

View Abstract

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TITLE: Crystal-field excitations and magnetic fluctuations of heavy-fermion metal CeB₆

Abstract Body: CeB₆ enters an antiferro-quadrupolar (AFQ) phase below T_{AFQ}=3.2K, in which the T_{2g}-symmetry quadrupoles order at a finite wave vector [Rep. Prog. Phys. 79, 066502 (2016)]. With its cubic lattice structure and 4f¹ Ce³⁺ electronic configuration, this compound is considered a prototypical example of heavy-fermion metal with quadrupolar ordering. We study the crystal-field (CF) excitations and magnetic fluctuations at Ce³⁺ sites by Raman scattering [Phys. Rev. Materials 3, 065003 (2019)]. The spectral linewidth of the CF transitions increases on cooling below 80K, at which the electric resistivity shows its maximum. This coincidence points to the relationship between the broadening of linewidth and Kondo physics. For quasi-elastic fluctuations, the temperature dependence of the static Raman susceptibility in the magnetic channel is consistent with the previously-reported magnetic susceptibility data. Such behavior implies that above T_{AFQ}, the tendency towards AFQ ordering induces ferromagnetic correlations which manifest as long-wavelength magnetic fluctuations.

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