

ProSEM

What's New in ProSEM 3.7

ProSEM 3.7 Key News

- General
 - Update on Operating System support
- Feature Detection and Measurements
 - Improved import of color images
 - Faster re-calculation after change of pixel size
 - Advanced Package: Image pixel down-sampling
 - Additional Python method for PSD data export
- SEM Tool Control
 - New SEM control mode: navigation
 - New SEM control mode: semi-automatic

General

- Release 3.5
 - Windows: 10 or 11, 64-bit
 - Redhat/Centos Linux: 7 or 8, 64-bit
 - Ubuntu Linux: 18.04 or 20.04, 64-bit
- Release 3.6
 - Windows: 10 or 11, 64-bit
 - Redhat/Centos Linux: 7, 8, or 9, 64-bit
 - Ubuntu Linux: 20.04, 22.04, or 24.04, 64-bit
- Release 3.7
 - Windows: 11, 64-bit
 - Redhat/Centos Linux: 8 or 9, 64-bit
 - Ubuntu Linux: 22.04 or 24.04, 64-bit

New from version 3.7

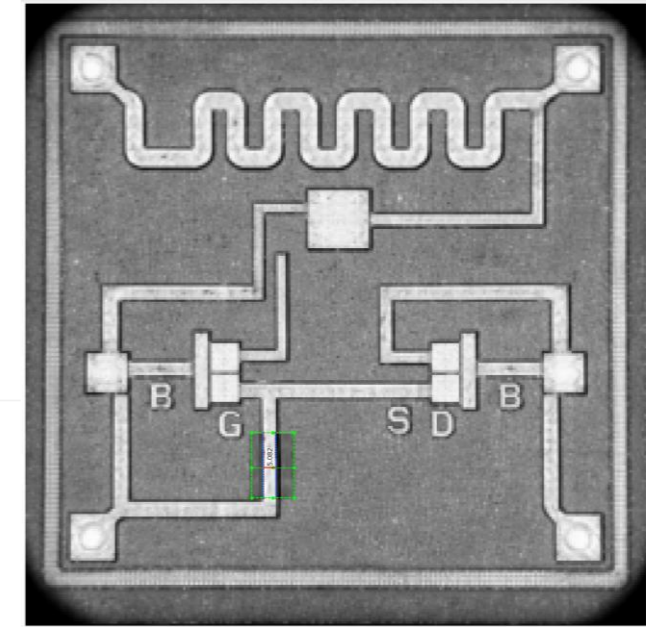
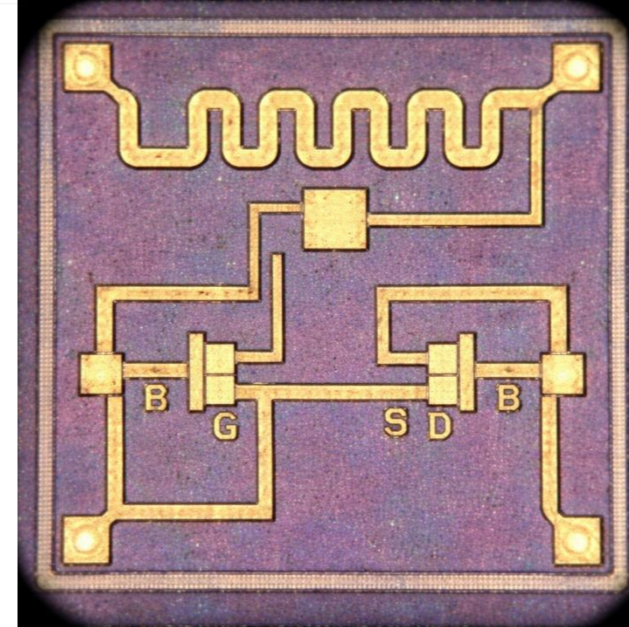
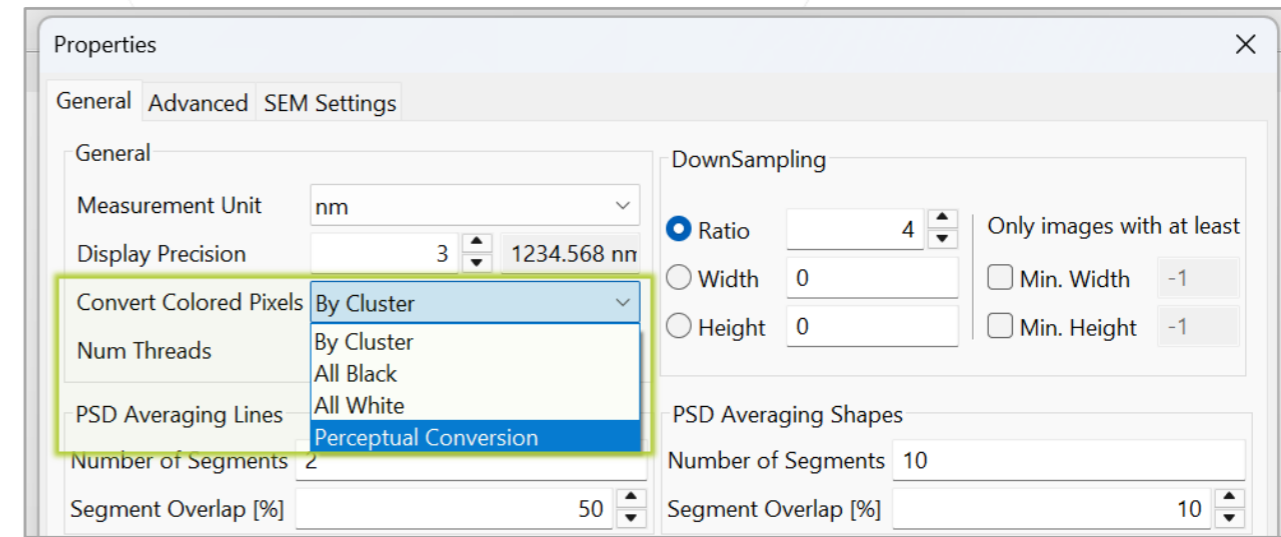
- Win 10 not officially supported
- Support for Redhat 7 stopped
- Support for Ubuntu 20 stopped

