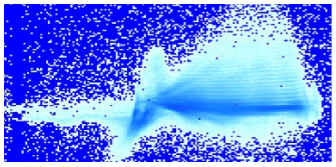

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Insights to Collective Skyrmion Lattice Dynamics from Coherent Soft X-ray REXS

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Ordering of large length-scale magnetic structures are commonly studied using techniques like electron microscopy (EM), small angle neutron scattering (SANS), and resonant elastic x-ray scattering (REXS). Using coherent X-rays to investigate these systems, we can probe magnetic textures in ways that were once exclusive to either EM or SANS: domain dynamics, inter-mixed phases, long and short range ordering – all with a flexible probe size (<10um). As such, coherent REXS is an important tool to extend our fundamental understanding of magnetic skyrmions, which is essential if they are to be a platform for quantum information systems. Particularly, Cu2OSeO3 (CSO) is an interesting skyrmion host material because it is an insulator – a requirement for low energy consumption devices. We will present new findings associated with skyrmion lattice (SkL) dynamics in CSO from experiments that push the collective behavior into different excited states. The insights gained from coherent REXS help to better understand domain motion, which aids in completing a microscopic explanation for the SkL dynamics.

Primary author: BARBOUR, Andi (Brookhaven National Laboratory)

Co-authors: HAN, M.G (Brookhaven National Laboratory); LIU, Chuhang (Condensed Matter Physics and Materials Science); CAMINO, Fernando (Brookhaven National Laboratory); JANGID, Rahul (Brookhaven National Laboratory); ZHU, Yimei (Brookhaven National Laboratory); CUOCO, Mario (CNR-SPIN); MAZZOLI, Claudio (Brookhaven National Laboratory)

Presenter: BARBOUR, Andi (Brookhaven National Laboratory)

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