Using the Fluorolog™-3 Luminescence Spectroscopy

Fluorolog Setup and Operation Instructions

pdf version

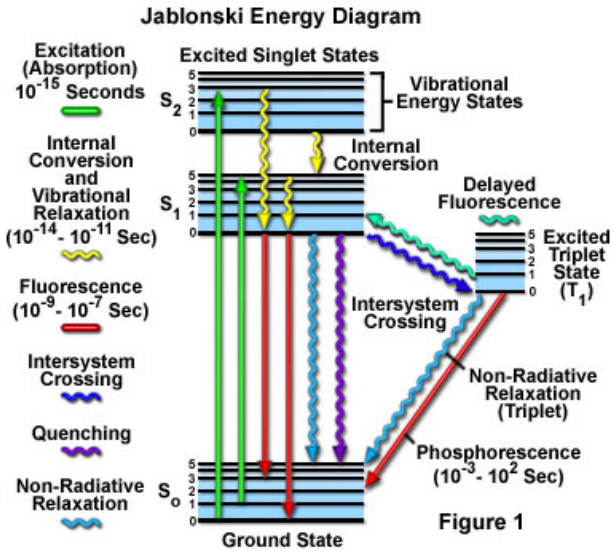
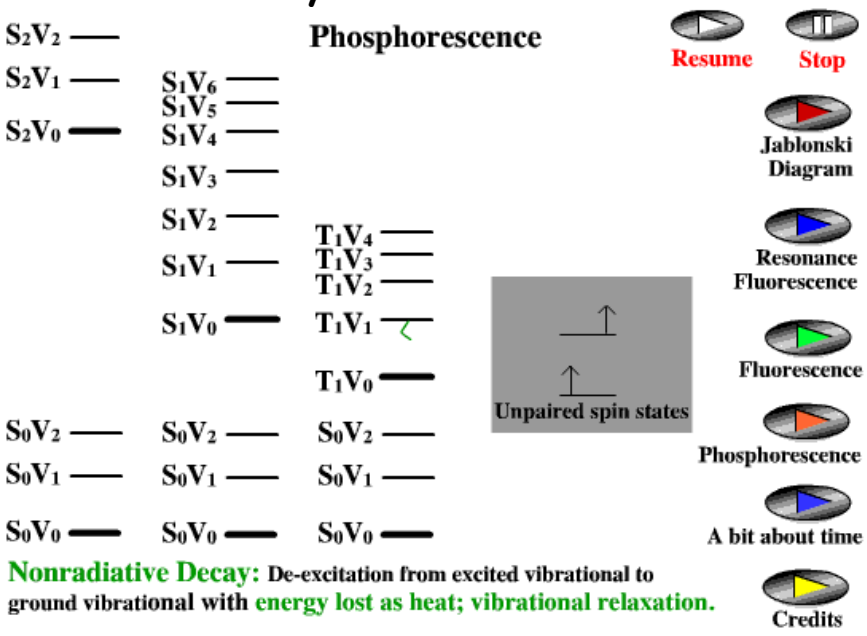


Figure 1

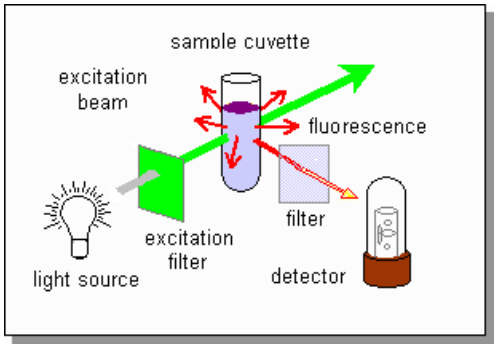
Theory of Luminescence



Nonradiative Decay: De-excitation from excited vibrational to ground vibrational with energy lost as heat; vibrational relaxation.

Resume
Stop
Jablonski Diagram
Resonance Fluorescence
Fluorescence
Phosphorescence
A bit about time
Credits

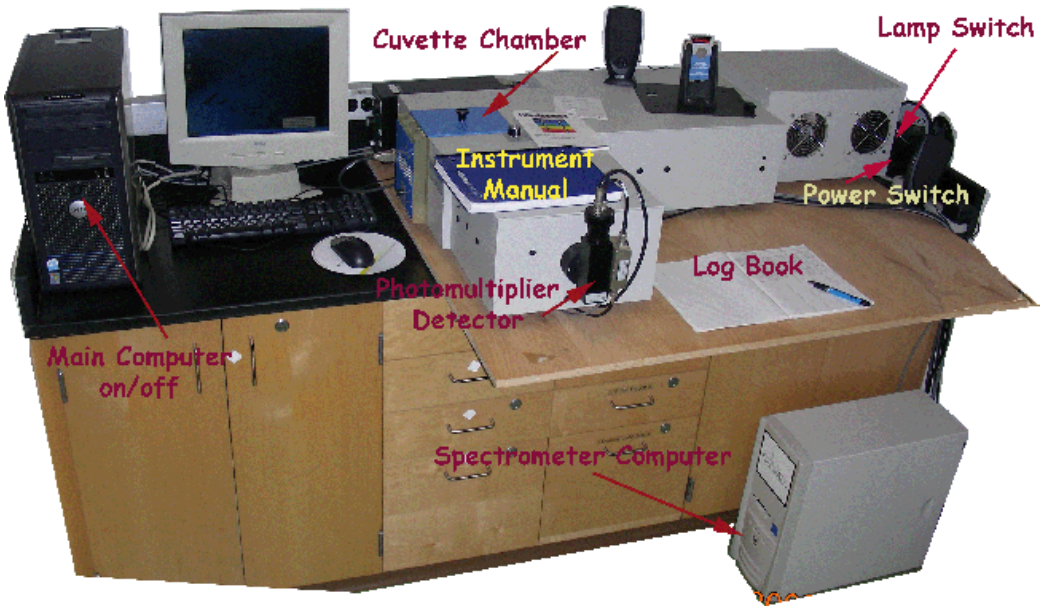
Basic Design of an Fluorimeter Spectrometer



