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Effect of beam-stop on EUV Ptychography reconstructions
In ptychography, we collect a stack of diffraction patterns by moving the object relative to the illumination beam.
Beam stop, a method to avoid the bleeding effect.

Bleeding effect in the images collected by the camera due to limited well depth.

Exposure time: 50 ms 1000 ms 5000 ms 20000 ms

A beam stop blocks the zeroth order and makes it possible to collect intense higher orders.

Problem: The information is lost in the blocked region.
What is the critical size of the beam stop?

We use **pixel masking** to instruct the algorithm to ignore the values at the blocked location and try to retrieve the values by taking advantage of the oversampling.
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* The beam stop size corresponding to the size of the illumination numerical aperture is marked by the red dotted circle.
**Analysis:**

Mean square error plot*

NA_{ill}

MTF analysis

* "Actinic inspection of EUV reticles with arbitrary pattern design", I. Mochi et al, Proc. SPIE 2017, 1045007
Conclusion & future work

• In a ptychographic imaging system, the beam-stop size should not exceed the illumination numerical aperture.
• When the beam stop size is larger than illumination numerical aperture, the reconstruction error increases and the contrast drops.

We plan to:
  o Investigate the effect of data loss in other regions of the Fourier domain
  o Investigate the effect of detector defective pixels.