Localization and delocalization of waves in potentials defined by moiré patterns

Optical and Electronic Technologies - OET



It has been shown that it is possible to localize and delocalize waves propagating in a potential defined by a moiré pattern, more precisely, a potential defined by the superposition of periodic potentials with a relative rotation between them. Localization only occurs when the resulting potential is aperiodic (i.e. for certain rotation angles) and the intensities of the periodic lattices' are appropriate. In this demonstration, the intensity of one of the periodic potentials is fixed as 1, while the other, p2, can be varied between 0 and 0.4. The rotation angle starts at arctan(3 / 4), i.e. resulting in a periodic moiré pattern. It can be slowly shifted away from this value, i.e. resulting in aperiodic moiré patterns, where localization may be observed for appropriate p2. In particular, the transition between delocalized and localized states is sharper for p2 between 0.1 and 0.3.

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