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On lowest Landau level dominance in QCD

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QCD thermodynamics in strong magnetic fields shows some unexpected features like inverse catalysis, which have been revealed mainly through lattice studies. Many effective descriptions, on the other hand, use Landau levels or approximate the system by just the lowest Landau level (LLL). Analyzing lattice configurations we ask whether such a picture is justified. We find the LLL to be separated from the rest by a spectral gap in the two-dimensional Dirac operator and look for the corresponding signals in four dimensions. We determine to what extent the quark condensate is LLL dominated at various magnetic fields and temperatures.

Summary

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