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## Phase retrieval in the wild: In-situ optimized reconstruction for single-distance X-ray near-field holography

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With a holographic setup, full-field projections can be obtained with a single exposure. Reconstruction of the complex refractive index of the sample is typically done in post-processing and requires many manual steps and time. The need for post-processing prevents an immediate optical evaluation of the measurement results during beamtime and complicates in-situ experiments. We propose a novel pre-processing and reconstruction scheme that allows reconstructions from single shot holograms without spatial support constraints. To this end, we investigate the source of reconstruction artifacts that appear in reconstructed projection images and propose countermeasures that are embedded in a gradient-descent-based algorithm. Most of the reconstruction parameters are independent of the measured object, and the reconstruction performance is significantly improved. The Artifact Suppressing Reconstruction Method (ASRM) and an online reconstruction framework are now available to users at the imaging beamline P05 at DESY, Hamburg.

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