ibsen\_photonics\_spectrometer Documentation

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Project Structure:

* luna\_filter\_and\_graph
  + ibsen\_photonics\_spectrometer
    - k\_baseline.py
    - matricies.py
    - plot\_and\_filter.py
  + csv\_files
  + utilities
  + experiment\_logs

csv\_files

Where the raw data file that is outputted from the ibsen spectrometer go.

FORMAT

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 0 | 1 | 2 | 3 | 4 | 5 | … | 2046 | 2047 |
| 171146580 |  |  |  |  |  |  |  |  |  |
| 171146841 |  |  |  |  |  |  |  |  |  |
| 171157100 |  |  |  |  |  |  |  |  |  |
| 171147620 |  |  |  |  |  |  |  |  |  |
| … |  |  |  |  |  |  |  |  |  |
| 171147849 |  |  |  |  |  |  |  |  |  |
| 171148012 |  |  |  |  |  |  |  |  |  |

Red = Pixel Number/Wavelength

* There is a total of 2048 pixel numbers

Blue = Quarter Second units.

Each wavelength the spectrometer reads corresponds with a specific pixel number.

For our case, we are interested in the following pixels.

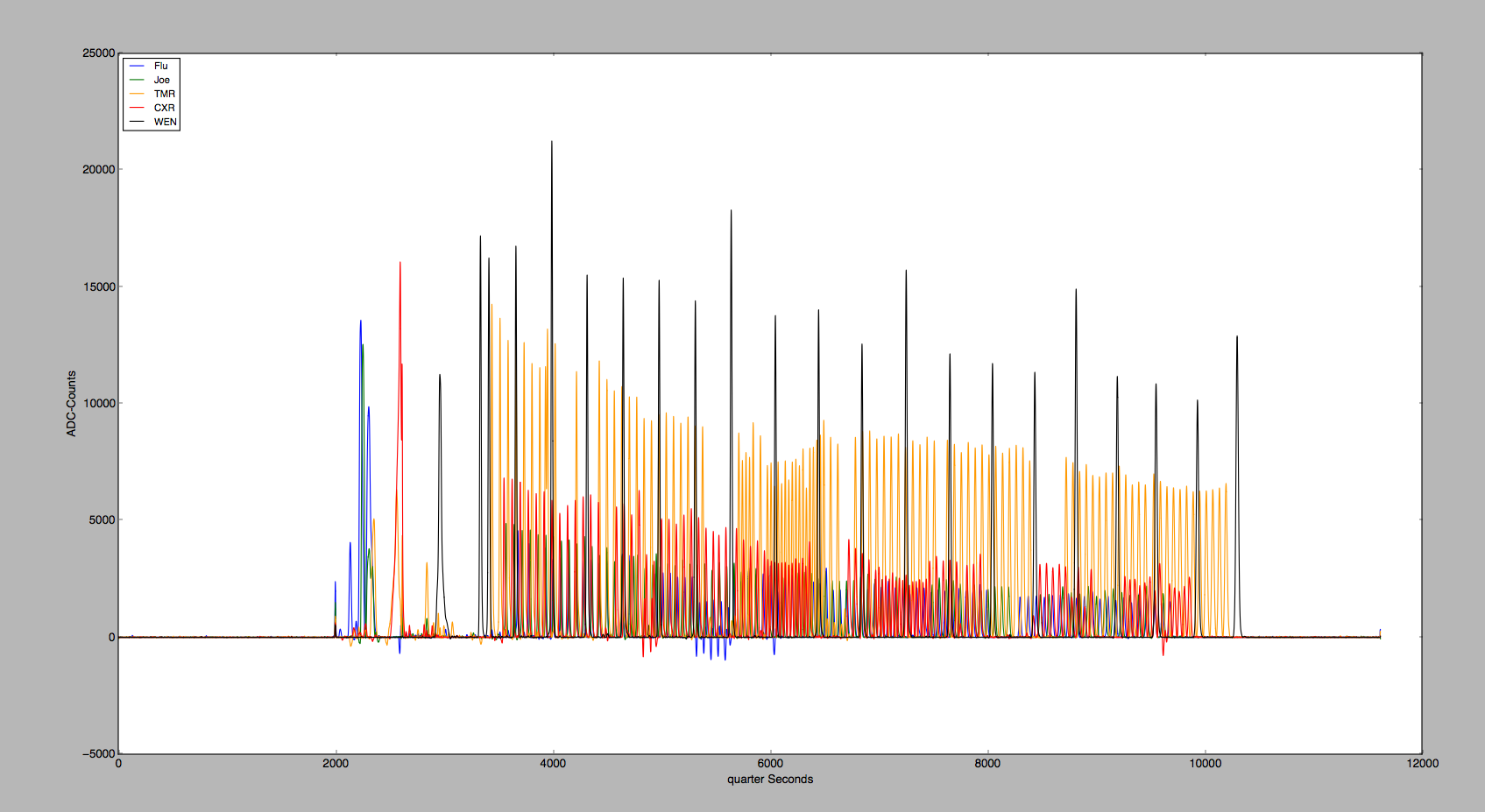
1. Flu = 905
2. Joe = 956
3. TMR = 1000
4. CXR = 1037
5. WEN = 1167 (Standard)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 0 | … | 905 | … | 999 | 1000 | 1001 | … | 2047 |
| 171146580 |  |  |  |  |  |  |  |  |  |
| 171146841 |  |  |  |  |  |  |  |  |  |
| 171157100 |  |  |  |  |  |  |  |  |  |
| 171147620 |  |  |  |  |  |  |  |  |  |
| … |  |  |  |  |  |  |  |  |  |
| 171147849 |  |  |  |  |  |  |  |  |  |
| 171148012 |  |  |  |  |  |  |  |  |  |

