Guide to operate the FEI Scios FIB/SEM equipped with EDAX EDS/EBSD
--- Elemental and texture analysis using EDS/EBSD

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Specimen Preparation and Handling

The sample material must be able to withstand a high vacuum environment without outgassing. It must be clean and conductive. Oil, dust, or other materials may cause sample charging or contaminate the chamber, which could hinder or even prevent evacuation.

Note: **1) *Always wear NFCF-supplied lint- / powder-free clean room gloves when manipulating inside the specimen chamber to minimize oils, dust, or other contaminants pollution of the chamber environment.***

Caution! *Store samples in a dry nitrogen storage cabinet when possible. Dust on samples can get drawn into the electron / ion column, degrading performance*

Mounting Specimen on Holder

Attach the specimen to the specimen holder using any suitable SEM vacuum-quality adhesive. The specimen must be electrically grounded to the sample holder to minimize specimen charging.

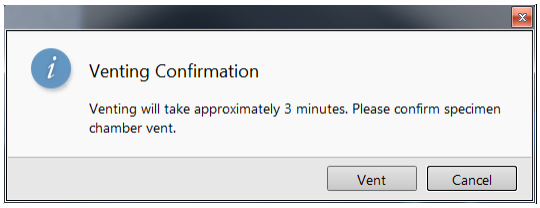
Operation Pre-Check

To ensure correct operation check the following list before continuing.

Adjustment	Electron Beam Setting	Ion Beam Setting
Column Use Case	Analytical	N/A
Accelerating Voltage	Select voltage relative to specimen type: optimized at 5 kV – 20 kV	N/A
Beam Current & Spot size	13 nA	N/A
Scan rate	fast scan (dwell time 0.1 - 0.3 µs)	N/A
Working Distance (FWD)	7 mm at 0 deg. tilt for EDS only; (**14-18** mm at ***+60 - +70*** deg. tilt for EBSD or EBSD/EDS)	N/A
Eucentric Position	7 mm	N/A
Magnification	Set to lowest – from 20× to 200×	N/A
Detector	ETD (SE)	N/A
Filtering	Live or Average (2-4 frames for fast scans)	N/A

Inserting / Exchanging Specimen

1. Click on the ***Vacuum*** module / ***Vent*** button. The confirmation dialog appears. After switching the High Voltage off the vacuum system switches off the pumps and opens appropriate valves to vent the system. After a specified venting time (~3 minutes) the venting valve will close.



Note :

If the venting valve closes before the chamber is at the atmospheric pressure (the door is not possible to open), click on the Vent button once more to open it again.

2. When vented, open the specimen chamber and, using **lint-free gloves or tweezers**, place a mounted specimen into the specimen holder at mounting hole **#12** or **#4** on the multipurpose stage.
3. Close the specimen chamber door and click on the ***Vacuum*** module / ***Pump*** button.
4. While pumping, choose the highest specimen point and bring it to the **7 mm** Free Working Distance (**FWD**, yellow line in CCD Quad) by holding down the mouse wheel and moving the mouse cursor up.

Imaging Onscreen

1. When the vacuum status is ***PUMPED*** (see the Status bar), click on the **System** module, if the system is at sleep mode, then click **Wake Up** button to wake the system up; otherwise click the **e-beam** button to open the electron beam shutter.
2. Select an appropriate **Column Use Case** (e.g. Standard, **Analytical**, OptiTilt, OptiPlan) and the detector and resume the active display, where an image appears.
3. Focus the image and **Link Z to FWD**.
4. Adjust to a suitable magnification; optimize the imaging using the **Contrast** & **Brightness**, **Focusing**, **Astigmatism Correction** etc.

