Abstract Submitted
for the APR20 Meeting of
The American Physical Society

Differential Architecture for Dark Count Reduction of Superconducting Nanowire Single Photon Detectors (SNSPDs)[1] HYUNSEONG KIM, ANDREW MUELLER, Division of Physics, Mathematics, and Astronomy, Caltech, BORIS KORZH, MATTHEW SHAW, Jet Propulsion Laboratory — Superconducting nanowire single photon detectors are the fastest single photon detectors with high detection efficiency, record time-resolution, and ultra-low dark count rate. However, for applications in dark matter search and quantum information, the dark count rate of SNSPDs must be further improved. In order to push these limits, we implemented a cryogenic differential bias-tee circuit, which filters high frequency noise from the current source and reduces electromagnetic noise coupling into the circuit thanks to a balanced architecture. We demonstrate that this differential architecture exhibits lower dark count rates compared to a single-ended device referenced to ground. We show, using a gaussian noise model, that the difference in dark counts for these two configurations can be attributed to electromagnetic noise.

[1]Caltech SURF, JPL Education Office, INQNET, DOE

Hyunseong Kim
Caltech

Date submitted: 25 Oct 2019 Electronic form version 1.4