

Abstract Submitted
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The non-magnetic collapsed tetragonal phase of CaFe_2As_2 and superconductivity in the iron pnictides¹ J.H. SOH, G.S. TUCKER, Ames Laboratory/ Iowa State University, D.K. PRATT, National Institute of Standards and Technology, D.L. ABERNATHY, M.B. STONE, Oak Ridge National Laboratory, S. RAN, S.L. BUD'KO, P.C. CANFIELD, A. KREYSSIG, R.J. MCQUEENEY, A.I. GOLDMAN, Ames Laboratory/ Iowa State University — The relationship between antiferromagnetic spin fluctuations and superconductivity has become a central topic of research in studies of superconductivity in the iron pnictides. We present unambiguous evidence of the absence of magnetic fluctuations in the non-superconducting collapsed tetragonal phase of CaFe_2As_2 via inelastic neutron scattering time-of-flight data, which is consistent with the view that spin fluctuations are a necessary ingredient for unconventional superconductivity in the iron pnictides. We demonstrate that the collapsed tetragonal phase of CaFe_2As_2 is non-magnetic, and discuss this result in light of recent reports of high-temperature superconductivity in the collapsed tetragonal phase of closely related compounds.

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