

# Pulsar Busy Week 10: A Quick Summary



Jason Hessels

on behalf of

Ken Anderson, Aris Noutsos, Aris Karastergiou, Ben Stappers,  
Anastasia Alexov, Vlad Kondratiev, Tom Hassall, Thijs Coenen,  
Sander ter Veen, Joeri van Leeuwen, Ashish Asgekar, Richard  
Fallows, and Jan David Mol

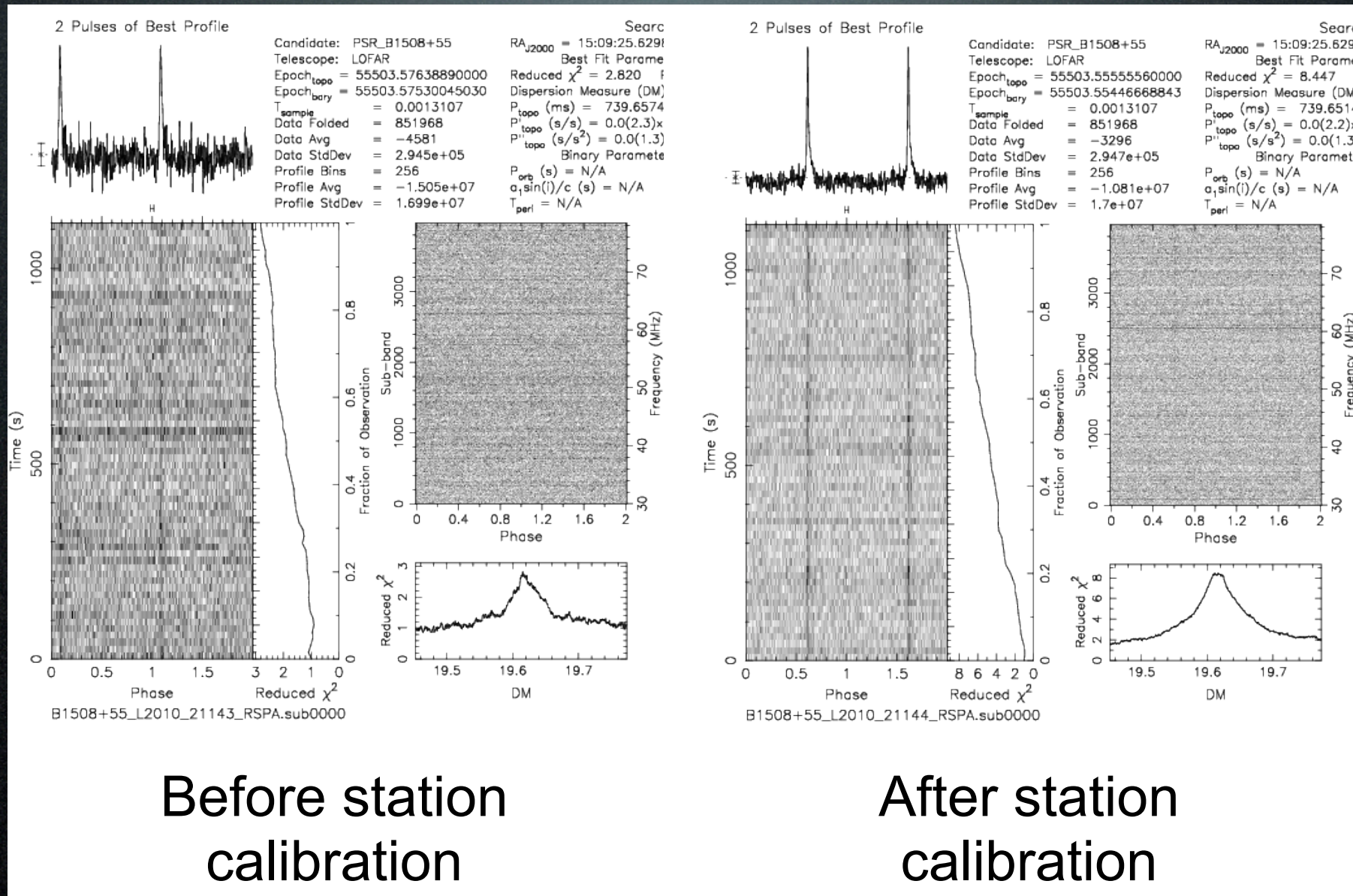
# Pulsar Busy Week 10

- Aris K.: Effelsberg/Chilbolton single station observations
- Anastasia: Pipeline and MoM interaction
- Aris N.: Coherent dedispersion, pol., and voltage data
- Jason: Coordination, observing and analysis
- Joeri: Reference paper edits.
- Thijs, Vlad: Search pipeline
- Tom: Scattering data, analysis and pipeline support
- Ashish: beam-formed cookbook
- Jan David: online pipeline development
- Ken: pipeline framework
- Sander: triggerring, data format support
- Richard: Solar observations and processing
- Ben: Reference paper, installing pipeline on Hydra (Manchester)

# Pulsar Busy Week 10

- LBA Station Calibration and related results
- LBA tracking issues or something else?
- Pulsar Survey Pipeline

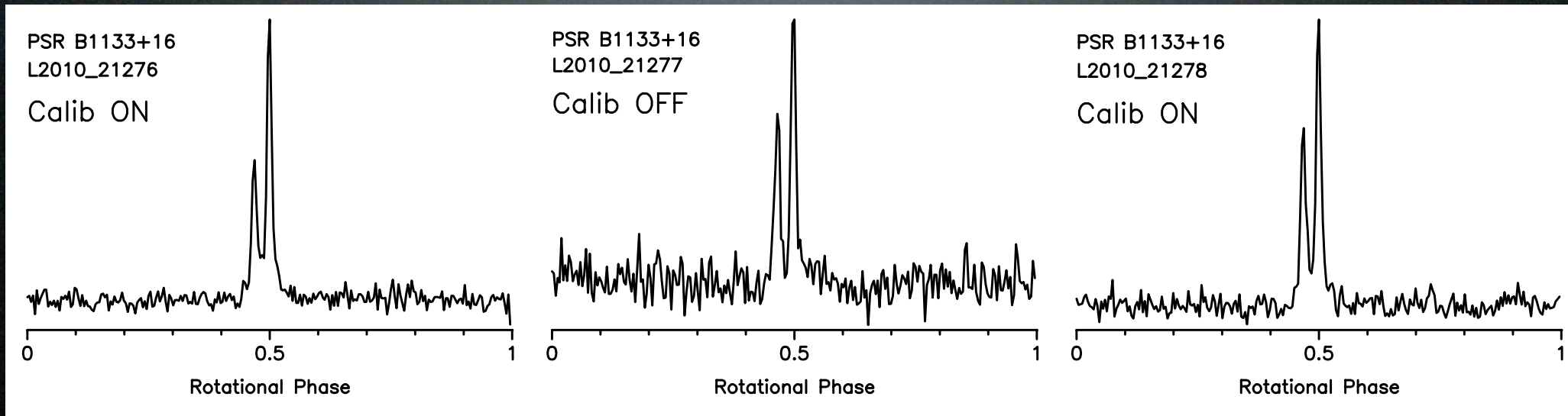
# LBA Station Calibration and related results



Consecutive obs., roughly a factor of 3 increase in SNR!

