Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Electronic Raman study of superconducting $Ba_{1-x}K_xFe_2As_2$[1] SHANGFEI WU, GIRSH BLUMBERG, Rutgers Univ, PIERRE RICHARD, HONG DING, IOP,CAS, HAIHU WEN, Nanjing Univ — We use electronic Raman scattering to probe the superconductivity gap structure and collective modes in under-doped and optimally-doped $Ba_{1-x}K_xFe_2As_2$. In the under-doped samples, we observe a sharp superconducting coherence peak at 60 cm^{-1} in the XY (B_{2g}) geometry below T_c, which is consistent with the gap value determined by ARPES on the outer hole Fermi surface pocket [2]. The Raman spectrum shows a threshold at approximately 30 cm^{-1} followed by the superconducting coherence peak with a low-energy tail. We identify a peak at around 95 cm^{-1} between 13 K and 22 K in the same geometry in the orthorhombic phase below T_c, which becomes broader and weaker upon heating. A sharp and symmetric mode at 120 cm^{-1} is also observed in the optimally-doped samples in the same geometry. These collective modes have similar energy scale with the neutron spin resonance mode, the kink observed by ARPES and the bosonic mode observed by STM [3], indicating that they have intimate relationship with superconductivity in the iron pnictides.

[1]GB and SW acknowledge support from DOE BES DE-SC0005463 and NSF DMR-1104884. PR and HD acknowledge support from MOST (2011CBA001001) and NSFC (11274362) of China. HW acknowledges support from MOST (2011CBA00102) and NSFC (11534005) of China.
[2]Nat. Commun. **2**, 394 (2011)
[3]Nature **456**, 930 (2008); PRL **102**, 047003 (2009); PRL **108**, 227002 (2012)

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Date submitted: 06 Nov 2015 Electronic form version 1.4