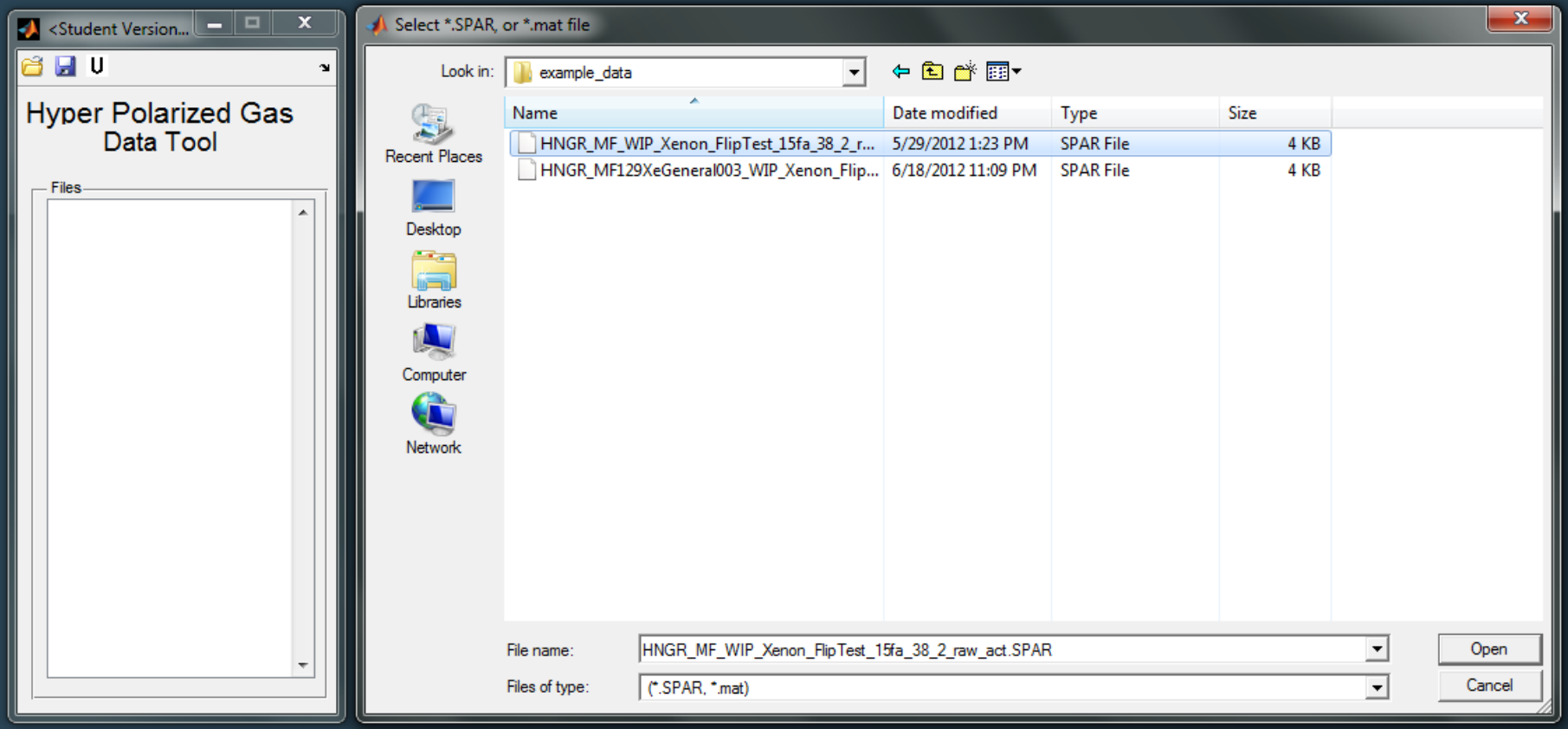
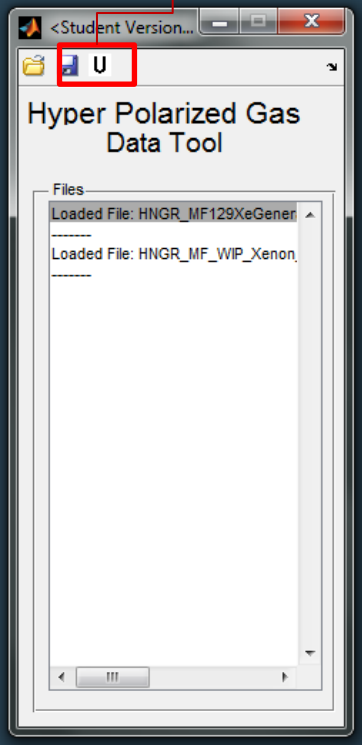
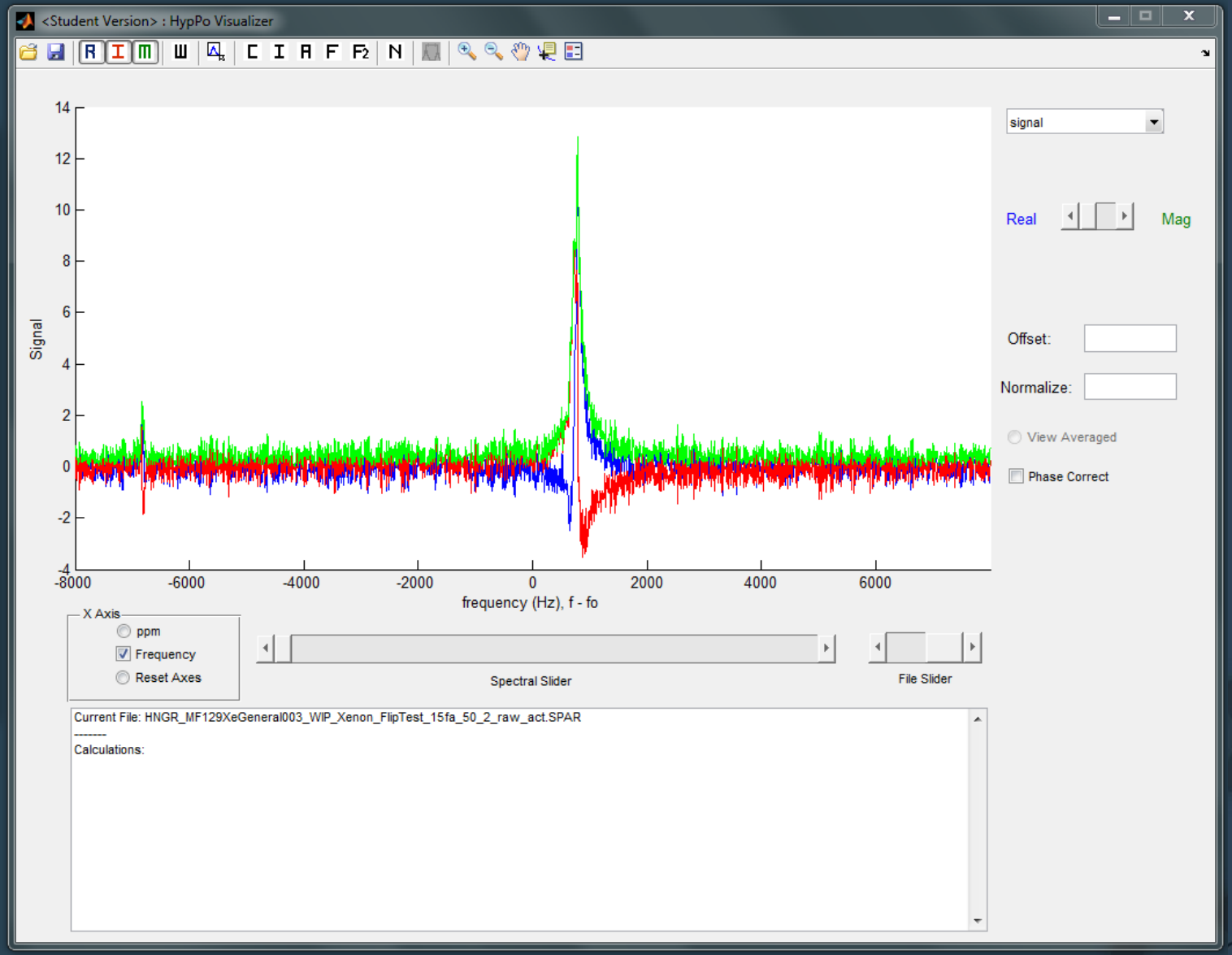
HypPo Data Tool User's Guide

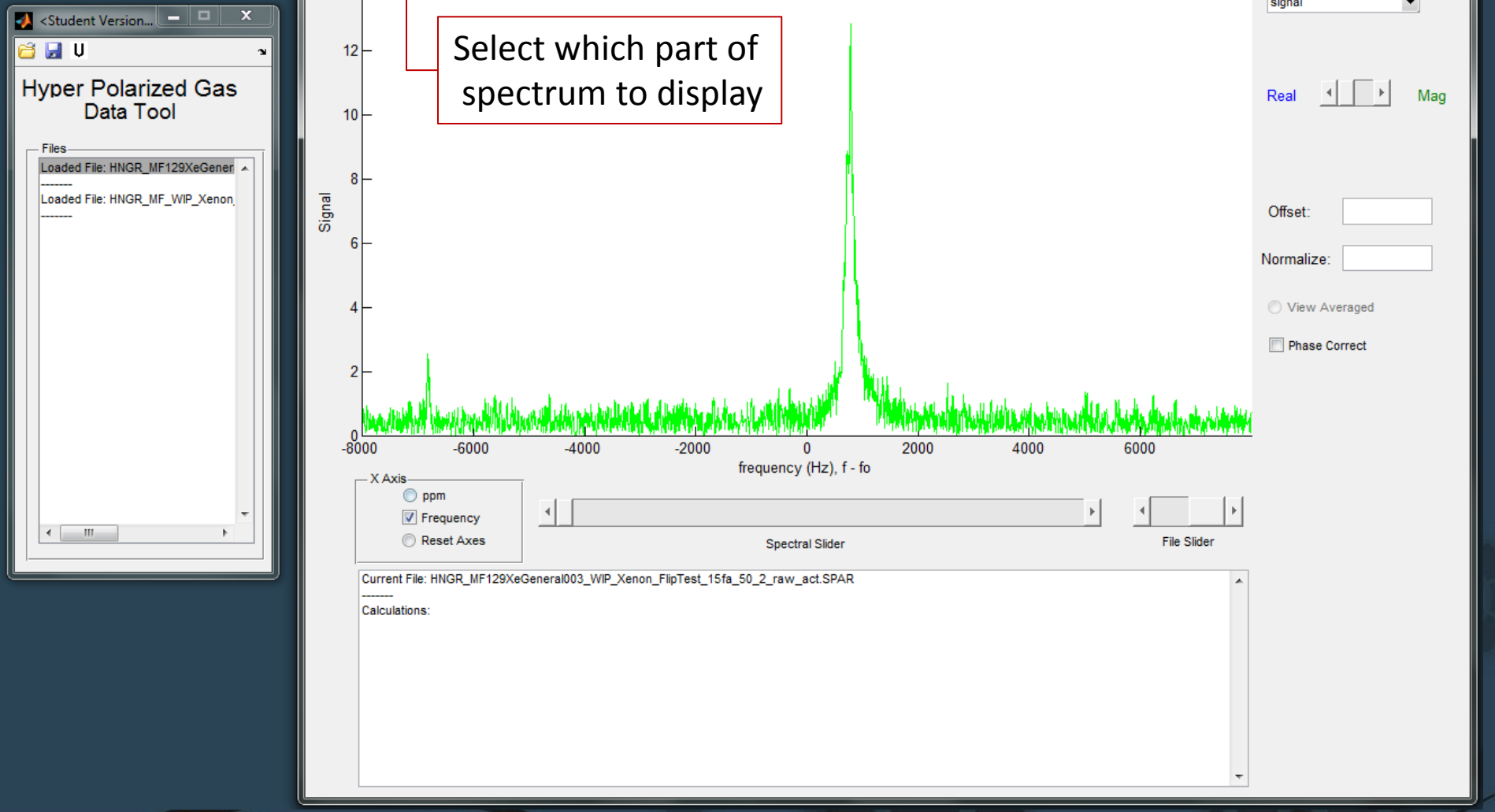
HypPo is a customizable graphical user interface (GUI) for analyzing spectroscopic data developed in Matlab 2012a

