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Einladung zum Oberseminar

Am Mittwoch, dem 7. Dezember 2022, um 17:45 Uhr und 18:30 Uhr im Seminarraum 1 des Mathematischen Instituts (Raum 005), Weyertal 86–90, 50931 Köln. Es sprechen:

Dr. Karl Olof Hallqvist Elias (Universität zu Köln) um 17:45 Uhr

Prof. Dr. Wolfgang König (TU Berlin & WIAS Berlin) um 18:30 Uhr

Karl Olof Hallqvist Elias Title: Percolation for two-dimensional interlacements and the discrete Gaussian free field

Abstract: We study percolative properties of interlacements processes and the discrete Gaussian free field (dGFF) in the planar unit disk. We consider discrete interlacements, defined using random walks as a two-dimensional version of random interlacements, as well as its scaling limit, defined using Brownian motion. We prove that the critical parameters u_c corresponding to vacant set percolation for the two models are the same and equal to $u_c = \frac{\pi}{3}$. Via an isomorphism theorem, we use a generalization of the discrete result that also involves a loop soup to show that the critical parameter h_c associated to level set percolation for the dGFF is strictly positive and smaller than $\sqrt{\frac{\pi}{2}}$. In particular this entails a strict inequality of the type $h_c < \sqrt{2u_c}$ between the critical percolation parameters of the dGFF and the two-dimensional interlacements. An analogous strict inequality is conjectured to hold in $\mathbb{Z}^d, d \geq 3$.

Wolfgang König Title: Self-repellent Brownian bridges in the interacting Bose gas

Abstract: We consider the d-dimensional interacting quantum Bose gas in the thermodynamic limit at positive temperature, expressed in terms of an ensemble of interacting Brownian bridges. Dropping all interactions between any two cycles, we obtain a simpler model, which actually lies in the class of random permutations with independent cycle weights. For this model, we give an explicit formula for the limiting free energy and a necessary and sufficient criterion for the occurrence of a condensation phase transition. For d≥5 and sufficiently low temperature, we prove that the condensate phase is not empty. Our proof relies on a comparison to the well-known self-repellent random walk. Our main proof method here is an extension of the lace expansion.
(joint work in progress with Erwin Bolthausen and Chiranjib Mukherjee)

Alle Interessenten sind herzlich eingeladen.

Die Dozenten der Stochastik