ISIS User Manual

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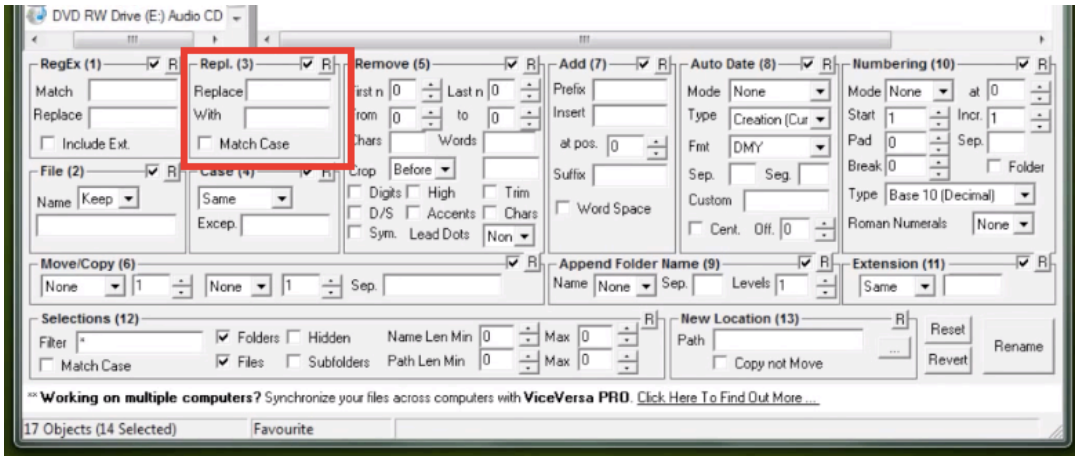
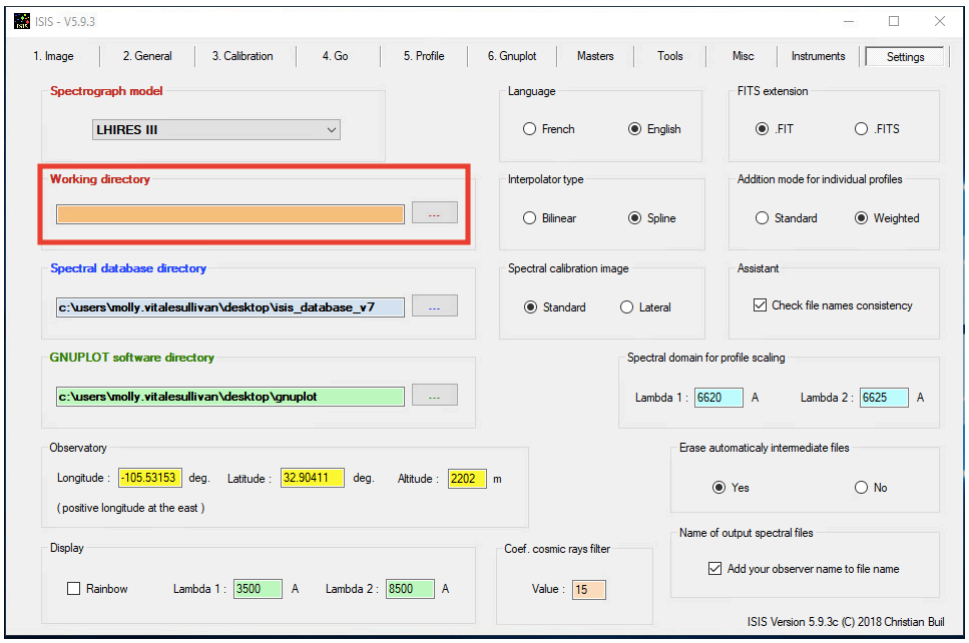
1) **Rename files**
    a) In the Bulk Rename Utility program select which files you would like to rename.
    b) In the 'Replace (3)' section, replace zeros and unneeded hyphens to the format 'starname-sequence#.fit'
    c) The renaming process is the same for flats and cal



