

Anomalous heat diffusion

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In low dimensional systems the transport of heat in form of diffusive spread or heat flux between reservoirs of differing ambient temperatures typically may exhibit anomalous features such as the violation of the Fourier Law with length-dependent heat conductivities or the diffusive spread of heat that occurs faster than normal. Here we will discuss results and open issues (!) how the dynamics of energy spread occurring in one-dimensional nonlinear lattices relates to anomalous diffusion behavior and heat conductivities. Moreover we explain how the carriers of heat, typically referred to as phonons, may be given meaning in a regime with nonlinear interaction forces beyond the ballistic behavior originating from solely harmonic (linear) interaction forces. The underlying physical mechanism of scattering then renders corresponding mean free paths of such effective phonons finite.

*Some pertinent own references are given below:

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