

Some Pulsar Updates Leading up to BW #12



Jason Hessels

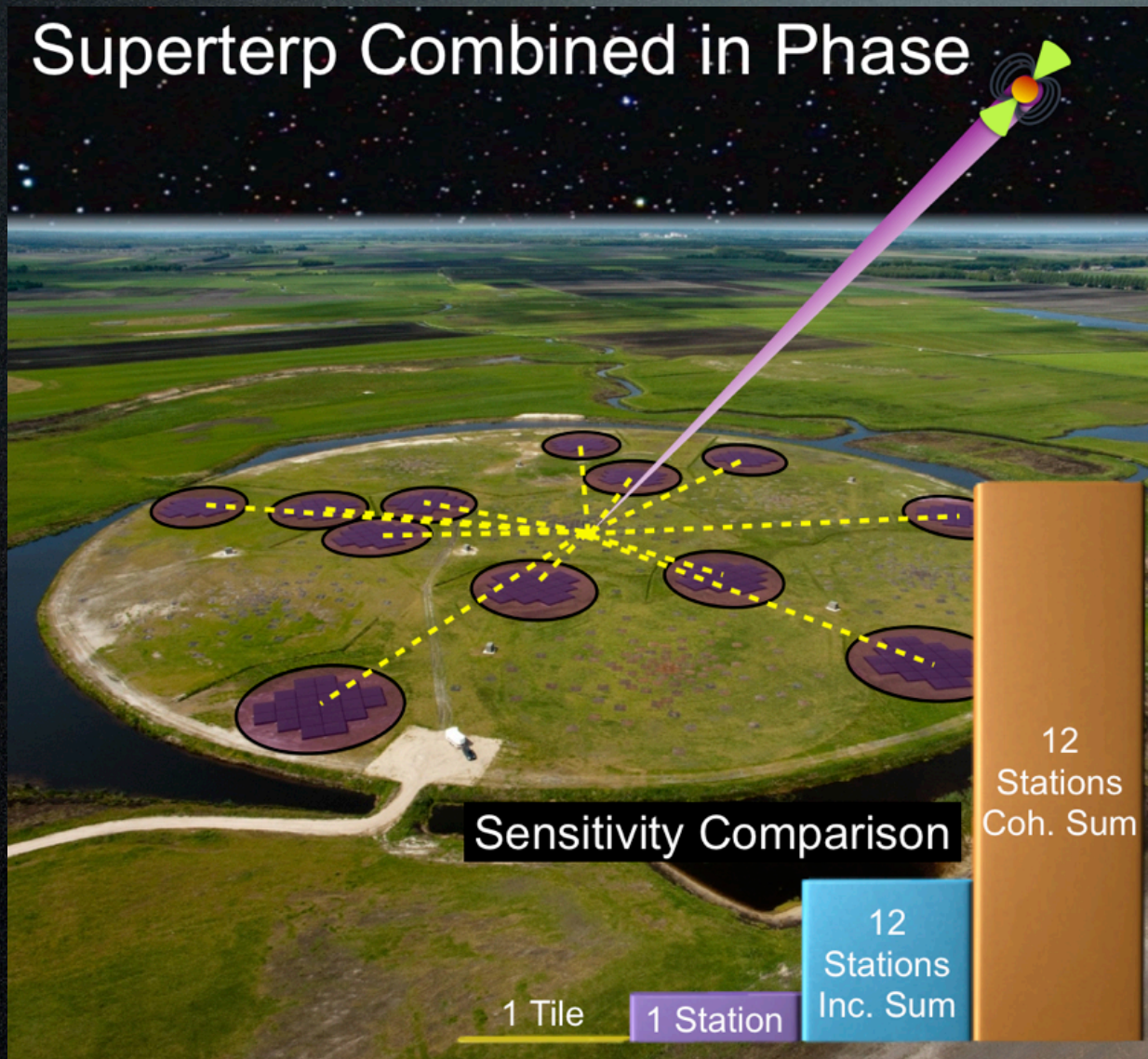
on behalf of

Aris Noutsos, Aris Karastergiou, Ben Stappers, Anastasia Alexov, Vlad Kondratiev, Tom Hassall, Thijs Coenen, Sander ter Veen, Joeri van Leeuwen, Ashish Asgekar, Jan David Mol, Joris Verbiest, Jean-Mathias Griessmeier, Masaya Kuniyoshi, Charlotte Sobey, John Romein

