

JEOL NeoScope EDS Viewer

User Guide

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1. Overview

The JEOL NeoScope EDS Viewer is a free, open-source application for viewing and exporting data collected on the JEOL NeoScope 6000 scanning electron microscope (SEM) with EDS (energy dispersive X-ray spectroscopy) attachment at GSECARS, The University of Chicago.

The viewer allows users to open their JEOL Analysis Station project files and explore their data without needing JEOL Analysis Station installed on their own computer. No Python installation or technical expertise is required.

The viewer provides:

- Display of backscattered electron (BSE) SEM images with scale bar
- Overlay of EDS acquisition point markers on the BSE image
- Display of EDS spectra with element peak labels
- ZAF quantification results table (when computed in Analysis Station)
- Elemental false-color maps with colourmap selection
- Three line elemental RGB maps
- BSE/map overlay with adjustable transparency
- Export of images, maps, spectra, and quantification data

2. System Requirements

- Windows 10 or Windows 11 (64-bit)
- Approximately 600 MB free disk space for the application folder
- No internet connection required after installation
- No Python or JEOL software required

Note: *A macOS version is planned for a future release.*

3. Installation

The viewer is distributed as a folder — no installer is required.

1. Download the JEOLViewer.zip file from the link provided by GSECARS.
2. Right-click the zip file and choose Extract All, or use your preferred zip tool.

3. Move the extracted JEOLViewer folder to any convenient location (e.g. your Desktop or Documents folder).
4. To start the viewer, double-click JEOL EDS Viewer (the shortcut with the spectrum icon) inside the JEOLViewer folder, or double-click JEOLViewer.exe directly.

Note: Do not move JEOLViewer.exe out of the JEOLViewer folder — it depends on the other files in that folder to run.

4. Your Data Files

JEOL Analysis Station saves your project as a folder with a specific structure. For example, a project named Biochar would be saved as:

```
Biochar/  Biochar.ASW      Sample/          00_View000/  (image, spectra,
maps)      00_View001/    ...
```

The .ASW file is the project master file. To open your data in the viewer, you need the entire project folder — not just the .ASW file. Copy the complete project folder from the instrument computer to your own computer (e.g. via USB drive or network share) before your session ends.

Note: The viewer opens your data read-only. Your original files are never modified.

5. Opening a Project

5. Launch the viewer by double-clicking JEOLViewer_launch.bat.
6. Click the Open Project button in the toolbar, or choose File → Open Project (.ASW).
7. Navigate to your project folder and select the .ASW file (e.g. Biochar.ASW).
8. Click Open. The viewer will load the project — this may take 15–30 seconds for large datasets.
9. Once loaded, the first view appears automatically.

The toolbar at the top shows the project name and a View dropdown. If your project contains multiple views (different fields of view on the sample), use the dropdown to switch between them.

6. The Main Window

The main window is divided into three panels:

Top left — BSE Image panel: Shows the backscattered electron SEM image for the selected view, with a white scale bar in the bottom-left corner. If EDS point spectra were collected, cyan crosshair markers (✚) show where each spectrum was acquired, labelled 001, 002, etc.

Top right — EDS Map panel: Shows the elemental false-colour map for the selected element. Use the toolbar at the top of this panel to choose the element and colourmap.

Bottom — Spectrum panel: Shows the EDS spectrum for the selected point, with element peak labels. If ZAF quantification was performed in Analysis Station, a table of results appears to the right of the spectrum.

The panels can be resized by dragging the dividers between them.

7. BSE Image Panel

The BSE image panel displays the scanning electron microscope image for the current view. A white scale bar in the bottom-left corner shows the physical scale. The view name, magnification, and field of view are shown in the top-left corner of the image.

EDS Point Markers

If point EDS spectra were collected during your session, cyan crosshair markers (✚) appear on the image at the locations where each spectrum was acquired. Each marker is labelled with its point number (001, 002, etc.).

To display a spectrum, click on a crosshair marker. The selected marker is highlighted with a yellow circle, and the spectrum appears in the bottom panel.

Note: *The click area around each marker is generous — you do not need to click precisely on the crosshair centre.*

8. EDS Map Panel

The EDS map panel shows the elemental distribution map for the current view. The panel has two toolbar rows:

Toolbar Row 1

Element: Select which element to display from the dropdown. The map updates immediately.

Colormap: Choose from inferno (default), viridis, hot, plasma, gray, or turbo. Inferno and hot are generally most useful for EDS maps.

Colorbar: Toggle a colourbar on the right side of the map showing the count range.

RGB Composite: Choose three Element maps to overlay as a Red Green Blue composite map.

Toolbar Row 2

1–99% Scale (default on): Scales the colourmap to the 1st–99th percentile of count values, suppressing hot spots that would otherwise compress the colour scale and obscure compositional variation. It is recommended to leave this on. Toggle it off to see the full count range.