High Resolution Imaging (*Optional if your main interest is for EDS/EBSD*)

1. Click the icon of ***Open Sample Exchange Window***, and then define the ***Working Folder*** to save images to;
2. Use the mouse wheel over the ***Chamber scope*** image in the Sample exchange dialog to move the same in the ***Z***-axis to the working distance of approximately ***7mm***;
3. From the main menu, go to **Stage → Take Nav-Cam Photo** to take a specimen navigation image;
4. Navigate to the sample of interest using the ***Nav-Cam*** image in the third quad display or using the sample holder drawing on the ***Stage Control*** page;
5. Setting imaging parameters as following:
    a. High Voltage: **2 kV**, Probe Current: **0.1 nA**;
    b. Set the electron beam to Display:
        i. Display 1: ETD detector;
        ii. Display 2: T1 detector;
        iii. Display 3: T2 detector.
    c. Press the **Beam On** and start scanning with image resolution = 768, dwell time = 200 us, averaging = 4.
    d. Adjust **Contrast** and **Brightness** for all appropriate displays;
    e. **Focus** the overview image and **Link Z** to free working distance;
    f. Navigate to the area of interest at low magnification;
6. Adjusting the Image:
    a. Bring the sample to the working distance of **2 mm**, which is optimized for high resolution imaging, and focus;
    b. Increase magnification until you can see the feature of interest;
    c. Move the stage to a recognizable feature next to the area of interest;
    d. Decrease the probe current to 25 pA;
    e. Focus once again – use ***Reduced Area*** to make focusing easier;
    f. Use (**Auto**) **Stigmator** to correct astigmatism.
7. Taking the Final Image:
    a. Focus once again;
    b. Adjust **stigmator** manually if the image after focusing still show astigmatism;
    c. Adjust **contrast** and **brightness** if necessary;
    d. Move stage to the area of interest;
    e. Take the final image with the following scanning parameters: image resolution = 1536, dwell time = 5 us, line integration = 10.

Elemental Analysis using Energy Dispersive Spectroscopy (EDS)

1. Navigate to the sample of interest using the ***Nav-Cam*** image in the third display if available or using the sample holder drawing on the ***Stage Control*** page;
2. Move the sample in the **Z** axis to the working distance of approximately **7 mm**;
3. Set High Voltage: **20 kV**, Probe Current: **1.6 nA** with Use Case: **Analytical**;
4. Set the electron beam to Displays:
    a. Display 1: **ETD** detector or **T1** detector;
5. Press **Beam On** if the E-beam is not turned on;
6. Start SEM scanning with image resolution = 768, dwell time = 200 ns, averaging = 2;
7. Adjust **Contrast** and **Brightness** to optimal;
8. **Focus** the overview image and **Link Z** to free working distance (**FWD**);
9. Navigate to the area of interest at low magnification;
10. Adjust (**Auto**) **Stigmator** knobs to correct astigmatism;
11. Focus image once again;
12. Start the EDS software to perform the analysis:
    a. Start the **TEAM** software on desktop of the ***EDAX PC***;
    b. Log in using username: **user** (*no password is needed*) or your own user ID;
    c. Click *user profile icon* to open the user profile;
    d. Change the **Custom Image Folder Location** that you want your data to be saved to;
    e. Open the ***EDS configuration*** menu by left clicking the arrow at the right of the monitor;
    f. Check **EDS Detectors → Octane Plus → Det 1 – Detector Status**, the status should be **Cooling On**, otherwise, click the ***Cooling Off*** button to cool the detector.
13. Perform EDS analysis:
    a. **Spectrum Only** for survey:
        i. From the drop down menu of **Collect Spectrum**, set the following parameters:
            Ev/Chan: 5 ev or 10 ev;
            Amp Time: adjust to give a dead time of ~33%;
            Limit By: Clock Time or Live Time
            Limit Value: Time for collection in seconds, e.g. 30.

        ii. Click **Collect Spectrum** button to start collecting EDS spectrum.

Note:

i. During the collection process element identification is automatically applied along with background determination and peak deconvolution and ultimately element quantification.
ii. Peaks are labeled according to the elements they represent together with their *k, l* or *m* energy lines.
iii. The *spectrum background* (noise) region is outlined in blue (default) towards the base of the spectrum plot.
iv. Element may be "locked" down and retained for the duration. This can be useful in preparation for EDS mapping for example.

b. **Point Analysis** for point ID and quantification;

Note: TEAM Point Analysis utilizes next generation element identification and quantification models and algorithms (***eZAF***) for examining EDS spectra. In particular, "Expert Id" and EDS quantification use an ***HT (high tilt) ZAF*** model. This allows for accurate results for tilted specimens ***at angles between 0 and 70 degrees*** as needed for EBSD (Electron Backscatter Diffraction).

i. Select the '**Area Image**' button in the Activity bar using the following settings:

- ***Drift Correction***: Check this on to compensate for microscope electron beam drift side-effects during mapping.
- ***Resolution***: The image collected will be at the specified resolution (e.g. 1024x800) and it is possible to select the resolution from a drop-down list in the Settings bar.
- ***Magnification***: Current SEM magnification at which image is being collected.
- ***WD***: Current specimen Working Distance at which image is being collected.
- ***Advanced***: Open up Tier II settings for advanced control of the area image collection process. This includes Auto Image functionality which optimize collection settings for the best possible image of the specimen surface.

ii. Click **Collect Spectra** of single point, multiple points, selected area, or along specific line after defining the following settings:

- ***Collect On Click***: Each time the cursor is positioned over the area image and the left mouse button clicked, spectrum collection begins.
- ***Amp Time***: Range of EDS analyzer time constants to allow for optimum resolution or x-ray count throughput. Includes an "auto" setting. Values depend on detector type.
- ***Limit By***: either *Clock Time* (real time), *Live Time* (x-ray collection cycle), *Counts* or *No limit*.
- ***Limit Value***: Time limit or count limit.
- ***Delete All Sites***: Remove all collection sites from the area image.
- ***Advanced***: Tier II settings to adjust spectrum collection parameters.

iii. Click **Report** button will display the area image, spectra, and quantified results.

c. **EDS Mapping** for full or selective area mapping;

i. Select the '**Area Image**' button in the Activity bar using the following settings:

- ***Drift Correction***: Check this on to compensate for microscope electron beam drift side-effects during mapping.
- ***Resolution***: The image collected will be at the specified resolution (e.g. 1024x800) and it is possible to select the resolution from a drop-down list in the Settings bar.
- ***Magnification***: Current SEM magnification at which image is being collected.
- ***WD***: Current specimen Working Distance at which image is being collected.
- ***Advanced***: Open up Tier II settings for advanced control of the area image collection process. This includes Auto Image functionality which optimize collection settings for the best possible image of the specimen surface.

ii. Click on the **Collect Data** button in the Activity bar to start mapping data collection after defining following settings:

- **Resolution:** The user selects a mapping resolution from a list of presets ranging from 64x50 to 2048x1600 (manual) or *Auto* are available in the drop-down Settings bar. The default preset is the same as the Area Image resolution setting.
- **Quality:** This will determine the duration of map collection accordingly: ***high***, ***standard*** and ***quick***. A *manual* option is also provided whereby a number of specific frames (scan cycles) can be set.
- **Display :** Select the type of map to be shown during collection:
  1). ***Phase to Element***. Phase maps with supporting element information.
  2). ***Element to Phase***. Element maps and information with supporting phase data.
  3). ***Counts per Second***. A grey-scale map updated each frame showing EDS counts per pixel. White pixels indicate highest counts.
  4). ***CPS Deviation***. Deviation Counts per Second map.

iii. Verify data and generate a report of EDS Mapping.

d. **Line Scan** for analysis along a selected line;
   i. Select the '**Area Image**' button in the Activity bar using the following settings:

- ***Drift Correction***: Check this on to compensate for microscope electron beam drift side-effects during mapping.
- ***Resolution***: The image collected will be at the specified resolution (e.g. 1024x800) and it is possible to select the resolution from a drop-down list in the Settings bar.
- ***Magnification***: Current SEM magnification at which image is being collected.
- ***WD***: Current specimen Working Distance at which image is being collected.
- ***Advanced***: Open up Tier II settings for advanced control of the area image collection process. This includes Auto Image functionality which optimizes collection settings for the best possible image of the specimen surface.

   ii. Collect Line Scan EDS data:
- Move the mouse pointer onto the image area and setup the linescan area.
  - Click on the start location of the line with the mouse and drag to the end point.
  - Release the mouse button at the end point.
- Additional parameter required:
  - **Resolution**. Resolution is the Step size in the interval (in microns) between each sampling point along the line where a spectrum will be collected.
  - Quality Settings: **High**, **Standard**, **Quick** and **Manual**. The system will collect multiple passes of a linescan to achieve the quality level desired.

   iii. Verify data and generate a report of EDS Linescan.

