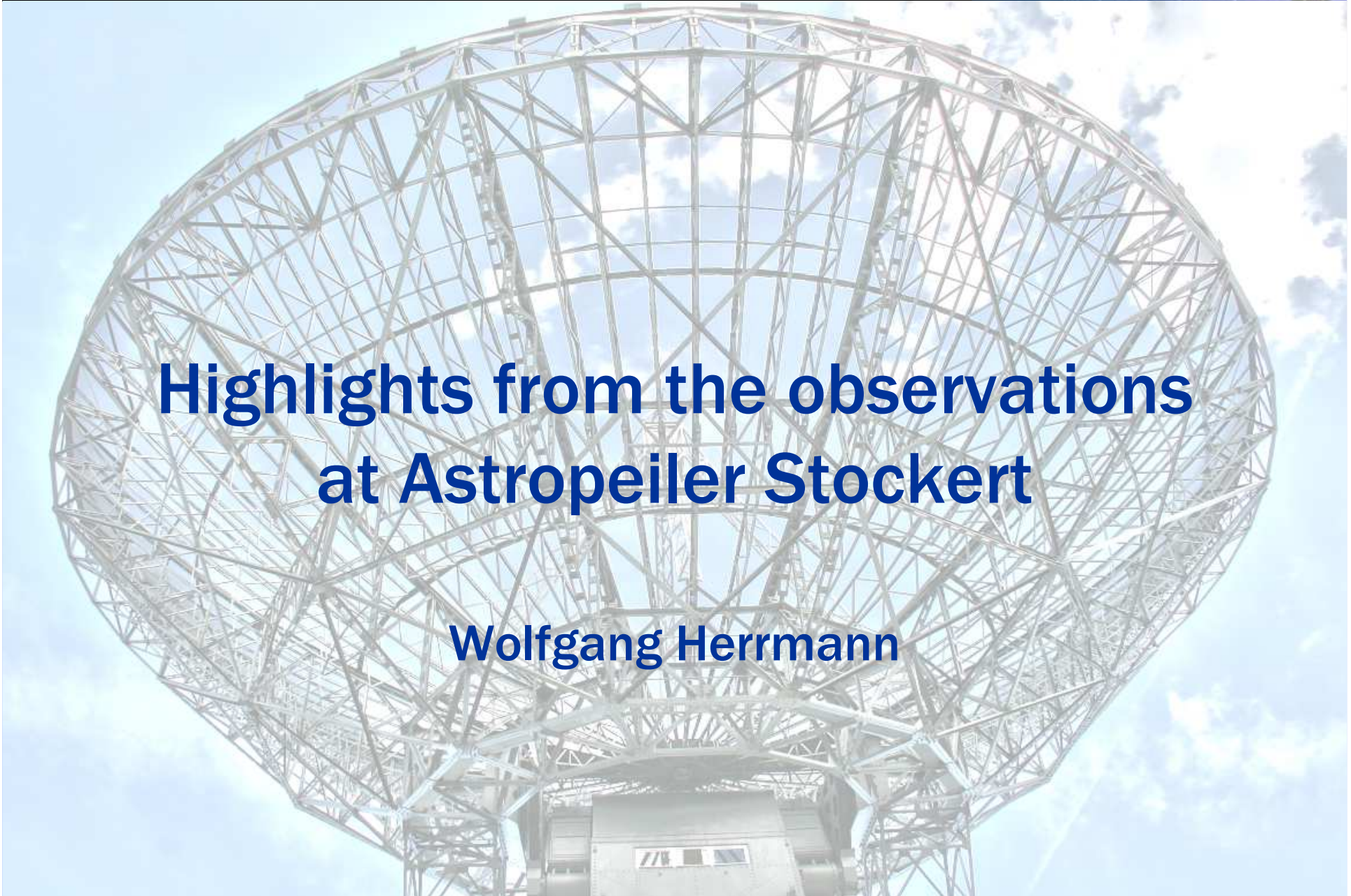


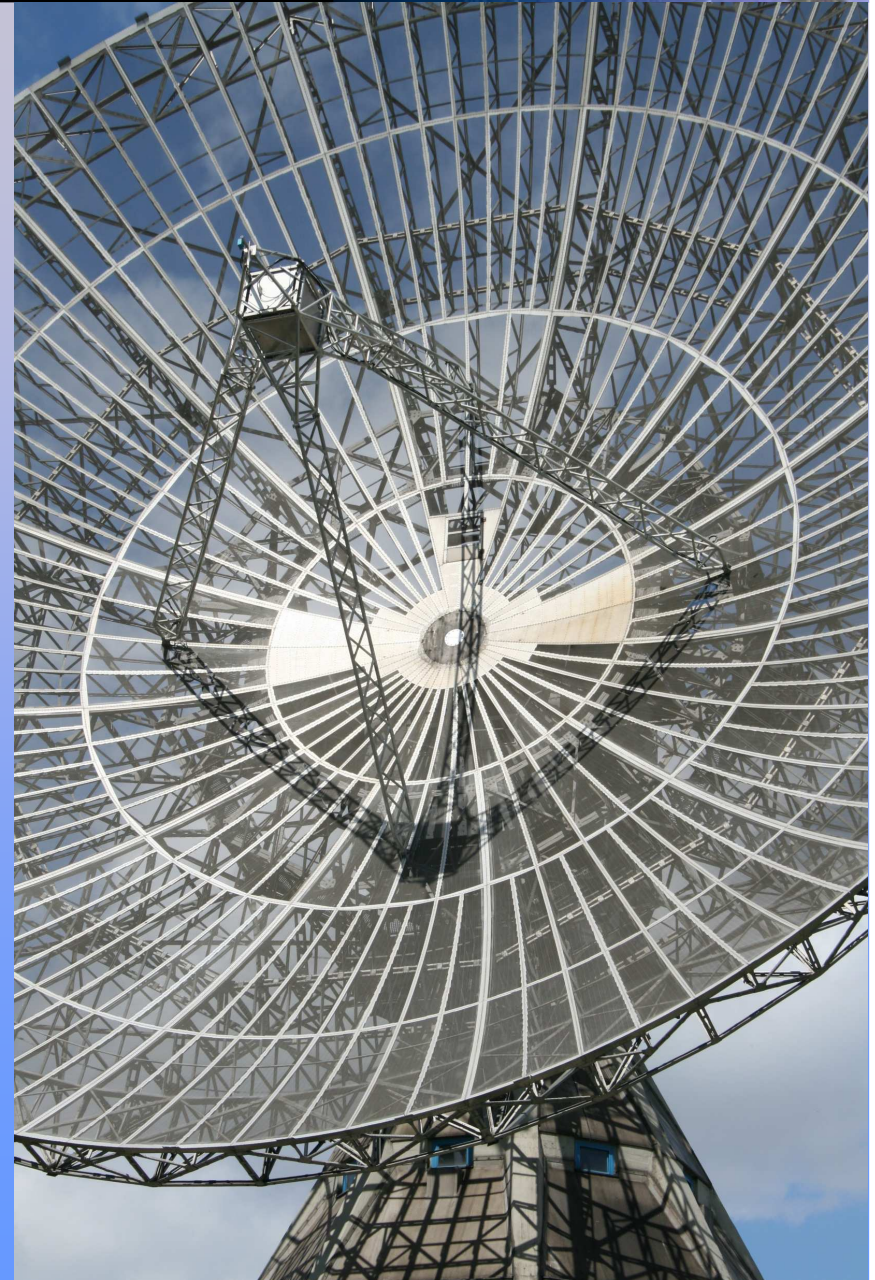


Highlights from the observations at Astropeiler Stockert

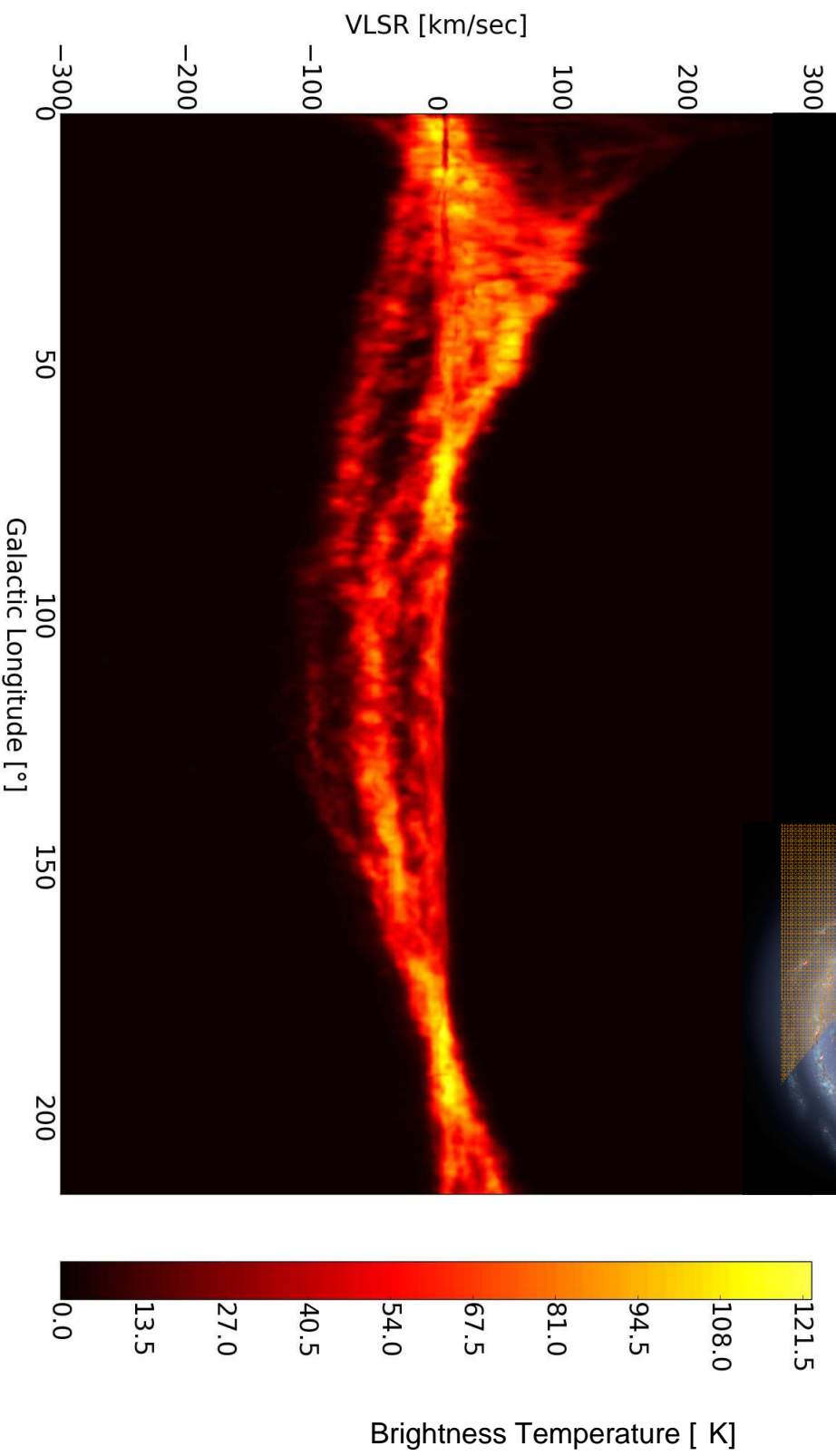
Wolfgang Herrmann



Hydrogen emission from the galactic plane



