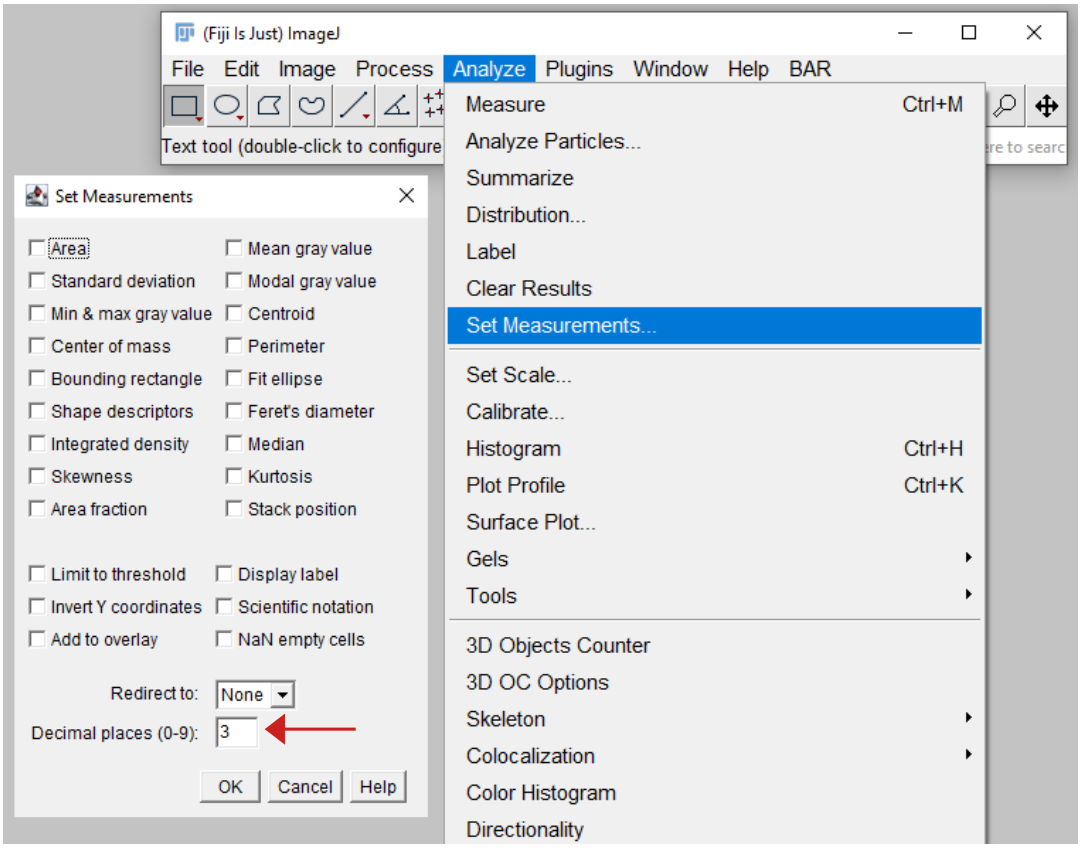
Tutorial: FFT 1D plugin (v1.0)

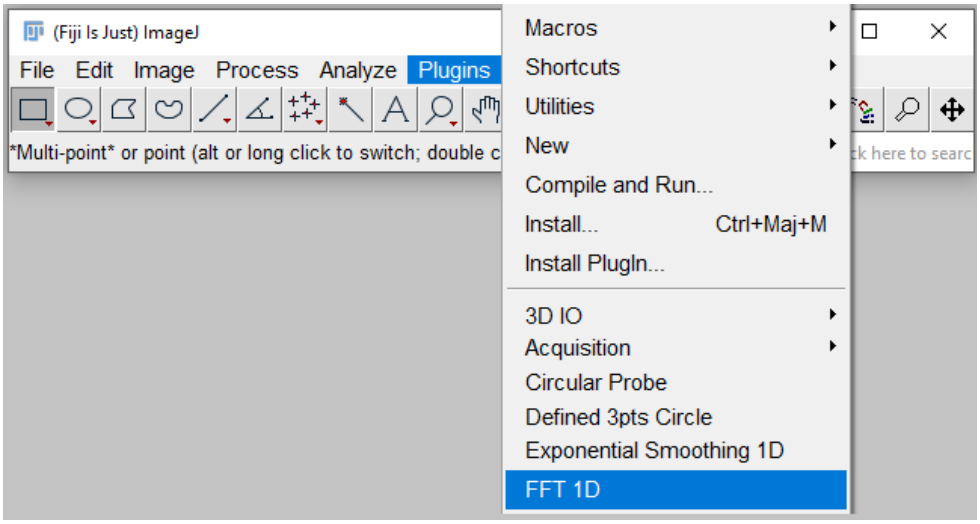
Description: to propose a tool able to apply a FFT (with apodization options) on 1D data (from a table for instance). Results: two data tables, four graphs (real part, imaginary part, amplitude, phase).