ibsen\_photonics\_spectrometer

Plot Correction Steps (proper\_main(file\_dir))

1. Load File
2. Time Averaging/K\_filter/Get\_5\_Dyes
3. Matrix Correction
4. Baseline Subtraction
5. Plot



k\_baseline.py

Python file that contains the Classes need to implement the K\_baseline subtraction.

matricies.py

Python file that contains all the different calculated matrices used in the

matrix\_correction(list\_list\_dyes, matrix).

plot\_and\_filter.py

All the functions that are needed to load a csv file in, and get a plot of the data as the output.

Functions

* load\_file(csv)
  + param: csv is a string
  + Loads a csv file and converts the column\_labels into increments starting from 1 and the index (row\_label) values to a float rounded to the nearest tenth place.
* k\_filter
* k\_filter2
* k\_filter2
* k\_filter2
* plot\_ibsen\_spectrum(list\_of\_values, color=”blue”, label=”label”)
* plot\_dyes(list\_list\_dyes, list\_of\_baseline\_x = [], list\_of\_baseline\_y = [], scatter=false)
  + param: list\_list\_dyes
  + param: list\_of\_baseline\_x: optional list – list of x’s to plot for the baseline to be subtracted
  + param: list\_of\_baseline\_y: optional list – list of y’s to plot for the baseline to be subtracted
  + param: scatter
  + Takes a list of list of the five dyes and then plotes each of them.
* get\_five\_dyes(data, flu=905, joe=956, tmr=1000, cxr=1037, wen=1167)
  + Returns five lists with flu, joe, tmr, and wen plots at their respective pixels/wavelengths.
* baseline\_subtraction(list\_list\_dyes, sub)
  + Baseline subtraction based on lists of each dye and a list of the subtraction number.
  + Subtracts each dye in list\_list\_dyes with the respective list of ints in sub
* matrix\_correction(list\_list\_dyes, matrix):
  + Matrix Correction (5 x 5 matrix).
  + Param: list\_list\_dyes: contains 5 lists that correspond with the 5 dyes (flu, joe, tmr, cxr, and Wen).
  + Param: matrx: numpy array matrix used for matrix correction.
* set\_threshold(list\_list\_dyes, threshold\_value):
  + Set a threshold so that all values below that is threshold is set to the threshold value.