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Landau levels in lattice QCD in an external magnetic field

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I will discuss the issue of Landau levels of quarks in lattice QCD in an external magnetic field. In two dimensions the lowest Landau level can be identified unambiguously even if the strong interactions are turned on. This allows to define a “lowest Landau level” also in the four-dimensional case. It is then possible to study to what extent the effect of a magnetic field on observables can be explained in terms of the lowest Landau level, and test the validity of low-energy models of QCD that make use of the lowest-Landau-level approximation.

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