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Hydrodynamic limit for exclusion processes with velocity.

ABSTRACT: We consider a new class of one-dimensional exclusion processes with velocities featuring random flips of velocities. These processes can be considered as intermediates between simple symmetric exclusion processes (SSEP) and totally asymmetric exclusion processes (TASEP) in a sense. We prove the diffusive scaling limits of these nonreversible and nongradient systems. The limits are identified as certain nonlinear diffusion equations, with coefficients characterized by variational formulas. We also obtain the asymptotic behavior of the diffusion coefficient as the rate of flips of velocities goes to ∞ or 0, which relates to the diffusion coefficients of SSEP or TASEP.