## Abstract Submitted for the APR21 Meeting of The American Physical Society

The ORGAN Experiment: Current Status, and Future Plans<sup>1</sup> BEN MCALLISTER, AARON QUISKAMP, GRAEME FLOWER, WILLIAM CAMPBELL, CATRIONA THOMSON, CINDY ZHAO, ARC Centre of Excellence for Engineered Quantum Systems/ARC Centre of Excellence for Dark Matter Particle Physics, PAUL ALTIN, ARC Centre of Excellence for Engineered Quantum Systems/ARC Centre of Excellence for Gravitational Wave Discovery, TOM STACE, ARC Centre of Excellence for Engineered Quantum Systems, EUGENE IVANOV, MAXIM GORYACHEV, MICHAEL TOBAR, ARC Centre of Excellence for Engineered Quantum Systems/ARC Centre of Excellence for Dark Matter Particle Physics, THE ORGAN COLLABORATION — We present the current status, and future plans of The Oscillating Resonant Group AxioN (ORGAN) Experiment, a high-mass (~  $60 - 200 \ \mu eV$ ) microwave cavity axion haloscope. ORGAN comprises various phases and sub-phases, having commenced in 2021, and running until 2026. We will discuss each phase, their experimental details, and projected reach. Initial phases rely on well-developed technologies such as traditional tuning-rod resonators, and HEMT amplifiers. Future phases project the use of novel resonant designs based on dielectric structures, and advanced readout techniques based on GHz single photon counters (SPCs). We will discuss the proposed resonant designs, and report on progress in the development of SPCs. It is projected that, with the development of efficient SPCs, within the 12+ Tesla, milli-Kelvin environment available, DFSZ sensitivity is attainable over the entire mass range within the time-scale of the experiment.

<sup>1</sup>ARC Centre of Excellence for Engineered Quantum Systems, ARC Centre of Excellence for Dark Matter Particle Physics

Ben

ARC Centre of Excellence for Engineered Quantum Systems/ARC Centre of Excellence for Dark Matter Partic

Date submitted: 12 Jan 2021

Electronic form version 1.4