



## Polarized SANS and GISANS at the ESS

*Dienstag, 17. September 2024 22:40 (20 Minuten)*

Small-Angle Neutron-Scattering (SANS) with polarization analysis is a powerful technique to investigate magnetic order in hard condensed matter systems on the nanometer and mesoscopic length scales. Especially for magnetic chiral structures, polarized SANS and its surface sensitive counterpart Grazing-Incidence-SANS (GISANS) are effective tools to determine their lateral and depth magnetic profiles. At the European Spallation Source (ESS), the expected high neutron flux coupled with novel instrumentation that will be supported by a wide variety of sample environments, will be combined with neutron polarization analysis on many instruments [1], enabling exciting new science projects.

Firstly, I will present an example system for future science projects at the ESS using polarized GISANS, and its impact on instrumental considerations. Thin film Nb/FePd exhibits coexisting superconducting and ferromagnetic phases, affecting both the superconducting and the magnetic order around its superconducting T<sub>c</sub> [2]. Although a Dzyaloshinskii–Moriya Interaction (DMI) leading to magnetic chirality is not expected in the L10-structured FePd, its domain walls obtain a preferred chiral direction, unveiled by polarized GISANS [3].

Secondly, comprehensive and user-friendly procedures for the collection, reduction, and analysis of polarized SANS data have to be established for ESS instruments. I will present the status of polarized SANS development on ESS instruments, including design, the data reduction protocols for polarized SANS and its future implementation into the data reduction software Scipp [4].

[1] W. T. Lee et al., EPJ Web of Conferences 286, 03004 (2023).

[2] A. Stellhorn et al., New Journal of Physics 22, 093001 (2020).

[3] A. Stellhorn, PhD thesis, RWTH Aachen University (2021).

[4] <https://scipp.github.io/ess/>

**Hauptautor:** STELLHORN, Annika (European Spallation Source)

**Co-Autoren:** Dr. BACKS, Alex (Lund University); Dr. JACKSON, Andrew (ESS); Prof. BLACKBURN, Elizabeth (Lund University); KENTZINGER, Emmanuel (JCNS-2); Dr. LEE, Wai-Tung (ESS)

**Sitzung Einordnung:** Mounting Posters, Beer and light Dinner

**Track Klassifizierung:** Instrumentation & Data Management