« Atelier sur les relations de fluctuation entropique en mathématiques et physique »
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Finite size quantum multibarrier systems vs. boundary driven Zero Range models

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A quantum finite-sized multi–barrier system, with periodic as well as random potentials, meant to describe nanostructured pressure sensors, is considered. Expressions for its plane wave amplitudes are obtained, and then are associated with the mass densities of a stochastic process of independent random walks on a lattice, properly relating wave amplitudes and hopping probabilities. Analytical and numerical results prove that the stationary density profile of the particle system overlaps with the quantum mass density profile of the stationary Schrödinger equation, when the parameters of the two models are suitably matched. This allows an investigation of the quantum model, that remains by and large elusive, in terms of the stochastic system, and vice-versa. A kind of large deviation principle for the transmission rate is observed to hold in the quantum case. The fluctuation relation for currents is briefly discussed.

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