

Abstract Submitted
for the DAMOP10 Meeting of
The American Physical Society

Quantum Simulation using Next Generation Degenerate Fermi Gas Apparatus KATE WOOLEY-BROWN, FLORIAN HUBER, WIDAGDO SETIAWAN, MARKUS GREINER, Harvard Physics, CENTER FOR COOL TECHNOLOGIES TEAM — Ultracold neutral atoms in optical lattices are a perfect toy model to simulate and study Hubbard model physics relevant to high temperature superconductivity and other exotic phases of matter. We present the design and construction of a novel apparatus to study these exciting condensed matter systems. We also investigate the viability of a various transport schemes to transport a quantum-degenerate Fermi gas of ultracold lithium atoms into a Science Chamber. The high optical access of the science chamber permits innovative probing and manipulation of BECs.

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Date submitted: 22 Jan 2010

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