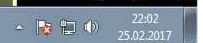
Scan of the Galactic Plane



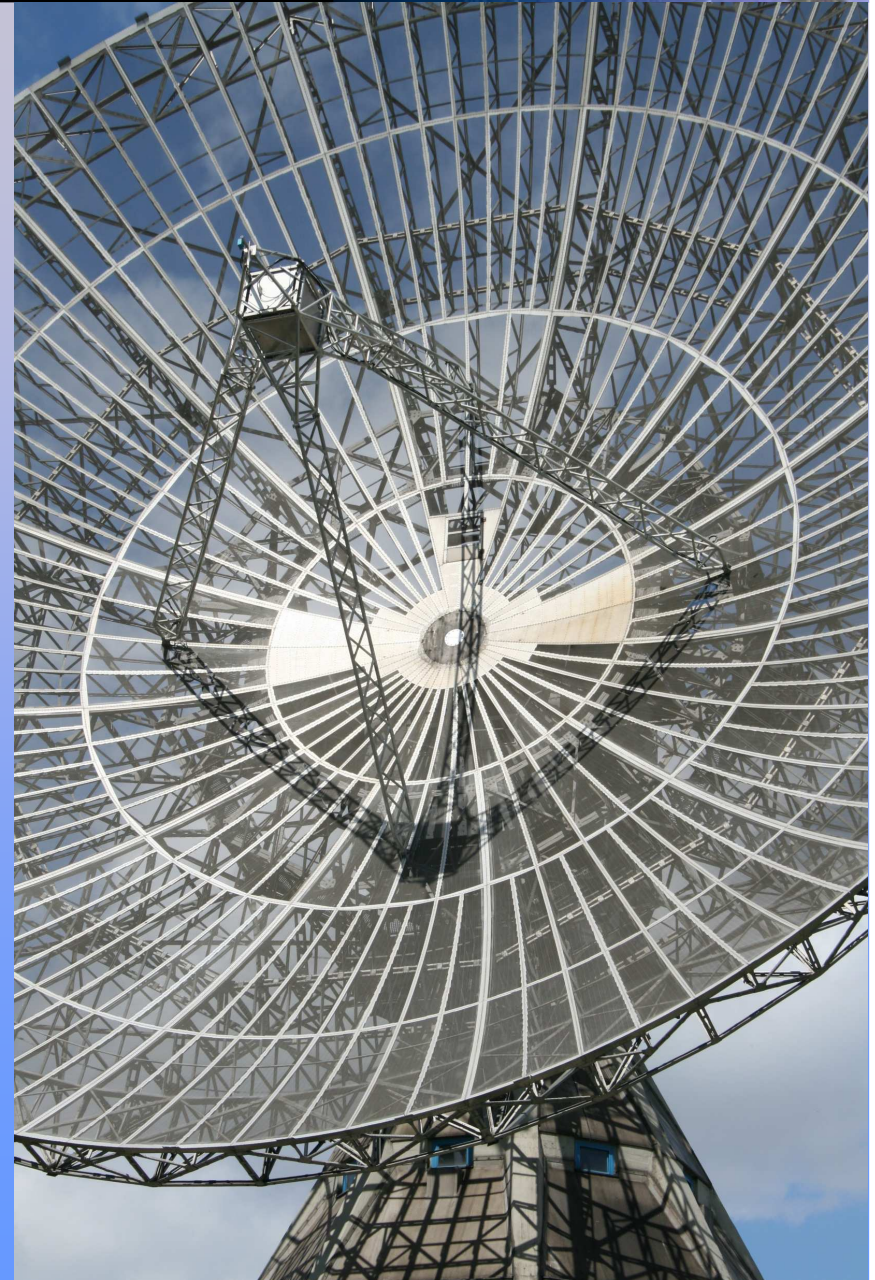


Virtual ANS

The video which is embedded in the original presentation can be found at:
<https://www.youtube.com/watch?v=N0Ja6jpju00>



