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Inverse catalysis effect of the quark anomalous magnetic moment to chiral restoration and deconfinement phase transitions

The effect of quark anomalous magnetic moment (AMM) to chiral restoration and deconfinement phase transitions under magnetic fields is investigated in a Pauli-Villars regularized Polyakov-extended Nambu–Jona-Lasinio model. A linear-in-
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term for quark anomalous magnetic moment is introduced to the Lagrangian density of our model, and it plays the role of inverse catalysis to the phase transitions. With fixed magnetic field, the critical temperature decreases with quark AMM. When fixing quark AMM, the critical temperature increases with magnetic field for a small quark AMM, but decreases with magnetic field for a large quark AMM. The critical temperature of chiral restoration and deconfinement phase transitions is determined by the two competing factors, the catalysis effect of magnetic field and inverse catalysis of quark anomalous magnetic moment.

Primary authors: 毛, 施君 (西安交通大学); 梅, 杰 (Xi an Jiaotong University)

Presenter: 梅, 杰 (Xi an Jiaotong University)