Miramar College, S5-210

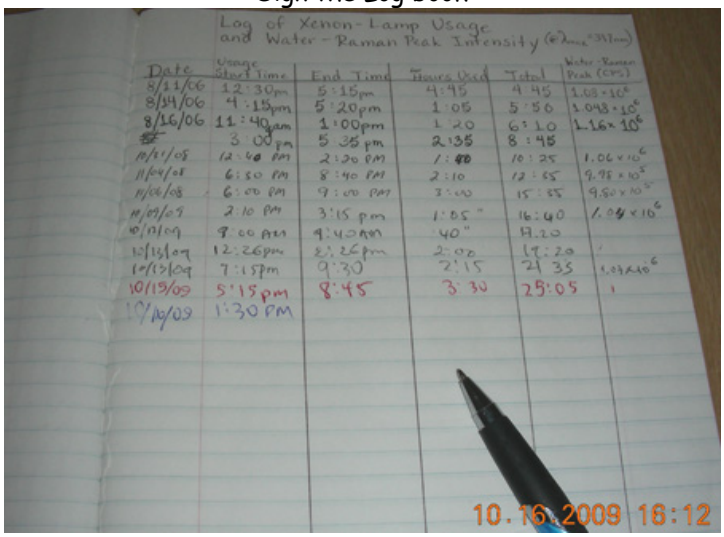
Horiba Jobin Yvon Fluorolog™-3

Features of the Horiba Jobin Yvon FluoroLog™-3



Preparing Instrument for Operation

Sign the Log book

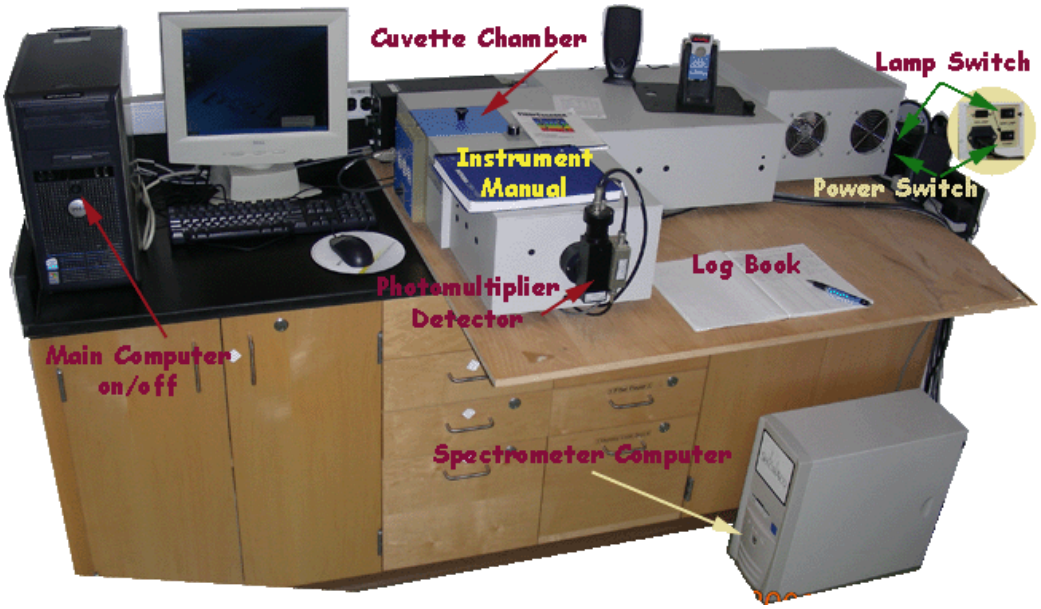


Turn on Power and Lamp Switch

Flip the **Power switch** to power up the instrument.

Flip the **Lamp switch** above the power switch.

WAIT 15 min. before turning on the instrument computers



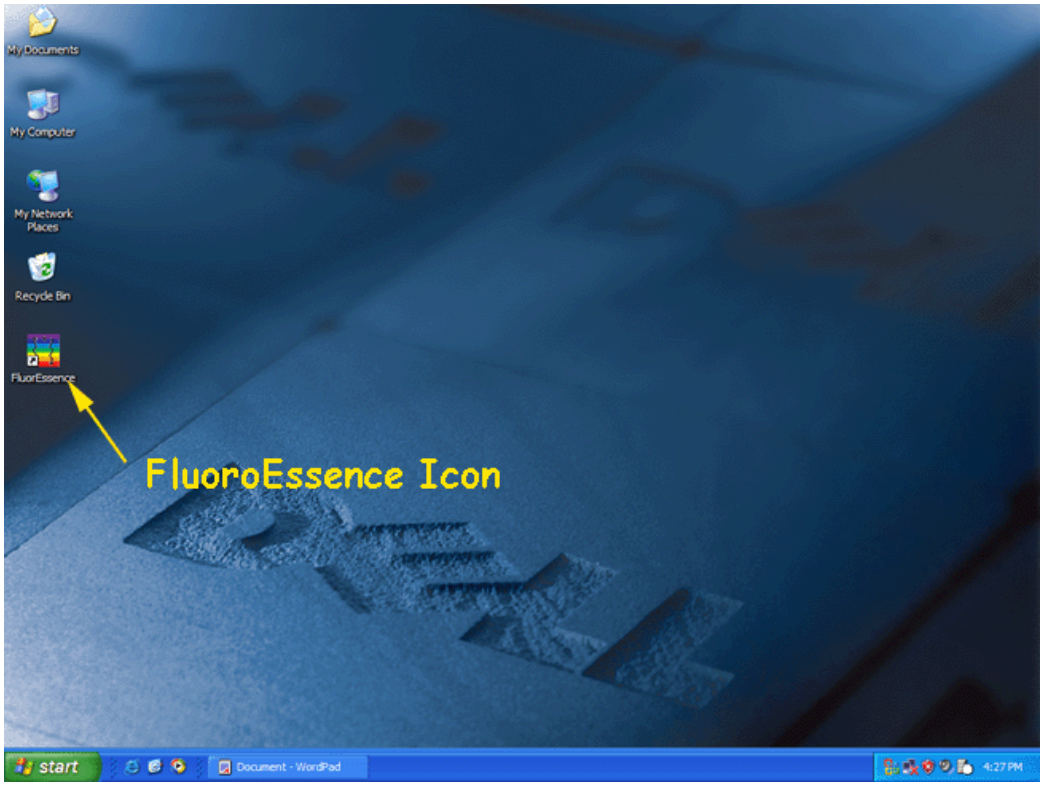
Turn on computer after 15 minutes.

Press the start button on the instrument computer (floor), this operates the fluorimeter.

Turn on the Dell Optiplex GX620 PC computer, that drives the software for the instrument.

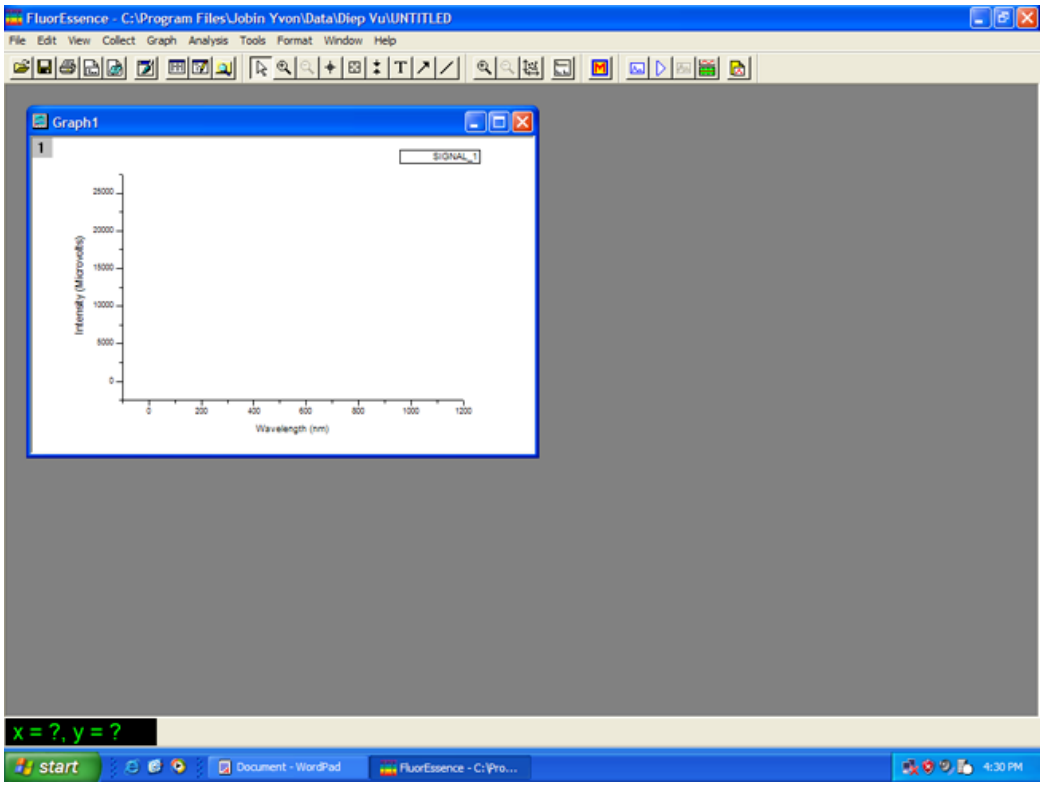
MS Windows will start with the display below.