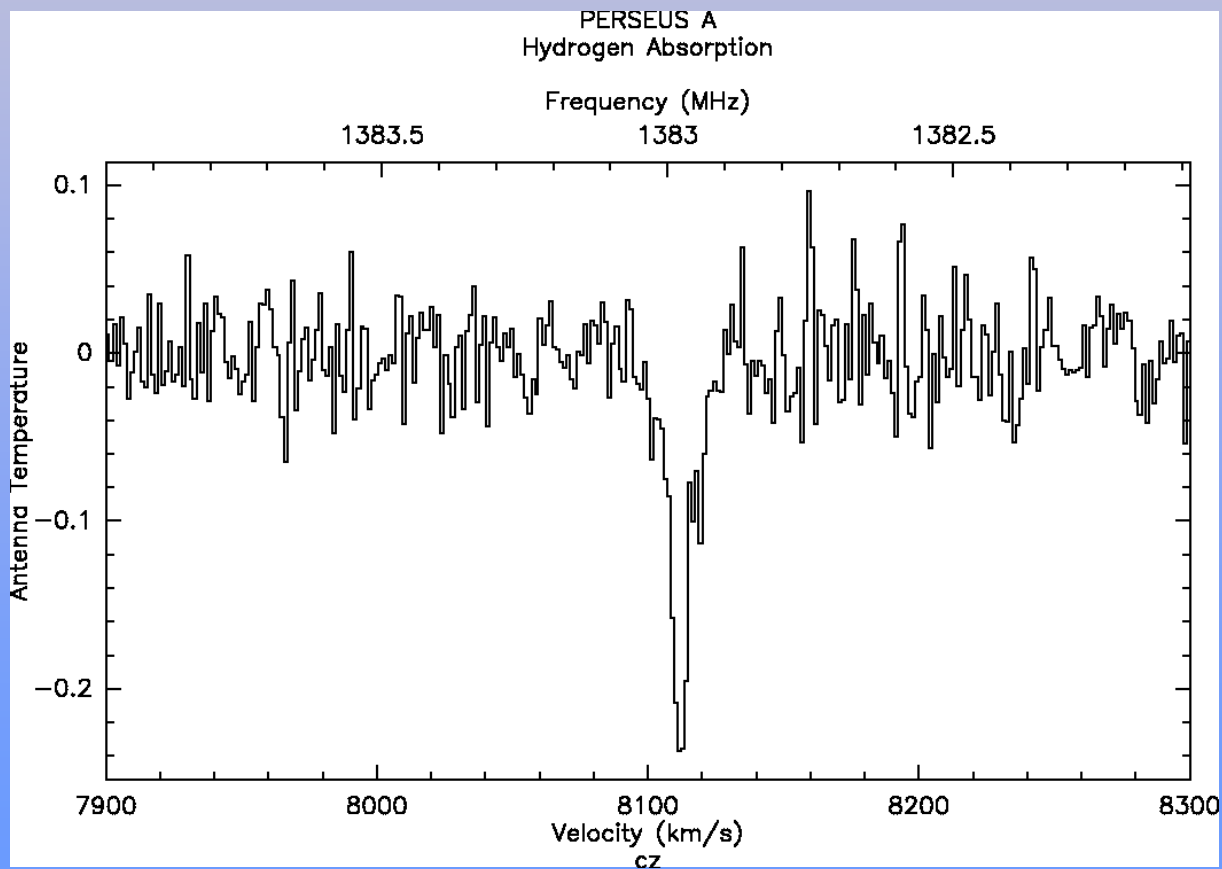
Absorption from Extragalactic Hydrogen





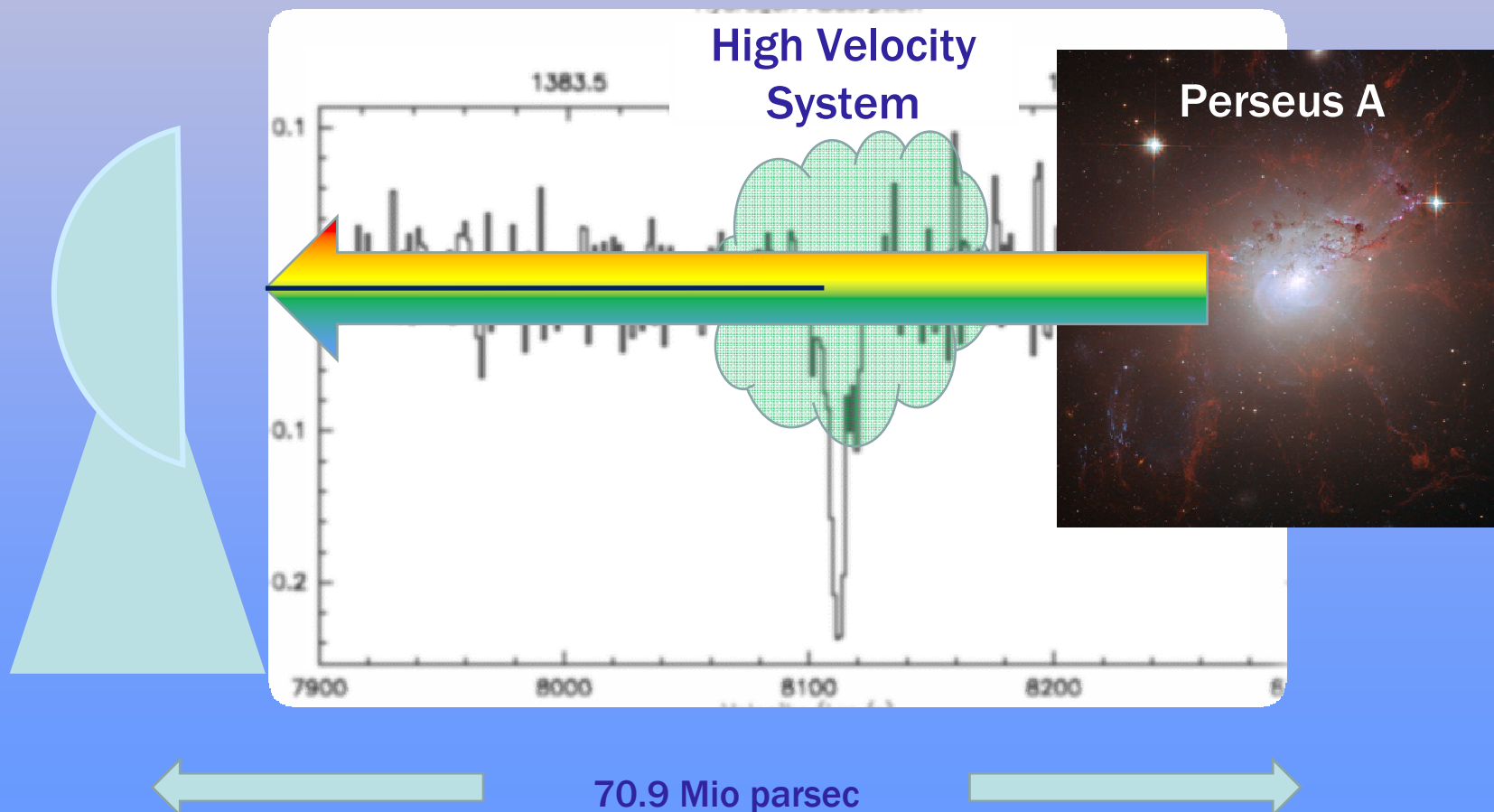
Extragalactic Hydrogen

Absorption from high velocity system towards Perseus A



