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Oceanview with CHEMUSB4 (or FLAME-CHEM) Aborbance Spectrophotometer

Quick Start

The CHEMUSB4 and the newer FLAME CHEM systems couple our CCD array based spectrometers with a miniature deuterium/tungsten source and an integrated 1cm cuvette holder. To operate the system you will need to install Oceanview software FIRST. Directions are included as an appendix to this guide.

All absorbance determinations require 3 measurements: DARK [D] is the signal with the light off, REFERENCE [R] is a cuvette filled with distilled water, which we will call zero absorbance, and SAMPLE [S] which is the signal from your sample solution in the cuvette. Absorbance [A] is calculated at each wavelength from:

$$A = -\log(S-D)/(R-D)$$

Absorbance [A] goes from 0 to infinity, but in our instrument we want to keep the values in the 0 – 3 range. The absorbance value will be directly proportional to the concentration of the absorbing chemical species.

Oceanview provides application wizards that guide you through the steps. This guide is meant as a quick walk through so you can see the screens and relevant controls.

Oceanview also supports other data analysis schemes or applications such as transmission, reflection, radiometry and color calculations. The CHEM system can be coupled with other accessories to perform those kinds of measurements.

The CHEMUSB4-UV-VIS and equivalent FLAME-CHEM-UV-VIS cover the 200 – 850nm range. For measurements in the UV you will need quartz cuvettes (such as our 1-Q-10) or plastic UV cuvettes (useful down to ~230nm).
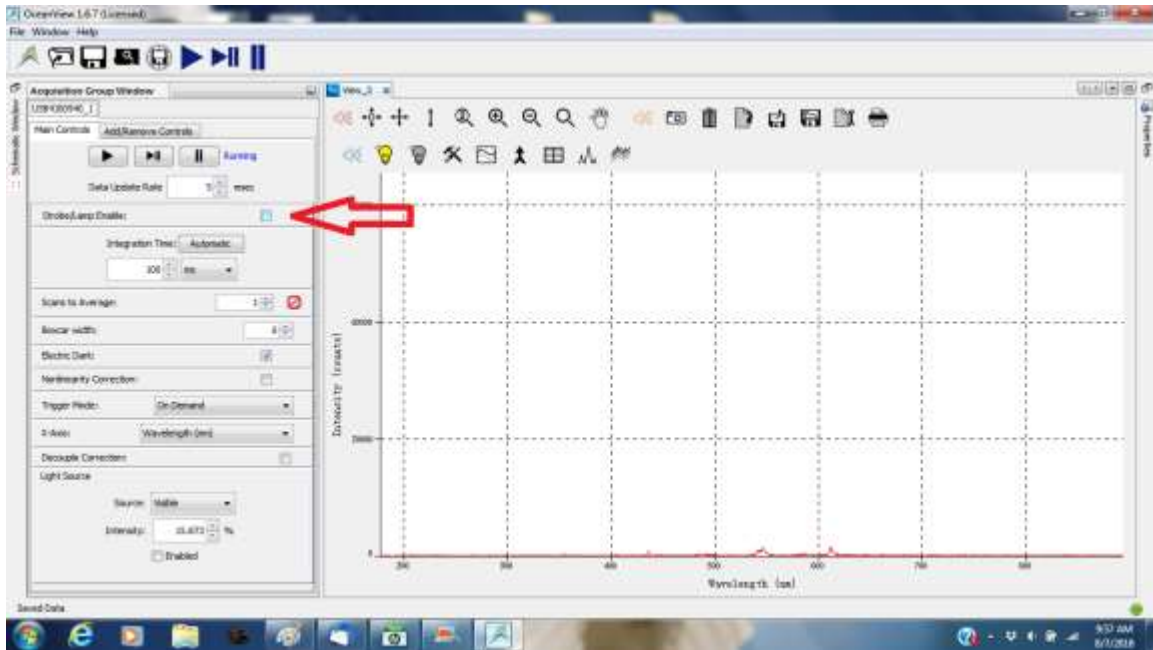
Hardware Setup

