

Abstract Submitted
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Photonic delocalization and optical propagation in one-dimensional random n-mer dielectric systems¹ RUWEN PENG, ZENG ZHAO, FENG GAO, LUSHUAI CAO, DE LI, ZHAN WANG, XIPING HAO, MU WANG, National Laboratory of Solid State Microstructures, NATIONAL LABORATORY OF SOLID STATE MICROSTRUCTURES TEAM — We have both theoretically and experimentally investigated the propagation of electromagnetic waves in a one-dimensional random n-mer(RN) dielectric system. Due to the positional correlation in the RN structure, the localization- delocalization transitions of photons happen at expected frequencies of photons. Multiple resonant transmissions are found in the photonic band gap. At each resonant mode, zero- Lyapunov exponent and undecayed field distribution of electromagnetic waves have been found through the whole system. Furthermore, the channel is opened for photonic transport at the resonant frequency, and the density of states of photons increases step by step as frequency increases. The theoretical results are experimentally demonstrated in RN dielectric multilayer films of SiO₂/TiO₂ for visible and near infrared light.

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