Extragalactic Hydrogen

Absorption from high velocity system towards Perseus A

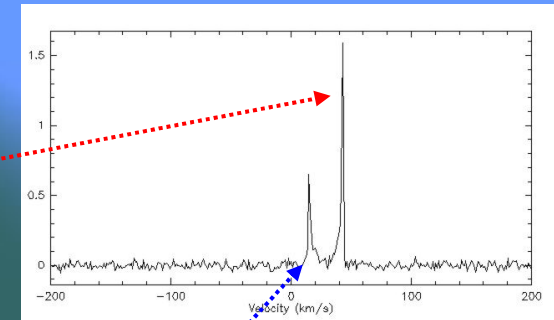
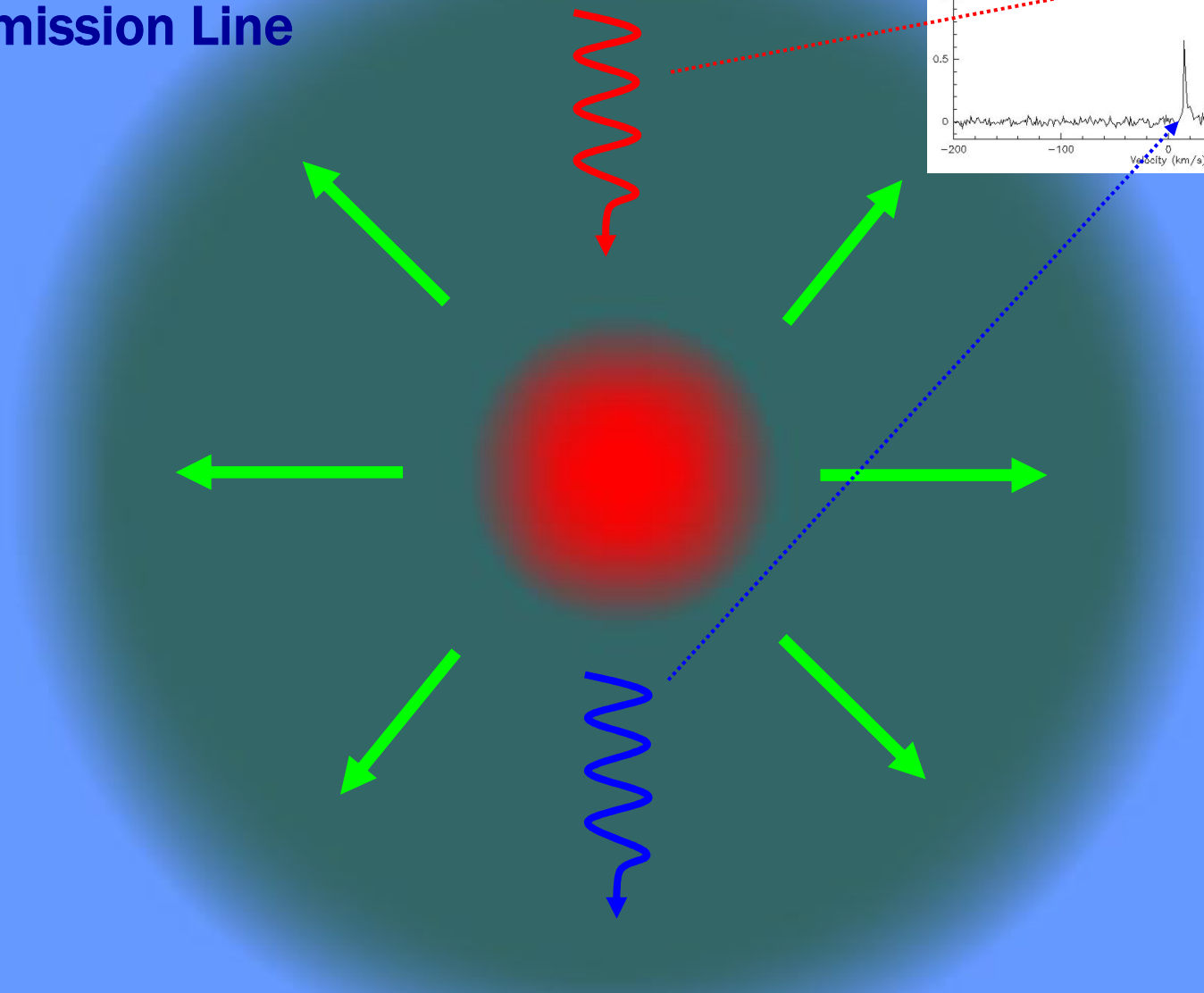