1. Install Oceanview
2. Plug in the 5V power supply to the CHEM unit
3. Plug in the USB cable
4. Start Oceanview

Follow the steps to perform an absorbance measurement
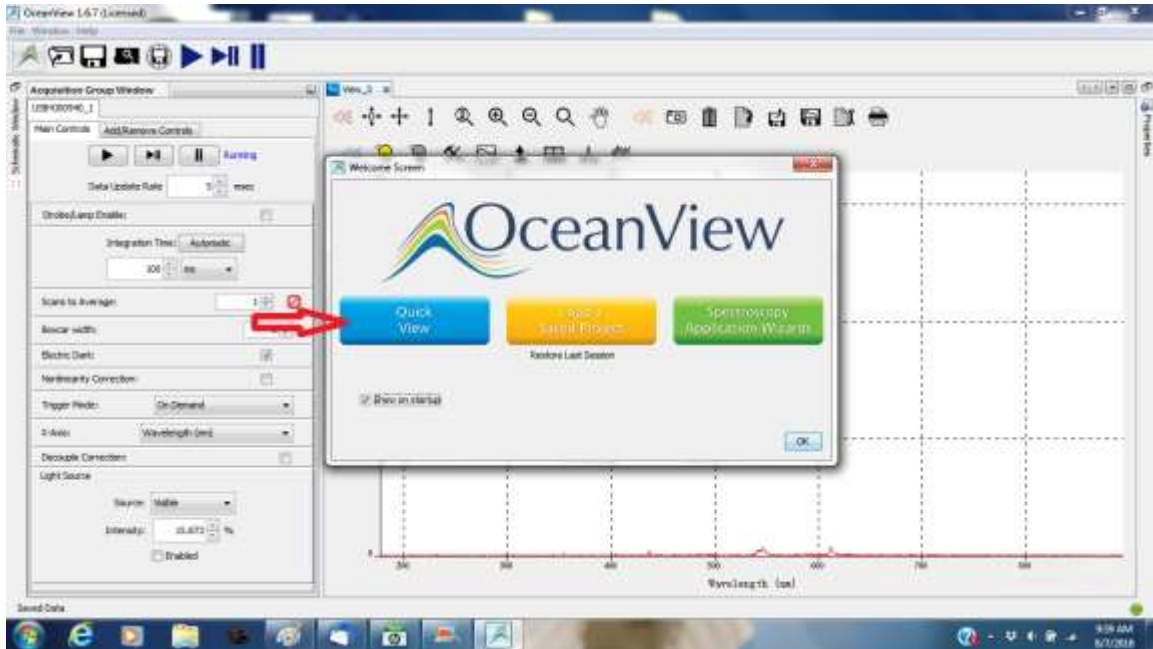
The startup text box appears, click on Quickview to check that the spectrometer is running, and to set up the control parameters in the Acquisition Group window.


The default startup has the light source off (shutter closed) so the trace will be at the bottom. Check the Strobe Lamp enable button to turn the light on.

With the light on the spectral curve will rise, and for these units typically go off scale.
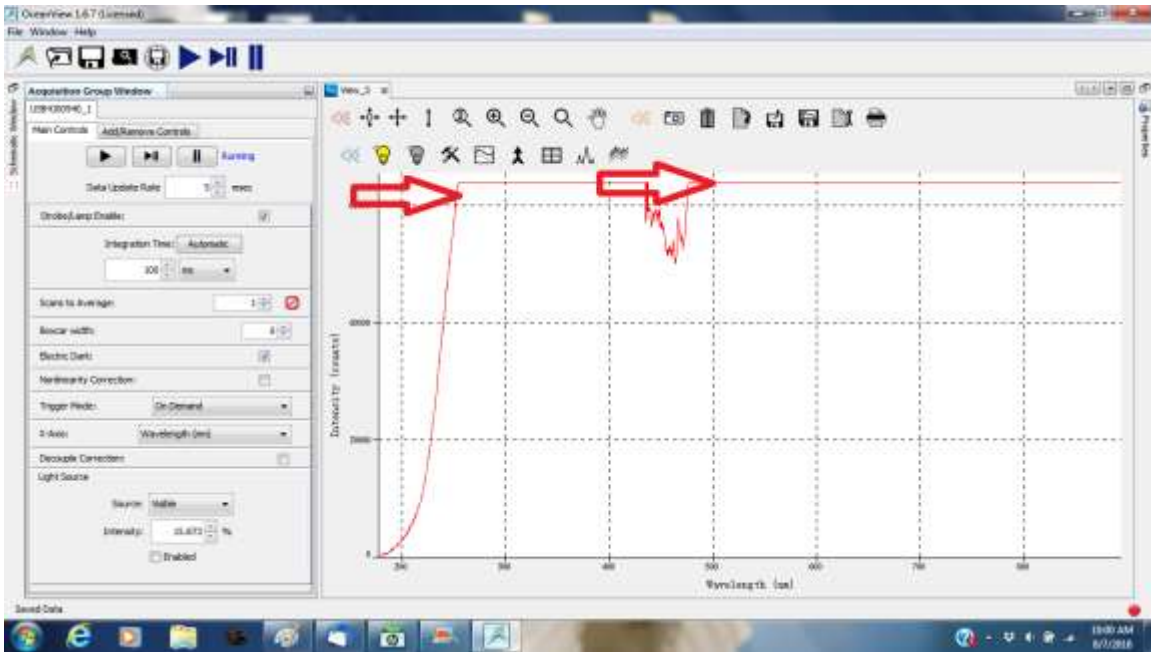
Now, adjust the sampling parameters in the Group acquisition box. The main control for sensitivity is the Integration Time (similar to the shutter speed on a camera). The default is 100 msec. To lower the signal, type in a shorter integration time. To get more signal make it longer.

