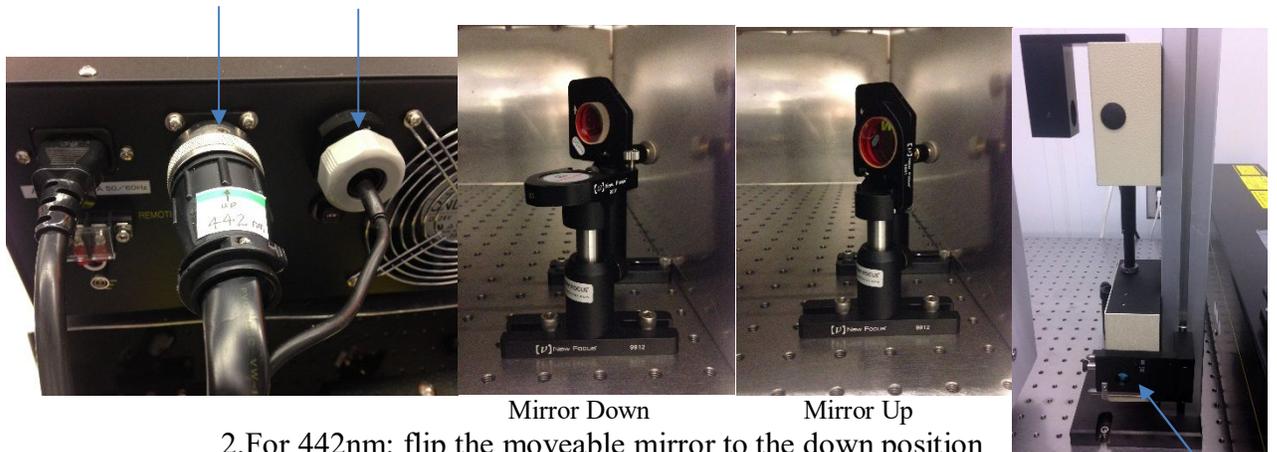


OPT3: Operating Procedure for Horiba Jobin Yvon LabRam Aramis Raman/PL System

See LabSpec_6_2 General User Quick Start Guide on the computer desktop

1. Log in usage using the SMIF web site
2. Turn power on to laser(s) that you will be using
 - a. 785nm (Diode Laser): Press the “Laser on” button on the blue Horiba box located on top of the Kimmon power supply (to the right of the Raman).
 - b. 633nm (HeNe Laser): Turn the key to “On” on the Melles Griot black box
 - c. 442nm or 325nm (HeCd Laser):
 1. Plug the desired power cables (325nm or 442nm) into the back of the Kimmon HeCd power supply. **Be gentle when removing and installing the cables – do not pull by the cable itself**



2. For 442nm: flip the moveable mirror to the down position
3. For 325nm: flip the moveable mirror to the up position
4. Insert the appropriate filter (442nm or 325nm) into the optics path as shown above

Do not touch the mirror surface with your fingers

5. Turn the key to “On” on the Kimmon HeCd laser power supply
 1. Allow time for warm-up after powering on (30min or more)
 2. After powering on, leave on for at least 30 minutes before powering off. After powering off, leave off for at least 30 minutes before powering on again.



3. Turn microscope lamp power on to 5 (intensity can be adjusted as needed)
4. Open the LabSpec6 software on the computer by double clicking on the desk top icon. Click “Yes” on the message window that appears



5. Verify that the CCD detector is functioning properly by checking that the detector tab at the bottom of the software window is green.