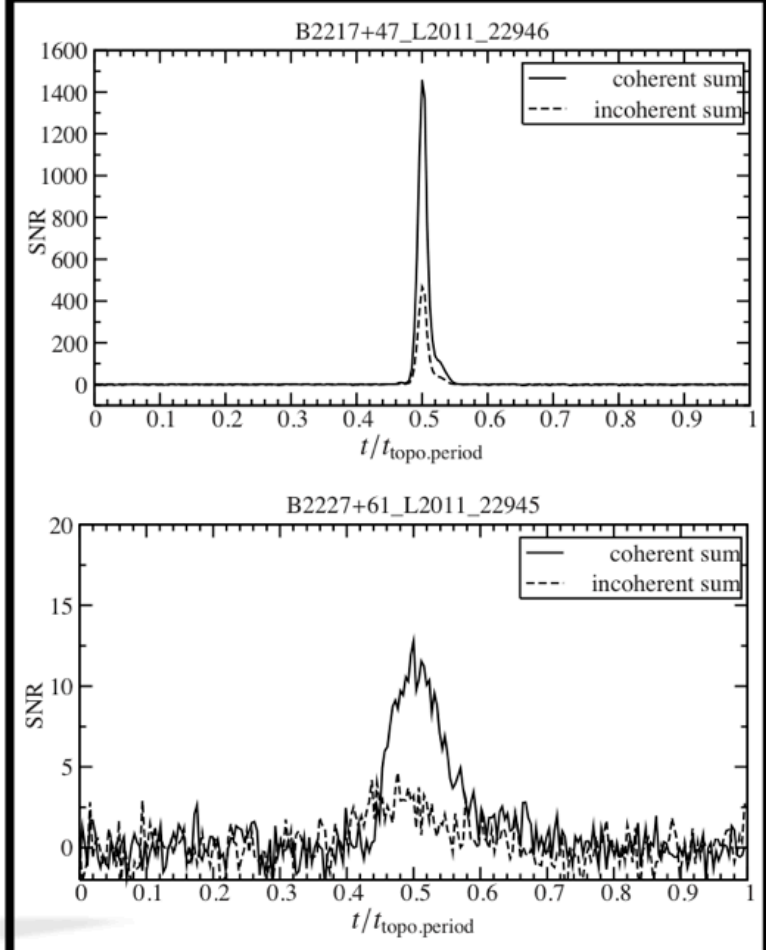
A couple things...

