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The phase diagram of $Sr_{1-x}Na_xFe_2As_2$: evidence of magnetic C4 phase universality K.M. TADDEI, Northern Illinois University, J.M. ALLRED, Argonne National Laboratory (ANL), D.E. BUGARIS, ANL, M. KROGSTAD, Northern Illinois University, S. ROSENKRANZ, R. OSBORN, H. CLAUS, D.Y. CHUNG, ANL, S.H. LAPIDUS, ANL Advanced Photon Source, M.G. KANATZIDIS, ANL and Northwestern University, O. CHMAISSEM, ANL and Northern Illinois University — Determination of the nature of superconductivity in the high Tc iron based superconductors requires understanding the material's magnetic behavior out of which superconductivity arises. The apparent competition between superconductivity and magnetism in these materials and the appearance of superconductivity upon suppression of magnetism suggests magnetic fluctuations as a possible superconducting pairing mechanism. A recent study of the sodium doped barium 122 system which established the existence of a new magnetic phase formed within the AFM dome and its coexistence with superconductivity, has generated intense interest in the nature of this novel magnetic phase and given new insights to the driving force behind the magnetic transitions and preceding nematic fluctuations in this system. To search for evidence of a universality to this new magnetic and tetragonal C4 phase in the hole doped iron pnictides, polycrystalline $Sr_{1-x}Na_xFe_2As_2$ samples were synthesized for measurements with x-ray and neutron diffraction experiments. In this talk, I will present results that show a more robust magnetic C4 phase, with a higher ordering temperature and stability over a larger range of compositions than has been seen in the $Ba_{1-x}Na_xFe_2As_2$ counterparts.

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