

**Berlin Leipzig Seminar**  
**Analysis/probability theory**  
**First Meeting Winter Term 2006/07**

Organized by the DFG Research Group *Analysis and Stochastics in Complex Physical Systems*

DATE:

Friday, 3 November 2006

VENUE:

Technical University Berlin, Institute for Mathematics, Str. des 17. Juni 136, 10623 Berlin  
Room MA313/314

PROGRAMME:

**9:45–10:45: Rongfeng Sun (TU Berlin)**

*The Brownian net*

*Abstract:* The (standard) Brownian web is a collection of coalescing one-dimensional Brownian motions, starting from each point in space and time. It arises as the diffusive scaling limit of a collection of coalescing random walks. We show that it is possible to obtain a nontrivial limiting object if the random walks in addition branch with a small probability. We call the limiting object the Brownian net, and discuss some of its elementary properties. This is joint work with Jan M. Swart.

**10:55–11:55: Codina Cotar (TU Berlin)**

*Construction of a percolating hard sphere model*

*Abstract:* Given a homogeneous Poisson point process in  $\mathbb{R}^d$ , Häggström and Meester asked whether it is possible to place spheres (of differing radii) centred at the Poisson points, in a translation-invariant way, so that the spheres do not overlap but there is an unbounded component of touching spheres. We prove that the answer is yes in sufficiently high dimension  $d$  ( $d \geq 45$ ).

This is joint work with Alexander Holroyd and David Revelle.

**13:00–14:00: Richard James (University of Minnesota and MPI MIS Leipzig)**

*New observations on the origins of hysteresis in phase transformations and metastability in the calculus of variations*

*Abstract:* We present some recent measurements of hysteresis that resulted from a systematic program of tuning of the lattice parameters of some alloys by changing composition. The lattice parameters were tuned so that a certain nongeneric condition of compatibility was satisfied. It was observed that there is a sharp drop of the hysteresis of the transformation at the special lattice parameters. The data has some fascinating features, including an apparent singularity. Some exploratory calculations suggest that this is related to metastability phenomena in the calculus of variations, suggesting a sensitive dependence of local minimizers on certain conditions of compatibility. This is joint work with Jerry Zhang, John Ball, and Stefan Müller.

Everybody is welcome to attend.

Wolfgang König, University of Leipzig