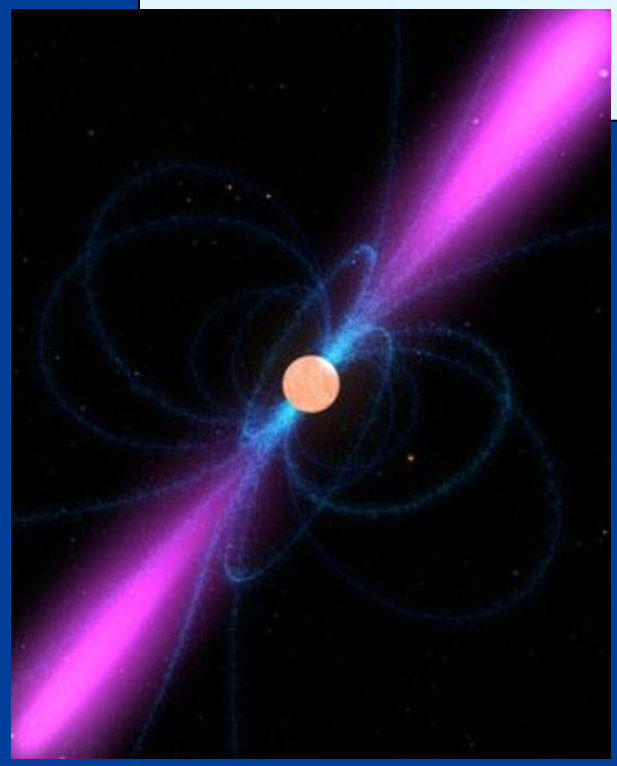


Analytical Review of Presto Plot and GBT drift scan



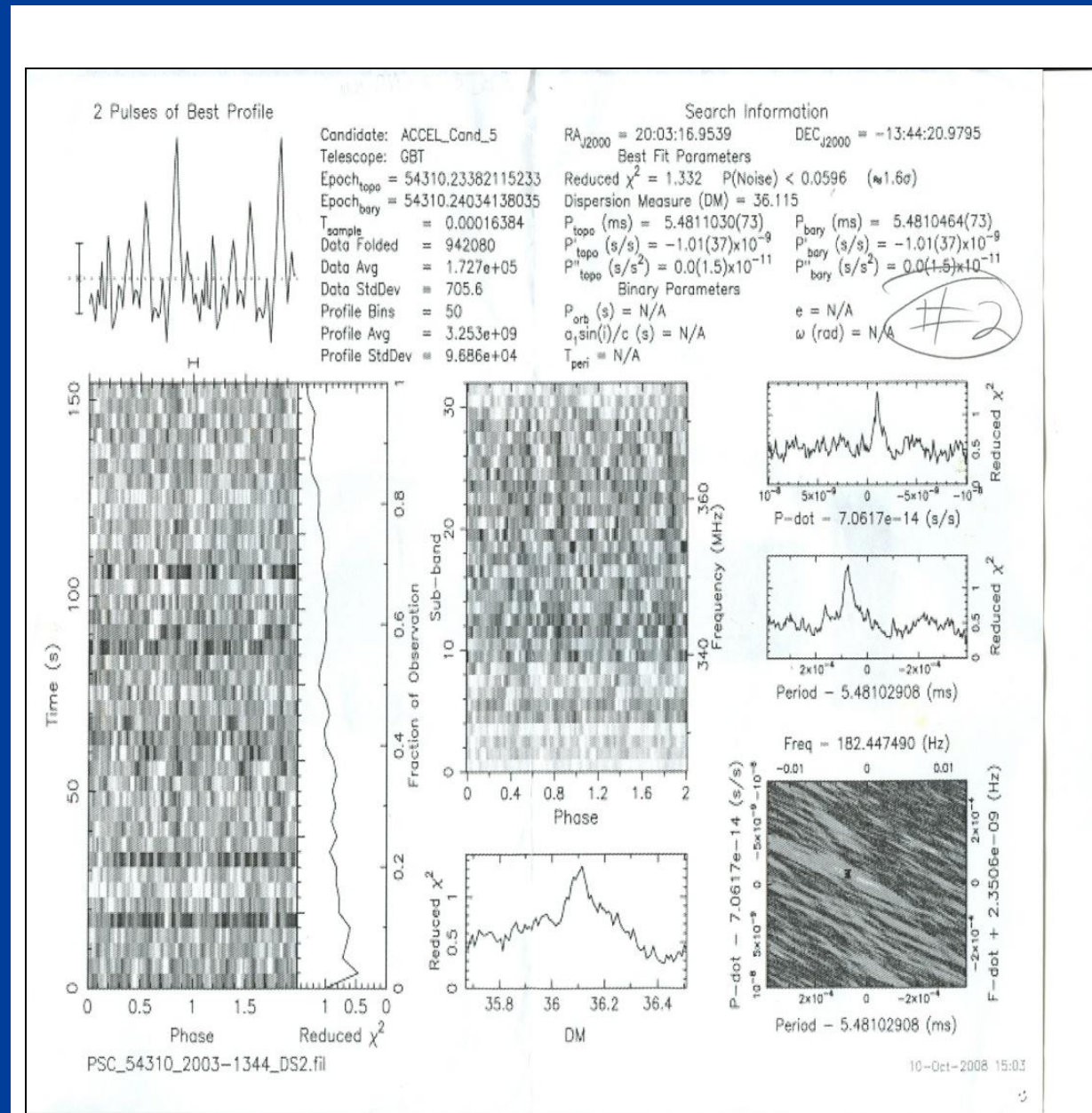
Team Taylor, 2010

Carl Thomas, Eric Smith, Austin Keyser, Jason Ogden, Franz Virtudes, Jesus Hinojosa

