Incompressible limit for the WASEP

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Abstract

We consider in this talk the so-called incompressible limit for the weakly asymmetric simple exclusion process. A fundamental question in mathematical physics is the derivation of the master equation of fluids such as the Burgers equation or the Navier-Stokes equation. Since the Navier-Stokes equation does not have scaling invariance, it cannot be obtained by a scaling limit. By the celebrated Varadhan's non gradient method, Esposito, Marra and Yau (1996) and Quastel and Yau (1998) derived the Navier-Stokes equation as an incompressible limit in dimensions larger than 2. On the other hand, the derivation of the Navier-Stokes equation in low dimensions is derived only from a stochastic lattice gas with long jumps. In this talk, we will consider the incompressible limit for the WASEP by recent notable entropy estimates obtained by Menezes and Jara. This talk is based on ongoing work with Milton Jara and Claudio Landim.