

Mesoscopic Magnetic Measurements

In this talk, I will take you on a tour of mesoscopic magnetic phenomena, enabled by recent advances in nanoscale magnetic measurements. We will visit metallic rings that exhibit persistent currents despite having a finite resistance; see images of superfluid density that provides clues to the origin of superconductivity; discover paramagnetism, ferromagnetism, and superconductivity in a complex oxide heterostructure; and manipulate quantum vortices, one-dimensional elastic objects moving through energy landscapes. These advances in nanomagnetic imaging provide insight into the interplay of disorder and order in quantum-mechanical phase-coherent states.