Click on the FluoroEssence Icon to launch the program



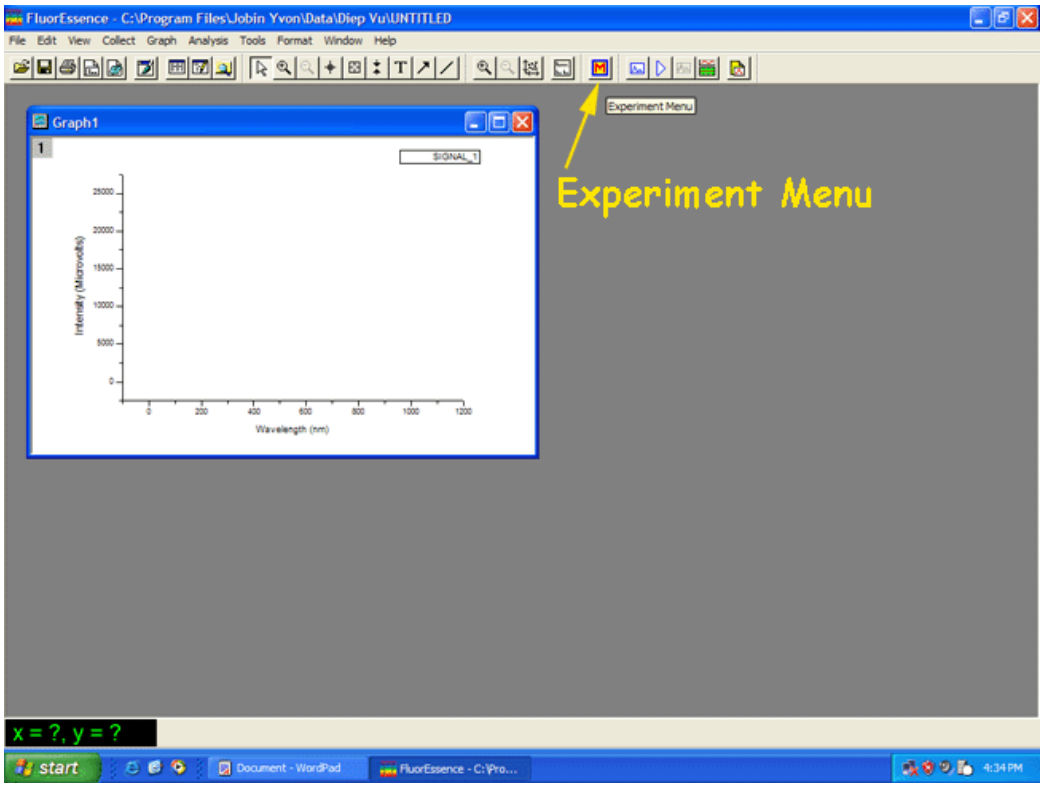
FluoroEssence

Opening Screen of the FluoroEssence Window



FluoroEssence → Experiment

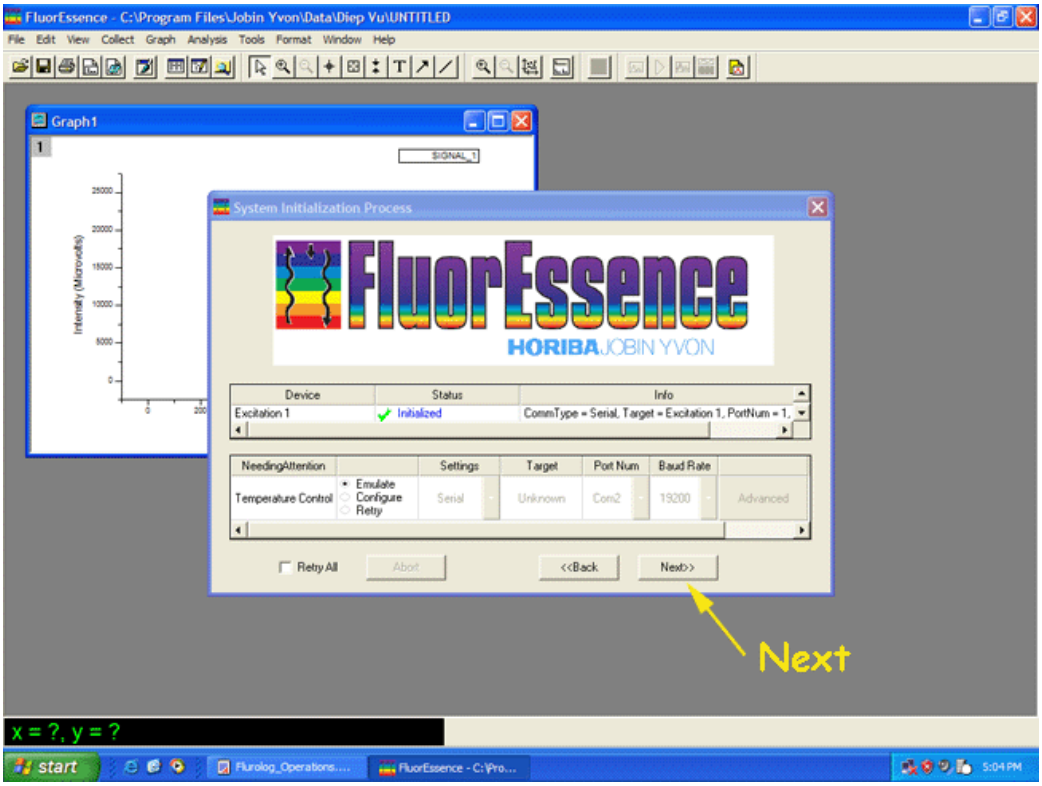
Click on Experiment Icon on the top toolbar



