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Effect of exit beam phase aberrations on coherent x-ray reconstructions of Au nanocrystals STEPHAN HRUSZKEWYCZ, ROSS HARDER, PAUL FUOSS, Argonne National Laboratory — Current studies in coherent x-ray diffractive imaging (CXDI) are focusing on in-situ imaging under a variety of environmental conditions. Such studies often involve environmental sample chambers through which the x-ray beam must pass before and after interacting with the sample: i.e. cryostats or high pressure cells. Such sample chambers usually contain polycrystalline x-ray windows with structural imperfections that can in turn interact with the diffracted beam. A phase object in the near field that interacts with the beam exiting the sample can introduce distortions at the detector plane that may affect coherent reconstructions. We investigate the effects of a thin beryllium membrane on the coherent exit beam of a gold nanoparticle. We compare three dimensional reconstructions from experimental diffraction patterns measured with and without a 380 micron thick Be dome and find that the reconstructions are reproducible within experimental errors. Simulated near-field distortions of the exit beam consistent with micron sized voids in Be establish a “worst case scenario” where distorted diffraction patterns inhibit accurate inversions.

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