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A Fermi gas in a homogeneous box potential BISWAROOP MUKHERJEE, MARK KU, ZHENJIE YAN, PARTH PATEL, ELMER GUARDADO-SANCHEZ, TARIK YEFSAH, JULIAN STRUCK, MARTIN ZWIERLEIN, Massachusetts Inst of Tech-MIT, ZWIERLEIN GROUP TEAM — Traditionally, bulk quantum gas experiments take place in inhomogeneous optical and/or magnetic traps. The properties of the homogeneous gas are in many cases masked by line-of-sight integration over the inhomogeneous sample. We report on the trapping of strongly interacting fermionic atoms (^6Li) in a quasi-homogeneous all-optical potential. We characterize the potential flatness through in-trap imaging, and discuss progress towards directly observing the momentum distribution of the fermions in a box, with the prospect to test predictions from Fermi liquid theory for interacting gases. In contrast to inhomogeneous traps, box potentials prepare a system in one particular point of the phase diagram, giving access to the properties of bulk matter with a high signal-to-noise ratio. This sets a new direction for the exploration of strongly interacting Fermi gases at finite temperature and in the presence of spin imbalance.

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