- Tied-array beam stability
- Blind pulsar searches

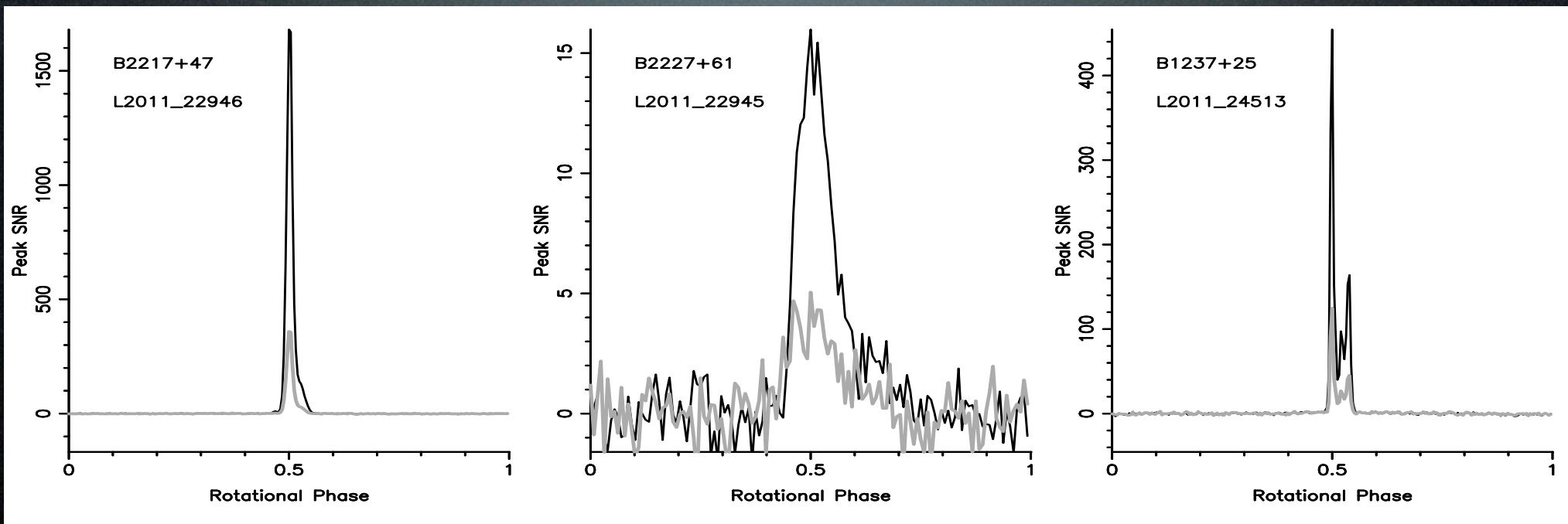
Tied-array stability



LOFAR Coherent Superterp Data



Tied-array beam stability



