
The mirrors model : diffusion without noise or chaos

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Abstract

We consider a discrete version of the mirrors model in a finite d -dimensional domain and connected to particles reservoirs at fixed chemical potentials. The dynamics is purely deterministic and non-ergodic. We study the macroscopic current of particles in the stationary regime. We show first that when the size of the system goes to infinity, the behaviour of the stationary current of particles is governed by the proportion of orbits crossing the system. Using this approach, we show first that Fick's law can not hold in two dimensions and next, through a numerical study, its validity in three dimensions. The negative correlations between crossing orbits play a key role in the argument.

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