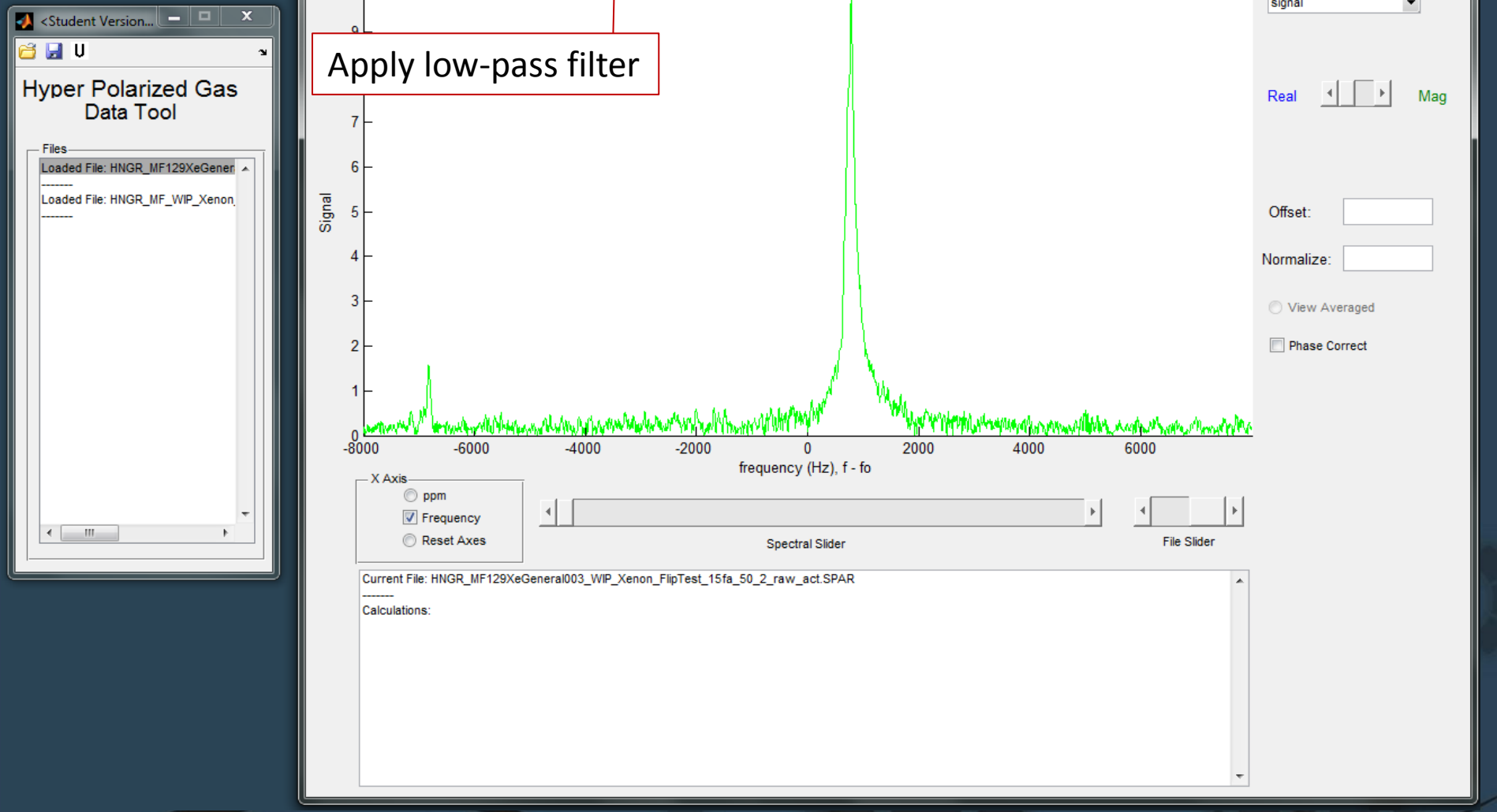

<Student Version...
Hyper Polarized Gas Data Tool
Files
Select *.SPAR, or *.mat file
Look in:
example_data
Recent Places
Desktop
Libraries
Computer
Network
Name
Date modified
Type
Size
HNGR_MF_WIP_Xenon_FlipTest_15fa_38_2_r...
5/29/2012 1:23 PM
SPAR File
4 KB
HNGR_MF129XeGeneral003_WIP_Xenon_Flip...
6/18/2012 11:09 PM
SPAR File
4 KB
File name:
HNGR_MF_WIP_Xenon_FlipTest_15fa_38_2_raw_act.SPAR
Files of type:
(*.SPAR, *.mat)
Open
Cancel

