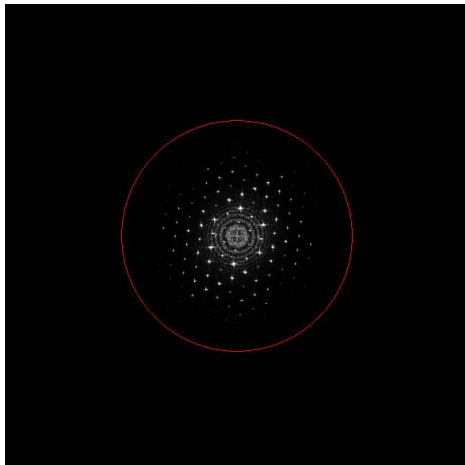
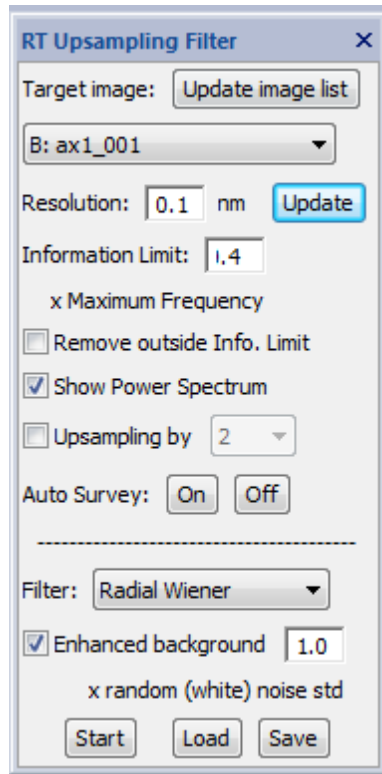


## Realtime Upsampling Filter



Power Spectrum of the target image



### Open the RT Upsampling Filter palette:

The Realtime Upsampling Filter palette will be opened by selecting “RT Upsampling Filter” from Window->Floating Windows, or selecting “Realtime Upsampling Filter” from the HREM Filters menu.

### Select a target image

The target image can be selected from the image pull-down list. If necessary, the image list can be updated by using “Update image list” button. The target image may be a STEM image, or a TEM image in the view mode.

#### TIPS: ROI on the target image

If there is a ROI on the target image, only the area in the ROI is processed. This capability is very useful for a high frame-rate large TEM image. The position and the size of the ROI can be changed at any time, but the filtered image will change only when the target image is updated.

### Set the processing parameters

“Resolution” and “Enhanced background factor” are important parameters that affect the filter performance.

#### *Resolution/Information Limit*

Resolution/Information Limit can be adjusted by looking the Power Spectrum of the image as usually done by using the command: HREM-Filters->Radial Wiener/Difference Filter. If you already done using the filter command, you can use the latest parameters used by the filter command by the “Load” button. Conversely, you can store these parameters for a later use by “Save” button.

When the target image is calibrated, the corresponding scale unit will be displayed, and you can use a fixed “Resolution” even when the magnification is changed. Contrary, if the target image is not calibrated, the unit “pix” is displayed and “Resolution” should be modified manually when the magnification is changed.

*Remove outside Info. Limit*

If checked, the noise outside of the Information Limit (Resolution) will be excluded.

*Show Power Spectrum*

Initial setting of this selection is ON. If you want hide the Power Spectrum window, you can do by unselect this check box.

*Upsampling by*

If checked, you can upsample the original image by a selected factor (2/3/4).

*Auto Survey: ON, OFF*

Using ON and OFF buttons you can change the Auto Survey status of the filtered image.

Following two settings are available only for the user who has the license for the **Real Time Filter module**.

*Filter mode*

You can select “Radial Wiener” or “Radial Difference” filter. If you don’t have the license, “None” will be shown here.

*Enhanced background*

You can reduce the random noise (quantum noise/Poisson noise) by increase the background level by a selected factor.

Start the filter

The Realtime Upsampling Filter will be started by pressing the “Start” button. Then, this button will change to “Stop,” by which you can terminate the processing.

When the Start button is pressed, a filtered image will be displayed in a separate window, and be updated when the target image is revised.

NOTE: If the image update is quicker than a required processing time, some of the frames during the processing will be skipped and not processed. This will usually happen for a high frame-rate TEM image that is larger than 512x512 pixels. By using a small ROI, you can decrease the required processing time and increase a number of frames (fps) that will be processed.

TIPS: This filter will work for a stacked image. You can select a stacked image as the target image. In this case, when you change a current slice of the target image, the filter works on the current slice image in the same way when the target image is updated by data acquisition.

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NOTE: Off-line use of the tool

You can use this tool for off-line processing, when you select an already acquired image stack. When you push “Start” for an acquired image stack, the upsampled image for a current (selected) slice is displayed, and the upsampled image will be updated when the slice is changed, say by the slice player.

NOTE: Use this tool without the license

This tool can be opened even when you don’t have the license of the Runtime Module, if you install the HREM-Filters Lite. In this case, however, the filter selection is set to “None.” Namely, you can use this tool without a filter capability to display a smoothed image in live by upsampling the selected image in the view mode.