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Title

Terahertz conductivity of the heavy-fermion compound UNi2Al3

Source

Physical Review B (Condensed Matter and Materials Physics), vol.84, no.3, 15 July 2011, 035132 (6 pp.). Publisher: American Physical Society, USA.

Abstract

We have studied the optical properties of the heavy-fermion compound UNi2Al3 at frequencies between 100 GHz and 1 THz (3 cm^-1 and 35 cm^-1), temperatures between 2 and 300 K, and magnetic fields up to 7 T. From the measured transmission and phase shift of radiation passing through a thin film of UNi2Al3, we have directly determined the frequency dependence of the real and imaginary parts of the optical conductivity (or permittivity, respectively). At low temperatures the anisotropy of the optical conductivity along the a and c axes is about 1.5. The frequency dependence of the real part of the optical conductivity shows a maximum at low temperatures, around 3 cm^-1 for the a axis and around 4.5 cm^-1 for the c-axis. This feature is visible already at 30 K, much higher than the Ne'el temperature of 4.6 K, and it does not depend on external magnetic fields as high as 7T. We conclude that this feature is independent of the antiferromagnetic order for UNi2Al3, and this might also be the case for UPd2Al3 and UPt3, where a similar maximum in the optical conductivity was observed previously. (37 References).