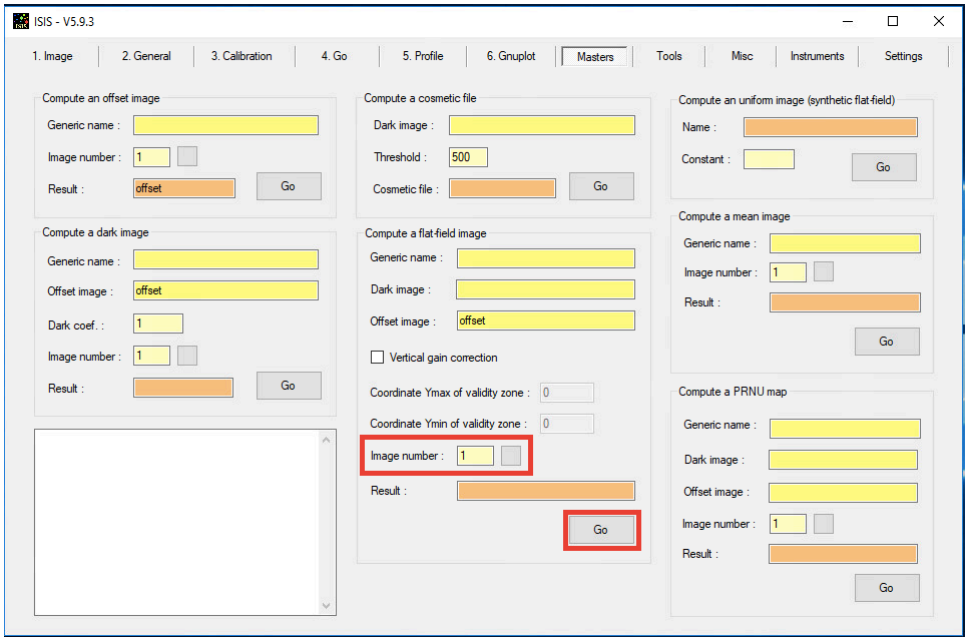
2) **Copy Masters into folder**
    a) M_Bias_2x2-15C.fit
    b) M_Dark10s2x2-15C.fit
    c) M_Dark600s2x2-15C.fit
    d) Hot_Pix_Map.lst
    e) response_starname_mm-dd-yy
    f) 6532start.lst

3) **Settings Tab**
    a) In the *Settings tab* and choose '...' below Working directory to choose the desired folder.

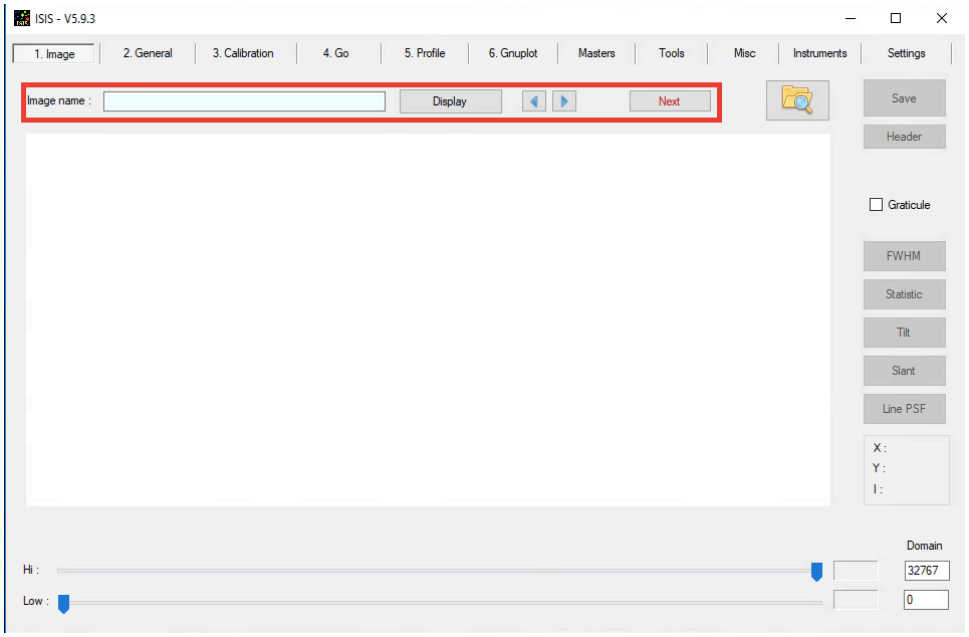


4) **Masters Tab**

a) In the *Masters tab,* click the box next to image number to double check that ISIS is reading the correct number of flats.
b) Click 'Go' and the M_Flat.fit file will be added to the folder



5) **Image Tab**
a) Choose the correct folder and select the first image.
b) Go through all the images to make sure they are all appearing correctly. Remove any outcasts.
c) Can adjust 'Hi:' for better quality of the spectra.
d) Click Next to go to general.