FluoroEssence → Experiment

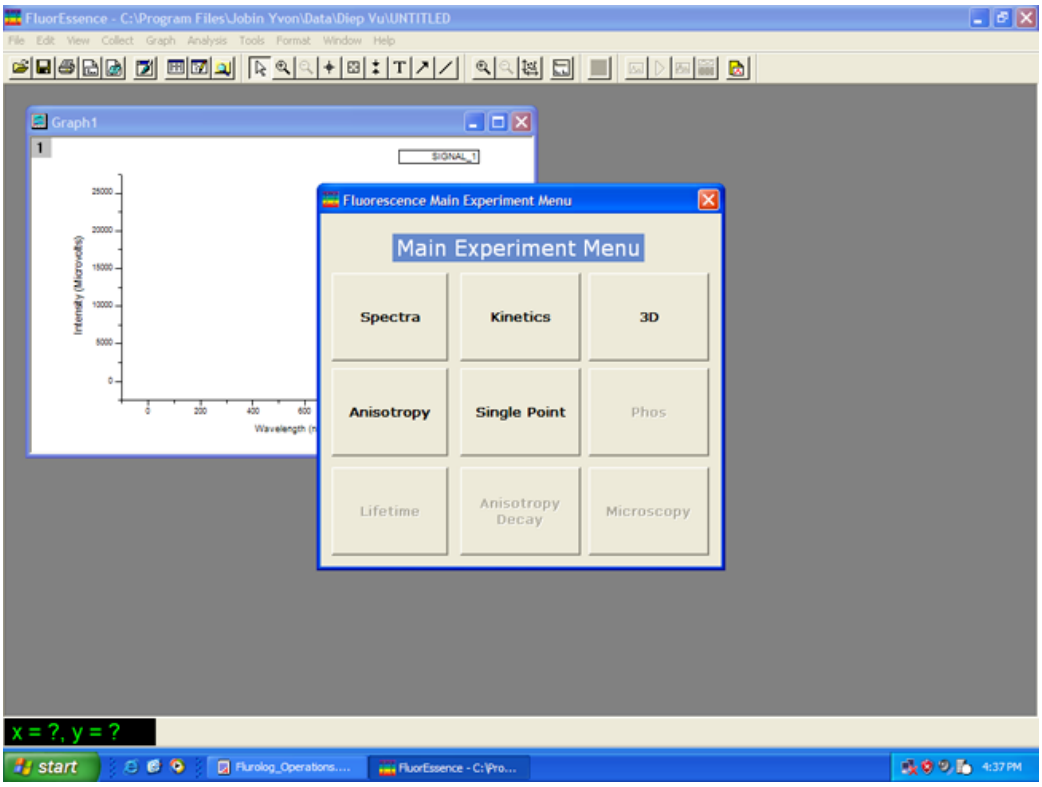
The instrument will initialize the setting
The wavelength motor will adjust the wavelength setting to the appropriate position

At this point a high pitch can be heard (if not, repeat this procedure)



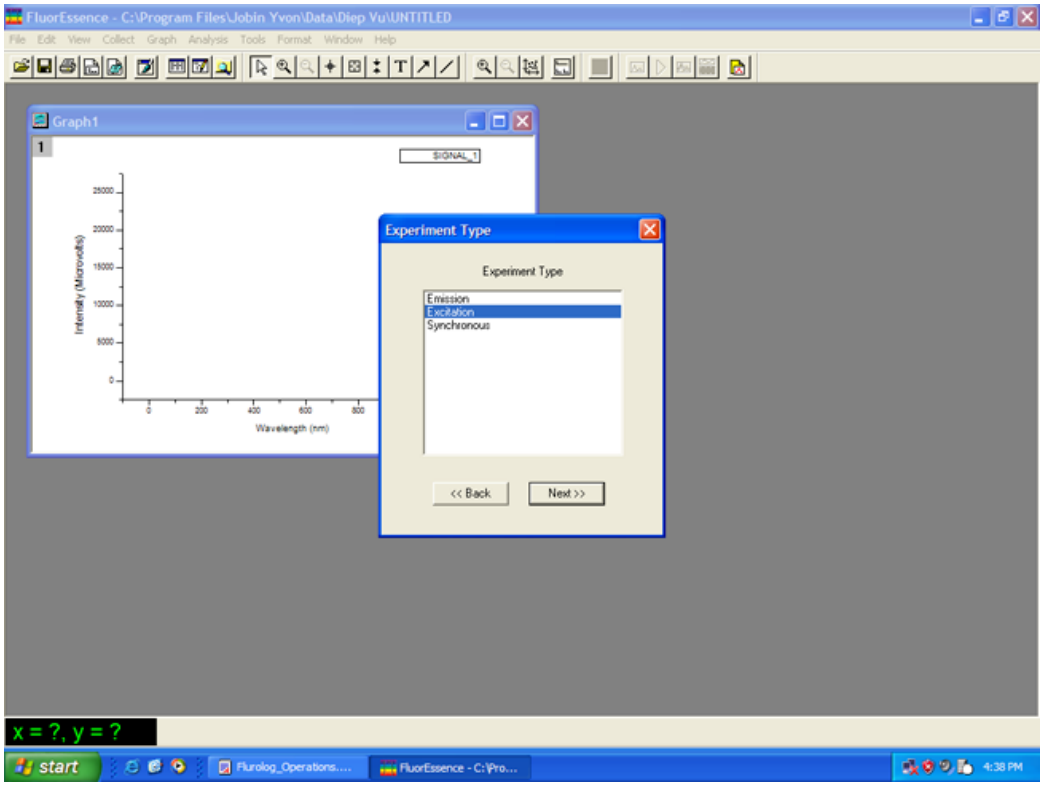
FluoroEssence → Experiment → Spectra (Excitation)

Select the Spectra selection



FluoroEssence → Experiment → Spectra (Excitation)

Choose Excitation on the next screen

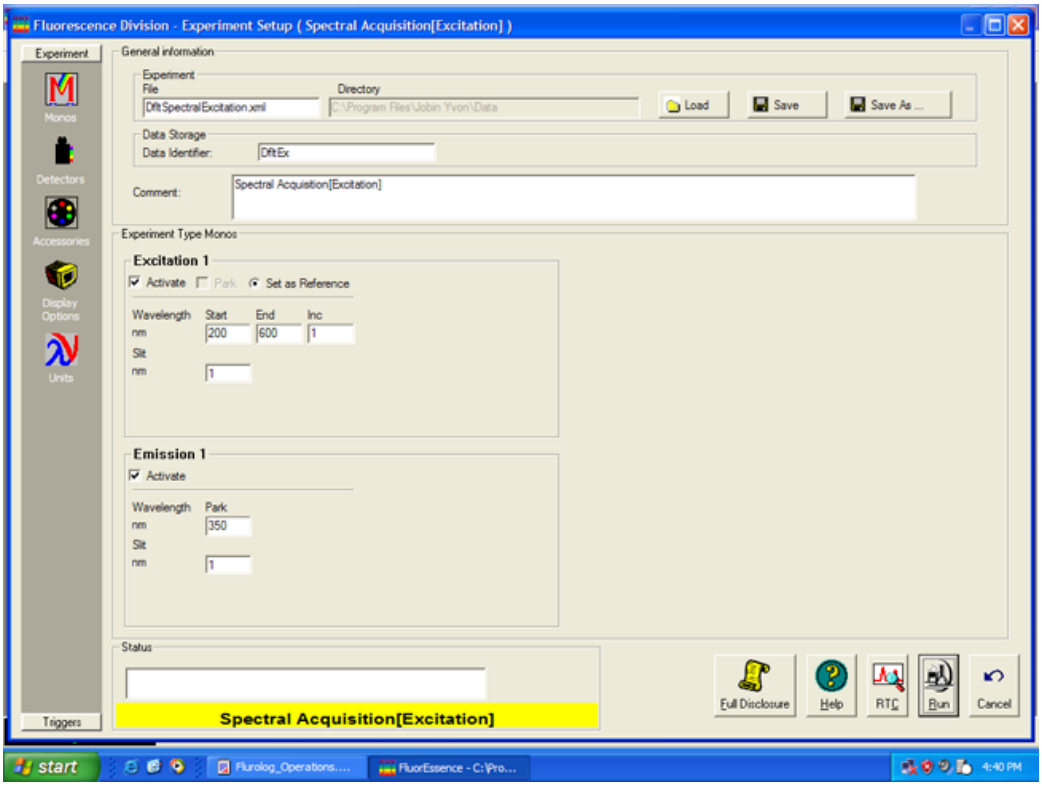


FluoroEssence → Experiment → Spectra (Excitation)

