

XVth Quark Confinement and the Hadron Spectrum



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Quantum critical point from competition between Dirac Kondo effect and chiral symmetry breaking

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We discuss the QCD phase diagram in strong magnetic fields, where the chiral condensate is enhanced by the magnetic catalysis mechanism. In contrast to the conventional discussions, we include heavy-quark impurities that have been known to induce the Kondo effect. We propose a quantum critical point that arises as a consequence of the Kondo effect and the chiral symmetry breaking. Our phase diagram is obtained from a self-consistent determination of the magnitudes of the chiral condensate and the Kondo condensate, which is a particle pairing composed of conducting Dirac fermions and localized impurities. We also discuss finite-temperature effects and implications for condensed matter physics including bilayer graphene.

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