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Power spectra in totally asymmetric simple exclusion process (TASEP) with local inhomogeneity JIAJIA DONG, Hamline University, ROYCE K.P. ZIA, Virginia Tech — As a paradigmatic system in non-equilibrium statistical mechanics, TASEP has been extensively studied in the abstract and also applied to model many complex phenomena such as traffic flow and protein synthesis. We focus on a rather less studied aspect of TASEP: the total number of particles on a one-dimension open TASEP at time t, $N(t)$, and its power spectra $I(\omega)$, especially when there are local inhomogeneities. Motivated by the protein synthesis process where messenger RNA, codons and ribosomes are associated with the underlying lattice, sites and particles transported in TASEP, we investigate the effect on the power spectrum due to one defect (slower hopping rate) at different positions along the lattice. Using Monte Carlo simulation, we measure $I(\omega)$ for both the entire system and the subsystems separated by the defect. As in previous studies, oscillations are found. Here, however, more interesting characteristics emerge, depending on the location and the "strength" of the slow site. The biological implication of these results is also discussed.

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