6. On the right panel, select the Acquisition tab, and open the “Acquisition Parameters” menu and the “Instrument Set-Up” menu.
7. **To load and use previously saved measurement settings (Template):**
 - a. Click on the Acquisition Parameters menu heading
 - b. Select “Load from File”
 - c. Find your folder in the User Data folder and select the template file you wish to use
 - d. The Acquisition and Instrument Set-Up parameters should change to your saved values

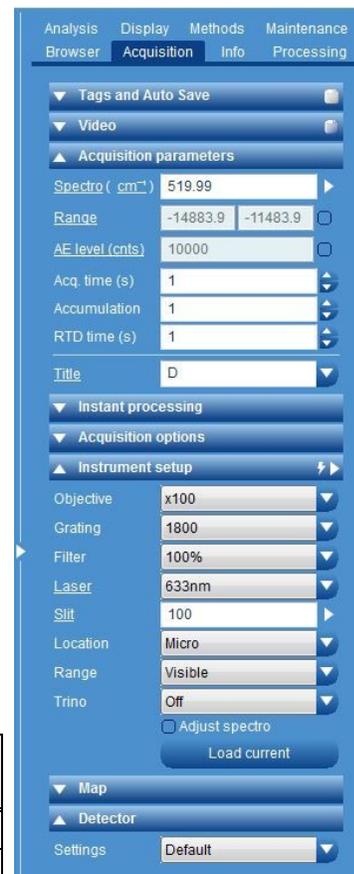
8. **Instrument Set-Up**

- a. **Objective:** Enter the microscope objective that you will be using. 100x is the typical value as this gives the smallest spot size and best signal. Lower power objectives can be used for volume sampling. The 40x UV objective must be used for the 325nm wavelength (*note that the working distance of the 40x UV objective is similar to the working distance of the 50x standard objective and the samples needs to be raised from the microscope stage in order to focus*)
- b. **Grating:** Select the grating according to the chosen laser line and desired measurement range. (See the table below) The optimal grating settings for each incident wavelength are given below.

For the CCD Detector (Raman):

- 785nm: 1200 grating
- 633nm: 1800 grating
- 442nm: 2400 grating
- 325nm: 2400 grating

Laser Line	Grating Setting	Measurement Range (wave numbers)
785nm	1800	0-1000
	1200	0-4900
	300	0-10700
633nm	1800	0-4000
	1200	0-7900
	300	0-13800
442nm	2400	0-7000
	1800	0-10900
325nm	2400	0-15100



- c. **Filter:** A filter can be chosen to reduce the laser power that strikes the sample if needed. 100% allows 100% of the intensity thru, while 1% allows 1% of the intensity thru
- d. **Laser:** Choose the laser wavelength you will be using. The optics will automatically change accordingly
- e. **Slit:** Enter a number between 50 and 400um. 100um is the typical value and gives the optimum resolution and counts, while 400um gives the highest number of counts (more light hitting the detector) but less resolution.
- f. **Location:** Choose Micro for measuring samples under the microscope. If using the Macro chamber, choose “Retro” for collection of the reflected signal or “Macro 90” for collection of a signal at 90 degrees.
- g. **Range:** Choose Visible for the 785nm, 633nm, or 442nm lasers. Choose UV for the 325nm laser.
- h. **Trino:** Set to Off

9. Perform Calibration

a. Set Acquisition Parameters

1.Spectro

1. **Select cm^{-1} units** (click on units indicator if need to change)
2. **For 785nm, 633nm, or 442nm: type in 520** (for silicon)
3. **For 325nm: type in 1295** (for teflon)

2.RTD time (s)

1. **For 785nm, 633nm, or 442nm: type in 1** (for silicon)
2. **For 325nm: type in 5** (for teflon)

- b. **Load Calibration sample:** Load silicon standard sample if using 785nm, 633nm, or 442nm laser lines. Load Teflon standard sample if using 325nm laser line

