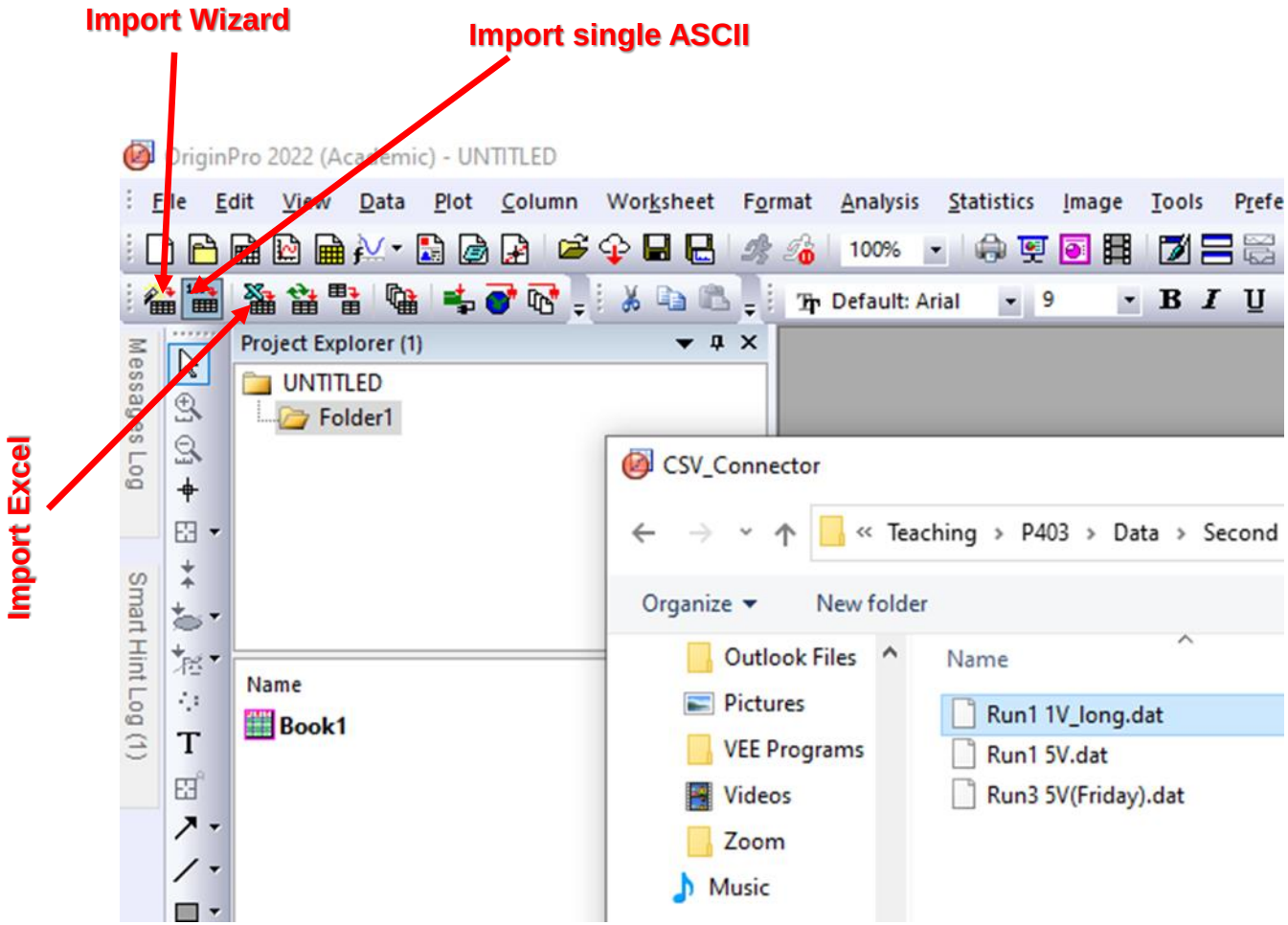
OriginLab Scientific Graphing and Analysis Software

Origin is on all Physics 403 computers.
What it can do:

1. **Graphical presentation of data**
2. **Data analysis**
3. **Preparation of publication-quality figures**

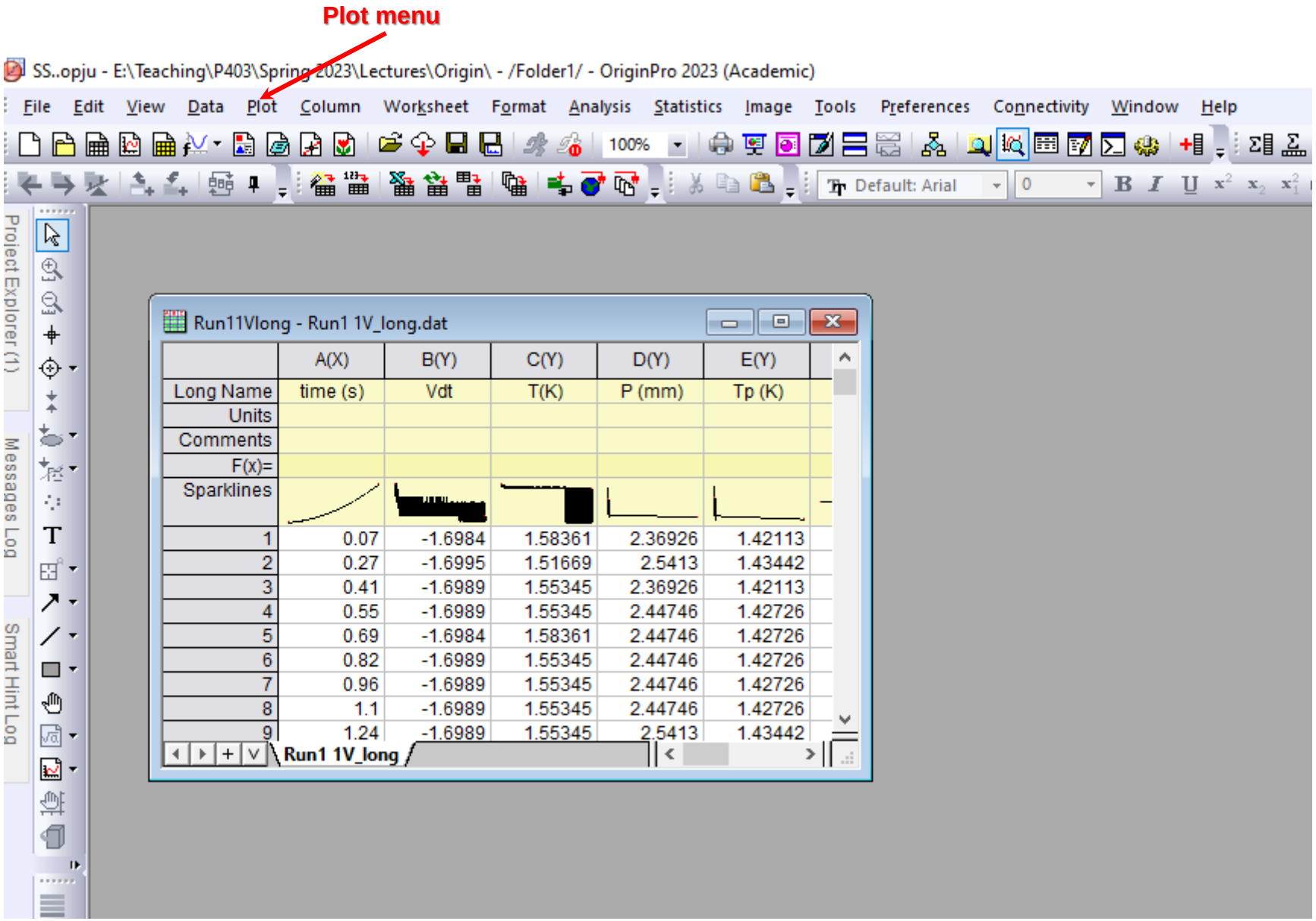
- **Specially designed for scientific graphics**
- **"Standard" Windows application, does not require knowledge of C++ or any other high level computer language**
- **Can write special functions or procedures using Origin programming tools**

Importing data



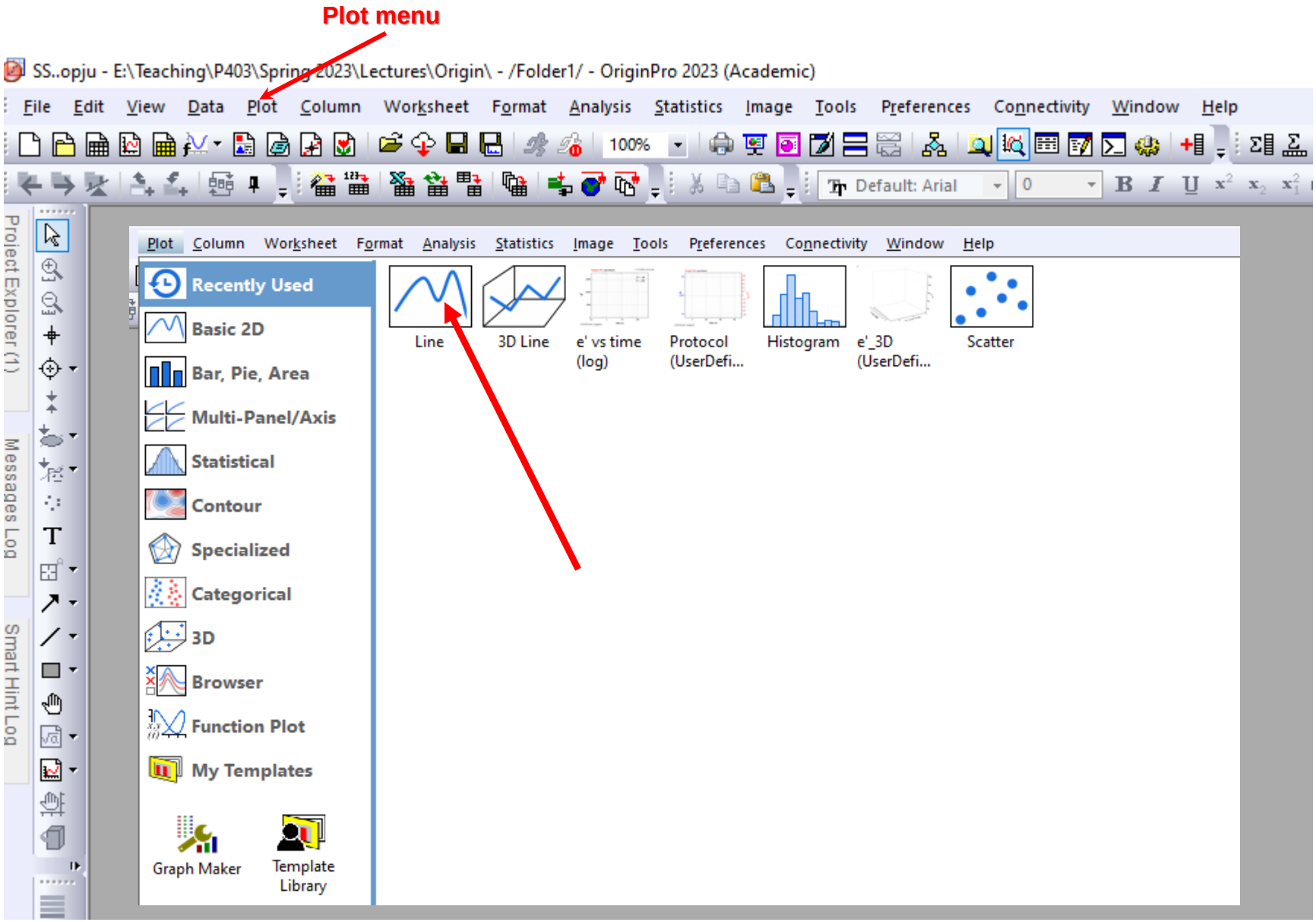
Can drag and drop .dat or .txt files into empty spreadsheet
Or import files

Graphical presentation of data: Basic Plot

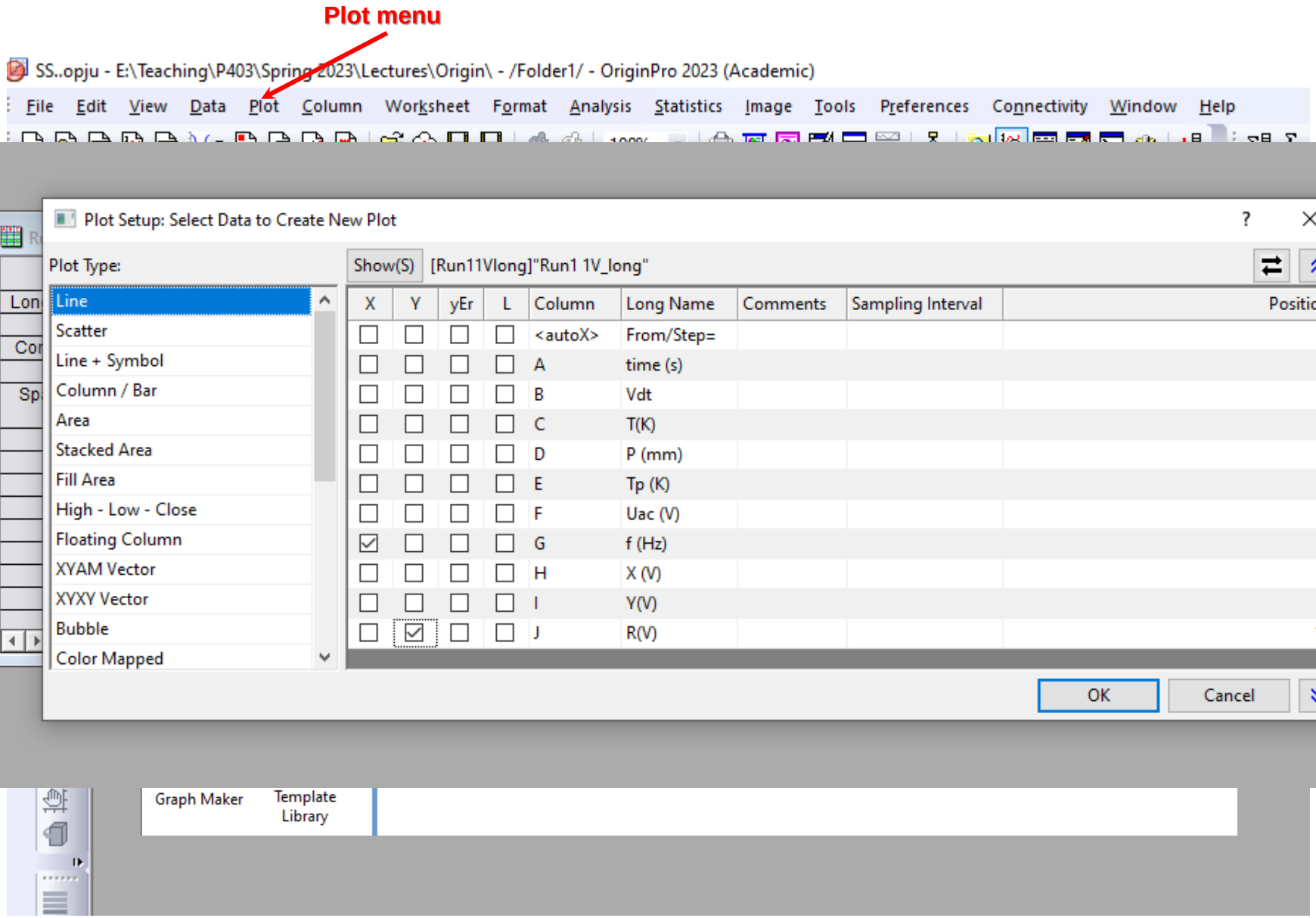


	A(X)	B(Y)	C(Y)	D(Y)	E(Y)
Long Name	time (s)	Vdt	T(K)	P (mm)	Tp (K)
Units					
Comments					
F(x)=					
Sparklines					
1	0.07	-1.6984	1.58361	2.36926	1.42113
2	0.27	-1.6995	1.51669	2.5413	1.43442
3	0.41	-1.6989	1.55345	2.36926	1.42113
4	0.55	-1.6989	1.55345	2.44746	1.42726
5	0.69	-1.6984	1.58361	2.44746	1.42726
6	0.82	-1.6989	1.55345	2.44746	1.42726
7	0.96	-1.6989	1.55345	2.44746	1.42726
8	1.1	-1.6989	1.55345	2.44746	1.42726
9	1.24	-1.6989	1.55345	2.5413	1.43442

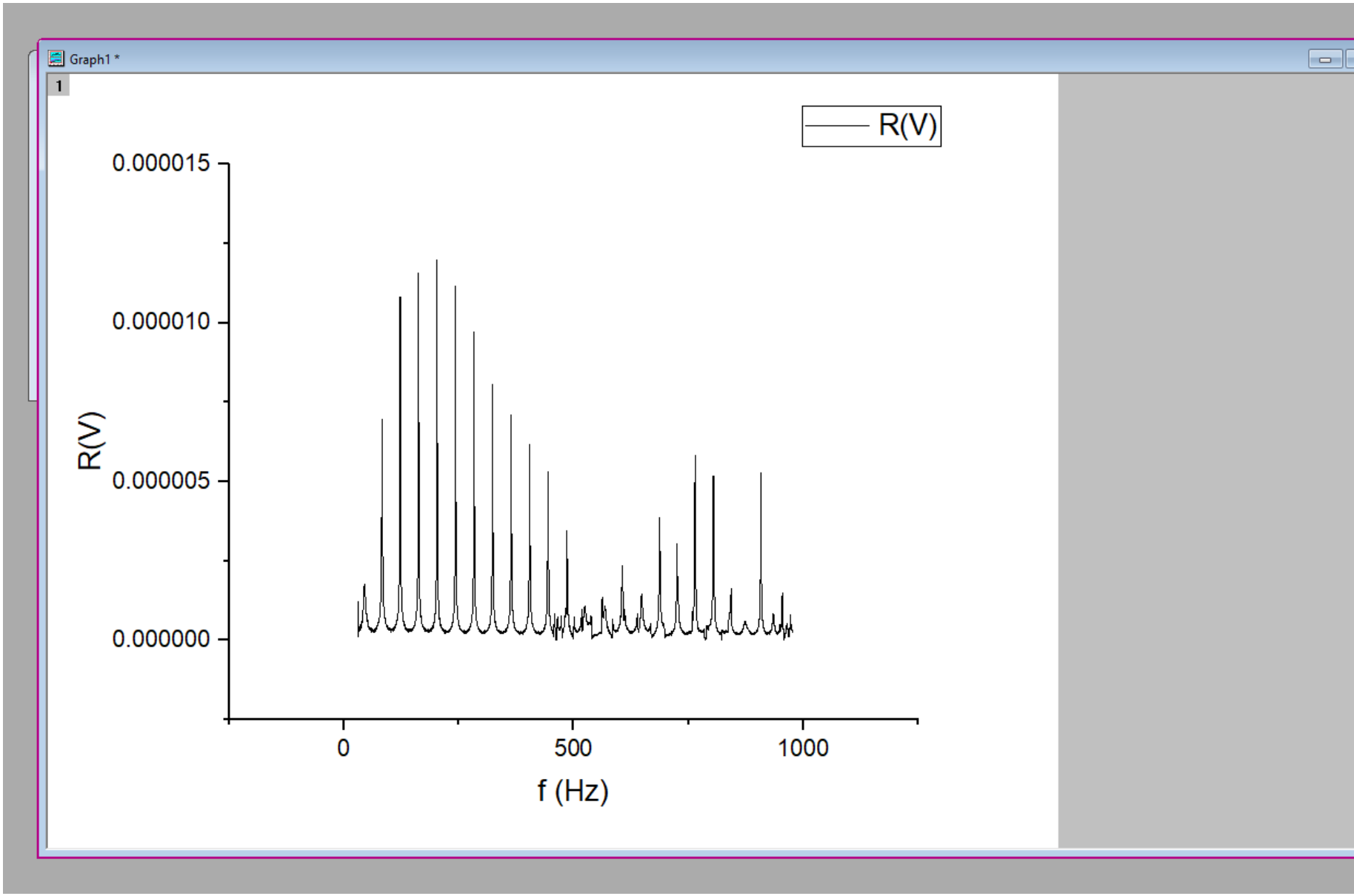
Graphical presentation of data: Basic Plot



