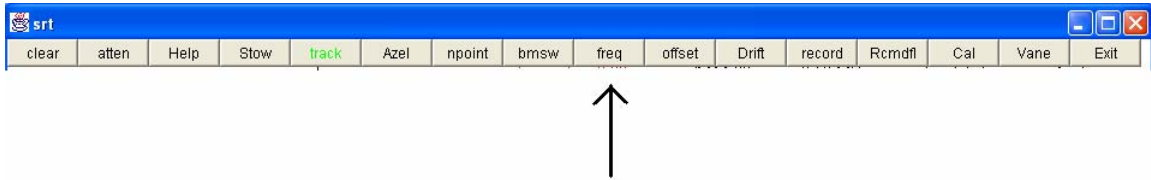


### LESSON #3 SETTING THE FREQUENCY

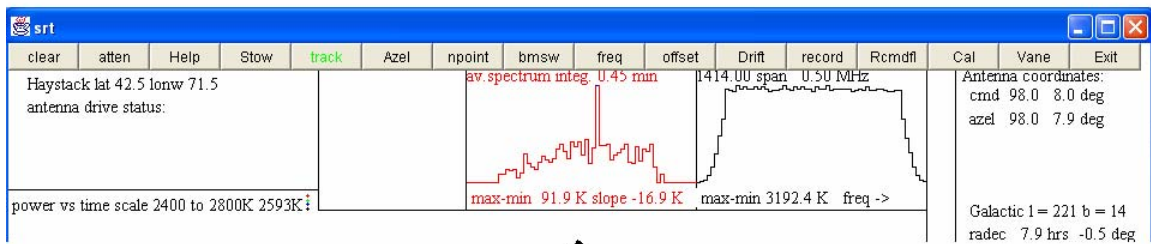
1. Start program
2. Click on the freq button to set the frequency.



3. At the bottom of the screen, type in the number “1420”. This will set the telescope to look at frequencies centered around 1420 MHz.
4. Click on the freq button again.
5. Notice that the following information appears near the bottom of the screen.

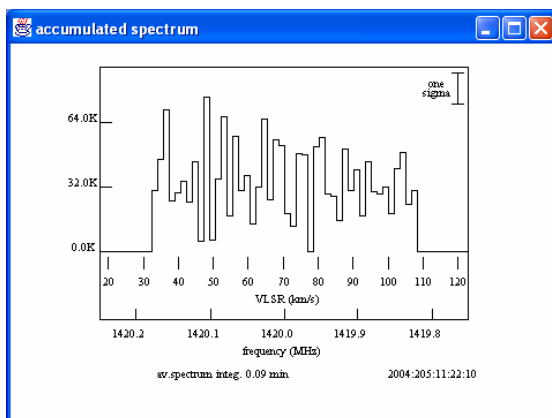
```
enter center frequency, mode Hz), [optional mode]
mode 1 - default bandwidth = 500 kHz mode 2 - bw = 250 kHz mode 3 - bw = 125 kHz mode 4 - 3x500 kHz mode 5 - scanmode
the 21cm hydrogen line has a rest frequency of 1420.4 MHz
default frequency for continuum is 1420.0 MHz continuum uses average power from all frequencies
```

6. Setting the telescope's mode tells the telescope how broad a range of frequencies to look at – the bandwidth. Mode 1, for example, has a bandwidth of 500 kHz or 0.5 MHz.
7. Set the telescope's mode by pressing the freq button and then typing “1420 1” at the bottom of the screen. This will set the telescope to look with a central frequency of 1420 MHz and a bandwidth of 0.5 MHz.
8. Find the box with the red graph near the top of the screen.



This black graph shows the most recent data taken by the telescope. The red graph shows an integration or averaging of the data taken.

9. Click on the red graph. It should appear in it's own window.



10. To make a copy of this picture “press ctrl-alt-printscreens”.

11. Remember how we had set the central frequency to 1420 MHz with a bandwidth of 0.5 MHz. Look at the x-axis of the graph. Notice that the central frequency is 1420 MHz, the maximum frequency (to the left) is 1420.25 MHz and the minimum frequency is 1419.75 MHz.

12. Set the telescope to a different central frequency and a different bandwidth. Predict what the range of the x-axis on the red graph. See if you were correct.

13. Click on stow; you're done.