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Deep Live Phase Retrieval for Ptychography

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Live reconstruction algorithms for ptychographic phase retrieval can enable immediate visual feedback during scanning, allowing for readjustments of the experiment, as well as paving the way for adaptive scanning techniques. We have shown in previous works that live variants of projection-based iterative algorithms, such as the Difference Map, can be naturally derived and may achieve higher quality than their classic non-live counterparts. In this work, we will extend these developments by combining them with another previous work on deep learning augmented projection algorithms. We will specifically adapt modern DNN architectures to this live setting to realize fast, high-quality reconstructions. We will investigate the possible increases in convergence speed, robustness to noise, and ability to perform with low-density scans (few measurements).

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