Texture Analysis using Electron Backscatter Diffraction (EBSD)

A. Sample Loading:
   a. **Vent** the specimen chamber and load sample/s to be analyzed to the position **#4** or **#12** at the multipurpose sample holder;
   b. Check the chamber scope image in the sample exchange dialog to ensure all samples fit below the pole piece and close the chamber;
   c. **Pump** the specimen chamber;

B. Navigate to the area of interest:
   a. Navigate to the sample of interest using the **Nav-Cam** image in the third display if available or using the sample holder drawing on the **Stage Control** page;
   b. Use the mouse wheel over the Chamber scope image in the Sample exchange dialog to move the sample in the ***Z*** axis to the working distance of approximately **14** mm;
   c. Set rotation angle at **180 degrees**.

C. Setting e-beam imaging parameters:
   a. Column Use Case: **Analytical**; High Voltage: **20 kV**, Probe Current: **13 nA**;
   b. Set the electron beam to *Display 1*: **ETD detector**
   c. Press the **Beam On**;
   d. Start scanning and obtain image with image resolution = 768x512, dwell time = 200 ns, averaging = 1;
   e. Adjust **Contrast** and **Brightness**, and **Focus** to obtain optimal image;
   f. Click **Link Z** to free working distance (**FWD**);
      i. Working distance for EBSD analysis = **14 – 18 mm**

D. Adjusting image:
   a. Tilt the stage to +**60** - +**70** degrees (*if specimen is small enough, use +70 degree* tilt angle);
      i. **Warning**: use the chamberscope to check position of the sample with respect to the pole piece while tilting. Use the ***ESC*** button to stop the movement when necessary.

b. Focus the image;
c. Increase the mag. until you can see the feature of interest;
d. Focus the image once again;

E. Start the TEAM software on the EDAX PC to perform EBSD analysis:

a. Log in to user account using *user ID*: ***user*** (no password is required) or your user ID and password;
b. Change the ***Custom Image Folder Location*** from your profile if necessary;
c. Open the ***EBSD Camera*** control page by clicking the Arrow of the ***Advanced Properties*** at the right-hand side of the monitor;
d. Click **Camera Position → Insert** camera;
e. From **Image Area**: check ***Tilt Correction*** and ***Auto Enhance***;
    i. DO NOT CHANGE **Mag Reference** values (Width & Height)!!!
f. From **EBSD Mapping**: choose either ***Square*** or ***Hexagonal*** Grid type;
g. From the **EBSD Camera** page: choose the scanning speed you prefer to use and click ***Optimize*** to optimize the camera acquisition parameters;

F. EBSD Point Analysis:

a. From **Point Analysis → Collect Data → Phase List**, select the phases in your sample;
b. Click **Image Area** to acquire an image with your preferred settings:

- **Matrix Size**: The image collected will be at the specified resolution (e.g. 1024x800) and it is possible to select the resolution from a drop-down list in the Settings bar.
- **Signal**: ADC1 (using Scios ETD detector) or FSD (EDAX front side detector).
- On systems with microscope communication, the current accelerating voltage, magnification and working distance will be displayed.
- **Display Options**: The user may select from one of two options – 1) ***Auto Enhance*** (Optimize collection settings for the best possible image of the specimen surface - contrast and gain) or 2) ***Auto S/N*** (Maximize the signal to noise ratio for the given operating conditions).
- **Advanced**: Open up Tier II settings for advanced control of the area image collection process.

c. Click on an interest position on the acquired image to collect a point EBSD pattern (and EDS spectrum) with your preferred settings, e.g.

- **Phase**: Hovering over the ***Phase List*** button will show the active phase list, so that the user can be aware of which crystallographic phases are being considered in the pattern indexing routines.
- ***Amp Time****: Range of EDS analyzer time constants to allow for optimum resolution or x-ray count throughput. Includes an "auto" setting. Values depend on detector type.*
- ***Limit By****: Limit spectrum collection time by either Clock Time (real time), Live Time (x-ray collection cycle), Counts or No limit.*
- ***Limit Value****: Time limit or count limit being applied to the Limit By option.*
- **Time Machine**: Instead of simply clicking on a point, the user can click and dwell on a point of interest in the field of view. The pattern and spectrum will be continuously collected while the mouse button is pressed. After the mouse button is released, the user can then use the slider to go "back in time" to select the pattern and spectrum at a given point during the collection process. This is particularly useful in materials susceptible to beam damage or when drift is a problem. In these cases, an operator can recall the pattern and spectrum just before damage begins to occur or the beam drifts.
- **Camera**: This selects the mode used to optimize the EBSD camera.
- **Advanced**: The camera console will be displayed allowing the user to manually setup the camera.

