Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

The FFLO state in two-dimensional D-wave superconductors ANTON VORONTSOV, Louisiana State University, MATTHIAS GRAF, LANL, JAMES SAULS, Northwestern university — We studied the Fulde-Ferrell-Larkin-Ovchinnikov (FFLO) state for two-dimensional D-wave superconductors with magnetic field parallel to the superconducting planes. This state occurs at high fields near the Pauli-Clogston limit and is a consequence of the competition between the pair condensation and Zeeman energy. We used the quasiclassical theory to self-consistently compute the inhomogeneous order parameter and the free energy. We mapped out the phase diagram and found that the transitions from the FFLO phase to either the normal state or uniform superconducting state are of second order, analogous to the S-wave case. Contrary to the S-wave case, we find that the FFLO state of a D-wave order parameter breaks translational symmetry along prefered directions. The orientation of the nodes in real space is pinned by the nodes of the basis function in momentum space. We will discuss the experimental consequences of this effect.

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Date submitted: 07 Dec 2004 Electronic form version 1.4