Berlin Leipzig Seminar
Analysis/probability theory
Second Meeting Summer Term 2009

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

DATE: Friday, 26 June 2009

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

PROGRAMME:

9:40–10:30: **Hans-Otto Georgii (Ludwig-Maximilians-Universität München)**

Variational characterisation of Gibbs measures with Delaunay triangle interaction

Abstract: It is well-known that stationary renewal processes can be characterised as Gibbsian point processes with an interaction depending on the distance of nearest-neighbour points. In this talk we consider an anlalogue in two dimensions, namely stationary Gibbsian point processes on $\mathbb{R}^2$ with an interaction that depends on the tiles of the Delaunay triangulation of points. Assuming boundedness and a weak geometric property of the interaction, we identify these processes as the minimisers of the associated free energy density. In particular, this implies their existence.

10:40–11:30: **Bernd Schmidt (Technische Universität München)**

On a semilinear variational problem

Abstract: We provide a detailed analysis of the minimizers of a semilinear functional under non-convex constraints. This problem, e.g., describes the long-time behavior of the parabolic Anderson in probability theory or ground state solutions of a nonlinear Schroedinger equation. While existence can be proved with standard methods, we show that the usual uniqueness results obtained with pde-methods can be considerably simplified by additional variational arguments. In addition, we investigate qualitative properties of the minimizers and also study their behavior near the critical exponent associated with the problem.

11:40–12:30: **László Erdős (Ludwig-Maximilians-Universität München)**

Bulk universality for Wigner matrices

Abstract: We consider $N \times N$ Hermitian Wigner random matrices H where the probability density for each matrix element is given by the density $\nu(x) = e^{-U(x)}$. We prove that the eigenvalue statistics in the bulk is given by Dyson sine kernel provided some regularity condition on U The proof is based upon an approximate time reversal of the Dyson Brownian motion combined with the convergence of the eigenvalue density to the Wigner semicircle law on short scales.

Everybody is welcome to attend.   Wolfgang König, University of Leipzig