

Small-time asymptotics of parabolic Anderson models and rigidity

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In this talk, we are interested in the Stratonovich parabolic Anderson model (PAM), which consists of a diffusion equation with a rough random potential. We will begin with a brief review of the current PAM literature, which mainly focuses on the large-time asymptotics of the equation. In this regime, one observes the occurrence of intermittency, which is closely related to the Anderson localization phenomenon in quantum mechanics. Next, I will advocate for the study of precise small-time asymptotics for the PAM, by explaining how this problem relates to so-called "rigidity" properties of randomly-perturbed quantum systems. That is, the observation that certain features of quantum systems remain unchanged even after adding a random perturbation. In closing, we will discuss two applications of small-time PAM asymptotics; one in planar geometry, and the other in multivariate statistics. This talk will feature discussions of various joint works with Promit Ghosal, Wilson Li, Yuchen Liao, Yuanyuan Pan, and Mykhaylo Shkolnikov.

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