January 25th, 2011

January 25th, 2011

March 23rd, 2011

SNR CS/IS = 4.7

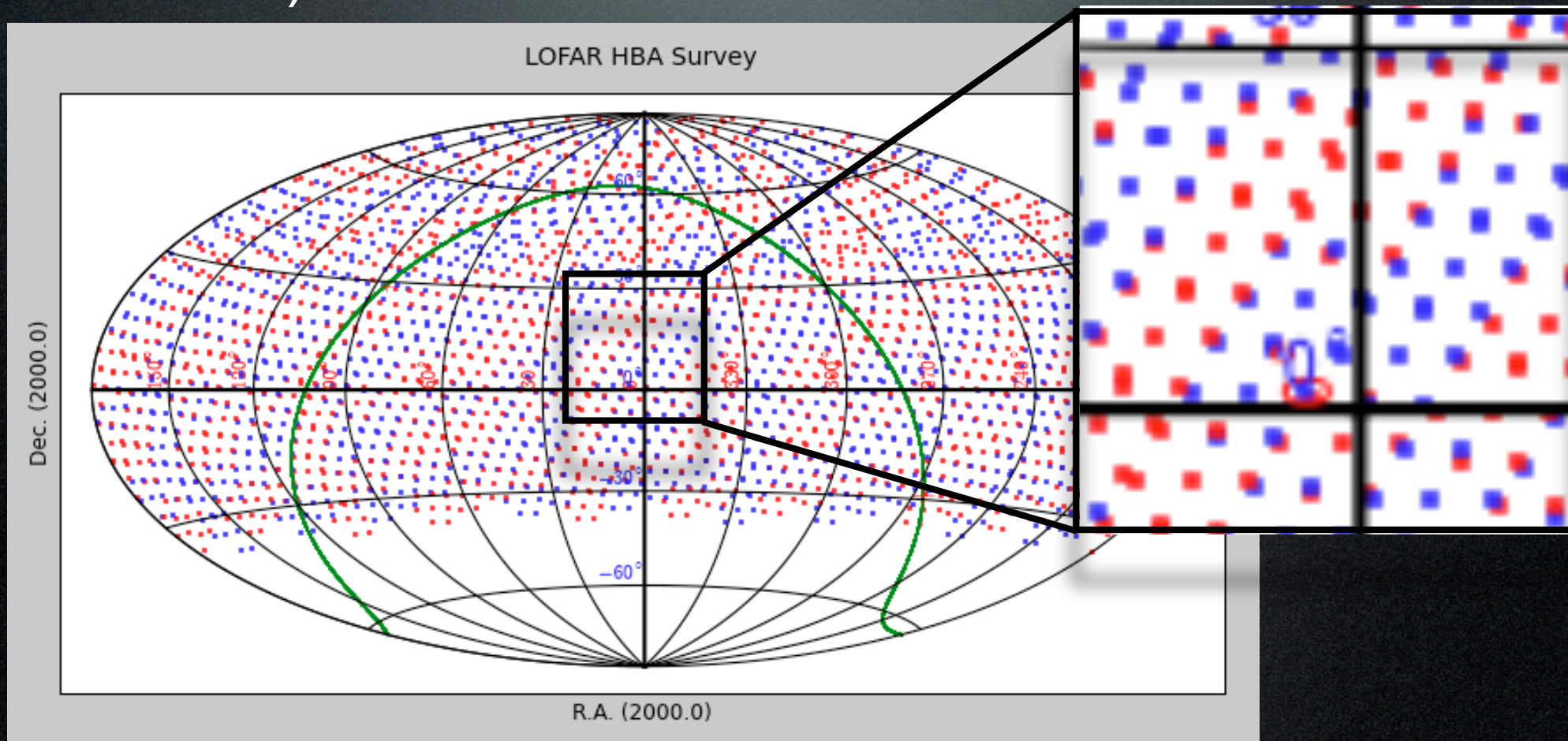
SNR CS/IS = 3.1

SNR CS/IS = 3.6

12 HBA sub-stations ($\sqrt{12} = 3.5$)

