GEOMETRY OF PERIODIC QUANTUM SYSTEMS

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Hamiltonian operators describing periodic quantum systems subject to constant magnetic fields give rise to interesting spectral and geometric structures. For the simplest possible model the fractal nature of the spectrum is nicely depicted in the famous Hofstadter butterfly and analyzed in the work of the recent fields medalist A. Avila. In my talk I describe recent results concerning perturbations of such systems for which an underlying geometric structure given by certain complex vector bundles over the torus becomes relevant.