Large deviations for the boundary driven weakly asymmetric exclusion process

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We consider the weakly asymmetric exclusion process on a bounded interval with birth/death processes and the endpoints. In the diffusiove scaling limit the empirical density converges to the solution of the viscous Burgers equation with Dirichelt boundary conditions. We discuss the associated large deviation principle and analyze the corresponding variational problem for the quasi-potential, which is the rate function for the empirical measure when particles are distributed according to the stationary measure. We characterize the quasi potential in term of a one-dimensional boundary value problem and show that, for particular values of the parameters the optimal "exit trajectory" is not unique. This behaviour is best understood in terms of the Hamiltonian flow associated to the variational problem defining the quasi potential.