heat equation should respect mass conservation and positivity of the solution. We introduce a model where the noise is adapted to the Wasserstein metric. A constrive existence result is obtained as a limit of a generalized Moran particle process where the jump rates are state dependent.

Schmitz: *Ballistic diffusions in random environment*

We introduce conditions that imply, in the multidimensional setting, a strong law of large numbers with non-vanishing limiting velocity (which we refer to as ballistic behavior) and an invariance principle with non-degenerate covariance matrix. As an application of our results, we give a concrete criterion on the drift term under which the diffusion in random environment exhibits ballistic behavior. This criterion provides new examples of ballistic diffusions. With our methods, we are further able to rederive the well-known ballistic character of a class of diffusions in random environment with a divergence-free drift by simply checking the above mentioned sufficient condition for ballistic behavior.

Caravenna: *A renewal theory approach to periodically inhomogeneous polymer models*

We consider a probabilistic model of an heterogeneous polymer chain fluctuating in the proximity of an interface between two selective solvents. The heterogeneous character of the model comes from the fact that each monomer unit interacts with the solvents and with the interface according to some chargethat it carries. In this talk we focus on the case when the charges repeat themselves along the chain in a periodic fashion.

The main question on this model is whether the polymer remains tightly close to the interface, a phenomenon called localization, or there is a marked preference for one of the two solvents yielding thus a delocalization phenomenon. We present an approach based on renewal theory that allows to get a complete understanding of the localization/delocalization issue, yielding a very precise description of the polymer measure both in a local sense (thermodynamic limit) and in a global sense (scaling limits).

Analogous results can be obtained also in the context of (1+1)-dimensional interface wetting models, where the same approach is applicable.

(Joint work with G. Giacomin and L. Zambotti)