Step 1: import the plugin in ImageJ/FIJI. Restart ImageJ/FIJI.

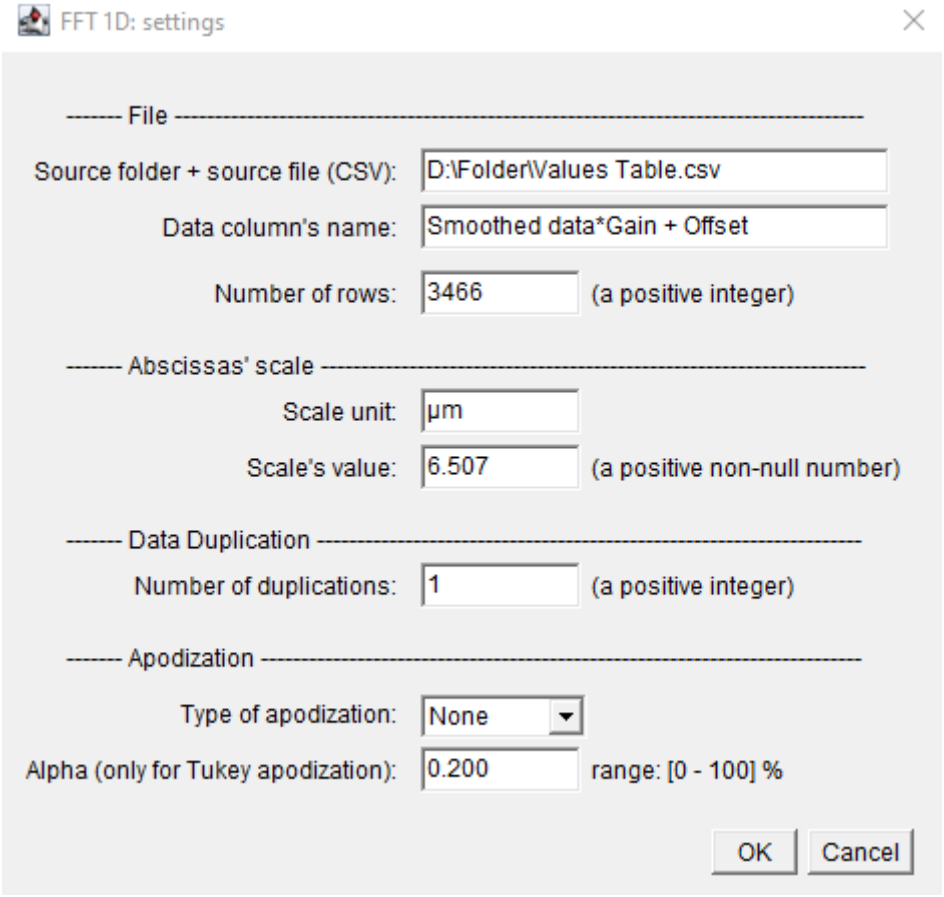
Step 2: set the Decimal place at the number required for your study.



Step 3: select the Exponential Smoothing 1D plugin. **This plugin does not required an image.**



Step 4: fill in the fields with the appropriate information, then click OK.



