Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Strong-coupling and the stability of crystalline order in superfluid ^{3}He films[1] JOSHUA WIMAN, J. A. SAULS, Northwestern University — In a film of thickness D, weak-coupling theory for p-wave, spin-triplet pairing predicts a "stripe" phase that spontaneously breaks translational symmetry in the plane of the film.[2] NMR on superfluid ^{3}He confined in a slab has so far failed to detect any signature of the stripe phase, and the A-B transition is observed at lower temperatures than predicted by weak-coupling theory.[3] We report calculations of the phase diagram for ^{3}He films based on Ginzburg-Landau (GL) theory that includes strong-coupling effects via experimentally estimated β parameters.[4] At low pressures GL theory predicts the A-stripe phase transition, for small D, to be significantly suppressed compared to weak-coupling. For large D, the stripe transition is eliminated in favor of an A-B transition at lower temperatures than in weak-coupling. At higher pressures the stripe phase is predicted to be stable only at very low temperatures, outside the expected applicability of the strong-coupling GL theory. Our results suggest that the discrepancy between experiment and weak-coupling theory likely results from strong-coupling effects.

[1]Supported by NSF Grant DMR-1106315.
[2]Vorontsov & Sauls. *Phys. Rev. Lett.* 98, 2007.
[3]Levitin et al. *Science* 340, 2013.
[4]Choi et al. *Phys. Rev. B* 75, 2007.

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Date submitted: 14 Nov 2014 Electronic form version 1.4