

EDAX APEX Instructions

These instructions assume you have had training in the use of the JEOL JSM6380-LV scanning electron microscope (SEM). These instructions are supplemental to training from the microscopy center manager or an approved representative. For more detailed information see the APEX Help.pdf document on the desktop or click on blue ? on the top right of the software.

There are five videos on the High Resolution Microscopy website to help you navigate the software. The videos are 5 to 9 minutes long and are very informative.

<https://research.fit.edu/hrm/equipment-and-procedures/>

If the IR camera is on, turn it off, the EDAX will not work if it is on.

As a general rule, the minimum SEM setup must be, aperture 3, 10mm working distance, and the kV will be 2.5 times the K-energy of the heaviest element you will be looking at.

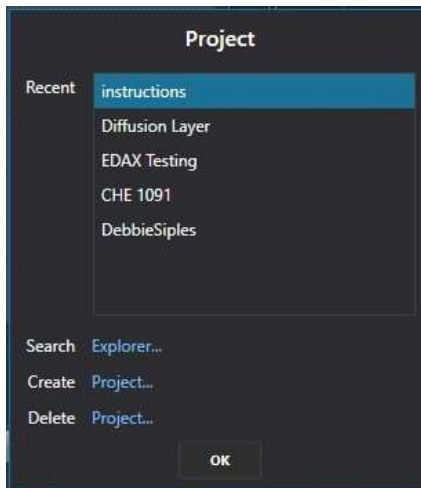
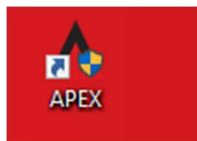
Check to see if the lights are on for the detector (under the desk).



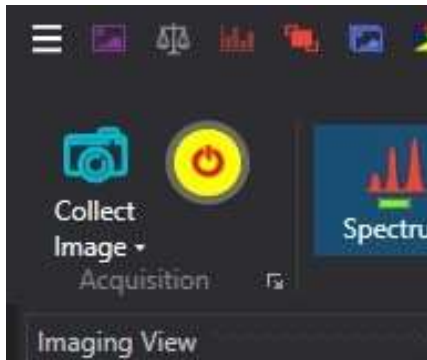
If there isn't any light turn on the detector.

If the computer is turned off, the password when you turn the computer on is octane9.

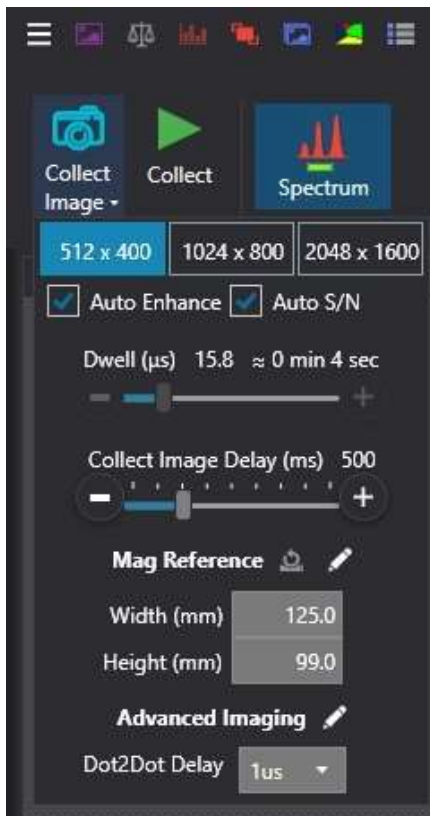
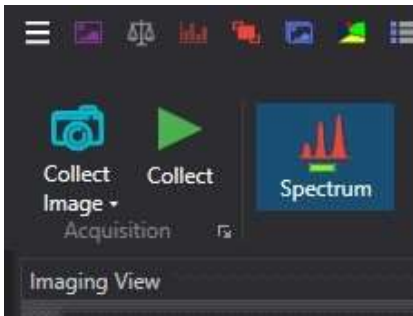
Click on the Apex software icon. →



The pop up screen to the left will come up and you must select or create a project to proceed. Click on Create and use your last name or Florida Tech email.



Once in the software you will need to turn the fan on to the detector. Click on the yellow and red icon to turn on the fan for cooling. It will take about a minute for the green Collect icon to come up. (Note: If you forget to turn on the detector before opening the software you will get the green collect button even though the fan is not on. It will cause errors and potentially hurt the system. If this happens, close the software, turn on the detector and then open the software again.)



Next you will collect an image but first you must select the image properties. By clicking on the down arrow next to Collect Image the popup window will give you options for image quality. Once you've selected your image capture properties you will collect the image by clicking on the camera icon.

Unlike the previous EDAX system this system does not require a Down Time of between 20 and 40. You will need to choose the kV on the SEM that is at least 2.5 times the heaviest metal you will be collecting in relation to the Energy on the EDAX Periodic Table. In the bottom left of the periodic table will be a blue square showing the relation of the K, L, and M lines the, the atomic number, the atomic weight, and the chemical symbol.

