

Advanced Analysis in TEM

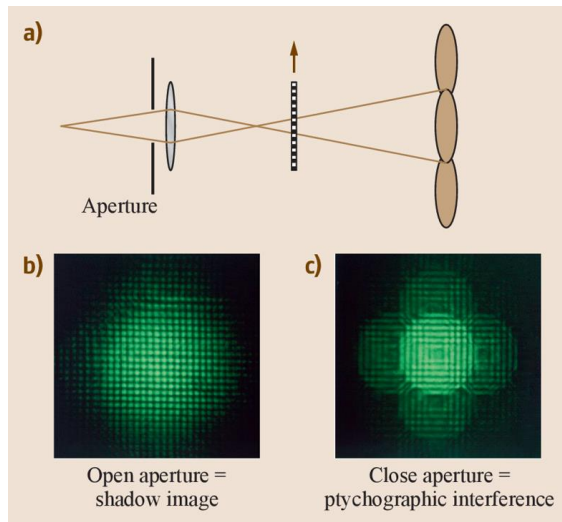
07/03/2020

Week 11

Ptychography

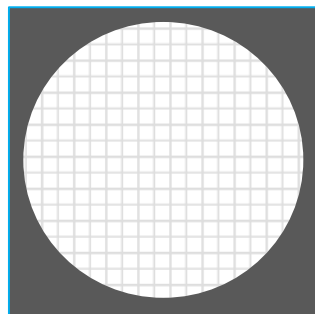
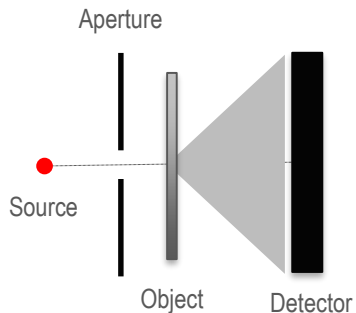
Introduction to Ptychography

- *Ptycho*: “fold”
- Introduced to describe a method of calculating the phase of the Bragg reflections from a crystal

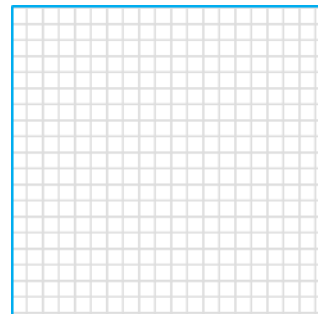


W. Hoppe, Acta Crystallogr. A 25, 495–501 (1969)

Solving the Phase Problem



Estimate of our object

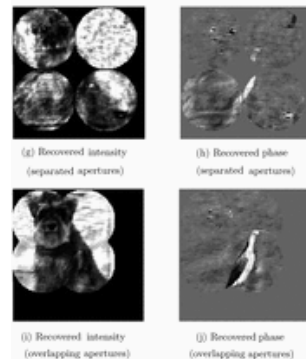
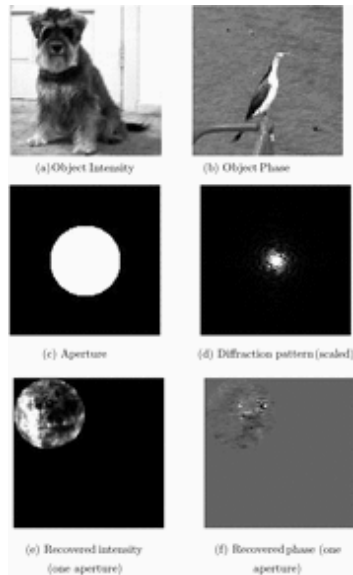
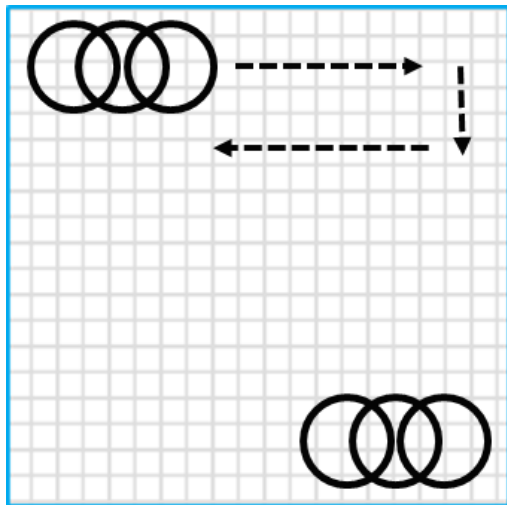


Pixels in our detector

If we know the object wave, calculating its diffraction pattern—the forward calculation—is **easy**

However, the inverse calculation seems **impossible!**

Ptychography: Multiple Diffraction Patterns



H. Faulkner, J. Rodenburg: Movable aperture lensless transmission microscopy: A novel phase retrieval algorithm, Phys. Rev. Lett. 93(2), 023903 (2004)