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Free Magnetic Moments in Disordered Metals[1] EDUARDO R. MUCCIOLO, University of Central Florida, STEFAN KETTEMANN, Institut für Theoretische Physik, Universität Hamburg, Germany, and Max-Planck Institute for Physics of Complex Systems, Dresden, Germany — The screening of magnetic moments in metals, the Kondo effect, is found to be quenched with a finite probability in the presence of nonmagnetic disorder. Numerical results for a disordered electron system show that the distribution of Kondo temperatures deviates strongly from the result expected from random matrix theory even in the diffusive regime. A pronounced second peak emerges for small Kondo temperatures, showing that the probability that magnetic moments remain unscreened at low temperatures increases with disorder. Analytical calculations, taking into account correlations between eigenfunction intensities yield a finite width for the distribution that survives the thermodynamic limit. Experimental consequences for the electron dephasing in disordered mesoscopic metals and the thermodynamic properties of heavy-fermion compounds are discussed.

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