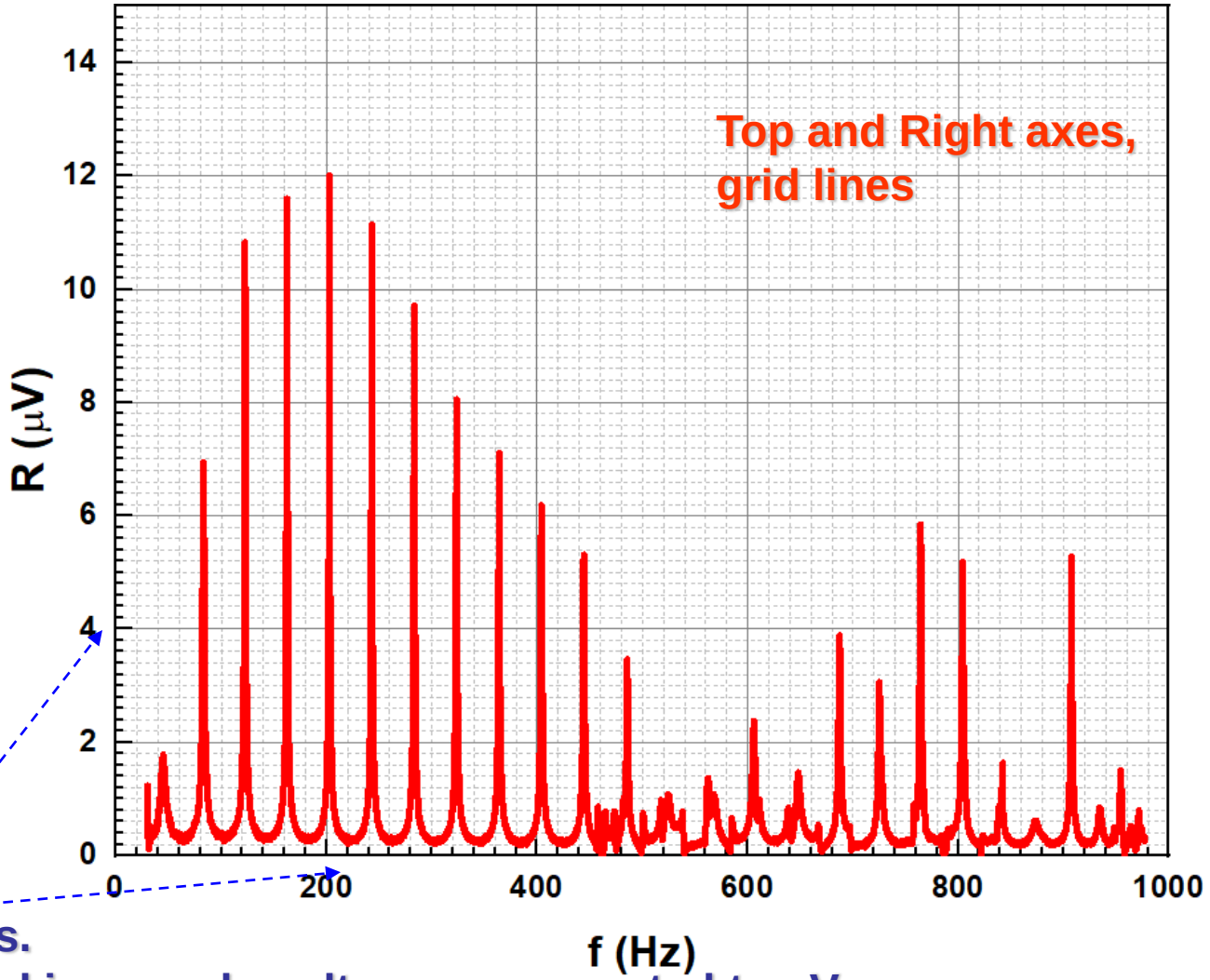
Graphical presentation of data: Basic Plot



Graphical presentation of data: Basic Plot



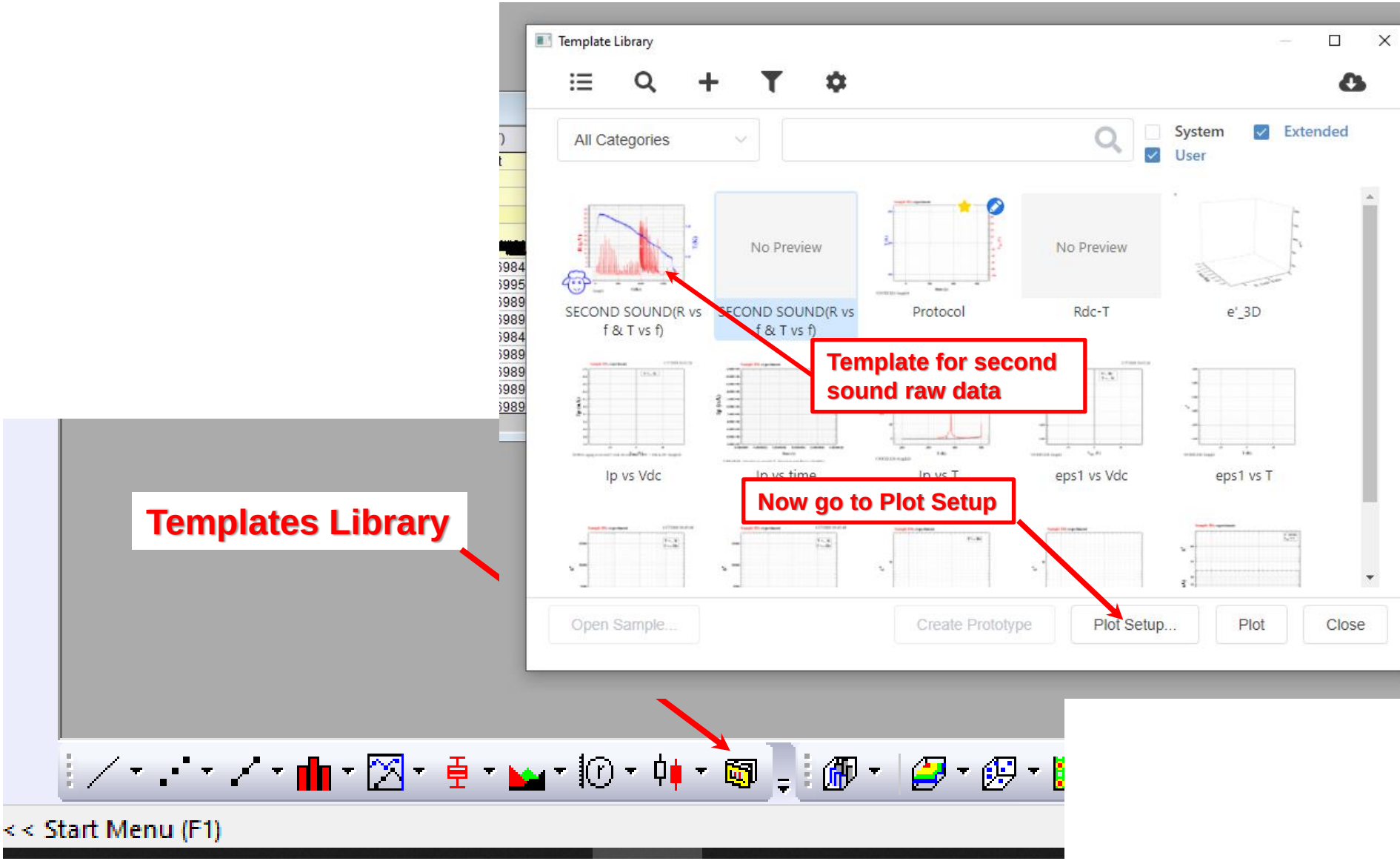
Graphical presentation of data: Basic Plot



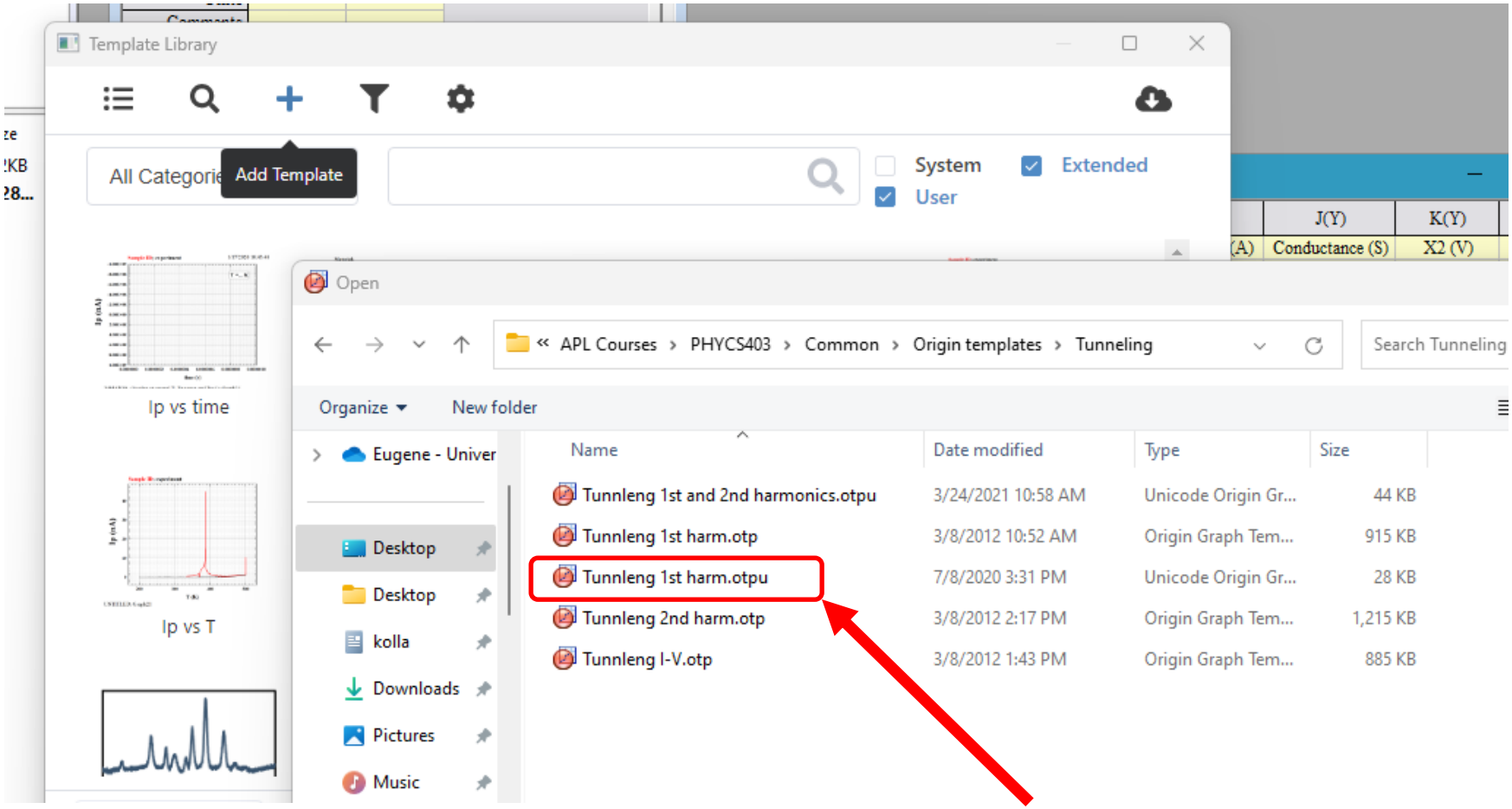
Bold tick labels.

For a better-looking graph, volts were converted to μV

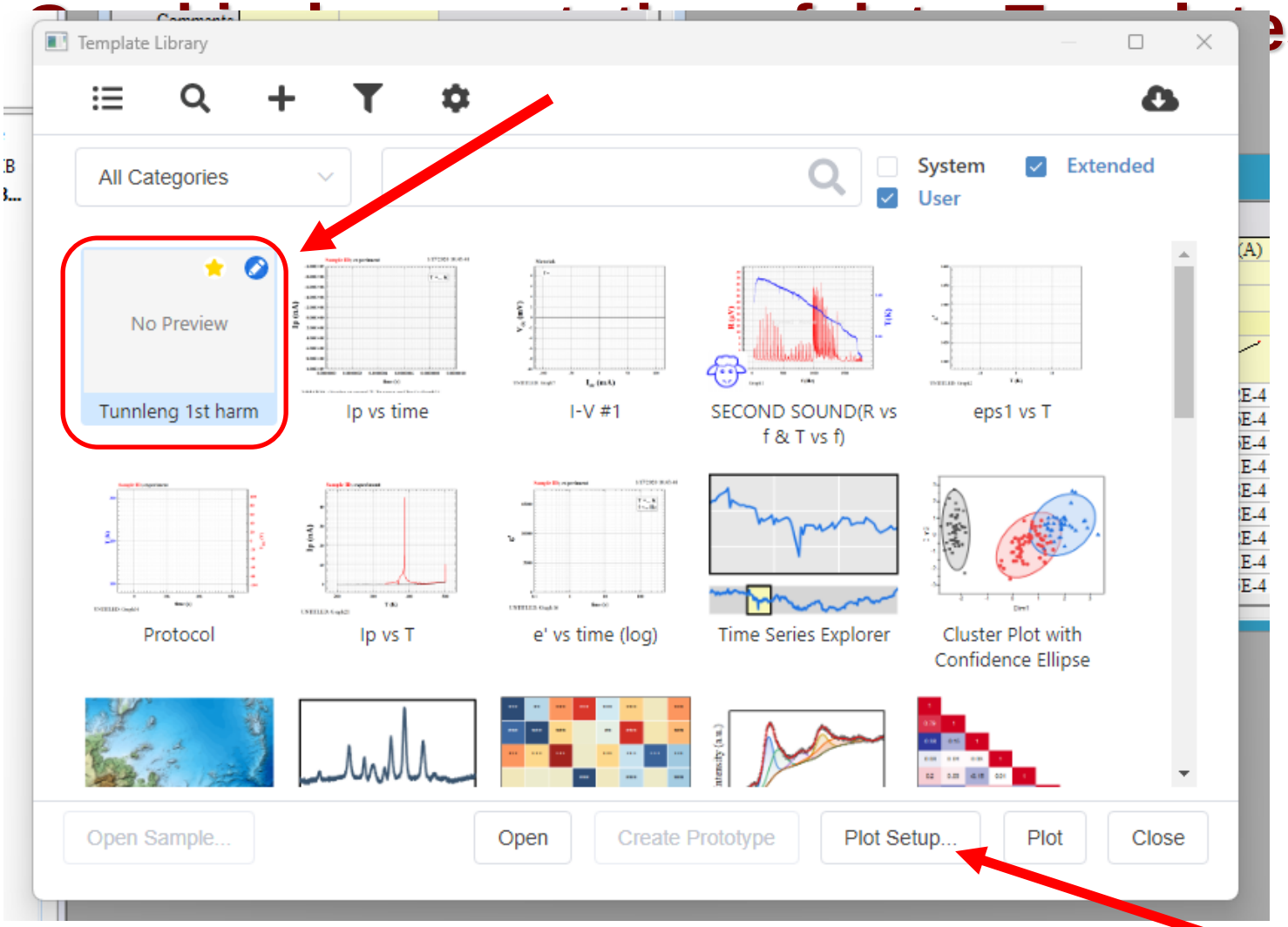
Graphical presentation of data: Templates



