

Spectral analysis near a Dirac type crossing in a weak non-constant magnetic field

Speaker: Bernard Helffer

(Laboratoire de Mathématiques Jean Leray, Université de Nantes)

Abstract

This is the continuation of a series of works together with H. Cornean and R. Purice devoted to the justification of the Peierls substitution in the case of a weak magnetic field. Here we deal with two $2d$ Bloch eigenvalues which have a conical crossing. It turns out that in the presence of an almost constant weak magnetic field, the spectrum near the crossing develops gaps which remind of the Landau levels of an effective mass-less magnetic Dirac operator. This involves the semi-classical analysis for the Peierls-Onsager effective Hamiltonian which is done through the combination of different pseudo-differential calculi.