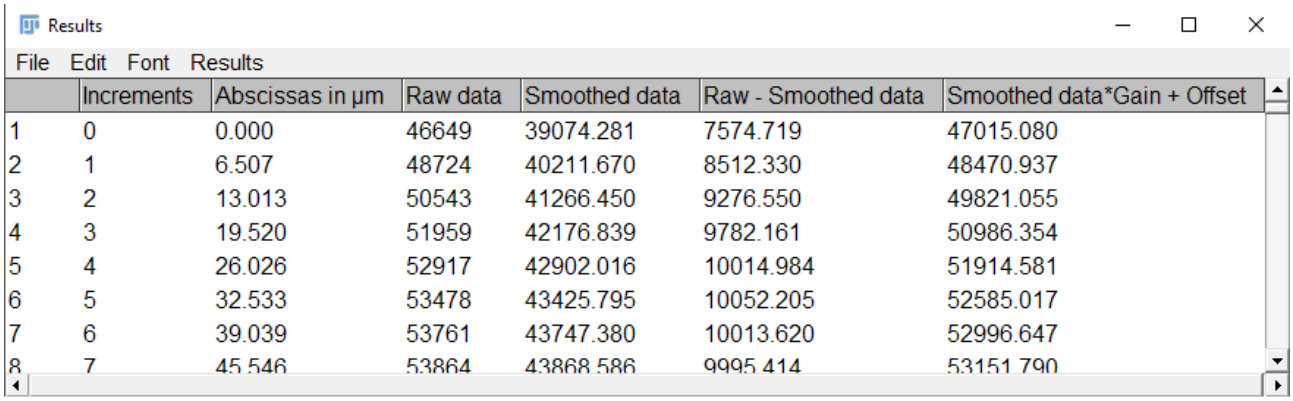
Number of rows: in the table (don't count the line used to label the columns; mind an eventually "0th" line!).

Scale value: the value, in the Scale unit (here µm for instance), of a pixel. The field must be filled in by a double type number.

Data duplication: prior to apply the FFT, builds a table containing N times the data set stitched one after the other.

Apodization: applied on the data set prior to the FFT (None, Hamming, Hann, Tukey). None means no apodization. The Tukey apodization required to set a parameter Alpha (ranging from 0 to 100%).

Results: two tables and four graphs are generated.

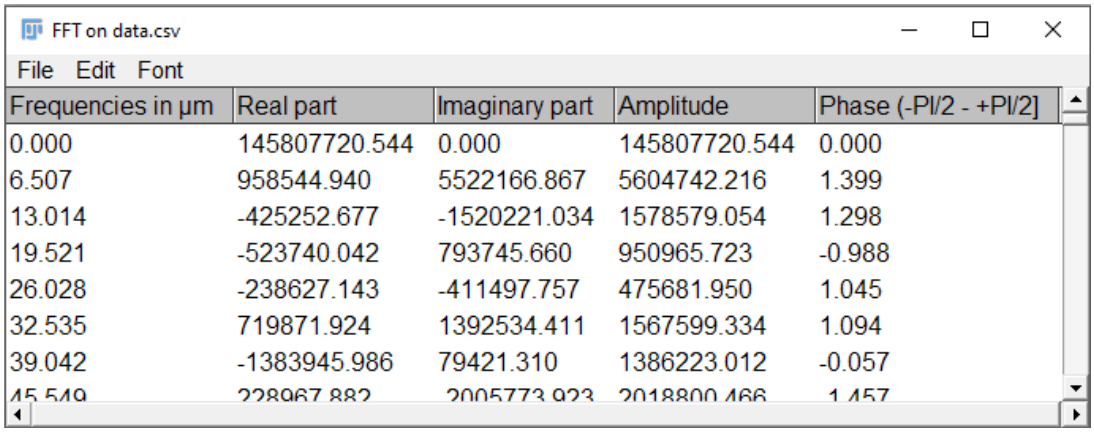


Results

File Edit Font Results

	Increments	Abscissas in µm	Raw data	Smoothed data	Raw - Smoothed data	Smoothed data*Gain + Offset
1	0	0.000	46649	39074.281	7574.719	47015.080
2	1	6.507	48724	40211.670	8512.330	48470.937
3	2	13.013	50543	41266.450	9276.550	49821.055
4	3	19.520	51959	42176.839	9782.161	50986.354
5	4	26.026	52917	42902.016	10014.984	51914.581
6	5	32.533	53478	43425.795	10052.205	52585.017
7	6	39.039	53761	43747.380	10013.620	52996.647
8	7	45.546	53864	43868.586	9995.414	53151.790

