

Phase structure of three flavor QCD in external magnetic fields using HISQ fermions

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We study the phase structure of QCD with three degenerate flavors in external magnetic fields using HISQ fermions. The simulations are performed on $16^3 \times 6$ and $24^3 \times 6$ lattices. In order to investigate the quark mass dependence of the QCD transition we vary the values of quark masses from 0.015 to 0.0009375 corresponding to $m_\pi = 320$ MeV and 80 MeV in the continuum limit. We found no indication of a first order phase transition in the current window of quark masses and external magnetic fields. Unlike to the case with standard staggered fermions inverse magnetic catalysis is always observed above the critical temperature. The microscopic origin of this phenomena as well as the volume effects are further discussed by looking into the Dirac eigenvalue spectrum.

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