Energy confinement in microwave aperiodic lattices

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Abstract

We study transport properties in 2D microwave lattices embedded in a quasi 2D cavity. A regular lattice, an aperiodic lattice (Vogel spiral (1)), and a disordered lattice were constructed using a set of dielectric cylinders. Our experimental platform allows us to extract the decay of the energy in time, the density of states, the Thouless conductance as well as the spatial shape of the eigenstates (3). We found that frequency windows where the Thouless conductance is small contain eigenstates that look spatially confined inside the lattice then the radial behavior of those states is analyzed. Gaussian and exponential radial behaviors are experimentally found for the different localized states in Vogel spirals (2), while localized states in disordered systems always decay in a exponential way.

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