Tagged particle in TASEP and random matrices

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The asymmetric simple exclusion process(ASEP) is a simple model for driven diffusive systems. The mathematical structure is closely related to that of XXZ spin chain and using the integrability of the model, various quantities are analyzed exactly. Recently the non-stationary properties of the ASEP are vigorously discussed. It has turned out that the fluctuations of current, particle position, etc are equivalent to the largest eigenvalue fluctuation in the random matrix model. In this presentation, we report the results on the position fluctuation of a particular particle ("tagged particle") in the 1D totally asymmetric simple exclusion process (TASEP). We will also discuss the relationship among the tagged particle problem in TASEP, Bethe ansatz, and the combinatorial techniques (RSK correspondence, Schur process, etc). This is the joint work with Tomohiro Sasamoto. (Ref. math-ph/0702009)