d. On the pop-up EBSD Kikuchi pattern window, click Tune button to match theoretical pattern with the experimental pattern, The CI (confidence coeffidence index should be > 0.1, Fit <1.0)
e. Data Report:

- Click the **Report** button to generate a quick report showing the results from the point analysis. The points for which data have been collected will be displayed on the SEM image for the field of view along with pattern and spectrum at each point and the corresponding analysis results.

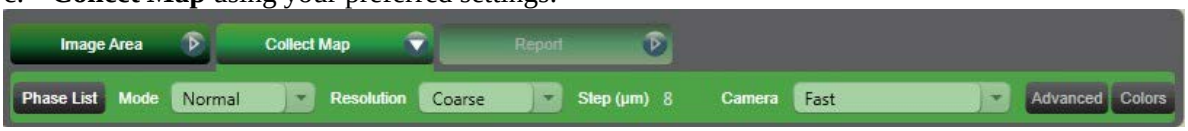
G. EBSD Mapping:

a. From **Mapping → Collect Data → Phase List**, select the phases in your sample;

b. Click **Image Area** to acquire an image with your preferred settings:

- **Matrix Size**: The image collected will be at the specified resolution (e.g. 1024x800) and it is possible to select the resolution from a drop-down list in the Settings bar.
- **Signal**: ADC1 (using Scios ETD detector) or FSD (EDAX front side detector).
- On systems with microscope communication, the current accelerating voltage, magnification and working distance will be displayed.
- **Display Options**: The user may select from one of two options – 1) ***Auto Enhance*** (Optimize collection settings for the best possible image of the specimen surface - contrast and gain) or 2) ***Auto S/N*** (Maximize the signal to noise ratio for the given operating conditions).
- **Advanced**: Open up Tier II settings for advanced control of the area image collection process.

c. **Collect Map** using your preferred settings:



- **Phase List**: Hovering over the Phase List button will show the active phase list, so that the user can be aware of which crystallographic phases are being considered in the pattern indexing routines.
- Pressing this button will launch the sample profile dialog where phases can be removed or added from the active phase list.
- **Mode**: Normal or Freeform as the available selections. Normal means that the scan area will be a rectangle, freeform allows the user to draw a shape of any kind on the field of view.
- **Resolution**: Four options are available:, coarse, medium, find and custom. In fine, the software selects a step size to obtain approximately 400,000 orientations, for medium it aims for 100,000 and 25,000 for coarse. In custom mode, the user specifies the step size. The step size along with the dimensions of the scan then define how many points will be contained in the scan grid.
- **Step size**: The step size is simply displayed for the coarse, medium and fine resolutions. However, it can be edited when the resolution is set to custom. The step size used will vary with the grain size of the material of interest, and the type of analysis you want from the material. For example, assume we have a material with a grain size of 10 microns. If you want to measure grain size and grain boundary character, you might set your step size to 2 microns or 1 microns, which would give 25-100 measurement points per grain. However, if you are interested more in the overall orientation distribution and texture of the material, you might set your step size to 5 or 10 microns, giving you 1-4 measurements per grain.
- **Camera**: This selects the mode used to optimize the EBSD camera.
- **Advanced**: Opens the Tier II panel where the camera can be manually configured using the camera settings panel and the scan settings precisely defined using the EBSD Mapping panel.
- **Colors**: The colors for the element maps can be defined using a periodic table dialog that appears after pressing this button.

Display Dial: Each of the available maps are defined below.

- **Color CI** – The confidence index or CI is a measure of the reliability of the indexing solution for any given pattern. It scales in value from 0 to 1 (a value of -1 indicates a null solution). A value of 0 does not necessarily mean the solution is incorrect, rather it indicates that the software is having a difficult time distinguishing between at least two potential solutions for the pattern. Our experiments indicate that CI>0.2 are generally correct. For the color map a value greater than 0.4 is colored dark green, a value between 0.2 and 0.4 is colored yellow and a value less than 0.2 is colored red. The colors actually fade from one to another along this scale.
- **Color IQ** – From the Hough transform analysis of the patterns and image quality or IQ values is calculated. This value gives an indication of the quality of the pattern. In this map the color value is continuous along a rainbow of colors from blue to green to yellow to red where blue indicates a

poor quality pattern and red indicates a high quality pattern. The coloring is done based on relative values within the scan area.