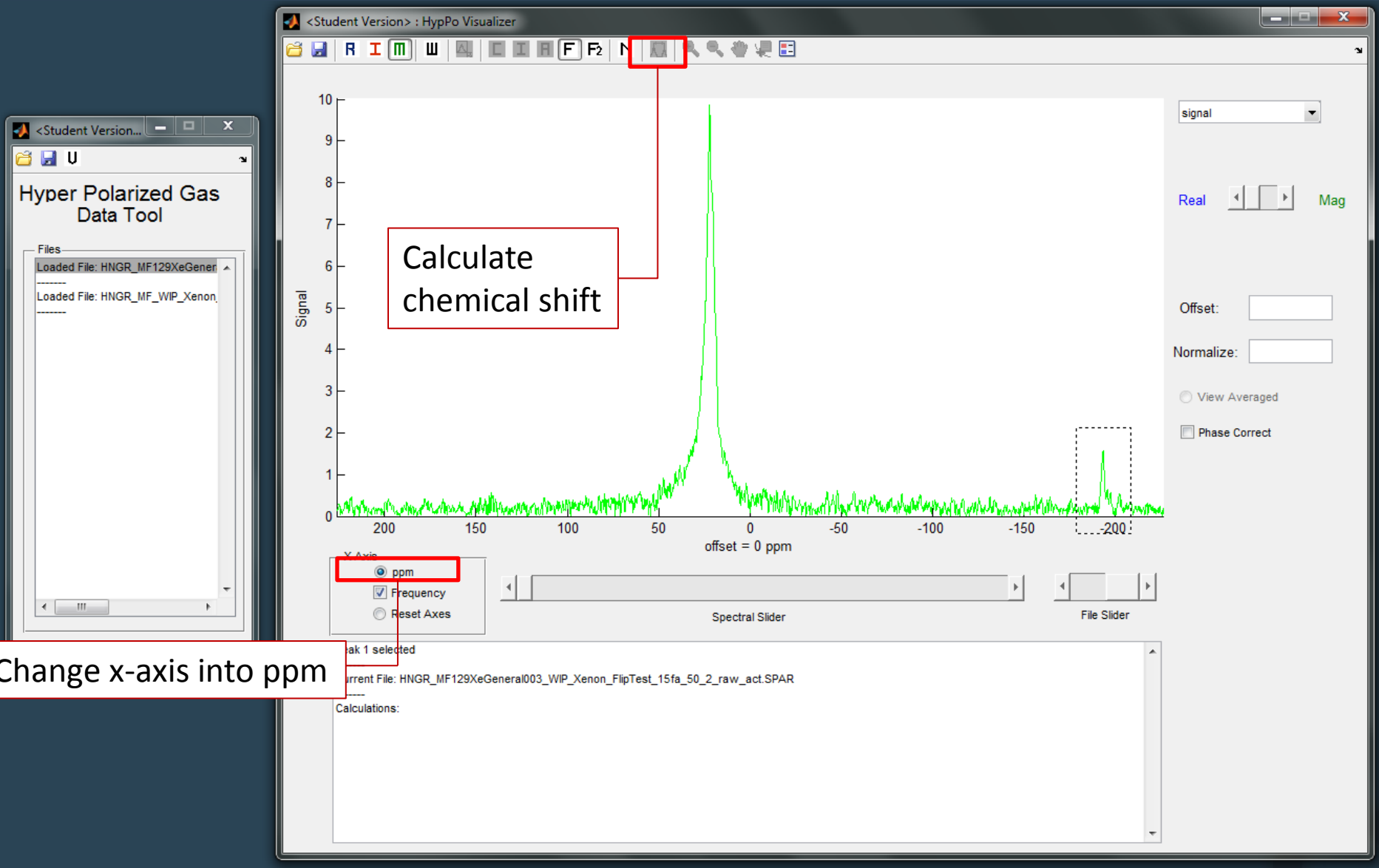
Click on visualizer button

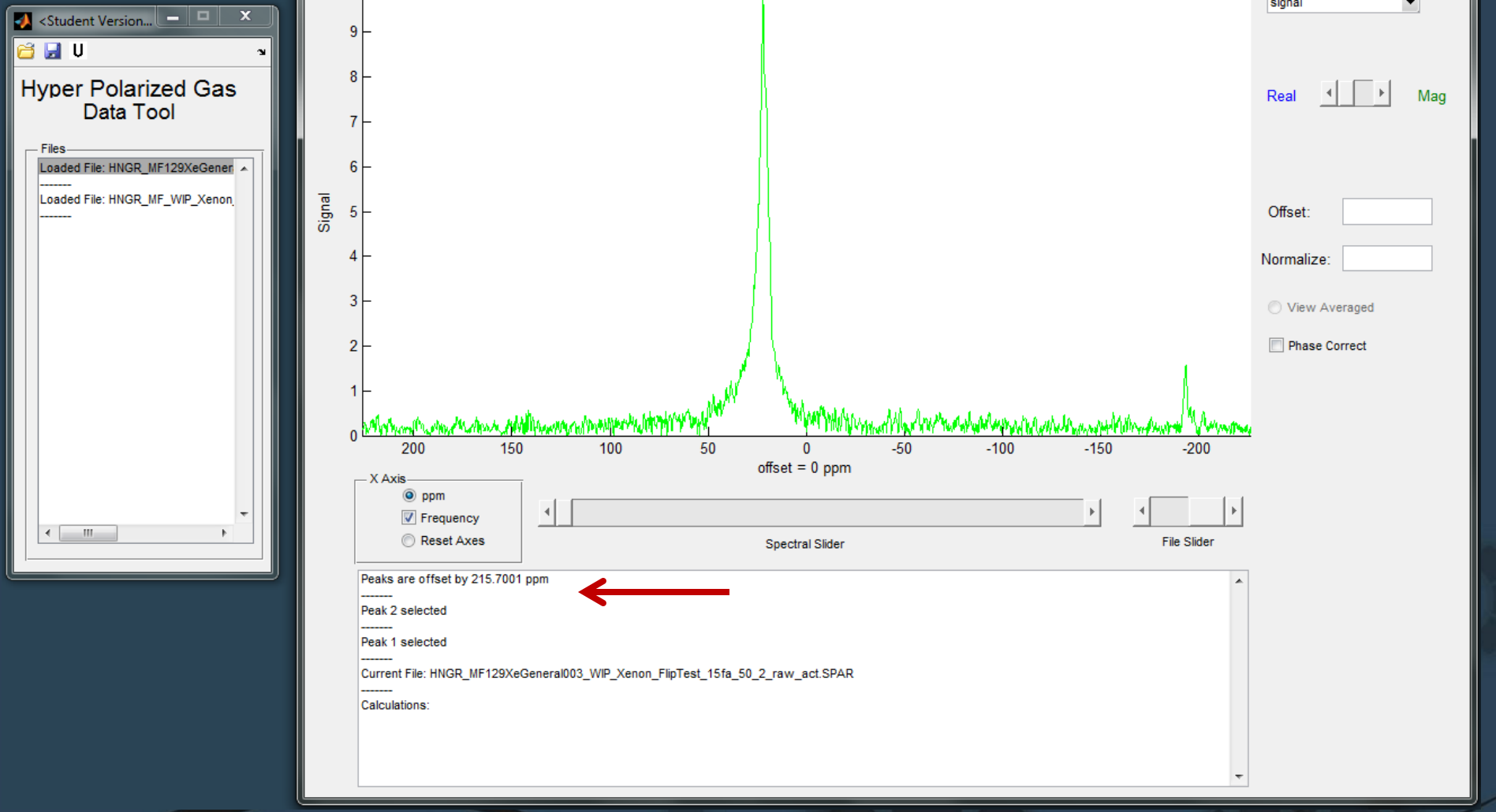


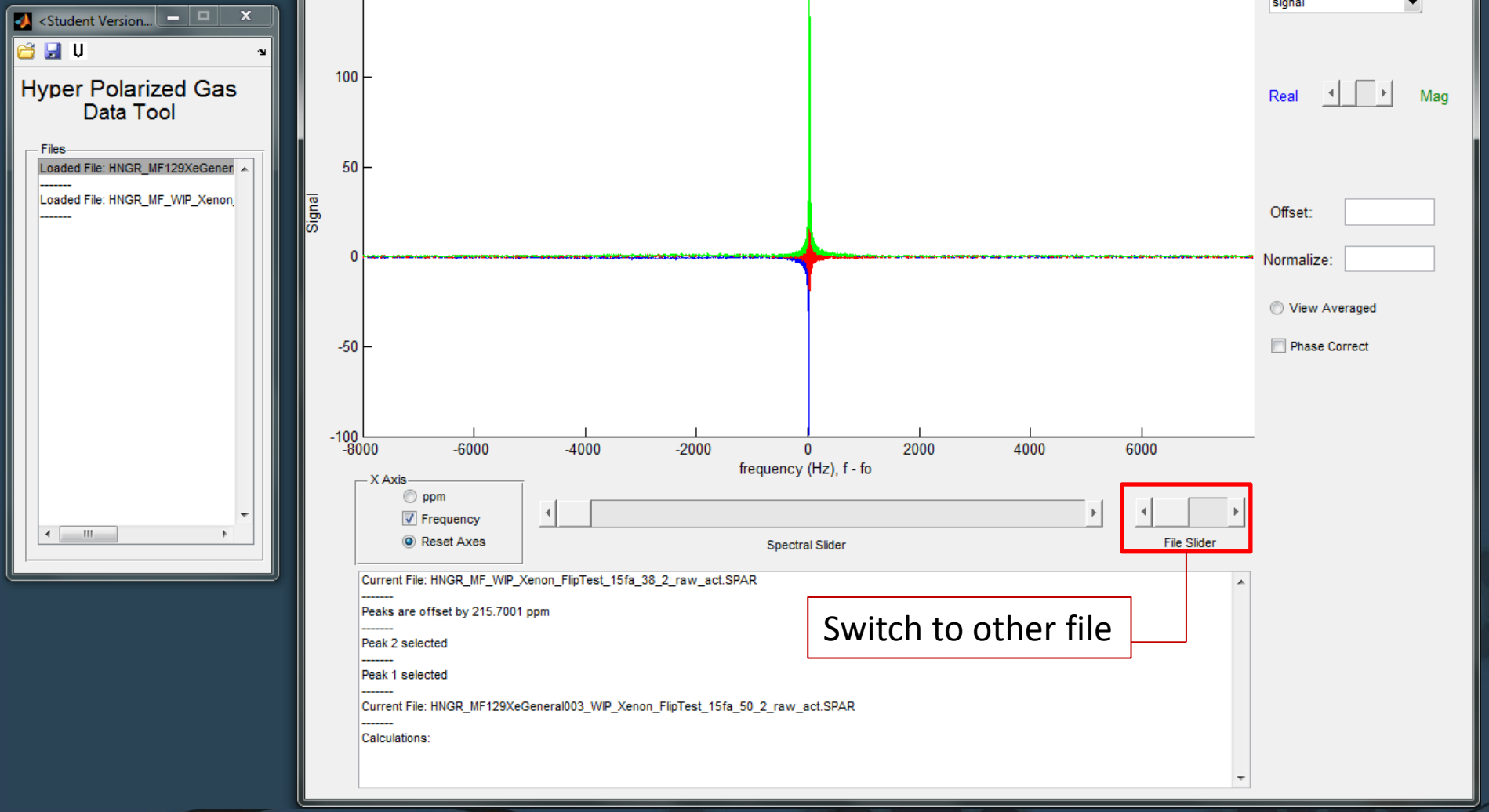


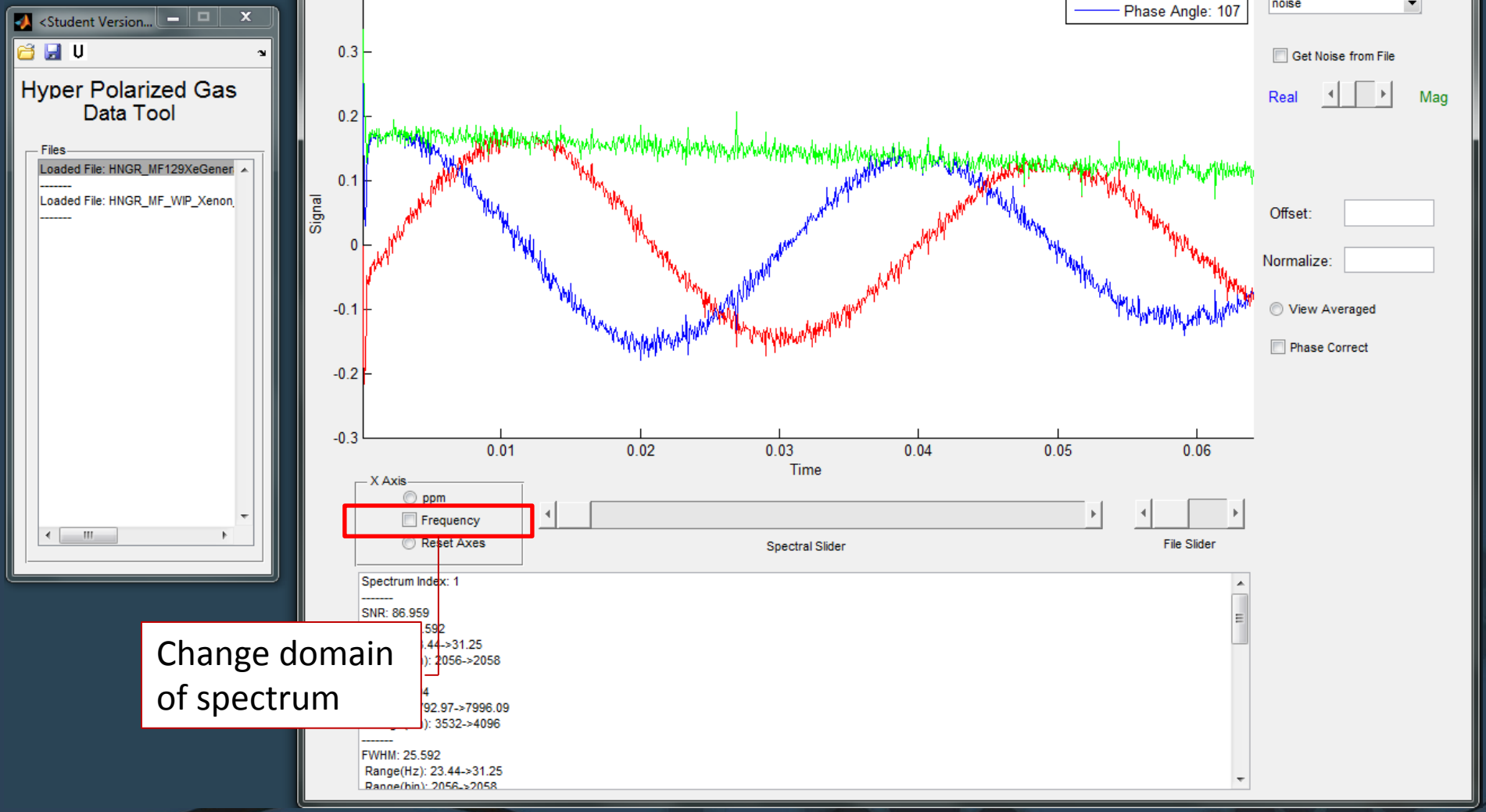

<Student Version...
Hyper Polarized Gas Data Tool
Files
Loaded File: HNGR_MF129XeGener
Loaded File: HNGR_MF_WIP_Xenon
<Student Version> : HypPo Visualizer
Select which part of spectrum to display
Signal
frequency (Hz), f - fo
signal
Real
Mag
Offset:
Normalize:
View Averaged
Phase Correct
X Axis
ppm
Frequency
Reset Axes
Spectral Slider
File Slider
Current File: HNGR_MF129XeGeneral003_WIP_Xenon_FlipTest_15fa_50_2_raw_act.SPAR
Calculations:

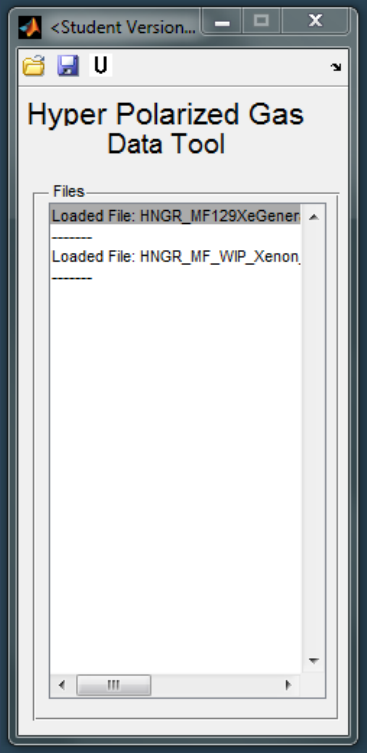

<Student Version...
Hyper Polarized Gas Data Tool
Files
Loaded File: HNGR_MF129XeGener
Loaded File: HNGR_MF_WIP_Xenon
<Student Version> : HypPo Visualizer
Apply low-pass filter
Signal
frequency (Hz), f - fo
signal
Real
Mag
Offset:
Normalize:
View Averaged
Phase Correct
X Axis
ppm
Frequency
Reset Axes
Spectral Slider
File Slider
Current File: HNGR_MF129XeGeneral003_WIP_Xenon_FlipTest_15fa_50_2_raw_act.SPAR
Calculations:

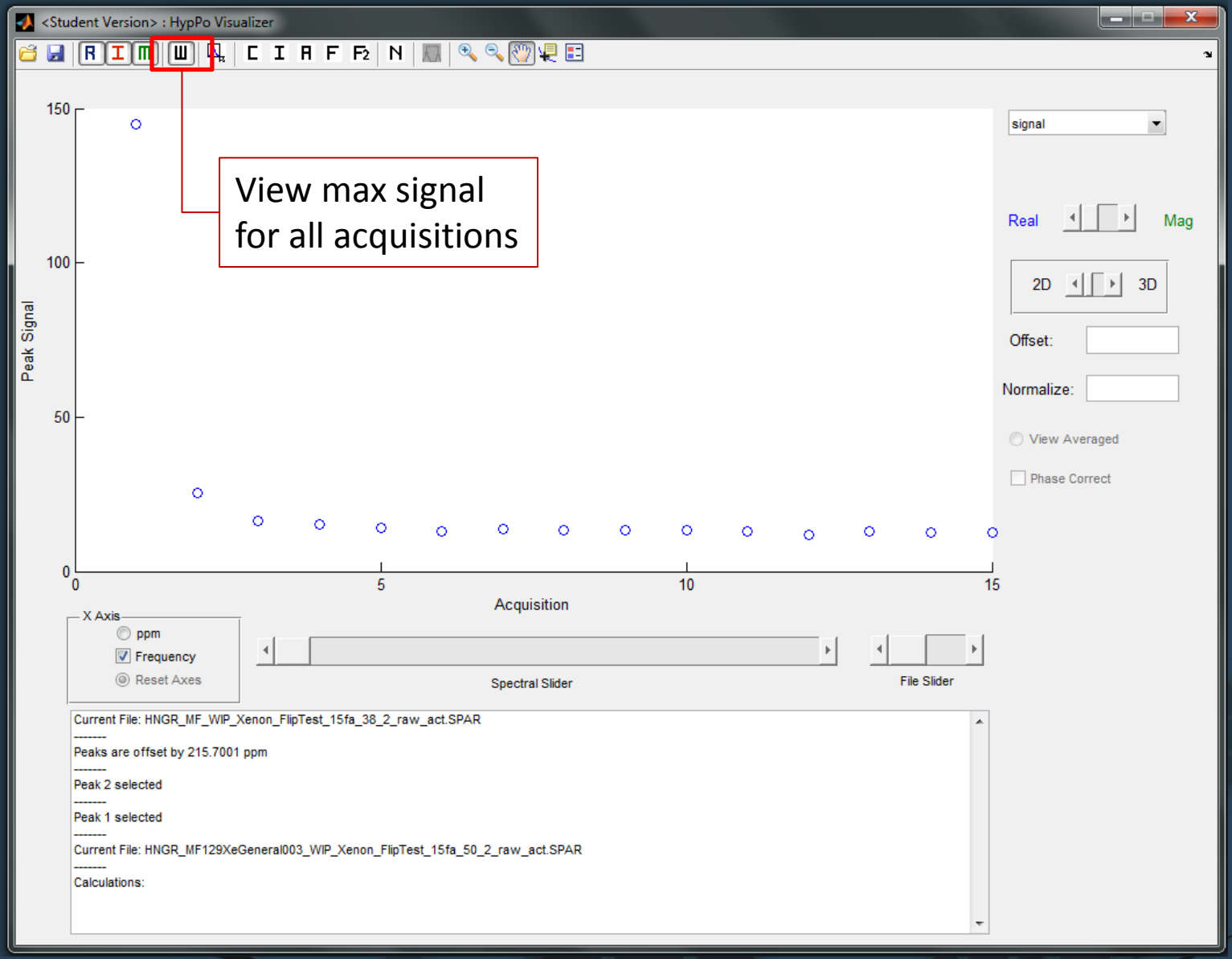

<Student Version...
Hyper Polarized Gas Data Tool
Files
Loaded File: HNGR_MF129XeGener
Loaded File: HNGR_MF_WIP_Xenon
<Student Version> : HypPo Visualizer
Calculate chemical shift
Signal
offset = 0 ppm
signal
Real
Mag
Offset:
Normalize:
View Averaged
Phase Correct
X Axis
ppm
Frequency
Reset Axes
Spectral Slider
File Slider
Calculations:
Change x-axis into ppm

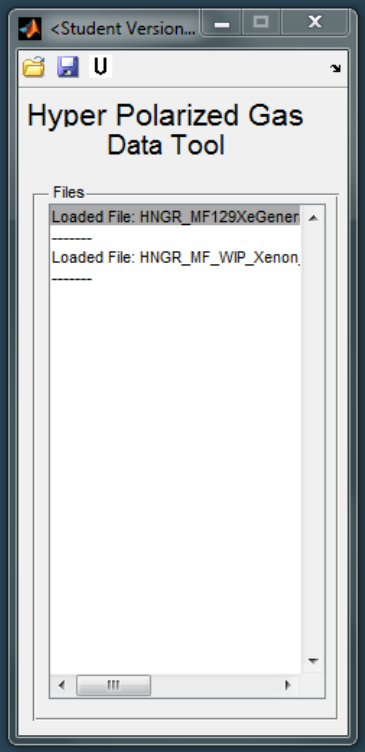

<Student Version...
Hyper Polarized Gas
Data Tool
Files
Loaded File: HNGR_MF129XeGener
Loaded File: HNGR_MF_WIP_Xenon
<Student Version> : HypPo Visualizer
Signal
offset = 0 ppm
signal
Real
Mag
Offset:
Normalize:
View Averaged
Phase Correct
X Axis
ppm
Frequency
Reset Axes
Spectral Slider
File Slider
Peaks are offset by 215.7001 ppm
Peak 2 selected
Peak 1 selected
Current File: HNGR_MF129XeGeneral003_WIP_Xenon_FlipTest_15fa_50_2_raw_act.SPAR
Calculations:


<Student Version...
Hyper Polarized Gas Data Tool
Files
Loaded File: HNGR_MF129XeGener
Loaded File: HNGR_MF_WIP_Xenon
<Student Version> : HypPo Visualizer
signal
Real
Mag
Offset:
Normalize:
View Averaged
Phase Correct
Signal
frequency (Hz), f - fo
X Axis
ppm
Frequency
Reset Axes
Spectral Slider
File Slider
Current File: HNGR_MF_WIP_Xenon_FlipTest_15fa_38_2_raw_act.SPAR
Peaks are offset by 215.7001 ppm
Peak 2 selected
Peak 1 selected
Current File: HNGR_MF129XeGeneral003_WIP_Xenon_FlipTest_15fa_50_2_raw_act.SPAR
Calculations:
Switch to other file

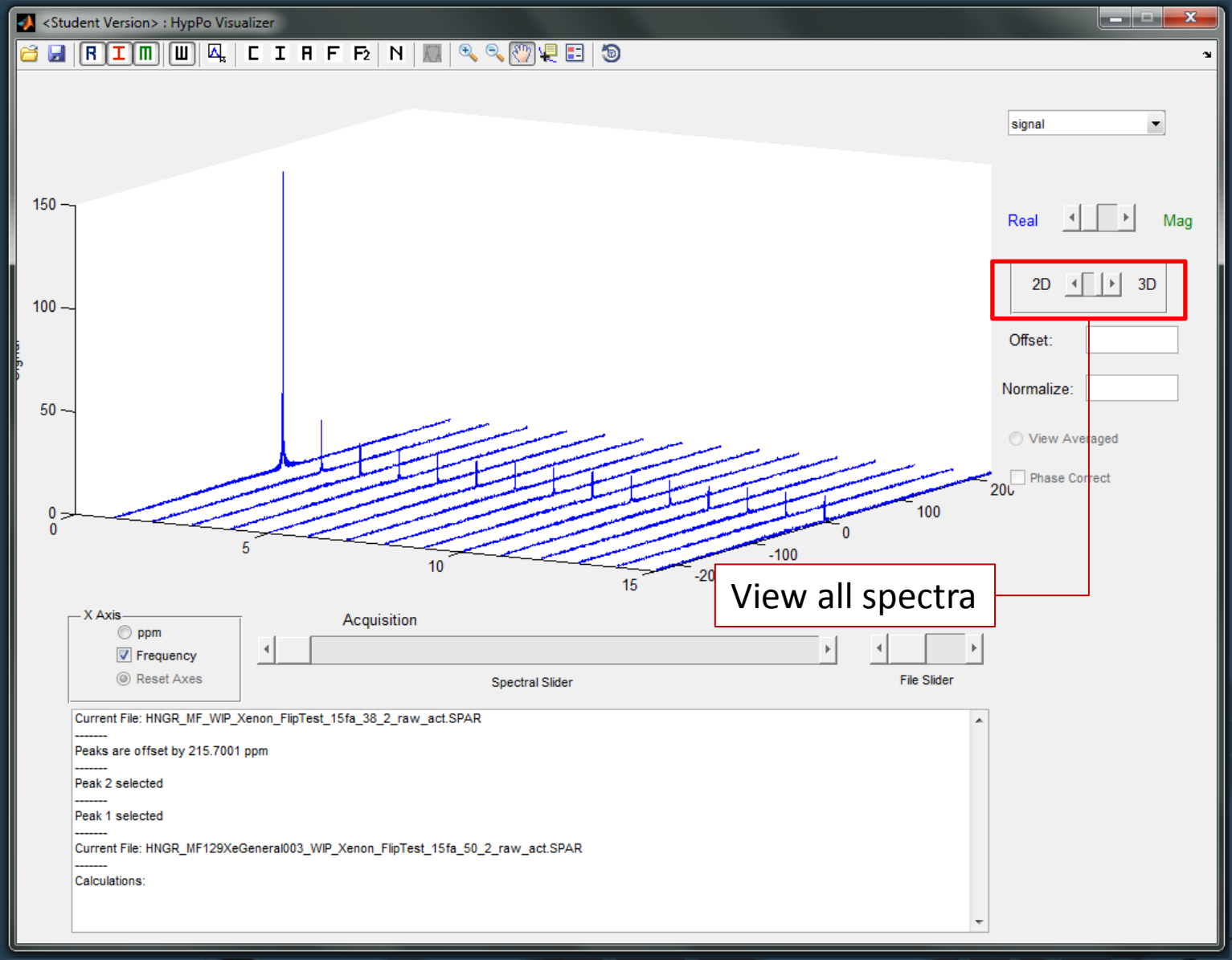

<Student Version...
Hyper Polarized Gas Data Tool
Files
Loaded File: HNGR_MF129XeGener
Loaded File: HNGR_MF_WIP_Xenon
<Student Version> : HypPo Visualizer
Phase Angle: 107
Signal
Time
noise
Get Noise from File
Real
Mag
Offset:
Normalize:
View Averaged
Phase Correct
X Axis
ppm
Frequency
Reset Axes
Spectral Slider
File Slider
Spectrum Index: 1
SNR: 86.959
FWHM: 25.592
Range(Hz): 23.44->31.25
Change domain of spectrum