5 stations summed: CS007,024,030,032,RS106

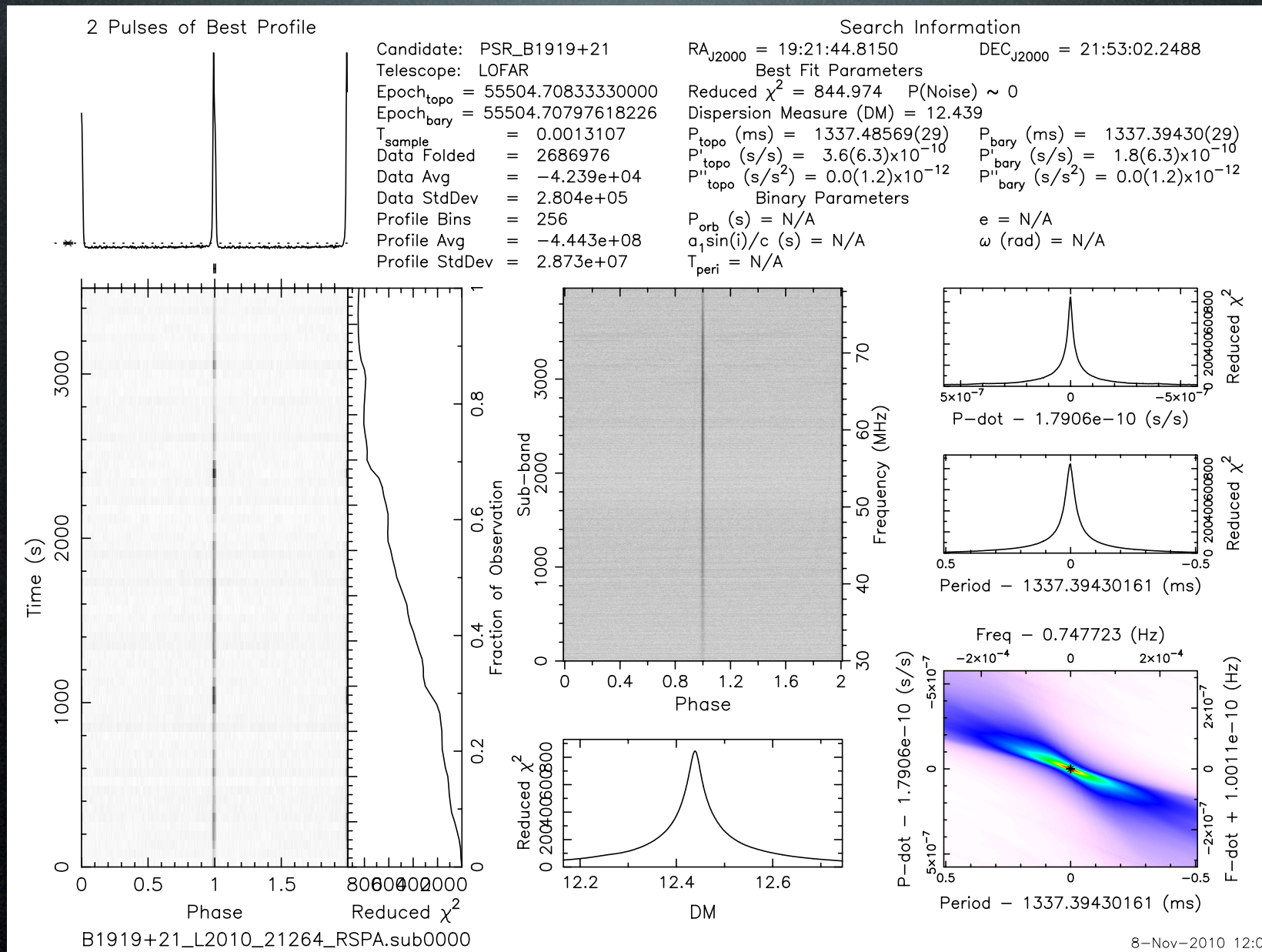
# LBA Station Calibration and related results



Again, consecutive observations  
Roughly a factor of 3 increase in SNR!

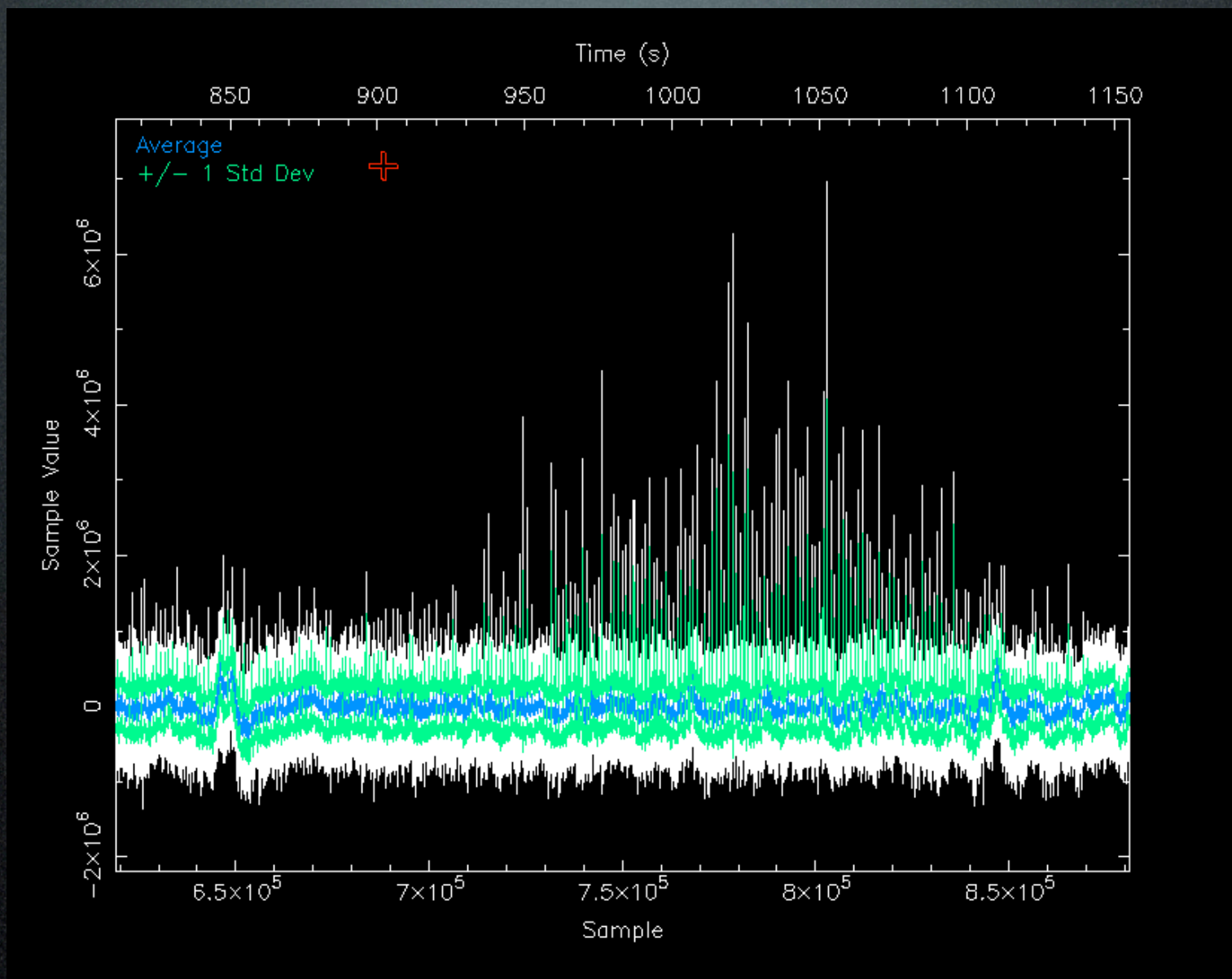
5 stations summed: CS007,024,030,032,RS106

# LBA Station Calibration and related results



All-time best LBA detection of any PSR - Next try at 10-30MHz!

