

Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Investigating the low-field vortex lattice phase diagram in CeCoIn₅ with $H \parallel c$ ¹ P. DAS, Los Alamos National Laboratory, NM, USA, M. R. ESKILDSEN, University of Notre Dame, IN, USA, E. M. FORGAN, University of Birmingham, UK, H. KAWANO-FURUKAWA, Ochanomizu University, Japan, C. PETROVIC, Brookhaven Natl. Lab., NY, USA — Here we present small angle neutron scattering studies of the vortex lattice (VL) phase diagram in CeCoIn₅ in the low-field high-temperature regime with $H \parallel c$ which remained unexplored. While previous studies [A. D. Bianchi *et.al.* Science **319**, 177 (2008)] reported the phase boundary between the high-field square \rightarrow rhombic \rightarrow hexagonal VLs, the lower boundary between hexagonal \rightarrow rhombic \rightarrow square remained unexplored at higher temperatures where only estimates were provided. We have investigated this regime and mapped out these VL transitions. Interestingly, at the base temperature, no rhombic phase is observed but a direct transition from hexagonal to square phase. A possible explanation for this deviation from earlier reports may be that the current measurements were done following a field-ramp at base temperature rather than field-cool used in previous measurements. This indicates a slight hysteresis associated with this transition. While the measured hexagonal to rhombic phase transition agrees with the earlier estimates, the square VL phase occupies a larger region at higher temperatures than previously estimated.

¹Supported by NSF award no. DMR-0804887 (Notre Dame). Work at LANL under the auspicious of the US DOE.

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Date submitted: 09 Nov 2012

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