<Student Version...
Hyper Polarized Gas
Data Tool
Files
Loaded File: HNGR_MF129XeGener
Loaded File: HNGR_MF_WIP_Xenon


<Student Version> : HypPo Visualizer
View max signal
for all acquisitions
Peak Signal
Acquisition
signal
Real
Mag
2D
3D
Offset:
Normalize:
View Averaged
Phase Correct
X Axis
ppm
Frequency
Reset Axes
Spectral Slider
File Slider
Current File: HNGR_MF_WIP_Xenon_FlipTest_15fa_38_2_raw_act.SPAR
Peaks are offset by 215.7001 ppm
Peak 2 selected
Peak 1 selected
Current File: HNGR_MF129XeGeneral003_WIP_Xenon_FlipTest_15fa_50_2_raw_act.SPAR
Calculations:


<Student Version...
Hyper Polarized Gas
Data Tool
Files
Loaded File: HNGR_MF129XeGener

Loaded File: HNGR_MF_WIP_Xenon


<Student Version> : HypPo Visualizer
signal
Real
Mag
2D
3D
Offset:
Normalize:
View Averaged
Phase Correct
150
100
50
0
0
5
10
15
-20
-100
0
100
200
View all spectra
X Axis
ppm
Frequency
Reset Axes
Acquisition
Spectral Slider
File Slider
Current File: HNGR_MF_WIP_Xenon_FlipTest_15fa_38_2_raw_act.SPAR

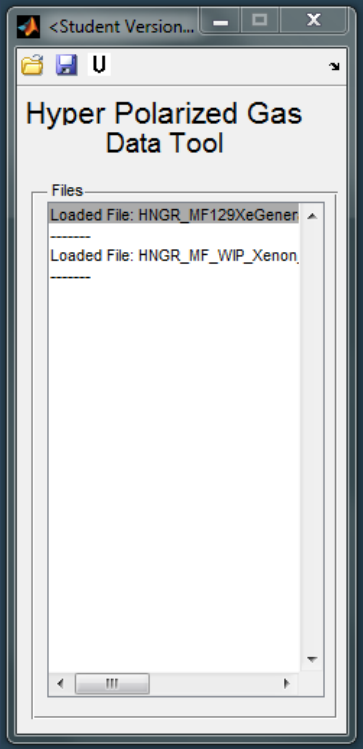
Peaks are offset by 215.7001 ppm

Peak 2 selected

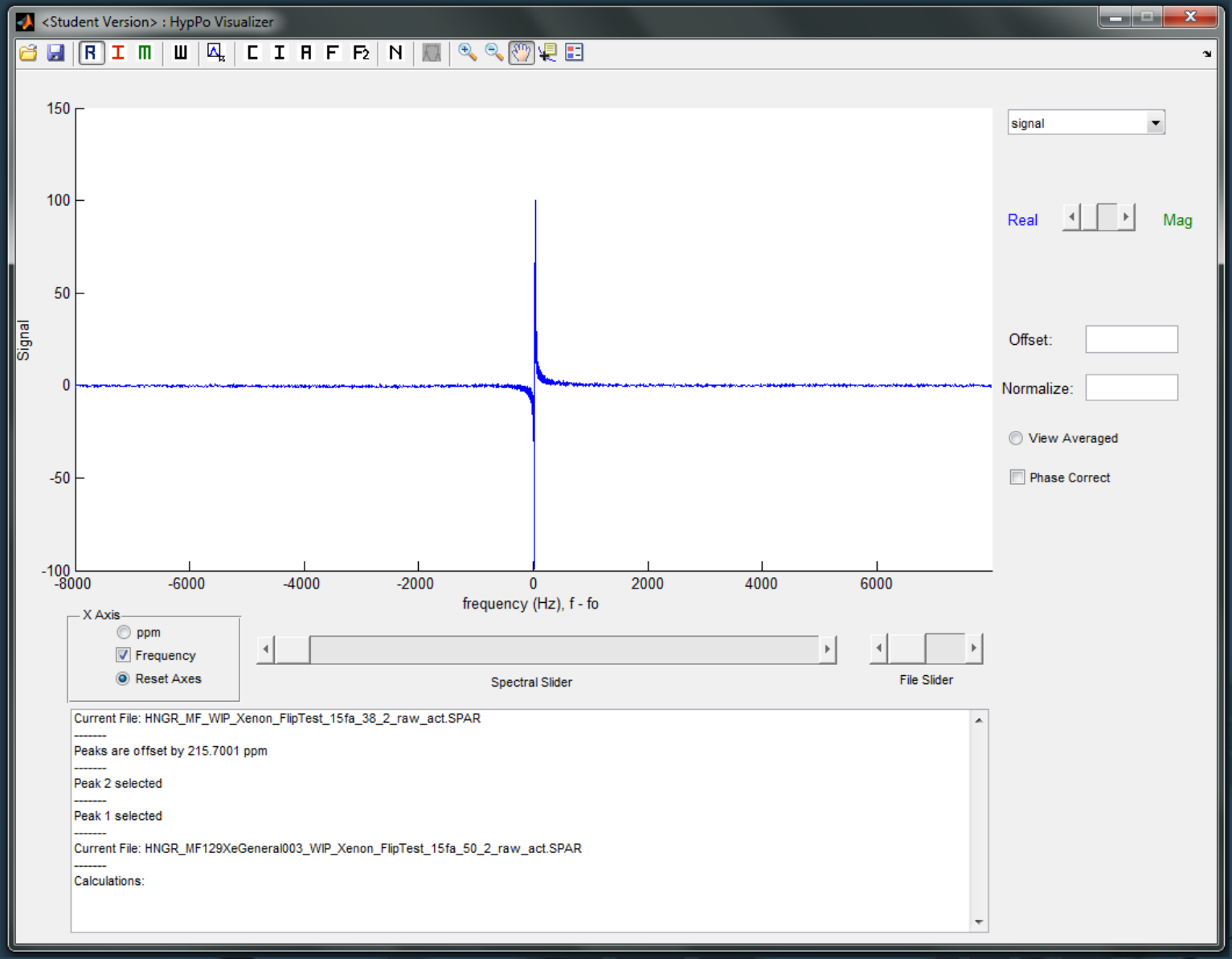
Peak 1 selected

Current File: HNGR_MF129XeGeneral003_WIP_Xenon_FlipTest_15fa_50_2_raw_act.SPAR

Calculations:


<Student Version...
Hyper Polarized Gas
Data Tool
Files
Loaded File: HNGR_MF129XeGener

Loaded File: HNGR_MF_WIP_Xenon


<Student Version> : HypPo Visualizer
150
100
50
0
-50
-100
Signal
-8000
-6000
-4000
-2000
0
2000
4000
6000
frequency (Hz), f - fo
signal
Real
Mag
Offset:
Normalize:
View Averaged
Phase Correct
X Axis
ppm
Frequency
Reset Axes
Spectral Slider
File Slider
Current File: HNGR_MF_WIP_Xenon_FlipTest_15fa_38_2_raw_act.SPAR

