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New bi-epitaxial Grain boundary Josephson Junction of $\mathbf{FeSe_{0.3}Te_{0.7}}$[1] YOU-SHENG LI, Institute of Physics, Academia Sinica, Y.T. SHEN, Department of Physics, National Tsing Hua University, M.J. WANG, Institute of Astrophysics and Astronomy, Academia Sinica, M.K. WU, Institute of Physics, Academia Sinica, C.C. CHI, Department of Physics, National Tsing Hua University — We have successfully fabricated epitaxial $FeSe_{0.3}Te_{0.7}$films on MgO substrate with its in-plane crystalline axis either parallel to or rotated 45° with respect to the MgO lattice. We use this technique to fabricate the 45° grain-boundary Josephson junction. The IV-curve measured at 4.2 K can be fitted with the RSJ model, and the measured $I_cR_n$value is 9.24μV, which is in general agreement with the values obtained by previous results for Fe-based grainboundary junctions on bi-crystal substrates. We have also measured the dc Josephson current as a function of applied magnetic fields, which shows a clear Fraunhofer-like pattern. Hence we can rule out the possibility of d-wave symmetry in $FeSe_{0.3}Te_{0.7}$ superconductor. Upon applying 6 GHz microwave irradiation, the junction IV curve exhibits clear Shapiro steps. Thus we have demonstrated our ability to fabricate high quality grain-boundary Josephson junctions of this new class of material. Further physical properties, such as the noise power spectrum, are currently being investigated.

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