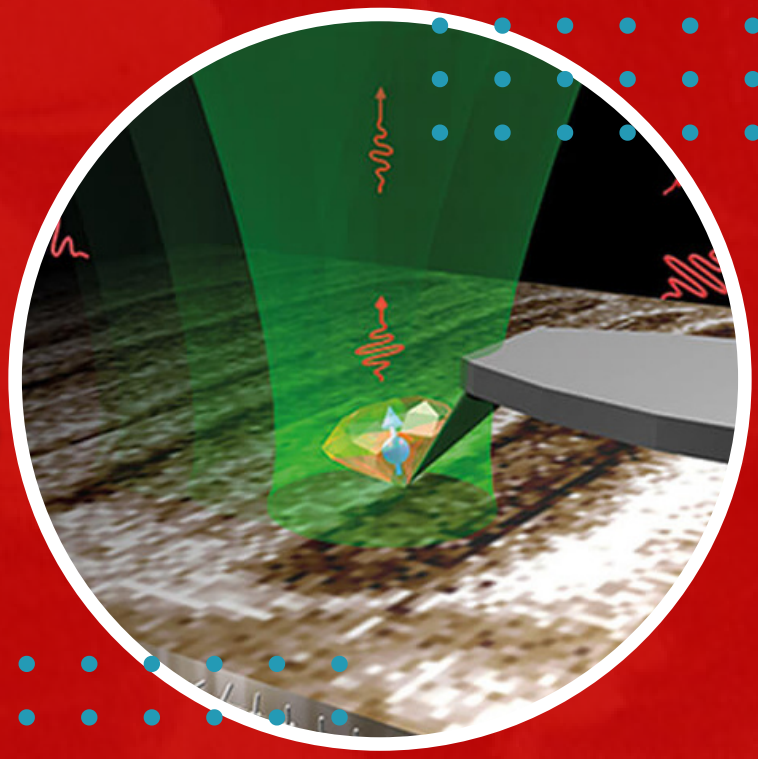
NCMN

Nebraska Center for Materials and Nanoscience

NCMN RECEIVES $500K MRI AWARD

Acquiring optical access for quantum sensing capabilities in a cryogenic scanning probe microscope



Nanoscale Imaging and Control of Domain-Wall Hopping with an NV Center Microscope. Image courtesy of V. Jacques, University of Montpellier, FR

NEW EQUIPMENT

This Track 1 Major Research Instrumentation award will be used for the acquisition of a Nitrogen-Vacancy (NV)-Attocube (Atto) atomic force microscope (AFM) integrated with a confocal microscope (CFM).

RESEARCH IMPACT

This acquisition will transform our existing scanning probe microscope into a versatile platform for NV quantum sensing and fundamental research on quantum entanglement. The point defect atomic nature of the NV center and its spin millisecond quantum coherence lifetime allow measurements of a wide range of quantum materials with high sensitivity and spatial resolution (< 40 nm). It operates at high magnetic fields and across a wide range of temperatures.

USER ACCESSIBILITY AND DIVERSITY

The new equipment will be located in NCMN's Surface and Materials Characterization facility, allowing access for internal & external users, and training for students and quantum engineers.

THE TEAM

Christian Binek, PI

Xia Hong, Co-PI

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QUICK FACTS

Currently, there are five similar instruments in the U.S. , but have limitations in types of materials or magnetic field range

The quantum sensing tool utilizes nitrogen-vacancy spectroscopy to image quantum states of matter

Advancing the Second Quantum Revolution