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**Neutron Scattering Study of Low Energy Magnetic Excitation in superconducting Te-vapor annealed under-doped FeTeSe** ZHIJUN XU, MING YI, UC Berkeley, GUANGYONG XU, J. A. SHNEELOCH, Brookhaven National Laboratory, MASAAKI MATSUDA, SONGXUE CHI, Oak Ridge National Laboratory, GENDA GU, J. M. TRANQUADA, Brookhaven National Laboratory, R.J. BIRGENEAU, UC Berkeley — To study the interplay between magnetism and superconductivity, we have performed neutron scattering and magnetization measurements on a Te vapor annealed single crystal  $\text{Fe}_{1+y}\text{Te}_{0.8}\text{Se}_{0.2}$  ( $T_c \sim 13\text{K}$ ) sample. Te vapor annealed process is found to reduce/remove the excess Fe in the as-grown sample and make the under-doped originally non-superconducting sample become good superconducting sample. Our neutron scattering studies show both spin gap and spin resonance found in the Te vapor annealed superconducting sample. Comparing to commensurate spin resonance in as-grown optimal-doped sample, the spin resonance of Te annealed sample only shows up at the clearly incommensurate positions. The temperature and energy dependence of low energy magnetic excitations are also measured in the sample. This work is supported by the Office of Basic Energy Sciences, DOE.

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