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Local imaging of the phase transition in single crystal Nd₂Fe₁₄B¹ MAGDALENA HUEFNER, ADAM PIVONKA, CUN YE, MARTIN BLOOD-FORSYTHE, Harvard University, RUSLAN PROZOROV, PAUL CANFIELD, Ames Laboratory and Iowa State University, JENNIFER HOFFMAN, Harvard University — The magnetic microstructure of hard magnets is of interest for immediate industrial applications and for fundamental understanding of the relationship between microscopic and macroscopic magnetic properties in materials. Of particular interest is Nd₂Fe₁₄B, which shows strong anisotropy with an easy axis along the c-axis at room temperature, but undergoes a phase transition around T~135K to an easy cone magnetization where the magnetic moments are canted away from the c-axis. Here we present magneto-optical Kerr effect (MOKE) and magnetic force microscope (MFM) measurements to investigate the spin-reorientation phase transition in single crystal Nd₂Fe₁₄B. The MFM measurements resolve a continuous change in the domain structure from rounded flower-shaped domains of a lateral extent ~ 200 nm- $\sim 7\mu m$ to larger rectangular features of typical width $\sim 1\mu m$ and length $\sim 10\mu m$ - $\sim 30 \mu \text{m}$. By imaging the same surface area in small temperature steps across the phase transition we track the evolution of single features.

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