Mott law for a random walk in a random environment

D. Spehner
Department of Physics
Universität Duisburg-Essen
45117 Essen, Germany

Abstract

We consider a random walk on the support of a stationary and ergodic simple point process in R^d. To each point in this support is associated a bounded random energy, these energies being independent. The transition rates of the random walk decay exponentially with the jump distance and depend upon the energies through a factor of the Boltzmann-type. Such a model arises in the study of hopping transport in disordered solids in the Anderson localization regime. It is shown that for dimensions d larger than two the motion is diffusive (convergence to a Brownian motion). A lower bound for the diffusion constant is obtained. This bound is given by the celebrated Mott's law for variable-range hopping in disordered solids.