Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

**Emergent magnetic anisotropy in cubic $CeIn_3$** FILIP RONNING, Los Alamos Natl Lab, PHILIP MOLL, TONI HELM, Max-Planck-Institute for Chemical Physics of Solids, NEIL HARRISON, ROSS MCDONALD, LAUREL WINTER, FEDOR BALAKIREV, ERIC BAUER, Los Alamos Natl Lab, BERTRAM BATLOGG, ETH Zurich, SHANGSHUN ZHANG, CRISTIAN BATISTA, University of Tennessee — Metals containing cerium exhibit a diverse range of fascinating phenomena including heavy fermion behavior, quantum criticality, and novel states of matter such as unconventional superconductivity. Because spin-orbit coupling and crystal field energy scales are large relative to the energy scales of the associated phenomena it is generally believed to be safe to assume that the interactions between the f-electrons are spherically symmetric in spin space. By using magnetic fields with strengths comparable to the crystal field energy scale we illustrate the breakdown of the spherical approximation in the prototypical cubic heavy fermion material $CeIn_3$, which also displays unconventional superconductivity near a quantum critical point under applied pressure. Above 40 T, the H-T phase diagram develops a surprising anisotropy. This work illustrates that magnetic fields can tune the effective hybridization and exchange interactions potentially leading to new exotic field tuned effects in f-based materials.

Filip Ronning
Los Alamos Natl Lab

Date submitted: 11 Nov 2016 Electronic form version 1.4