

Streak Camera : Calibrate monochromator

When the monochromator is powered on, it never goes exactly to the correct position. So it is advised to calibrate the monochromator each time it is switched on.

- **Make sure the entrance slit of the streak camera is closed** (red arrow to the left, micrometer before zero).
- Switch everything on.
- Using the StreakCamera program window 'Chromex 250 IS' : set Wavelength:500 nm and Slitwidth:10 micrometer.
- Place the calibration lamp in front of the last lens before the monochromator, so only the last lense is in between the calibration lamp and the monochromator. Switch it on. A faint blue circle of light is visible at the entrance of the monochromator.



- Using the StreakCamera window 'C5680+M5675(or 5677)', set Mode:Focus, MCP gain:25, Shutter:Open.
- Start measuring with 'Aquisition', 'live'.
- Press the star (bottom right) on the LUT window. The range should now be about 37-45 and greenish.
- Carefully open the entrance slit of the streak camera, by turning the slit-knob clock-wise. It starts opening when the red arrow is pointing upwards. While opening it, look at the live display of the StreakCamera program. If the slit is about 10 micron open, you should see a series of black dots. These are the lines of the calibration lamp.
- Optionally, change the "Exposure time "in the "Aquisition control window" from the default 111 ms to 1000 ms. This gives better defined peaks with less noise.
- Press 'freeze' (Aquisition window), and close the entrance slit of the streak camera, counter clockwise, until the red arrow points to the left.
- Menu : Analysis | Profile
- Using the horizontal integration lines, to make a vertical integration.
- In the window "Profile control" : GetH, M0 (this shows the spectrum)

- Measure the position of the 546.08 nm peak, by left clicking the mouse in the spectrum window and dragging the vertical line to the peak.
- The position of the line is shown in the window "Profile Analysis"
- The resolution of the monochromator is about 0.62 nm. So if this position is off by more than, say, 0.3 nm go to to the 'Tools' menu, section '**Spectrograph calibration**'.
- The 40.7 g/mm grating has a resolution of $-2 \times 0.3106796 = \sim 0.62$ nm/pixel. (2x2 binning)
- Adjust the '**Pixel location corresponding to the center**' value :
for each **0.3 nm** that the measured wavelength of the 546.08 nm peak is **before 546.08**, increase the 'Pixel location corresponding to the center' value by **+1**. And vice versa.
 $\Delta \text{ pixels} = (546.1 - \text{measured}) / 0.3$

| measured | Δ pixels |
|----------|-----------------|
| 540 | 21 |
| 542 | 14 |
| 544 | 7 |
| 546.1 | 0 |
| 548 | -6 |
| 550 | -13 |
| 552 | -20 |

- Repeat the entire procedure until the calibration is correct.
- Set the "Exposure time" back to 111 ms