# LBA Station Calibration and related results

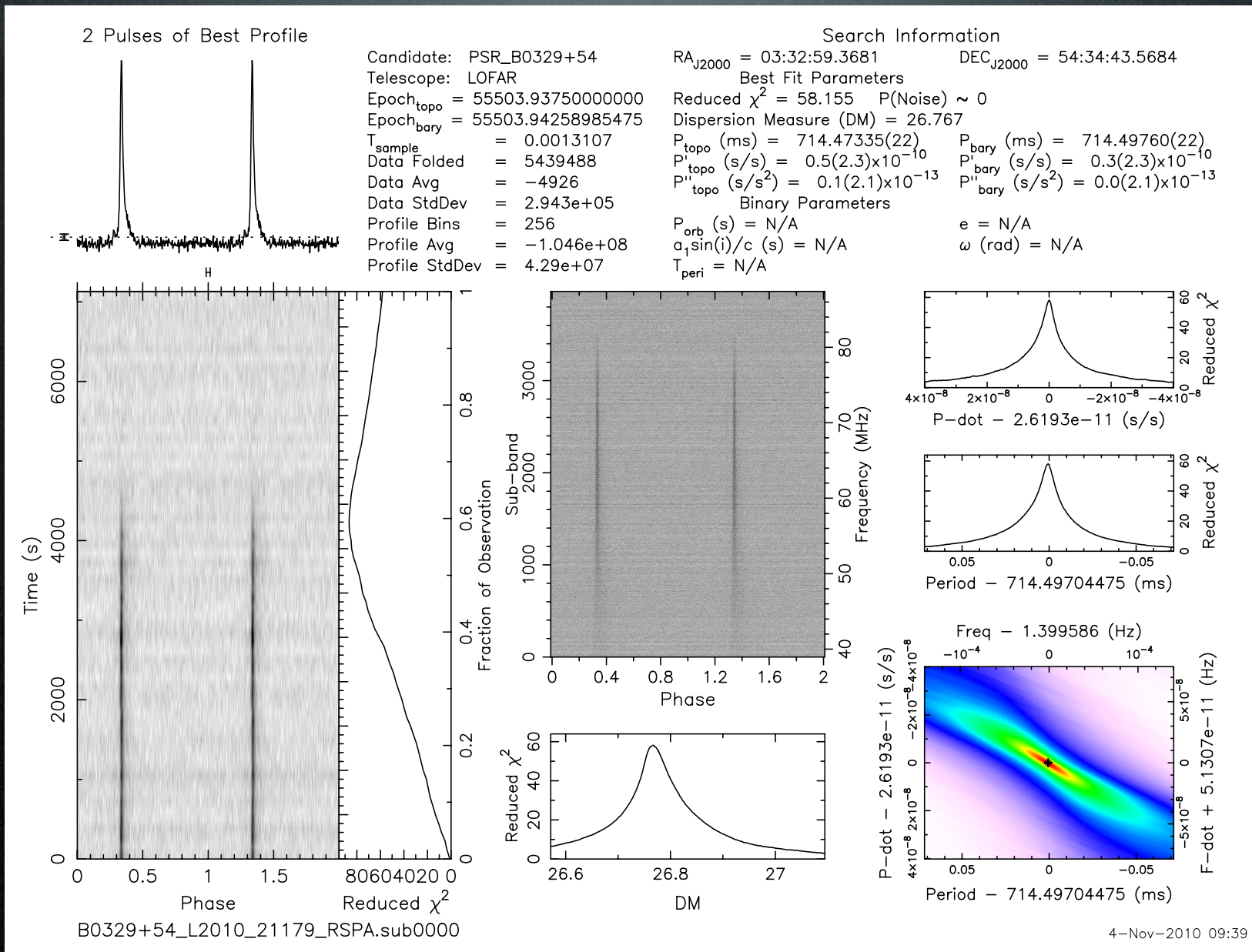


Periods with bright single pulses.

# LBA tracking issues or something else?

These data with new Beam Server

Transit



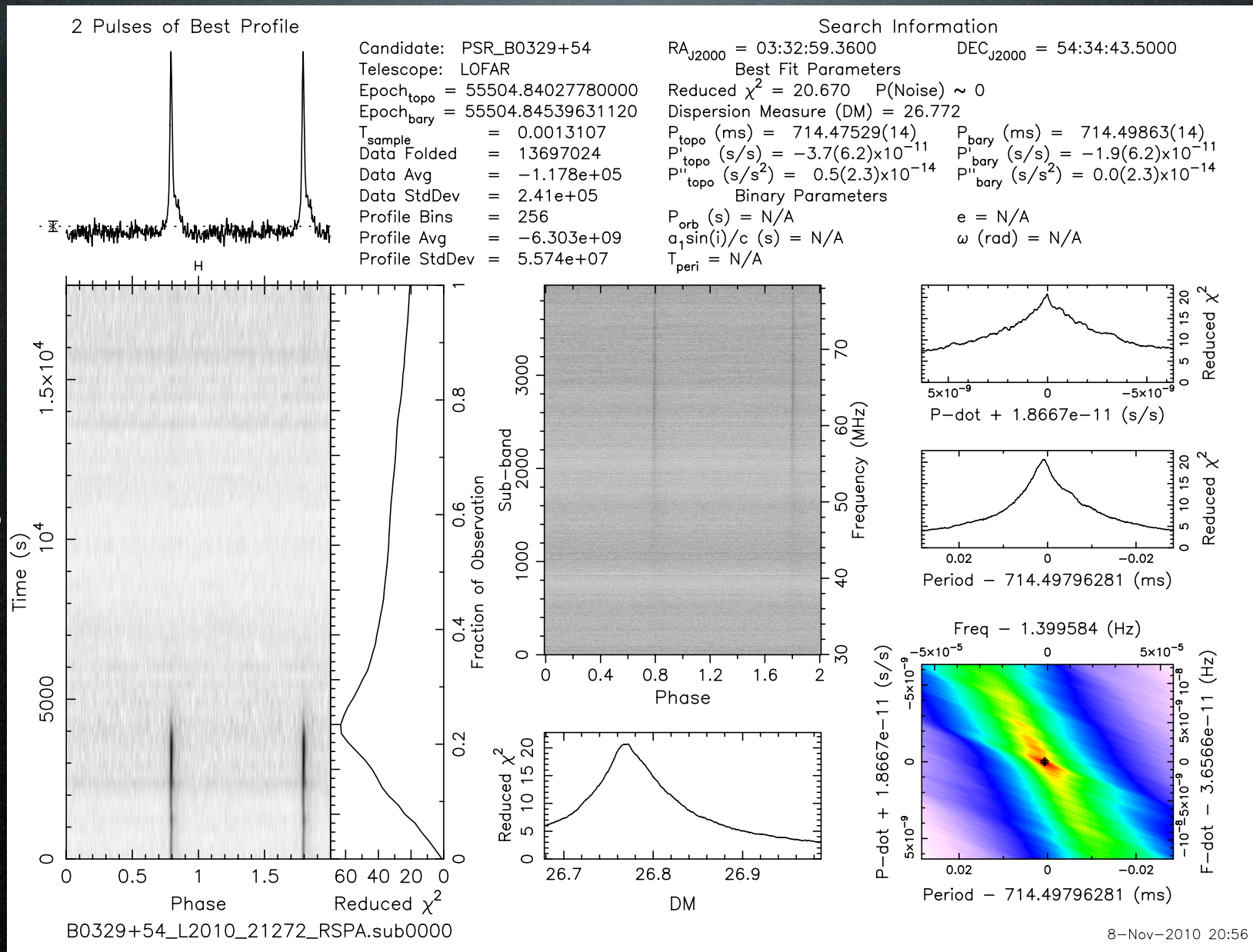
Still some weird issues however (also saw with old BeamServer)



# LBA tracking issues or something else?

These data with new Beam Server

Transit??

