

## New Features of xHREM v3.6 (Windows/Mac OS)

### 1. STEM: 64-bit OS support

STEM Extension Pro supports 64-bit OS: Windows XP, Vista, Windows 7 and Mac OS X. With the Extension Pro you can handle a memory space more than 4 GB (Each application of a 32-bit OS can handle roughly 2 GB.) Thus, you can handle more phase gratings (namely, larger non-periodic model) than ever. Most of STEM simulation of an ideal crystal may be carried out by using a normal STEM Extension (32-bit version).



MultiGUI / STEM Extension / Option Tab

### 2. STEM: Cluster computing support

STEM Extension Cluster support cluster computing. We will supply both 32-bit and 64-bit versions for both Windows and Mac OS X. Since STEM simulation requires a heavy number crunching, the cluster computing will be a rational choice. If you have already more than single license, you can use a corresponding version of STEM Extension Cluster without any surcharge. Especially, a 32-bit STEM Extension Cluster will accelerate an ideal crystal simulation effectively.

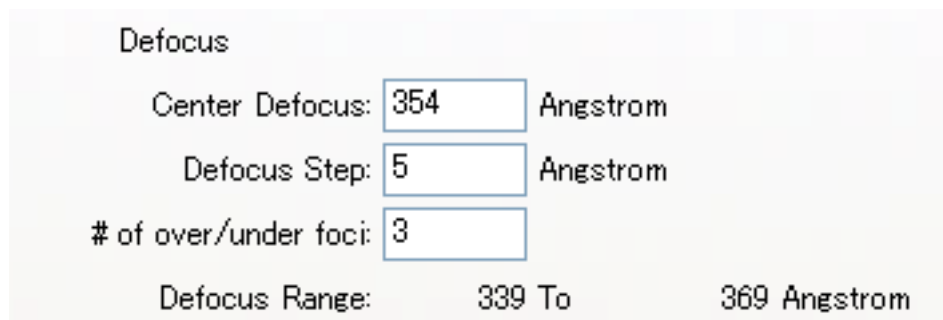


MultiGUI / STEM Extension / Option Tab

### 3. STEM: Partial coherency handling

Partial coherency of STEM image due to a defocus spread and a physical probe size can be handled by xMultiGUI/STEM Extension and xSTEMImage.

The defocus-spread effect is emulated as a weighted sum of intensities of different defocus simulations, which will be performed easily with the following control:



Defocus

Center Defocus: 354 Angstrom

Defocus Step: 5 Angstrom

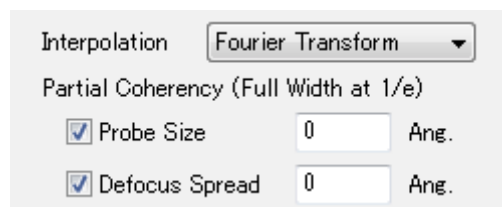
# of over/under foci: 3

Defocus Range: 339 To 369 Angstrom

MultiGUI / STEM Extension / Basic Tab

NOTE: The physical probe size effect (under implementation) will be emulated as a weighted sum of intensities of neighbor calculation points.

Actual effect of partial coherency due to a probe size and defocus spread can be evaluated by xSTEMImage. Here, Gaussian distributions are assumed for both the probe size and the defocus spread, and a full width at 1/e value is specified.



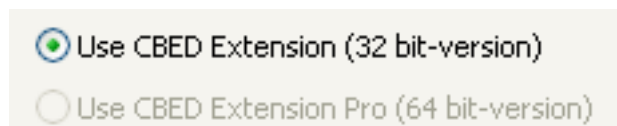
xSTEMImage

#### 4. xSTEMImage: New image intensity interpolation method

You can select one of the two interpolation methods (Fourier Transform/Bi-linear Interpolation) to estimate intensity between the calculated points. Usually, an interpolation using Fourier transform gives smoother image. Thus, a wider step (scan distance) can be used in calculation and a computation time may be substantially decreased.

#### 5. CBED: 64-bit OS support

CBED Extension Pro supports 64-bit OS: Windows XP, Vista, Windows 7 and Mac OS X. With the Extension Pro you can handle a memory space more than 4 GB (Each application of a 32-bit OS can handle roughly 2 GB.) Thus, you can use up to 16k x 16k diffraction points that is 16 times diffraction points handled by a 32-bit version.



MultiGUI / CBED Extension / Option Tab

#### 6. xImageGUI: Fifth order spherical aberration and Zernike Phase plate

You can specify the coefficient of the fifth order spherical aberration as well as a phase shift due to Zernike phase plate. The specified phase shift will be applied in the area inside of the inner aperture.

#### 7. 3D numerical data output for DigitalMicrograph

Since DigitalMicrograph does not currently support the 3D tiff format, we have implemented the gfx format (Gatan) for a 3D numerical output of raw data. Thus, you can analyze a 3D raw data quantitatively using DigitalMicrograph.