Seminar/Talk

Diffusion in the curl of the 2-dimensional Gaussian Free Field

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Host: M. Beiglböck, N. Berestycki, L. Erdös, J. Maas, F. Toninelli

I will discuss the large time behaviour of a Brownian diffusion in two dimensions, whose drift is divergence-free, ergodic and given by the curl of the 2-dimensional Gaussian Free Field. Together with G. Cannizzaro and L. Haundschmid, we prove the conjecture by B. Toth and B. Valko that the mean square displacement is of order $t \sqrt{\log t}$. The same type of superdiffusive behaviour has been predicted to occur for a wide variety of (self)-interacting diffusions in dimension d = 2: the diffusion of a tracer particle in a fluid, self-repelling polymers and random walks, Brownian particles in divergence-free random environments, and, more recently, the 2-dimensional critical Anisotropic KPZ equation. To the best of our authors' knowledge, ours is the first instance in which $\sqrt{\log t}$ superdiffusion is rigorously established in this universality class.

Thursday, September 30, 2021 04:30pm - 05:20pm
Rényi Institute Budapest

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