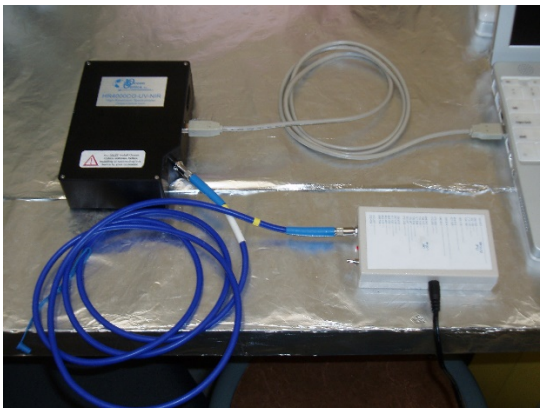
Helium atomic spectrum analysis Pre Lab:



This spectrometer measures optical spectra from wavelengths 200-1100 nanometers. The Ocean Optics Spectrometer measures the intensity (classical) of the radiation. Here, we are not counting photons as was done with the gamma detectors. The intensity in each "channel" is not an integer, and does not necessarily obey Poisson statistics. The shape of the peaks are not necessarily Gaussian. However, the peaks are close enough to a Gaussian shape that we can fit them as we did with the gamma spectrometers. To run the experiments click on: Ocean Optics Spectrometer. Below are some experiments that we will perform.

1. **Wavelength Calibration**
   The virtual optical spectrometer contains numerous hydrogen and helium spectra taken with different collection times. The collection time for each spectra is listed in the select box. The hydrogen spectra are used to calibrate the detector. For calibration standards, we use the Balmer lines listed below:

Transition ($n_i \rightarrow n_f$)	Wavelength (nm)
$3 \rightarrow 2$	656.28
$4 \rightarrow 2$	486.13
$5 \rightarrow 2$	434.05
$6 \rightarrow 2$	410.17
$7 \rightarrow 2$	397.01

2. **Helium Spectrum Analysis**
Measure as many spectral lines as you can for helium. Then look for patterns in ΔE_{ji}, which is defined and explained in the experiment description