6) **General Tab**
a) Make sure the Root name and the Object name match the star name
b) Insert cal_1 file into calibration box
c) In the "Files name prefix and suffix" section make sure to put a hyphen in the object suffix box
d) In the "Spectral Calibration" box is where you choose which wavelengths you're spectra will include. The predefined mode: 2400 grooves/mm (3 lines) will start you at the hydrogen alpha

e) If you want to do custom mode, you will have to make a Dispersion number .lst file in notepad and insert the name of the file (omit .lst) in the box beside

i) The dispersion number conveys how wavelength changes as you go across pixels. You have to manually change the part of spectra you want to look at (between which wavelengths you collect), take the spectra, and then tell ISIS what wavelengths. Make sure to type the starting wavelength in the X Coordinate of Line at Wavelength box in *Calibration* Tab. To do this, you gotta make a notepad document with the following

ii) Subtract the third (highest) wavelength from the first (lowest) wavelength

iii) Go to calibration tab as display the calibration photo from the spectra

iv) Put cursor over the middle of the first line on the red line to find the x coordinate of the middle pixel

v) Put cursor over the middle of the third line on the red line to find the x coordinate of the middle pixel

vi) Subtract the third pixel coordinate from the first pixel coordinate

vii) Divide the change in wavelength by the change in pixels. This will be your dispersion number

Change in Wavelength/ Change in Pixels

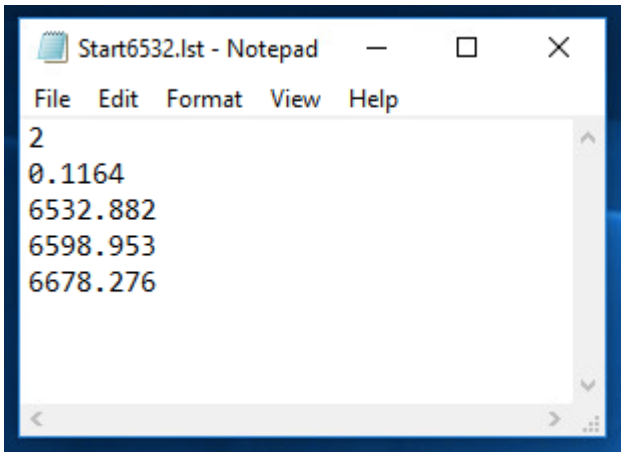
viii) Open notepad and put the following

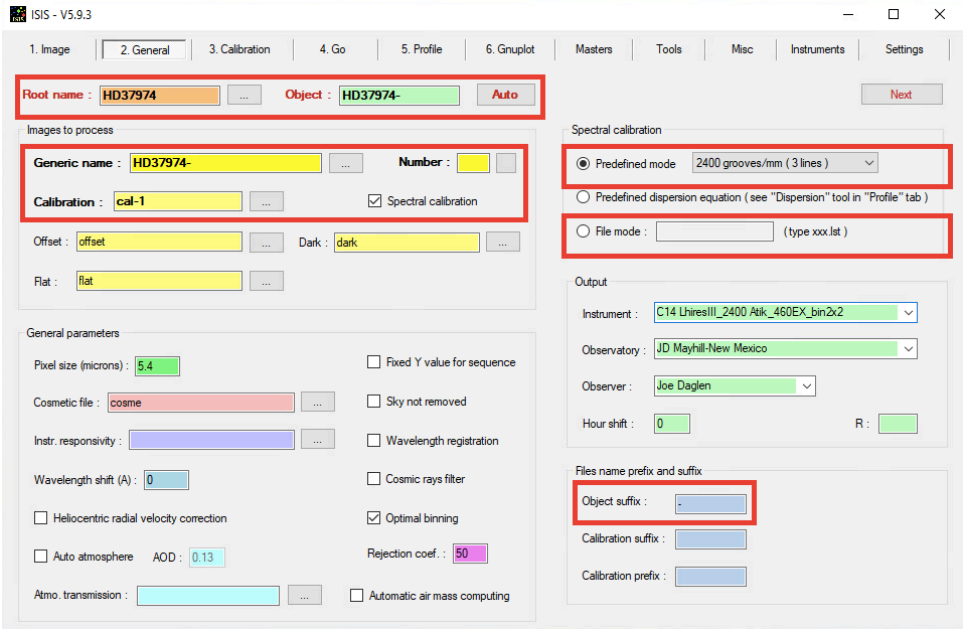
(1) 2 (This number is the polynomial. Since we have 3 wavelengths, polynomial is 2)

