Contribution ID: **53** Type: **not specified**

Chiral Properties of (2+1)-Flavor QCD in Strong Magnetic Fields at Zero Temperature

Thursday, 27 November 2025 17:25 (1 minute)

We present a lattice QCD study of the chiral properties of (2+1)-flavor QCD in background magnetic fields at zero temperature with physical pion masses. Simulations are performed using the highly improved staggered quark (HISQ) action across four different lattice spacings to enable a controlled continuum extrapolation. We compute the renormalized chiral condensates, pseudoscalar meson masses, and decay constants of pions, kaons, and the $\eta_{s\bar{s}}$ as functions of the magnetic field strength. Our results show that magnetic fields enhance the chiral condensates and lead to characteristic modifications in the meson spectrum: the masses of neutral mesons are reduced, while those of charged mesons exhibit a non-monotonic behavior. The decay constants of neutral pseudoscalar mesons are found to be suppressed with increasing magnetic field. To elucidate the origin of the non-monotonic behavior in charged meson masses, we separately analyze the sea and valence quark contributions. These results provide new insights into the interplay between QCD chiral symmetry breaking and strong magnetic fields.

Primary authors: DING, Heng-Tong (Central China Normal University); ZHANG, dan (华中师范大学)

Presenter: ZHANG, dan (华中师范大学)

Session Classification: Poster