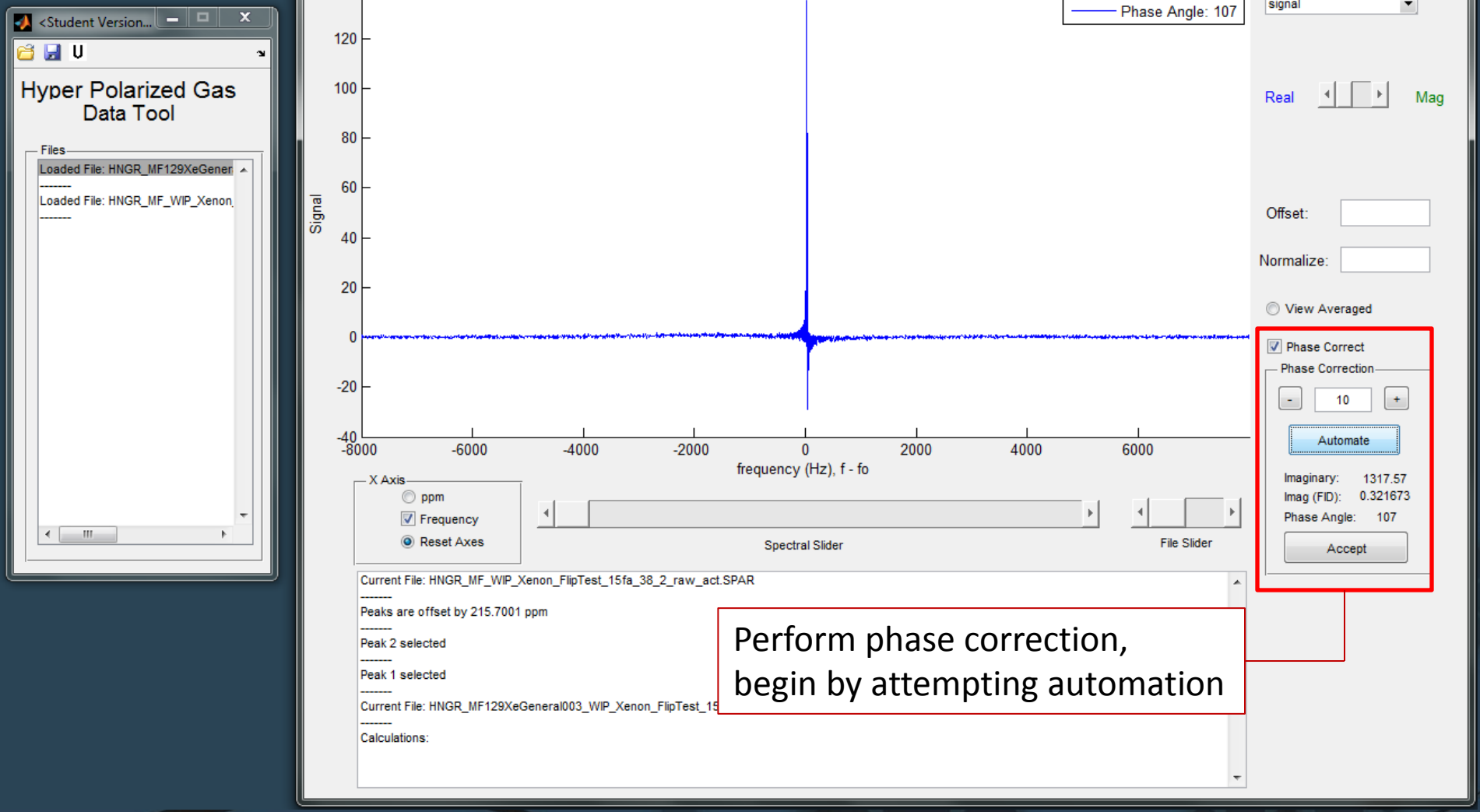
Peaks are offset by 215.7001 ppm

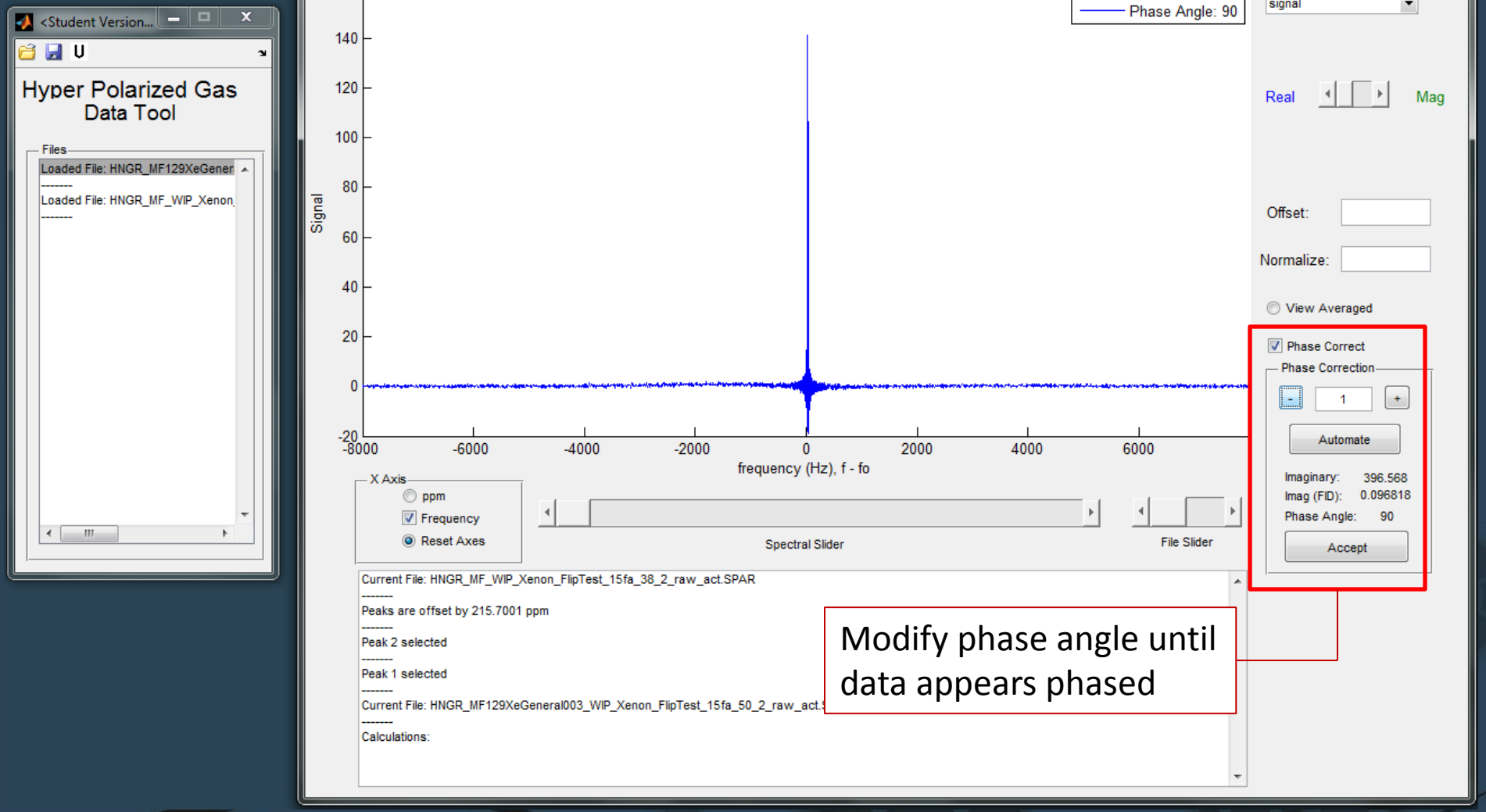
Peak 2 selected

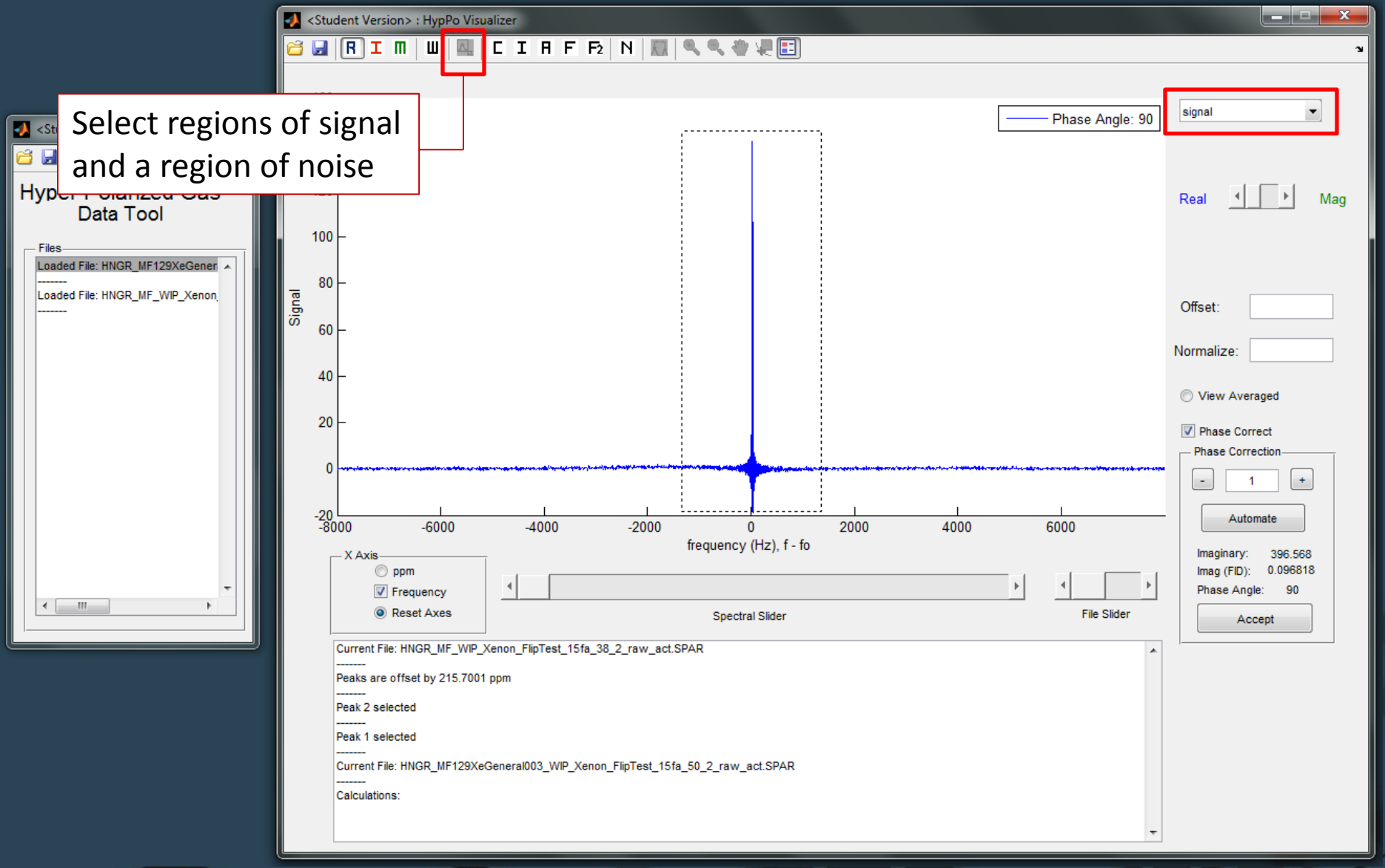
Peak 1 selected

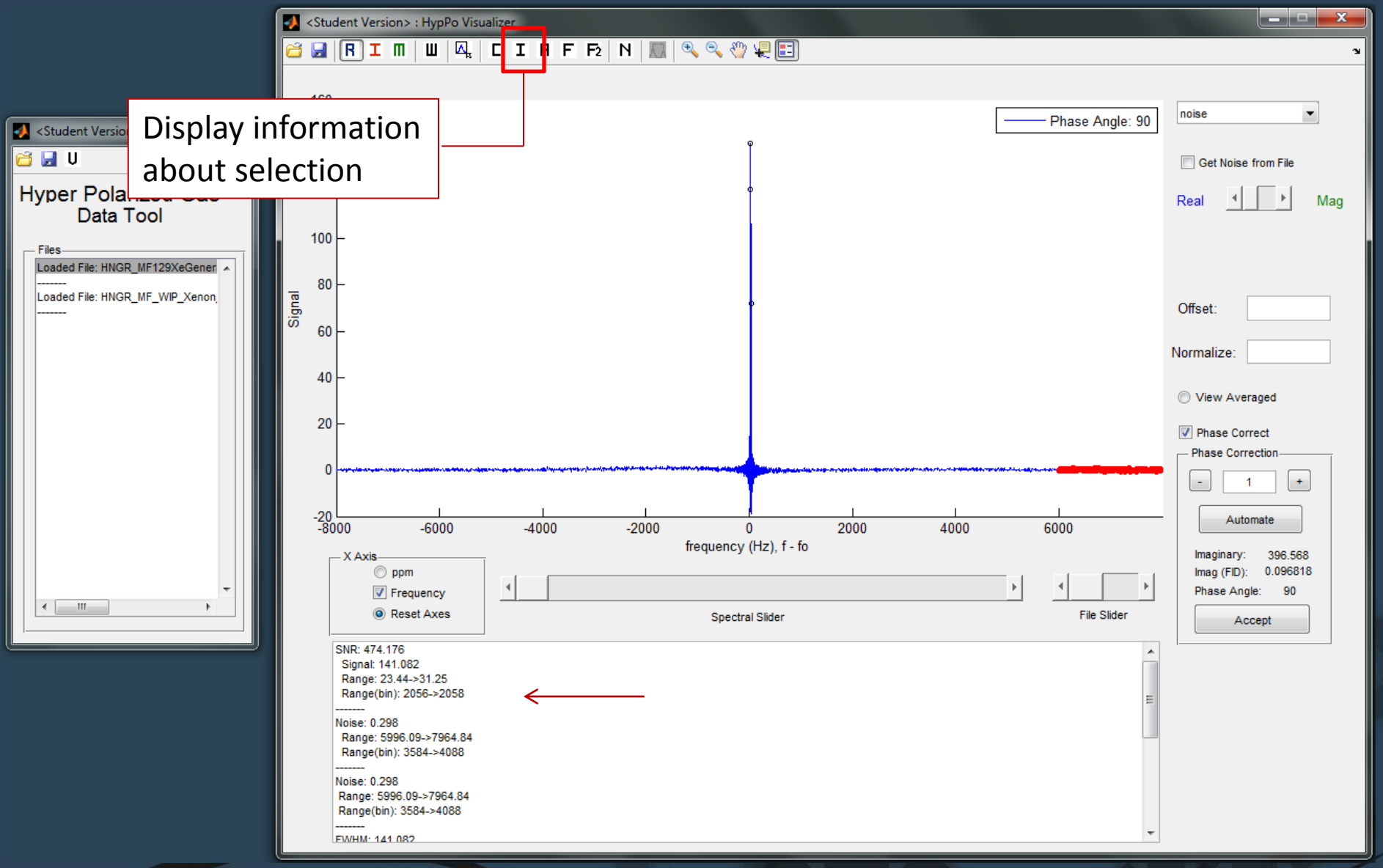
Current File: HNGR_MF129XeGeneral003_WIP_Xenon_FlipTest_15fa_50_2_raw_act.SPAR

