

Orbital-wise Decomposition of Magnetic Compton Profiles and Spin Moments in UGe_2

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The uranium ferromagnet UGe_2 has drawn much attention because of possible coexistence of superconductivity and ferromagnetism [1].

We have measured the spin-polarized electron momentum density distributions (magnetic Compton profiles) of UGe_2 using the synchrotron-based magnetic Compton scattering technique. The spin moment of UGe_2 has been determined as $-1.15 \text{ } i_B$ at 10 K with an applied magnetic field of 0.5 T. Compared with the saturated magnetization of $+1.40 \text{ } i_B$, we have determined the orbital moment at $+2.55 \text{ } i_B$.

The magnetic Compton profiles are decomposed into partial profiles by fitting with the U-5f atomic profiles with different magnetic quantum number m . From the fitted results, we estimated the orbital moment at $+2.90 \text{ } i_B$. It gives a slightly higher value since this estimation does not take account of the partial quenching of the orbital moment due to hybridization.

We also found that the shape of the magnetic Compton profiles depend on temperature, indicating the spin-polarized, ground-state wave-functions vary with temperature.

[1] Saxena S. S. et al., *Nature*, 2000, **406**, 587.

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