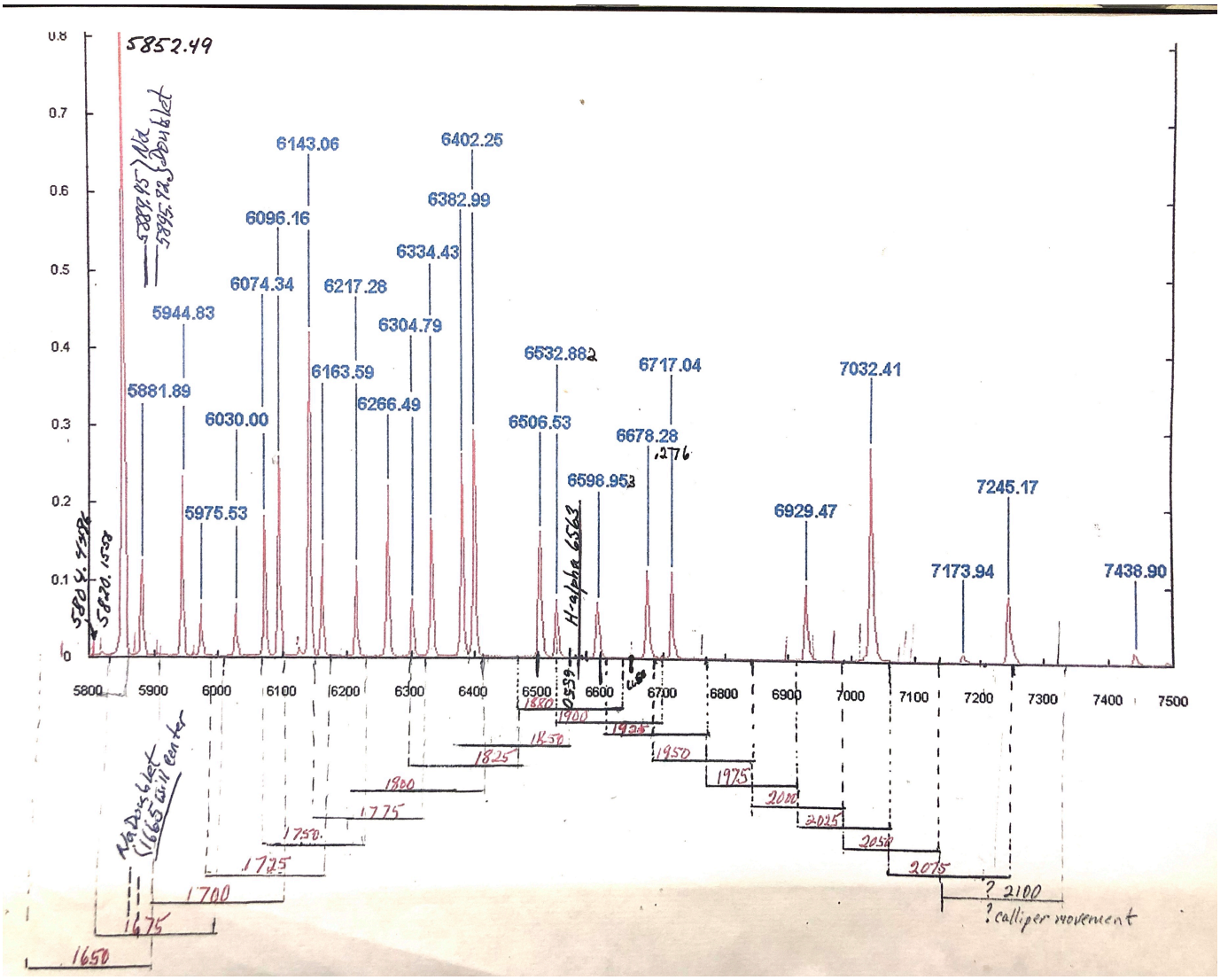
(2) Dispersion number

(3) List the three different wave length numbers

ix) Save as a .lst file (Just type name and then .lst)