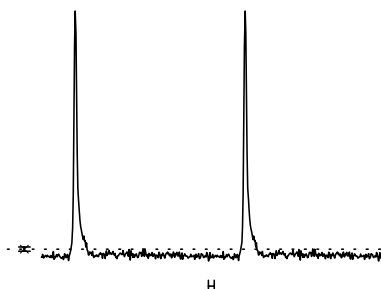


Again disappears after ~5000s AND well before transit?!

# LBA tracking issues or something else?

These data with new Beam Server

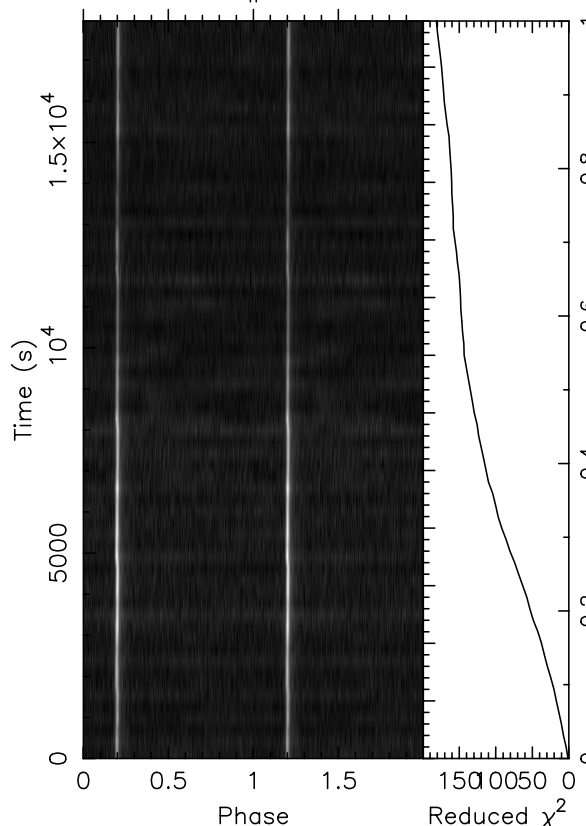
2 Pulses of Best Profile



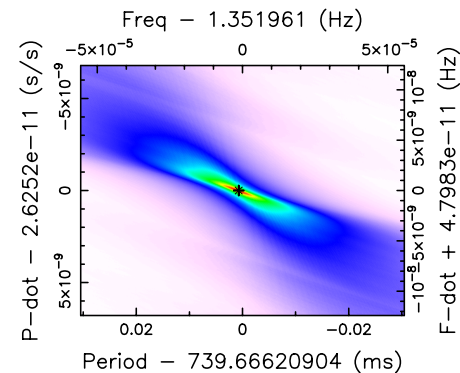
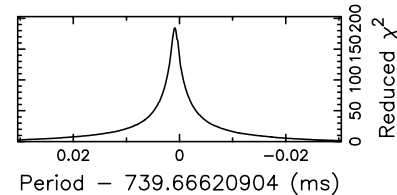
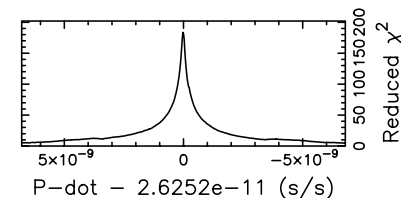
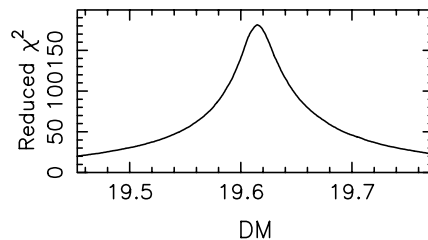
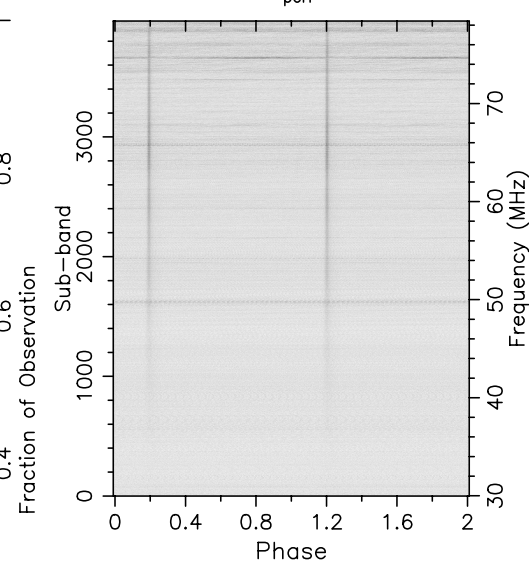
Candidate: PSR\_B1508+55  
 Telescope: LOFAR  
 Epoch<sub>topo</sub> = 55506.43055560000  
 Epoch<sub>bary</sub> = 55506.42953070295  
 T<sub>sample</sub> = 0.0013107  
 Data Folded = 13697024  
 Data Avg = -3.565e+05  
 Data StdDev = 1.22e+05  
 Profile Bins = 256  
 Profile Avg = -1.907e+10  
 Profile StdDev = 2.821e+07

Search Information

RA<sub>J2000</sub> = 15:09:25.6298      DEC<sub>J2000</sub> = 55:31:32.3940  
 Best Fit Parameters  
 Reduced  $\chi^2$  = 181.321      P(Noise)  $\sim$  0  
 Dispersion Measure (DM) = 19.615  
 P<sub>topo</sub> (ms) = 739.648790(42)      P<sub>bary</sub> (ms) = 739.666923(42)  
 P<sub>topo</sub><sup>1</sup> (s/s) = 5.2(1.8)x10<sup>-11</sup>      P<sub>bary</sub><sup>1</sup> (s/s) = 2.6(1.8)x10<sup>-11</sup>  
 P<sub>topo</sub><sup>11</sup> (s/s<sup>2</sup>) = 3.4(6.6)x10<sup>-15</sup>      P<sub>bary</sub><sup>11</sup> (s/s<sup>2</sup>) = 0.0(6.6)x10<sup>-15</sup>  
 Binary Parameters  
 P<sub>orb</sub> (s) = N/A      e = N/A  
 a<sub>1</sub>sin(i)/c (s) = N/A       $\omega$  (rad) = N/A  
 T<sub>peri</sub> = N/A



B1508+55\_L2010\_21313\_RSPA.sub0000



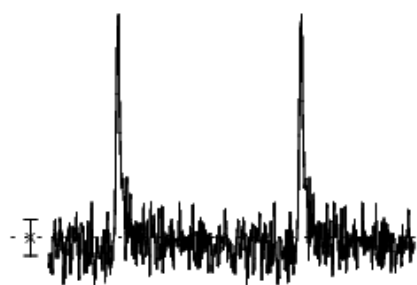
9-Nov-2010 02:20

Transit

This observation looks fine however.