- **Color IPF** – The orientation obtained from a given pattern can be used to create a color map. The color is defined by color-coded inverse pole figure. The color provides an indication of which crystal direction is aligned with the sample normal. This color key differs with crystal symmetry. The legend is shown directly above the display dial. The example below shows the legend for a phase with cubic crystal symmetry. In this example, a pixel colored red in the map would indicate that the <001> crystal direction is aligned parallel with the sample normal, blue would indicate <111> and green <011>.
- **Color Phase** – The crystallographic phase associated with each point in the scan denoted by a color. A legend shows the colors assigned. It should be noted that this phase is obtained from the indexing of the EBSD pattern. It is indirectly related to the phase map in general EDS mapping but is not precisely the same thing as phase in the EDS mapping is defined by composition, not crystallography.
- **Color EDS** – This option displays elemental maps.
- **Gray IQ** – From the Hough transform analysis of the patterns and image quality or IQ values is calculated. This value gives an indication of the quality of the pattern. In this map the gray hue is continuous from black to white where black indicates a poor quality pattern and white indicates a high quality pattern. The shading is done based on relative values within the scan area.
- **Gray SEM –** The intensity value from whichever detector was used to collect the original gray scale image of the field of view (typically the secondary electron detector or forward scatter detector) is collected at each point in the scan. This value can be used to shade the maps as well. In this map the gray hue is continuous from black to white where black indicates a low intensity value and white indicates a high value. The shading is done based on relative values within the scan area.
- **Gray CPS –** The count rate at the EDS detector is obtained at each point in the scan. This value can be used to shade the maps as well. In this map the gray hue is continuous from black to white where black indicates a low count rate and white indicates a high count rate. The shading is done based on relative values within the scan area.

d. Reporting EBSD maps:

Click the **Report** button to generate a quick report showing the maps constructed from the OIM data.

Settings

- A user can build a template to create a report showing various components of the data in a custom report template. The template can then be selected from the setting bar and the report built by pressing the Build Report button.
- Templates designed to analyze various aspects of the microstructure based on analysis of the orientation data have been configured. These templates include: basic map, basic review, grain boundaries, grain size, IPF texture and local misorientation. The data and the template are sent to ***OIM Analysis*** using the **Send to OIMA** button. Maps, charts and plots are constructed along with other statistical analyses as defined by the template. The template provides a good starting point for exploring the collected data using the powerful suite of tools available in OIM Analysis.

e. OIM Analysis of EBSD maps

Quick-Gen Toolbar

Quick New - Pops up the Quick New menu (shown below). Use this to create a new Document based on the active Partition or Dataset. This is a simpler alternative to using the Project Tree to create a new Document.

Active Partition - This drop down list allows the user to select the active Partition and Dataset for use in the other Quick-Gen options.

IPF Quick Map - Generate an 001 inverse Pole Figure Map for the active Partition.

IQ Quick Map - Generate an Image Quality Map for the active Partition.

Unique Grain Color Quick Map - Generate a Unique Grain Color Map for the active Partition.

Grain Boundary Quick Map - For the active Partition, generate an Image Quality Map with Rotation Angle Boundaries as follows: 1-5 degrees in red, 5-10 degrees in green, 10-180 degrees in black.

Phase QuPage 9 of 10ick Map - Generate a phase map for the active Partition.

EDS Quick Maps - Generates EDS maps for the active Partition an EDS map using a different color is generated for each element for which counts were selected during the OIM scan.

User Defined Quick Maps - Generates a map based on a user-assigned template selected in the preferences dialog. The template assigned to this button will be displayed when the mouse is hovered over the button.

Quick Pole Figure - Generate a Discrete 001 Pole Figure for the active Partition.

Quick Inverse Pole Figure - Generate a Discrete 001 Inverse Pole Figure for the active Partition.

