

Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Pressure dependence of Ce valence in CeRhIn₅¹ ZACHARY BRUBAKER, Univ of California - Davis, PAUL CHOW, YUMING XIAO, HPCAT, Geophysical Laboratory, Carnegie Institute of Washington, Argonne National Laboratory, Argonne, Illinois, RENA ZIEVE, Univ of California - Davis, JASON JEFFRIES, Lawrence Livermore National Laboratory, Livermore, California — Though many theoretical descriptions have been put forth, the mechanism facilitating superconductivity in heavy-fermion materials remains a topic of discussion. Magnetic fluctuations are often thought to mediate superconductivity in Ce-based superconductors, but this scenario fails to adequately describe superconductivity far from magnetic order. The critical valence fluctuation (CVF) scenario has been proposed to explain some superconducting domes, including those far from magnetic order, commonly found in the Ce-122 and Ce-115 families. Because the CVF scenario relies on valence fluctuations mediating superconductivity, there should exist a sharp valence crossover near the critical pressure of the material studied. We have studied the Ce valence in CeRhIn₅ under pressure using x-ray absorption spectroscopy in partial fluorescent yield mode at 300 K. We find a constant Ce valence of 3.0 up to a pressure of 5.5 GPa, far above the predicted valence crossover at $P_c = 2.35$ GPa.

¹LLNL is operated by Lawrence Livermore National Security, LLC, for the U.S. Department of Energy, National Nuclear Security Administration under Contract DE-AC52-07NA27344. This material is supported by the NSF under Grant No. NSF DMR-1609855.

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Date submitted: 11 Nov 2016

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