Graphical presentation of data: Templates

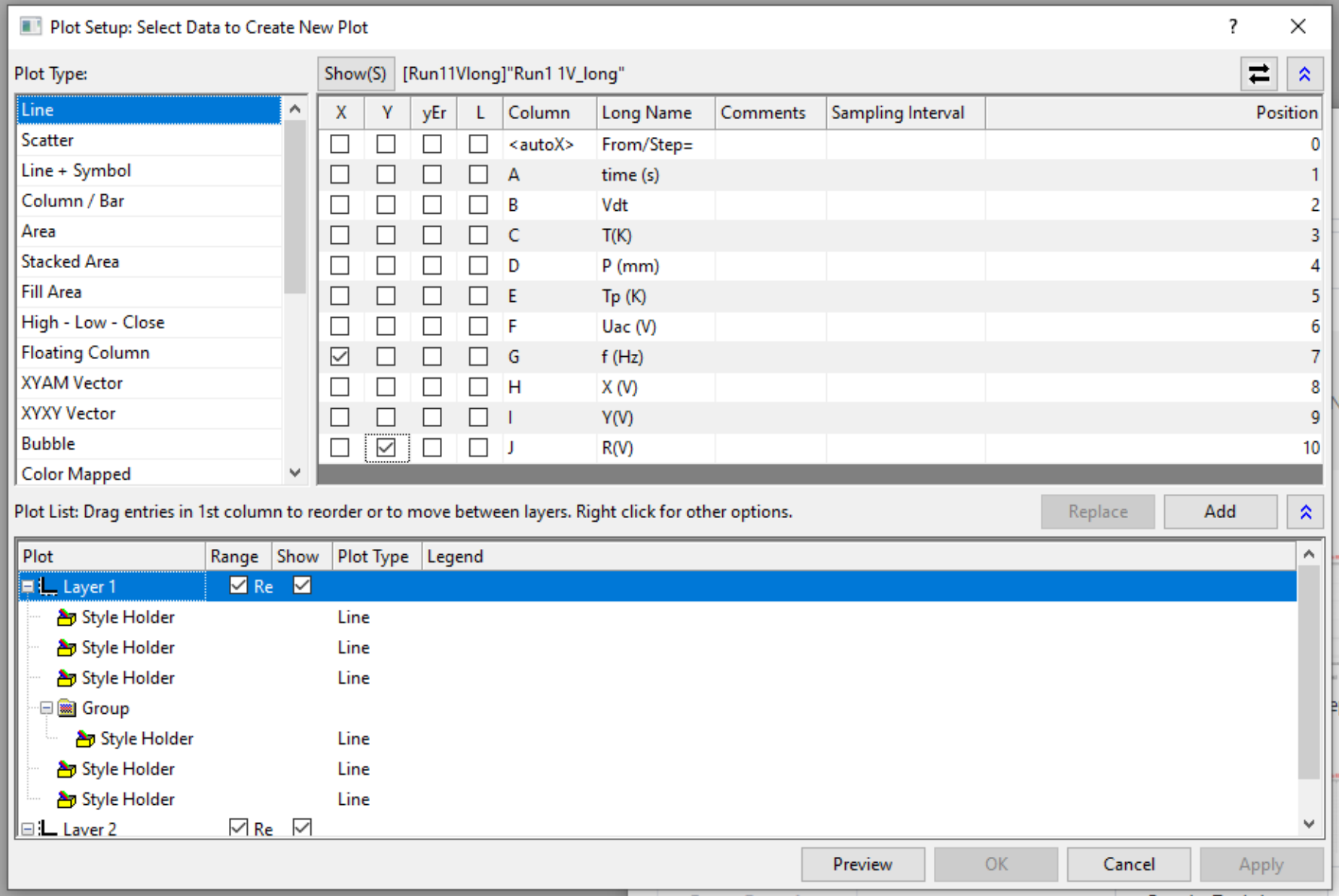


\\engr-file-03\PHYINST\APL Courses\PHYCS403\Common\Origin templates\Tunneling

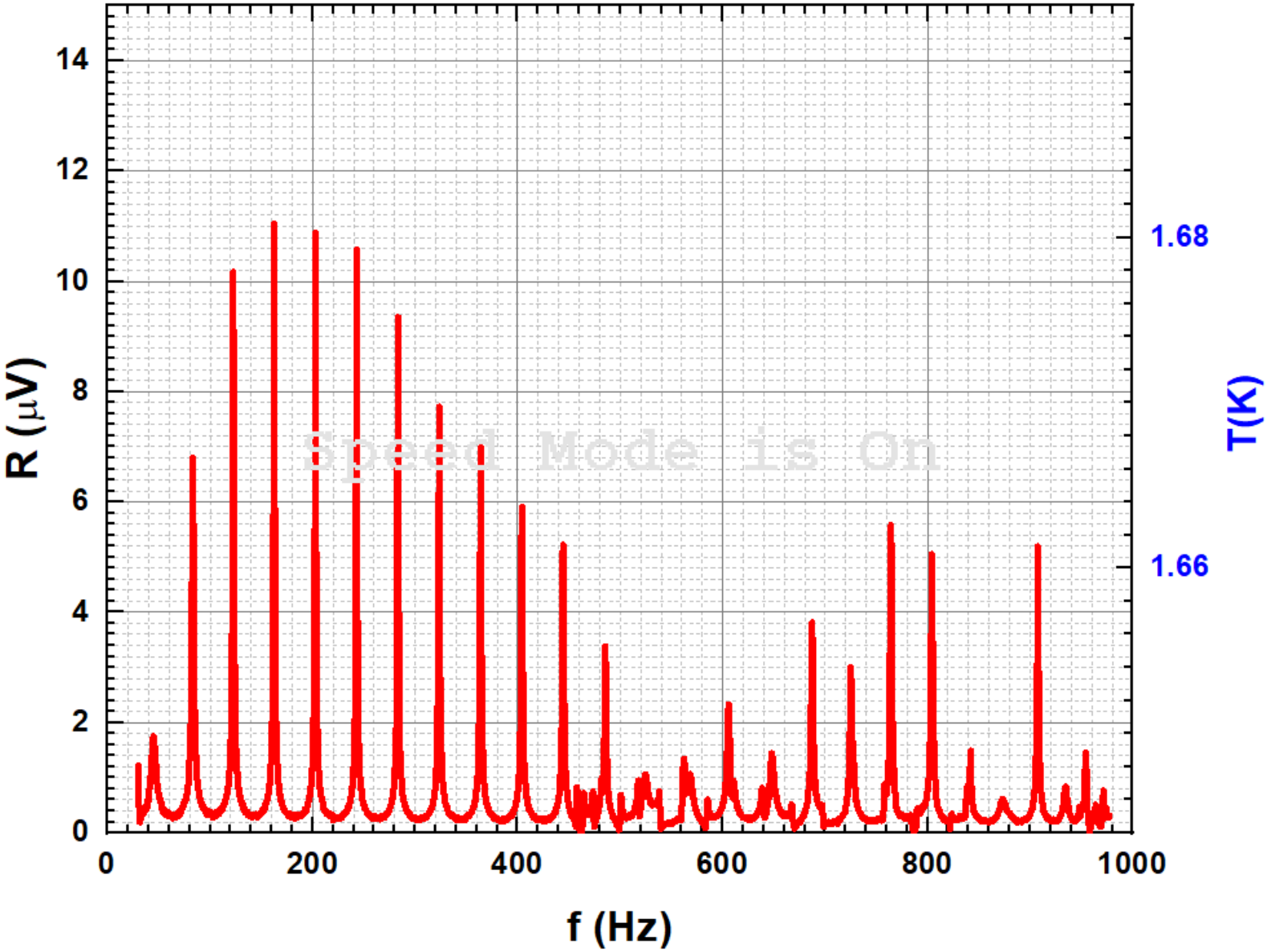


\\engr-file-03\PHYINST\APL Courses\PHYCS403\Common\Origin templates\Tunneling

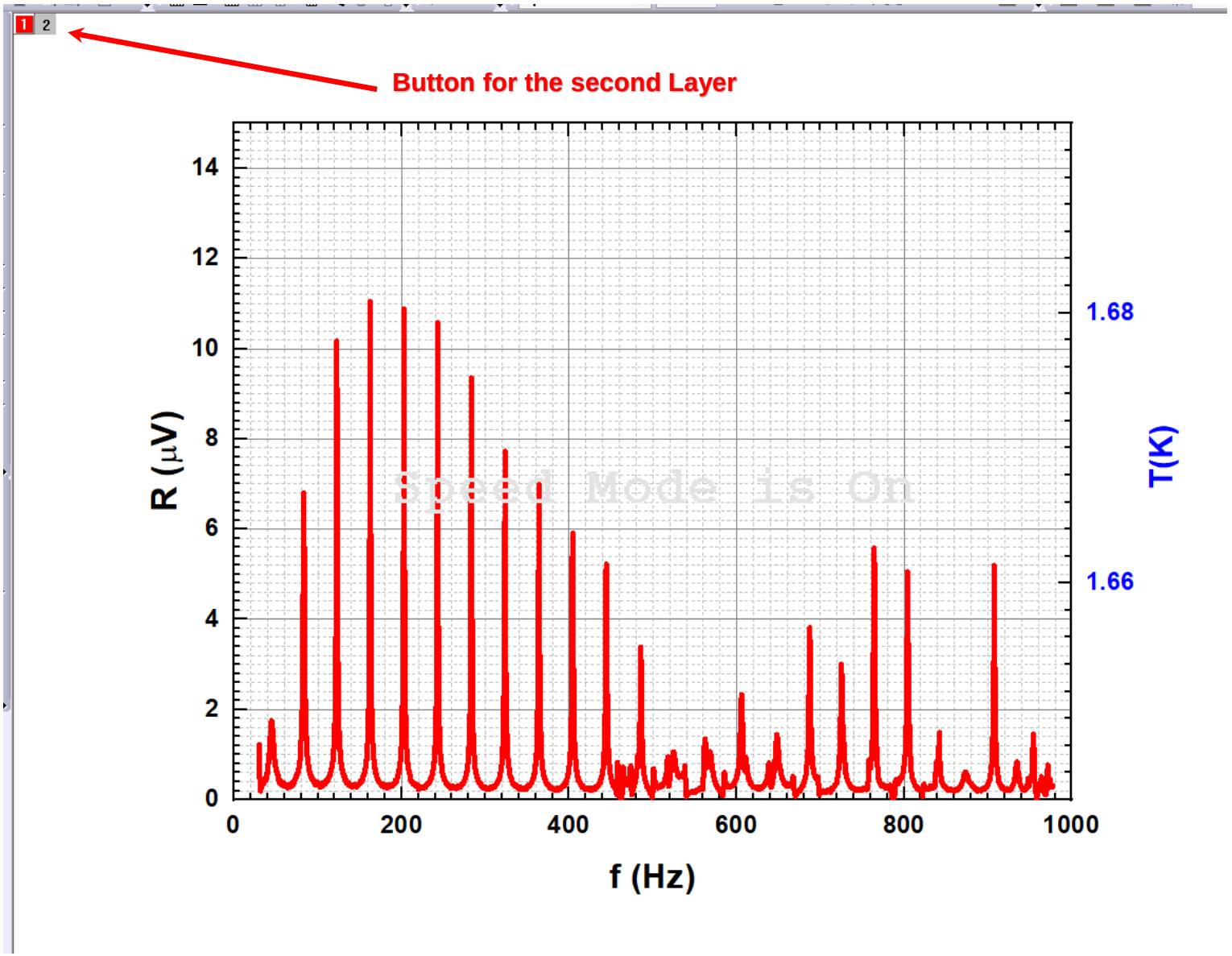
Graphical presentation of data: Templates

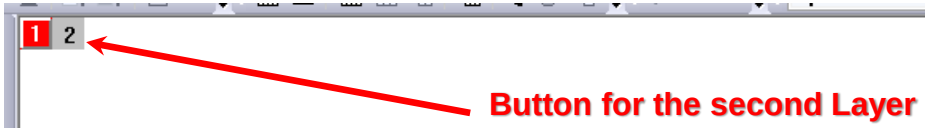


Graphical presentation of data: Templates



Graphical presentation of data: Extra Layer





Plot Setup: Configure Data Plots in Layer

Plot Type:

- Line
- Scatter
- Line + Symbol
- Column / Bar
- Area
- Stacked Area
- Fill Area
- High - Low - Close
- Floating Column
- XYAM Vector
- XYXY Vector
- Bubble
- Color Mapped
- Bubble + Color Mapped

Show(S) [Run11Vlong]"Run1 1V_long"

X	Y	yEr	L	Column	Long Name	Comments	Sampling Interval	Position
☐	☐	☐	☐	<autoX>	From/Step=			0
☐	☐	☐	☐	A	time (s)			1
☐	☐	☐	☐	B	Vdt			2
☐	☑	☐	☐	C	T(K)			3
☐	☐	☐	☐	D	P (mm)			4
☐	☐	☐	☐	E	Tp (K)			5
☐	☐	☐	☐	F	Uac (V)			6
☑	☐	☐	☐	G	f (Hz)			7
☐	☐	☐	☐	H	X (V)			8
☐	☐	☐	☐	I	Y(V)			9
☐	☐	☐	☐	J	R(V)			10

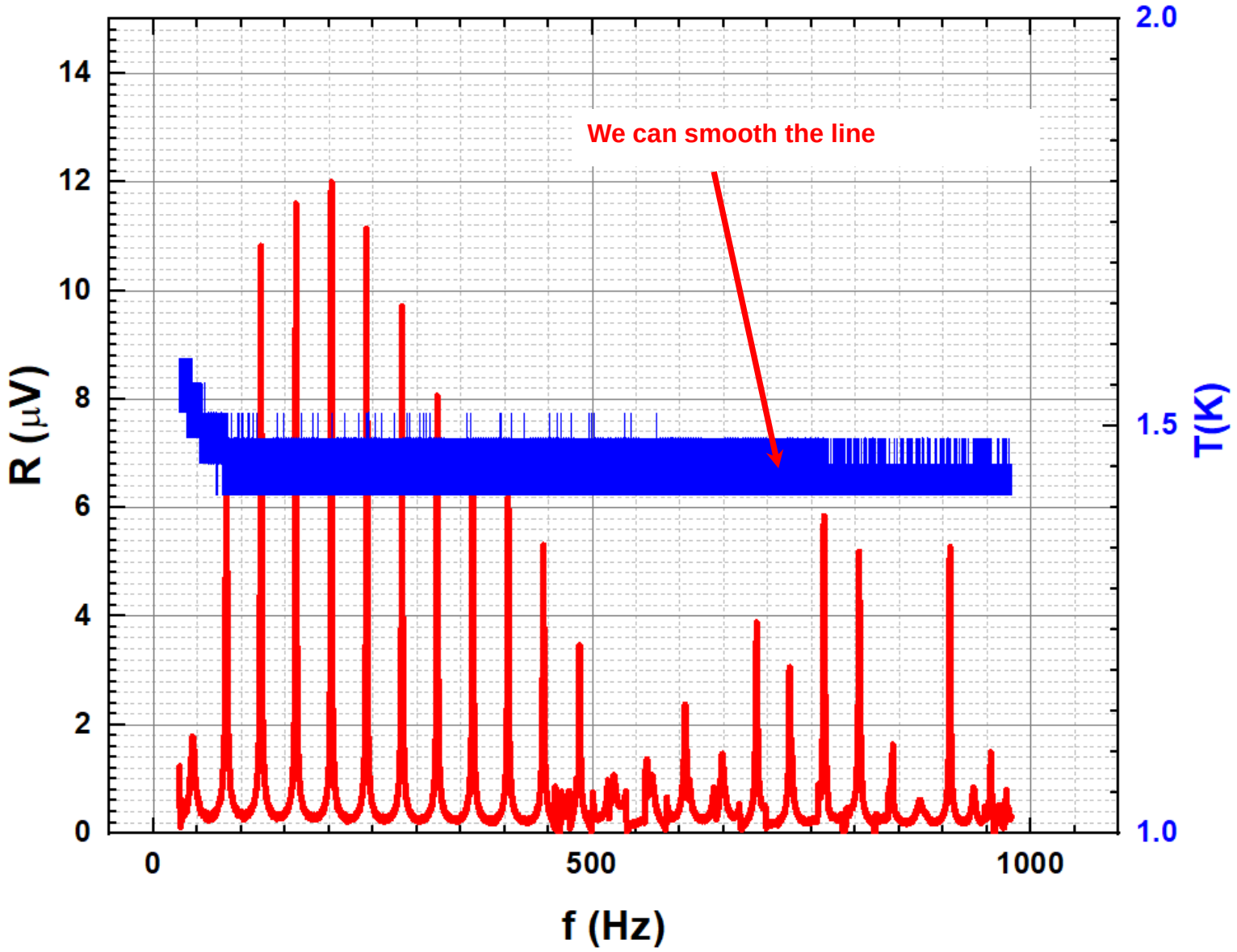
Plot List: Drag entries in 1st column to reorder or to move between layers. Right click for other options.

Replace Add

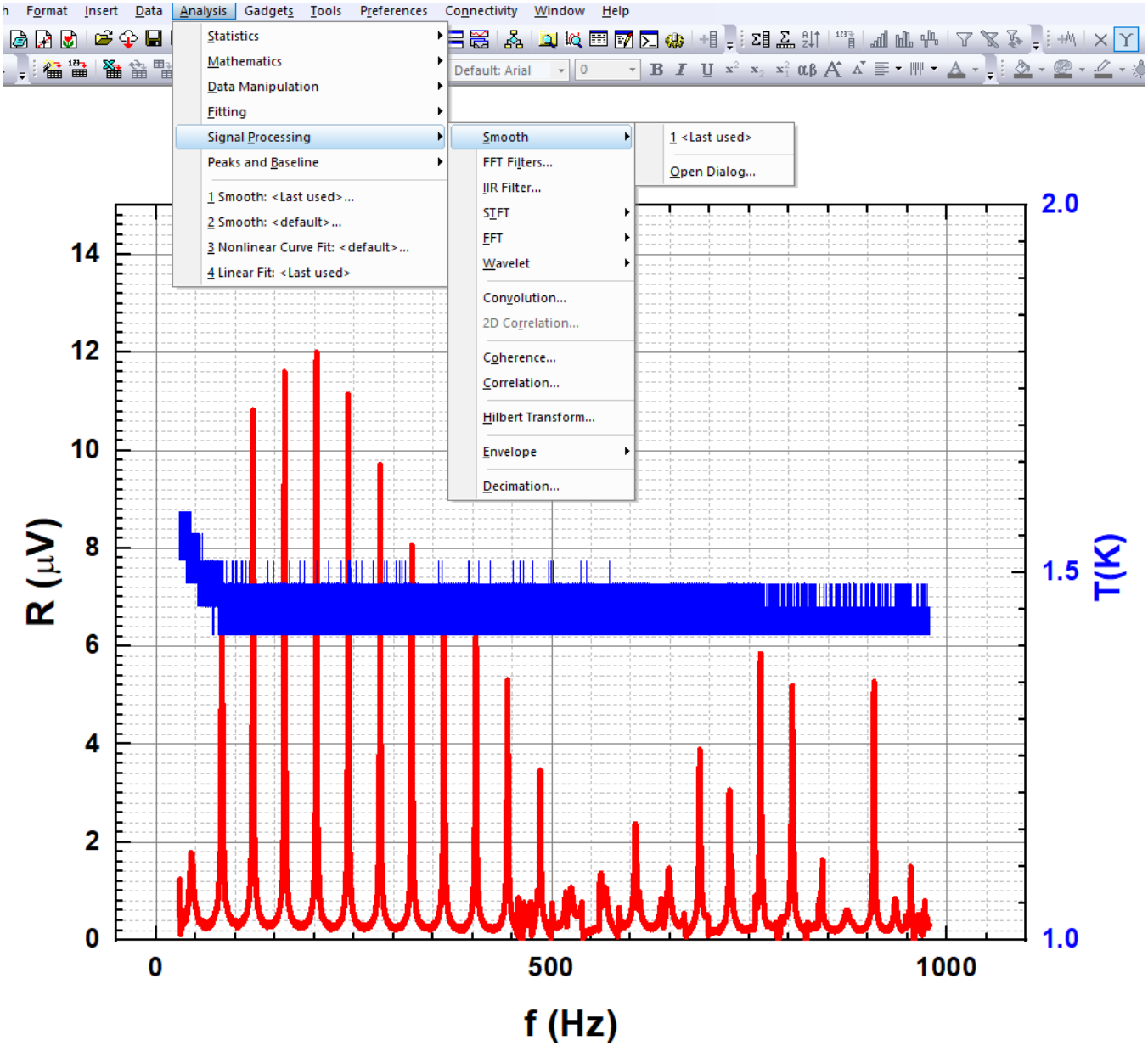
Plot	Range	Show	Plot Type	Legend
Layer 1	☐ Rescale	☑		
[Run1 1V_long.dat]Run1 1V_long! "f (Hz)"(X), "R(V)"(Y)	[1*:94707*] 30.01 < X < 977.07 , 0 < Y < 1.20039E-5	☑	Line	R(V)
Layer 2	☑ Rescale	☑		
[Run1 1V_long.dat]Run1 1V_long! "f (Hz)"(X), "T(K)"(Y)	[1*:94707*] 30.01 < X < 977.07 , 0 < Y < 1.58361	☑	Line	T(K)

Preview OK Cancel Apply

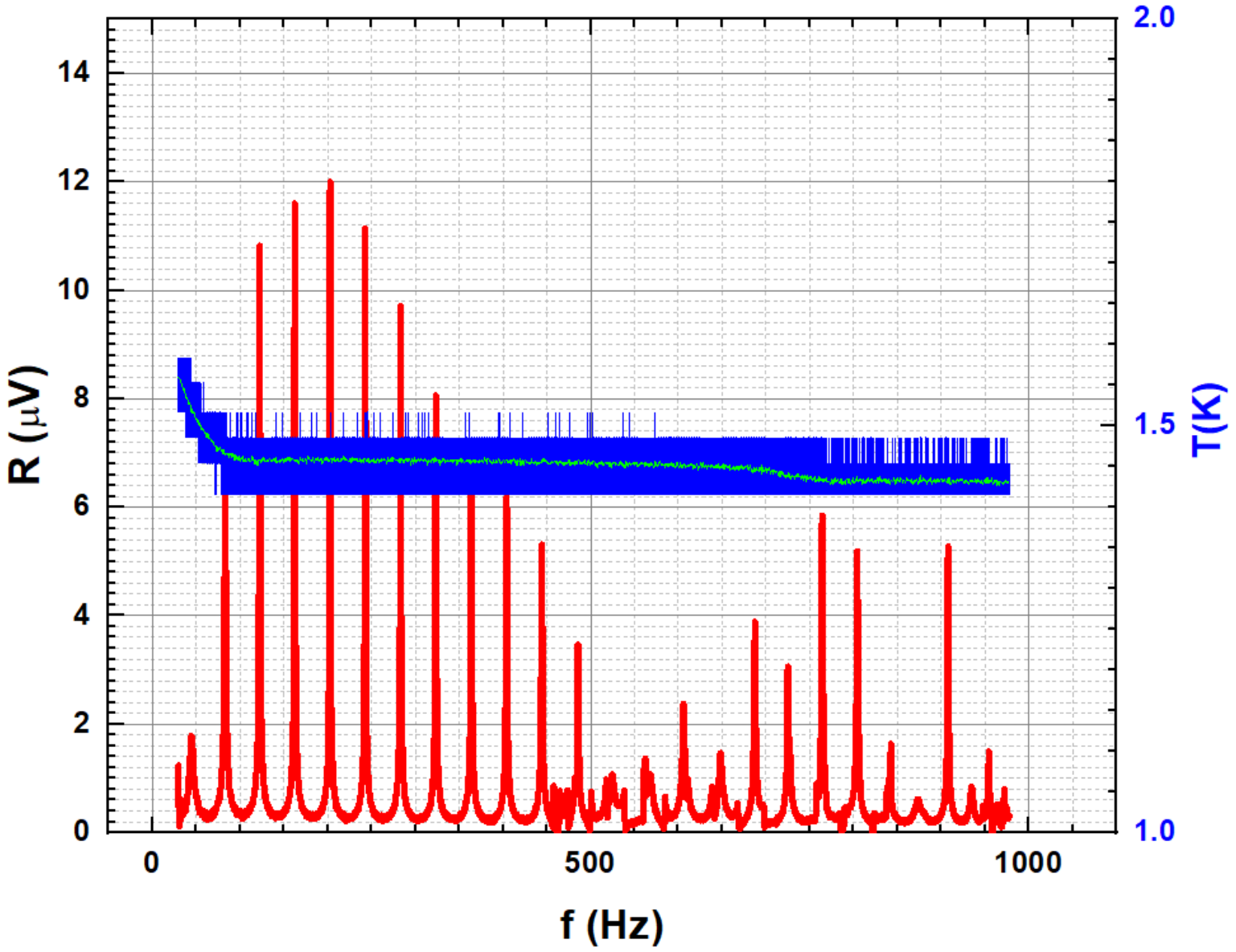
Graphical presentation of data: Extra Layer



