

Experimental report

14/02/2022

Proposal: 5-31-2831

Council: 10/2020

Title: Magnetic ordering in a quasi-one-dimensional $S = 1/2$ chain compound AgCuVO_4

Research area: Physics

This proposal is a new proposal

Main proposer: Matej PREGELJ

Experimental team: Vivian NASSIF

Local contacts: Ines PUENTE ORENCH
Vivian NASSIF

Samples: AgCuVO_4

Instrument	Requested days	Allocated days	From	To
D1B	1	1	13/03/2021	14/03/2021

Abstract:

Here we propose to investigate the low-temperature magnetic structure of a quasi-one-dimensional $S = 1/2$ chain compound AgCuVO_4 . In contrast to typical cuprate spin-chain systems, AgCuVO_4 exhibits a Cu-O-Cu bonding angle that is between the common 90° and 180° values, leading to ferro- and antiferro-magnetic interactions, respectively. Moreover, DFT calculations imply additional frustrated interchain interactions, which promise a rich magnetic phase diagram consisting of complex magnetic phase that may exhibit intriguing magnetic excitations. The system orders below $T_N = 2.5$ K, yet its ground state is still unknown.

Powder neutron diffraction patterns were measured for AgCuVO_4 compound at 10 K and at 2 K, i.e., above and below the anomaly at ~ 2.5 K reported in specific heat measurements, respectively. We find no difference between the two diffraction patterns, except for a small shift of nuclear reflections resulting from lattice contractions. The same response was observed for two neutron wavelengths of 1.28 and 2.52 Å. This implies that ordered magnetic moments at this temperature are probably too small to be detected. On the other hand, the refinement of the diffraction pattern to the crystal structure model yields a very good agreement and shows no contributions of potential impurity phases.