1154-65-1274 **Rayan Saab*** (rsaab@ucsd.edu) and **Brian P Preskitt**. *Phase Retrieval from Locally Supported Measurements: Improved Algorithms and Robustness.*

We study an approach to solving the phase retrieval problem as it arises in ptychography. In ptychography, small overlapping sections of an unknown sample (or signal, say $x_0 \in \mathcal{C}^d$) are illuminated one at a time, often with a physical mask between the sample and light source. The corresponding measurements are the noisy magnitudes of certain corresponding Fourier transform coefficients. The goal is to recover the original signal from such measurements.

The algorithmic framework we study herein relies on first inverting a linear system of equations to recover a fraction of the entries in $x_0 x_0^*$ and then using non-linear techniques to recover the magnitudes and phases of the entries of x_0. Our contributions are three-fold. First, we expand the theory studying which measurement schemes (i.e., masks, shifts of the sample) yield invertible linear systems, including an analysis of the conditioning of the resulting systems. Second, we analyze a class of improved magnitude recovery algorithms and, third, we propose and analyze algorithms for phase recovery in the ptychographic setting where large shifts — up to 50% the size of the mask — are permitted. (Received September 14, 2019)