Feature Detect & Measure

New method for color conversion

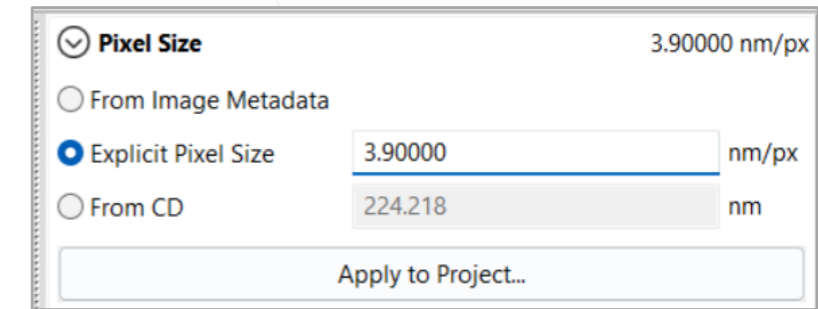
- Accessible in ProSEM properties
 - Method “perceptual conversion” as general setting
 - Color-to-grayscale conversion: desaturates color images and keeps overall impression
 - Recommended for work with real color images
 - Still default setting for SEM images: “by cluster” for importing color annotations and data zones

→ Enables ProSEM metrology on color images (e.g. optical) directly after import



Re-calculation after change of image pixel size

- Setting a new pixel size
 - With already existing measurements
 - Apply new pixel size
 - Requires re-calculation of metrology and results
- New implementation conducts a more efficient “scaling”
 - Significantly shorter processing time of re-calculation
 - Runtime reduction from 3x for a few, up to 50x for many measurements