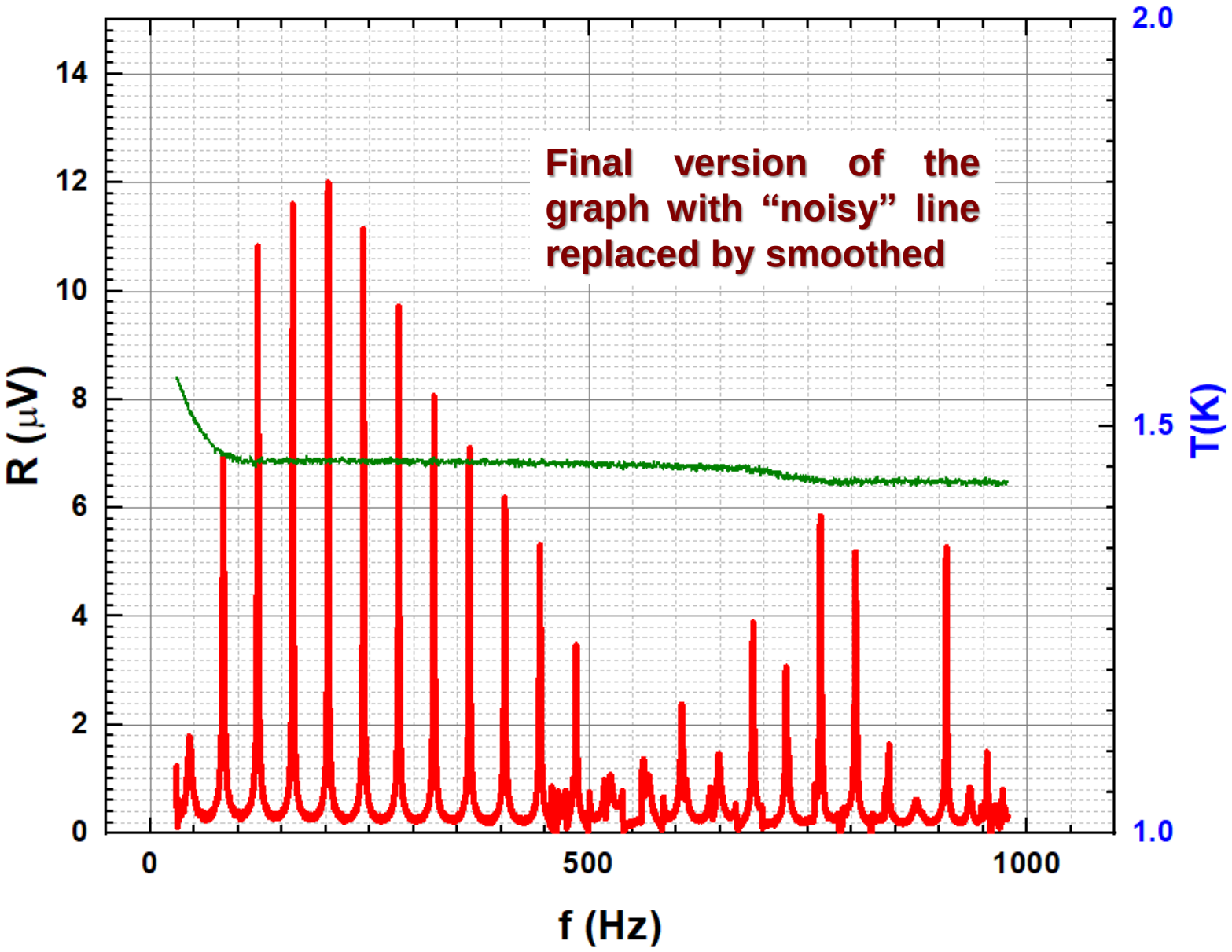
Graphical presentation of data: Extra Layer



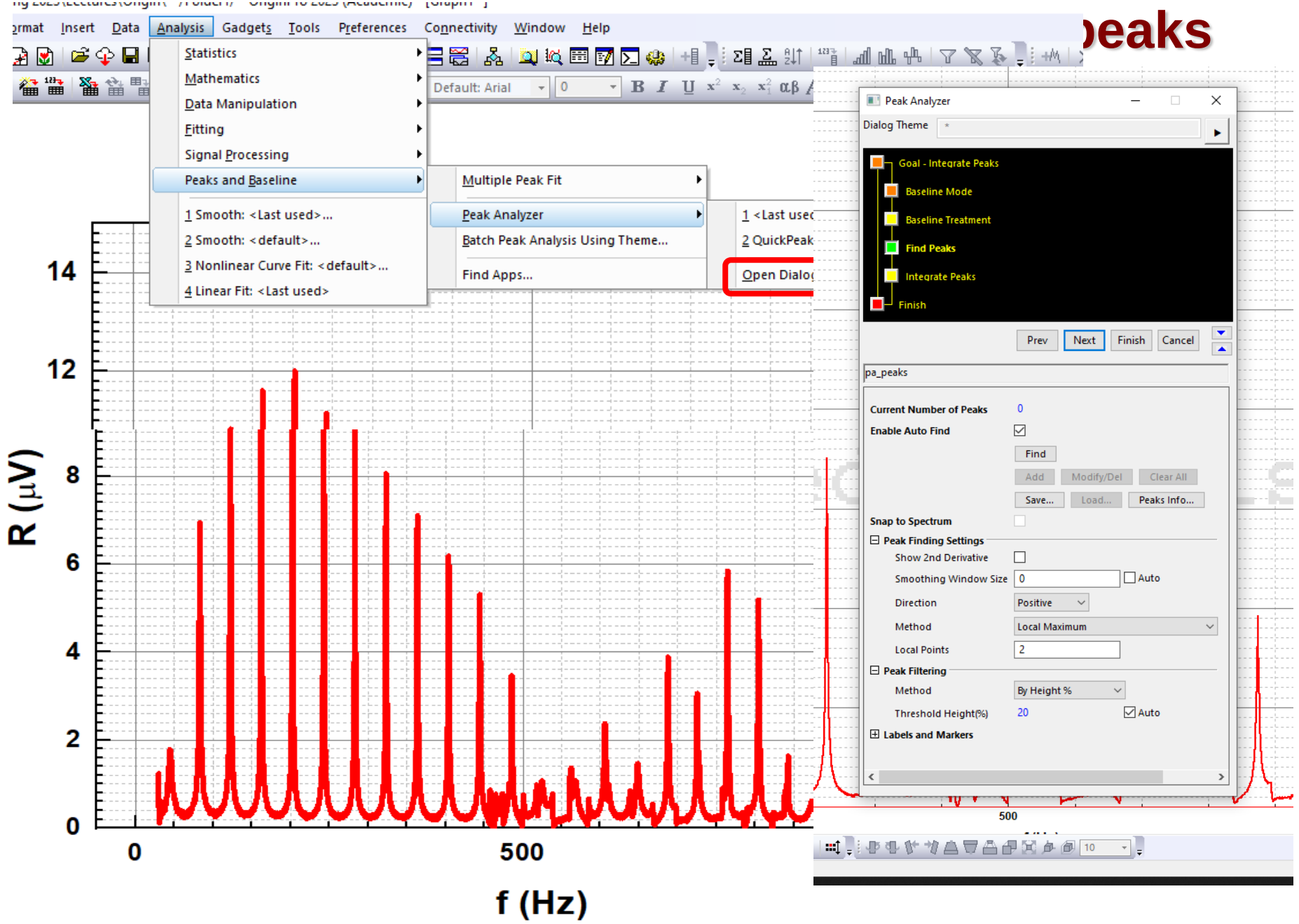
Graphical presentation of data: Extra Layer



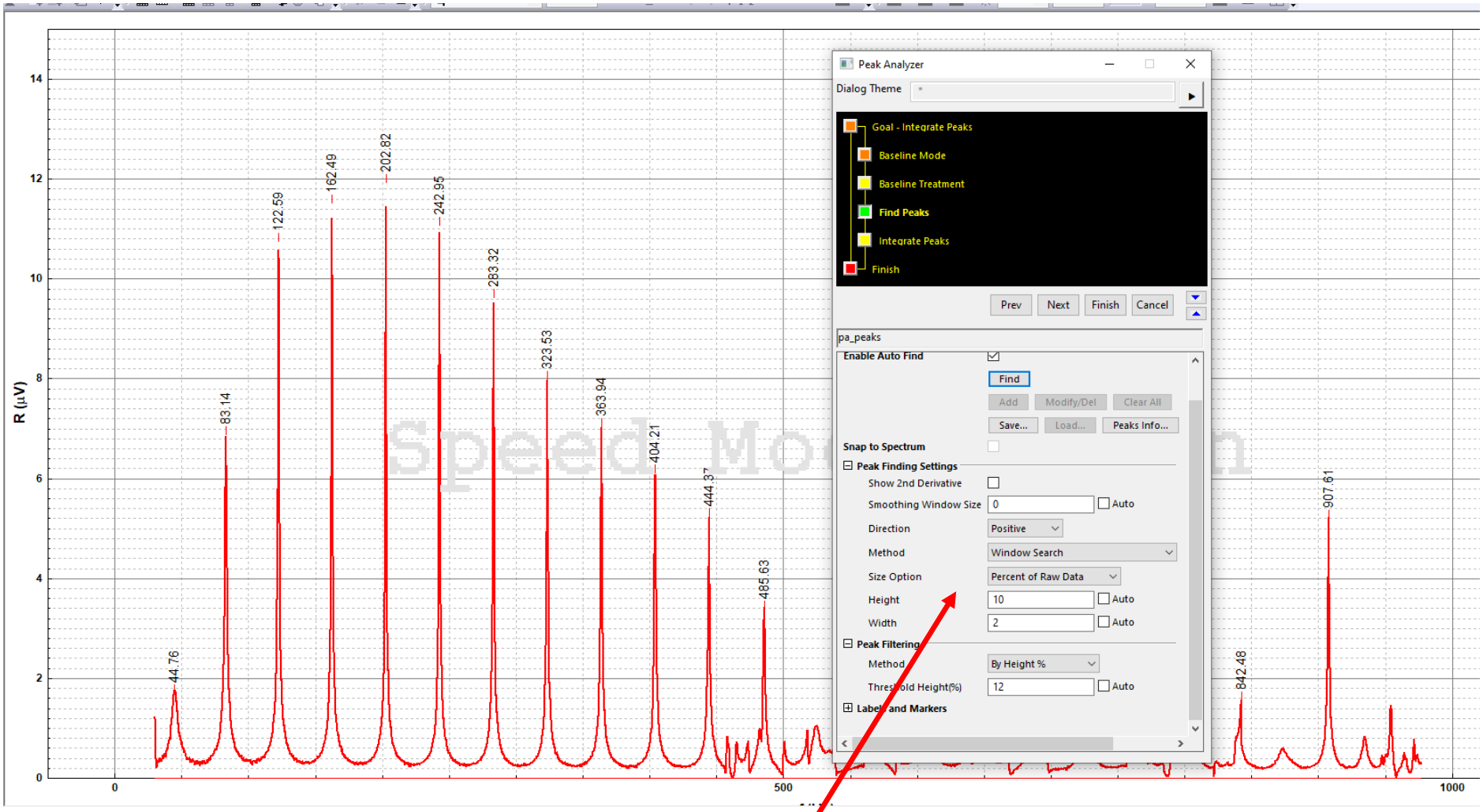
Graphical presentation of data: Extra Layer



peaks

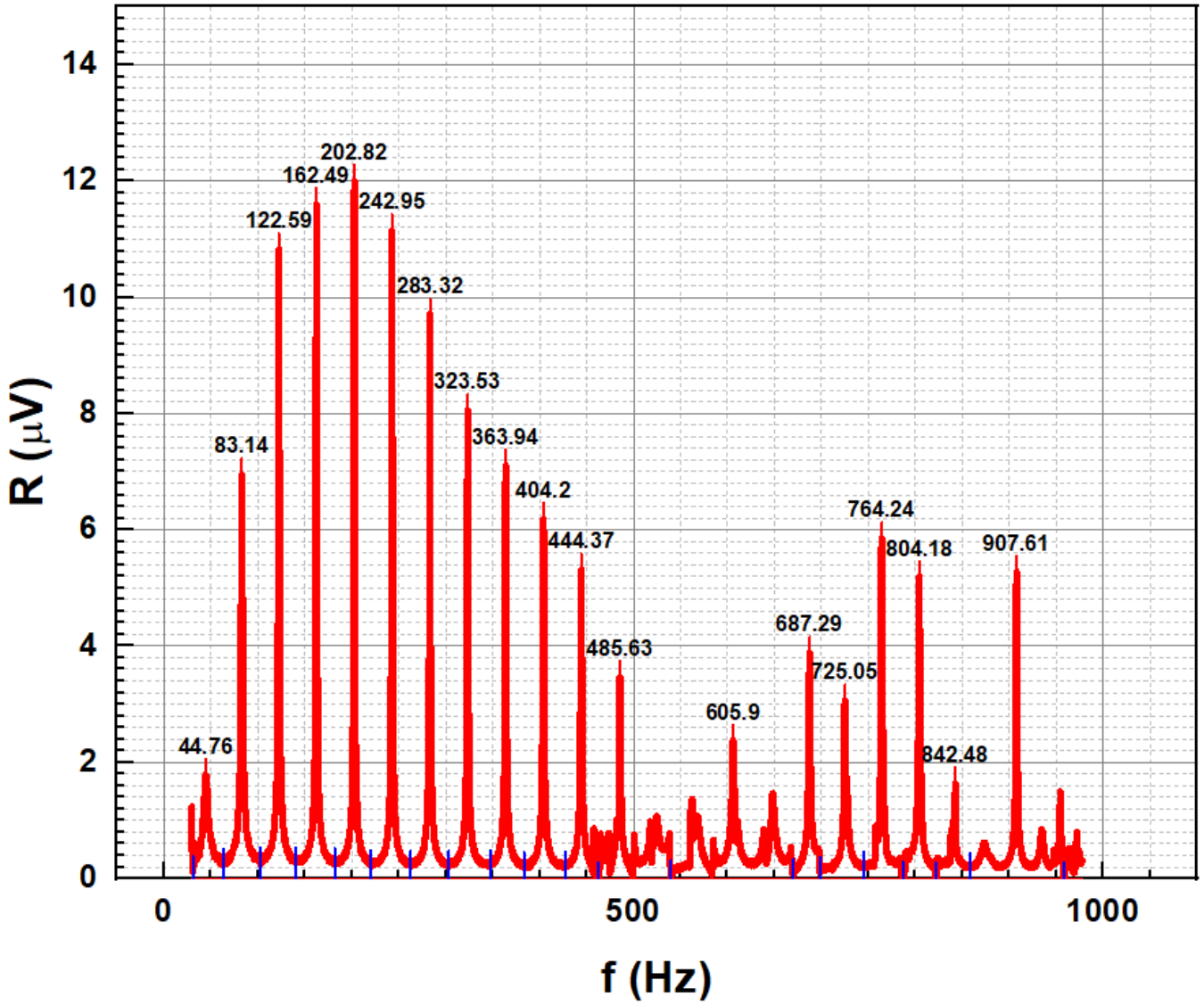

Analysis
Statistics
Mathematics
Data Manipulation
Fitting
Signal Processing
Peaks and Baseline
1 Smooth: <Last used>...
2 Smooth: <default>...
3 Nonlinear Curve Fit: <default>...
4 Linear Fit: <Last used>
Multiple Peak Fit
Peak Analyzer
Batch Peak Analysis Using Theme...
Find Apps...
Peak Analyzer
Dialog Theme
Goal - Integrate Peaks
Baseline Mode
Baseline Treatment
Find Peaks
Integrate Peaks
Finish
Prev
Next
Finish
Cancel
pa_peaks
Current Number of Peaks
Enable Auto Find
Find
Add
Modify/Del
Clear All
Save...
Load...
Peaks Info...
Snap to Spectrum
Peak Finding Settings
Show 2nd Derivative
Smoothing Window Size
Auto
Direction
Positive
Method
Local Maximum
Local Points
Peak Filtering
Method
By Height %
Threshold Height(%)
Auto
Labels and Markers
R (μV)
f (Hz)
0
2
4
6
8
12
14
500