# LBA tracking issues or something else?

2 Pulses of Best Profile



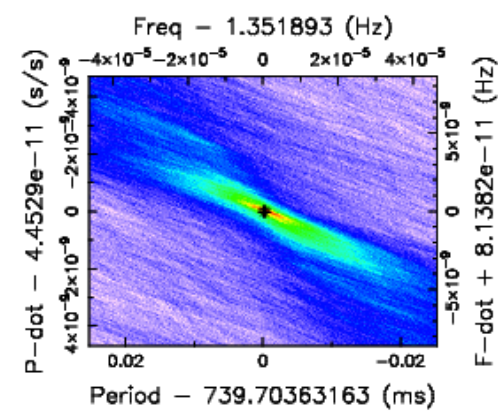
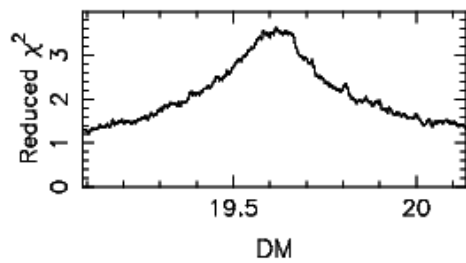
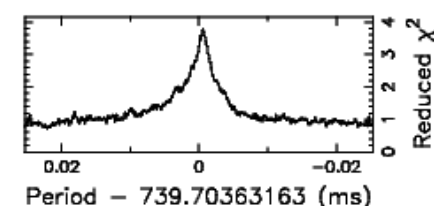
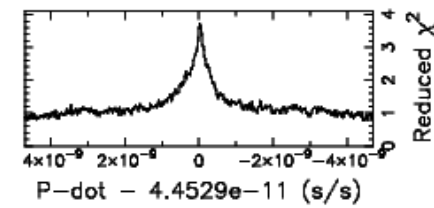
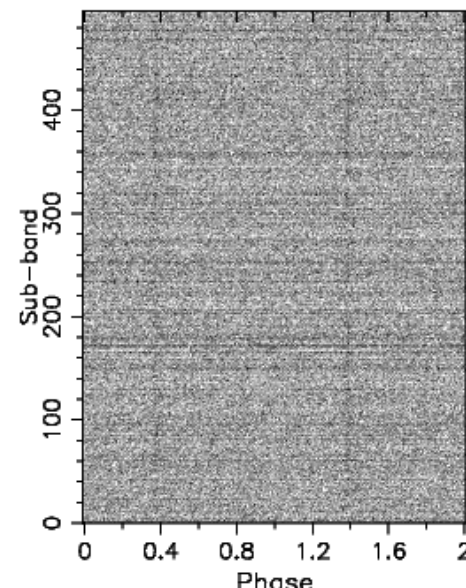
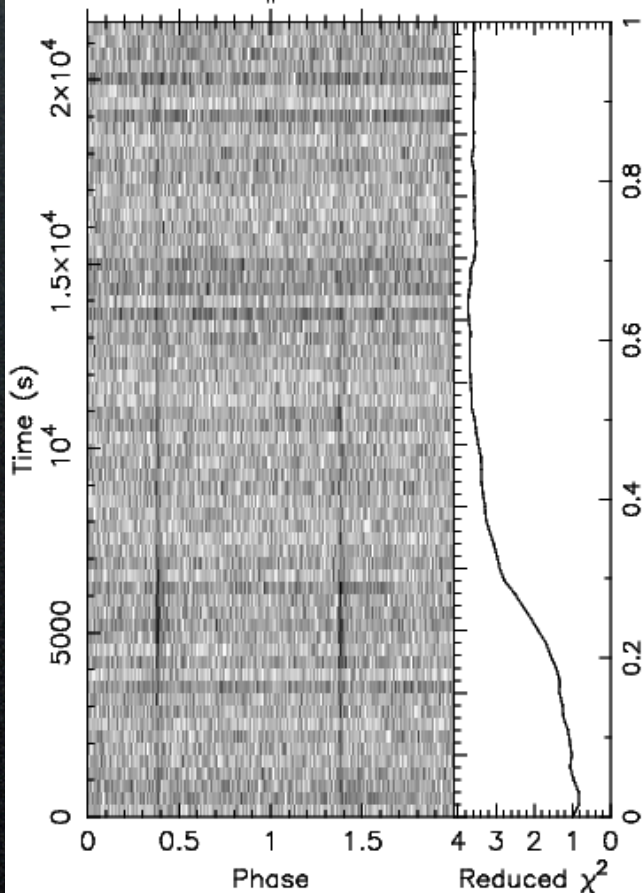
Candidate: PSR\_B1508+55  
 Telescope: LOFAR  
 Epoch<sub>topo</sub> = 55425.63866900000  
 Epoch<sub>bary</sub> = 55425.63780330241  
 T<sub>sample</sub> = 0.0013107  
 Data Folded = 16449536  
 Data Avg = -121.3  
 Data StdDev = 1.039e+05  
 Profile Bins = 256  
 Profile Avg = -7.781e+06  
 Profile StdDev = 2.632e+07

Search Information

RA<sub>J2000</sub> = 15:09:25.5837      DEC<sub>J2000</sub> = 55:31:32.2252  
 Best Fit Parameters  
 Reduced  $\chi^2$  = 3.581      P(Noise) < 7.35e-75 ( $\approx 18.3\sigma$ )  
 Dispersion Measure (DM) = 19.613  
 P<sub>topo</sub> (ms) = 739.72276(14)      P<sub>bary</sub> (ms) = 739.70343(14)  
 P<sub>dot</sub> (s/s) = 8.9(5.1)x10<sup>-11</sup>      P<sub>dot</sub> (s/s) = 4.5(5.1)x10<sup>-11</sup>  
 P<sub>ddot</sub> (s/s<sup>2</sup>) = -0.3(1.5)x10<sup>-14</sup>      P<sub>ddot</sub> (s/s<sup>2</sup>) = 0.0(1.5)x10<sup>-14</sup>  
 Binary Parameters  
 P<sub>orb</sub> (s) = N/A      e = N/A  
 a<sub>1</sub>sin(i)/c (s) = N/A       $\omega$  (rad) = N/A  
 T<sub>peri</sub> = N/A

