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Evolution of magnetic exchange interactions in the multiferroic $\text{Mn}_{1-x}\text{Fe}_x\text{WO}_4$ JAIME FERNANDEZ-BACA, FENG YE, RANDY FISHMAN, HERB MOOK, Oak Ridge National Laboratory, YIMING QIU, NCNR-NIST, R.P. CHAUDHURY, Y.-Q. WANG, B. LORENZ, C.W. CHU, University of Houston — The experimental investigation of the spin dynamical properties in the multiferroic material $\text{Mn}_{1-x}\text{Fe}_x\text{WO}_4$ is essential to the understanding of the interplay between the magnetic and ferroelectric phenomena. We have systematically studied the low temperature magnetic excitations in the Fe-doped $\text{Mn}_{1-x}\text{Fe}_x\text{WO}_4$. The spin wave dispersion relations in the commensurate (CM) phase are well described by a model that accounts for the magnetic exchange coupling of up to nine nearest neighbors. Our results indicate that these magnetic systems are highly frustrated and the CM spin structures result from the competing interactions. The evolution of the spin dynamics reveals the role of the magnetic impurities and the influence of Fe-doping to the multiferroic properties are discussed. This work was partially supported by Division of Scientific User Facilities of the Office of Basic Energy Sciences, U.S. DOE.

Jaime Fernandez-Baca
Oak Ridge National Laboratory

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