

Imaging Quantum Bits with Quantum Sensors



Kam Moler
Stanford University
*Vice Provost and Dean of Research
and Professor of Applied Physics and of Physics*

Abstract:

Quantum devices and materials have exceptional promise for energy, computation, communication, and sensing. To realize this potential, scientists and engineers must find the right physical systems. Emergent phenomena in quantum systems often exhibit magnetic signatures. Superconducting QUantum Interference Devices (SQUIDs) can map superfluid density and quantum vortices to reveal unconventional superconducting states.

SQUIDs can also measure the current in quasi-one-dimensional rings to identify topological and other fundamental properties of quantum states of charge-carrying particles. In particular, in junctions made of topological materials, the current could theoretically be 4π -periodic rather than 2π -periodic as a function of the phase across the junction. I will report on progress towards this smoking-gun signature for Majorana modes.

