Contribution ID: **290** Type: **Poster**

Polarized SANS & GISANS studies on condensed matter systems

Tuesday 21 March 2023 16:00 (2 hours)

Small-Angle-Neutron-Scattering (SANS) and Grazing-Incidence-SANS (GISANS) techniques have seen a remarkable growth in their application in studies of magnetic materials. In combination with neutron polarization analysis, SANS and GISANS offer magnetic vector analysis on the micro- and mesoscopic length scale with high signal to noise ratio. However, in multiple sample environments like applied magnetic and electric field and at low temperatures, the experimental setup and data analysis procedures remain open issues.

Two examples are presented here. Firstly, magnetic chiral domain walls in thin-film heterostructures of Nb/FePd [1] have been investigated using GISANS with polarization analysis in an applied magnetic field and at low temperature. Optimizing the neutron-spin transport for low magnetic guide fields and its impact on the data analysis using in-house developed tools will be discussed. Secondly, magnetic chiral phases occurring in the magnetoelectric single crystal Ba_{2-x}Sr_xMg_2Fe_12O_22 [2] are studied using SANS with polarization analysis in applied magnetic and electric fields at low temperatures. Considerations in the instrumental design and the SANS data analysis using the SasView software [3] will be reported.

Polarization analysis has been incorporated as an integral part of the ESS instrument suite [4]. An introduction of its current scope will be provided.

[1] A. Stellhorn *et al.*, New Journal of Physics 22, 093001 (2020).
[2] K. Zhai *et al.*, Nature Communications 8, 519 (2017).
[3] www.sasview.org
[4] W. T. Lee *et. al.*, Report on ESS Polarisation Workshop, ESS-3549713 (2020).

Primary author: Dr STELLHORN, Annika (Lund University, Division of Synchrotron Radiation Research, 22100 Lund, Sweden and European Spallation Source (ESS), Instrument Technologies Division, 22484 Lund, Sweden)

Co-authors: BLACKBURN, Elizabeth (Lund University, Division of Synchrotron Radiation Research, 22100 Lund, Sweden); KENTZINGER, Emmanuel (Forschungszentrum Jülich GmbH, Jülich Centre for Neutron Science (JCNS-2) and Peter Grünberg Institut (PGI-4), JARA-FIT, 52428 Juelich, Germany); Dr SHEN, Lingjia (Lund University, Division of Synchrotron Radiation Research, 22100 Lund, Sweden); Mr STEPANCIC, Oskar (Lund University, Division of Synchrotron Radiation Research, 22100 Lund, Sweden); Dr LEE, Wai Tung (Hal) (European Spallation Source (ESS), Instrument Technologies Division, 22484 Lund, Sweden)

Presenter: Dr STELLHORN, Annika (Lund University, Division of Synchrotron Radiation Research, 22100 Lund, Sweden and European Spallation Source (ESS), Instrument Technologies Division, 22484 Lund, Sweden)

Session Classification: Poster session TUESDAY

Track Classification: Magnetism, Superconductivity, Topological Systems, Magnetic Thin Films an other electronic phenomena