Graphical presentation of data: Finding peaks

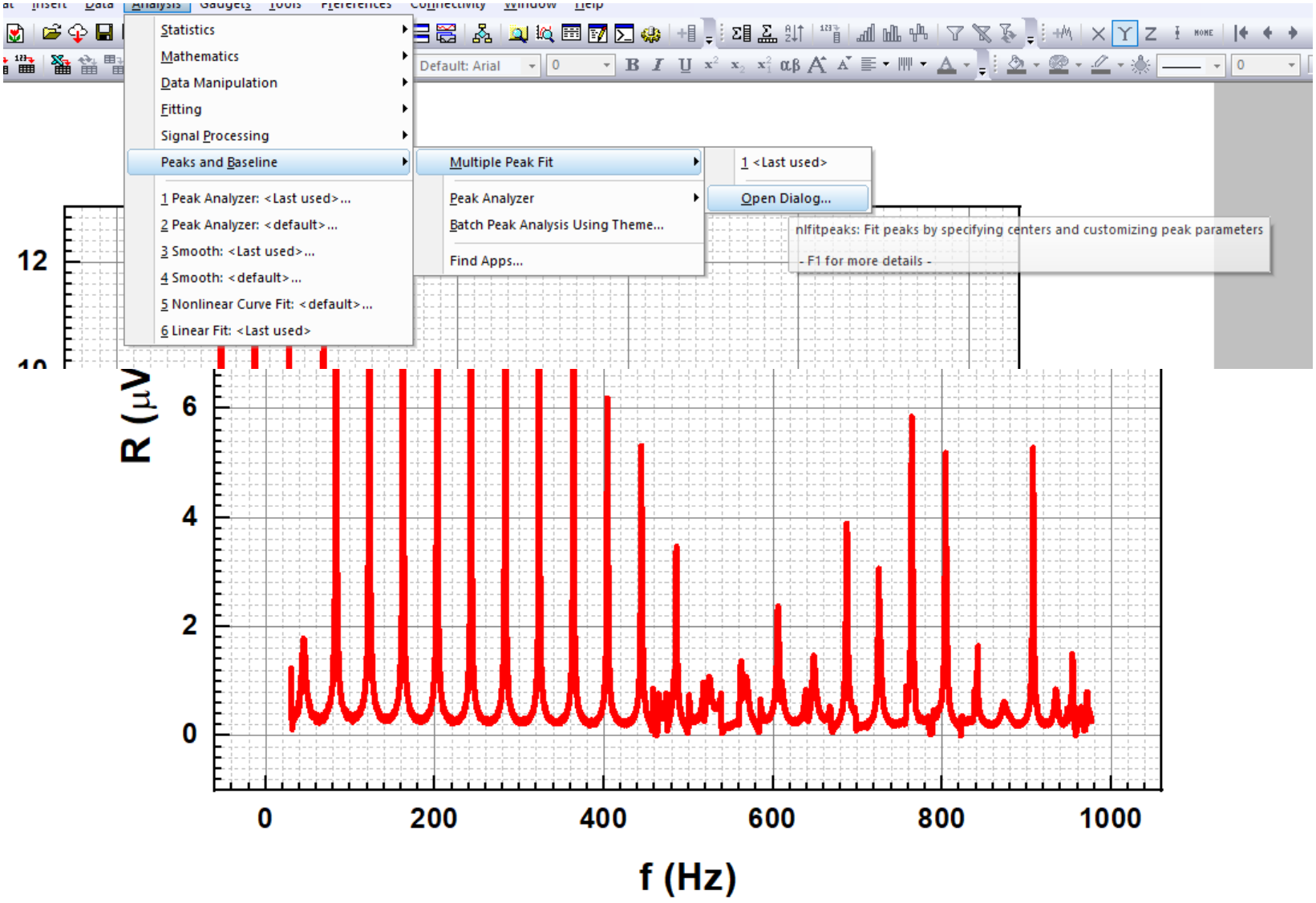


Choose the proper search parameters

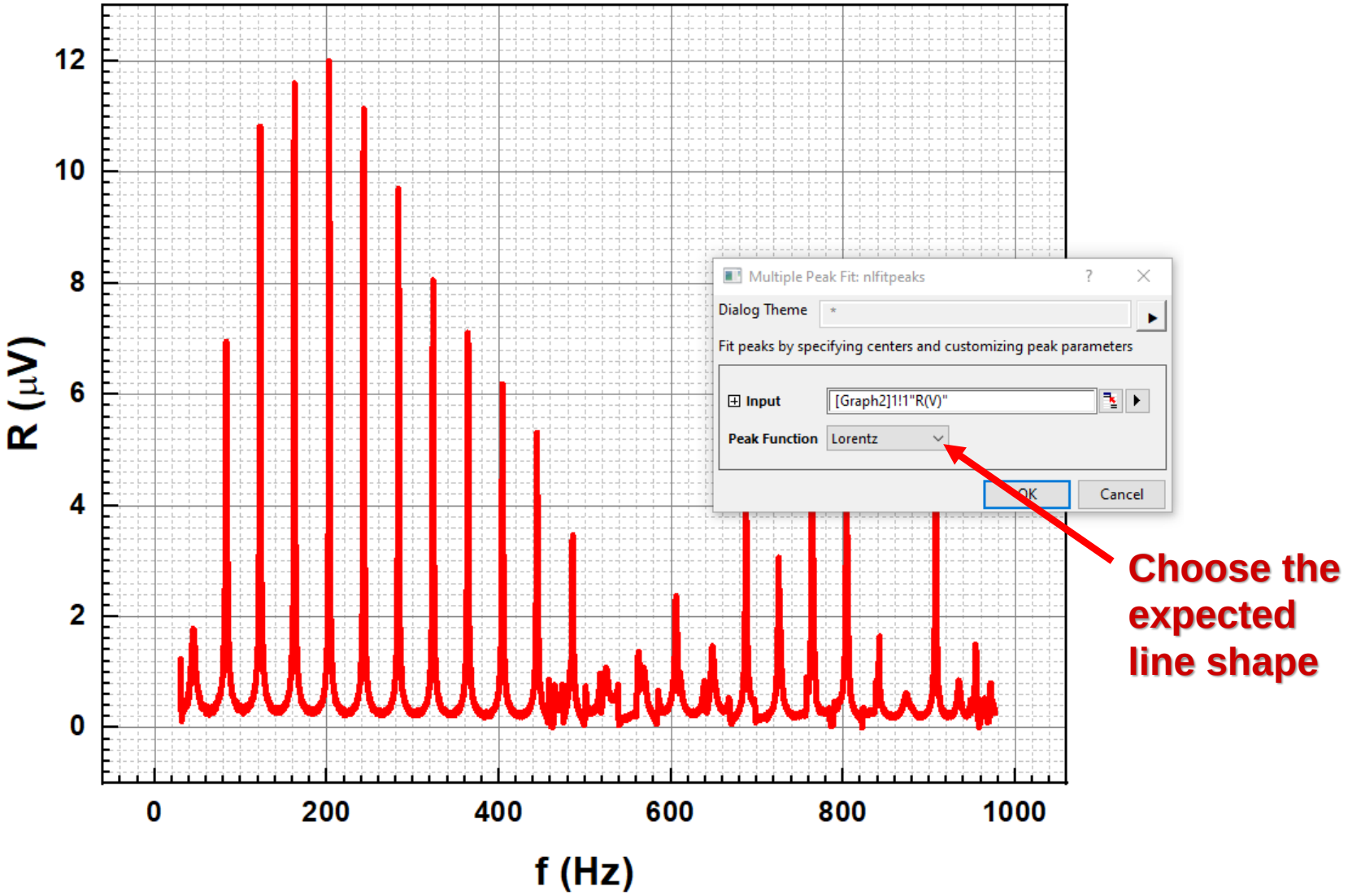
Graphical presentation of data: Finding peaks



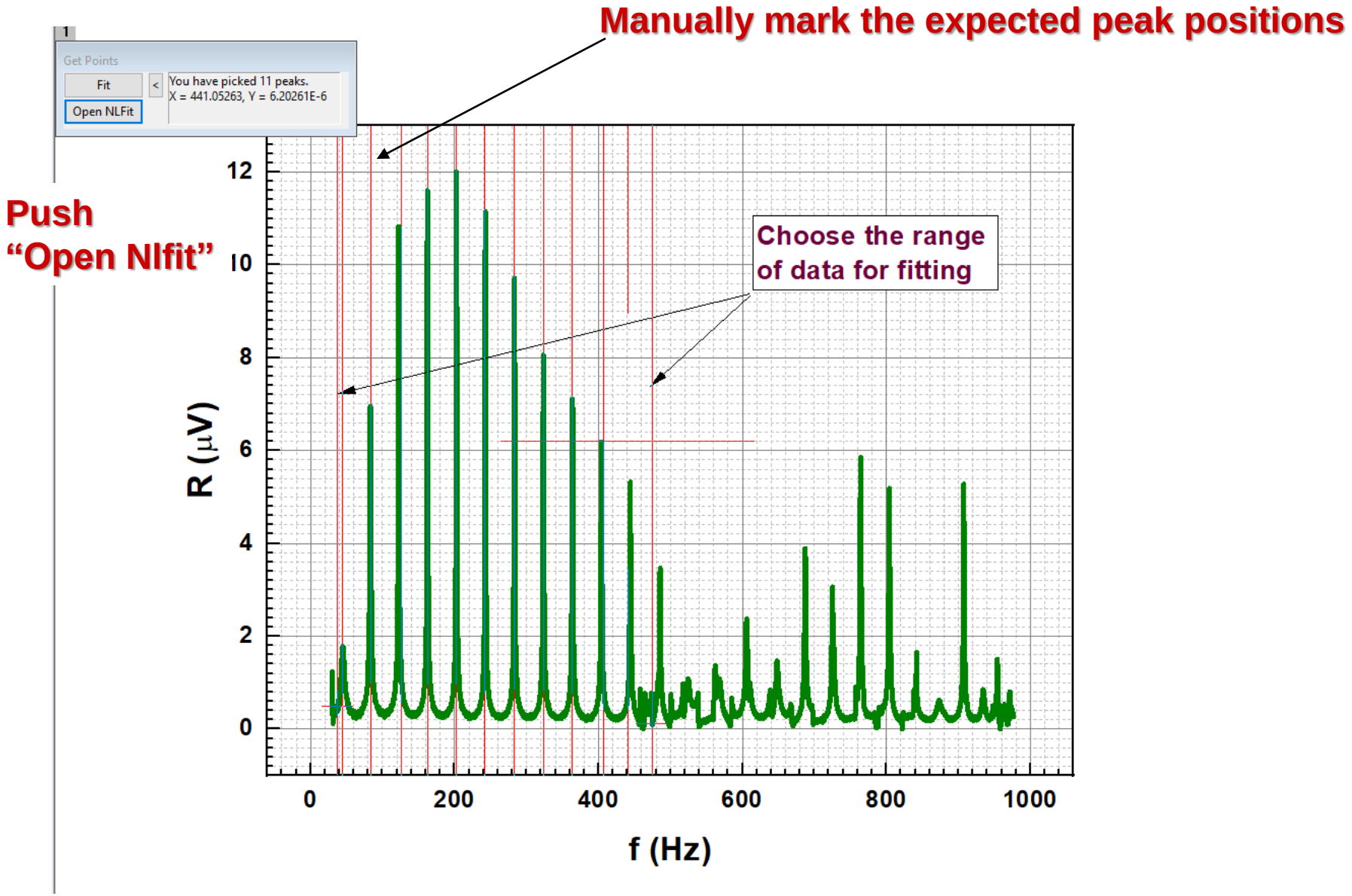
Graphical presentation of data: Multiple peak Fit



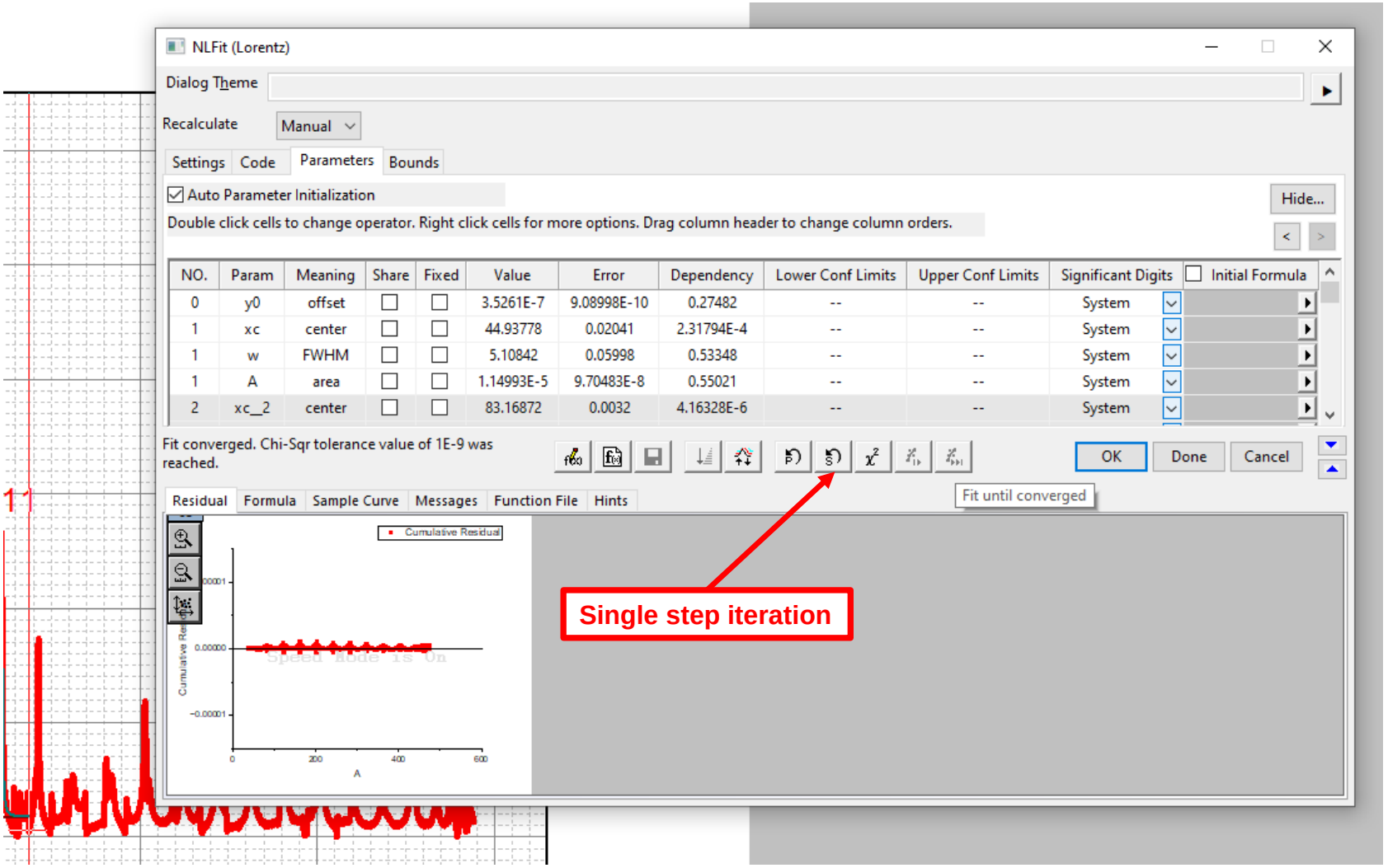
Graphical presentation of data: Multiple peak Fit



Graphical presentation of data: Multiple peak Fit

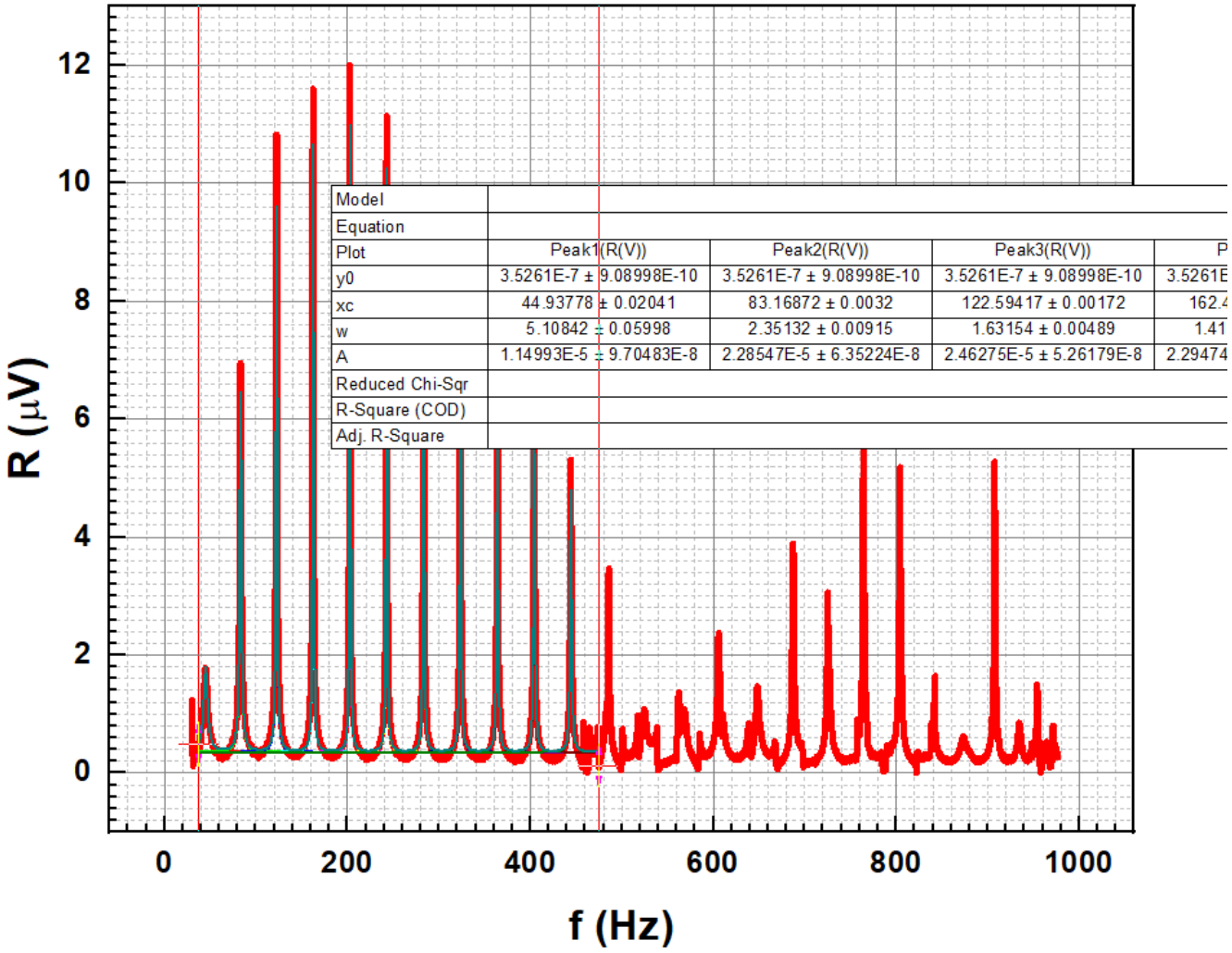


Graphical presentation of data: Multiple peak Fit



Recommendation: start first with "*Single step iteration*" and next if fitting goes in proper direction push "*Fit until converged*"

Graphical presentation of data: Multiple peak Fit



Model				
Equation				
Plot	Peak1(R(V))	Peak2(R(V))	Peak3(R(V))	P
y0	3.5261E-7 ± 9.08998E-10	3.5261E-7 ± 9.08998E-10	3.5261E-7 ± 9.08998E-10	3.5261E
xc	44.93778 ± 0.02041	83.16872 ± 0.0032	122.59417 ± 0.00172	162.4
w	5.10842 ± 0.05998	2.35132 ± 0.00915	1.63154 ± 0.00489	1.41
A	1.14993E-5 ± 9.70483E-8	2.28547E-5 ± 6.35224E-8	2.46275E-5 ± 5.26179E-8	2.29474
Reduced Chi-Sqr				
R-Square (COD)				
Adj. R-Square				

Finally, you will have the data plot with set of fitting lines plus the table with found parameters

Graphical presentation of data: Multiple peak Fit

All fitting results could be found in added layer to data worksheet

100 : Fit converged. Chi-Sqr tolerance value of 1E-9 was reached.

Summary

	y0		xc		w		A		H		Statistics	
	Value	Standard Error	Value	Standard Error	Value	Standard Error	Value	Standard Error	Value	Standard Error	Reduced Chi-Sqr	Adj. R-Square
Peak1(R(V))	3.5261E-7	9.08998E-10	44.93778	0.02041	5.10842	0.05998	1.14993E-5	9.70483E-8	1.43306E-6	1.15019E-8	2.62144E-14	0.98415
Peak2(R(V))	3.5261E-7	9.08998E-10	83.16872	0.0032	2.35132	0.00915	2.28547E-5	6.35224E-8	6.18792E-6	1.68499E-8		
Peak3(R(V))	3.5261E-7	9.08998E-10	122.59417	0.00172	1.63155	0.00489	2.46275E-5	5.2618E-8	9.60952E-6	2.02275E-8		
Peak4(R(V))	3.5261E-7	9.08998E-10	162.49202	0.0015	1.41975	0.00426	2.29474E-5	4.90025E-8	1.02897E-5	2.16838E-8		
Peak5(R(V))	3.5261E-7	9.08998E-10	202.81031	0.00139	1.30551	0.00395	2.17874E-5	4.69447E-8	1.06244E-5	2.26126E-8		
Peak6(R(V))	3.5261E-7	9.08998E-10	242.93645	0.0015	1.32379	0.00428	2.05619E-5	4.72812E-8	9.88834E-6	2.24559E-8		
Peak7(R(V))	3.5261E-7	9.08998E-10	283.3134	0.0018	1.42423	0.00513	1.91415E-5	4.90864E-8	8.55609E-6	2.16497E-8		
Peak8(R(V))	3.5261E-7	9.08998E-10	323.52904	0.00231	1.60858	0.00659	1.79125E-5	5.22522E-8	7.08916E-6	2.03714E-8		
Peak9(R(V))	3.5261E-7	9.08998E-10	363.9371	0.0027	1.70221	0.00769	1.67149E-5	5.37935E-8	6.25132E-6	1.98032E-8		
Peak10(R(V))	3.5261E-7	9.08998E-10	404.21923	0.0032	1.8129	0.00913	1.54766E-5	5.5566E-8	5.43479E-6	1.91892E-8		
Peak11(R(V))	3.5261E-7	9.08998E-10	444.35606	0.00381	1.89097	0.01086	1.38639E-5	5.67808E-8	4.66745E-6	1.8789E-8		

ANOVA

		DF	Sum of Squares	Mean Square	F Value	Prob>F
R(V)	Regression	33	7.12026E-8	2.15765E-9	82307.90245	<0.0001
	Residual	43715	1.14596E-9	2.62144E-14		
	Uncorrected Total	43749	1.01914E-7			
	Corrected Total	43748	7.23485E-8			

R(V): At the 0.05 level, the fitting function is significantly better than the function y=constant.