These data  
with old  
BeamServer

Transit

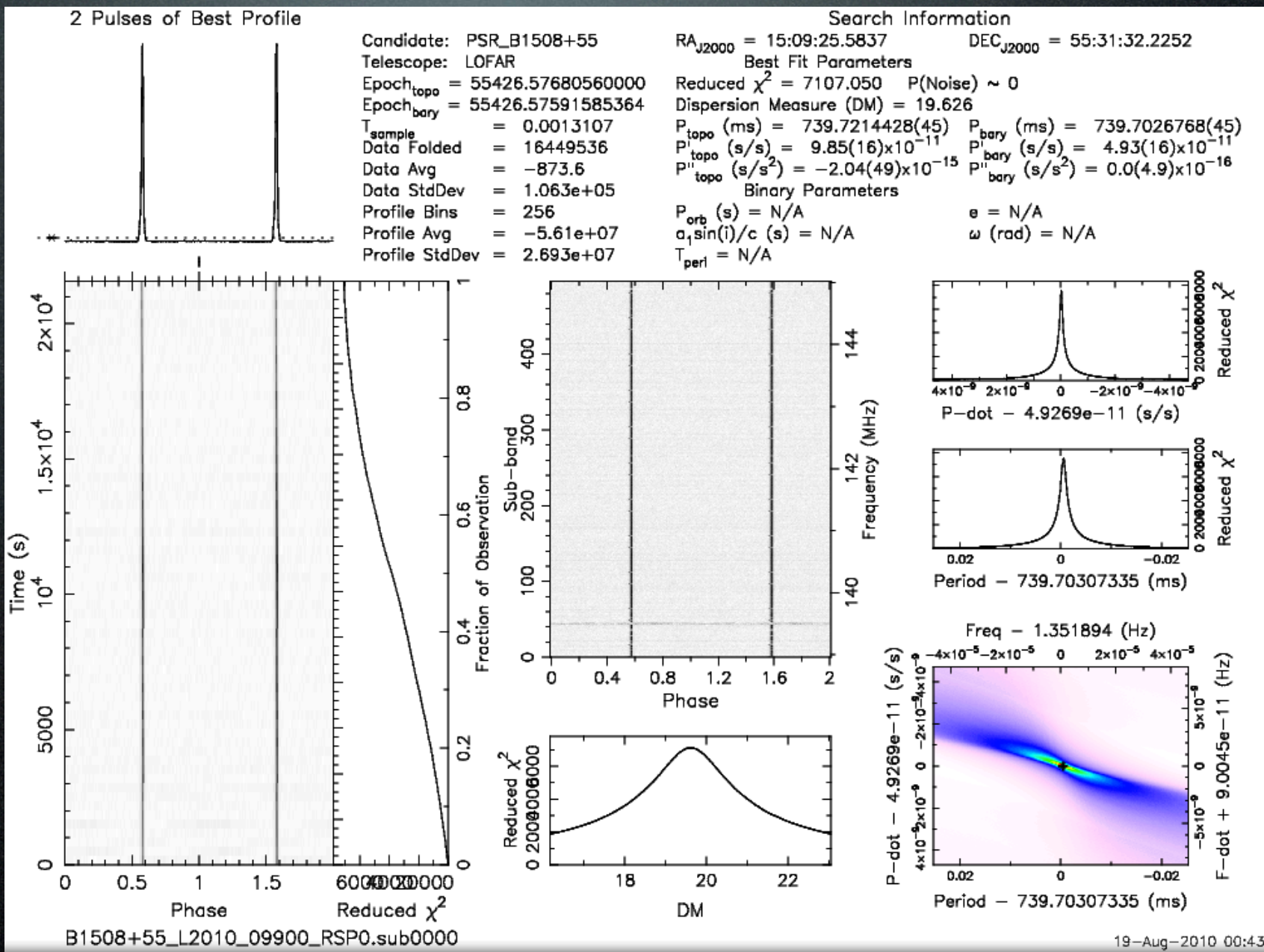


B1508+55\_L2010\_09891\_RSP4.sub0000

18-Aug-2010 09:52

# HBA tracking is fine

These data  
with old  
BeamServer  
Transit



19-Aug-2010 00:43

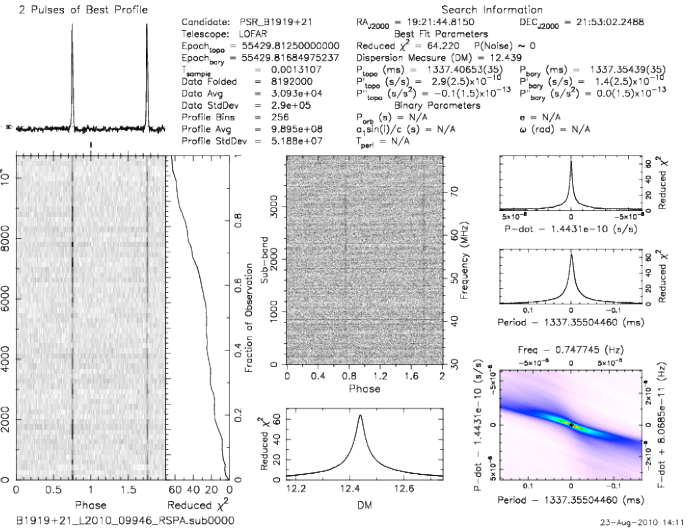
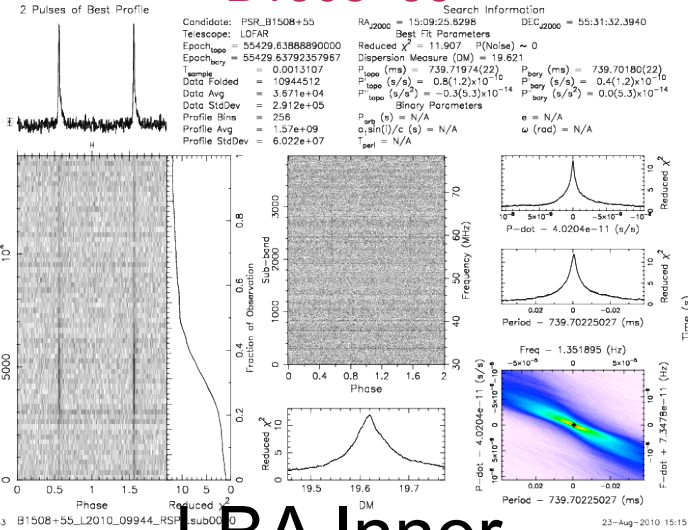
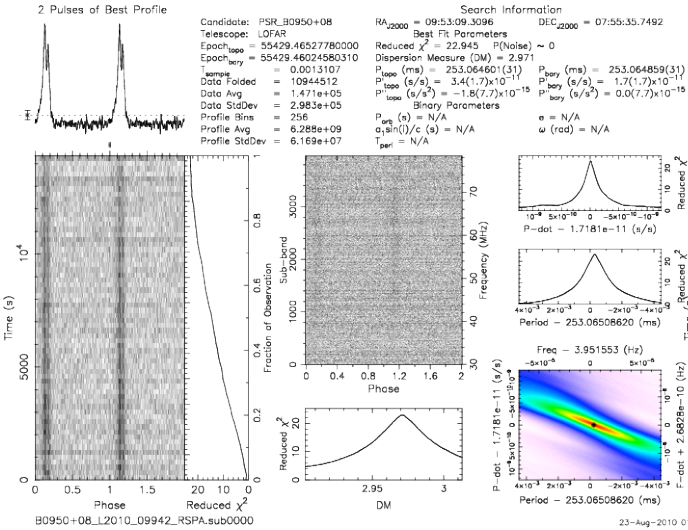
These data  
with old  
BeamServer

# LBA tracking issues or something else?

B0950+08

LBA Outer  
B1508+55

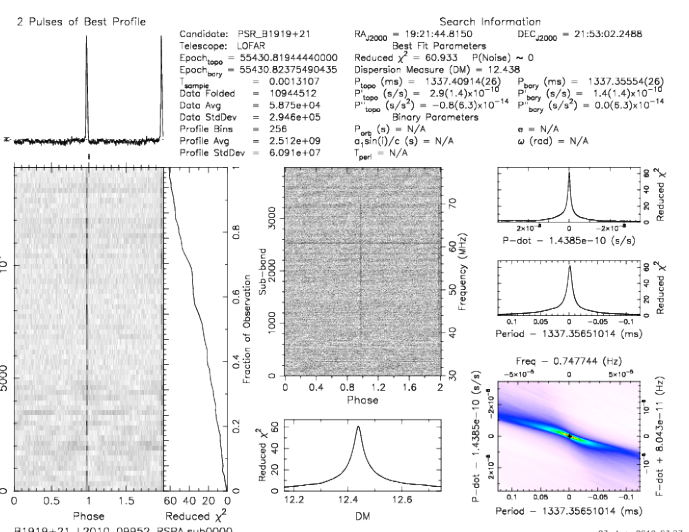
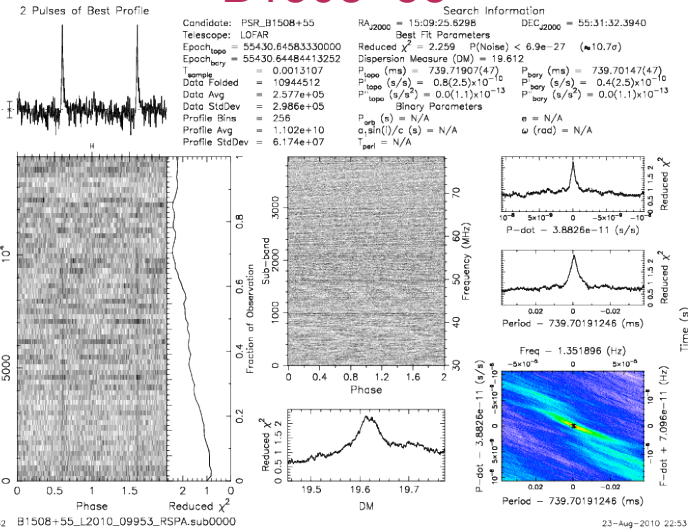
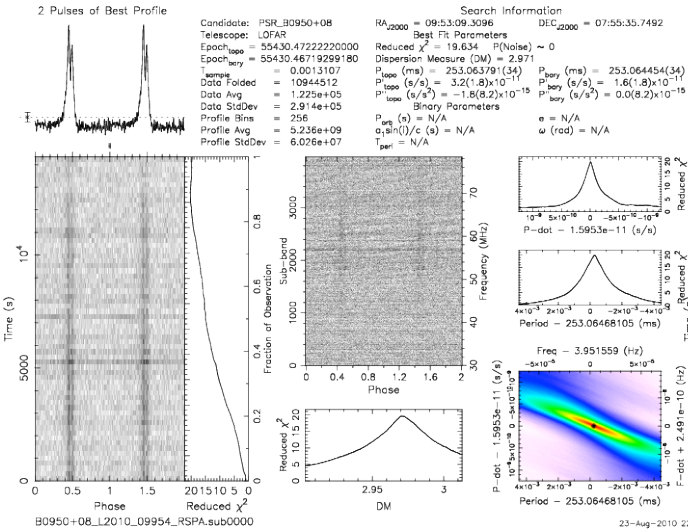
B1919+21



