

Yuanyuan Wang "Disappearance of the first-order chiral phase transition in QCD: cosmological implications for dark QCD,"

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The first-order nature of the chiral phase transition in QCD-like theories can play crucial roles in addressing a dark side of the Universe, where the created out-of equilibrium is essential to serve as cosmological and astrophysical probes such as gravitational wave productions, which have extensively been explored. We find that such a first order feature may not hold when ordinary or dark quarks are externally coupled to a weak enough background field of photon or dark photon (which we collectively call a "magnetic" field). We assume that a weak magnetic background field could be originated from some "magnetogenesis" in the early Universe. We work on a Nambu-Jona-Lasinio model which can describe the chiral phase transition in a wide class of QCD-like theories. We show that in the case with massless (light) three flavors, the firstorder feature goes away when the magnetic field is greater than the critical value.

Session Classification: Short talks