Experimental report

02/05/2022

Proposal: 5-54-368 **Council:** 10/2020

Title: Is the magnetic structure of EuCuAs a transverse helix or a collinearantiferromagnet?

Research area: Physics

This proposal is a continuation of 5-41-1048

Main proposer: Andrew Timothy BOOTHROYD

Experimental team: Jian Rui SOH

Local contacts: Jose Alberto RODRIGUEZ VELAMAZAN
Anne STUNAULT

Samples: EuCuAs

Instrument	Requested days	Allocated days	From	To
D3	8	8	01/03/2021	05/03/2021
			12/05/2021	17/05/2021

Abstract:

EuCuAs hosts magnetically-induced Weyl fermions whose band topology depends on the magnetic structure. In zero field the magnetic structure is either a transverse helix of a collinear antiferromagnet. Our previous unpolarized neutron diffraction measurements on D9 indicate the helix, but the very strong absorption due to Eu makes it difficult to determine Bragg peak intensities accurately. We wish to obtain an independent confirmation of the magnetic structure by spherical neutron polarimetry, which is not affected by sample absorption.

Experiment

We performed spherical neutron polarimetry measurements of EuCuAs to identify if the magnetic order is a spin helix or a collinear anti-ferromagnet.

Results

Indeed, spherical neutron polarimetry played a decisive role in the determination of the ground state magnetic order. The results obtained from this SNP measurements on D3 will be used in conjunction with inelastic neutron scattering data obtained from Thales, Merlin, MARI and LET.