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Two-fluid behavior of the Kondo lattice in the $1/N$ slave boson approach.[1] VICTOR BARZYKIN, University of Tennessee, Knoxville, TN, LEV P. GOR'KOV, NHMFL, Tallahassee, FL — It has been recently shown by Nakatsuji, Pines, and Fisk [S. Nakatsuji, D. Pines, and Z. Fisk, Phys. Rev. Lett. **92**, 016401 (2004)] from the phenomenological analysis of experiments in $Ce_{1-x}La_xCoIn_5$ and $CeIrIn_5$ that thermodynamic and transport properties of Kondo lattices below coherence temperature can be very successfully described in terms of a two-fluid model, with "Kondo gas" (interacting magnetic moments) and "Kondo liquid" (heavy electron Fermi liquid) contributions. We analyze thermodynamic properties of Kondo lattices using $1/N$ slave boson treatment of the periodic Anderson model and show that these two contributions indeed appear below the coherence temperature. We find that the "Kondo gas" contribution to thermodynamics corresponds to thermal excitations into the flat portion of the energy spectrum. As a result, the relative fraction of "Kondo gas" depends exponentially on temperature, rather than linearly in experiment.

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