

# Experimental report

15/09/2022

**Proposal:** 5-41-1169

**Council:** 4/2021

**Title:** Magnetic and electric field switching of magnetic domains in MnSb<sub>2</sub>O<sub>6</sub>

**Research area:** Physics

**This proposal is a continuation of** 5-11-439

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**Samples:** MnSb<sub>2</sub>O<sub>6</sub>

Instrument	Requested days	Allocated days	From	To
D10	2	3	28/06/2021	02/07/2021
D3 CPA	7	8		

## Abstract:

Multiferroic MnSb<sub>2</sub>O<sub>6</sub> has a chiral crystal structure which is directly coupled to its magnetic chiralities. Using polarized neutrons applied to magnetic and Schwinger scattering, we have shown the non-racemic mixture of chiral structural domains in our single-crystal. We would like to complement our magnetic structure refinement with a collection of high statistics magnetic reflections on D10. Previous macroscopic experiment showed the tunability of the magnetic domains applying an external magnetic field. We would like to unambiguously characterize the microscopic magnetic structure after cooling the sample under magnetic field. Similarly, we would like to confirm the unique ferroelectric switching mechanism which was predicted in this compound. For this purpose, spherical neutron polarimetry on D3 is needed.

Proposal 5-41-1169, 3 days on D10 (28/06/2021 to  
02/07/2021)  
Magnetic and electric field switching of magnetic domains in  
 $\text{MnSb}_2\text{O}_6$

The results from this single-crystal magnetic neutron diffraction experiment were published in the following paper:

E. Chan, J. Pásztorová, R. D. Johnson, M. Songvilay, R. A. Downie, J.-W. G. Bos, O. Fabelo, C. Ritter, K. Beauvois, Ch. Niedermayer, S.-W. Cheong, N. Qureshi, and C. Stock, Phys. Rev. B **106**, 064403 (2022).