Abstract We consider the parabolic Anderson model $\frac{\partial u}{\partial t} = \kappa \Delta u + \gamma \xi u$ with $u : \mathbb{Z}^d \times \mathbb{R}^+ \to \mathbb{R}^+$, where $\kappa \in \mathbb{R}^+$ is the diffusion constant, $\Delta$ is the discrete Laplacian, $\gamma \in \mathbb{R}^+$ is the coupling constant, and $\xi : \mathbb{Z}^d \times \mathbb{R}^+ \to \{0, 1\}$ is the voter model starting from Bernoulli product measure $\nu_{\rho}$ with density $\rho \in (0, 1)$. The solution of this equation describes the evolution of a “reactant” $u$ under the influence of a “catalyst” $\xi$.

In Gärtner, den Hollander and Maillard [?] the behavior of the annealed Lyapunov exponents, i.e., the exponential growth rates of the successive moments of $u$ w.r.t. $\xi$, was investigated. It was shown that these exponents exhibit an interesting dependence on the dimension and on the diffusion constant.

In the present paper we address some questions left open in [?] by considering specifically when the Lyapunov exponents are the a priori maximal value in terms of strong transience of the Markov process underlying the voter model.