Fitted Curve

R(V)

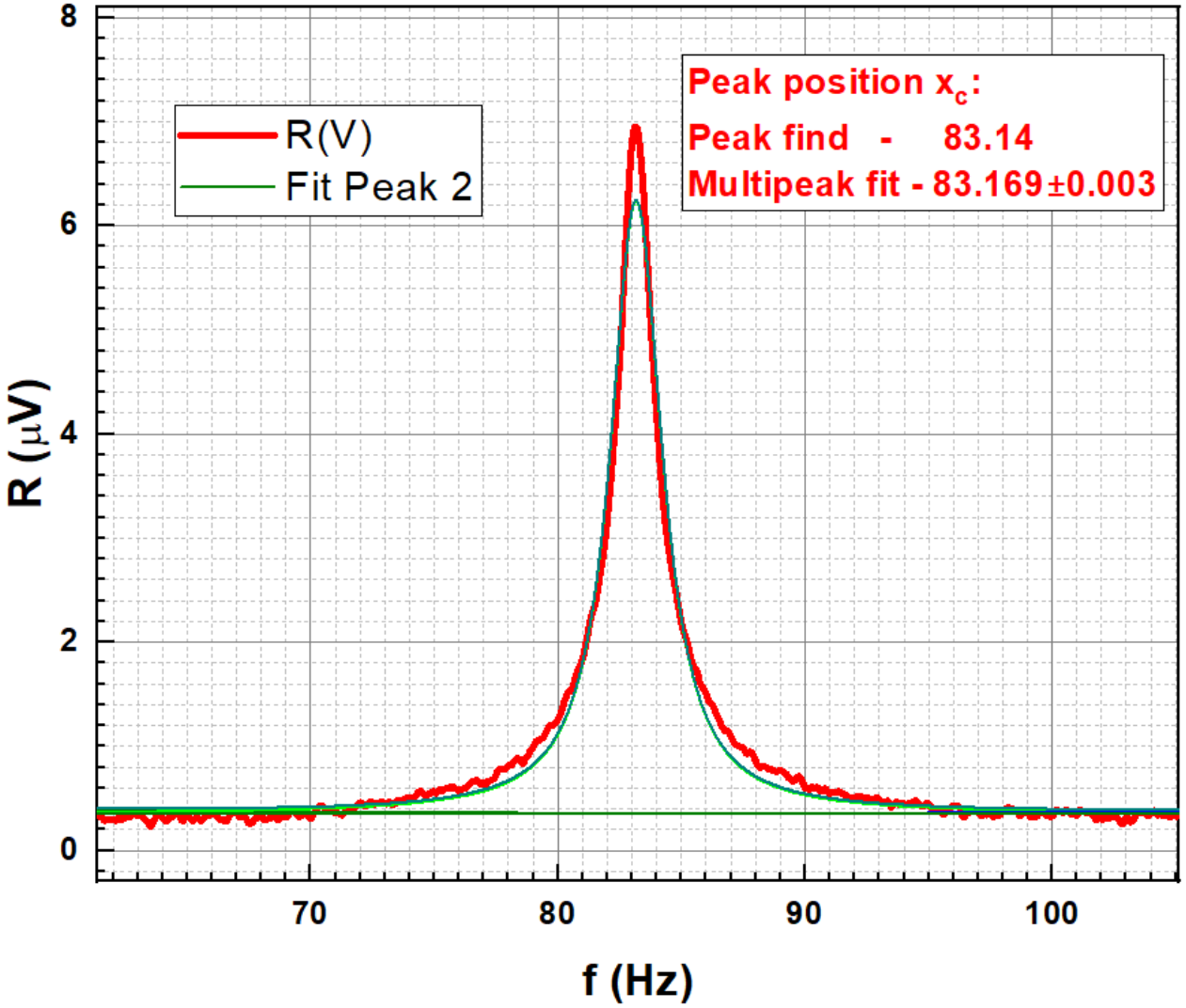
Run1 1V_long | nlfitpeaksCurve1 | **nlfitpeaks2** | nlfitpeaksCurve2

X = 277.281465, Y(/1e-06) = 13.5085131

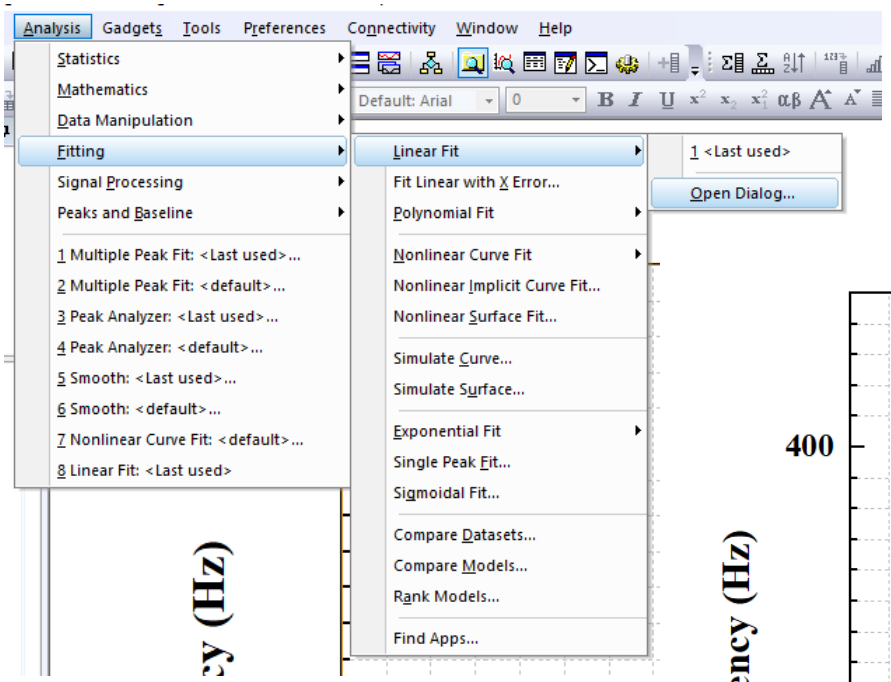
This layer contains all fitting results

Graphical presentation of data: Multiple peak Fit

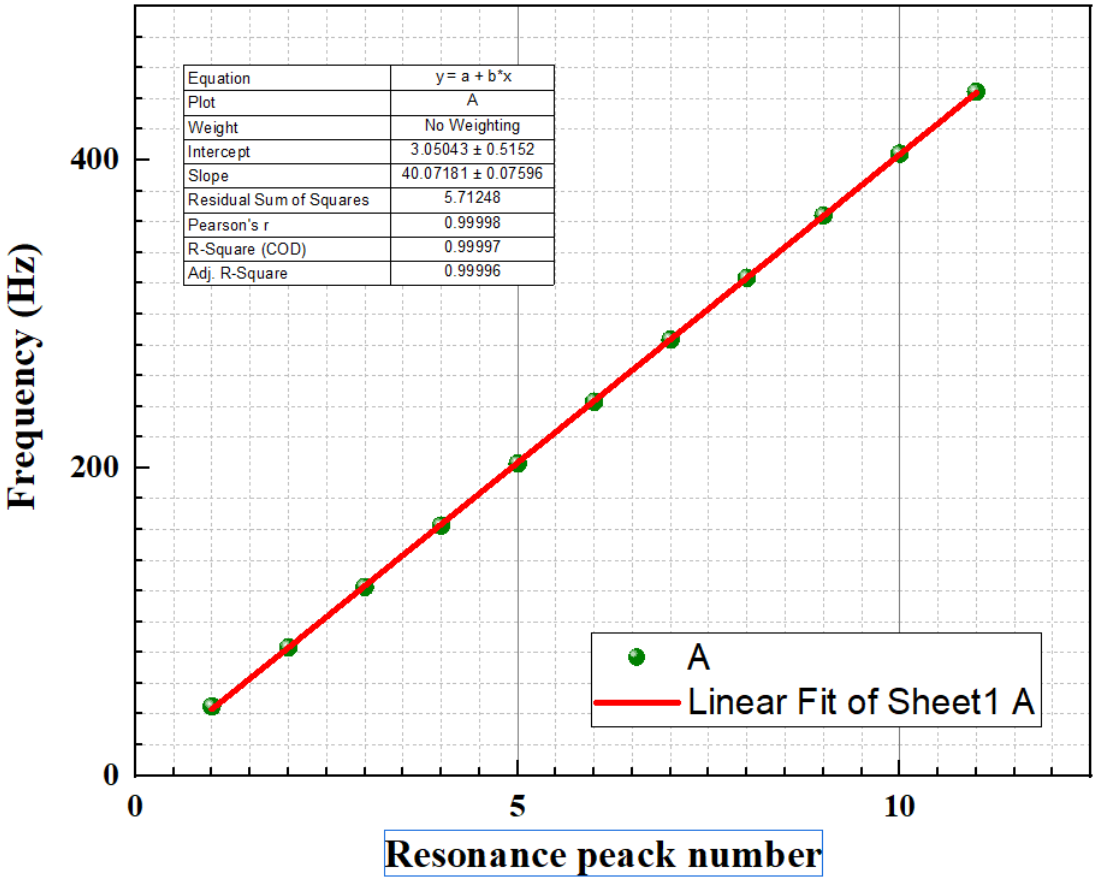
Comparing the results obtained by using "Peak find" and "Multipeak fit" procedures



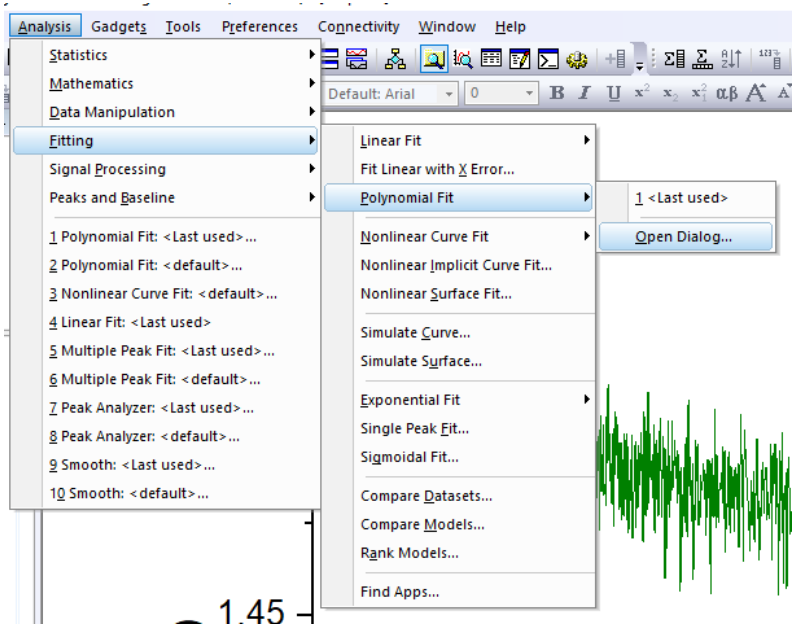
Graphical presentation of data: Fit Linear

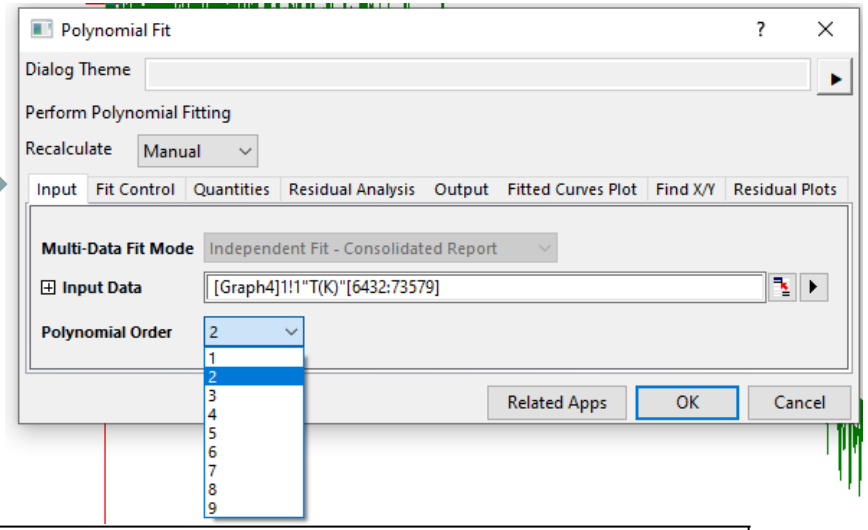


Example of linear fitting. Data from *Second sound* experiment

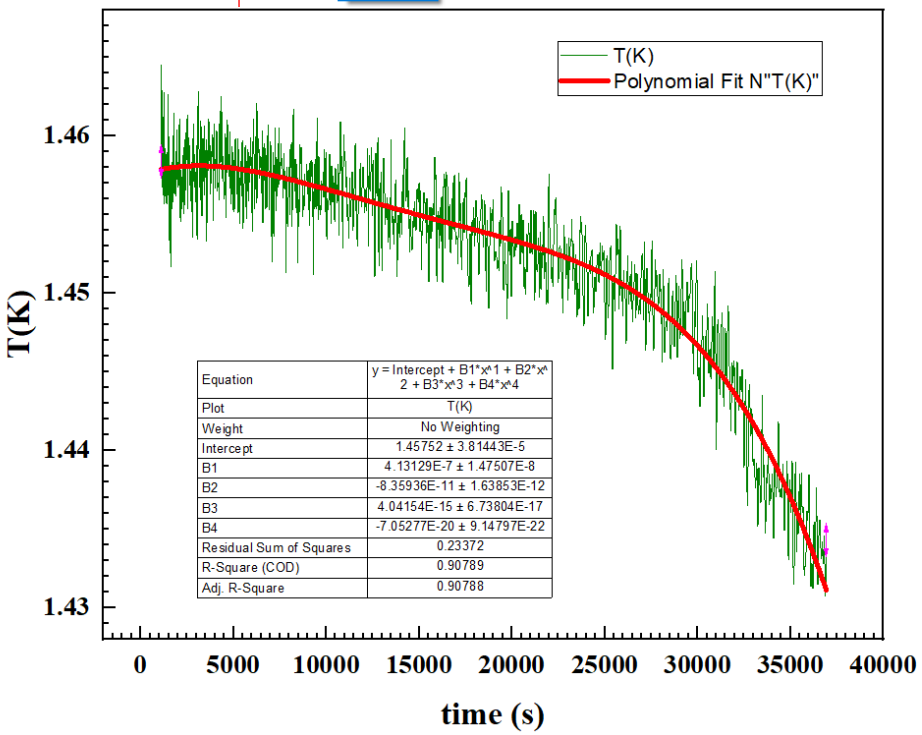


Graphical presentation of data: Fit Polynomial

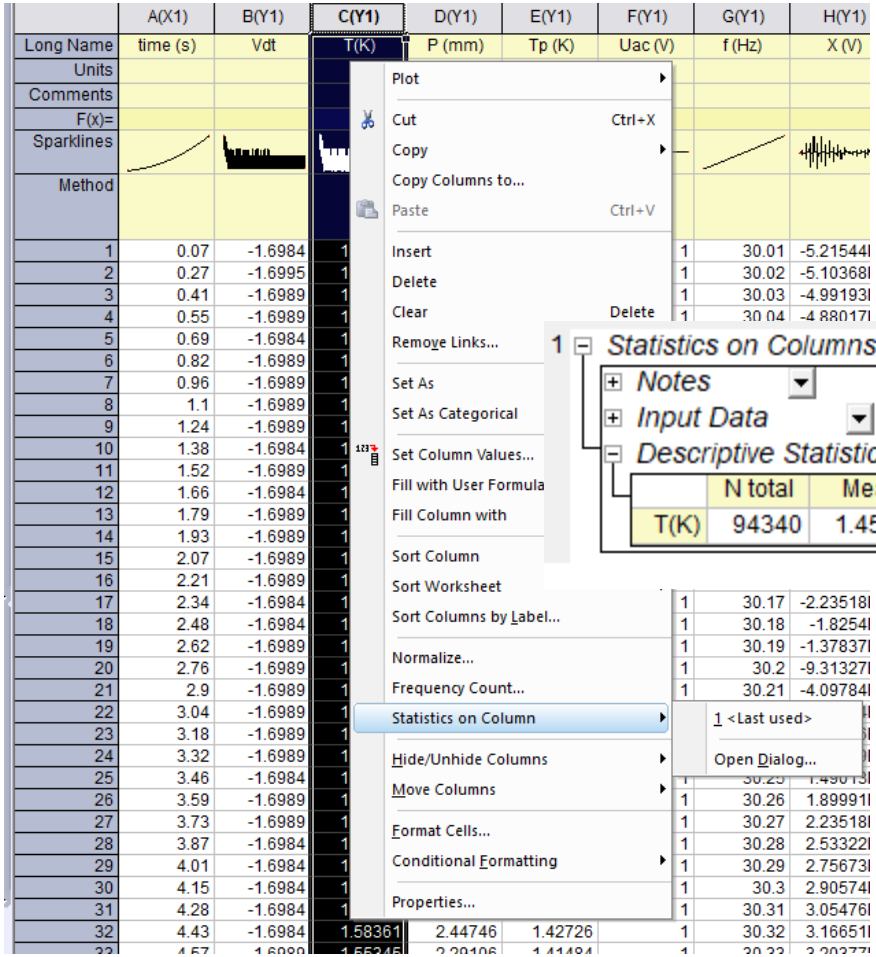


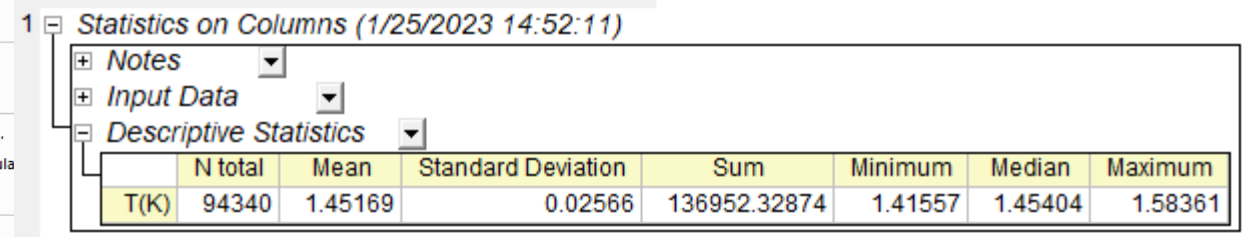


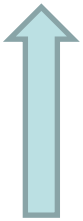
Graph showing the temperature variations during the taking data with results of polynomial fit



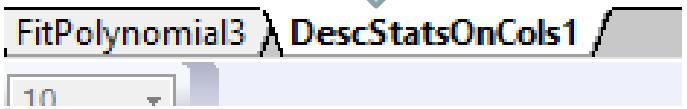
Working with data: Worksheets. Statistics on Column