1. Turn laser off using the Laser On/Off panel at the bottom of the window (if not off already)

Laser On



Laser Off



2. Rotate the microscope turret to the 10x objective and rotate the focus knob to raise the objectives away from the sample stage
3. Load sample onto the microscope stage.
4. Click on the video icon in the top menu of the software to see a video image
5. Adjust the microscope focus knobs to bring the video image of the sample into focus
6. Change the objective to 100x (or to the desired objective)
7. Turn the laser On, and fine adjust the focus to minimize the laser spot size
8. Click on the STOP button to stop the video image





c. **Run a Real Time Scan** by clicking on the Real Time Display Icon

d. **Measure the peak location**

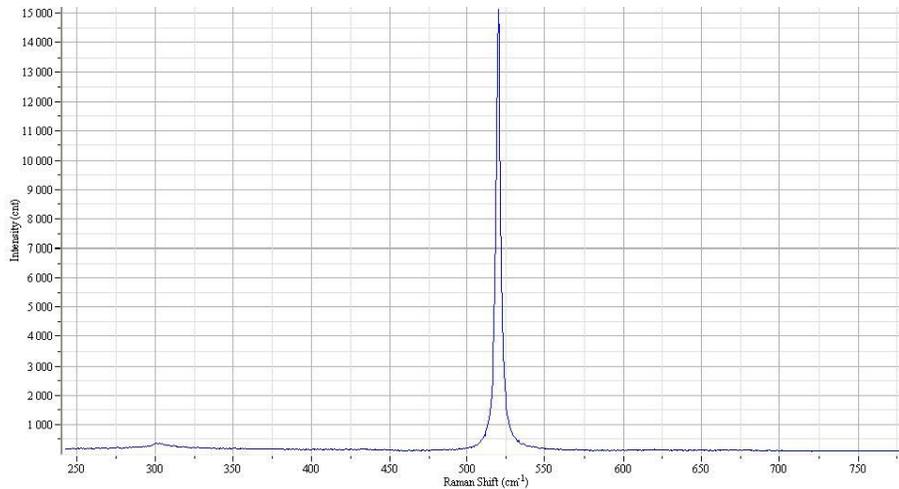
1. Zoom into the sample peak using the zoom tool



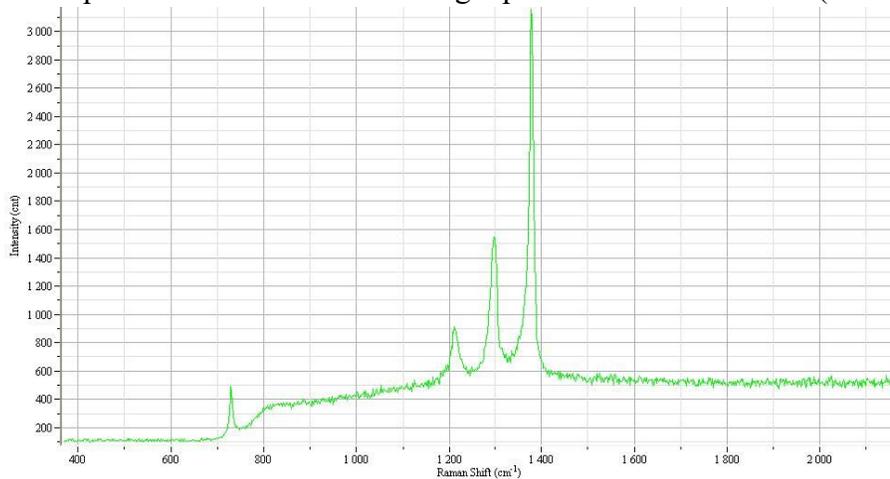
and measure the location of the peak using the line cursor tool.
These tool icons are located on the left panel.



