Abstract Submitted
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Towards Non-Equilibrium Interfaces of Strongly Interacting Fermi Gases[1] IAN CRAWLEY, CHRISTOPHER ANGYAL, DADBEH SHADDEL, JOHN GRIFFIN, DING ZHANG, JIANYI CHEN, GEORGE AWAD, MARY KATE PASHA, ARIEL SOMMER, Lehigh University — Strongly interacting Fermi gases out of equilibrium provide an ideal platform for quantum simulation of transport and non-equilibrium dynamics of strongly correlated fermions. Here we describe our apparatus and proposed experiments utilizing lithium-6 atoms in multi-region atomic traps for non-equilibrium and transport studies. We will employ thin light sheet potentials to prepare two- and three-region homogeneous-density atomic traps in which the spin composition of each region can be independently initialized, enabling the controlled production of non-equilibrium normal-superfluid interfaces. The transport properties of fermionic atoms across such interfaces will shed light on transport in strongly correlated normal-superconductor and ferromagnet-superconductor solid state junction devices. We describe our experimental setup, which includes a novel high-power RF antenna design for implementing spin-dependent forces, and high-field magnetic bias coils with field curvature that can be tuned through zero to maintain a homogeneous trapping potential.

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