Abstract Submitted for the APR21 Meeting of The American Physical Society

Dark Matter Signal Enhancement with a Superconducting Qubit¹ ANKUR AGRAWAL, AKASH DIXIT, TANAY ROY, University of Chicago, SRI-VATSAN CHAKRAM, Rutgers University, KEVIN HE, University of Chicago, WENJIE YAO, STEVEN JOHNSON, Massachusetts Institute of Technology, AARON CHOU, Fermi National Accelerator Laboratory, DAVID SCHUSTER, University of Chicago — The signal from low mass bosonic dark matter, such as axions or hidden photons, in 5-30 GHz regime is vanishing due to the shrinking detector volume. We propose to enhance the signal rate by initializing the microwave cavity in a large n-photon Fock state using the non-linearity of a superconducting qubit. We expect to enhance the signal rate by a factor of at least 10 before being limited by the coherence time of the cavity. Experimental protocol and recent results will be presented to demonstrate this novel technique.

¹Supported by Heising-Simons Foundation

Ankur Agrawal University of Chicago

Date submitted: 08 Jan 2021 Electronic form version 1.4