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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 scatterings 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].

[1] Hattori, Itakura, Ozaki, Yasui, “QCD Kondo effect: quark matter with heavy-flavor impurities,” Phys.Rev. D92 (2015) 065003.

[2] Hattori, Huang, Pisarski, “Emergent QCD Kondo effect in two-flavor color superconducting phase,” [arXiv:1903.10953 [hep-ph]].

[3] Gusynin, Miransky, Shovkovy, “Dimensional reduction and dynamical chiral symmetry breaking by a magnetic field in (3+1)-dimensions,” Phys.Lett. B349 (1995) 477-483.

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

**Primary author:** Dr HATTORI, Koichi (Yukawa Institute, Kyoto University)

**Presenter:** Dr HATTORI, Koichi (Yukawa Institute, Kyoto University)

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