7) **Calibration Tab**

a) Click on the center of the spectra to set the vertical coordinate

b) Draw a box around the center lines above and below the spectra, then click Tilt
c) Next to Calibration Image, click Display. The calibration lines should appear
d) Scroll to the leftmost calibration line and slide the Seuil haut to the left enough to decrease the width of the calibration line.
e) Click on the center of the calibration line to set the X coordinate at wavelength ___ to A: ___ (pixels)
f) Draw a box around the calibration line just inside the outer Binning Zone Adjustment lines, then click Slant
g) Click Next

8) **Go Tab**

a) Click Go!

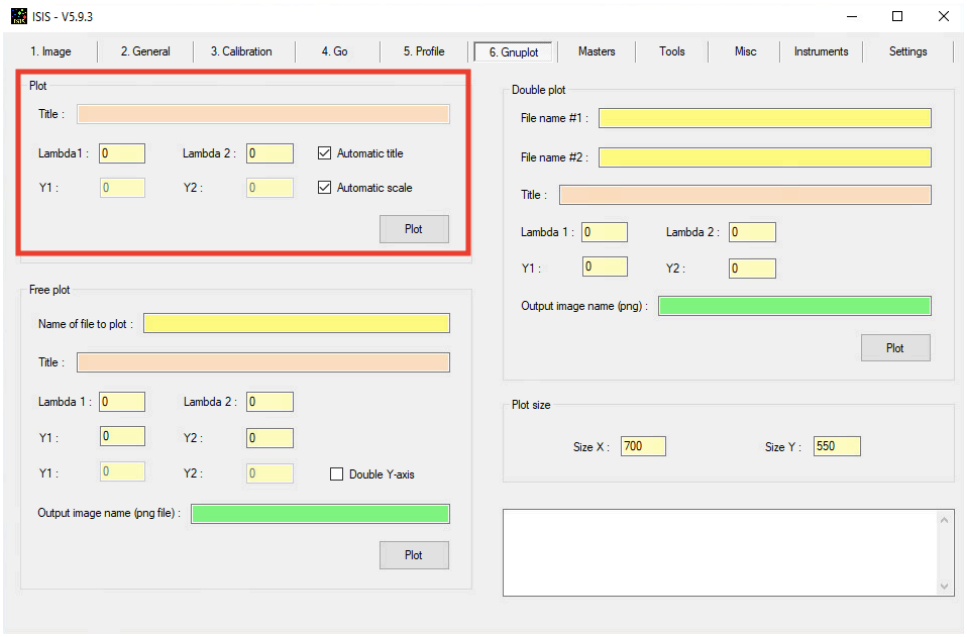
b) Display Profile. This will go to the **Profile Tab** and display the plot.

c) Title the plot- with the standard naming conventions

9) **Gnuplot Tab**

a) Rename the plot to 'starname,date and time' or something to this idea.

