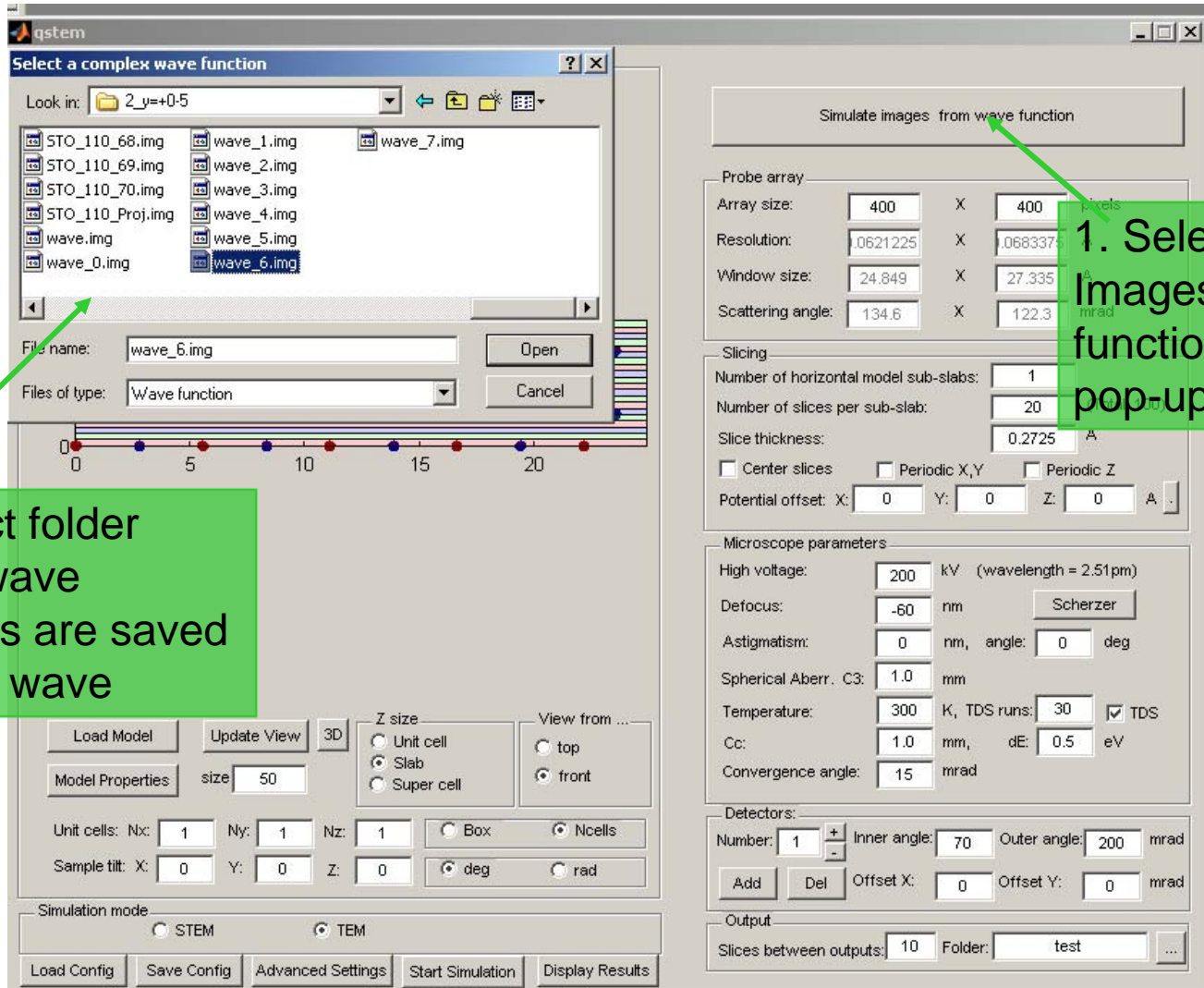# ImageSim-TEM tutorial

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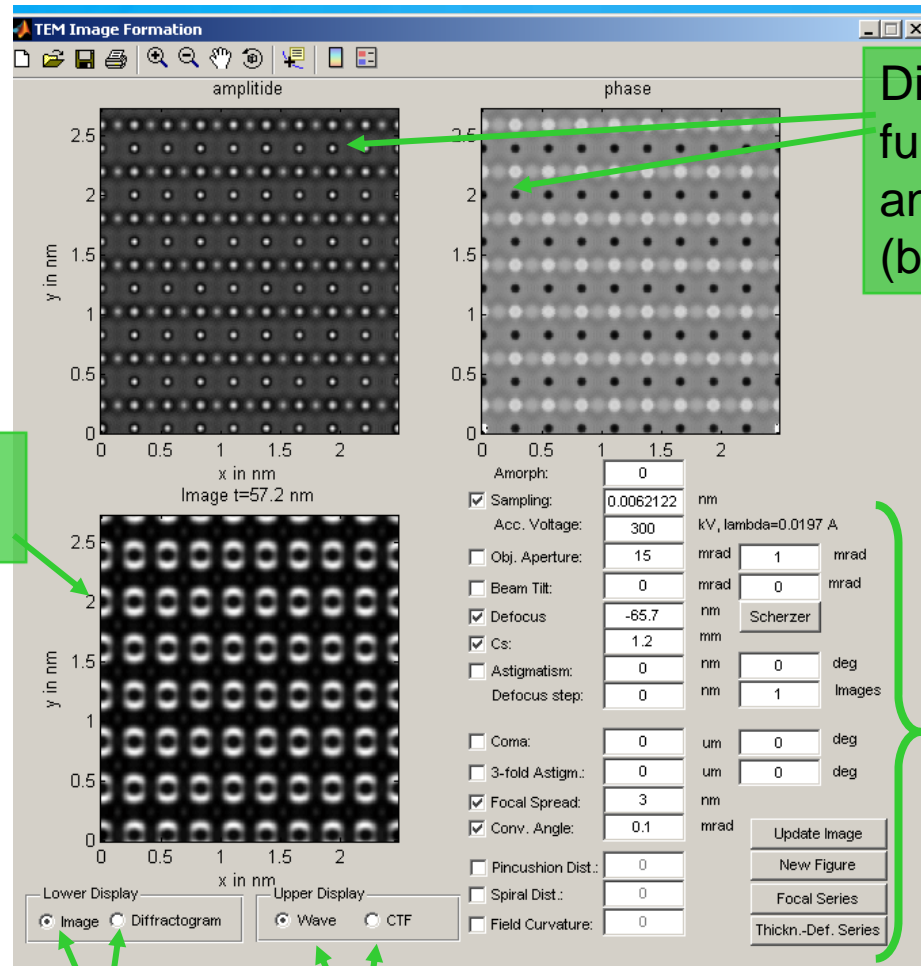
# HRTEM Image Simulation

# Enter TEM parameters



Displays exit wave function amplitude and phase or CTF (buttons at bottom)

Displays image or diffractogram

Enter Microscope Parameters

Toggle between displaying image and diffractogram

Toggle between displaying wave function modulus and phase and CTF

| | | |
|---|---|---|
| Amorph: | 0 | |
| ☑ Sampling: | 0.0062122 | nm |
| Acc. Voltage: | 300 | kV, lambda=0.0197 A |
| ☐ Obj. Aperture: | 15 | mrad [ 1 ] mrad |
| ☐ Beam Tilt: | 0 | mrad [ 0 ] mrad |
| ☑ Defocus | -65.7 | nm Scherzer |
| ☑ Cs: | 1.2 | mm |
| ☐ Astigmatism: | 0 | nm [ 0 ] deg |
| Defocus step: | 0 | nm [ 1 ] Images |
| ☐ Coma: | 0 | um [ 0 ] deg |
| ☐ 3-fold Astigm.: | 0 | um [ 0 ] deg |
| ☑ Focal Spread: | 3 | nm |
| ☑ Conv. Angle: | 0.1 | mrad |
| ☐ Pincushion Dist.: | 0 | |
| ☐ Spiral Dist.: | 0 | |
| ☐ Field Curvature: | 0 | |

Update Image

New Figure

Focal Series

Thickn.-Def. Series

Add "amorphous" noise to image

Change sampling (pixel size) of image (linear interpolation)

Initial defocus of focal series, or defocus of a single image

Include defocus step and number of image for focal series (if number of images = 1 then a single image is simulated)

Update the display

Generate a single image in a window (without saving)

