Abstract Submitted
for the SES21 Meeting of
The American Physical Society

Growth of superconducting YB_6 thin films for the study of proximity effect in the topological Kondo insulator SmB_6[1] ARIJIT GUPTA, LAURA GREENE, WAN KYU PARK, Florida State University — Proximity-induced superconductivity in topological insulators has been predicted to exhibit various novel phenomena including Majorana zero modes [1]. Our goal is to study this proximity effect using bilayer thin films consisting of the topological Kondo insulator samarium hexaboride (SmB_6) and superconducting yttrium hexaboride (YB_6) due to their excellent lattice match. The superconducting properties of YB_6 have been reported to be strongly dependent on the stoichiometry with the maximum T_c (~7.5 K [2] and 6.1 K [3] in single crystal and thin film forms, respectively) observed in boron deficient YB_6. We have grown YB_6 thin films by co-sputtering YB_6 and Y targets in an ultrahigh-vacuum-compatible chamber. Towards achieving the highest T_c (~5.7 K currently), various growth parameters are explored/optimized including the sputter power, substrate temperature, and post-deposition annealing. Their composition and microstructure are characterized by energy-dispersive X-ray spectroscopy, ellipsometry, and atomic force microscopy. The superconducting properties are investigated using resistivity, magnetization, and tunneling spectroscopic measurements. [1] L. Fu & C. L. Kane, Phys. Rev. Lett. **100**, 096407 (2008). [2] N. Sluchanko *et al.*, Phys. Rev. B. **96**, 144501 (2017). [3] S. Lee *et al.*, *Nature* **570,** 344–348 (2019).

[1]This work was supported by the NSF/DMR-2003405 at the NHMFL funded by NSF/DMR-1644779 and the State of Florida.

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Date submitted: 30 Sep 2021 Electronic form version 1.4