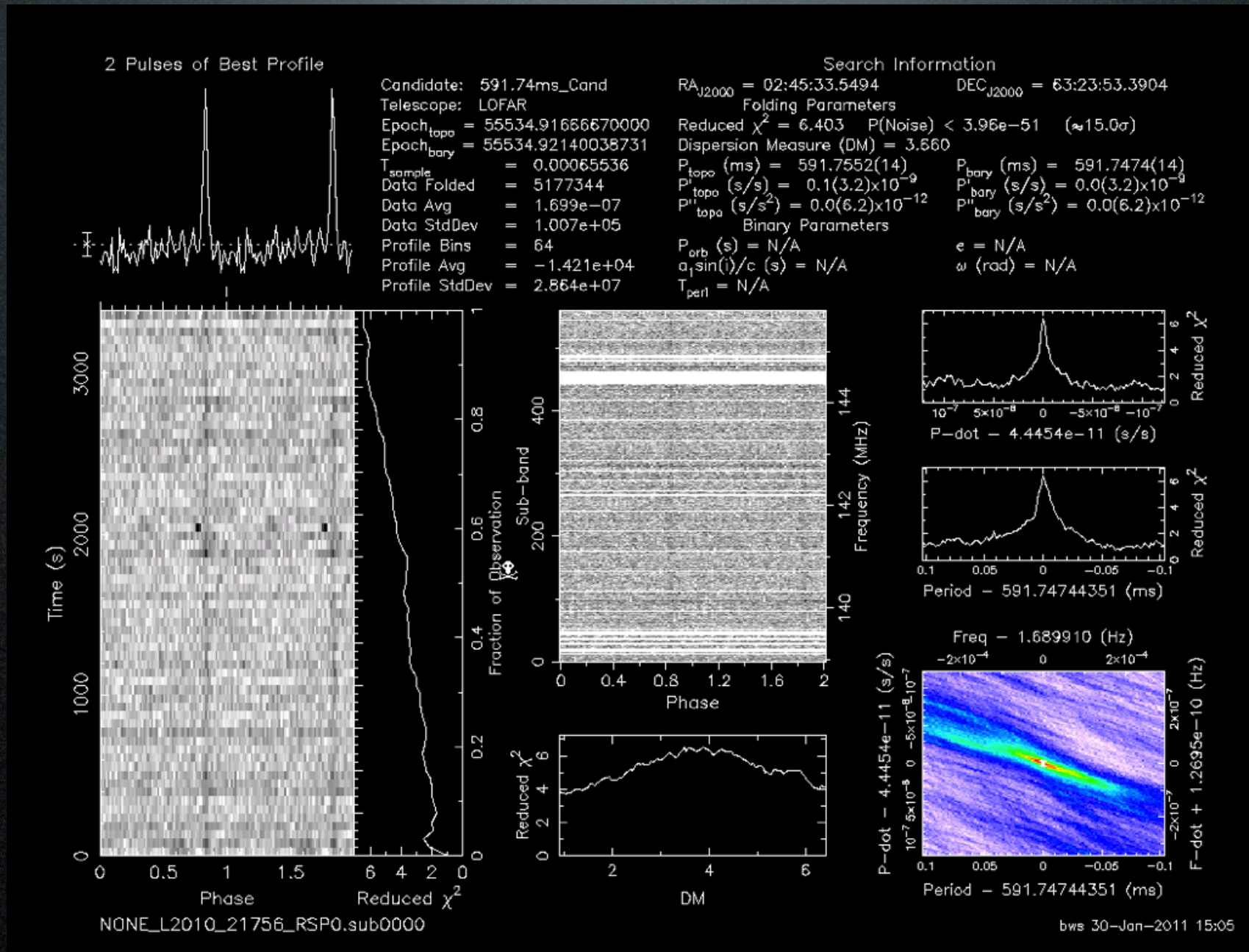
Blind Pulsar Searches

- Incoherent 7-beam data taken during Christmas
- Blind pulsar searches with prototype pipeline (Thijs Coenen)