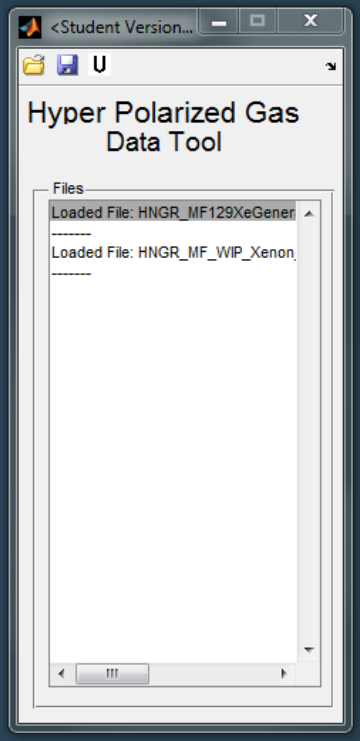
Calculations:

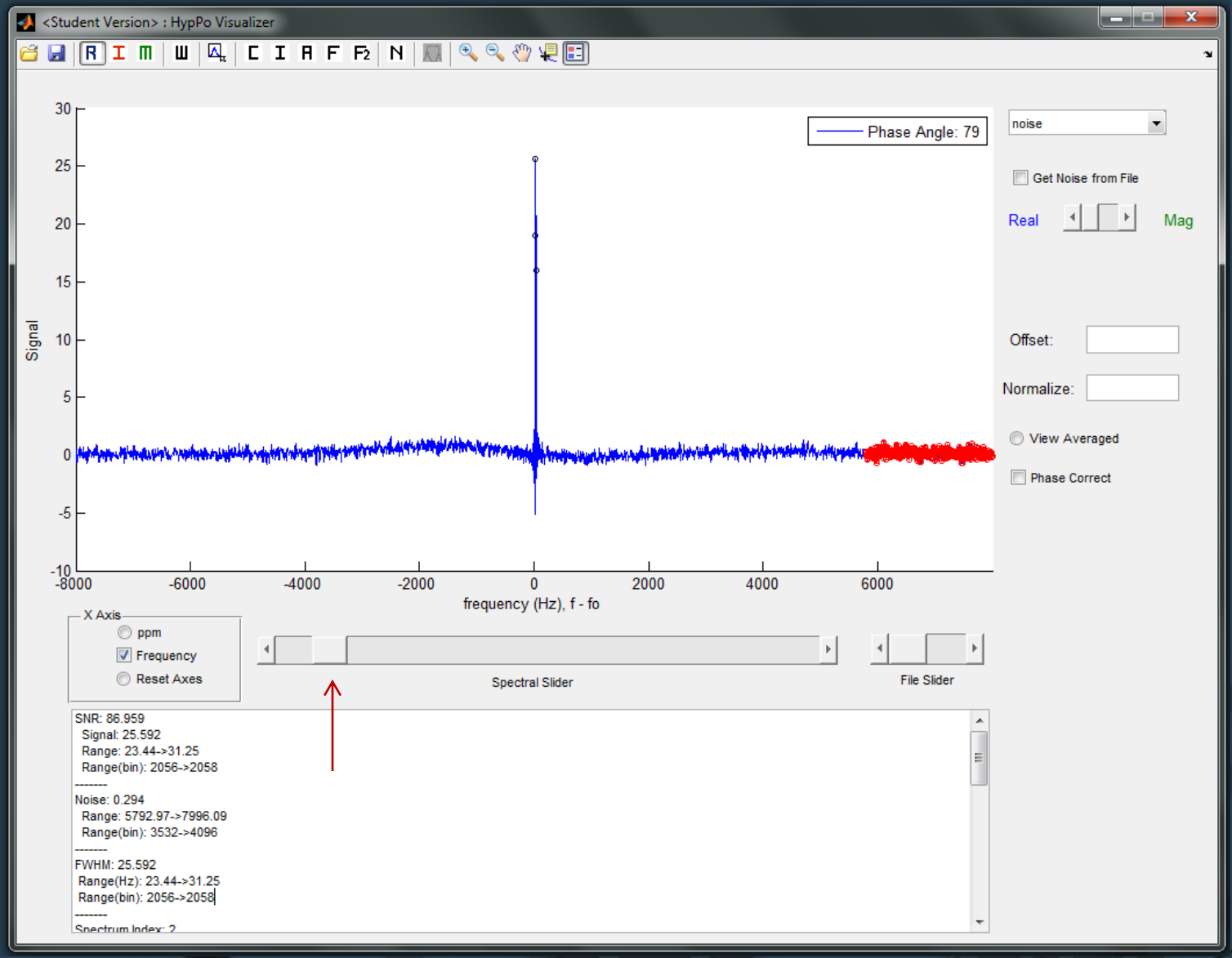

<Student Version...
Hyper Polarized Gas Data Tool
Files
Loaded File: HNGR_MF129XeGener
Loaded File: HNGR_MF_WIP_Xenon
<Student Version> : HypPo Visualizer
Phase Angle: 107
signal
Real
Mag
Signal
frequency (Hz), f - fo
Offset:
Normalize:
View Averaged
Phase Correct
Phase Correction
10
Automate
Imaginary: 1317.57
Imag (FID): 0.321673
Phase Angle: 107
Accept
X Axis
ppm
Frequency
Reset Axes
Spectral Slider
File Slider
Current File: HNGR_MF_WIP_Xenon_FlipTest_15fa_38_2_raw_act.SPAR
Peaks are offset by 215.7001 ppm
Peak 2 selected
Peak 1 selected
Current File: HNGR_MF129XeGeneral003_WIP_Xenon_FlipTest_15
Calculations:
Perform phase correction,
begin by attempting automation

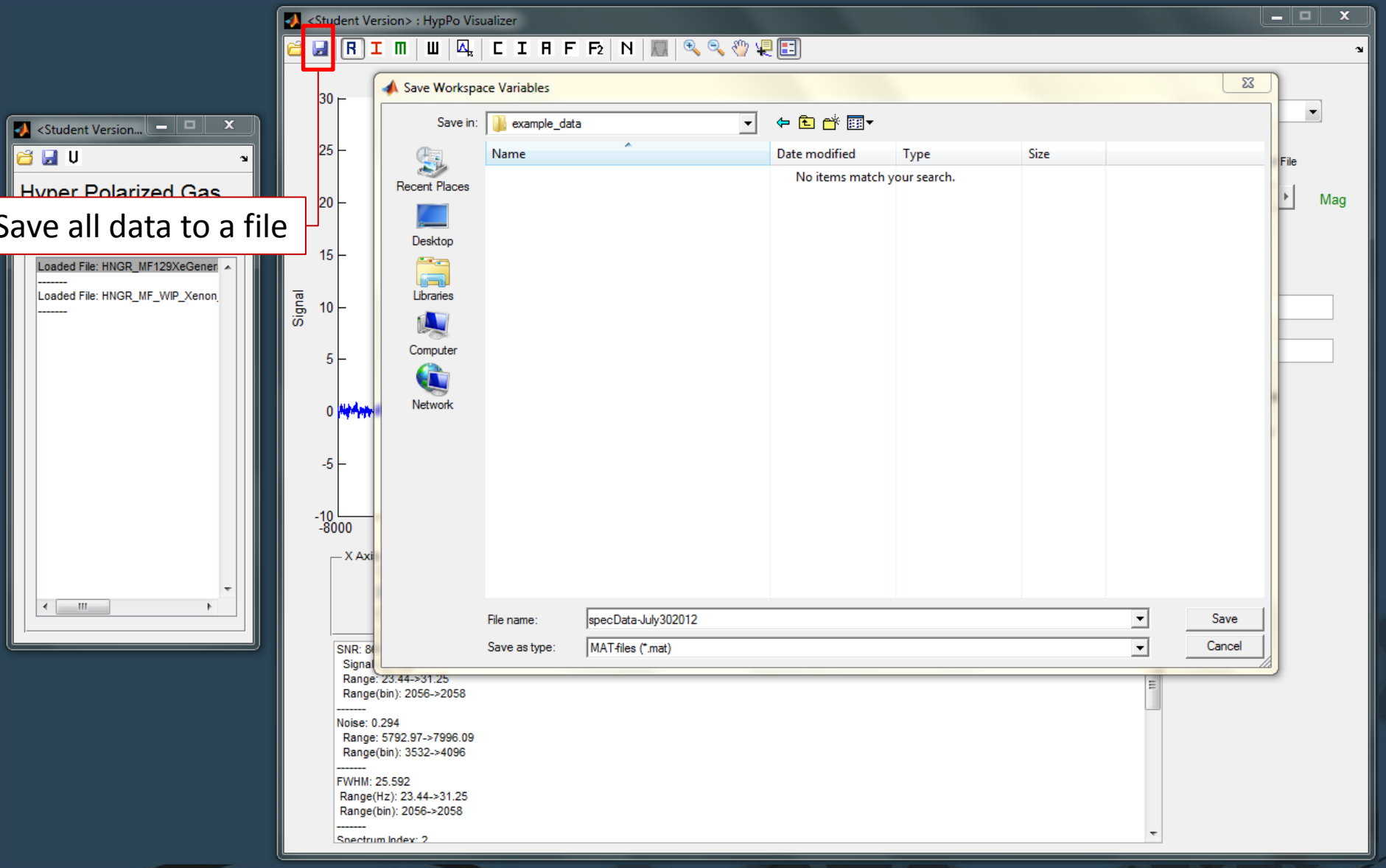

<Student Version...
Hyper Polarized Gas Data Tool
Files
Loaded File: HNGR_MF129XeGener
Loaded File: HNGR_MF_WIP_Xenon
<Student Version> : HypPo Visualizer
Phase Angle: 90
signal
Real
Mag
Signal
frequency (Hz), f - fo
Offset:
Normalize:
View Averaged
Phase Correct
Phase Correction
Automate
Imaginary: 396.568
Imag (FID): 0.096818
Phase Angle: 90
Accept
X Axis
ppm
Frequency
Reset Axes
Spectral Slider
File Slider
Current File: HNGR_MF_WIP_Xenon_FlipTest_15fa_38_2_raw_act.SPAR
Peaks are offset by 215.7001 ppm
Peak 2 selected
Peak 1 selected
Current File: HNGR_MF129XeGeneral003_WIP_Xenon_FlipTest_15fa_50_2_raw_act.
Calculations:
Modify phase angle until data appears phased


