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Diffusion limit in complex media LEV DEYCH, Queens College of CUNY, MIKHAIL EREMETNCHOUK, University of Central Florida, HUI CAO, HEESO NOH, Northwestern University, ALEXANDER LISYANSKY, Queens College of CUNY — Structures with pre-engineered spatial modulations of the dielectric function attract a lot of attention because they provide possibility to control effectively propagation of light. Recently it has been realized that unusual optical characteristics of such structures have a deep impact on their general physical properties. Even such well-studied phenomenon as light transport in disordered media is strongly affected by the regular modulation of the dielectric function. As a result, the transport in complex media has specific features, which can not be understood in the framework of the standard theory. We present the general theory of the diffusive (completely incoherent) limit in disordered structures with regular modulation of the dielectric function. We establish a relation between this limit and equilibrium understood from the statistical physics point of view. We show, in particular, that in the case of weak disorder the diffusion limit is virtually independent on the disorder and is nontrivially determined by properties of the ideal structure. We demonstrate how the diffusion of light appears as the perturbation of equilibrium.

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