Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Orthorhombic distortion, superconductivity and magnetic fluctuations in FeSe A.E. BÖHMER, F. HARDY, P. SCHWEISS, T. WOLF, C. MEINGAST, Institute for Solid-State Physics, Karlsruhe Institute of Technology, T. ARAI, T. IYE, T. HATTORI, K. ISHIDA, Department of Physics, Kyoto University — The recently observed scaling between magnetic and lattice fluctuations observed for $Ba(Fe,Co)_2As_2$ provides evidence that its tetragonal-to-orthorhombic structural transition is magnetically driven[1]. Here, we study the interplay between structure, magnetism and superconductivity in FeSe, an iron-based superconductor which is particularly interesting because it orders magnetically only under high pressure, while a tetragonal-to-orthorhombic structural transition takes place at 90 K at ambient pressure. In contrast to the 122-systems, our high-resolution thermal-expansion data clearly demonstrate that orthorhombic distortion and superconductivity do not compete in FeSe[2], while the shear modulus softening is similar to the 122 systems. By studying magnetic fluctuations using nuclear magnetic resonance, we investigate whether FeSe is simply a case of extreme splitting of magnetic and structural phase transitions - and thus comparable to 122 systems - or whether its structural transition has a qualitatively different origin.

[1]Fernandes et al. PRL 111, 137001 (2013)
[2]Böhmer et al. PRB 87, 180505 (2013)

Anna Böhmer
Institute for Solid-State Physics, Karlsruhe Institute of Technology

Date submitted: 15 Nov 2013 Electronic form version 1.4