b) Click Plot and DONE! There should be a .png image in the folder now



i) YOU DID IT □□ Cheers! □□

10) **Converting to Radial Velocity**

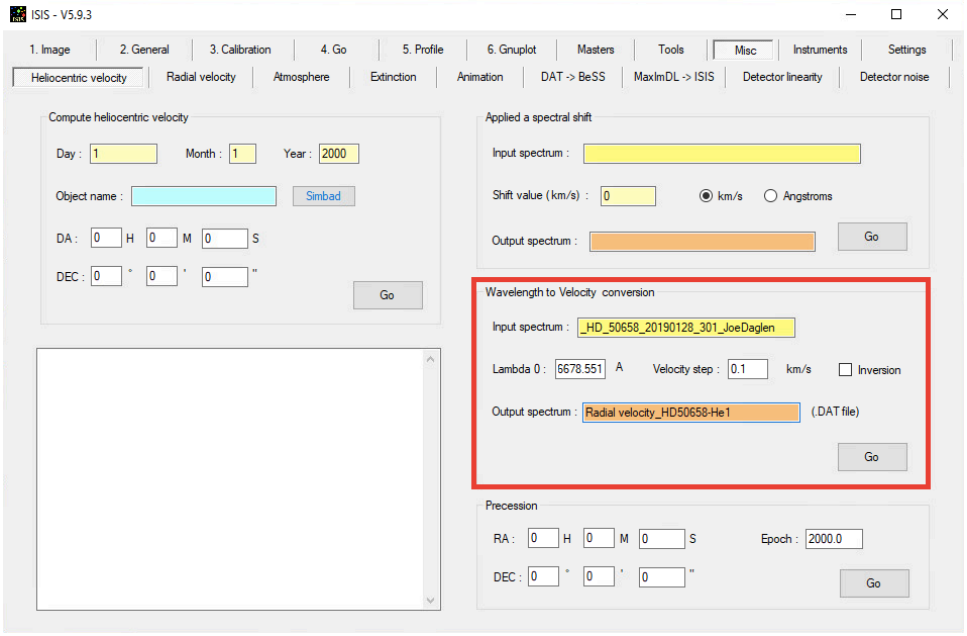
a) Under the *Profile tab* click on FWHM (full-width half max)

b) If it is an absorption peak, choose absorption

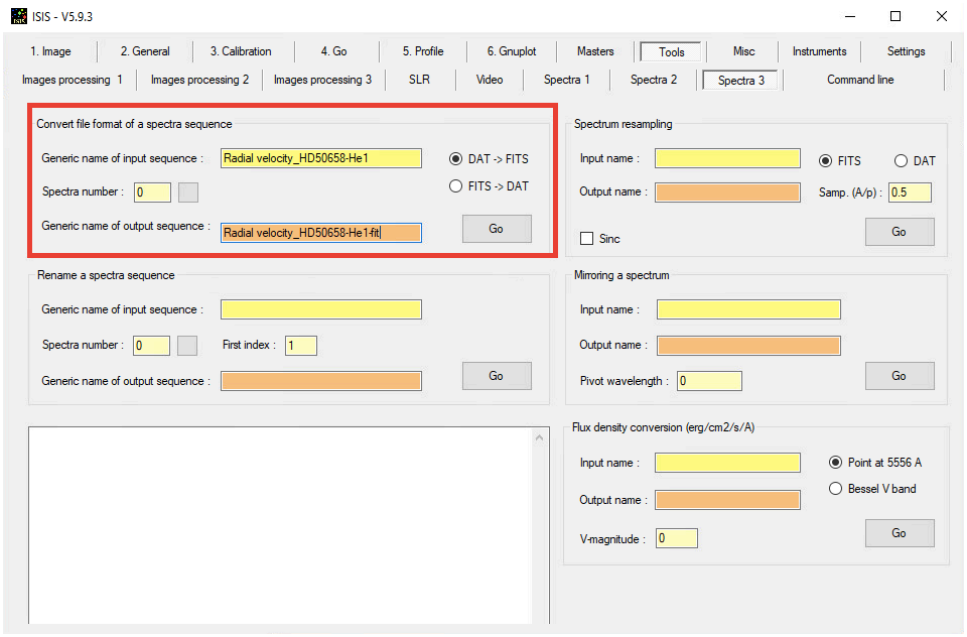
c) Double click on both sides of the peak at the same height

d) Record the Position value and check the signal to noise ratio SNR (3)

e) Under the *Misc tab* and under the Wavelength to Velocity section type profile name into Input Spectrum box, input starting wavelength you got from FWHM, and then title your output spectrum



f) Turn this .dat file into .fit file by going to the *Tools Tab* under the Spectra 3 subtab in the convert file format of a spectra sequence and convert it. Put name in input file and the name you want in the output file



g) You can display this new .fit file on profile. The radial velocity is now in place of the wavelength at the bottom of the screen.

h) Figure out how to label the x-axis with the radial velocity (instead of Angstroms)