Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

NMR Study of the Possible FFLO State in $CeCoIn_5$ V. F. MITROVIĆ, Brown University, Providence, RI, M. HORVATIĆ, C. BERTHIER, GHMFL, Grenoble, France, G. KNEBEL, G. LAPERTOT , J. FLOUQUET, SPSMS, CEA, Grenoble, France — We report nuclear magnetic resonance (NMR) measurements of the heavy-fermion superconductor $CeCoIn_5$ in the vicinity of the superconducting critical field H_{C2} for a magnetic field applied perpendicular to the c axis. A possible inhomogeneous superconducting state, Fulde-Ferrel-Larkin-Ovchinnikov (FFLO), is stabilized in this part of the phase diagram. In 11 T applied magnetic field, we observe clear signatures of the two phase transitions. We show that a higher temperature transition is clearly associated with the transition to the homogeneous superconducting state. The low temperature phase cannot be characterized by a simple FFLO state, viewed as a stack of static, and spatially well separated, superconducting and normal regions. Alternative explanations of the nature of the low temperature phase are discussed.

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Date submitted: 30 Nov 2005 Electronic form version 1.4