User Defined Quick Plots - Generates a discrete plot based on a user-assigned template selected in the preferences dialog. The template assigned to this button will be displayed when the mouse is hovered over the button.

Grain Size Quick Chart - Generate a Grain Size Chart for the active Partition.

Misorientation Angle Quick Chart - Generate a Misorientation Angle Chart for the active Partition.

User Defined Quick Charts - Generates a chart based on a user-assigned template selected in the preferences dialog. The template assigned to this button will be displayed when the mouse is hovered over the button.

Auto Partition - A partition is created containing all of the datapoints with CI values greater than 0.1. The IQ, Unique Grain Color, Grain Boundary and IPF Quick Maps are all created automatically along with the Misorientation Angle Quick Chart.

User Defined Quick Partition - Generates a partition based on a user-assigned template selected in the QuickGen Preferences Dialog. Partition templates not only contain the partition definition but may also contain maps, plots, charts and textures. The template assigned to this button will be displayed when the mouse is hovered over the button.

Auto CI Standardization - Performs an automatic Confidence Index Standardization on the dataset. A grain tolerance of 5 degrees is used with a minimum grain size of three datapoints, but the three datapoints must extend over multiple rows.

User Defined Data set - Generates all the partitions, maps, charts... assigned to a dataset template on the current dataset. The template assigned to this button will be displayed when the mouse is hovered over the button.

Template Selector - The user can select any template or cleanup recipe saved in the templates folder. The templates folder is the folder containing the last template selected by the user. Cleanup recipe's can be created using the Batch Processor.

Highlighting Toolbar

Record - Toggles the interactive data record mode on/off. If toggled on, interactive data is collected with each mouse click in a Map document and displayed in the Interactive List.

Undo - Remove the last highlighting operation from all Documents.

Redo - Resend the last highlighting operation to all Documents.

Clear - Remove all highlighting from all Documents.

Tolerance Angle - Allows the user to change the tolerance angle used for Tolerance Mode highlighting.

Vector profile width - By increasing the width beyond 1 the values in the measurement points perpendicular to the profile vector are averaged together in the resulting profile chart.

Plane Trace HKL - Set the indices for the plane of interest when highlighting plane traces.

Use Average Grain Orientations - For the Boundary and Triple Junction Modes, instead of calculating misorientations based on the actual orientation associated with each point in the pair, calculate the misorientation based on the average orientation of the grain to which each point belongs.

Overlay Size - Change the size of the crystal lattice wireframe and the plane trace overlays as well as the thickness of any boundaries drawn because of highlighting (i.e. like on a misorientation angle chart).

Point Mode - Highlight an individual point when clicking in a Map, and record the orientation data for that point in the Interactive List.

Tolerance Mode - Highlight all points within a certain tolerance of the point clicked on in a Map, and record the orientation data for each point in the Interactive List.

Grain Mode - Highlight all points of the grain clicked on in a Map, and record the orientation data for the grain in the Interactive List.

Boundary Mode - Highlight the two points clicked on in a Map, and record the misorientation data in the Interactive List.

Triple Junction Mode - Highlight the three points clicked on in a Map, and record the misorientation data in the Interactive List.

Vector Profile Mode - Highlight all points along the line segments drawn on a Map, and record the orientation and misorientation data in the Interactive List

Crystal Direction Mode - display the crystal direction parallel to the vector draw on a Map.

Plane Traces - Draw the traces of the specified plane for the datapoint selected on a Map. The length of the traces drawn is proportional to the inclination of the plane relative to the sample surface. The more inclined the plane the longer the trace.

Crystal Lattice - Draw a crystal lattice in the orientation of the data point selected on a map.

Ruler - Measure the distance between two points on a map (x, y and overall distance).

Tolerance - Show the points within the specified angular tolerance relative to the point clicked in a Plot.

Misorientation - Show the misorientation between two points clicked in a Plot. For pole figures the angular distance between the two sample directions, for inverse pole figures the angular distance between the two crystal directions, in ODFs the angular distance between two orientations (the minimum misorientation based on the crystal symmetry). Not implemented for misorientation plots.

Color - Select the current highlighting color, which is used for the Point, Boundary, and Triple Junction Modes.

Color Gradient - Select the current highlighting gradient, which is used for the Tolerance, Grain, and Vector Modes.