

Abstract Submitted  
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**Chemical tuning of magnetism and superconductivity in  $\text{Fe}_{1+x}(\text{Te,Se})$**  EFRAIN E. RODRIGUEZ, CHRIS STOCK, NIST Center for Neutron Research, NICHOLAS P. BUTCH, JOHNPIERRE PAGLIONE, Center for Nanophysics and Advanced Materials, U. of Maryland, MARK GREEN, NIST Center for Neutron Research — We present evidence demonstrating how the magnetism and superconductivity can be tuned for the phases  $\text{Fe}_{1+x}\text{Te}$  and  $\text{Fe}_{1+x}\text{Te}_{1+y}\text{Se}_{1+y}$ . Through the use of iodine vapor as an oxidant, we can de-intercalate these materials to remove the interstitial iron, *i.e* the  $x$  in  $\text{Fe}_{1+x}(\text{Te,Se})$ . Our analysis of the neutron inelastic scattering indicates that paramagnetism from this interstitial iron is detrimental to superconducting properties, and magnetization measurements show that superconducting volume fraction is indeed increased as the amount of interstitial iron is removed. Diffraction results detailing changes in key structural parameters and magnetic ordering will also be presented.

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