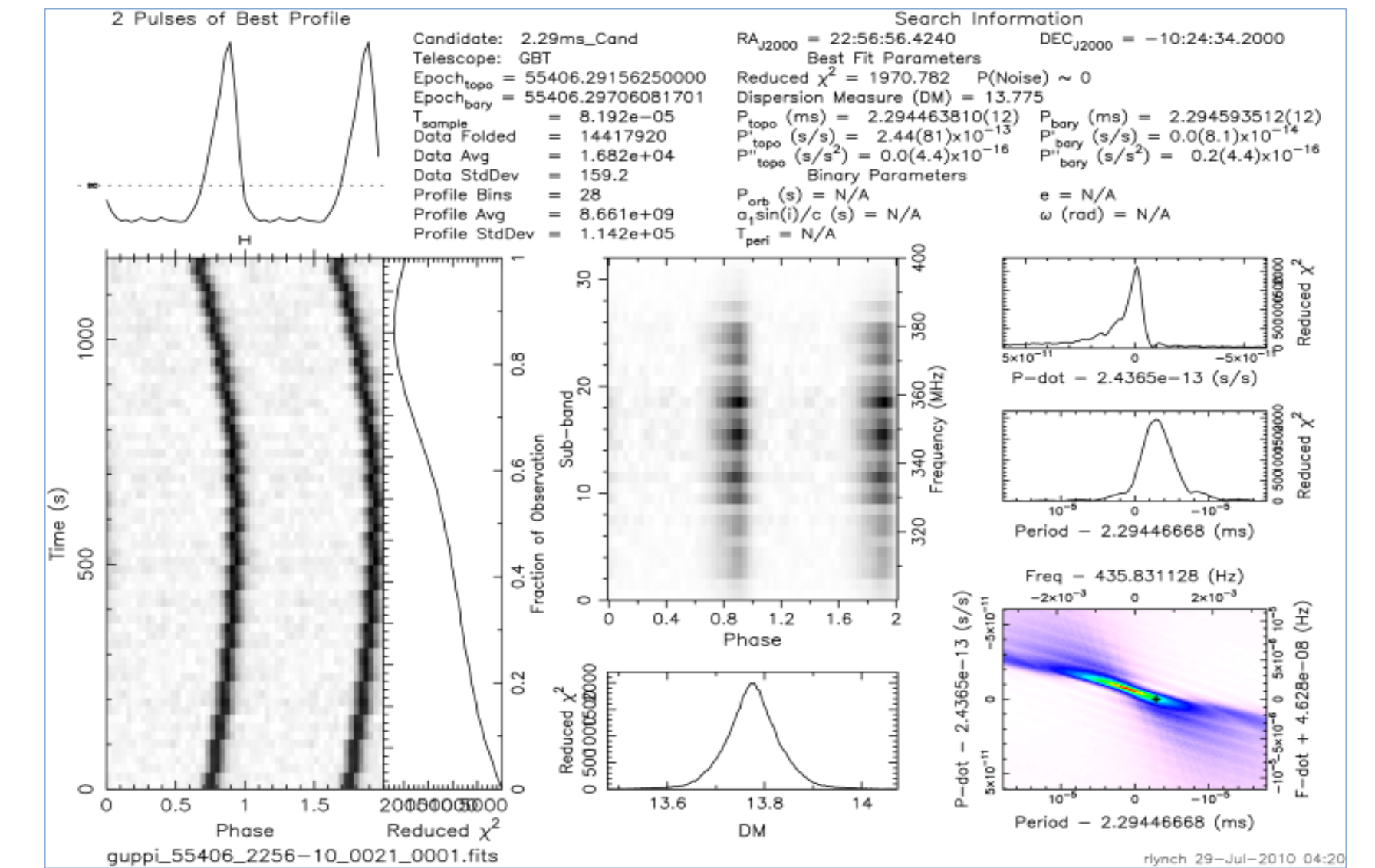
Introduction

We observed objects from the GBT 350 MHz drift scan.

These are the pointings we looked at: 2256-1024, 1854-0649, 1901+0331, 2003-1344, and 2154-1345.



The graph to the left show one of the possible candidates that was just some noise.



Above is the binary black widow pulsar

The orbit of the binary causes the delay and the return of the pulses as seen in the time-domain plot. From the DM you can calculate that is about 1950 light-years away. The pulses are very strong over the noise. The white dwarf that it's orbiting is slowly evaporating due to high energy particle winds coming from the rapidly rotating pulsar. These types of pulsars are known as Black Widow pulsars.

