UNUSUAL FEATURES OF ITINERANT ANTIFERROMAGNETISM IN UGA_3

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9.7 cm

Antiferromagnetic UGa_3 is a prototypical representative of an unusual class of itinerant magnets with large orbital moments. Although the magnetic, electrical transport and thermodynamic properties of this compound closely resemble those of 3d-electron transition-metal systems, some peculiar features unambiguously manifest the presence of large orbital moments, as in lanthanide-based materials with localized 4f-electrons. This unique behavior of itinerant 5f-electrons makes UGa_3 an interesting system for both experimental and theoretical studies. In the talk, we shall review the results of a series of sophisticated experiments performed on high-quality single crystals of UGa_3: elastic and inelastic neutron scattering, optical ellipsometry, resonant X-ray magnetic scattering, Mössbauer spectroscopy. Among other topics we shall discuss a two-component dynamical magnetic response, related to fast and slow quasiparticle excitations in the ordered state, and a giant enhancement of the RXMS signal at the K-edge of nonmagnetic Ga anion, which possibly involves the hybridization of the gallium 4p-orbitals with the uranium 5f-states. The experimental findings will be compared to the calculated results, derived in the framework of local spin density functional theory.

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13.4 cm

Subject category :

4. Rare Earths and Actinides, Alloys and Compounds

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