# Coherent magnetic excitations in a topological Kondo semimetal

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CeNiSn is an unusual example of a Kondo semimetal, for which transport measurements evidence the opening of a gap in the electronic structure due to Kondo hybridization between the Ce-4f and conduction electrons at low temperatures, yet a fully-fledged Kondo insulating state fails to develop [1]. More recently, CeNiSn has also been proposed to be a topological Möbius Kondo insulator, where the nonsymmorphic symmetry leads to unusual topologically protected surface states [2]. Previous inelastic neutron scattering measurements using triple-axis spectrometers showed evidence for magnetic excitations together with a spin-gap only at limited momentum transfers [3,4]. Since there is a strong Kondo effect in CeNiSn but no evidence for magnetic order down to the lowest measured temperatures, there have been several competing proposals put forward to explain the origin of the peculiar low energy magnetic excitations.

Here we report inelastic neutron scattering measurements on single crystals of CeNiSn performed using a cold-neutron time-of-flight spectrometer, allowing for a wider range of energy and momentum transfers to be measured. We reveal the presence of dispersive coherent magnetic excitations in CeNiSn at low temperatures, together with the opening of a spin gap over an extended range of momentum transfers. Comparisons to electronic structure calculations indicate that these dispersive excitations correspond to transitions between strongly renormalized heavy 4f-bands. Moreover, analysis of the results of DMFT calculations show that the renormalized band structure has a fully open direct gap with a $Z_2$ invariant of (1;000), indicating the presence of a low temperature topological Kondo insulating state in CeNiSn.

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