

Low energy electrodynamics of the Kondo-lattice antiferromagnet CeCu_2Ge_2

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We present time-domain THz spectroscopy data of a thin film of the heavy fermion compound CeCu_2Ge_2 . Measurements to obtain the frequency dependent complex conductivity were taken as a function of temperature down to temperatures below the onset of magnetic order. At low temperatures a narrow Drude-like peak forms, which is likely associated with the heavy fermion or spin density wave state. Using this data in conjunction with DC resistivity measurements and Fourier transformed infrared reflectivity data, we obtain the frequency dependence of the scattering rate and the mass renormalization through an extended Drude model analysis. At lowest temperatures, an effective mass of almost 80 times the band mass is observed, which is consistent with reported specific heat measurements. The persistence and further development of the heavy fermion state well into the antiferromagnetic state, which challenges the conventional understanding of the low temperature competition between Kondo screening and the Ruderman-Kittel-Kasuya-Yosida interaction, will be discussed.

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