B0950+08

LBA Inner  
B1508+55

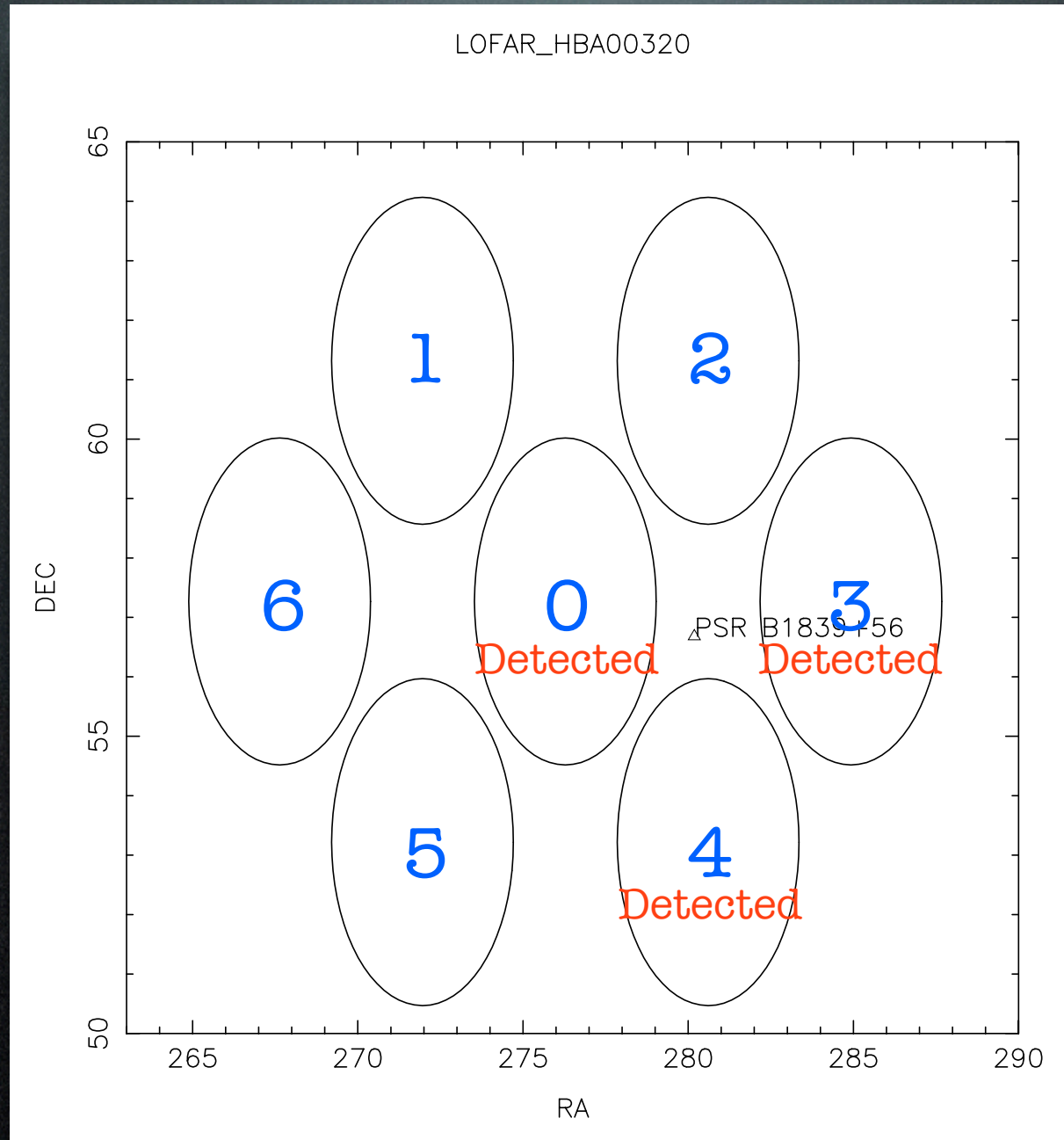
B1919+21



LOFAR Status Meeting - November 10th, 2010 - Dwingeloo



# Pulsar Survey Pipeline

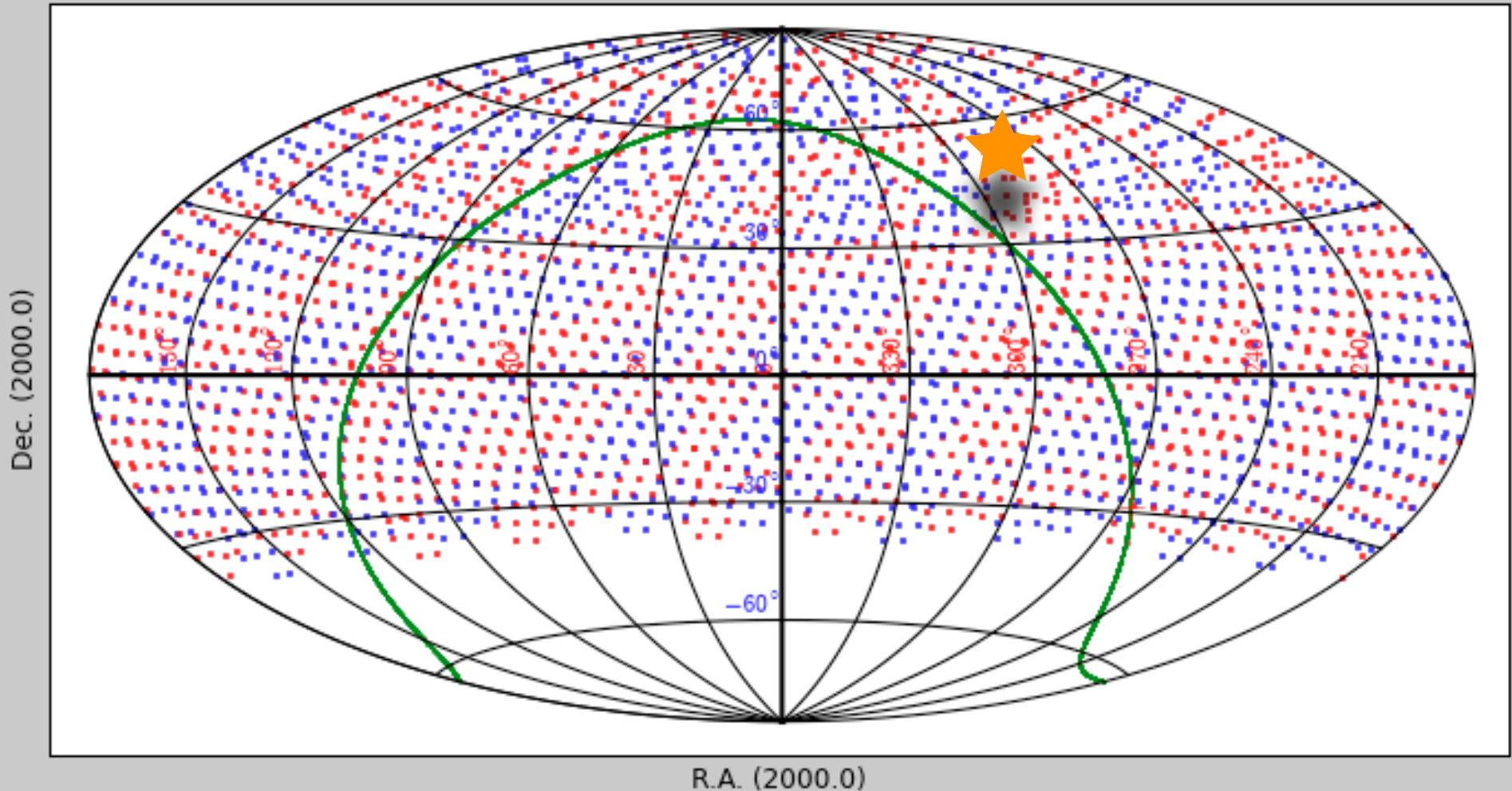


7-beam HBA  
grid covers 166  
sq deg!!!

