Ben Pingault Argonne National Lab

Title: Interfacing spins with mechanical vibrations

Abstract:

The silicon-vacancy center (SiV) in diamond is an optically active atomic impurity with a large strain susceptibility. We probe this susceptibility using a single SiV embedded in a diamond cantilever and show how strain can be used to improve the SiV spin coherence. We leverage the strain susceptibility to implement mechanical control of the SiV spin and of neighboring nuclear spins. We also use the SiV to probe the local phononic density of states of a phononic crystal and demonstrate the suppression of single-phonon processes in SiV by the phononic crystal bandgap.