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Kondo effect and non-Fermi liquid behavior in Dirac and Weyl semimetals E. ROSSI, Physics Department, College of William and Mary, ALESSANDRO PRINCIPI, GIOVANNI VIGNALE, Physics Department, University of Missouri — We study the Kondo effect in three-dimensional (3D) Dirac materials and Weyl semimetals [1]. We find the scaling of the Kondo temperature with respect to the doping n and the coupling J between the moment of the magnetic impurity and the carriers of the semimetal. We find that when the temperature is much smaller than the Kondo temperature the resistivity due to the Kondo effect scales as the n to the -4/3.We also study the effect of the interplay of long-range scalar disorder and Kondo effect. In the presence of disorder-induced long-range carrier density inhomogeneities the Kondo effect is not characterized by a Kondo temperature but by a distribution of Kondo temperatures. We obtain the expression of such distribution and show that its features cause the appearance of strong non-Fermi liquid behavior. Finally we compare the properties of the Kondo effect in 3D Dirac materials and 2D Dirac systems like graphene and topological insulators.

[1] Alessandro Principi, Giovanni Vignale, E. Rossi, arXiv:1410.8532.

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