

Abstract Submitted
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The electronic spectrum of a quasiperiodic potential: from the Hofstadter butterfly to the Fibonacci chain GERARDO NAUMIS, Depto. de Física-Química, Instituto de Física, UNAM — We show that the electronic spectrum of a tight-binding Hamiltonian defined in a quasiperiodic chain with an on-site potential given by a Fibonacci sequence, can be obtained as a superposition of Harper potentials. Since the spectrum of the Harper equation as a function of the magnetic flux is a fractal set, known as Hofstadter butterfly, here we show that is possible to follow the transformation of the butterfly to a new one that contains the Fibonacci potential and related approximants. As a result, the equation in reciprocal space for the Fibonacci case has the form of a chain with long range interaction between Fourier components. Then we explore the transformation between both spectra, and specially the origin of energy gaps due to the analytical calculation of the components in reciprocal space of the related potentials. As an application, we calculate the correlator of each potential, which allows to obtain some of the localization properties.

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