~400 7-beam pointings > -35 deg DEC

Blind Pulsar Searches - Pulsar Candidate



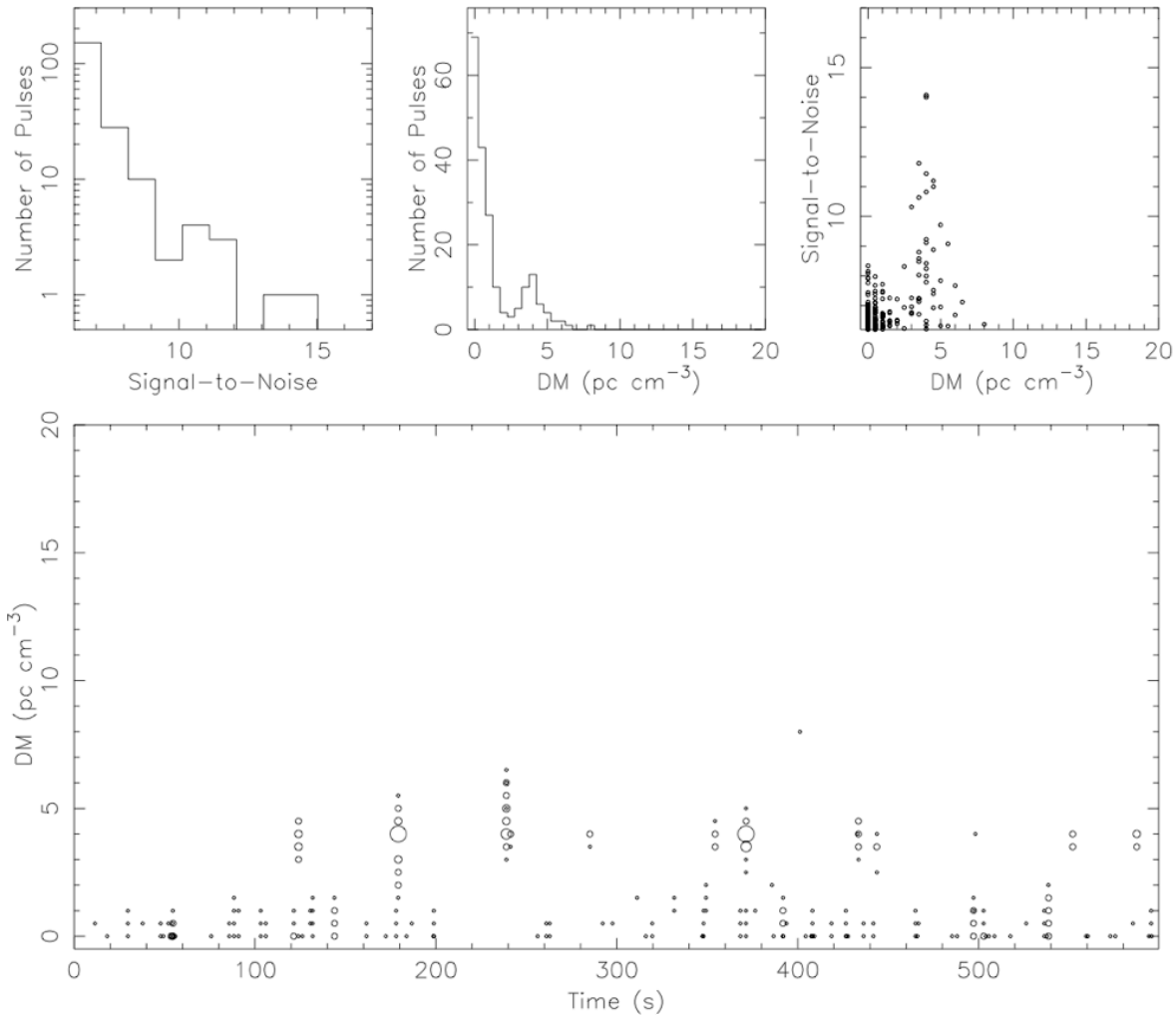
J0240+63 Single Pulses

Single pulse results for 'spigot_54175_0003'

Source: 0240+62
Telescope: GBT
Instrument: SPIGOT

RA (J2000): 02:40:30.9360
DEC (J2000): 62:48:50.0400
MJD_{bary}: 54175.854267988849