You must make sure you are not saturating the detector, as is shown above where the signal flat tops. When saturated, the data is not valid. In the image below, all data is on scale and optimized.
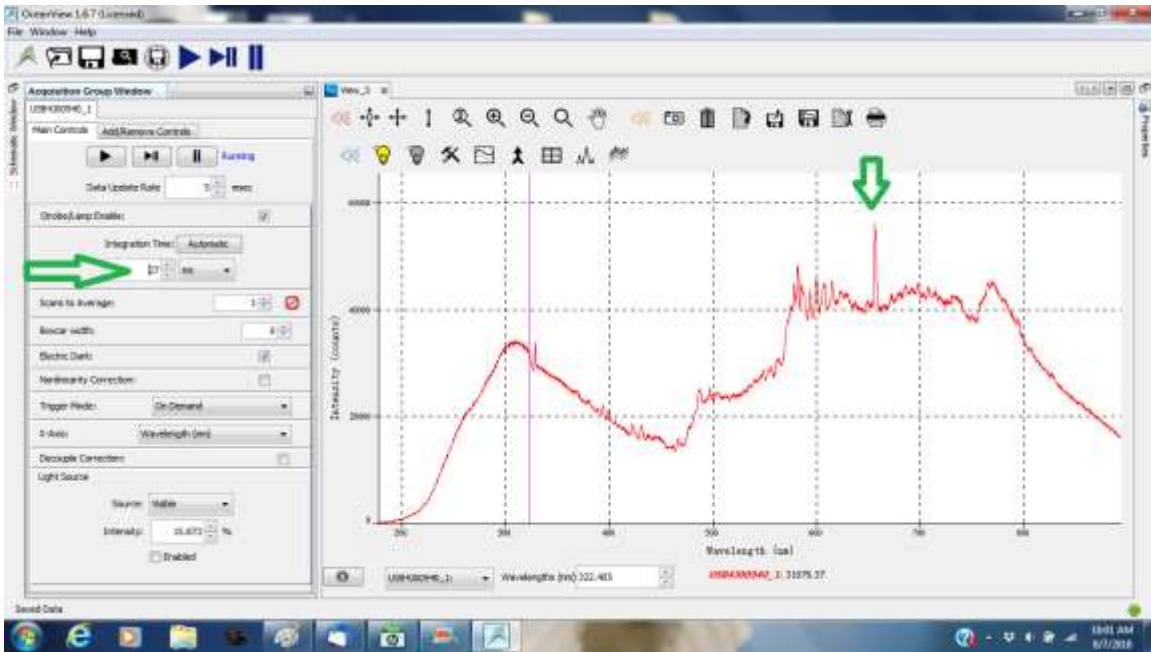
Next add boxcar smoothing and signal averaging to improve signal to noise.
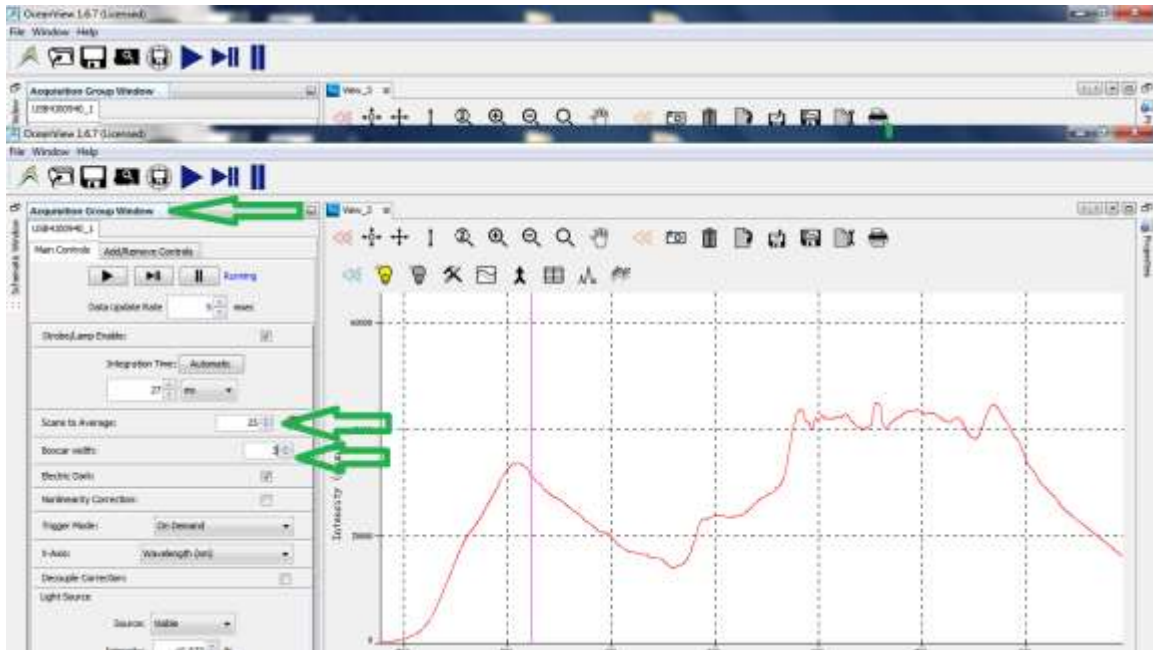

