

Institute for Applied Mathematics, Bonn University

Oberseminar Stochastik

Thursday, 8 July 2021, 17:30

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Edwards-Wilkinson fluctuations for the AKPZ equation in the weak coupling regime

In this talk, we present recent results on an anisotropic variant of the Kardar-Parisi-Zhang equation, the Anisotropic KPZ equation (AKPZ), in the critical spatial dimension $d = 2$. This is a singular SPDE which is conjectured to capture the behaviour of the fluctuations of a large family of random surface growth phenomena but whose analysis falls outside of the scope not only of classical stochastic calculus but also of the theory of Regularity Structures and paracontrolled calculus. We first prove that the nonlinearity causes a logarithmically superdiffusive behaviour at large scales and more precisely that correlation length of the solution grows like $t^{\frac{1}{2}}(\log t)^{\frac{1}{4}}$ up to lower order correction. Motivated by the previous, we consider the AKPZ equation in the so-called weak coupling regime, i.e. the equation regularised at scale N and the coefficient of the nonlinearity tuned down by a factor $(\log N)^{-\frac{1}{2}}$, and prove that, for N going to infinity, its solution converges to a linear stochastic heat equation with renormalised coefficients. The talk is based on (ongoing) joint work with G. Cannizzaro and D. Erhard.