Current Large Deviations in the Kipnis-Marchioro-Presutti Model of Heat Conduction

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We present numerical results for the one dimensional Kipnis-Marchioro-Pressutti (KMP) lattice model for heat conductivity. In particular, we focus on the fluctuating behavior of the heat current and the associated thermal profiles. We compare our results with a recent theoretical approach by Bodineau and Derrida[1] based on an additivity principle for the current in one dimensional diffusive systems. Using a recently introduced algorithm which allow the direct computation of large deviations[2,3], we measure the large deviation function of the total heat current in the KMP model. Our results point out that deviations from the Bodineau-Derrida theory show up for large enough current fluctuations, due to the presence of time-dependent optimal energy profiles, in agreement with recent results[4,5].

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