Now click on the Oceanview icon top left to bring up the Spectroscopy Application menu. Choose the Absorbance selection.
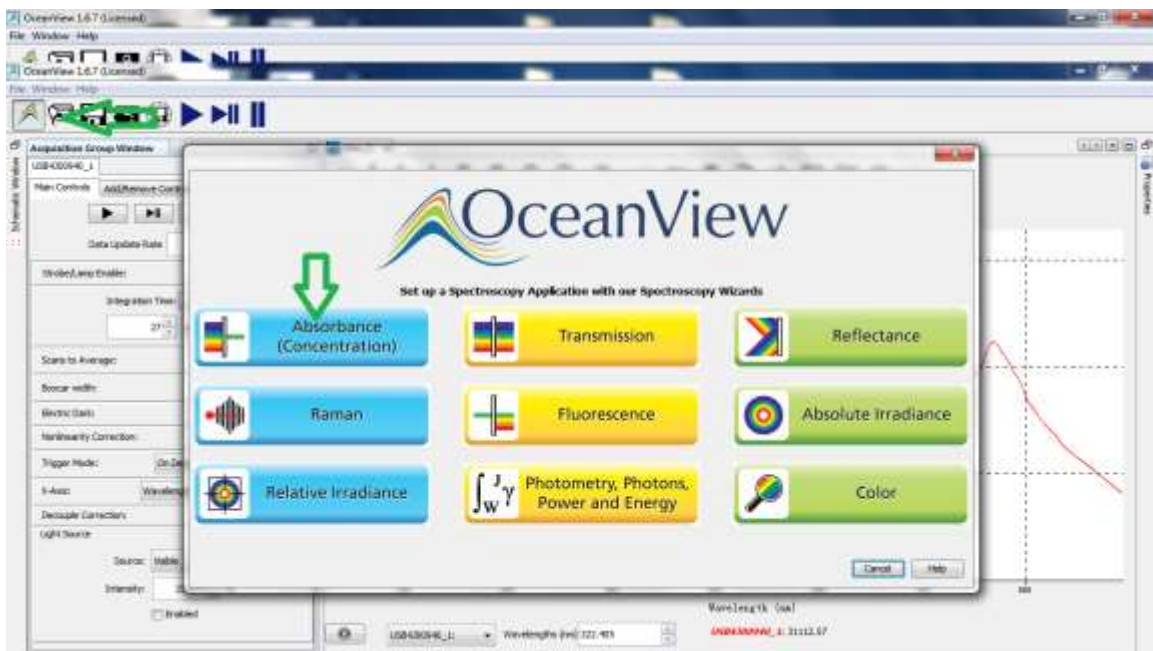
Choose Absorbance Only (using these directions, the Beers Law and Standards options wizard will walk you through those steps if you prefer)


