

Abstract Submitted  
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**Neutron investigation of possible (ferro)magnetic order in the new superconductor  $\text{Li}_{1-x}\text{Fe}_x\text{OD}(\text{Fe}_{1-y}\text{Se})$**  JEFFREY LYNN, NIST Center for Neutron Research, Gaithersburg, MD 20899, XIUQUAN ZHOU, CHRISTOPHER K. H. BORG, EFRAIN RODRIGUEZ, Department of Chemistry and Biochemistry, University of Maryland 20742 — The system  $\text{Li}_{1-x}\text{Fe}_x\text{OH}(\text{Fe}_{1-y}\text{Li}_y)\text{Se}$  has recently been reported to become superconducting at  $T_C \approx 43$  K and then developing ferromagnetism in terms of a spontaneous vortex lattice below  $T_M \approx 10$  K [1]. We have prepared the tetragonal  $(\text{Li}_{1-x}\text{Fe}_x\text{OD})(\text{Fe}_{1-y}\text{Se})$  phase by hydrothermal synthesis in  $\text{D}_2\text{O}$  to reduce the neutron incoherent scattering cross section. We also prepared the samples using isotropically purified  $^7\text{LiOD}$  as a starting material to reduce the neutron adsorption cross section. The lattice parameters according to neutron and X-ray diffraction varied with  $3.79 \text{ \AA} < a < 3.82 \text{ \AA}$  and  $9.16 \text{ \AA} < c < 9.20 \text{ \AA}$ . We have carried out bulk magnetization, high resolution powder diffraction measurements to determine the crystal structure, high intensity diffraction measurements for the magnetic structure, and small angle scattering measurements to elucidate the interaction between the magnetism and superconductivity. The results of the neutron and bulk measurements will be discussed in detail.

[1] U. Pachmayr, et al., arXiv:1411.3304.

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