

Study of Transport Phenomena in Photonic Crystals with Correlated Disorder

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Abstract : Using the transfer-matrix technique and the Kronig Penney model, we numerically and analytically investigate the effect of short-range correlated disorder in random dimer model (RDM) on transmission properties of light in one dimension photonic crystals made of three different materials. Such systems consist of two different structures randomly distributed along the growth direction, with the additional constraint that one kind of these layers appears in pairs. It is shown that the one-dimensional random dimer photonic crystals support two types of extended modes. By shifting of the dimer resonance toward the host fundamental stationary resonance state, we demonstrate the existence of the ballistic response in these systems.

Keywords : photonic crystals, disorder, correlation, transmission

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