

Abstract

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Fractal properties of the Hofstadter's butterfly and singular continuous spectrum of the critical almost Mathieu operator

Harper's operator – the 2D discrete magnetic Laplacian – is the model behind the Hofstadter's butterfly. It reduces to the critical almost Mathieu family, indexed by phase. We discuss the proof of singular continuous spectrum for this family, for all phases, finishing a program with a long history. We also present a result (with I. Krasovsky) that proves one half of the Thouless' one half conjecture from the early 80s: that Hausdorff dimension of the spectrum of Harper's operator is bounded by $1/2$ for all irrational fluxes.