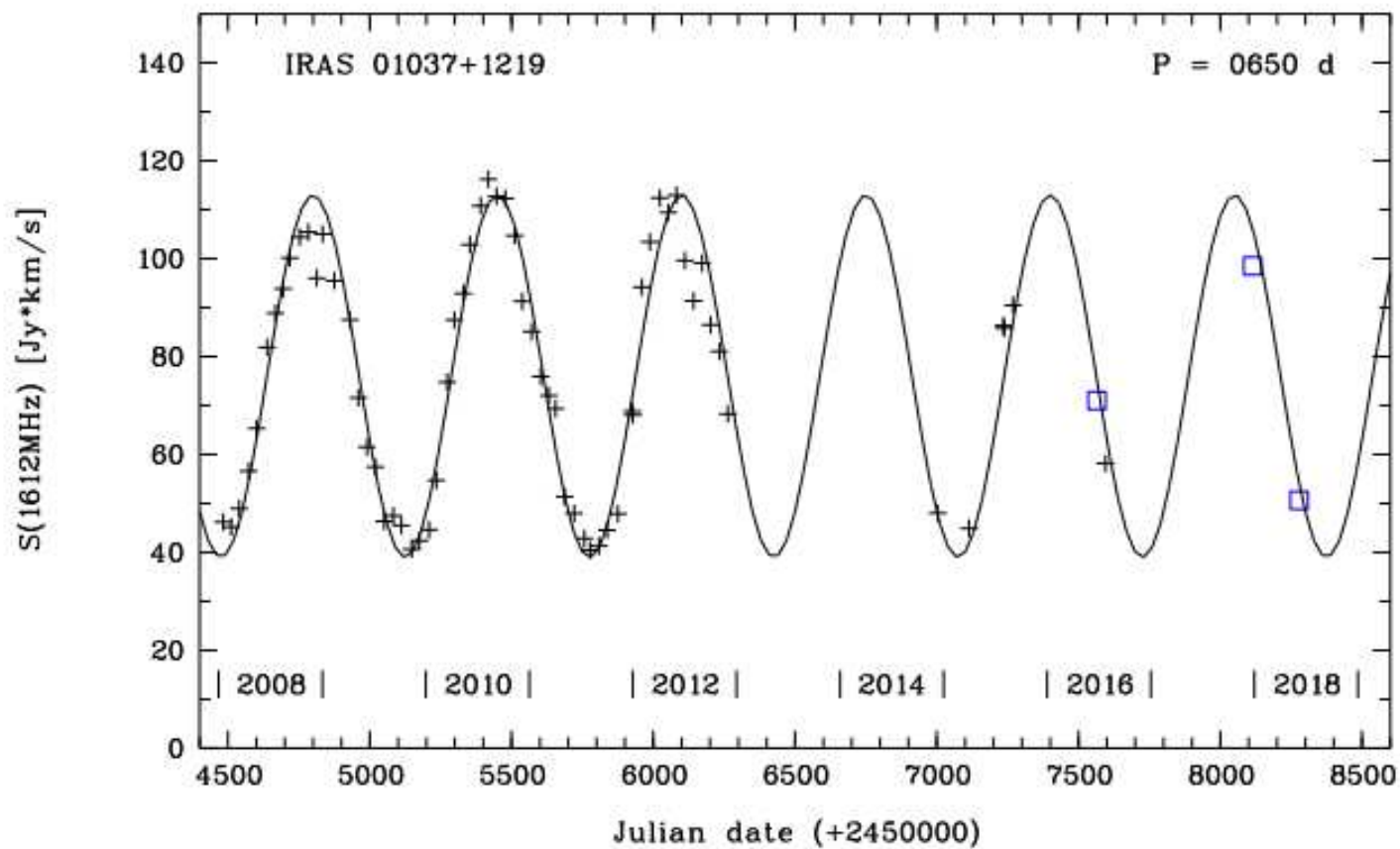
OH Maser monitoring program



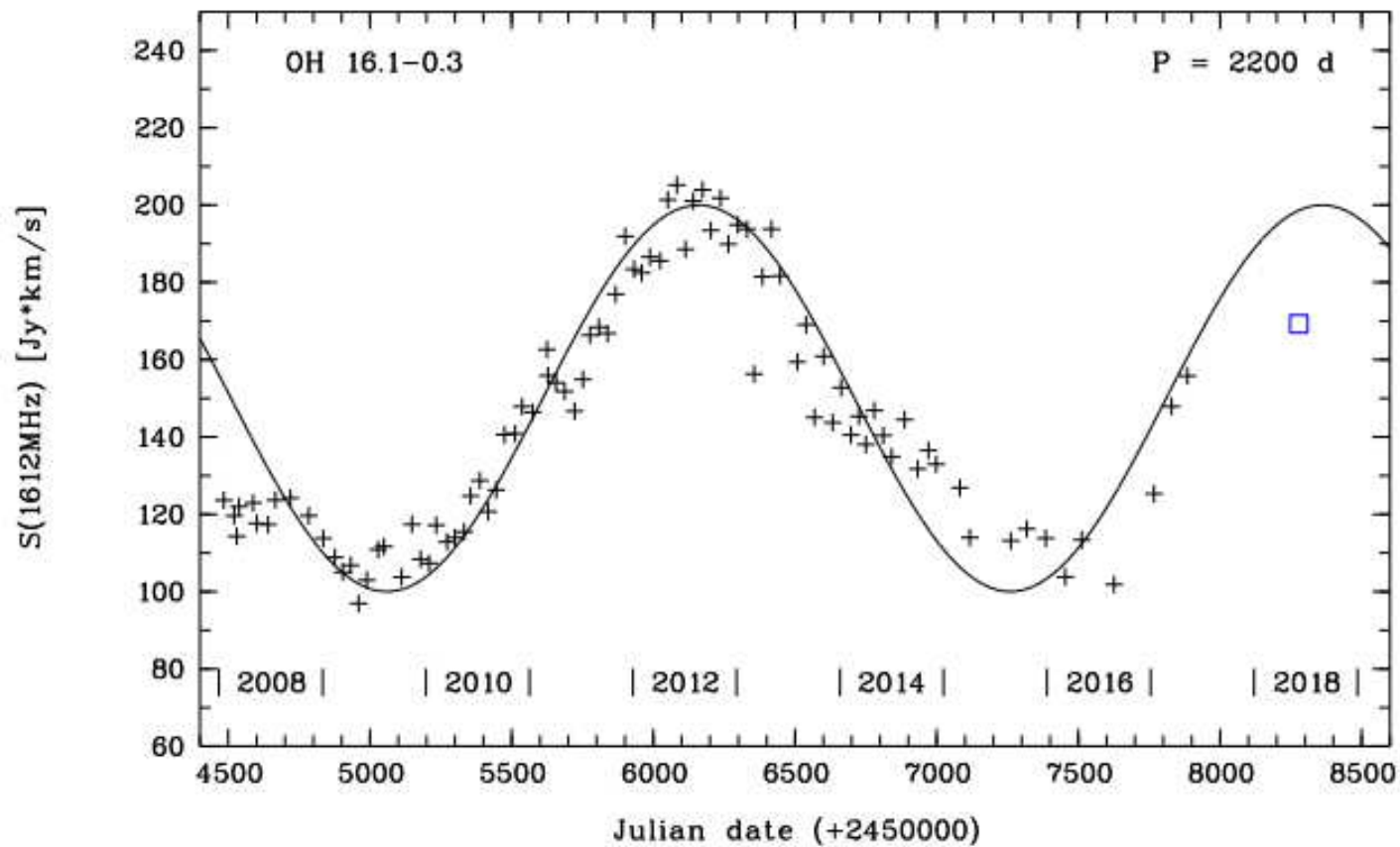
Circumstellar OH Maser Double Emission Line



