Abstract Submitted
for the MAS21 Meeting of
The American Physical Society

Low-light Single Pixel Imaging Using Quantum Noise[1] SAVANNAH CUOZZO, William mary, PRATIK BARGE, LIOR COHEN, HWANG LEE, LSU, IRINA NOVIKOVA, EUGENIY MIKHAILOV, William Mary — When imaging in the low-light regime, the accuracy of detection is often limited by the dark noise of your camera. This can be circumvented by analyzing the quantum noise of the illuminating probe beam if it has non-classical noise statistics (e.g. quadrature squeezed vacuum). Quantum-limited cameras that allow this kind of detection, where the dark noise is below the shot-noise limit, can be quite costly and only allow you to probe a single noise quadrature at a time. At the same time, classical single-pixel imaging methods have been developed to interrogate an object using different spatial patterns (we use the Hadamard modes). We present a method combining the analysis of quantum noise modes and single-pixel imaging techniques to reconstruct an image in the low light regime without relying on a camera. This method also allows us to also track the phase changes with each mode, providing us with a more complete image of the quantum noise when we reconstruct the object of interest.

[1]This research was supported by Grant No. AFOSR FA9550- 19-1-0066.

Savannah Cuozzo
William
Mary

Date submitted: 05 Nov 2021 Electronic form version 1.4