

Abstract Submitted
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High-Pressure Studies of Valence and Magnetic State in Europium Metal¹ W. BI, G. FABBRIS, J. SCHILLING, Physics Department, Washington University in Saint Louis, N. SOUZA-NETO, D. HASKEL, J. ZHAO, E. ALP, Advanced Photon Source, Argonne National Lab, Y. MENG, HPCAT, Carnegie Institution of Washington, Argonne National Laboratory, A. ALSMADI, Hashemite University — The strong local-moment magnetism in divalent Eu metal ($4f^7$) suppresses superconductivity. At extreme pressure Eu is expected to become trivalent and nonmagnetic ($4f^6$). Recently, superconductivity in Eu was discovered by Debessai *et al.* for pressures above 80 GPa [1]. However, Eu's transition temperature lies near 2 K, nearly an order of magnitude lower than for comparable trivalent d-electron metals, possibly because Eu is not fully trivalent but rather mixed valent. Here we report recent experimental results on Eu's valence and magnetic state to Mbar pressures through synchrotron x-ray absorption near edge structure (XANES), synchrotron x-ray magnetic circular dichroism (XMCD), and synchrotron Mössbauer spectroscopy (SMS).

[1] M. Debessai, T. Matsuoka, J. J. Hamlin, J. S. Schilling, and K. Shimizu, *Phys. Rev. Lett.* 102, 197002 (2009).

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Wenli Bi
Physics Department, Washington University in Saint Louis

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