Correlated heavy-fermion ground state in $CeAl_3$

V.N.Lazukov
Russian research centre "Kurchatov Institute", Moscow, Russia.

The extended study of $CeAl_3$ magnetic response has been performed by inelastic neutron scattering spectroscopy. Considerable changes of low-energy inelastic as well as quasielastic peaks have been observed in the magnetic excitation spectra in the temperature range between Kondo temperature ($T_K \sim 5$ K) and the first excited crystal field level energy ($E_{CF} \sim 70$ K). In particular, the energy of the crystal field excitation from the $|\pm 3/2\rangle$ ground state increases significantly. Furthermore, spectral weight is transferred to quasielastic (QE) magnetic scattering. The intensity of QE neutron scattering exhibits an oscillatory behaviour as a function of momentum transfer at low temperature. All observed features are interpreted as consequence of a heavy-fermion ground state formation of a spin liquid type with resonance valence bonds.