Phase Diagram of the Two-Species TASEP with Open Boundaries

Chikashi Arita

Institute of Physics, University of Tokyo,
Komaba 3-8-1, Meguro-ku, Tokyo 153-8902, Japan

The two-species totally asymmetric exclusion process (TASEP) on a chain with an open boundary condition is considered. The model is formulated as a master equation. Its exact stationary-state solution is obtained as a matrix product form and explicit expressions of physical quantities are found. In the thermodynamic limit, the physical quantities exhibit boundary-induced phase transitions. The phase diagram of the current and the densies consists of three regions: maximal-current phase, low-density phase and high-density phase. The phase diagram of the localization lengths consists of eight regions, which is a feature that one-species TASEP does not have.