Select regions of signal and a region of noise
<Student Version> : HypPo Visualizer
Data Tool
Files
Loaded File: HNGR_MF129XeGener
Loaded File: HNGR_MF_WIP_Xenon
Phase Angle: 90
signal
Real
Mag
Signal
frequency (Hz), f - fo
Offset:
Normalize:
View Averaged
Phase Correct
Phase Correction
Automate
Imaginary: 396.568
Imag (FID): 0.096818
Phase Angle: 90
Accept
X Axis
ppm
Frequency
Reset Axes
Spectral Slider
File Slider
Current File: HNGR_MF_WIP_Xenon_FlipTest_15fa_38_2_raw_act.SPAR
Peaks are offset by 215.7001 ppm
Peak 2 selected
Peak 1 selected
Current File: HNGR_MF129XeGeneral003_WIP_Xenon_FlipTest_15fa_50_2_raw_act.SPAR
Calculations:


Display information about selection
<Student Version> : HypPo Visualizer
Hyper Polarized Gas Data Tool
Files
Loaded File: HNGR_MF129XeGener
Loaded File: HNGR_MF_WIP_Xenon
Phase Angle: 90
noise
Get Noise from File
Real
Mag
Signal
frequency (Hz), f - fo
Offset:
Normalize:
View Averaged
Phase Correct
Phase Correction
Automate
Imaginary: 396.568
Imag (FID): 0.096818
Phase Angle: 90
Accept
X Axis
ppm
Frequency
Reset Axes
Spectral Slider
File Slider
SNR: 474.176
Signal: 141.082
Range: 23.44->31.25
Range(bin): 2056->2058
Noise: 0.298
Range: 5996.09->7964.84
Range(bin): 3584->4088
Noise: 0.298
Range: 5996.09->7964.84
Range(bin): 3584->4088
FWHM: 141.082


<Student Version...
Hyper Polarized Gas
Data Tool
Files
Loaded File: HNGR_MF129XeGener
Loaded File: HNGR_MF_WIP_Xenon


<Student Version> : HypPo Visualizer
Phase Angle: 79
Signal
frequency (Hz), f - fo
noise
Get Noise from File
Real
Mag
Offset:
Normalize:
View Averaged
Phase Correct
X Axis
ppm
Frequency
Reset Axes
Spectral Slider
File Slider
SNR: 86.959
Signal: 25.592
Range: 23.44->31.25
Range(bin): 2056->2058
Noise: 0.294
Range: 5792.97->7996.09
Range(bin): 3532->4096
FWHM: 25.592
Range(Hz): 23.44->31.25
Range(bin): 2056->2058


<Student Version> : HypPo Visualizer
Save all data to a file
Save Workspace Variables
Save in:
example_data
Recent Places
Desktop
Libraries
Computer
Network
Name
Date modified
Type
Size
No items match your search.
File name:
specData-July302012
Save as type:
MAT-files (*.mat)
Save
Cancel
Signal
Loaded File: HNGR_MF129XeGener
Loaded File: HNGR_MF_WIP_Xenon
SNR: 8
Range: 23.44->31.25
Range(bin): 2056->2058
Noise: 0.294
Range: 5792.97->7996.09
Range(bin): 3532->4096
FWHM: 25.592
Range(Hz): 23.44->31.25
Range(bin): 2056->2058
Spectrum Index: 2

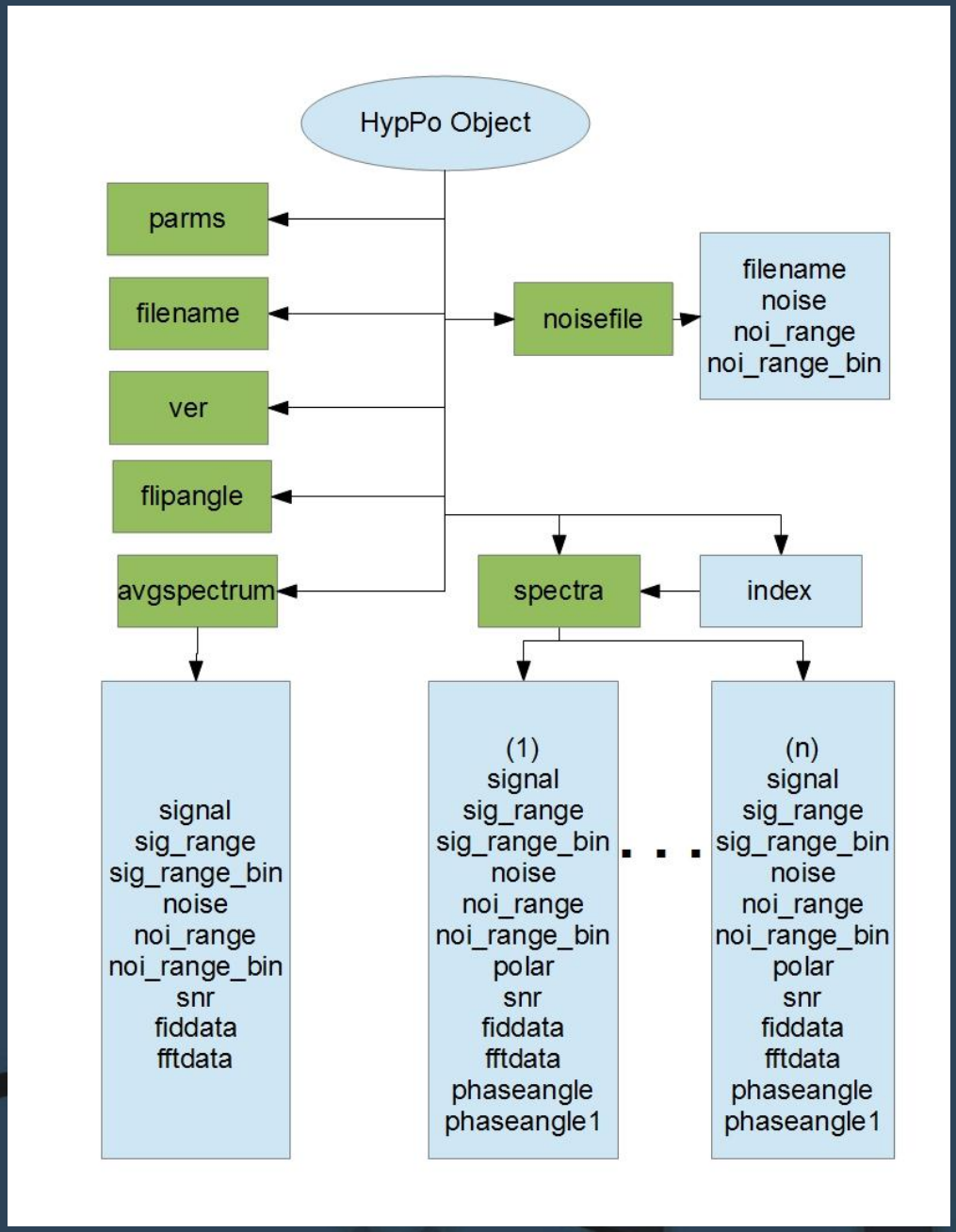
```
EDU>> load('specData-July302012.mat')
EDU>> dataArr

dataArr =

  1x2 hypData handle

  Properties:
    spectra
    avgspectrum
    ver
    parms
    filename
    flipangle
    noisefile
    index

  Methods, Events, Superclasses
```


HypPo Object
parms
filename
ver
flipangle
avgspectrum
noisefile
filename
noise
noi_range
noi_range_bin
spectra
index
signal
sig_range
sig_range_bin
noise
noi_range
noi_range_bin
snr
fiddata
fftdata
(1)
signal
sig_range
sig_range_bin
noise
noi_range
noi_range_bin
polar
snr
fiddata
fftdata
phaseangle
phaseangle1
(n)
signal
sig_range
sig_range_bin
noise
noi_range
noi_range_bin
polar
snr
fiddata
fftdata
phaseangle
phaseangle1

```
EDU>> load('specData-July302012-3.mat')
EDU>> dataArr(1).filename

ans =

HNGR_MF129XeGeneral003_WIP_Xenon_FlipTest_15fa_50_2_raw_act.SPAR

EDU>> dataArr(1).getSNR

ans =

    9.5993   66.2221

EDU>> dataArr(1).getPhaseAngle

ans =

    28
```

Data is stored as an object which can be interacted with in the matlab workspace.

Built in functions are provided for ease of access.

```
EDU>> dataArr(1).setFlipAngle(90)

ans =

  hypData handle

  Properties:
        spectra: [1x30 struct]
    avgspectrum: [1x1 struct]
            ver: 'This file contains time domain data in the spectral dimension.  '
          parms: [1x1 struct]
       filename: 'HNGR_MF129XeGeneral003_WIP_Xenon_FlipTest_15fa_50_2_raw_act.SPAR'
      flipangle: 90
      noisefile: [1x1 struct]
          index: 1

  Methods, Events, Superclasses
```

```
Methods for class hypData:

addlistener          getFID               getSigRangeAvg       notify               setSNRAvg
clearCalcs           getFlipAngle         getSigRangeAvgBin    setAveragedData      setSigRange
clearCalcsAvg        getNoiRange          getSigRangeBin       setDatapoints        setSigRangeAvg
correctPhase         getNoiRangeAvg       getSignal            setFlipAngle         setSigRangeAvgBin
delete               getNoiRangeAvgBin    getSignalAvg         setNoiRange          setSigRangeBin
eq                   getNoiRangeBin       getSpectrum          setNoiRangeAvg       setSignal
findobj              getNoise             gt                   setNoiRangeAvgBin    setSignalAvg
findprop             getNoiseAvg          hypData              setNoiRangeBin       setSpectrum
ge                   getPhaseAngle        identify             setNoise
getAllFFT            getPolar             isvalid              setNoiseAvg
getAveragedData      getSNR               le                   setPhaseAngle
getDatapoints        getSNRAvg            lt                   setPolar
getFFT               getSigRange          ne                   setSNR
```

Measuring the size of this program

```
import fileinput, glob, string, sys

code, comments, total = 0, 0, 0
for line in fileinput.input(glob.glob("C:/Users/Owner/Desktop/hyppo/*.m")):
    if fileinput.isfirstline():
        sys.stderr.write("-- reading %s\n" % fileinput.filename())
    line = line.strip()
    if not line:
        continue
    if line[0] == "%":
        comments += 1
    else:
         code += 1
    total += 1

print "total:", total, "\ncomments:", comments, "\ncode:", code
```

```
total: 2750
comments: 699
code: 2051
```

For information about extending HypPo, see Code Documentation – Developers Guide