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Fluctuations of conserved charges in strong magnetic fields in (2+1)-flavor QCD

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We present the first lattice QCD results of the second order fluctuations of and correlations among net baryon number, electric charge and strangeness in (2+1)-flavor lattice QCD in the presence of a background magnetic field with physical pion mass $m_\pi = 135$ MeV. To mimic the magnetic field strength produced in the early stage of heavy-ion collision experiments we use 6 different values of the magnetic field strength up to $\sim 10 m_\pi^2$. The simulations were performed using the Highly Improved Staggered Quarks with physical pion mass on $N_\tau = 8$ and 12 lattices. By comparing lattice QCD results to results from the hadron resonance gas model, possible proxies are proposed to study the imprints of magnetic fields in high-energy heavy ion collision experiments.

Topical area

QCD at Non-zero Temperature

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