Check for the following parameter or adjust to-

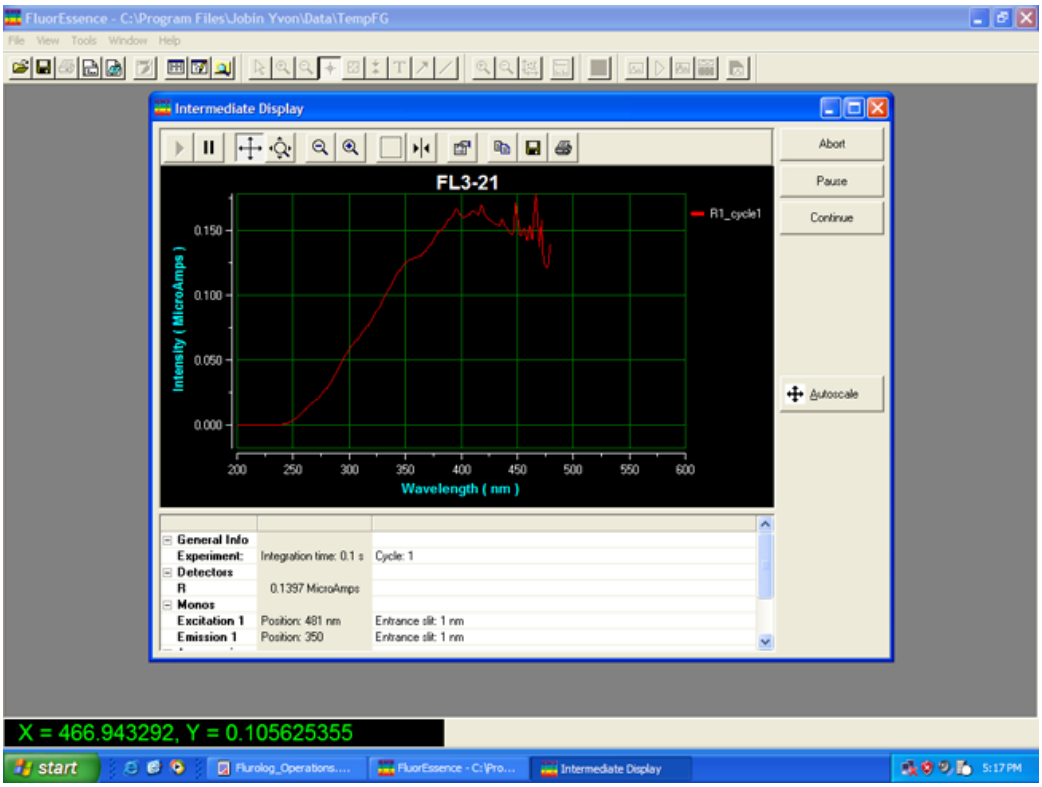
Monochomator (bandpass) 1200 groove/nm	initial Wavelength	Final Wavelength	Increment	Slit
Excitatioin	200 nm	600 nm	1 nm	1 nm
Emission	350 nm	-	-	1 nm
Default detector parameters for xenon-lamp scan				
Detector (Signal)	Integration	Units		
Signal (SI)	100 ms	CPS		
Reference (RI)	100 ms	mA		

Click on Run.



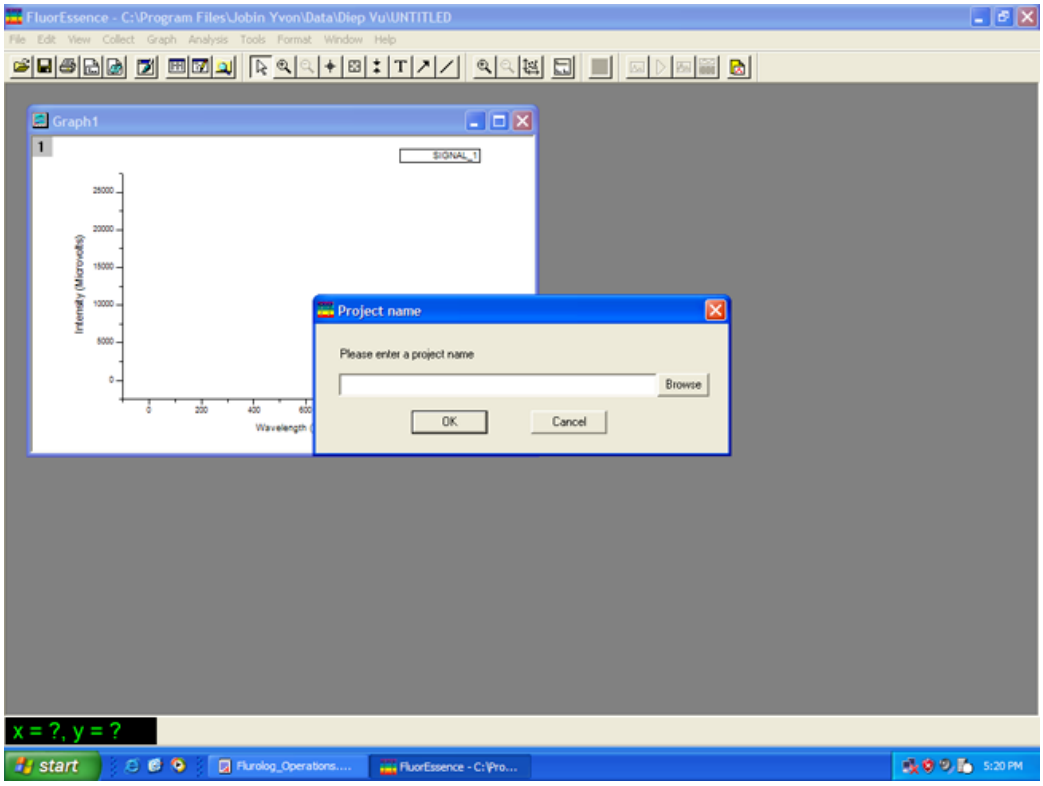
FluoroEssence → Experiment → Spectra (Excitation)

The Fluorolog Instrument will begin running the excitation scan on the xenon lamp



FluoroEssence → Experiment → Spectra (Excitation)

After the excitation scan is complete
the computer will prompt for the a file name.