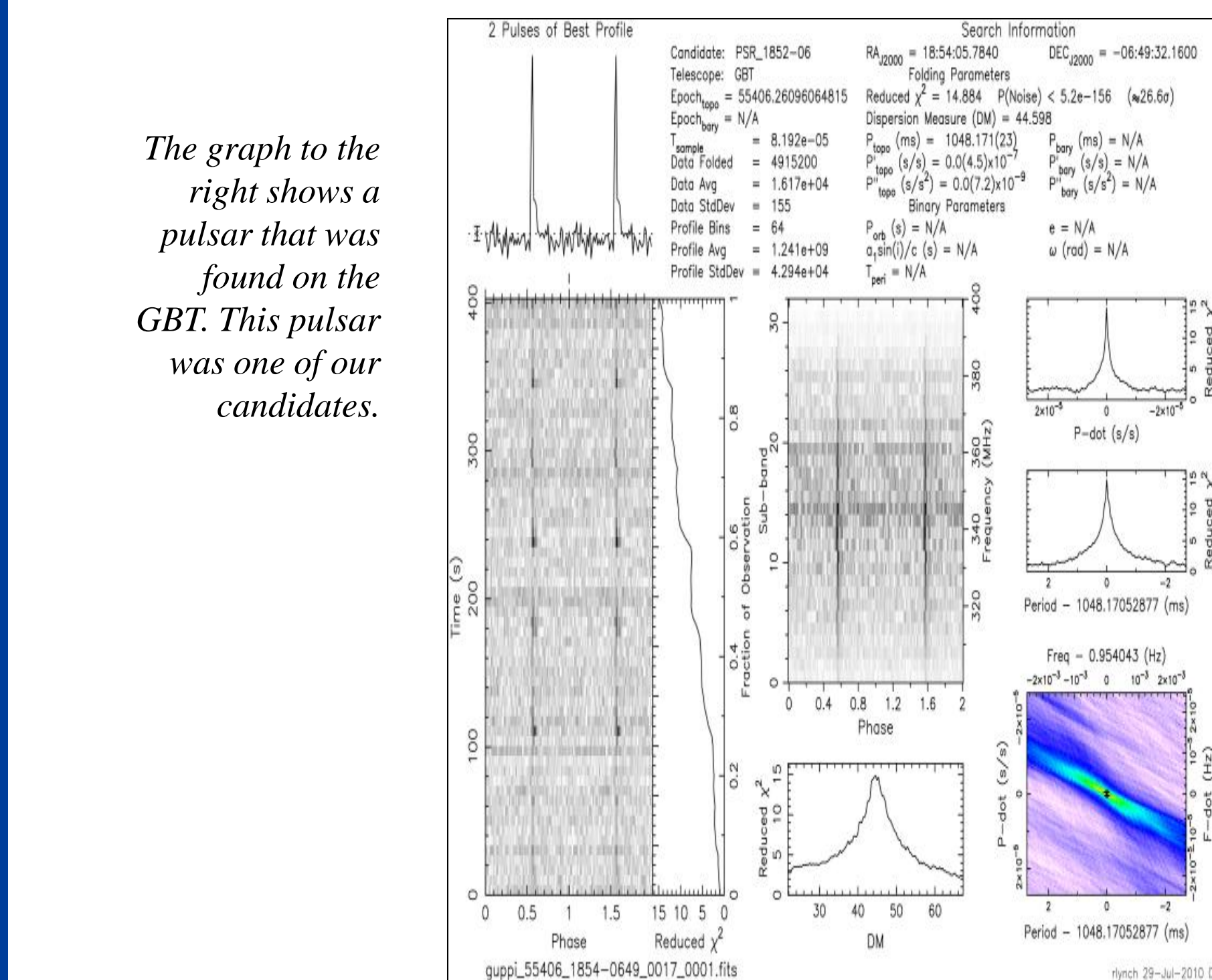
Method

First we found possible candidates to look at when we went to the GBT.

We searched through raw data and looked for these candidates.

