# Documentation for Counts in Tail Vs Injection Trap Potential Script

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## User Required Actions

1. Change folder locations
2. Ensure txt file names follow proper format

## Description

Takes a single specified folder location as input. Using this folder location, the code will do the following in this specific order:

1. It will locate all .txt files within a specified folder and use them as input data. The code will examine each txt file individually before moving onto the next
2. Read the x and y data from the TXT file
3. Get the voltages for the trap through reading the txt file name.
4. Truncate the data outside a specified radius of the highest peak, effectively isolating that peak within the data
5. Fit a Gaussian to the highest peak
6. Subtract the Gaussian from the data, leaving the tails. Any overestimations made by the Gaussian will result in a subtraction to zero. Ie not negative counts
7. Remove all remaining counts due to the Gaussian fit’s underestimation within the area included in the fitted Gaussian’s FWHM.
8. Plot the original data, Gaussian fit, and the Gaussian and FWHMsubtracted result
9. Determine the integral of the remaining left and right tail data, as well as the integral of the original data. Compare these values to see he percentage of the whole area that was within the tails
10. Print statistics about that specific peak
11. Once all text files have been analyzed, graph the percentage of the peak that was in the left and right tail respectively as a function of turn number

## Important user notes

* Code depend on a '####.#-####.#V' format in the TXT file name as described below:
* The voltage trap values used in a text file be displated in the file name under the

format of the voltages being displayed in the thousands and to a sigle decimal precision

seperated by a dash or space, followed by a capital V, no spaces.

Example: '1234.5-3456.7V' and '0245.0 0255.5V' Bad:'1234.5-3456.7 V' or '345-123.4V'

* That there be NO OTHER characters using a capital V in that file name

Example: Good: 'Example\_File\_1234.5-3456.7V' and'1234.5-3456.7V Good Name'

Bad: 'Example\_Voltage\_txt\_1234.5-3456.7V' and 'V great data file 1234-3456V'

* The txt reader skips the first 18 lines of the txt files; this is because these are usually text, not data. One can remove this function by commenting out the specified line within the "GetData" function
* The Gaussian will only fit to the highest peak in the spectra
* This code is written assuming the peak with the highest count number is the desired peak, and looks at a 0.4 uses window centered on the location of said maximum. This window can be increases
* Negative count numbers caused by Gaussian fit overestimation are treated as zeroes
* Data is not normalized, but could be if you so wished