Wavelength calibration of USB650

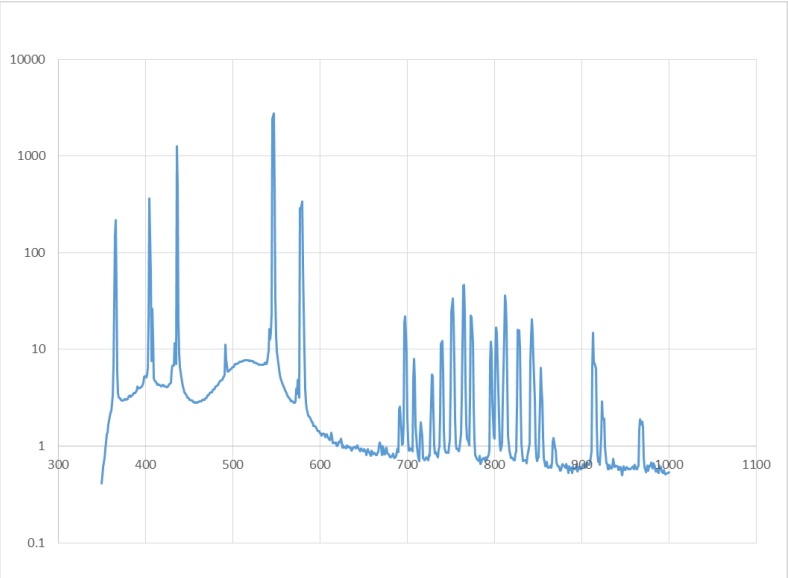
Version 2.3.2022

The following devices are used for the calibration:

- Ocean Insight wavelength calibration source HG-2 (mercury, argon)

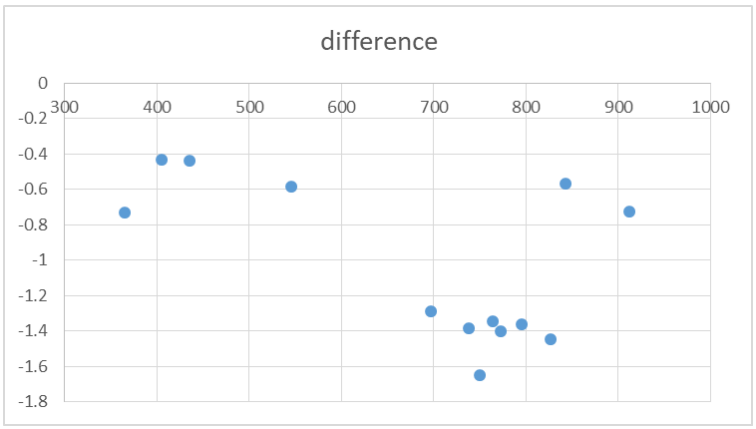
Wavelength calibration of the USB650 spectrometer

Start the 'Spectrometer' program and set the exposure time to 3ms. Start the measurement in the "Current spectrum" mode. After the dark-spectrum is taken, interconnect the spectrometer and the HG-2 source by the optical cable. Stop the measurement and copy the content of the 'spectrum_*.dat' (don't mistake it for the 'spectrum_*_cal.dat' that is modified by the calibration settings in 'calibration.cfg' and 'offset.cfg' files) into the 'spectrum_wavel.xlsx'-file (sheet 'Original'). Check the spectrum:



Recorded spectrum of the HG-2 light source

Identify the lines using the values provided in the HG-2 user guide (also marked directly on the source itself). Use the 'Maximum'-sheet to find the position of the maxima using weighted average – copy 5 neighbouring values of the peak into the sheet. Write down the positions found into the 'Difference'-sheet. Look at the plot:



The differences between the real/measured positions of the lines

As it is not expected to find big changes in the calibration, usually only a constant offset has to be considered (-1nm on this case). Residuals less than 1 nm are irrelevant in comparison to the resolution of the spectrometer.

Read the mean difference and write it down into the 'offset.cfg' – file.

If higher differences are shown in the figure, fit the differences by a polynomial curve and correct the measured wavelengths in the measured spectra in the post-processing phase.