1163-42-276 **Jessica Bennett*** (jessica_bennett@brown.edu) and **Penelope Fiaschetti** (pmf2022@bu.edu). *Robust and Efficient Phase Retrieval from Magnitude-Only Windowed Fourier Measurements.* Preliminary report.

We propose and analyze a new generalization of an existing algorithm to reconstruct a complex vector (up to a global phase factor) from the squared magnitude of its windowed discrete Fourier transform. This is more commonly referred to as a phase retrieval problem, since this process requires the recovery of critically important phase information from magnitude-only measurements. This is a challenging yet fascinating non-linear inverse problem since there are often several possible solutions. The proposed algorithm utilizes results from discrete Fourier analysis to linearize the governing equations and obtain a highly structured Fourier based linear system. This linear system of equations can be efficiently inverted using the fast Fourier transform (FFT) algorithm. This provides relative phase information which we use to construct a special class of banded matrices, on which we perform spectral analysis to retrieve individual phase information. In addition to developing an efficient reconstruction algorithm, we provide mathematically rigorous theoretical error bounds in the case of noisy measurements, and provide numerical simulations demonstrating that this algorithm is computationally efficient and able to recover data in the presence of noise. (Received August 31, 2020)