



Contribution ID: 68

Type: **Talk**

【619】 Three-Dimensional Characterization of the Metamagnetic Phase Transition in B2-Ordered FeRh

Thursday 7 September 2023 16:15 (15 minutes)

We use soft x-ray magnetic laminography to characterize the three-dimensional spatial evolution of both the ferromagnetic and antiferromagnetic domains through the FeRh first-order phase transition. We observe different distributions of the nucleating magnetic domains in three-dimensions on heating and cooling. Monte Carlo simulations reveal different sample properties –namely, the sample surface and local variations in the exchange energy - are responsible for the nucleation of domains of differing magnetic order. This asymmetry suggests the microscopic mechanism responsible for the transition differs on heating and cooling, which affects the systems' macroscopic thermodynamic properties.

Theoretical Work

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Session Classification: Spintronics and Magnetism at the Nanoscale

Track Classification: Spintronics and Magnetism at the Nanoscale