# Hofstadter butterfly for a quasicrystal washed out by phason disorder

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Electrons moving on a two-dimensional quasicrystal made of a single rhombic tile – the isometric Rauzy tiling – are described by a tight-binding model. Phason flips are introduced to disorder the tiling. The two systems – the clean and the disordered tilings – are studied in parallel and compared. The energy spectrum of a large cluster with periodic boundary conditions is computed numerically as a function of the magnetic flux per tile. Different types of gaps are identified in the clean Hofstadter butterfly : quantum Hall gaps labeled by two integers, quasicrystalline gaps labeled by three integers and gaps of mixed type. The disordered butterfly looses most of its finer structure but retains the main quantum Hall gaps. Band edge Landau levels define an effective mass, which can also be computed from the zero-field density of states.