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The Speed-N^2 Large Deviations of the TASEP

Consider the Totally Asymmetric Simple Exclusion Process (TASEP) on the integer lattice $\mathbb{Z}$. Under the scaling N^{-1} of space and time, we study the functional Large Deviations (LDs) of the integrated current. As hinted by the asymmetric of the LD of the exponential Last Passage Percolation, the TASEP exhibits two types of LDs: one corresponds to events of probability $\exp(-O(N))$, and the other corresponds to events of probability $\exp(-O(N^2))$. In this talk I will report a result on the speed-N^2 LD Principle of the TASEP, with an explicit rate function. This result complements the speed-N LD Principle of Jensen (2000) and of Varadhan (2004). Also, viewing the TASEP as a special degeneration of the stochastic Six Vertex Model, we interpret our result as giving an explicit formula of the surface tension function of a titling model.

This is joint work with Stefano Olla