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The Kondo effect in dense QCD

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We discuss Kondo effect occurring in dense QCD [1,2]. Based on the renormalization-group analysis, we show that effective coupling strengths between ungapped and gapped quarks in the two-flavor color superconducting (2SC) phase are renormalized by logarithmic quantum corrections, which drives the system into a strongly coupled regime [2]. This is a characteristic behavior observed in the Kondo effect, which has been known to occur in the presence of impurity catterings via non-Abelian interactions. We propose a novel Kondo effect emerging without doped impurities, but with the gapped quasiexcitations and the residual SU(2) color subgroup intrinsic in the 2SC phase, which we call the 2SC Kondo effect [2]. The Kondo effect is a consequence of the dimensional reduction near the Fermi surface, and an analogous dimensional reduction in a strong magnetic field is also known to induce similar phenomena [3, 4].

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[4] Ozaki, Itakura, Kuramoto, "Magnetically induced QCD Kondo effect," Phys.Rev. D94 (2016) 074013.

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