

Hybridization gap and anisotropic far-infrared optical conductivity of URu₂Si₂

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We present far-infrared reflectivity measurements on URu₂Si₂ as a function of temperature along the a-axis and the c-axis of the tetragonal structure. Our results demonstrate that in addition to a pronounced anisotropy, a partial gap emerges at ~ 30 K, well above the hidden order temperature T_{HO} and whose amplitude seems to be T-independent and not affected by the hidden order transition. As this suppression of spectral weight coincides with the development, at the same energy, of a maximum in the scattering rate, indicating optical interband transitions, we propose that this partial gap is a hybridization gap and that this change in the bandstructure below 30 K is a precursor of the hidden order state. However, since these changes have no noticeable impact on the entropy nor on the DC transport properties, we suggest that this is a crossover phenomenon rather than a thermodynamic phase transition.

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