OH Maser Monitoring Program: IRAS 01037+1219

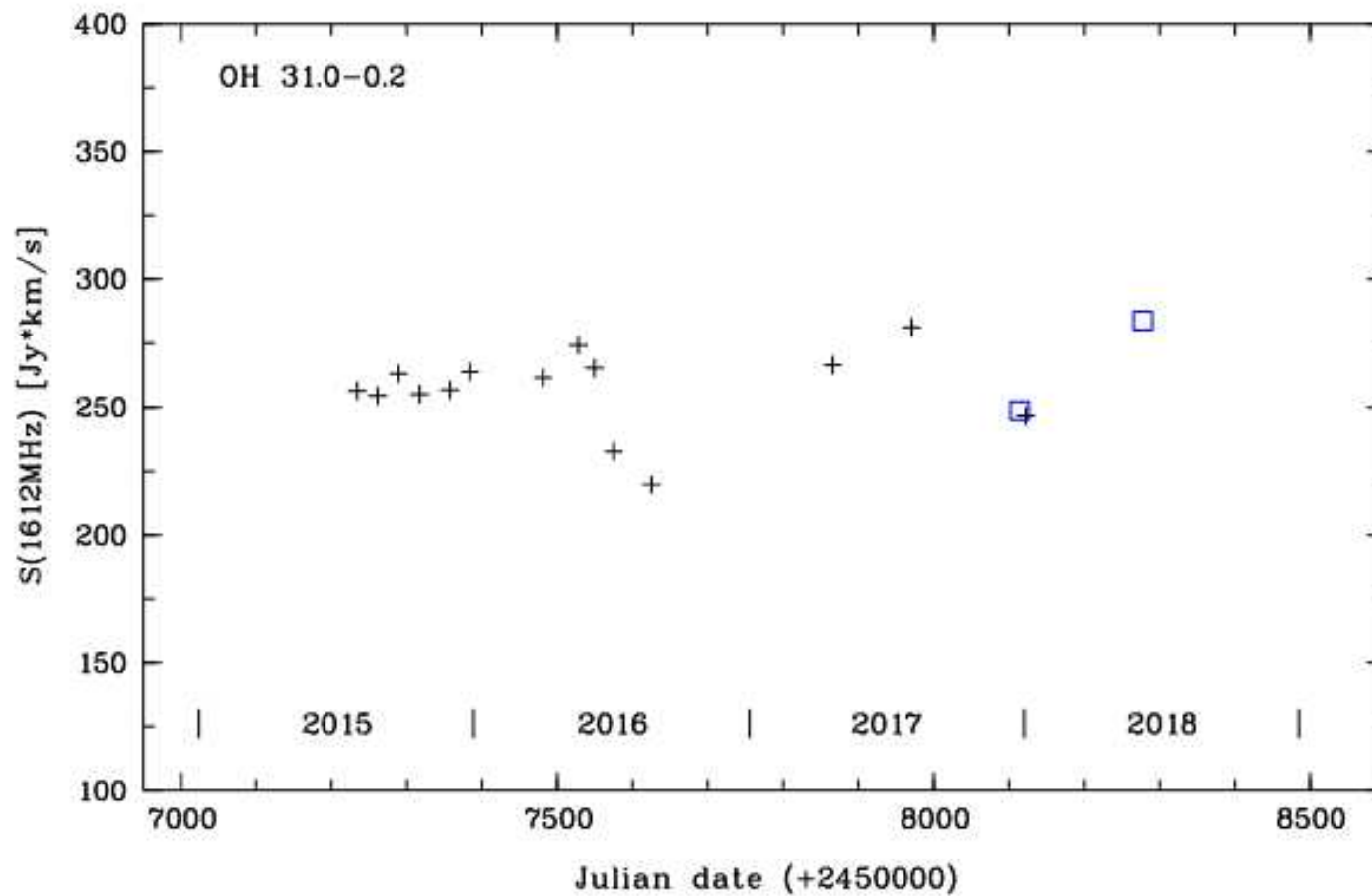


OH Maser Monitoring Program: OH 16.1-0.3

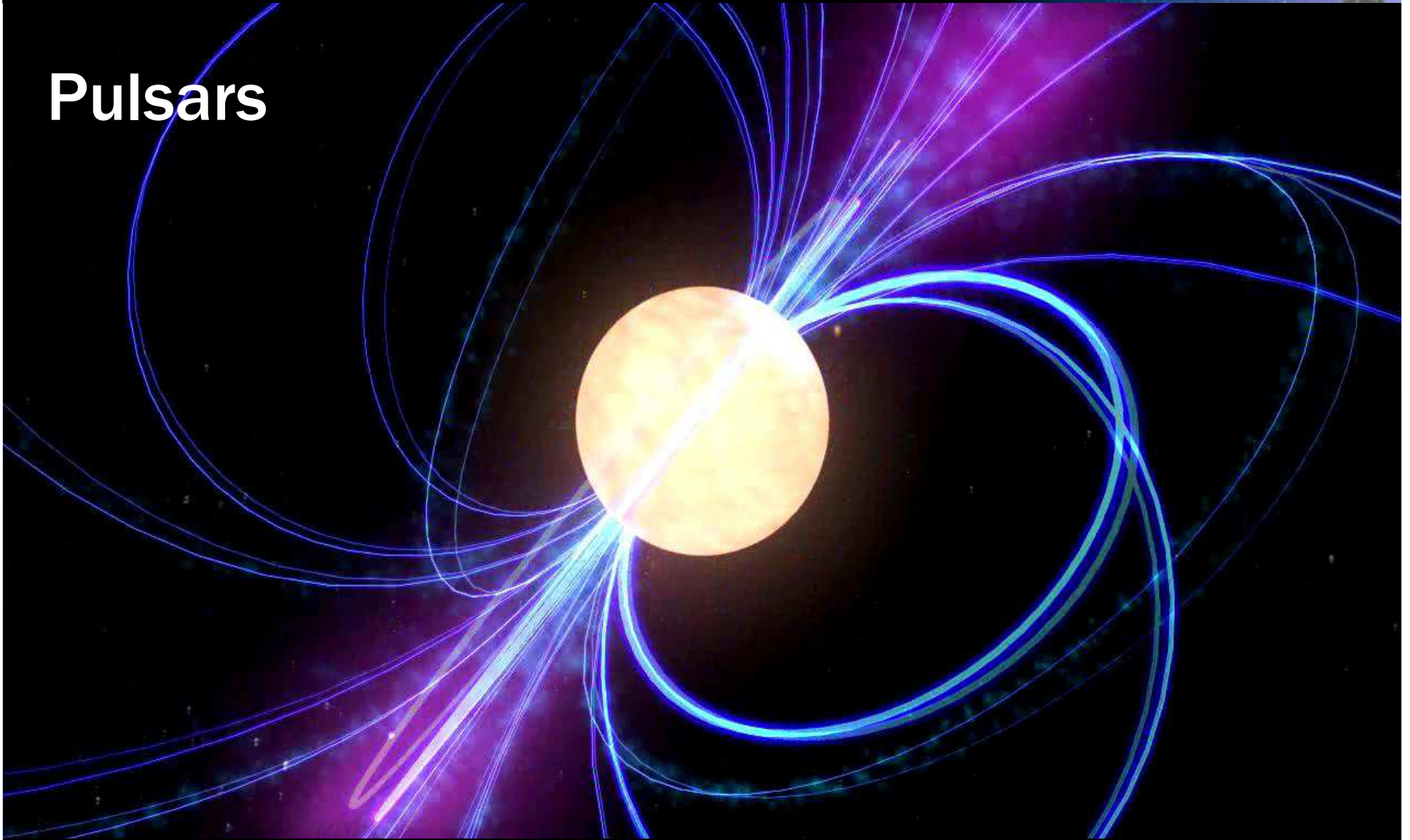




OH Maser Monitoring Program: OH 31.0-0.2