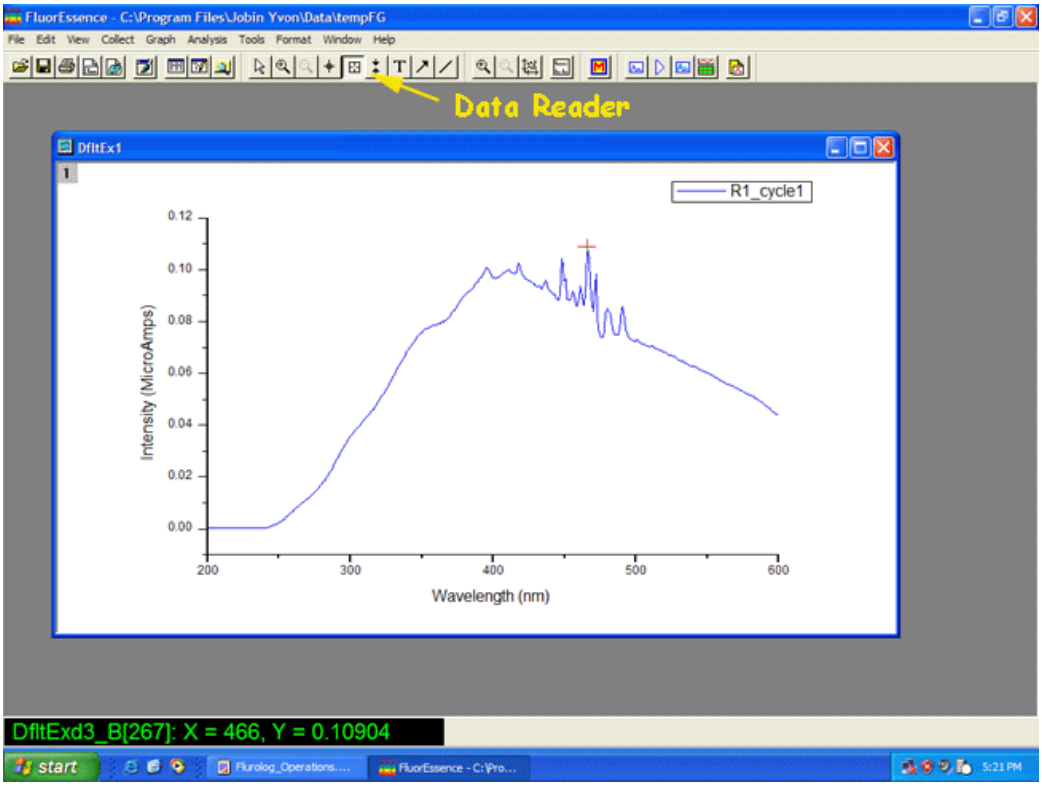


FluoroEssence → Experiment → Spectra (Excitation)

After entering the filename, the screen will display
the uncalibrated FluoroMax Lamp Spectrum.

The highest peak should be centered at 467 nm.

Use the data reader (from the toolbar) to inspect the position of the signal.
Grab the left portion of the spectra to enlarge the spectrum window.



FluoroEssence → Experiment → Spectra (Excitation) If the most intense peak is 467 ± 1 nm, then the instrument is calibrated for excitation.
You may proceed to calibrate the emission parameters.

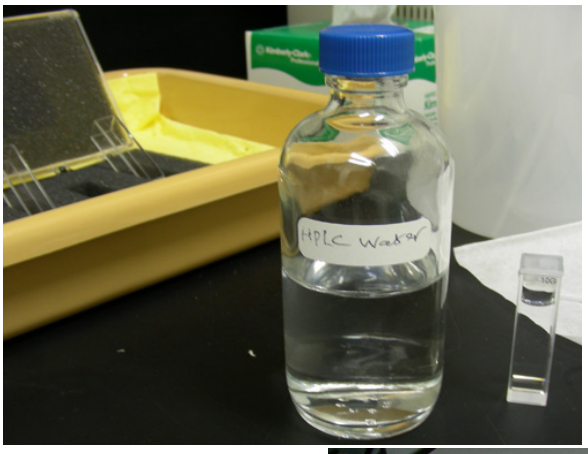
If the signal is not centered at 467 nm, that is the signal is off by more than 4 nm,
then steps must be taken to calibrate the excitation monochromator.
Go to the instrument operation manual for this procedure.

FluoroEssence

Prepare a water sample using ultra high purity water.

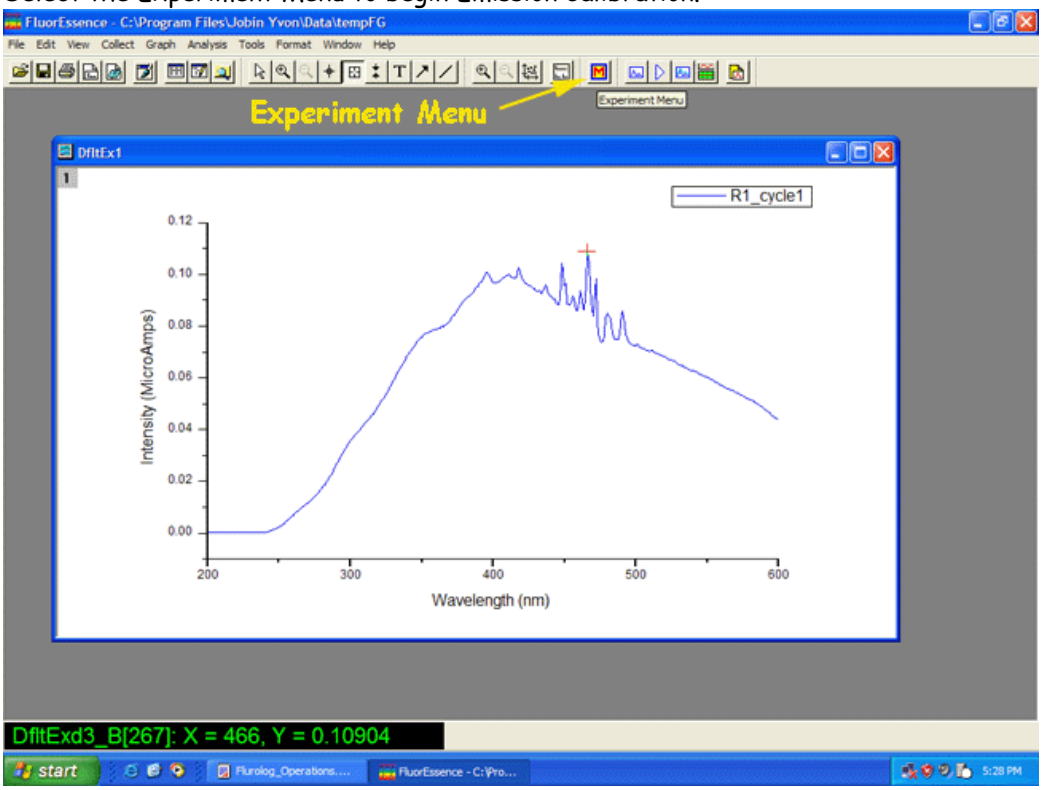
Insert the cuvette containing the water into the cuvette compartment

Close the lid and select the FluoroEssence Key in the toolbar.



