Contribution ID: **26** Type: **Poster**

Evolution of Magnetization in Sequentially Grown Ferrite Nanoparticles

Monday 20 March 2023 16:00 (2 hours)

Magnetic nanoparticles (NPs) are technologically relevant for catalysis, high density magnetic data storage, ferrofluids and medical applications. A drastically reduced magnetization compared to the bulk material is commonly attributed to spin disorder in magnetic NPs. Such spin disorder has recently been suggested to be beneficial for magnetic heating, e.g. in intracellular magnetic hyperthermia [1] and is typically considered confined to the NP surface but has also been observed in the NP interior [2]. A key challenge in magnetic NP research lies therefore in the quantitative description and control of the nanoscale distribution of magnetization and spin disorder. Magnetic SANS provides the nanoscale spatial sensitivity to monitor the intraparticle magnetization distribution [3, 4].

In this contribution, we will present our approach of using sequential growth for a systematic variation of spin disorder in ferrite NPs. Our aim is to follow the surface near spin disorder in NPs when the initial surface becomes the interior of the grown particle. Structural and magnetic characterization confirms a systematic particle growth that is accompanied by a significant evolution of the NP magnetization upon the first growth stages.

References:

[1] A. Lak, S. Disch *et al.*, *Adv. Science* **2021**, *8*, 2002682.
[2] S. Disch *et al.*, *New J. Phys.* **2021**, *14*, 01302.
[3] S. Mühlbauer, S. Disch *et al.*, *Rev. Mod. Phys.* **2019**, *91*, 015004.
[4] D. Zákutná, S. Disch *et al.*, *Phys. Rev. X* **2020**, *10*, 031019.

Author: ROUZBEH, Nahal (Universität zu Köln)

Co-author: DISCH, Sabrina (Universität zu Köln)

Presenter: ROUZBEH, Nahal (Universität zu Köln)

Session Classification: Poster Session MONDAY

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