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Fermi-liquid effects in the Fulde-Ferrell-Larkin-Ovchinnikov state of two-dimensional d-wave superconductors[1] MATTHIAS J. GRAF, Los Alamos National Laboratory, ANTON B. VORONTSOV, Louisiana State University — We study the effects of Fermi-liquid interactions on quasi-two-dimensional d-wave superconductors in a magnetic field. The phase diagram of the superconducting state, including the periodic Fulde-Ferrell-Larkin-Ovchinnikov (FFLO) state in high magnetic fields, is discussed for different strengths of quasiparticle many-body interactions within Landau's theory of Fermi liquids. Decreasing the Fermi-liquid parameter F_0^a causes the magnetic spin susceptibility to increase, which in turn leads to a reduction of the FFLO phase. It is shown that a negative F_0^a results in a first-order phase transition from the normal to the uniform superconducting state in a finite temperature interval. Finally, we discuss the thermodynamic implications of a first-order phase transition for the heavy-fermion superconductor $CeCoIn_5$.

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