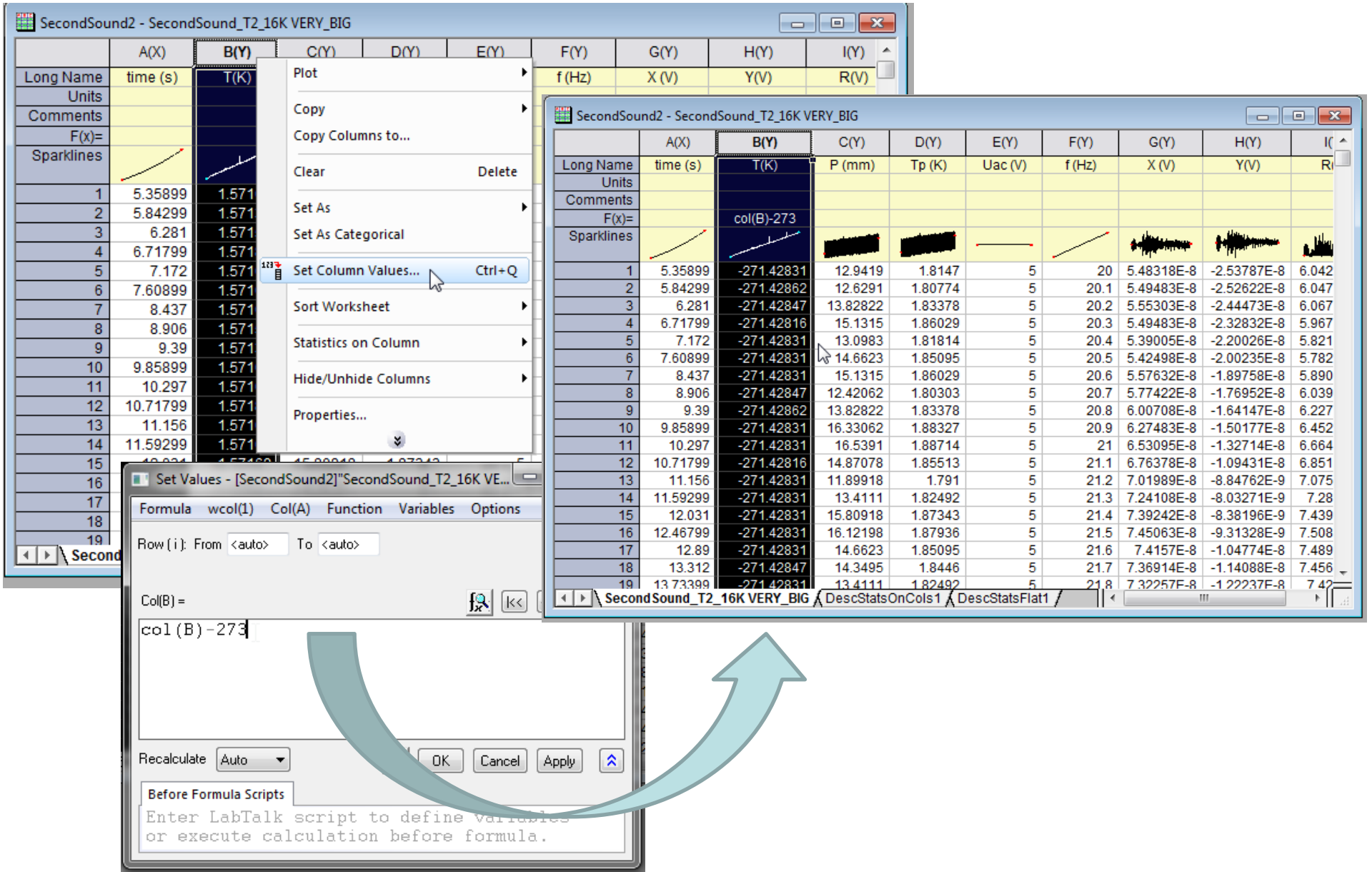




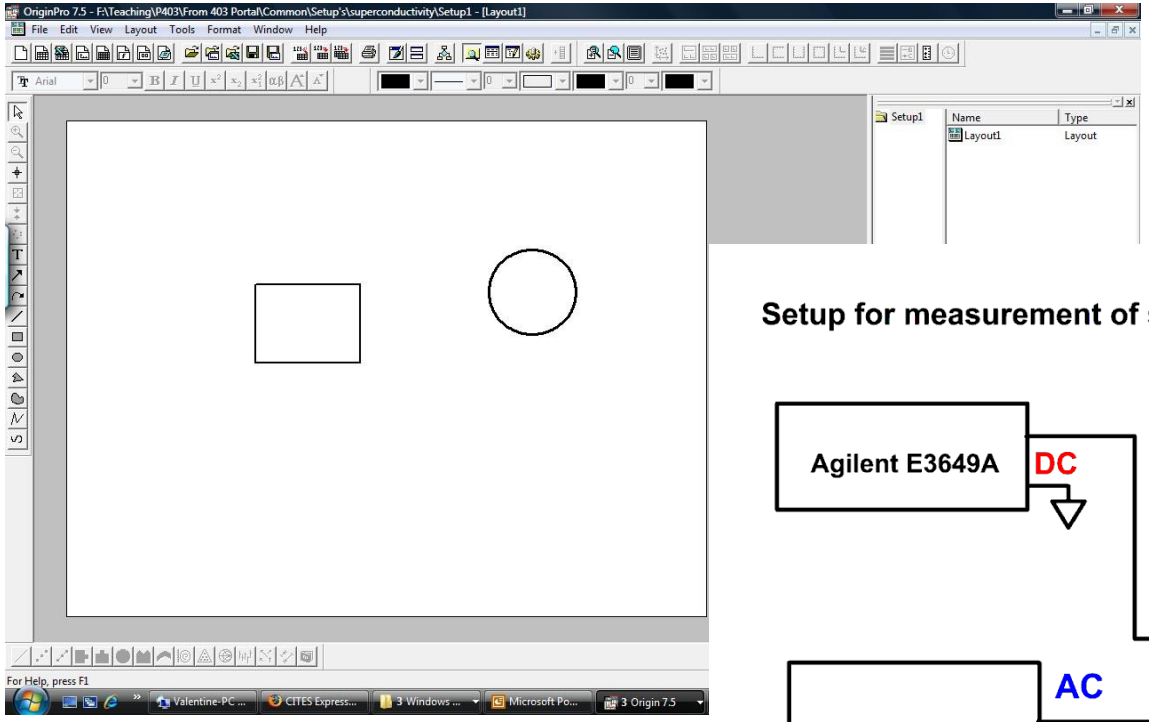
The results could find here



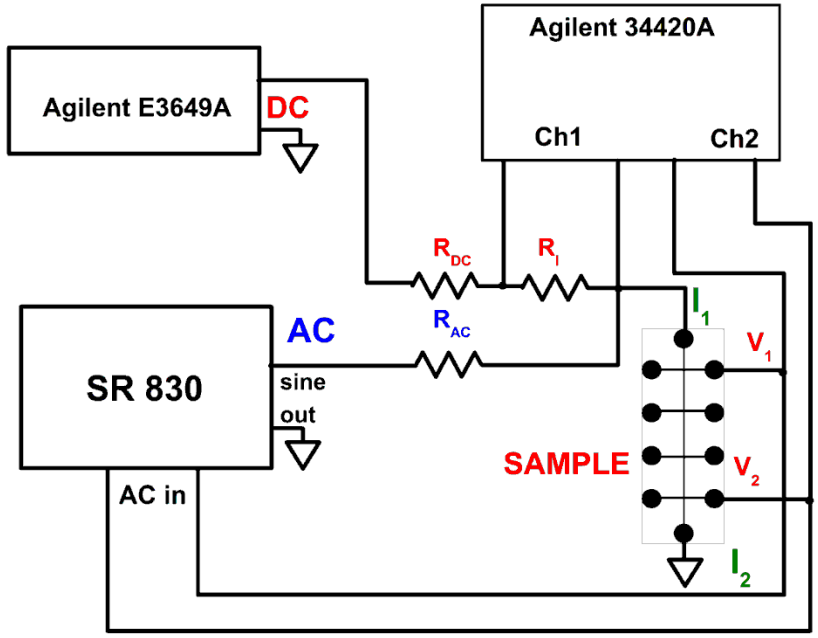
Working with data: Worksheets. “Set Column Values”