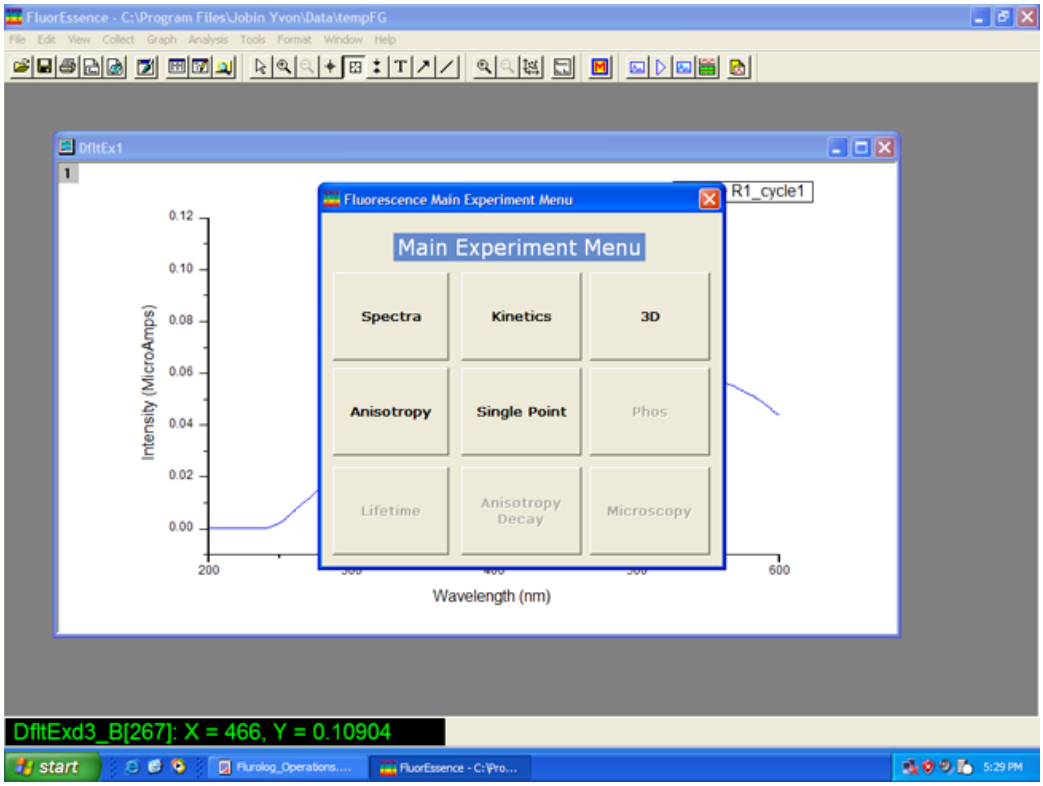
FluoroEssence → Experiment

Select the Experiment Menu to begin Emission Calibration.



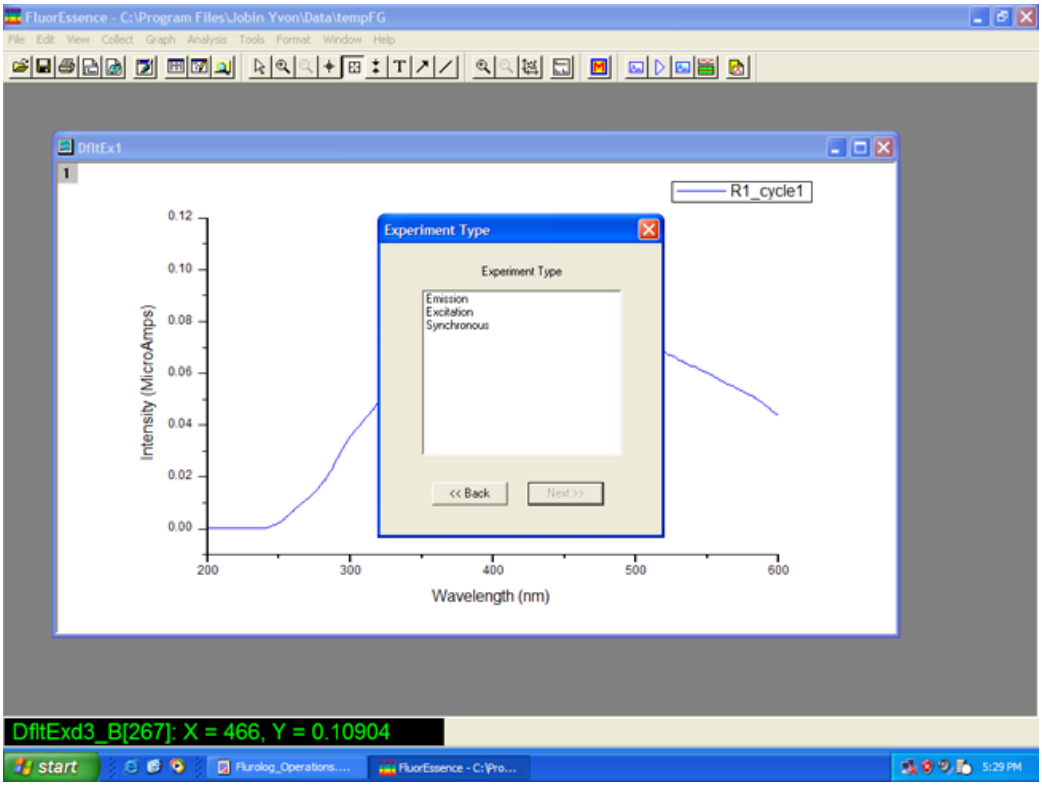
FluoroEssence → Experiment → Spectra (Emission)

Choose Spectra



FluoroEssence → Experiment → Spectra (Emission)

Select Emission and then Next



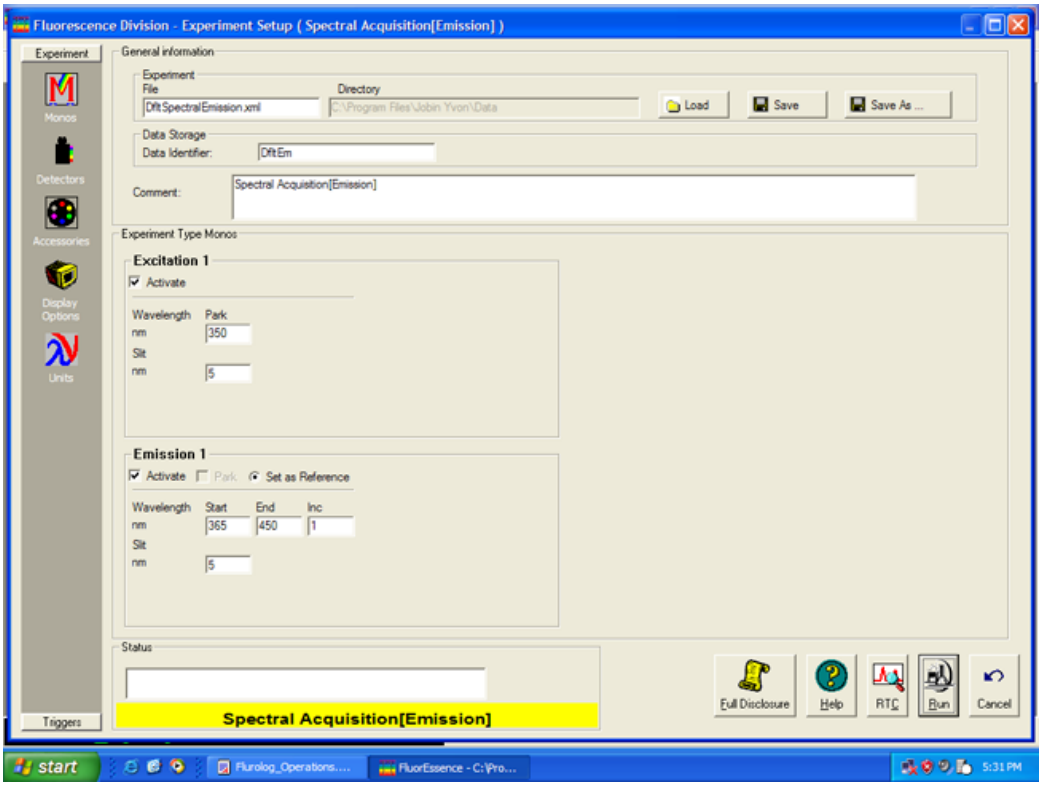
FluoroEssence → Experiment → Spectra (Emission)

Choose the default parameter for the water-Raman scan:

Check for the following parameter or adjust to-

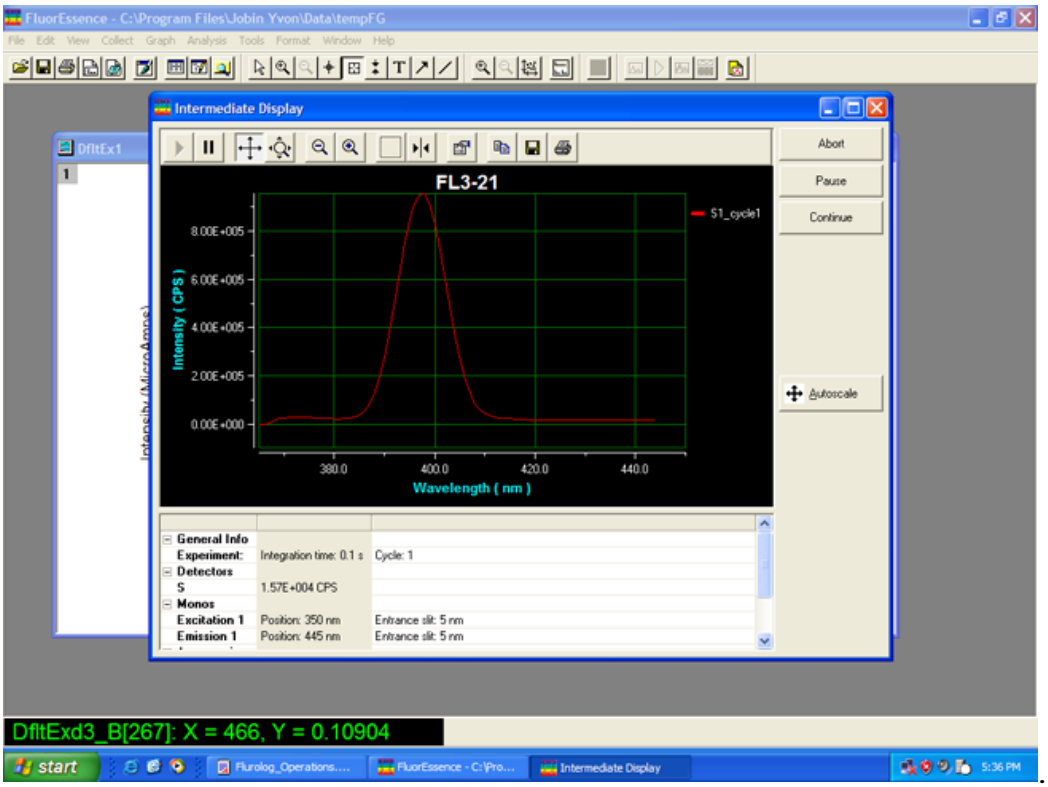
Monochomator (bandpass) 1200 groove/nm	initial Wavelength	Final Wavelength	Increment	Slit
Excitation	350 nm	-	-	5 nm
Emission	365 nm	450 nm	1 nm	5 nm
Default detector parameters for xenon-lamp scan				
Detector (Signal)	Integration	Units		
Signal (SI)	100 ms	CPS		
Reference (RI)	100 ms	mA		

Click on Run.



FluoroEssence → Experiment → Spectra (Emission)

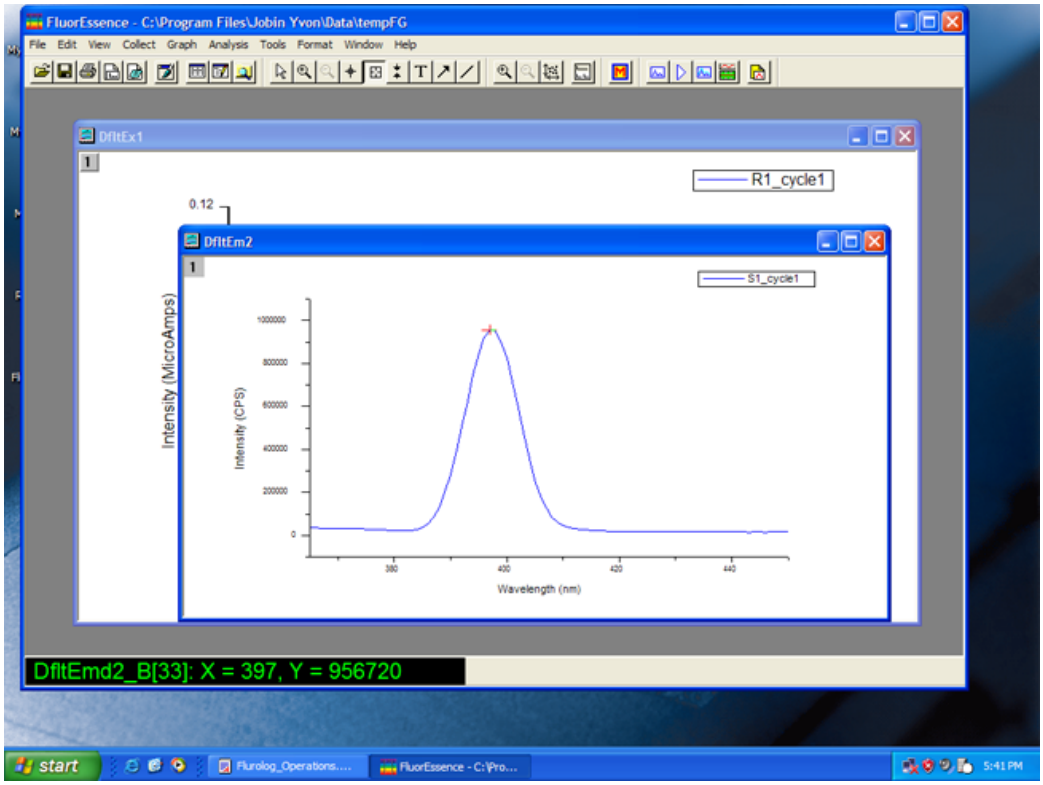
The spectrometer will run an emission scan for water and a broad signal centered at 397 nm.



FluoroEssence → Experiment → Spectra (Emission)

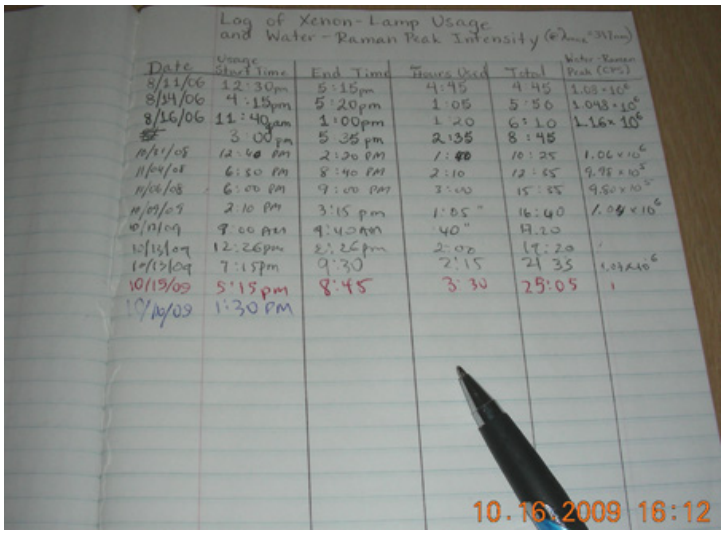
After the scan, the screen will show the water-Raman spectra. Use the data reader to confirm that the signal is centered at 397 nm.

If the water-Raman peak is not centered at 397 + 1 nm, calibrate the emission monochomator. Refer to the instrument operation manual for this procedure.



FluoroEssence → Experiment → Spectra (Emission)

Report the intensity of the water-Raman line in the log book.



As long as the instrument is not turn off, calibration need not be performed again until the lamp is turned off.

If everything checks, you are ready to use the instrument for the experiment. Refer to the directions of the experimental procedure to determine the settings of the instrument.

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