

On hydrodynamic limits in Sinai-type random environments

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Abstract

We investigate the hydrodynamical behavior of a system of random walks with zero-range interactions moving in a common ‘Sinai-type’ random environment on a one dimensional torus. The hydrodynamic equation found is a quasilinear SPDE with a ‘rough’ random drift term coming from a scaling of the random environment and a homogenization of the particle interaction. Part of the motivation for this work is to understand how the space-time limit of the particle mass relates to that of the known single particle Brox diffusion limit. In this respect, given the hydrodynamic limit shown, we describe formal connections through a two scale limit. It is a joint work with Claudio Landim, Carlos Pacheco and Sunder Sethuraman.