

Abstract Submitted
for the DAMOP20 Meeting of
The American Physical Society

High-power optical transport of ultracold fermions using focus-tunable lens¹ JERE MKINEN, GABRIEL ASSUMPCAO, YUNPENG JI, GRANT SCHUMACHER, FRANKLIN VIVANCO, NIR NAVON, Yale University — We present an all-optical setup designed to transport a trapped cold cloud of ^6Li over a macroscopic distance of 30 cm, based on a focus-tunable lens. We transport the atoms from the initial preparation chamber to a dedicated glass cell with increased optical access by displacing the focus of the focus-tunable lens. We estimate the transport efficiency by measuring the atom number and temperature both before and after the transfer. We further characterize the loading and post-transport focus stability. We show that the atom number and focus fluctuation amplitudes can be greatly reduced by a stabilization of lens temperature and the focus-tunable lens control current. We demonstrate the robustness of the optical transport by preparing a molecular BEC after transporting the atoms to the glass cell.

¹The authors acknowledge financial support by Yale Quantum Institute.

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Date submitted: 02 Feb 2020

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