

Current fluctuations for totally asymmetric exclusion on the relaxation scale

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The asymmetric simple exclusion process (ASEP) is a Markov process describing particles hopping on a one-dimensional lattice with a preferred direction. Its evolution operator is equal to the Hamiltonian of an XXZ spin chain with twisted boundary conditions. Many exact results have been obtained for current fluctuations using Bethe ansatz, both in the infinite volume limit $L \rightarrow \infty$ and in the stationary state obtained in the long time limit $T \rightarrow \infty$. The crossover between these two regimes corresponds to the relaxation scale $T \sim L^{3/2}$. It has been studied recently in the totally asymmetric model (TASEP) where all particles hop in the same direction, and which corresponds in terms of XXZ spin chain to an anisotropy $\Delta \rightarrow \infty$.