

Abstract Submitted  
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**Observation of room-temperature ferromagnetism in Cu:ZnO films part I; soft X-ray Magnetic Circular Dichroism** C. SANCHEZ-HANKE, Brookhaven National Laboratory, T.S. HERNG, D.-C. QI, National University of Singapore, T. BERLIJN, Brookhaven National Laboratory, J.B. YI, K.S. YANG, National University of Singapore, Y. DAI, Shandong University, Y.P. FENG, I. SANTOSO, X.Y. GAO, A.T.S. WEE, National University of Singapore, W. KU, Brookhaven National Laboratory, J. DING, A. RUSYDI, National University of Singapore — We report direct evidence of room-temperature ferromagnetic ordering in O-deficient Cu:ZnO films by using soft x-ray magnetic circular dichroism and x-ray absorption [1]. Our measurements have revealed unambiguously two distinct features of Cu atoms associated with (i) magnetically ordered Cu ions present only in the oxygen-deficient samples and (ii) magnetically disordered regular Cu<sup>2+</sup> ions present in all the samples. We find that a sufficient amount of both oxygen vacancies and Cu impurities is essential to the observed ferromagnetism, and a non-negligible portion of Cu impurities is uninvolved in the magnetic order.

[1] T.S. Herng et al, Phys. Rev. Lett. **105**, 207201 (2010)

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