The next screen will be directing you to choose integration time, smoothing and averaging functions, which you already did. So, click the NEXT button. The "Store reference" window appears.
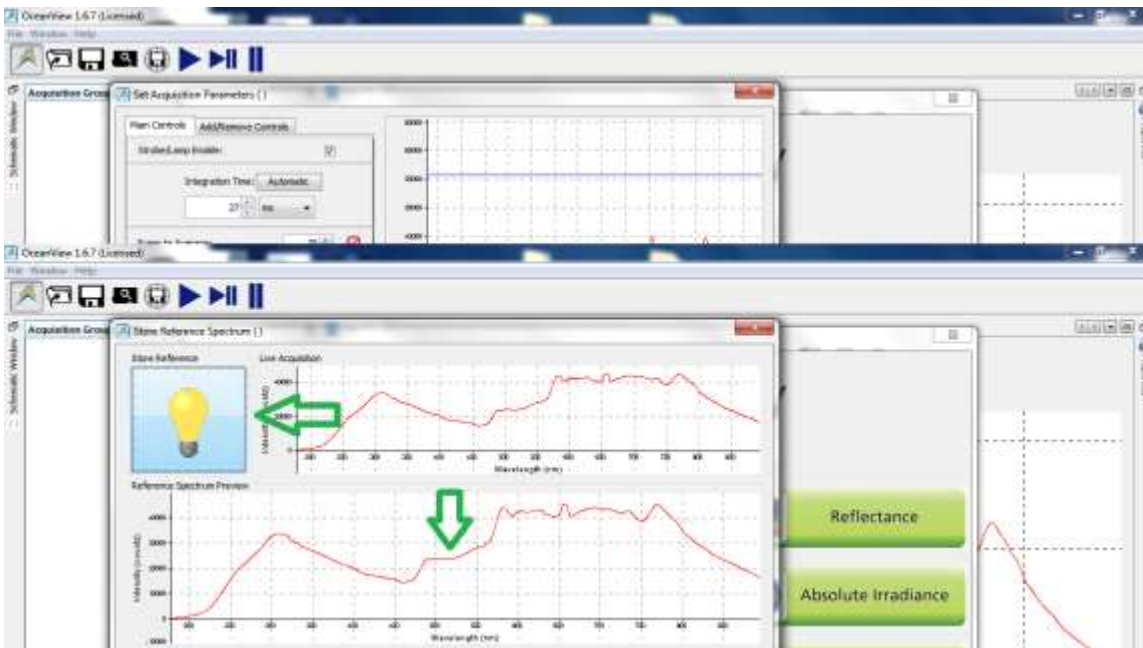
The lit light bulb icon will save the current spectra as the reference (blank). Each time you click it, software replaces the old values with the new values. The lower spectra shows what has been saved, the top panel shows the live trace. Click a few times to make sure the reading is stable, and is in fact showing the light source. The reference you are looking at is up to you. It can be air (nothing in the cuvette well) or a cuvette filled with the blank solution.

Next turn off the light by unchecking the strobe enable, and store the "Dark" spectrum. The graph will auto scale, so the dark always looks noisy. The noise is actually called fixed pattern noise caused by differences among each detector pixel. This fixed pattern gets subtracted by the software. Click on the dark bulb icon until you are satisfied, then click NEXT
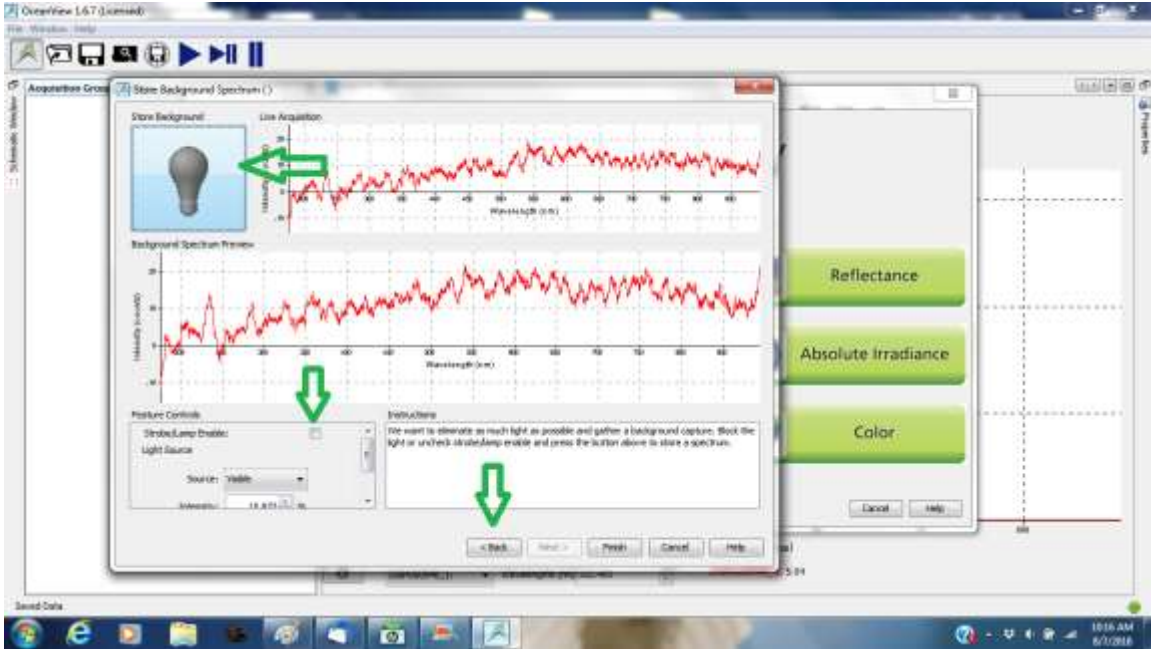

