Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Nematic Crossover in BaFe2As2 under Uniaxial Stress XIAO REN[1], LIAN DUAN, YUWEN HU, JIARUI LI, Peking University, Beijing 100871, China, RUI ZHANG, Rice University, Houston, Texas 77005, USA, HUIQIAN LUO, Institute of Physics, Chinese Academy of Sciences, Beijing 100190, China, PENGCHENG DAI, Rice University, Houston, Texas 77005, USA, YUAN LI[2], Peking University, Beijing 100871, China — The nature of the nematic order in iron-based superconductors has invoked intense research interest. A substantial portion of experimental attempts on resolving this issue required the use of single-domain samples produced under external stress. Here we use Raman scattering, a technique that can detect spontaneous point-group symmetry breaking without resorting to single-domain samples, to study BaFe2As2, the parent compound of the 122 Fe-based superconductors. We show that an applied compression along the Fe-Fe direction, which is commonly used to produce untwinned orthorhombic samples, changes the structural phase transition at temperature Ts into a crossover that spans a considerable temperature range above Ts. Even in crystals that are not subject to any applied force, a distribution of substantial residual stress remains, which may explain phenomena that are seemingly indicative of symmetry breaking above Ts. Our results are consistent with an onset of spontaneous nematicity only below Ts.

[1]first author
[2]corresponding author

Xiao Ren
School of Physics, Peking University, Beijing 100871, China

Date submitted: 05 Nov 2015 Electronic form version 1.4