

Calibration Hints

1 Calibration Procedure

Data acquisition for this experiment is very similar to that used in the Optical Spectroscopy experiment in Phys 215 lab. (A copy of the *Getting Started* guide is in the room with the spectrometer, and also is available from the course website.)

The first step is a calibration using a mercury lamp, which is set up on the side (“Lateral”) entrance to the spectrometer.

1. The mercury pen and entrance slit should already be set up. The entrance slit is set to the bottom “dot” and the width is set to about 20 μm . The exit slit is set about 30 μm .
2. Cover the pen lamp with the box and then turn it on.
3. Use **Experiment** \rightarrow **Collect** to open the Collection menu. Under the “Monos” entry, set the entrance to “Lateral.” Under the “Detectors” entry, set the voltage to 850 V and set the integration time to 0.1 s.
4. *If necessary*, perform a rough scan over the range 400 nm to 600 nm in order to identify intense peaks in the mercury spectrum. A resolution of about 0.05 nm is useful for this first-pass scan. Export the data as an ASCII file. *If there is a recent rough scan, you may be able to skip this step and proceed to the next step. To see if there is a significant change from the previous rough scan, a scan over the range 400 nm to 410 nm is often sufficient.*
5. If you do a full scan, please leave a copy of the scan on the Desktop so that other students can refer to it as well.
6. Compare these peaks to known peaks in the Hg spectrum (e.g. NIST database or the supplied article by Sansonetti, Salit, and Reader). Note that some visible peaks may be second-order peaks, given by $d \sin \theta = 2\lambda$. That is, the line at 253.65 nm will also show up (more faintly) at 507.30 nm. The **Data** tab below the spectrometer graph is often useful for this first look at finding the peaks.
7. Perform detailed, “zoomed-in” scans for about 5 or 6 intense peaks which can be correlated to a known intense Hg line. A resolution of 0.002 nm is sufficient here.
8. Use the positions of the known peaks to create an equation to convert your measured wavelengths to “corrected wavelengths”. Typically, a linear relation is sufficient. This is a typical way to calibrate a spectrometer.