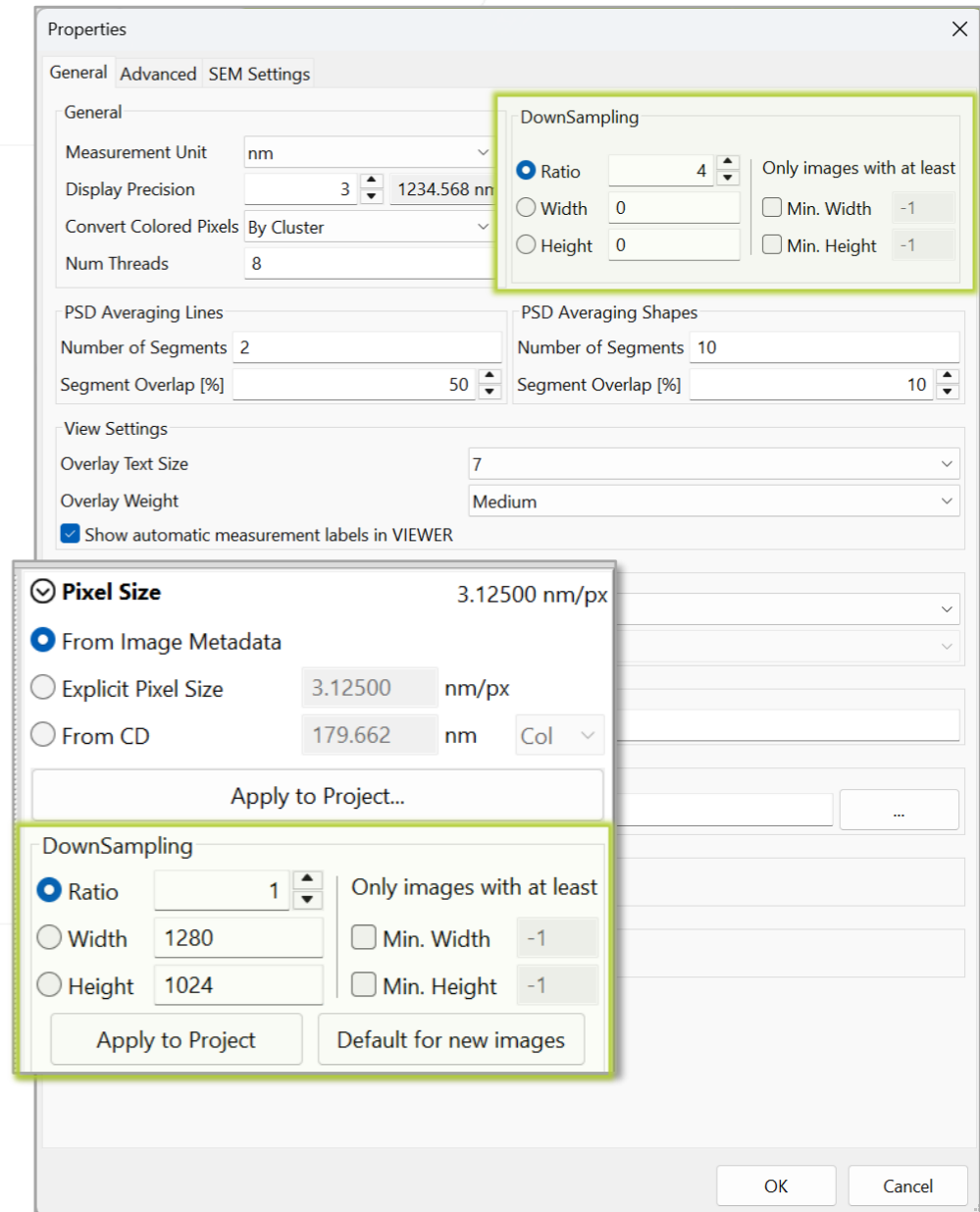


Setting for image load with down-sampling

- Control via ProSEM properties
 - Preference setting serves as default
 - Apply to selected image, project or all new images
- Apply down-sampling
 - By relative ratio
 - By absolute value width/ height
 - Conditional for min. image size

- Optimize pixel resolution for large image files, e.g. optical images
- Faster processing for large images or data sets

(For Advanced Package or higher)



Additional Python export

- PSD curves data export possible via Python API
 - PSD has been added as Python properties
 - Easier for numerous PSD than exporting separate data per image/ group into csv format

Get all info on ProSEM website “Examples” →
prosem.genisys-gmbh.com/scripts-reference.html

has_psd_data()	Attribute	Checks whether PSD data exists for the measurement	>>> a.has_psd_data()	Returns Boolean
avg_psd_data_le	Attribute	Average Power Spectral Density for left edge	<pre>>>> prosem[0] [0].avg_psd_data_le <ProSEMPy.GOutline object at 0x000001D8B3AAB520> >>> psd[0] GPoint(x=891.7930591357799, y=0.00032598522220509616)</pre>	Returns outline. Only available when PSD has been computed
avg_psd_data_re	Attribute	Average Power Spectral Density for right edge	>>> g.avg_psd_data_re	Returns outline. Only available when PSD has been computed
avg_psd_data_w	Attribute	Average Power Spectral Density for linewidth roughness (LWR)	>>> g.avg_psd_data_w	Returns outline. Only available when PSD has been computed

Scripts - Reference

Summary:

Basics of Scripts, and reference details for the ProSEM classes and functions available in scripts, as well as the common libraries that are included with the ProSEM Python instance.

