

Intermittency on catalysts: three-dimensional simple symmetric exclusion

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Abstract: We continue our study of intermittency for the parabolic Anderson model $\partial u/\partial t = \kappa \Delta u + \xi u$ in a space-time random medium ξ , where κ is a positive diffusion constant, Δ is the lattice Laplacian on \mathbb{Z}^d , $d \geq 1$, and ξ is a simple symmetric exclusion process on \mathbb{Z}^d in Bernoulli equilibrium. This model describes the evolution of a *reactant* u under the influence of a *catalyst* ξ . In [?] we investigated the behavior of the annealed Lyapunov exponents, i.e., the exponential growth rates as $t \rightarrow \infty$ of the successive moments of the solution u . This led to an almost complete picture of intermittency as a function of d and κ . In the present paper we finish our study by focussing on the asymptotics of the Lyapunov exponents as $\kappa \rightarrow \infty$ in the *critical* dimension $d = 3$, which was left open in [?] and which is the most challenging. We show that, interestingly, this asymptotics is characterized not only by a *Green* term, as in $d \geq 4$, but also by a *polaron* term. The presence of the latter implies intermittency of *all* orders above a finite threshold for κ .

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