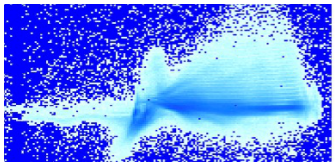

COHERENCE 2024
11th International Conference
on Phase Retrieval
and Coherent Scattering

MAX IV

Contribution ID: **34** Type: **Oral**

High resolution spin texture imaging in spin caloritronics prototype device structures: New opportunities for coherent hard X-rays with resonant scattering at 4th generation light sources.

Monday 17 June 2024 11:55 (20 minutes)

Spin caloritronics are currently a science focus due to their potential exploitation in the next generation of spintronics applications. This class of materials combine both spintronic and thermoelectric functionalities by interconversion of charge, spin and heat currents [1]. Revealing how atomic strain and magnetic structure are intertwined at the nanoscale is of central importance to the development of emerging spin caloritronic nanotechnologies [2]. The recent investment in high brilliance 4th generation synchrotron sources hold promise for the development of new microscopic tools to reveal simultaneously atomic and magnetic nano-structure. Here, we present preliminary results from ID01 of the ESRF-EBS and NanoMAX of MAX IV Laboratory. The first combine Bragg ptychography with X-ray resonant scattering at low temperatures to investigate prototype spin caloritronic devices structures of Gd3Fe5O12 epitaxial films capped with a Platinum layer. The second are focussed on the analysis of structure and strain of diverse prototype structures at room temperature. From our analysis exploiting inverse microscopy approaches, we demonstrate the potential to correlate atomic strain and magnetic structures down to 16 nm spatial resolution.

References
[1] S. Geprägs et al. Nature Com. 7, 10452 (2016).
[2] P.G. Evans et al. Science Advances 2020, 6 (40), eaba9351. DOI: doi:10.1126/sciadv.aba9351

Primary author: Dr MANNIX, Danny (European Spallation Source)

Co-authors: Mr THOMAS-HUNT, Jack (Aarhus University); Prof. EVANS, Paul (University of Wisconsin); Dr GEPRÄGS, Stephan (Walther Meissner Institut); Dr CHAMARD, Virginie (University Marseille / Institut Fresnel); Dr LI, Peng (Diamond Light Source); Dr CARBONE, Dina (MAX-IV, Lund University)

Presenter: Dr MANNIX, Danny (European Spallation Source)

Session Classification: Ptychography at different wavelengths - S1