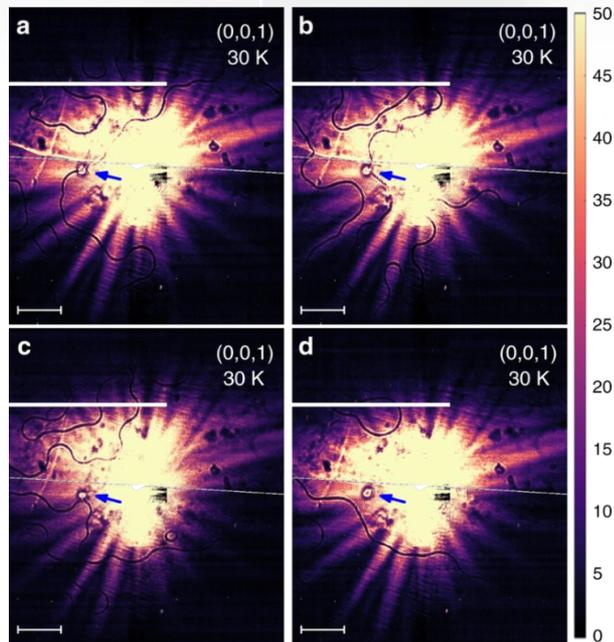


Reflecting Antiferromagnetic Arrangements



Scientific Achievement

Scientists imaged antiferromagnetic (AFM) domains using a new coherent x-ray diffraction technique and observed evidence of the interaction between domain walls and structural defects in the material.

Significance and Impact

The capability to see and manipulate magnetic domains plays an essential role in the development of novel spintronic devices; this techniques opens a way to see and explore magnetic domains of AFMs.

Research Details

- Scientists demonstrated the capability to image antiphase AFM domain boundaries with $5\ \mu\text{m}$ spatial resolution and images of $0.3 \times 0.3\ \text{mm}$ area.
- The new technique at NSLS-II CSX beamline, resonant magnetic X-ray Bragg diffraction, probed the AFM structure directly.
- They discovered that some of the domains were free to move with each thermal cycle.

The images show the antiphase domain boundaries (black wavy lines) of the same sample at the same temperature after various thermal cycles. The blue arrows indicate the position of a stationary structural defect used as a reference point.

M. G. Kim, H. Miao, B. Gao, S.-W. Cheong, C. Mazzoli, A. Barbour, W. Hu, S.B. Wilkins, I.K. Robinson, M.P.M. Dean, V. Kiryukhin. *Nat. Comm.* **9**, 5013 (2018).

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