Neutron Scattering Study of Low Energy Magnetic Excitation in superconducting Te-vapor annealed under-doped FeTeSe

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To study the interplay between magnetism and superconductivity, we have performed neutron scattering measurements on a group of Te vapor annealed single crystal FeTe1-xSex (Tc~11-13K) samples. The 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 have mapped the magnetic excitation in the (HK0) plane in these compounds. A spin resonance can be observed at incommensurate wavevectors away from (0.5,0.5). The change of low energy magnetic excitations with temperature suggests a possible phase with SC and NSC coexist on a microscopic level.

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