Abstract Submitted
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Elastic softening of the shear modulus in Fe-based superconductors[1] C. MEINGAST, A. BOEHMER[2], P. ADELMANN, R. FROMKNECHT, P. SCHWEISS, TH. WOLF, F. HARDY, IFP, Karlsruhe Institute of Technology, Germany, W. SCHRANZ, M. REINECKER, Faculty of Physics, University of Vienna — A strong softening of the elastic shear modulus C_{66} has been observed as one approaches the spin-density-wave (SDW) transition in Ba122 from high temperature [1,2]. A smaller softening is still observed for superconducting Co-doped Ba122 crystals, followed by distinct hardening below T_c [1,2]. This elastic response has been taken as evidence either for electronic-magnetic nematic fluctuations [1], or as evidence for a structural quantum critical point near optimal doping [2]. Here we study the elastic response of various Fe-based superconductors by a recently developed technique based upon a three-point bending experiment in a high-resolution capacitance dilatometer. We measure the temperature dependence of the Young's modulus, which for thin slabs can be shown to be closely related to C_{66} for a given orientation. This is confirmed by measurements on Co-doped Ba122, for which we find very similar results as previously reported [1,2]. We will report on new measurements of the Young's modulus on other Fe-based Ba122 systems in order to study the universality of the elastic response at the SDW and superconducting transitions. [1] R. M. Fernandes, et al., Phys. Rev. Lett. 105, 157003 (2010). [2] M. Yoshizawa, et al., J. Phys. Soc. Jpn. 81, 024604 (2012).

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