You will see a lot of noise until you **click the Strobe Enable** to turn the light back on. Then you should see the absorbance scale, with the trend near zero. If you left click on the graph a cursor appears and the wavelength and amplitude at that point are shown below the graph.
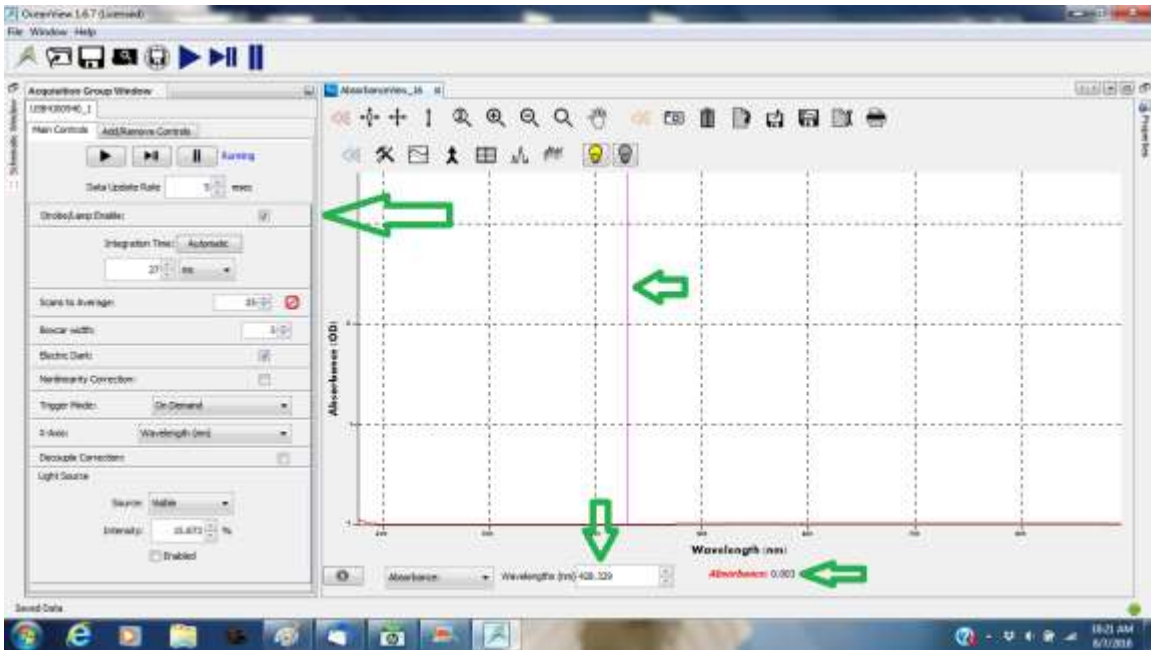
Now you are ready! **Put your sample in the cuvette well**. You will see the absorbance spectra displayed in real time. To