Raman spectra of silicon standard: Target peak location: 520cm^{-1}



Raman spectra of teflon standard: Target peak location: 1295cm^{-1} (middle peak)



e. **Calibrate** (if measured value is shifted more than one wavenumber from target value)

1. Select the Maintenance tab on the right panel

2. Adjust the offset shift value You can either type in a new number or click on the arrows

1. To move measured peak to the right, decrease the offset value

2. To move measured peak to the left, increase the offset value



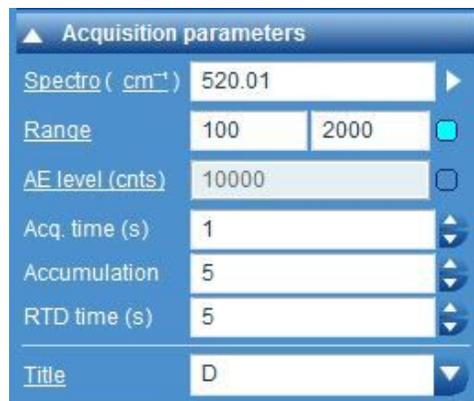
3. Keep adjusting the offset shift value until the measured peak value is within one wavenumber of the target value.
4. Click the STOP button to stop the real time acquisition
5. Select the Acquisition tab on the right panel
6. Rotate the microscope turret to the 10x objective and rotate the focus knob to raise the objectives away from the sample stage, and unload the standard sample from the microscope stage

10. Load your sample and focus as follows:

- a. Rotate the microscope turret to the 10x objective and rotate the focus knob to raise the objectives away from the sample stage
- b. Load sample onto the microscope stage.
- c. Click on the video icon in the software to bring up the video screen
- d. Adjust the microscope focus knobs to bring the camera image of the sample into focus
- e. Change the objective to 100x (or to the desired objective)
- f. Turn the laser On using the Laser On/Off panel at the bottom of the window, and fine focus to minimize the laser spot size
- g. Click the STOP button to stop the video image
- h. Turn off microscope light and close the sample chamber doors

11. Set Scan Parameters

- a. Select the desired **units** by clicking on the units indicator after the word “Spectro”
 cm^{-1} (used for Raman) is the amount of wavenumber shift from the laser line
 nm (used for PL) is the actual wavelength value measured
- b. Select the **Range**
 1. Select the box beside the range numbers to activate the range selection
 2. Enter the desired start and end values
- c. Enter desired **Acq. Time (s)** – this is the count time; higher values result in more counts and longer acquisitions
- d. Enter desired **Accumulation** – this is the number of measurement averages; high values result in smoother data and longer acquisitions
- e. **Title:** enter a sample ID



12. Acquire Spectra –



- a. Click on the Spectra Acquisition icon to perform the full range scan
- b. Click on the rescale icon to auto scale
- c. Right click on the graph and select display mode:
 1. Single spectra
 2. Overlay spectra
 3. Stack Spectra



13. Saving data



- a. Click “Save as Data” icon of type CTRL S
- b. Select or create your own folder in the User Folder
- c. Enter a filename
- d. Select the format for the saved data under the “Save As Type” pull down menu:
 1. Labspec6: saves the data in the Labspec format, and also saves the measurement parameters that were used
 2. Text: saves the data at x,y pairs in a text file. This does not save the measurement parameters.
- e. The spectra can be saved as a picture file by copying (CTRL C) and pasting into the Paint program

14. Saving Your Measurement Settings (Template)

- a. Click on the “Acquisition Parameters” menu heading
- b. Select “apply to all frames”
- c. Enter a template name
- d. Click “Save to file”
 1. Select or create your own folder in the User Folder
 2. Enter a filename and save as a template file

15. Process the data (if desired)

- a. Select Analysis tab at the top of the right panel for peak searching and fitting
- b. Select Processing tab at the top of the right panel for:
 1. Smoothing and filtering
 2. Application of math functions
 3. Baseline correction

16. When finished:

- a. **Unload your sample**
 1. Make sure laser is off using the Laser On/Off panel
 2. Rotate the microscope turret to the 10x objective and rotate the focus knob to raise the objectives away from the sample stage
 3. Unload sample from the microscope stage

b. Turn off the microscope lamp power

c. Turn off the laser(s) power

- d. Remove all data files from the active screen by clicking on the “Close Active Data” icon for each file



- e. Exit the LabSpec6 software
- f. Log out usage using the SMIF web site