N samples: 7318562
Sampling time: 81.92 μ s
Freq_{ctr}: 350.0 MHz

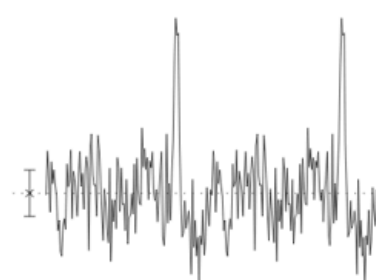


Hessels et al. 2007

J0240+63 Periodicity

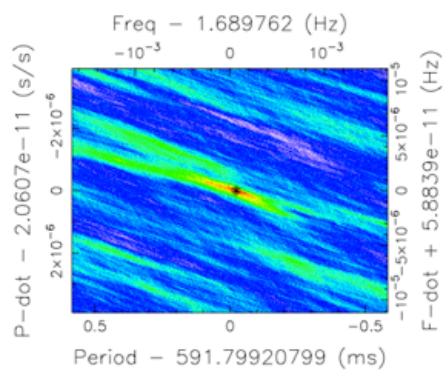
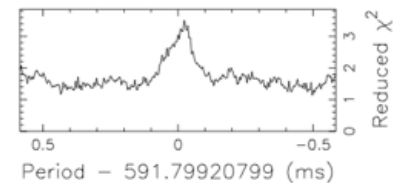
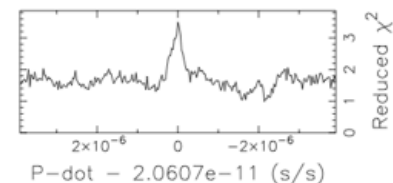
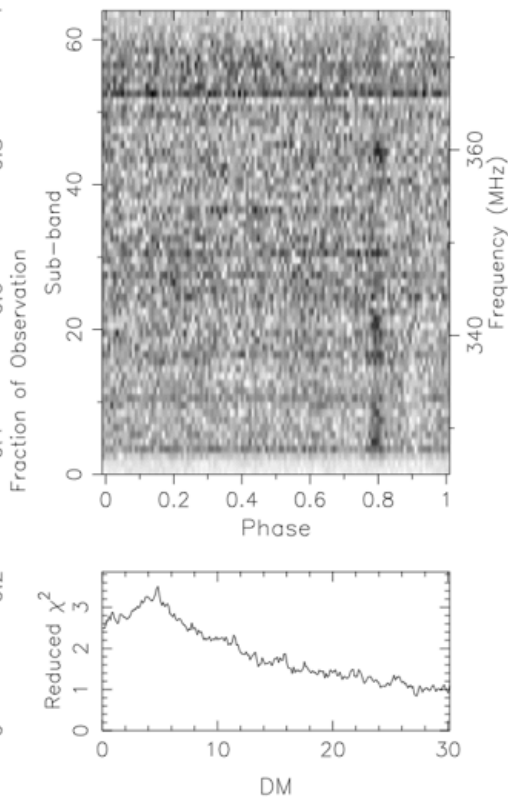
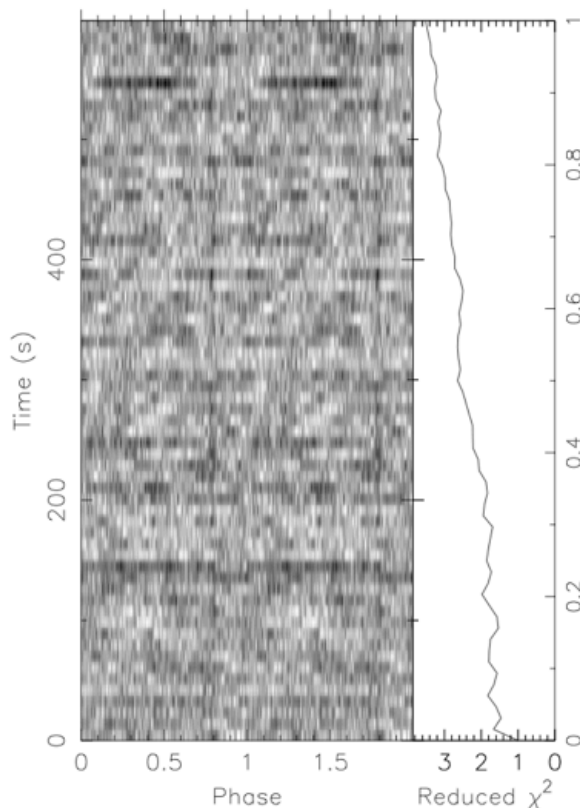
2 Pulses of Best Profile spigot_54175_0003_0001.fil

Search Information



Candidate: 591.76ms_Cand
 Telescope: GBT
 Epoch_{topo} = 54175.85523148148
 Epoch_{bary} = 54175.85426662262
 T_{sample} = 8.192e-05
 Data Folded = 7307264
 Data Avg = 6.619e+04
 Data StdDev = 358.5
 Profile Bins = 128
 Profile Avg = 3.777e+09
 Profile StdDev = 8.565e+04

RA_{J2000} = 02:40:30.9360
 DEC_{J2000} = 62:48:50.0400
 Best Fit Parameters
 Reduced χ^2 = 3.509 P(Noise) < 5.38e-37 ($\approx 12.7\sigma$)
 Dispersion Measure (DM) = 4.827
 P_{topo} (ms) = 591.7764(34) P_{bary} (ms) = 591.7377(34)
 P_{dot}_{topo} (s/s) = 0.0(4.4)x10⁻⁸ P_{dot}_{bary} (s/s) = 0.0(4.4)x10⁻⁸
 P_{ddot}_{topo} (s/s²) = 0.0(4.7)x10⁻¹⁰ P_{ddot}_{bary} (s/s²) = 0.0(4.7)x10⁻¹⁰
 Binary Parameters
 P_{orb} (s) = N/A e = N/A
 a₁sin(i)/c (s) = N/A ω (rad) = N/A
 T_{peri} = N/A



Hessels et al. 2007

Plans for the near future

- Pulsar Busy Week #12: April 11-15th
- Tied-array stability, polarization, coherent dedispersion, searching.