Next when we found our objects, we went to the GBT and keyed in the coordinates for our objects in RA and Dec.

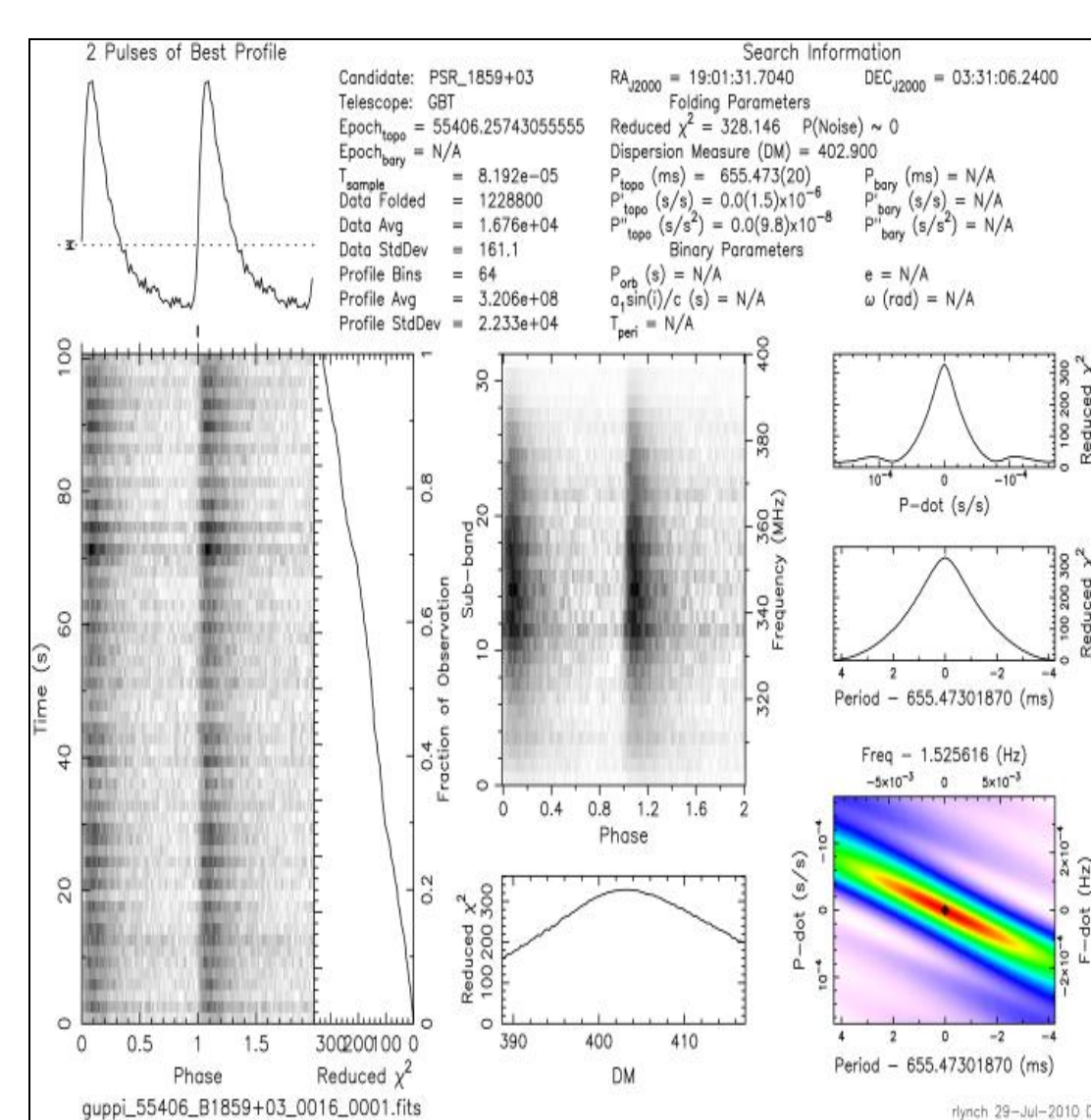
Then the GBT slewed to our objects and scanned that part of the sky.



The graph to the right shows a pulsar that was found on the GBT. This pulsar was one of our candidates.

Results

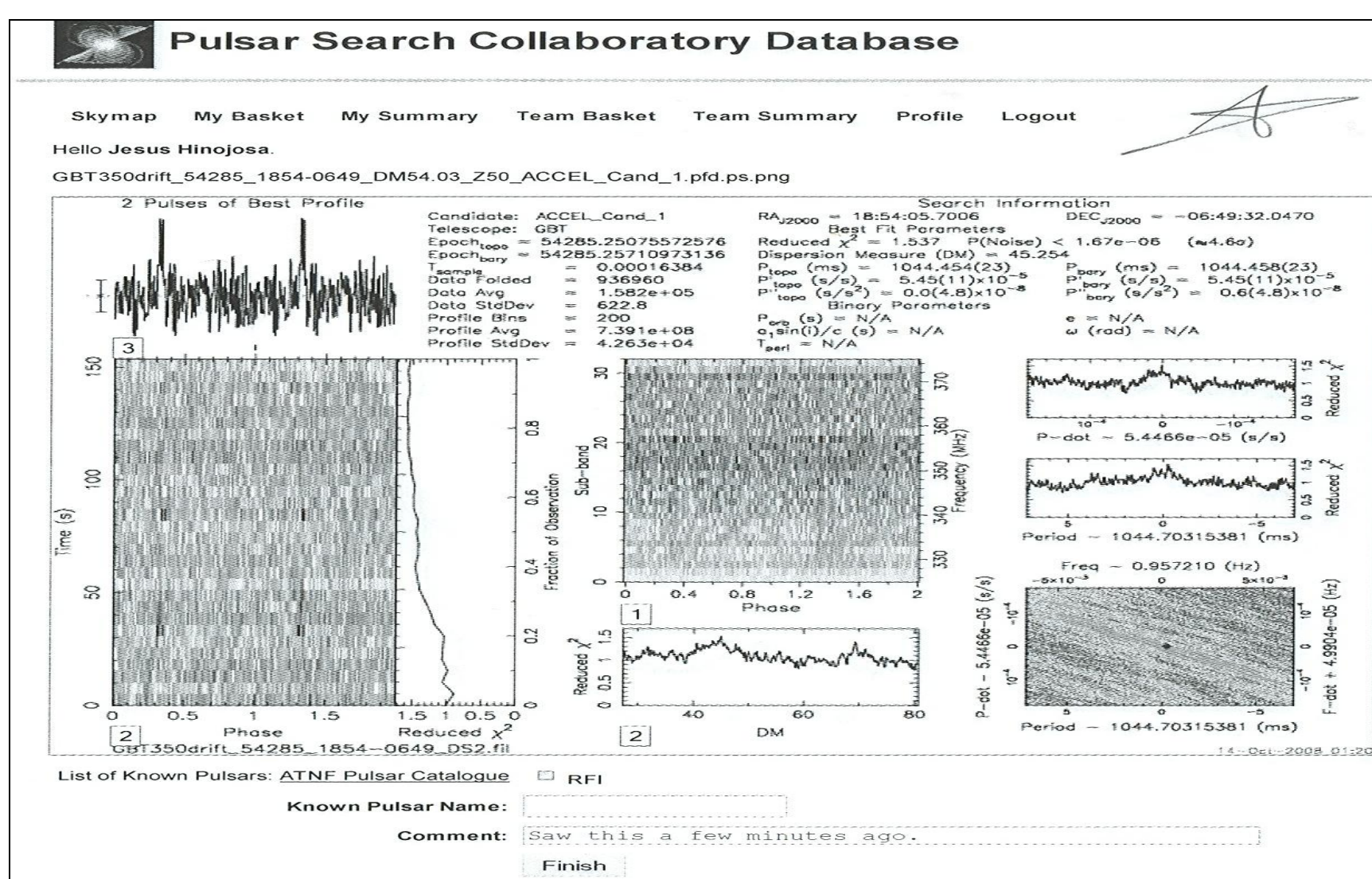
Two of the five candidates we found were not pulsars. Then two other candidates we found were in fact pulsars. One in which had severe scattering. Our final candidate was a binary system pulsar. The binary pulsar is called a black widow.



