

# Radiometric calibration of USB650

Version 2.3.2022

The following devices are used for the calibration:

- Ocean Insight halogen calibrated source HL-3 Plus

## Radiometric calibration of the USB650 spectrometer

### Step 1. Measurements

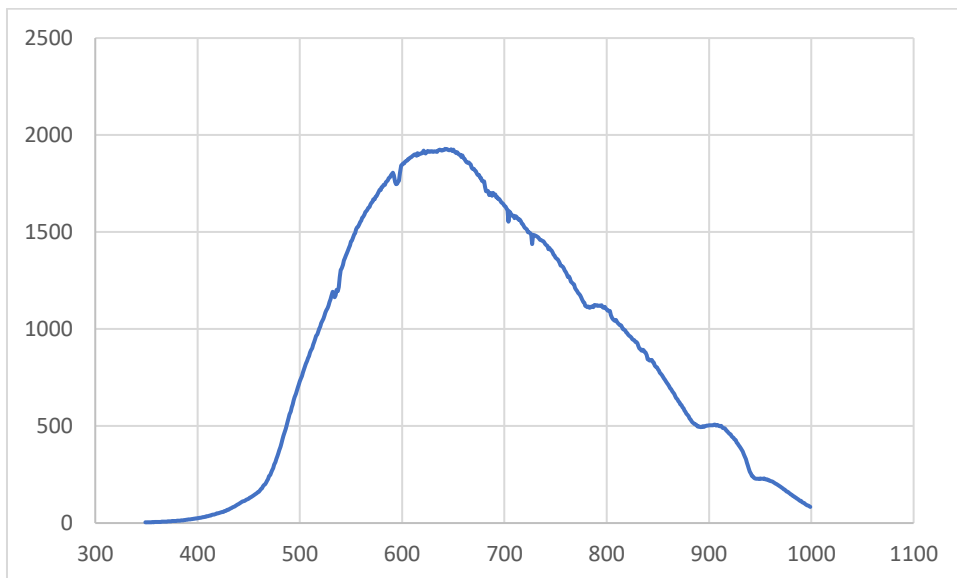
Warm-up the source 15 minutes, connect the spectrometer by the optical cable + cosine corrector to the source.

Start the GUI of the spectrometer. Use the waveleng offset found in wavelength calibration step (-1 nm as an example). Use no calibration coefficients (no calibration.cfg file).

Use long-time averaging for the spectrum of the source (open the built-in shield) exposure 0.5s (maximum of the signal about 2000), total averaging time about 3 minutes.

Then close the built-in shield and using long-time averaging (exposure time 0.5s) for about 3 minutes take the dark spectrum.

Subtract the measured spectra in EXCEL:



### Step 2. Processing

Interpolate calibration data provided by the Ocean Optics. Use Origin, Cubic spline and step 5 nm. Such density allows later to use simple linear interpolation. Save interpolated data as "real.txt" file.

Save measured spectrum (Step 1) as "measured.txt" file.

Run "radiometrical.exe" program. The ratio real/measured is saved for each pixel in the form expected by the GUI of the spectrometer. Rename created "calibration.txt" file into the "calibration.cfg" and use it with the GUI. **The output of the GUI will be calibrated in uW/cm2/nm at 0.5 s exposure time.**

Typical calibration curve:

