Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Spin Waves and magnetic exchange interactions in insulating Rb0.89Fe1.58Se2 MIAOYIN WANG, Dept. Phys., University of Tennessee, Knoxville, CHEN FANG, Dept. of Phys., Purdue University, DAOXIN YAO, State Key Laboratory of Optoelectronic Materials and Technologies, Sun Yat-sen University, GUOTAI TAN, College of Nuclear Science and Technology, Beijing Normal University, LELAND HARRIGER, YU SONG, TUCKER NETHERTON, CHENGLIN ZHANG, Dept. Phys., University of Tennessee, Knoxville, MENG WANG, IOP, Chinese Academy of Sciences, MATTHEW STONE, Neutron Scattering Science Division, ORNL, WEI TIAN, Ames Lab and Dept. Phys., Iowa State University, JIANGPING HU, Dept. of Phys., Purdue University, PENGCHENG DAI, Dept. Phys., University of Tennessee, Knoxville — Superconductivity in alkaline iron selenide $AFe_{1.6+x}Se_2$ (A = K, Rb, Cs) may have a different origin from the sign reversed s-wave electron pairing mechanism, because they are insulators near x = 0 and form a blocked AF structure that is completely different from the iron pnictides. We use neutron scattering to map out spin waves in the AF insulating $Rb_{0.89}Fe_{1.58}Se_2$. A comparison of the fitted effective exchange couplings using a local moment Heisenberg Hamiltonian in $Rb_{0.89}Fe_{1.58}Se_2$, $(Ba,Ca,Sr)Fe_2As_2$, and iron chalcogenide Fe1.05Te reveals that their next nearest neighbor (NNN) exchange couplings are similar. Therefore, superconductivity in all Fe-based materials may have a common magnetic origin that is intimately associated with the NNN magnetic exchange interactions, even though they have metallic or insulating ground states, different AF orders and electronic band structures.

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Date submitted: 14 Nov 2011 Electronic form version 1.4