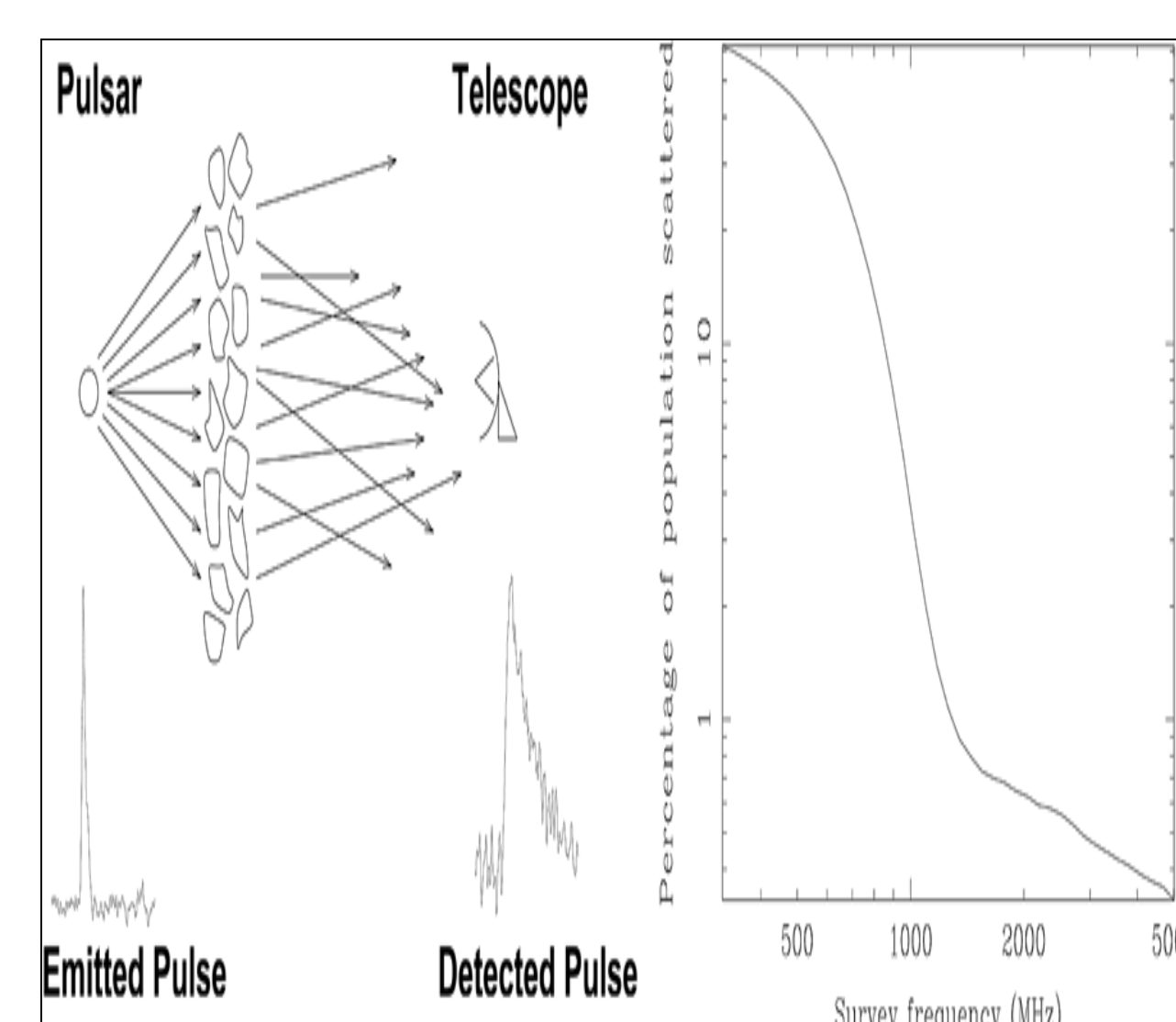
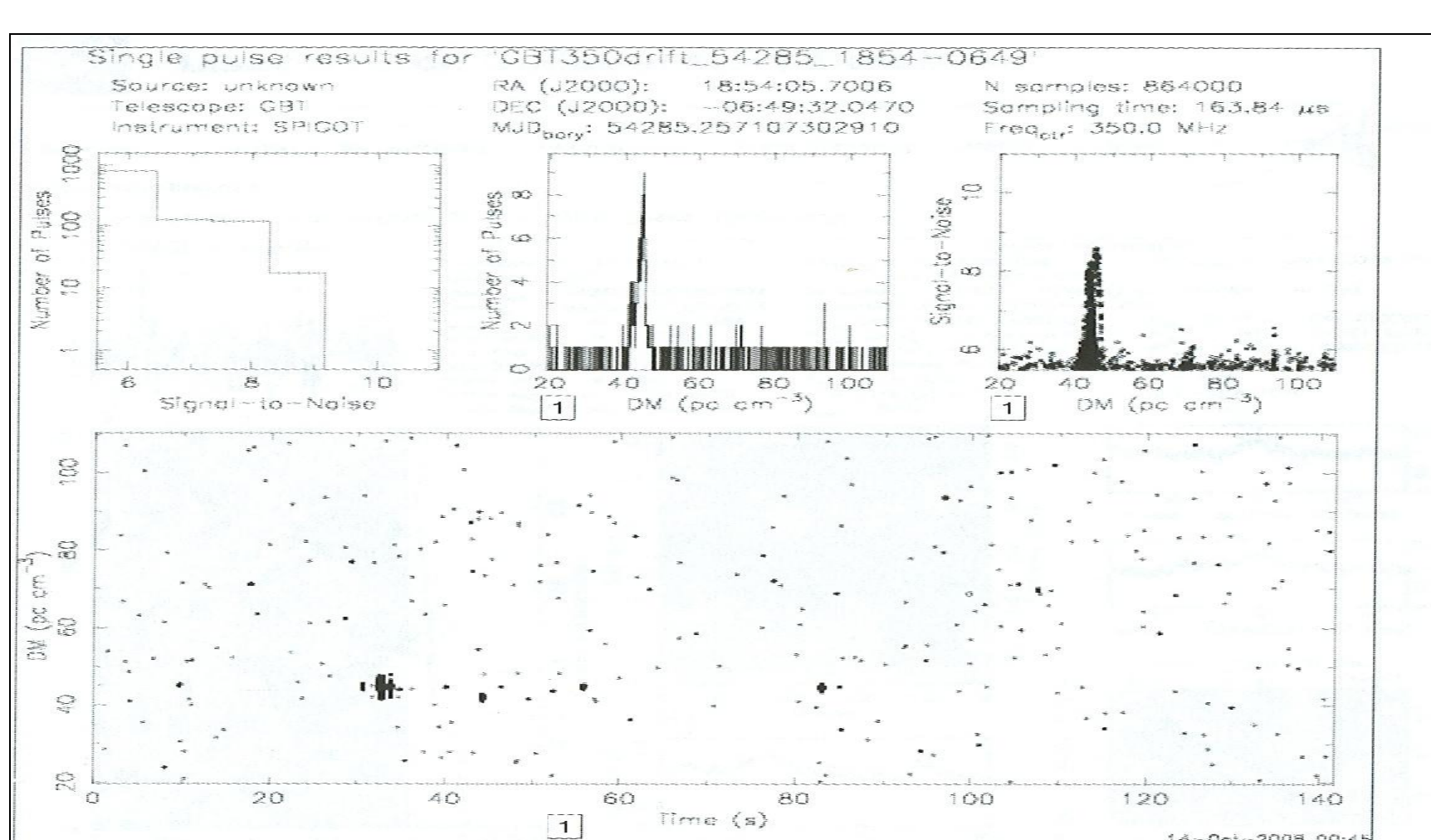
To the right pulsar profile shows a significant amount of scattering which explains the jagged downward slope.

Conclusion

Majority of our candidates were pulsars and only two were just noise or too weak to detect.



Above is the pulsar profile. At first glance you wouldn't think that it was a pulsar, but then the single pulse plot you can see the black dots representing the pulsar. The DM for the single pulse plot matches with the graph above.



The diagram to the left explains what scattering is and how it effects the way we see it in the telescope.