

# Fluctuations of conserved charges in strong magnetic fields

*Monday, 1 November 2021 15:30 (30 minutes)*

We present results on 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. We extended our previous simulations with pion mass  $m_\pi = 220$  MeV [1] to physical pion mass  $m_\pi = 140$  MeV. Simulations are performed on  $32^3 \times 8$  lattices using the highly improved staggered fermions with different values of lattice spacing corresponding to temperatures ranging from 144 MeV to 166 MeV. The magnetic field strength  $eB$  is simulated with 9 different values up to  $\sim 40m_\pi^2$  at each temperature. We discuss the temperature and  $eB$  dependences of the second-order fluctuations of and correlations among net baryon number, electric charge, and strangeness. We find that these fluctuations and correlations are substantially affected by the magnetic field at  $eB \sim 15m_\pi^2$ , which is around the strength produced in the initial stage of non-central heavy-ion collisions at the LHC energy. We propose that these fluctuations and correlations could be useful for probing the existence of a magnetic field in heavy-ion collision experiments.

**Presenter:** Dr LIU, Junhong (C)

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