Lab 0: Wavelength measurement with Ocean Optics

Figure1: Equipment

1. LED Array ST-11A
2. Ocean Optics: STS-VIS Microspectrometer Kit
3. Small v-clamp

Goal: *To measure the center wavelength and full-width half-max of an array of LEDs using an Ocean Optics spectrometer.* Be sure to note when more than one peak is observed. Plot the measured values as a function of the nominal values on the array. Use the FWHM values as error bars, and fit the data to a line using Matlab. Write down the serial number of the spectrometer on the graph. Also look at the white LED and the fluorescent lights in the lab.

Turn in:
1. Fit. Comment on agreement/disagreement with expectations.
2. Spectrum of one color LED, the white LED, and the fluorescent lights. Comment on the differences. See if you can identify the elements in the fluorescent lights from the spectral peaks.

Supplementary

Ocean Optics Basic Instructions:

1. Connect a fiber optic cable to the threaded SMA 905 connector on the housing of the spectrometer.
2. Connect the spectrometer to your computer using the USB cable.
3. Start the OceanView software.
4. Select the Quick View option on the Welcome Screen.
5. Allow the spectrometer to warm up for at least 15 minutes before proceeding.
6. Turn on the light source. Aim the tip of the fiber optic cable at the light source. DO NOT TOUCH THE TIP OF THE FIBER TO ANYTHING.
7. There are two methods for optimizing the spectrum showing intensity versus wavelength. Note that one method may be better than the other depending on the light source you are measuring.

    Option 1: Adjust the distance between the light source and fiber. Set the distance between the light source and the tip of the fiber optic cable so that the peak intensity on the graph is high but not close to saturation.

Option 2: Adjust the integration time. Click the Automatic button in the Acquisition Group Window to automatically adjust the Integration Time to the optimum value.

8. When you are satisfied with your emission graph, save the spectrum by clicking the Configure Graph Saving button to configure the File Writer.

      a. Select the directory where you want to save the file.

      b. Enter a filename for your spectrum.

   c. Click Apply and then Exit to close the dialog box.

9. Click the Save Graph to Files button to save your emission spectrum.

Alternately, you can print our your spectrum using the print graph button

10. To analyze your emission spectrum graph:

Click anywhere on the graph to activate the cursor. Note the vertical line marking a given wavelength on the graph. A legend below the graph displays the counts at the wavelength of the cursor location. You can also use the built-in functions of the spectrometer to read-out the Peak and FWHM values -View Spectrum Peaks button (ᴧᴧ) .

Matlab fitting

1. Download Matlab fitting file from Blackboard.
2. Right click on the Matlab filename.
3. Choose "Save link as" with destination of Desktop.
4. Remove (1) from the name before saving, if it appears.
5. Double click on filename in the Desktop and choose Matlab to open it.
6. File will open in Matlab.
7. Import data as described in comments section of code.