

Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Temperature-enhanced nearly critical magnetic scattering in nearly superconducting $\text{FeTe}_{0.87}\text{S}_{0.13}$ ¹ IGOR ZALIZNYAK, CEDOMIR PETROVIC, RONGWEI HU, Brookhaven National Laboratory, ANDREI SAVICI, KAROL MARTY, MARK LUMSDEN, Oak Ridge National Laboratory — Recent neutron scattering measurements [1] have revealed an unusual temperature-induced enhancement of dynamical magnetism in iron telluride, FeTe, the parent material of the chalcogenide family of iron-based superconductors. Here we report a study of magnetic excitations in the sulfur-doped $\text{FeTe}_{0.87}\text{S}_{0.13}$, where bulk measurements show presence of the filamentary superconductivity [2]. Our neutron measurements probe the bulk of the material, which is nearly critical (filamentary superconductivity emerges in a small volume fraction of the sample, which is supercritical). We observe a peculiar pattern of low-energy magnetic scattering, characteristic of critical magnetic fluctuations, and find that it is also anomalously enhanced with the increasing temperature up to ~ 100 K.

[1] I. A. Zaliznyak, *et. al.*, Z. J. Xu, J. M. Tranquada, G. D. Gu, A. M. Tsvelik, M. B. Stone, Phys. Rev. Lett., in press (2011).

[2] Rongwei Hu, E. S. Bozin, J. B. Warren, C. Petrovic, Phys. Rev. B **80**, 214514 (2009).

¹We acknowledge useful discussions with J. Tranquada. This work was supported by the US DOE under Contract DE-AC02-98CH10886.

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Date submitted: 20 Nov 2011

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