Kevin Wright

Assistant Professor, Dartmouth College, New Hampshire, USA

Talk Title: Persistent currents in rings of ultracold fermionic atoms

Abstract: Quantum gases in rings have many remarkable properties which make them an attractive setting for testing theories about interacting quantum systems. Superfluid circuits of ultracold atoms have also been shown to possess many of the essential characteristics that make superconducting circuits uniquely useful. All previous work on superfluid atomtronic circuits has been conducted with weakly interacting bosonic atoms. In this talk I will report on the first experiments conducted with a toroidal degenerate Fermi gas with tunable interactions. I will discuss the conditions for reliably creating and detecting currents around a ring containing an equal spin mixture of Li-6 atoms, show that quantized flow can be long-lived well into the BCS limit, and present evidence that normal currents around the ring are not strongly damped. I will conclude by discussing prospects for more ambitious experiments with spin-imbalanced fermionic gases, quasi-1D rings, coupled rings, and ring lattices.