see the absorbance at a single wavelength put the cursor on that wavelength and read the values below. The scroll bar on the wavelength text box lets you fine tune the cursor location.
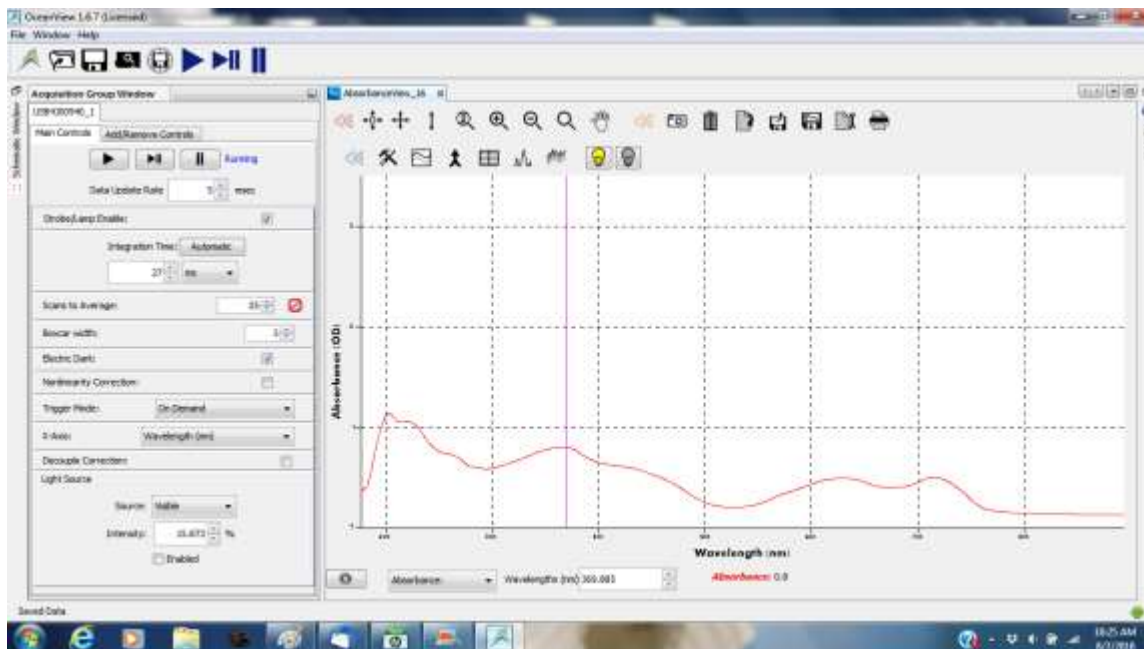
Icons have a hover message saying what they do. The camera captures the current spectra as an overlay. The sheet with a down arrow copies the spectral data to Windows clipboard.
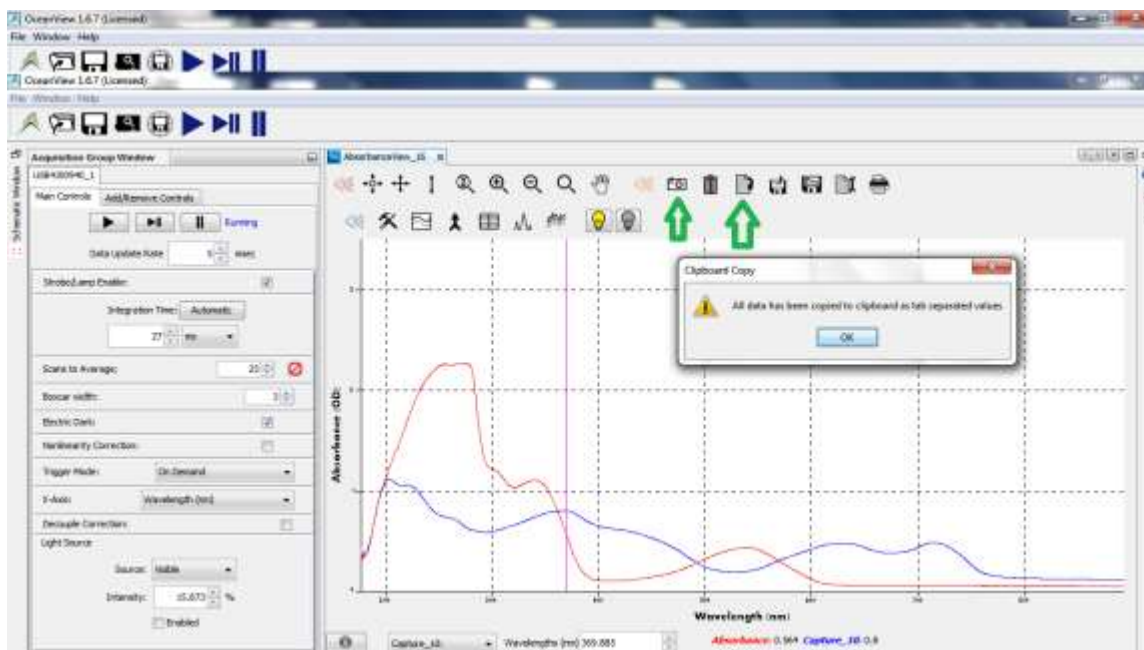

