Evolution of FFLO state of CeCo(In$_{1-x}$Cd$_x$)$_5$

YOSHIFUMI TOKIWA, FILIP RONNING, JOE THOMPSON, ROMAN MOVSHOVICH, Los Alamos National Laboratory, LONG PHAM, University of California, Davis, ZACHARY FISK, University of California, Irvine — Unconventional superconductor CeCoIn$_5$ at high magnetic field displays first order superconducting transition and an additional high field-low temperature superconducting phase (previously proposed to be an inhomogeneous superconducting FFLO state). Both phenomena were attributed to strong Pauli limiting effects. Our specific heat measurements on low Cd-doping (for In) samples, at fields close to the superconducting critical field $H_{c2}$, show that superconducting transition remains first order for samples with $H_{c2}$ up to 5.7 T (from 4.95 T in a pure compound), for field out of plane orientation ($H \parallel c$). We discuss systematic evolution of the proposed FFLO state with Cd content.

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