"Results" is as a reminder of the he source file



FFT on data.csv

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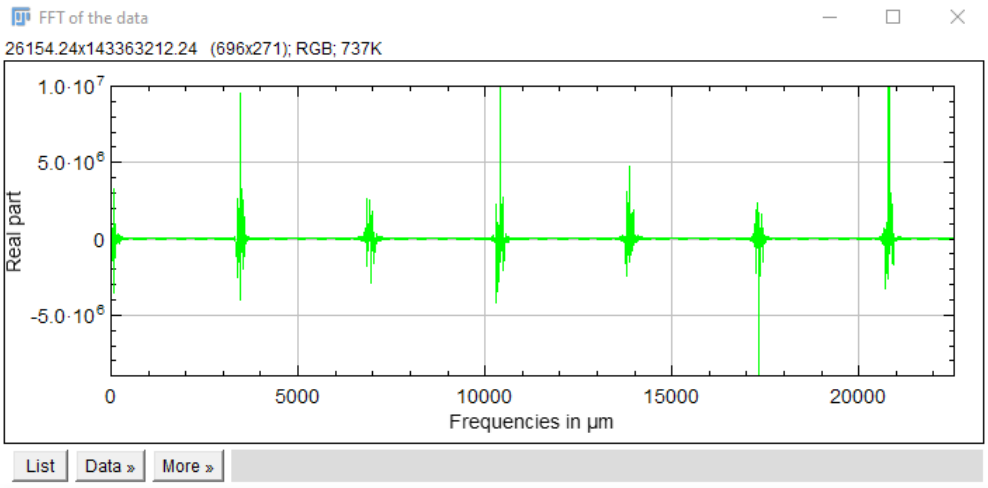
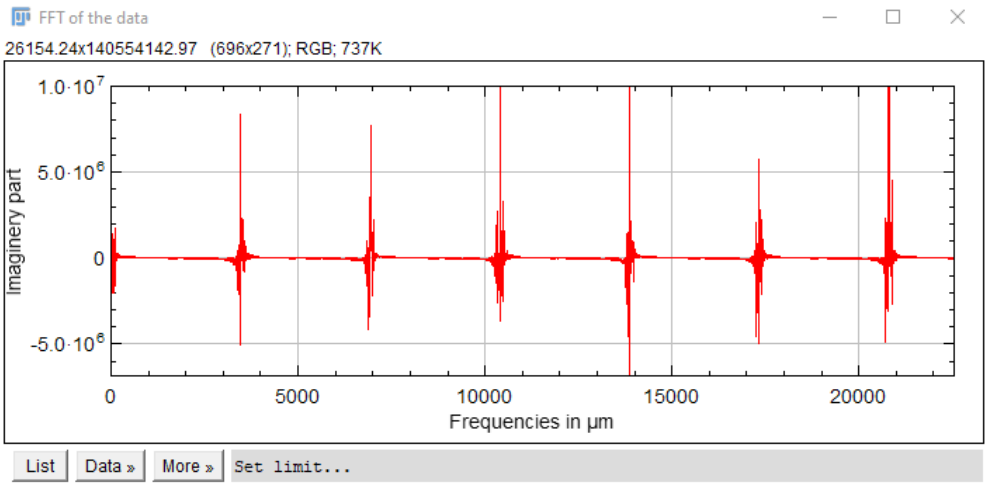
Frequencies in µm	Real part	Imaginary part	Amplitude	Phase (-PI/2 - +PI/2]
0.000	145807720.544	0.000	145807720.544	0.000
6.507	958544.940	5522166.867	5604742.216	1.399
13.014	-425252.677	-1520221.034	1578579.054	1.298
19.521	-523740.042	793745.660	950965.723	-0.988
26.028	-238627.143	-411497.757	475681.950	1.045
32.535	719871.924	1392534.411	1567599.334	1.094
39.042	-1383945.986	79421.310	1386223.012	-0.057
45.549	228967.882	2005773.923	2018800.466	1.457

