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Mixing time for exclusion processes and the effect of asymmetry

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The simple exclusion process on a finite graph of size n with k particles is obtained by considering k particles performing independent random walk on the graph, and adding an exclusion rule: two particles cannot occupy the same site the respect of this constraint is obtained by canceling the jump when a particle tries to go on an already occupied sites. We study the system in the limit when n goes to infinity with a density of particle $k = \alpha n$ for $\alpha \in (0, 1)$. The talk is focused on the question: if a system starts with a really atypical configuration, how much time does it need to reach its equilibrium state, and what patterns does it use to reach it? We present results obtained in the case where the graph is a segment and discuss the effect of the asymmetry of the walk, and discuss open problems in one and higher dimensions.

Based on joint work with Cyril Labbé (Paris Dauphine).

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