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Robust Ferromagnetism in Ultrathin Films of CeFeAsO LIFENG YIN, ZHENG GAI, Oak Ridge National Laboratory, THOMAS ZAC WARD, Oak Ridge National Laboratory, The University of Tennessee, PAUL C. SNIJDERS, Oak Ridge National Laboratory, JIAN SHEN, Oak Ridge National Laboratory, The University of Tennessee — The mechanism of magnetic order in iron-oxypnictides has attracted lots of research efforts, but the conclusions are so distinct: local moment ground state with antiferromagnetic fluctuation vs. itinerant ground state with ferromagnetic fluctuation, although a spin-density-wave (SDW) ground state is generally observed in polycrystalline parent compounds. Because single-crystal growth of iron-oxypnictides seems very tough, the fabrication of epitaxial thin films by pulsed laser deposition (PLD) technique should be an important solution for basic research. Here we report a successfully fabrication of c-axis oriented high quality CeFeAsO(001) heteroepitaxial ultrathin film, which shows an atomic flat surface with (4×1) reconstruction at initial stage. We find a striking in-plane ferromagnetic ground state with a small Fe moment in CeFeAsO ultrathin film, followed by the development of spin glass like order with thickness. Therefore, the robust ferromagnetism in single crystalline parent compound thin film implies that the superconductivity in 1111 system should be mediated by ferromagnetic spin fluctuation.

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