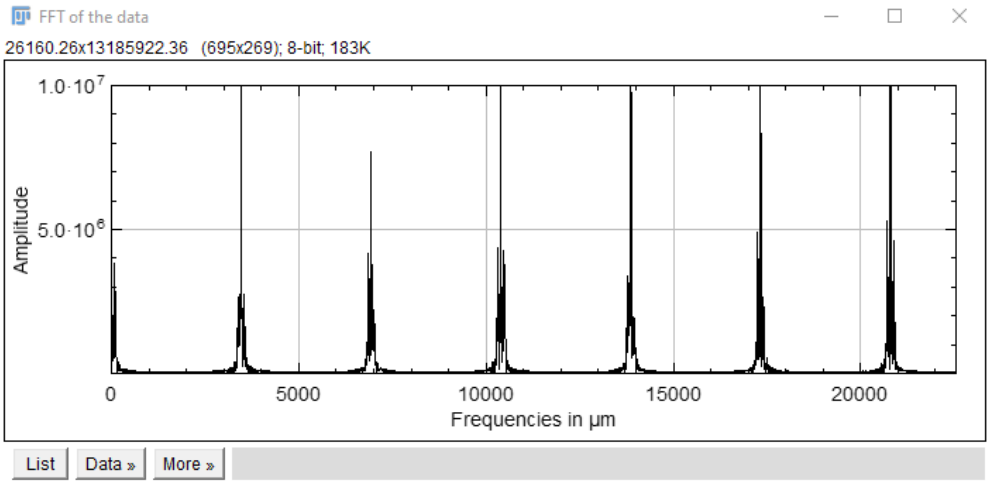
"FFT on data" shows all the results provided by the plugin



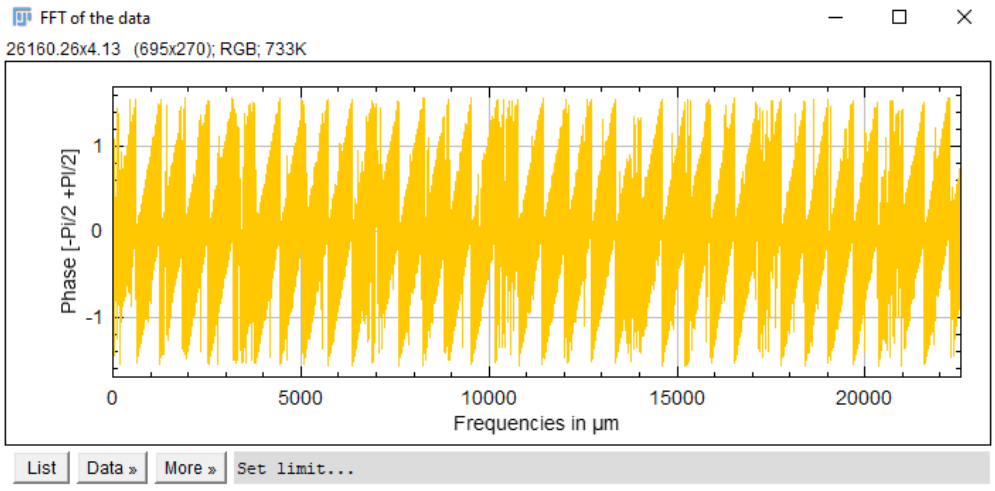
Plot of the Real part of the FFT (you can use the tools provided in the interface to zoom, etc.)



Plot of the Imaginary part of the FFT



Plot of the Amplitude



Plot of the Phase

<u>Plugin limitation:</u> developed on ImageJ 1.54 K (may not work properly on earlier version).

If this plugin is used in your application and research, please reference it in your paper.