Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Doping Dependence of Resonant Spin Excitations in $BaFe_2(As_{1-x}P_x)_2$ RAYMOND OSBORN[1], Argonne National Laboratory, JOHN-PAUL CASTELLAN, Karlsruhe Institute of Technology, STEPHAN ROSENKRANZ, KEITH TADDEI, JARED ALLRED, OMAR CHMAISSEM, Argonne National Laboratory, SEVDA AVCI, Afyon Kocatepe University, DUCK-YOUNG CHUNG, HELMUT CLAUS, Argonne National Laboratory, MERCOURI KANATZIDIS, Northwestern University, DOUG ABERNATHY, MATTHEW STONE, Oak Ridge National Laboratory — The first spectroscopic evidence of unconventional $s_{\pm}$-symmetry in the iron-based superconductors was provided by inelastic neutron scattering on $Ba_{1-x}K_xFe_2As_2$ with the observation of a resonant spin excitation at the wavevector, Q, that connected the hole and electron Fermi surfaces, centered at the zone center and zone boundary, respectively. Subsequent measurements as a function of hole doping showed that the resonant excitations split into two incommensurate peaks because of the growing mismatch in the hole and electron Fermi surface volumes and the resonant enhancement below T_c falls to zero as the magnetic interactions weaken, in good agreement with RPA theory. We have now extended these measurements to investigate the doping dependence of $BaFe_2(As_{1-x}P_x)_2$, whose nominal isovalence has been the subject of debate, from $x = 0.2$ to 0.6. We find no evidence of a splitting of the resonance with increasing x, but see a monotonic decrease in the resonant enhancement across the superconducting dome falling to zero close to $x = 0.6$.

[1]Supported by U.S. DOE, Office of Basic Energy Sciences, MSED, under contract No. DE-AC02-06CH11357.

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Date submitted: 15 Nov 2013 Electronic form version 1.4