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Landau Renormalizations of Superfluid Density in the Heavy-Fermion Superconductor CeCoIn5[1] LEI SHU, Fudan University, D.E. MACLAUGHLIN, C.M. VARMA, UC Riverside, O.O. BERNAL, California State U. LA, P.-C. HO, R.H. FUKUDA, California State U. Fresno, X.P. SHEN, Fudan University, M.B. MAPLE, UC San Diego — The formation of heavy fermion (HF) bands can occur by means of the conversion of a periodic array of local moments into itinerant electrons via the Kondo effect and the huge consequent Fermi-liquid(FL) renormalizations. Leggett predicted for liquid ^{3}He that FL renormalizations change in the superconducting state, leading to a temperature(T) dependence of the London penetration depth Λ quite different from that in the BCS theory. Using Leggett's theory, as modified for HF, it is possible to extract from the measured T dependence of Λ in high quality samples both Landau parameters F_0^s and F_1^s; this has never been accomplished before. A modification of the T dependence of the specific heat $C_{\rm el}$, related to that of Λ, is also expected. We have carefully determined the magnitude and T dependence of Λ in $CeCoIn_5$ by muon spin relaxation rate measurements to obtain $F_0^s = 36 \pm 1$ and $F_1^s = 1.2 \pm 0.3$, and find a consistent change in the T dependence of electronic specific heat $C_{\rm el}$. This, the first determination of F_1^s with a value $\ll F_0^s$ in a HF compound, tests the basic assumption of the theory of HF,that the frequency dependence of the self-energy is much more important than its momentum dependence.

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