Simulate focal series – using initial defocus, focal step and number of images set above
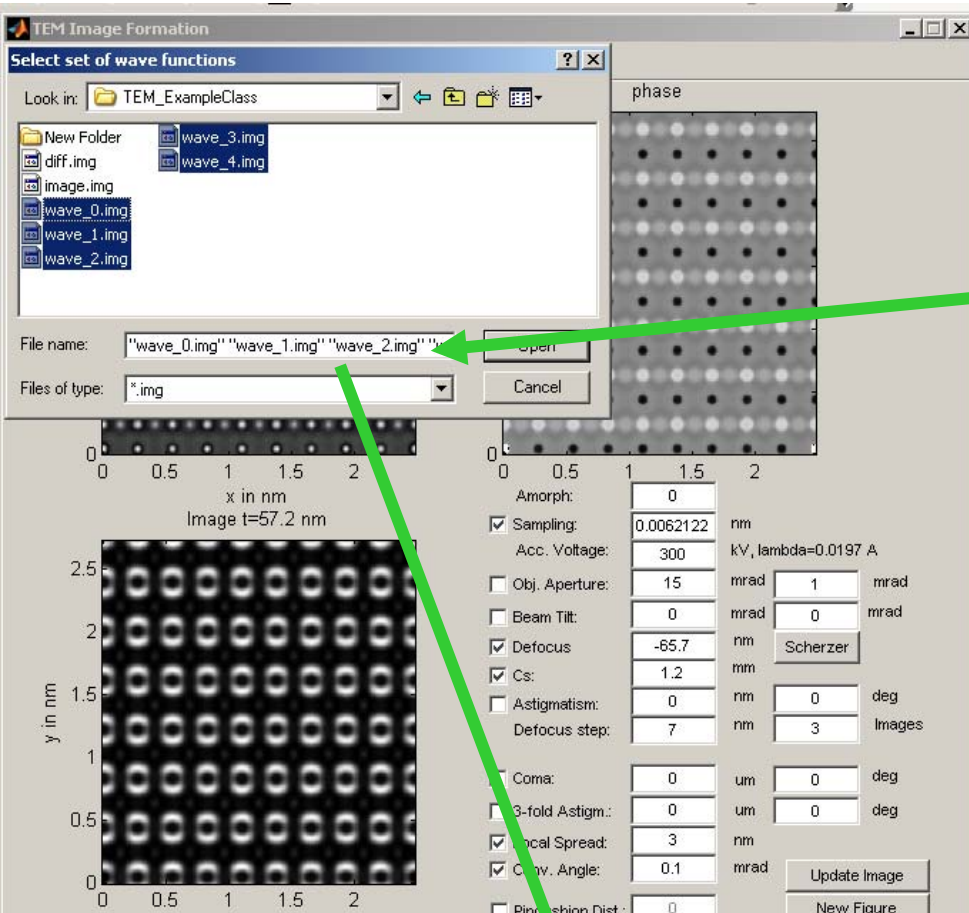
Simulate thickness defocus series

Uncheck boxes to set value to zero or to not include

# Thickness-Defocus Series



Select the different thicknesses – these are the output wave functions from the simulation done previously.

Select wave functions from which you want to simulate defocus series (in most cases wave functions at different [intermediate] sample thicknesses, but can also be wave functions for different frozen phonon configurations, or both).
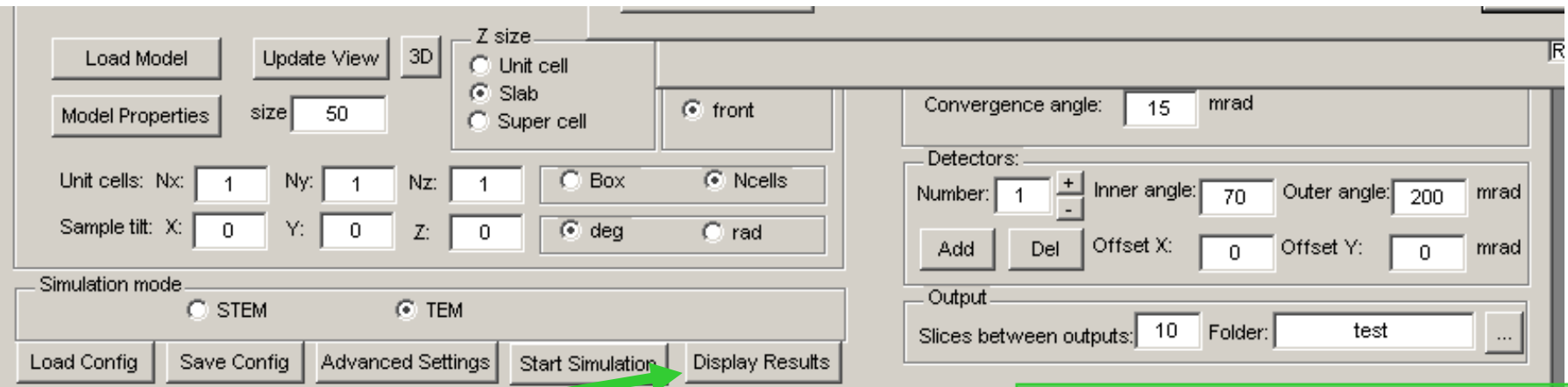
# View Results



1. From main window - click "Display Results" to open pop up window

2. Click "Select Folder", opens a new pop-up window

Alternatively, one can also import the images into DigitalMicrograph

3. Select the folder location where the wave functions or images are located