

Near-field and far-field ptychography

In near-field and far-field ptychography, the object is illuminated with a condensed and out-of-focus electron beam, i.e. a disc-pattern. Then, the beam is scanned and for each position an image is recorded for near-field ptychography, or a diffraction pattern for far-field ptychography. The phase of the exit-wave is retrieved from this set of recordings, using the constraint that the beam should see the same object wherever the discs are overlapping.

In this project, the reconstruction algorithm for these imaging modes will be written. Furthermore, it is checked if superresolution, i.e. resolution beyond the Abbe-limit, can indeed be attained. If enough time is left, also nuisance parameters (beam position, defocus ...) are estimated.

Email: vandenbroek@physik.hu-berlin.de | **url:** <https://www.physik.hu-berlin.de/en/sem>

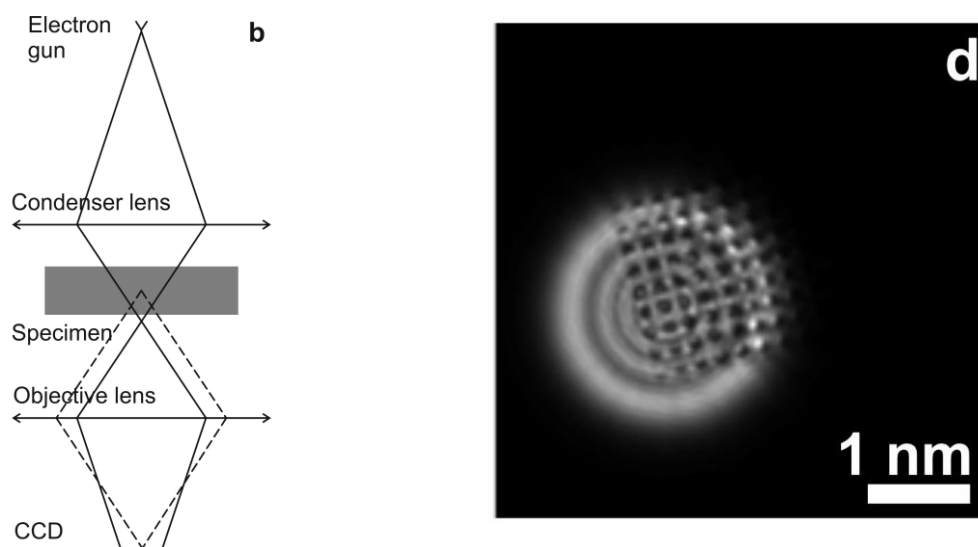


Fig. 1. *Left:* Ray diagram for near-field ptychography. *Right:* A typical, atomic resolution, image simulated in this mode.

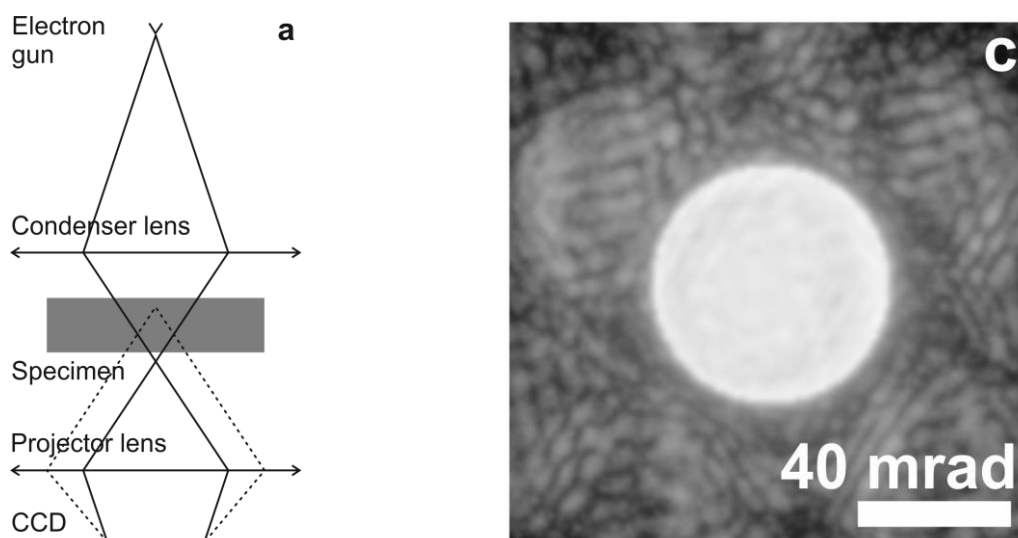


Fig. 1. *Left:* Ray diagram for far-field ptychography. *Right:* A typical diffraction pattern simulated in this mode.