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Martingale description of the two-dimensional stochastic heat equation

The two-dimensional stochastic heat equation has a simple, but purely formal, description as the two-dimensional heat equation with a random potential given by space-time white noise. Since this equation poses difficulties for solution theories of stochastic partial differential equations (SPDEs), some approximate solutions developed in the late 90s have played a vital role in subsequent studies. This talk will provide an overview of a precise martingale description of the limiting solutions. The description extends the existing random-field and semigroup formulations of SPDEs. Certain extremal properties of Gaussians, previously known in solvable models of quantum mechanics, are now incorporated.