Jump to: Properties: Project, Image, Group, Gratings, Arrays, Generic to All Measurements, Line/Space, Circle/Ellipse, Rectangle, Triangle, SingleEdge, Shape, Multi-Edge

Included Libraries

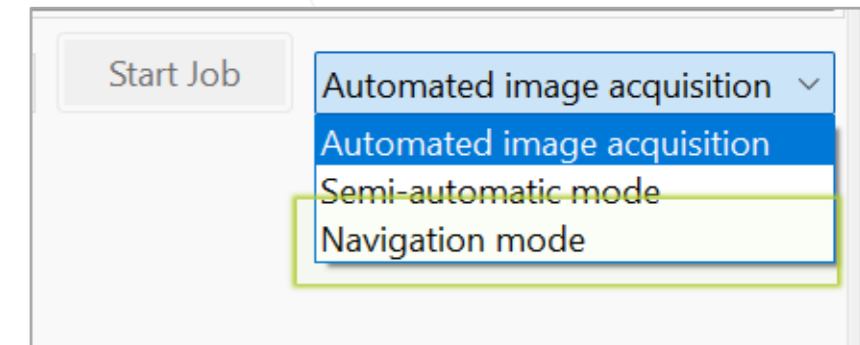
In addition to the Python Standard Library, ProSEM also includes several useful libraries. (Links open documentation pages for each library in a new browser window.)

Library Name	Description
dateutil	Extended parsing and processing of date and time strings

SEM tool control

New SEM workflow for layout navigation

- Default tool control: stage drive + automated image scan
- New interactive mode provides sample navigation (only)
 - Use CAD layout and global alignment as usual
 - Define automation list with positions and entries
 - Navigate to layout position on sample
 - Software prompt allows for interactive SEM work
 - Continue to next position



→ Interactive usability

Alignment	Measurements	Image Registration	Measurement Info	Pick Data Info
enter X [um]	enter Y [um]	Width [um]	Height [um]	Feature Typ
-763.000	3288.000	55.000	55.000	Circles
-596.000	3288.000	24.000	24.000	Circles
237.000	3288.000	55.000	55.000	Circles
404.000	3288.000	24.000	24.000	Circles
1237.000	3288.000	55.000	55.000	Circles
1404.000	3288.000	24.000	24.000	Circles

Shift Left-Click into the layout to create a measurement ROI.

Find Similar	Layer	Status	Key / File
<input type="checkbox"/>	0(1000)	scan finish	<automat
<input type="checkbox"/>	0(1000)	scanning	<automat
<input type="checkbox"/>	0(1000)	scan penc	<automat
<input type="checkbox"/>	0(1000)	scan penc	<automat
<input type="checkbox"/>	0(1000)	scan penc	<automat
<input type="checkbox"/>	0(1000)	scan penc	<automat

Stage Navigation

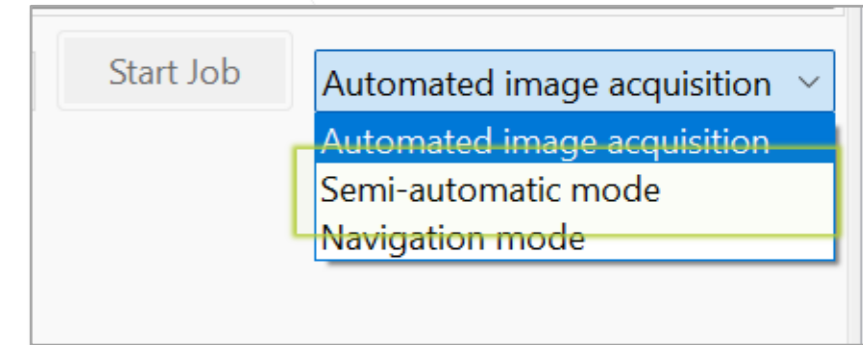
i Stage Position reached.
Confirm for next position.

Continue Stop

Tool Control Mode: Semi-automatic Imaging

New SEM workflow for interactive image acquisition

- Default tool control: stage drive + automated image scan
- New mode with interactive SEM optimization for imaging
 - Use CAD layout and global alignment as usual
 - Define automation list with positions and entries
 - Navigate to layout position on sample
 - Software prompt allows for fine-tuning at SEM
 - Continue starts SEM scan



→ Interactive usability

Center X [um]	Center Y [um]	Width [um]	Height [um]	Feature Type	Find Similar	Layer	Status	Key / File
-763.000	3288.000	55.000	55.000	Circles	<input type="checkbox"/>	0(1000)	scanning	<automat
-596.000	3288.000	24.000	24.000	Circles	<input type="checkbox"/>	0(1000)	scan finish	<automat
237.000	3288.000	55.000	55.000	Circles	<input type="checkbox"/>	0(1000)	scan stop	<automat
404.000	3288.000	24.000	24.000	Circles	<input type="checkbox"/>	0(1000)	scan finish	<automat
1237.000	3288.000	55.000	55.000	Circles	<input type="checkbox"/>	0(1000)	scan finish	<automat
1404.000	3288.000	24.000	24.000	Circles	<input type="checkbox"/>	0(1000)	scan finish	<automat

Image Sequence

i Stage Position reached.
Confirm to start SEM scan.

Continue Stop

Thank You!

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