Abstract Submitted
for the DAMOP08 Meeting of
The American Physical Society

The Effect of Trap Geometry on Phase Separation in a Polarized Fermi Gas[1] YEAN-AN LIAO, Rice University, W. LI, G.B. PARTRIDGE, T. PAPROTTA, R.G. HULET — We have observed phase separation in a polarized ^{6}Li atomic Fermi gas in an elongated (aspect ratio of 30) single-beam optical trap.[2] The phase-separated phase consists of a paired superfluid core surrounded on each end of the trap by a completely polarized normal gas. The observed density distributions represent a violation of the local density approximation, and have been explained by surface tension. In addition, we find that the superfluid core survives until the system is nearly completely polarized, with $P \geq 0.95$. These results contrast with a similar experiment, done at MIT, that observes the superfluid core to survive up to $P \sim 0.74$, in agreement with the Clogston limit. In this case, no surface tension is observed.[3] Though the the explanation of these discrepancies is not yet clear, one major difference is trap geometry, since the MIT trap has an aspect ratio 6 times smaller than ours. We have implemented a crossed beam trap with an aspect ratio $\sim$3 in order to study the effects of trap geometry. Our latest experimental results will be presented.

[1]Supported by NSF, ONR, and the Welch and Keck Foundations.
[2]G. B. Partridge *et al.*, *Science* **311**, 503 (2006); *PRL* **97**, 190407 (2006).
[3]C. H. Schunck *et al.*, *Science* **316**, 867 (2007).

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Date submitted: 04 Feb 2008 Electronic form version 1.4