Once the data has been copied to the clipboard, you can paste into other applications such as EXCEL. Just put your cursor in a cell and PASTE (CTRL V)

The spectral data from the graph above has been pasted into an EXCEL worksheet below. 2 columns -- wavelength and amplitude, are pasted for each of the two spectrums. There is one row for each pixel in the detector.

You can also save the data in an ASCII txt file. The format is the same, 2 columns, wavelength and amplitude. The save button is the diskette icon. Before you do that though, you need to set up the file saving by clicking on the wrench icon. The window appears below with options for directory, root file name, number or time increments. When these are set up, clicking on the diskette icon will save a file with base + increment file name. Options on the right side are for setting up automatic file saving timed experiments.
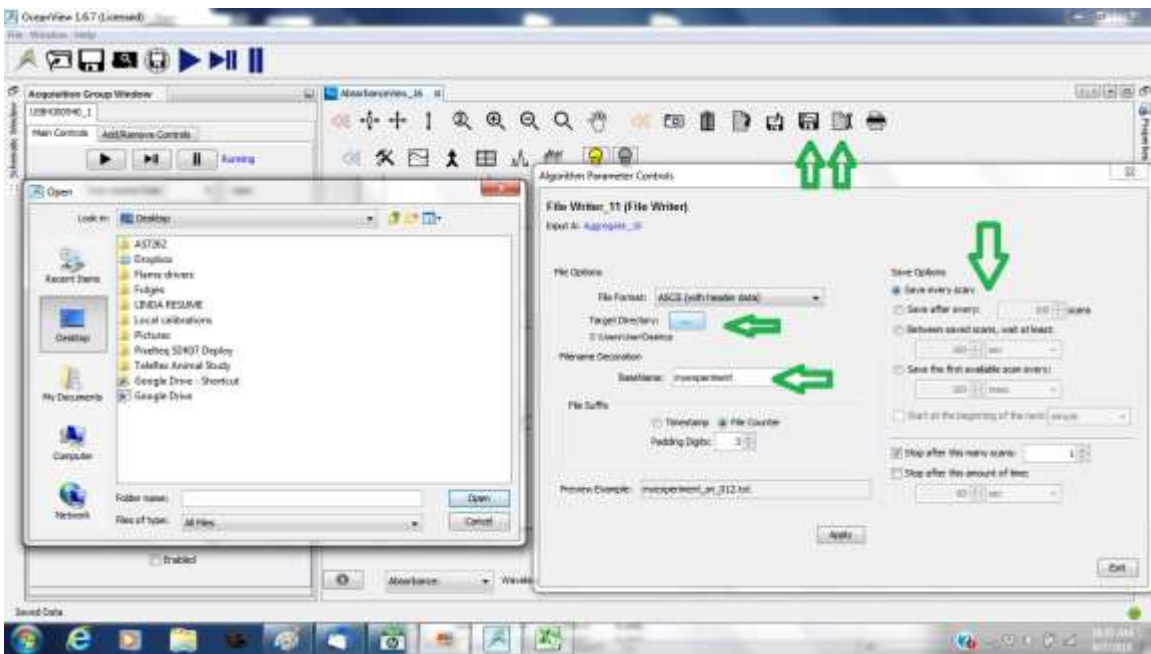
Good luck with your experiments! Call us if you need help. 727.230.1697

Appendix I Install the Oceanview Software

For rental systems follow the directions for the 10 day free trial, or the "lite" version
You may download OceanView (if you already have not done so) from this link:
http://oceanoptics.com/product/oceanview-downloads/
Please select the installer that corresponds to your operating system (i.e. 64-bit Windows vs. 32-bit Windows).
After installation, it will start in OceanView Lite with minimal features.
If using the 10-day free trial, please do the following:
1. Go into its main menu under Help / Licensing.
2. Click the "Activate full version trial period.
If you have a product key and wish to activate:
1. Go into its main menu under Help / Licensing.
2. Enter your product key and click the "Activate" button.
When purchased, we provide you with a product key that allows activation of OceanView on two computers at a time (which may be changed whenever you wish) with three years of updates to its latest versions.

Windows Driver Installation
After you install OceanView, attach your spectrometer to the computer. After this, the "Windows Found New Hardware" wizard will open, but may not find the device driver. If it does not find the driver, please follow this procedure.
1. Go to Device Manager and find the "Ocean Optics spectrometer" (it should
be under the category "Other Devices").
2. Right click on the "Ocean Optics spectrometer" and select "Update Driver Software." You will get a choice of finding the driver automatically or "Browse My Computer."
3. Select Browse and then browse to the following directory: "C:\Program Files\Ocean Optics\OceanView \SystemFiles." Please be sure to select the "SystemFiles" directory, and not the subfolder.
4. It should display "Your hardware was installed successfully" when finished.

Mac OSX Java Requirement
OceanView requires installation of the latest Java for OSX.
OceanView Quick Start Guide: http://oceanoptics.com///wpcontent/uploads/OceanViewQuickStart.pdf
OceanView Operating Instructions: http://oceanoptics.com///wpcontent/uploads/OceanViewIO.pdf
OceanView video: http://www.spectroscopytv.com/oceanview-software-generalfeatures/