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The effect of detachment and attachment to a kink motion in ASEP

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我々は、開放境界条件下の非対称単純排他過程 (ASEP) において現れるキンクの運動について、端以外での粒子の出入りがキンクの運動にどう影響するかを調べた。キンクの運動は、粒子の出入り口付近にトラップされるようになり、今回我々は、キンクの位置の分布を計算し、シミュレーションと比較した。

1 Abstract

We study the dynamics of a kink in a one-lane asymmetric simple exclusion process with detachment and attachment of the particle at arbitrary sites. For a system with one site of detachment and attachment we find that the kink is trapped by the site, and the probability distribution of the kink position is described by the overdamped Fokker-Planck equation with a V-shaped potential. Our results can be applied to the motion of a kink in arbitrary number of sites where detachment and attachment take place. When detachment and attachment take place at every site, we confirm that the kink motion obeys the diffusion in a harmonic potential. We compare our results with the Monte Carlo simulation, and check the quantitative validity of our theoretical prediction of the diffusion constant and the potential form.[1]

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