NB: beams are  
2x wider than  
shown here.

# Pulsar Survey Pipeline

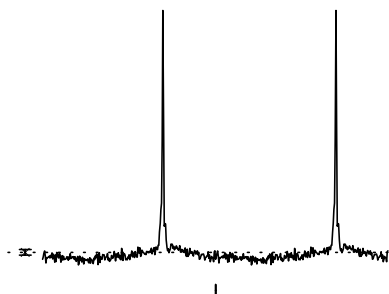
LOFAR HBA Survey



~400 7-beam pointings  $>$  -35 deg DEC

# Pulsar Survey Pipeline

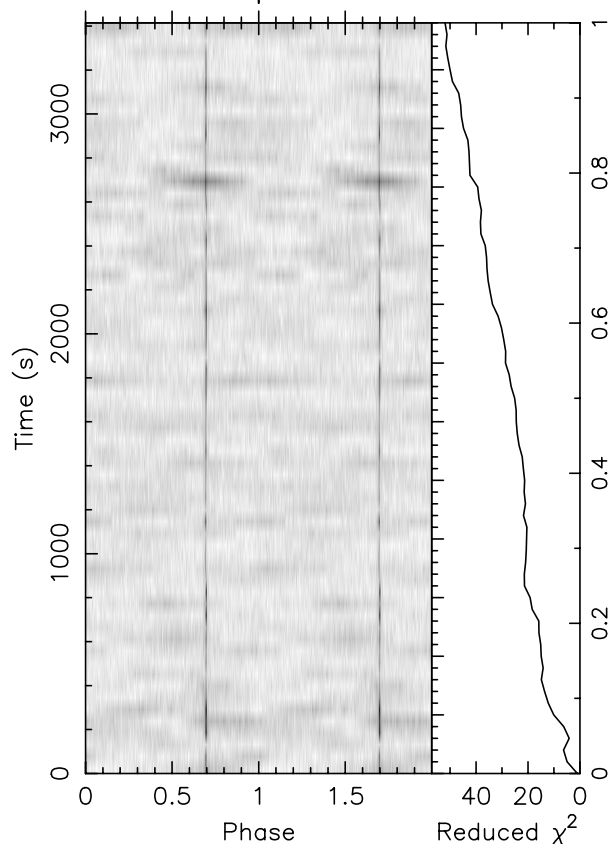
2 Pulses of Best Profile



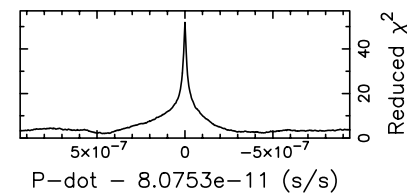
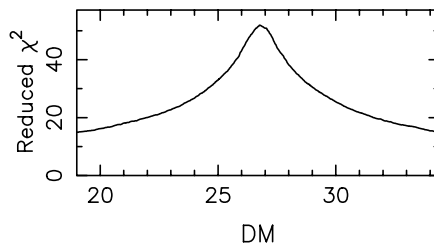
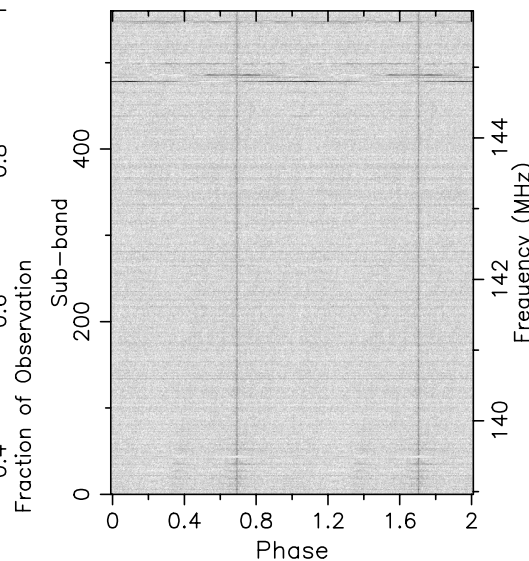
Candidate: PSR\_B1839+56  
 Telescope: LOFAR  
 Epoch<sub>topo</sub> = 55507.59722220000  
 Epoch<sub>bary</sub> = 55507.59758523902  
 T<sub>sample</sub> = 0.00032768  
 Data Folded = 10420224  
 Data Avg = -584.1  
 Data StdDev = 1.105e+05  
 Profile Bins = 256  
 Profile Avg = -2.407e+07  
 Profile StdDev = 2.229e+07

Search Information

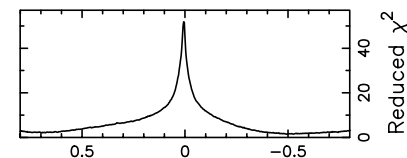
RA<sub>J2000</sub> = 18:25:07.4621      DEC<sub>J2000</sub> = 57:16:05.1456  
 Best Fit Parameters  
 Reduced  $\chi^2$  = 51.891      P(Noise)  $\sim$  0  
 Dispersion Measure (DM) = 26.788  
 P<sub>topo</sub> (ms) = 1652.9157(15)      P<sub>bary</sub> (ms) = 1652.8923(15)  
 P<sup>1</sup><sub>topo</sub> (s/s) = 0.2(3.3) $\times$ 10<sup>-9</sup>      P<sup>1</sup><sub>bary</sub> (s/s) = 0.1(3.3) $\times$ 10<sup>-9</sup>  
 P<sup>11</sup><sub>topo</sub> (s/s<sup>2</sup>) = 0.0(6.3) $\times$ 10<sup>-12</sup>      P<sup>11</sup><sub>bary</sub> (s/s<sup>2</sup>) = 0.0(6.3) $\times$ 10<sup>-12</sup>  
 Binary Parameters  
 P<sub>orb</sub> (s) = N/A      e = N/A  
 a<sub>1</sub>sin(i)/c (s) = N/A       $\omega$  (rad) = N/A  
 T<sub>peri</sub> = N/A



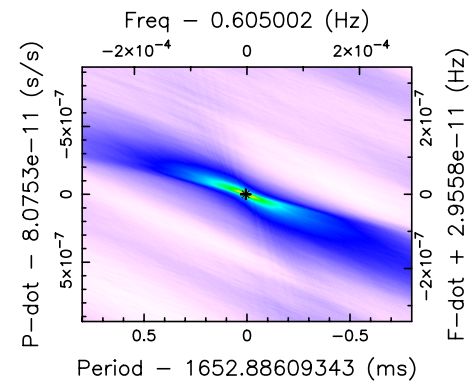
B1839+56\_L2010\_21335\_RSP0.sub0000



P-dot - 8.0753e-11 (s/s)



Period - 1652.88609343 (ms)



Period - 1652.88609343 (ms)

8-Nov-2010 17:4