

Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Polarised Fermi condensates with equal and unequal masses

FRANCESCA MARIA MARCHETTI, Rudolf Peierls Centre for Theoretical Physics, University of Oxford, 1 Keble, Oxford OX1 3NP, UK, MEERA PARISH, Princeton Center for Theoretical Physics, Jadwin Hall, Princeton University, Princeton, NJ 08544, AUSTEN LAMACRAFT, Rudolf Peierls Centre for Theoretical Physics, 1 Keble Road, Oxford OX1 3NP, UK and All Souls College, Oxford, BEN SIMONS, Cavendish Laboratory, J. J. Thomson Avenue, Cambridge, CB3 0HE, UK — We consider a two-spin atomic Fermi gas, where both the mass and population of each component are unequal. We show that the finite temperature phase diagram contains a region of phase separation between the superfluid and normal states that touches the boundary of second-order superfluid transitions at a tricritical point, reminiscent of the phase diagram of ^3He - ^4He mixtures. We discuss the implications of our findings for a trapped gas at finite temperature and the different topologies of phase separation by changing the mass ratio. Finally we find that the interior gap state is always unstable to phase separation, while the breached pair state with one Fermi surface for the excess fermions exhibits differences in its DoSs and pair correlation functions depending on which side of the resonance it lies.

Francesca Maria Marchetti
Rudolf Peierls Centre for Theoretical Physics
University of Oxford, 1 Keble, Oxford OX1 3NP, UK

Date submitted: 06 Nov 2006

Electronic form version 1.4