Abstract Submitted for the MAR15 Meeting of The American Physical Society

30 MHz Self Oscillator using Topological Kondo Insulator SmB6¹ ALEXANDER STERN, DAEJEONG KIM, SEAN THOMAS, ZACHARY FISK, JING XIA, University of California, Irvine, Department of Physics and Astronomy — We are studying electrical properties of SmB6 (or Samarium Hexaboride), which is a topological insulator material. By applying a DC current to a tiny crystal of SmB6 and a capacitor, we were able to generate 30 MHz oscillation voltage across the crystal. The frequency range is set by the crystal size and quality and the frequency can be fine-tuned by the amount of DC current. With varying crystal size, we have achieved the frequencies from 20Hz to 30MHz with amplitudes up to 50mV. The DC current driven oscillation is induced by thermal oscillation between topological surface and the bulk states. We will present a theoretical model for this intriguing behavior. This work is supported by DARPA/Air force grant FA 8650-14-1-7407.

¹This work is supported by DARPA/Air force grant FA 8650-14-1-7407.

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Date submitted: 13 Nov 2014

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