Ptychography with an unknown mask and object is analyzed for both the lattice scheme and the non-lattice mixing schemes under general mask phase constraint and object support constraints.

Furthermore, we show that in the case of the mixing schemes the only ambiguities are a constant scaling factor and an affine phase factor.

In the case of the lattice scheme, the mask and object errors have additional $\tau^2$ degrees of uncertainty where $\tau$ is the stepsize of the raster scan, consistent with the raster grid pathology reported in literature.

We present a reconstruction scheme informed by the mask phase constraint whose numerical performance matches the predictions of the theory. (Received July 19, 2018)