BSE Overlay: Blends the elemental map with the BSE image, making it easy to correlate elemental distribution with sample morphology. When active, use the Map opacity slider to adjust the balance between the map and the BSE image.

9. Spectrum Panel

The spectrum panel appears at the bottom of the window after you click an EDS point marker on the BSE image. It shows:

- The EDS spectrum (energy in keV on the X axis, counts on the Y axis)
- Dashed vertical lines marking characteristic X-ray emission lines, colour-coded by type: steelblue for $K\alpha$ lines, orange for $K\beta$ lines
- Acquisition statistics: live time, real time, dead time, and count rate
- ZAF quantification table (if results were computed in Analysis Station)

Log / Linear Scale

The Switch to Linear Scale / Switch to Log Scale button below the quantification table toggles the Y axis. Log scale (default) is most useful for viewing both major and minor peaks simultaneously. Linear scale is useful for comparing peak heights directly.

Quantification Table

If ZAF quantification was performed in JEOL Analysis Station for this point, a table shows the results. Columns are:

Compound: The element or oxide form (e.g. SiO_2 , Al_2O_3 , FeO).

Atom %: Atomic percentage of the element.

Mass1 %: Weight percent normalised to the directly measured elements.

Mass2 %: Weight percent with oxygen calculated by stoichiometry (oxide totals).

***Note:** Quantification results are only available if ZAF analysis was run in JEOL Analysis Station during your session. If no results are available, the table shows a message to that effect.*

10. Keyboard Shortcuts

Key	Action
← Left arrow	Select the previous EDS point in the current view
→ Right arrow	Select the next EDS point in the current view
↑ Up arrow	Select the previous element in the EDS map panel
↓ Down arrow	Select the next element in the EDS map panel
Ctrl+O	Open a JEOL project file
Ctrl+Q	Quit the application

11. Exporting Data

All export functions are available under the Export menu. Exported files are written to a location you choose — your original data files are never modified.

Export BSE Image

Saves the current BSE image as a PNG or TIFF file at 200 dpi. A dialog lets you choose whether to include the scale bar and EDS point markers in the exported image.

Export EDS Map

Saves the current elemental map exactly as displayed (including colourmap, percentile scaling, colourbar, and BSE overlay if active) as a PNG or TIFF file.

Export Spectrum (CSV)

Saves the EDS spectrum for the currently selected point as a CSV file with two columns: Energy (keV) and Counts. A header block records the project name, view, point label, and acquisition statistics. This requires an EDS point to be selected first.

Export Quantification (CSV)

Saves the ZAF quantification results for the currently selected point as a CSV file. This option is only available if quantification results are present for that point.

Export All Spectra (this view)

Saves CSV files for every EDS point spectrum in the current view to a folder you choose. Where quantification results are available, a separate quantification CSV is also saved for each point. Useful for exporting all spectra from a session in one step.

Export All Maps (this view)

Saves PNG files for every elemental map in the current view to a folder you choose, using the current colourmap and scaling settings.

12. Tips and Recommendations

- Copy your complete project folder from the instrument computer before leaving — the viewer needs the entire folder structure, not just the .ASW file.
- The 1–99% Scale option in the map panel is on by default and is recommended. Turn it off only if you need to see the true maximum count value.
- Use log scale for the spectrum when looking for minor elements — peaks that are invisible in linear scale become clearly visible in log scale.
- The BSE Overlay mode is particularly useful for interpreting elemental maps — try setting the map opacity to around 50–60% for a good balance.
- Use the arrow keys to quickly cycle through EDS points and elements without reaching for the mouse.
- If you collected multiple views at different magnifications during your session, use the View dropdown in the toolbar to switch between them.
- Export All Spectra and Export All Maps save everything for a view in one step — useful at the end of a session before the data folder leaves the facility.

13. Troubleshooting

The application does not start: Make sure you are running JEOLViewer.exe or JEOLViewer_launch.bat from inside the JEOLViewer folder, not from a shortcut pointing to a moved executable. Do not move JEOLViewer.exe out of its folder.

The project loads but no EDS points appear on the image: EDS point markers only appear if point EDS spectra were collected during the session. Views that had only mapping (no point spectra) will show the BSE image and elemental maps but no crosshair markers.

The quantification table shows ‘No quantification results available’: ZAF quantification must be run in JEOL Analysis Station before the session ends. If it was not run, the raw spectrum data is still available and can be exported as CSV.

The BSE Overlay button shows a warning about scipy: This should not occur in the distributed version. If you see this, please contact GSECARS.

The loading takes a long time: This is normal for large datasets, particularly those with multiple views and hyperspectral mapping data (.pts files). Loading times of 15–60 seconds are typical. A progress dialog will be shown.

14. Contact and Support

For questions, feedback, or to report issues, please contact:

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13-BM-D, Advanced Photon Source, Argonne National Laboratory

This software is provided free of charge for use by external users of the GSECARS SEM facility.
It is built on open-source components including HyperSpy, eXSpy, PySide6, and Matplotlib.