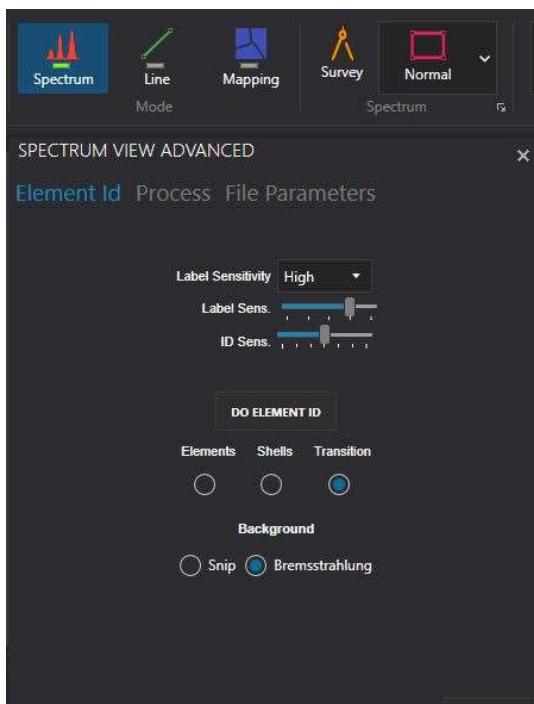
Atomic Number	Atomic Weight	Symbol
13	26.982	Al Aluminum
79	196.967	Au Gold


As you can see above the energy (kV) needed to look at the K line of aluminum is much less than the energy needed to look at gold. For that reason and because of the limitations of the SEM you will only ever see an L or M energy line when looking at gold under the EDS (Energy-dispersive X-ray spectroscopy) detector. With that in mind you could see the spectrum using about 5kV of energy. The full periodic table is listed at the end of this document.

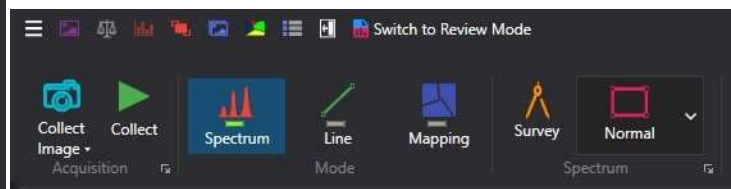
Now that you've selected the kV on the SEM for EDS you can look at the status bar on the bottom of the screen. Depending on the kV and spotsizes you use, the Counts Per Second, DeadTime, Lsec, and Amp Time will change accordingly. The resolution is chosen in the software and the rest of the information is read/based on information from the scanning electron microscope.

CPS 867	DT 3.7	Lsec 10.0	Amp Time 1.92
Res 128.0	Take Off 35.1°	WD 10.1 mm	Mag 30 x
HT 10.0 kV			

Collecting your X-ray information

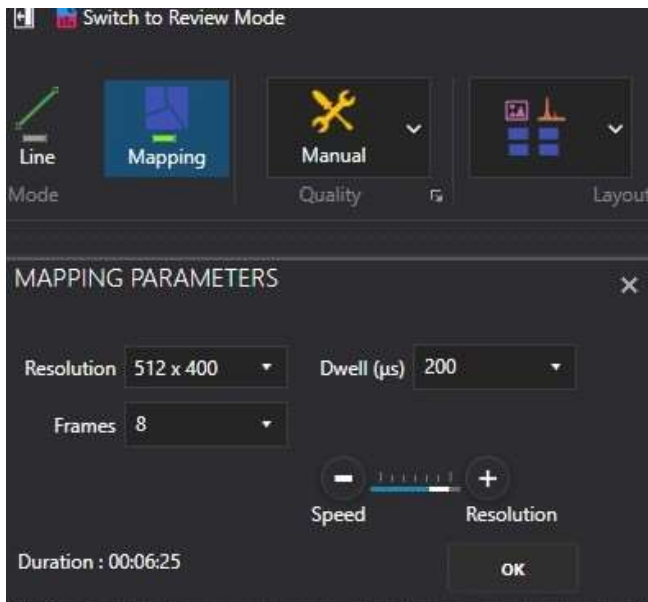


As with the image parameters you can choose the information for your X-ray detection. You can choose from Spectrum, Line, and Mapping. In this example Spectrum is selected on the bottom right on this next image you will see a little icon  to open a dialog box to choose your collection parameters.





The eighth icon from the left gives you the ability to choose from Quick, Standard, High, and Manual. If you choose Manual you can bring up individual menus to choose your own collection parameters.



If you want a quick map manual may actually be faster. By choosing a lower resolutions, and just 8 frames this scan finished in less than 7 minutes. If in Quick mode at any point you can click on the Collect icon again and you will have 4 options:



Send to Folder saves the file as an image file so that it can be put in a PowerPoint or shared with anyone who does not have APEX system.

These instructions are not complete. There are many processes available on the software that will be added in the future. In the meantime click on the ? on the top right of the software or watch the software movies on the desktop for more information.