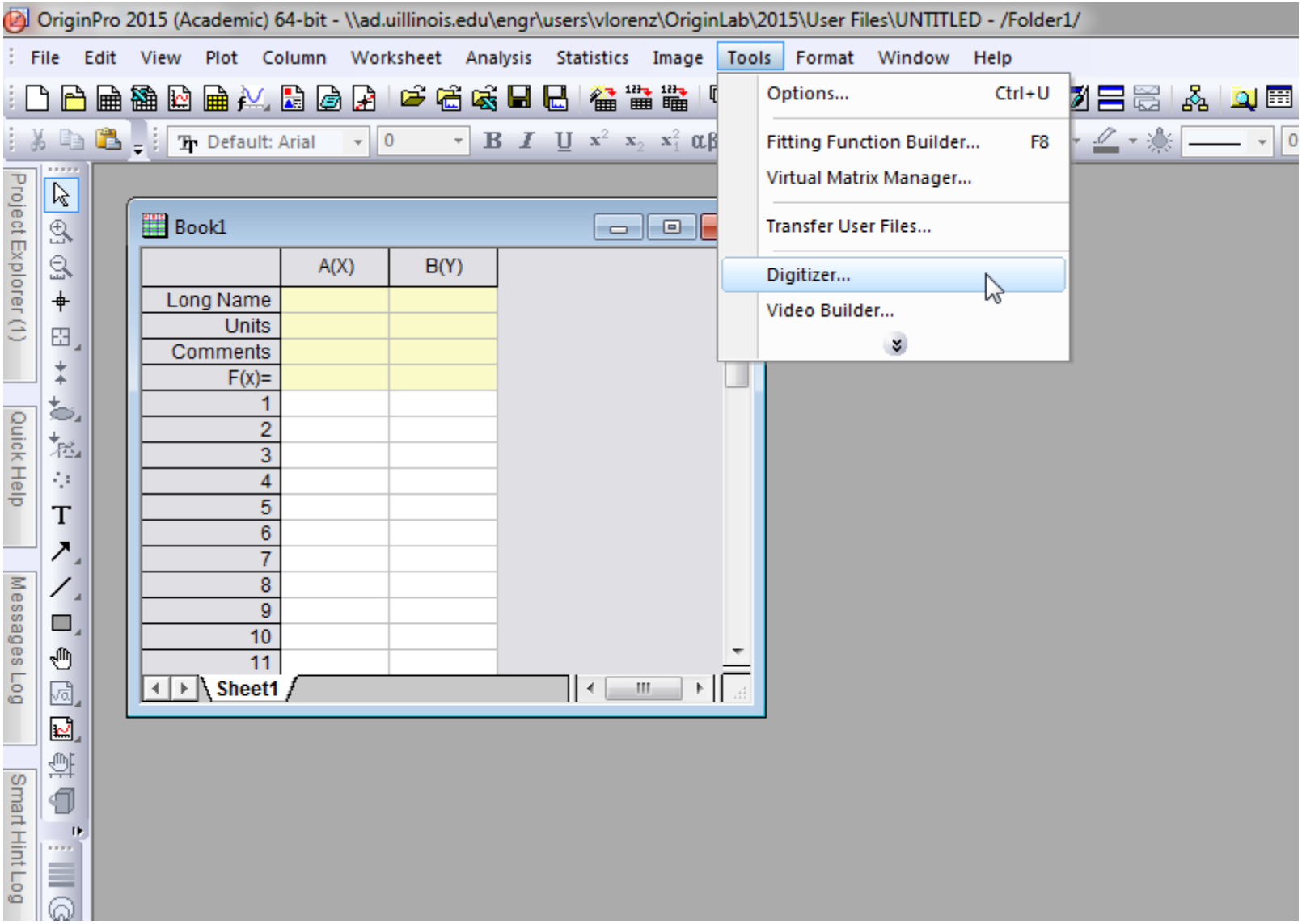
Layouts



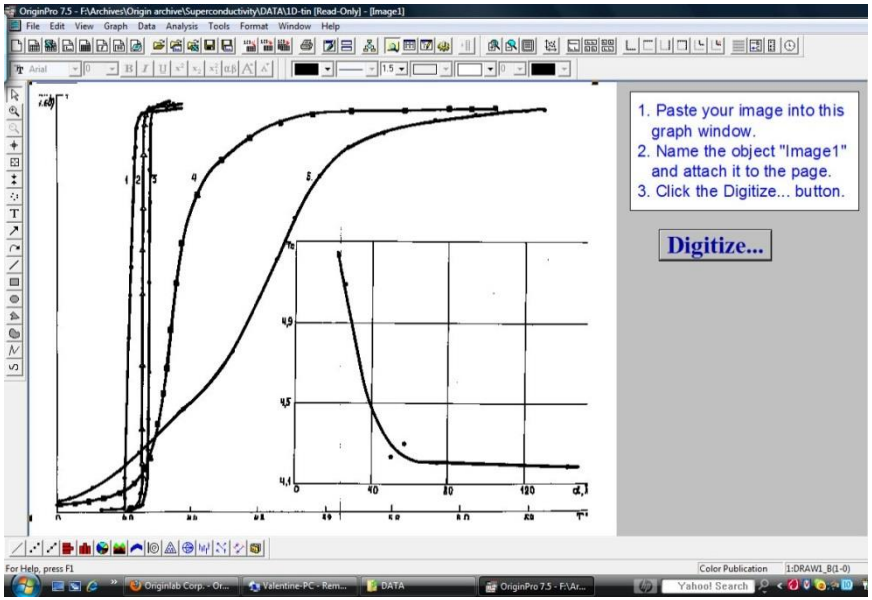
Setup for measurement of s/c properties

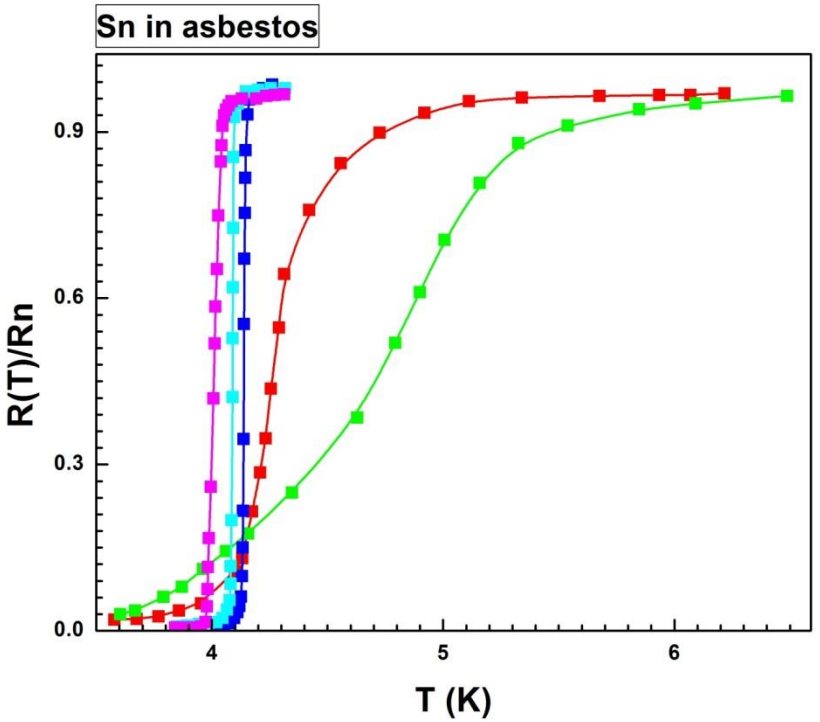


Custom tools

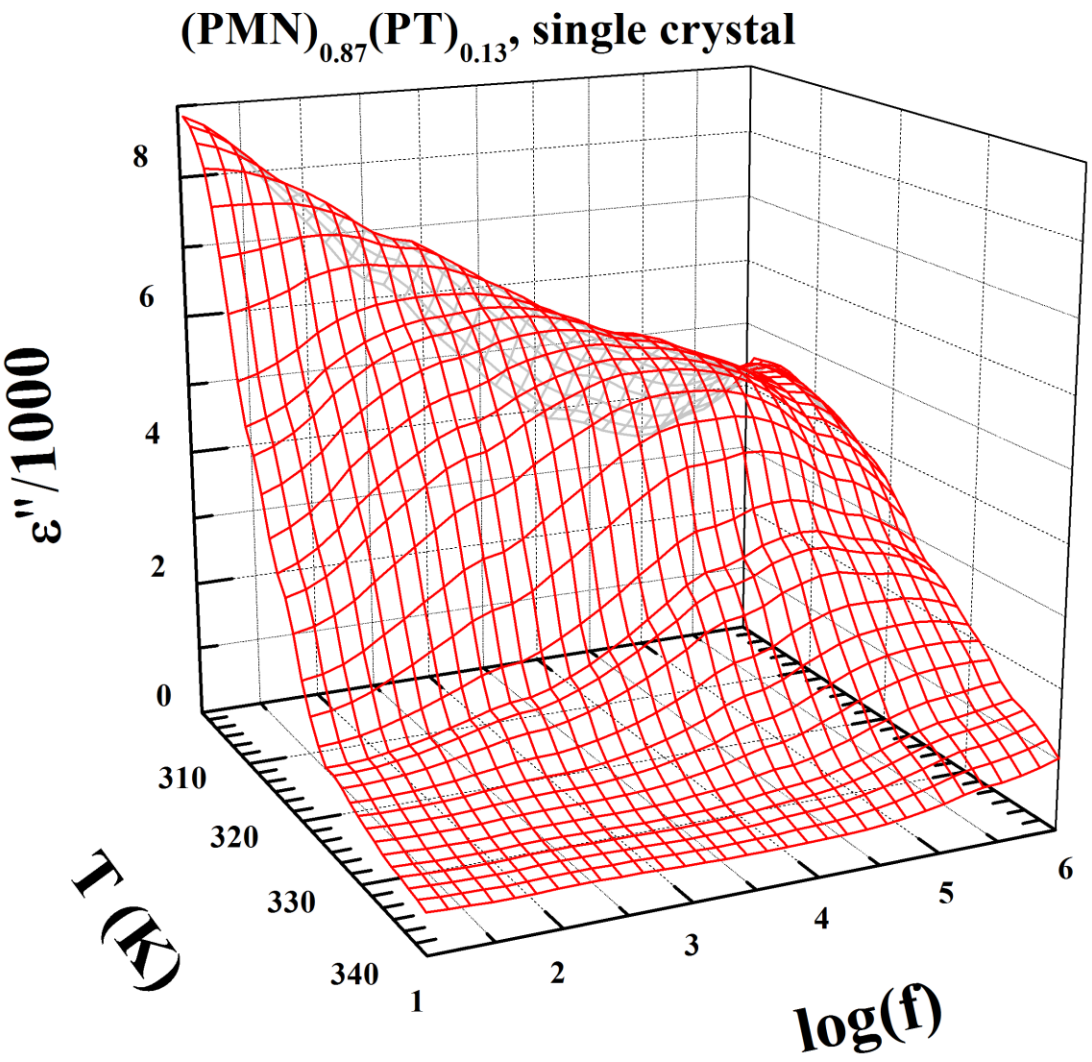


Using digitizer script





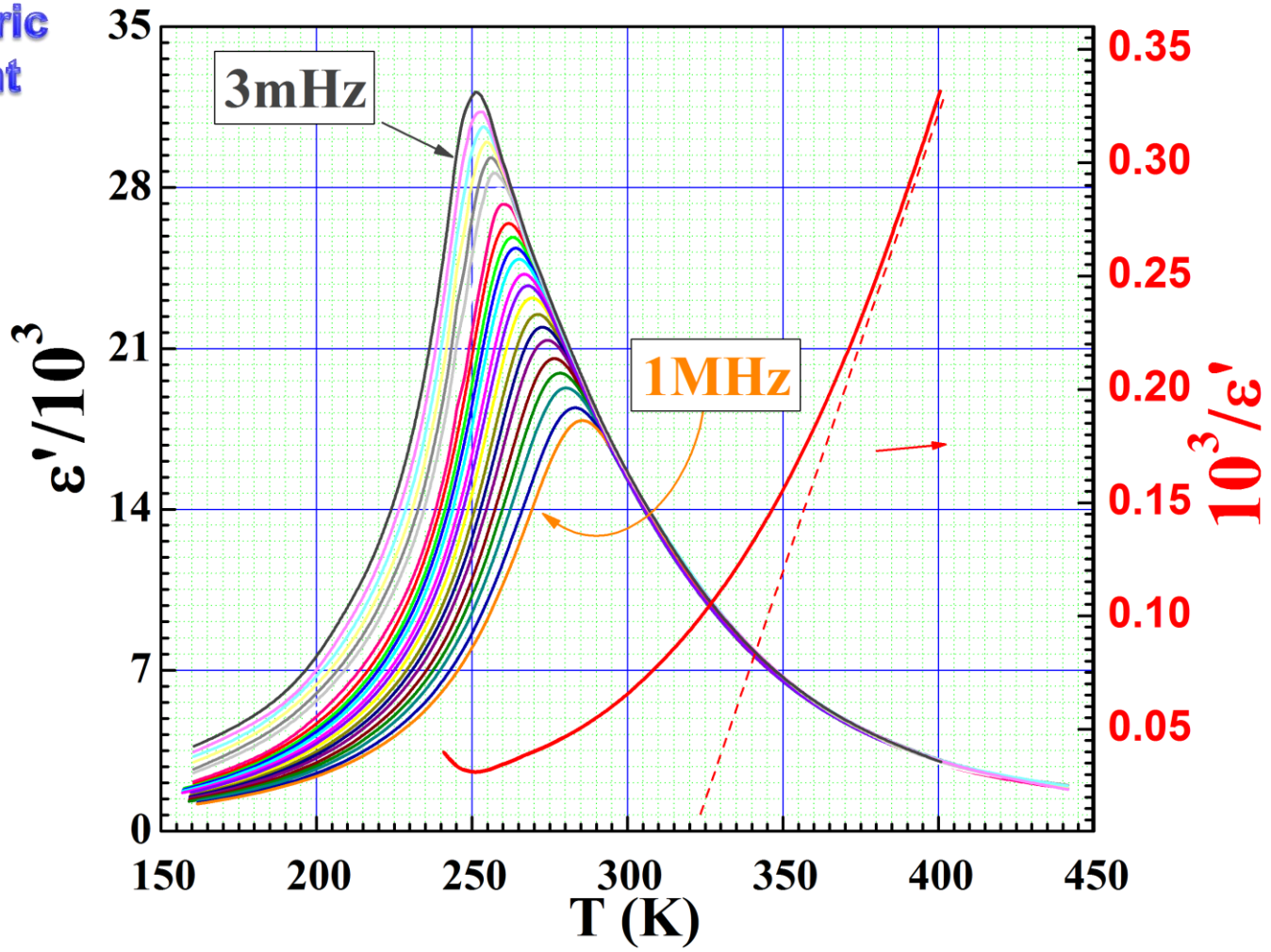
Example Origin graphs



Ferroelectric Experiment

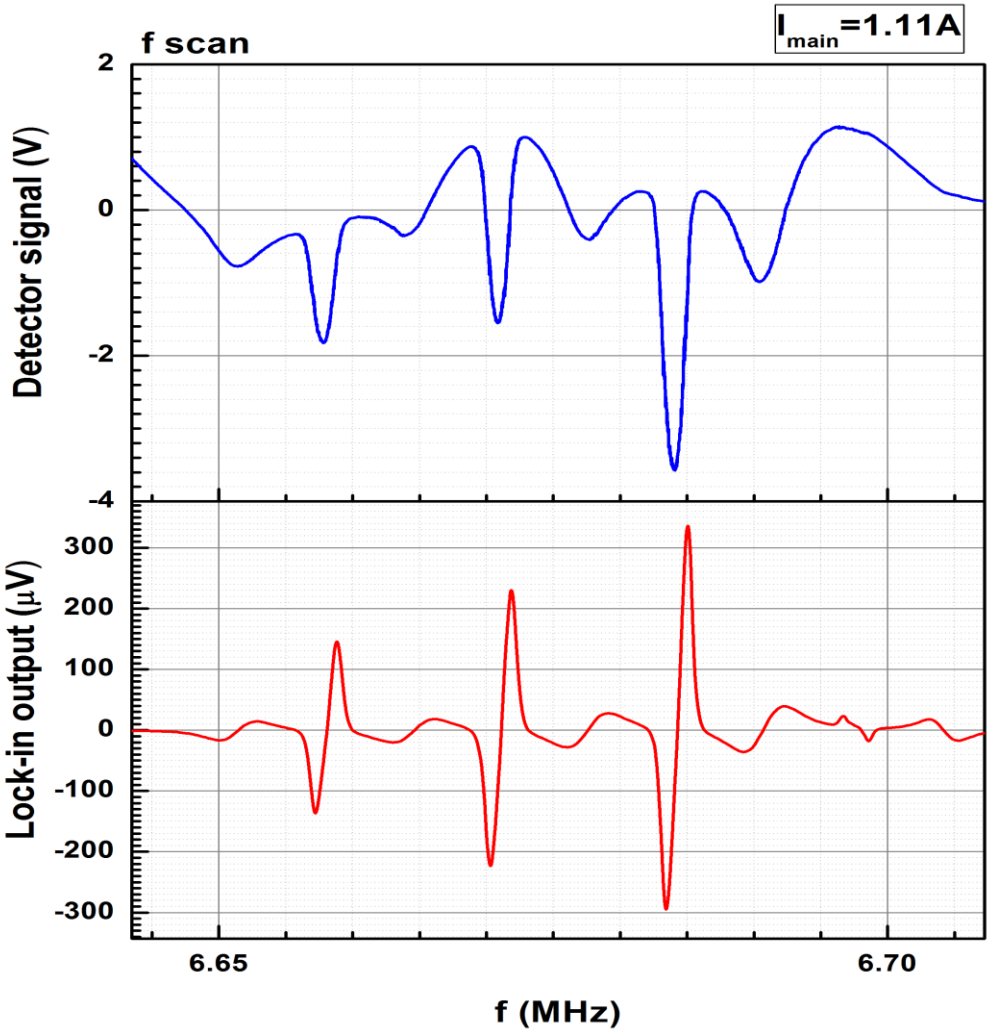
Example Origin graphs

Ferroelectric Experiment



Example Origin graphs

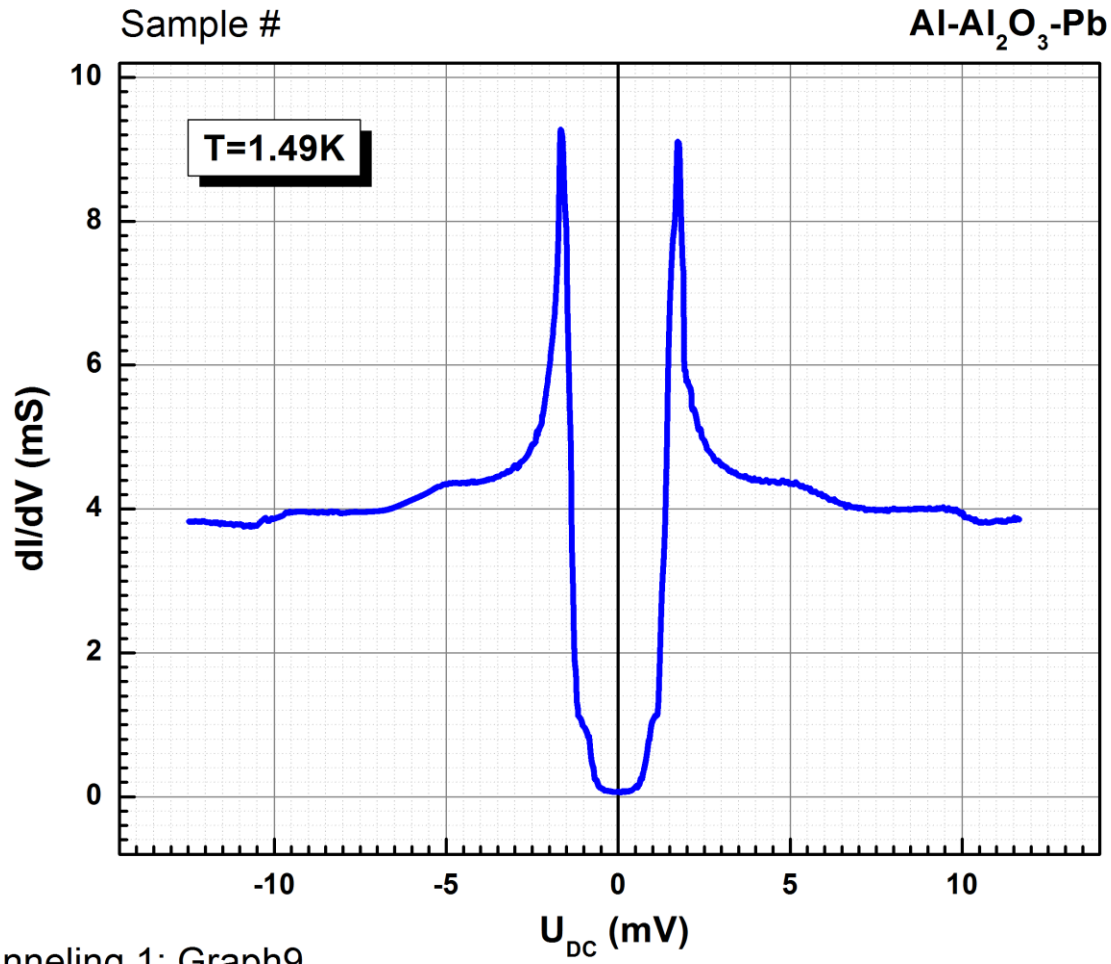
Optical pumping



Mapping 0.5-2.5A from March 1st 2012: Graph7

Example Origin graphs

Tunneling Experiment

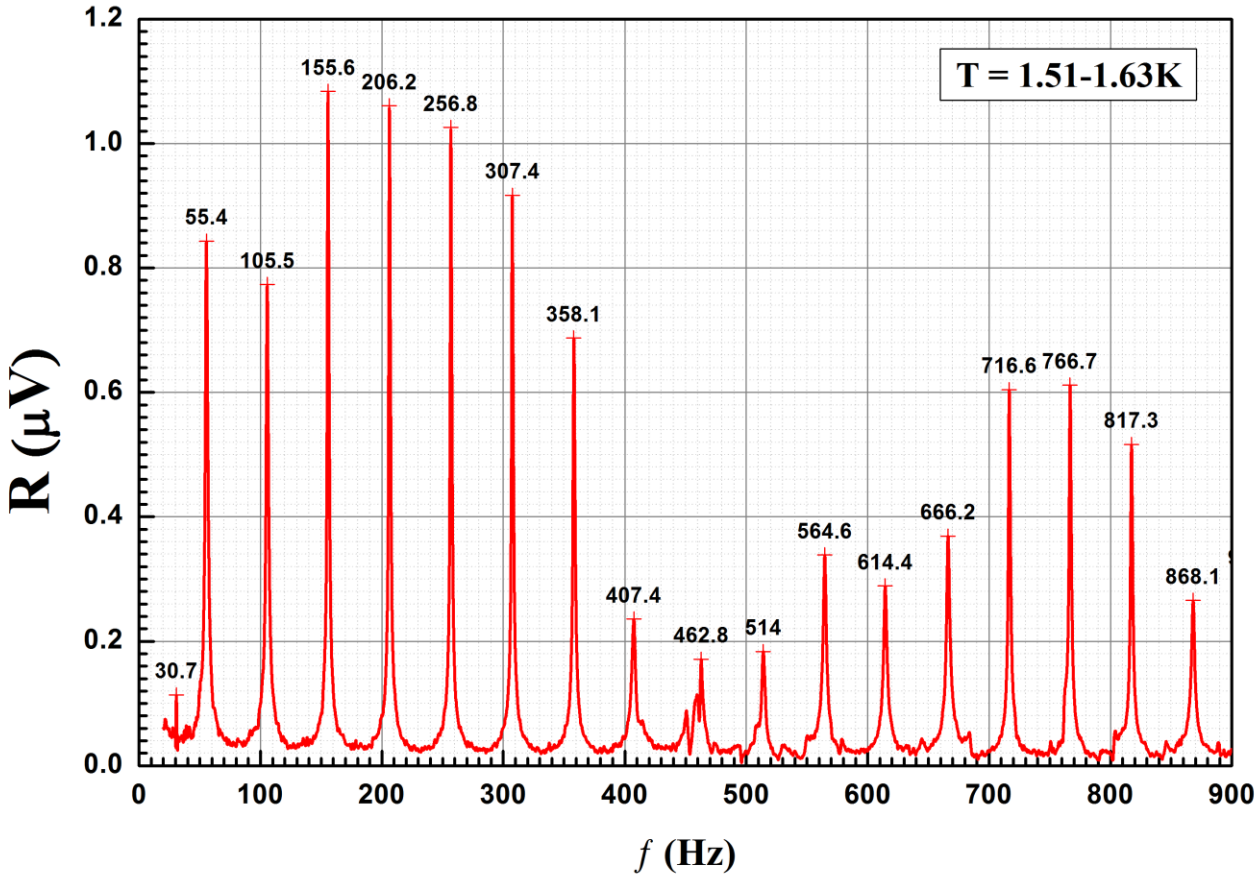


Tunneling 1: Graph9

Sample n2 run8 zoom temp 1.55K

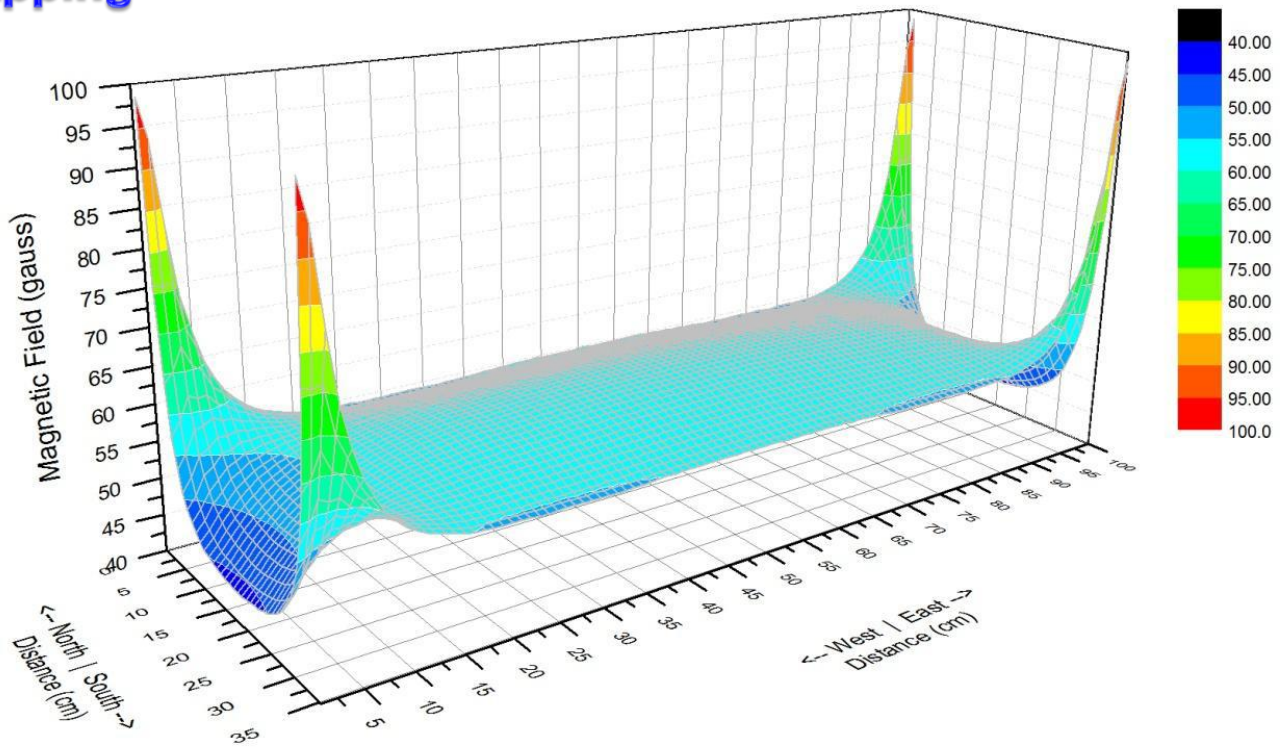
Example Origin graphs

Second sound



Example Origin graphs

Magnet mapping



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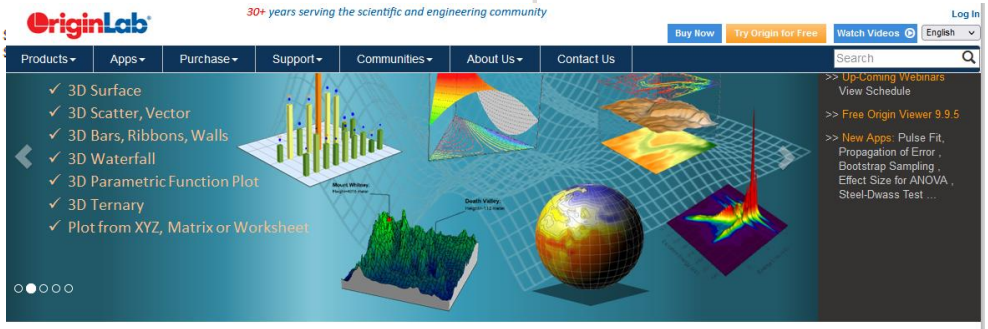


www.originlab.com

Running Origin remotely

Here is another way to run Origin without needing to install it on your own computer (e.g. if you have a Mac, which is not supported by Origin):

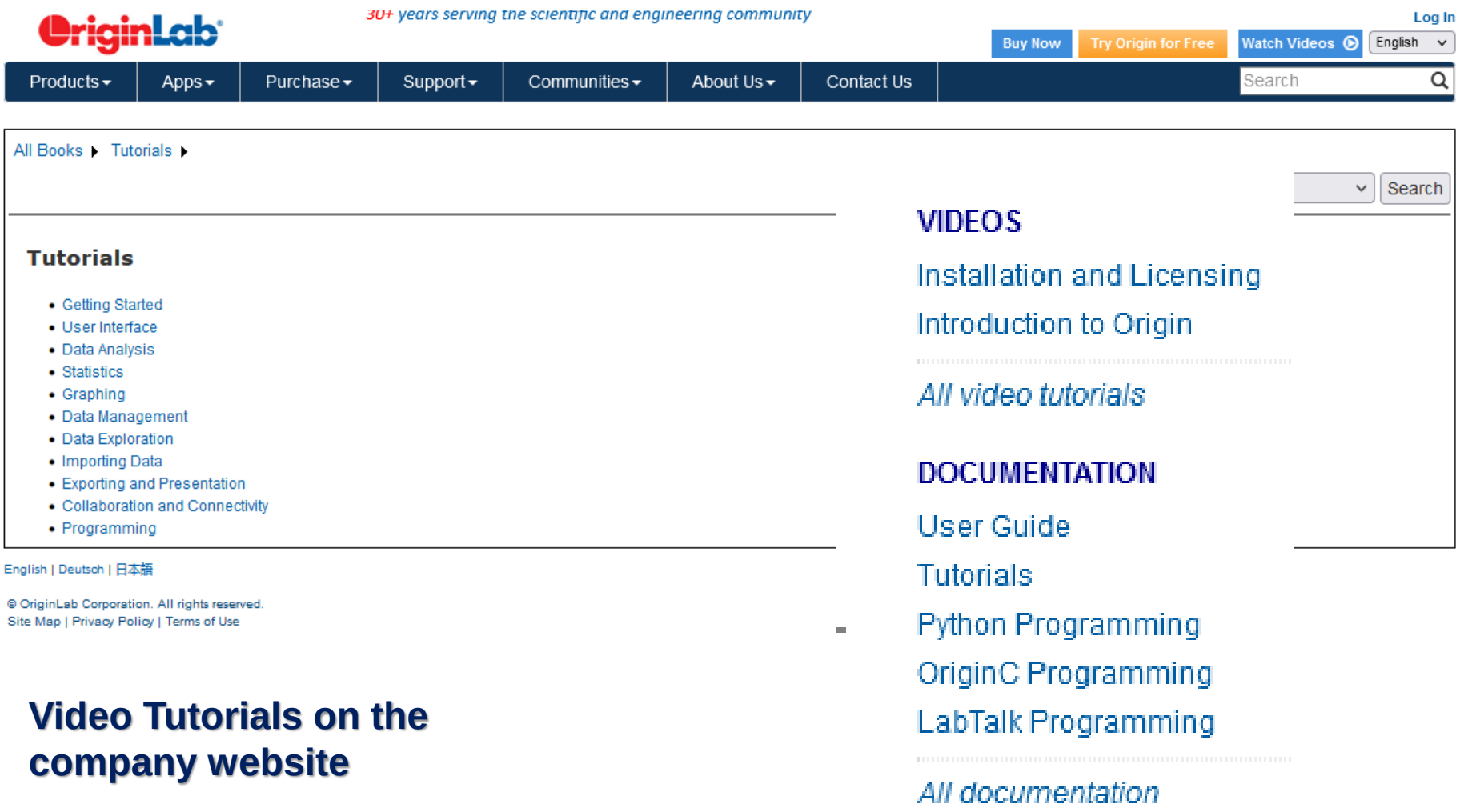
1. Connect to VPN

2. Install and run Citrix: http://it.engineering.illinois.edu/ews/lab-information/remote-connections/connecting-citrix

3. Click on "Apps" and then "Origin“

4. To open and save files, use your EWS folder at this address: "smb://ad.uillinois.edu/engr-ews/[Your netID]"

Origin manuals



Video Tutorials on the company website

http://www.originlab.com/index.aspx?go=SUPPORT/VideoTutorials

Origin manuals

Video Tutorials on the company website

Title	Category	Length	PlayNow	LastUpdated	Version	Audio	Youtube
Origin 2023 Highlights	General - Overviews	00:05:26	▶	11/1/2022	10.0	Y	YouTube
Introduction to Origin/OriginPro	General - Overviews	00:02:30	▶	6/9/2021	9.85	Y	YouTube
Getting Starting with Graphing	General - Overviews	00:04:14	▶	10/18/2019	9.7	Y	YouTube
Bringing Data into Origin	General - Overviews	00:03:07	▶	10/18/2019	9.7	Y	YouTube
Analysis with Auto Recalculations	General - Overviews	00:02:28	▶	10/18/2019	9.7	Y	YouTube
Build Your Presentation in 60 Seconds	General - Overviews	00:01:22	▶	1/5/2018	9.5	Y	YouTube
Origin Learning Center	General - Overviews	00:02:26	▶	12/25/2017	9.5	Y	YouTube
Apps for Origin	General - Overviews	00:01:54	▶	12/14/2017	9.5	Y	YouTube
Origin vs OriginPro	General - Overviews	00:06:56	▶	6/14/2016	9.3	Y	YouTube

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