



Condensed Matter Seminar

Prof. So Takei

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“Macroscopic Quantum Spintronics Devices”

Monday, March 18, 2019

4:00pm – 5:00pm

304 Robeson Hall

We propose two platforms for realizing macroscopic spintronics qubits. The first prototype magnetic quantum information processing device, based on spin superfluidity and spin Hall phenomena, realizes the spin-supercurrent analog of the superconducting phase qubit, and allows for full electrical control and readout. The second device stores a quantum state in a topological defect of a magnetic insulator and realizes the magnetic analog of the three-level rf-SQUID qubit. We propose non-invasive methods to coherently control and readout the quantum state using ac magnetic fields and magnetic force microscopy, respectively. Various physical estimates for both devices, e.g., operational temperatures and decoherence times, will be made and discussed.

