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Structural and magnetic properties of $\mathbf{Ba_{1-x}Na_xFe_2As_2}$ OMAR CHMAISSEM, Northern Illinois University and Argonne National Laboratory (ANL), S. AVCI, Bursa technical University, Turkey, R. OSBORN, S. ROSENKRANZ, H. CLAUS, D.Y. CHUNG, ANL, M. KANATZIDIS, ANL and Northwestern University, D.D. KHALYAVIN, P. MANUEL, ISIS, Rutherford Appleton Laboratory, UK — Iron pnictides have attracted significant intrigue because of their astonishing superconducting properties in a large number of materials that support chemical substitutions at literally every site. Of particular interest is AFe2As2 (A= Ba, Sr, Ca) in which hole or electron-doping is achieved by chemical substitution of alkaline or transition metal elements at the Ba and Fe sites, respectively. Nominally isovalent P substitutions for As have also been achieved producing a phase diagram remarkably similar to the electron- or hole-doped diagrams. A universal picture has emerged: a spin density wave region is stable at low substitution levels in which the Fe magnetic moments are aligned antiferromagnetically along the a- and c-axes and ferromagnetically in the direction of the b-axis. With increased substitution, the magnetic structure progressively loses strength to a point where it's suppressed in favor of superconductivity usually extending over a broad substitution range to form a superconducting dome. In these 122 systems, samples with compositions in the crossover region have been demonstrated by neutron diffraction and other techniques to allow the microscopic coexistence of both magnetism and superconductivity. I will present insights on the structural and magnetic properties of the $Ba_{1-x}Na_xFe_2As_2$ system and discuss the results in a general context.

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