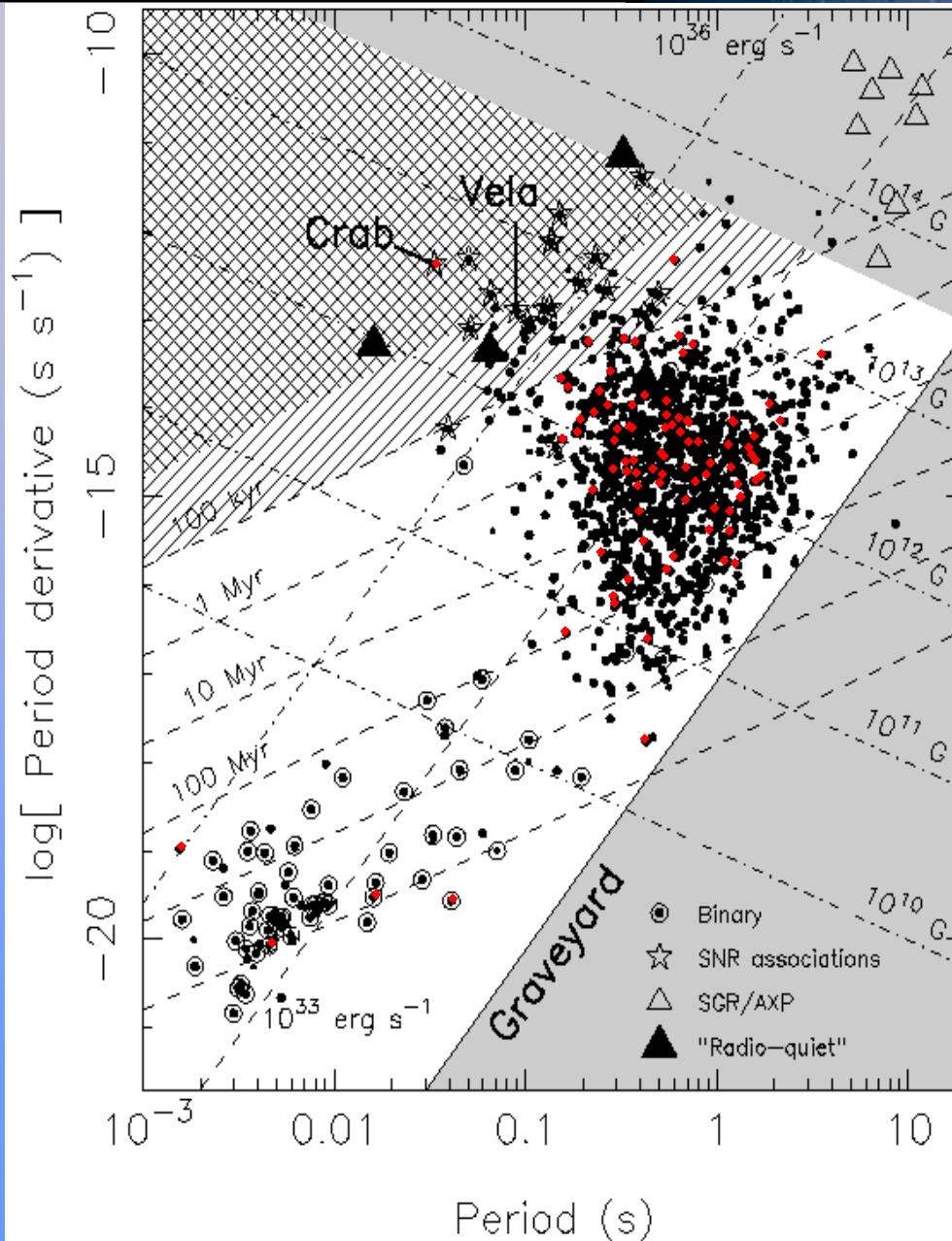
Pulsars



Plot of spindown rate vs.
pulse period
(PPdot diagram)

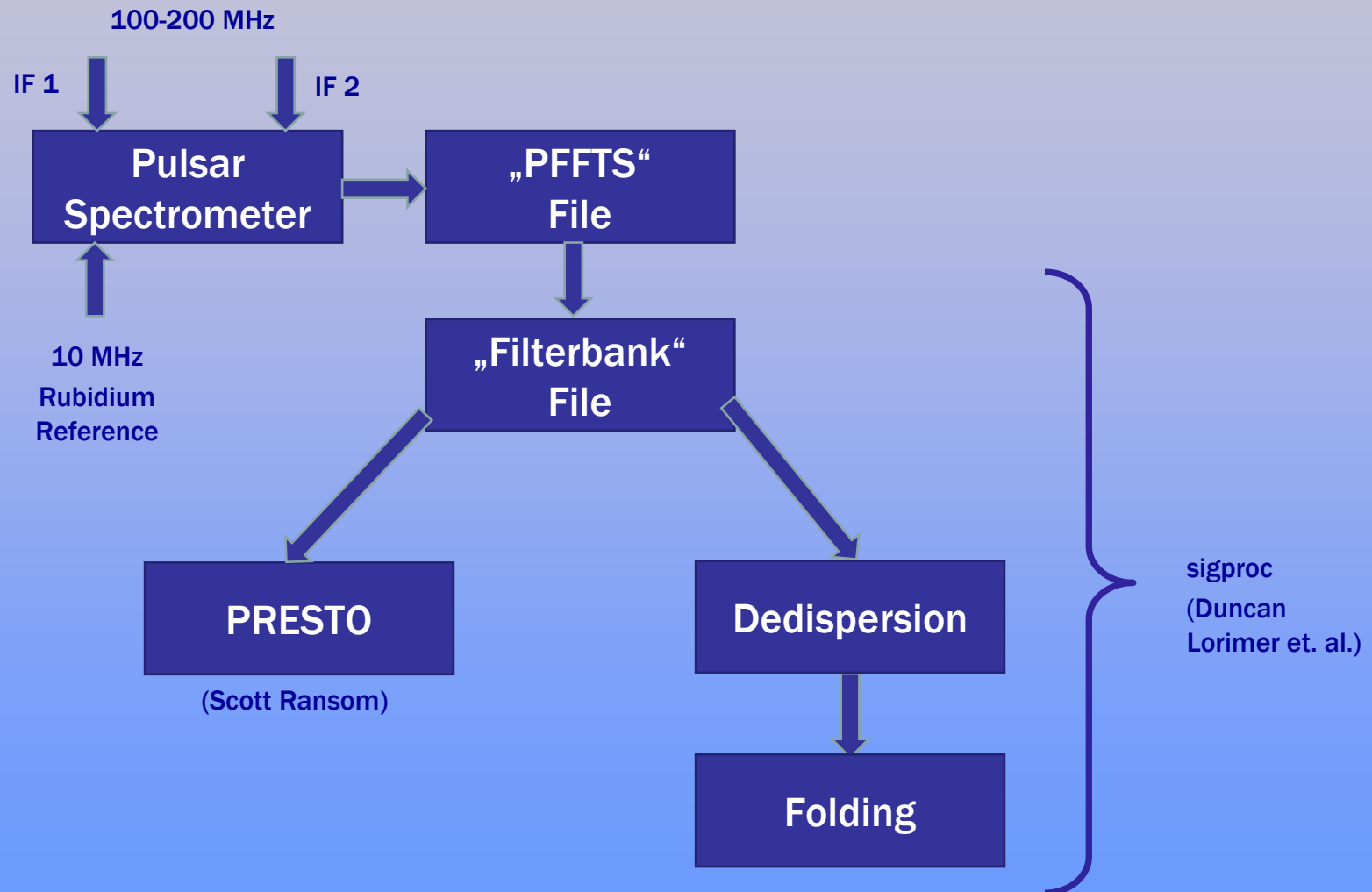
Red: 112 Pulsars
observed with the
Stockert Telescope

Graph from:
Duncan Lorimer, Michael Kramer
Handbook of Pulsar Astronomy
Cambridge University Press, 2005



Taken from "Handbook of Pulsar Astronomy" by Lorimer & Kramer

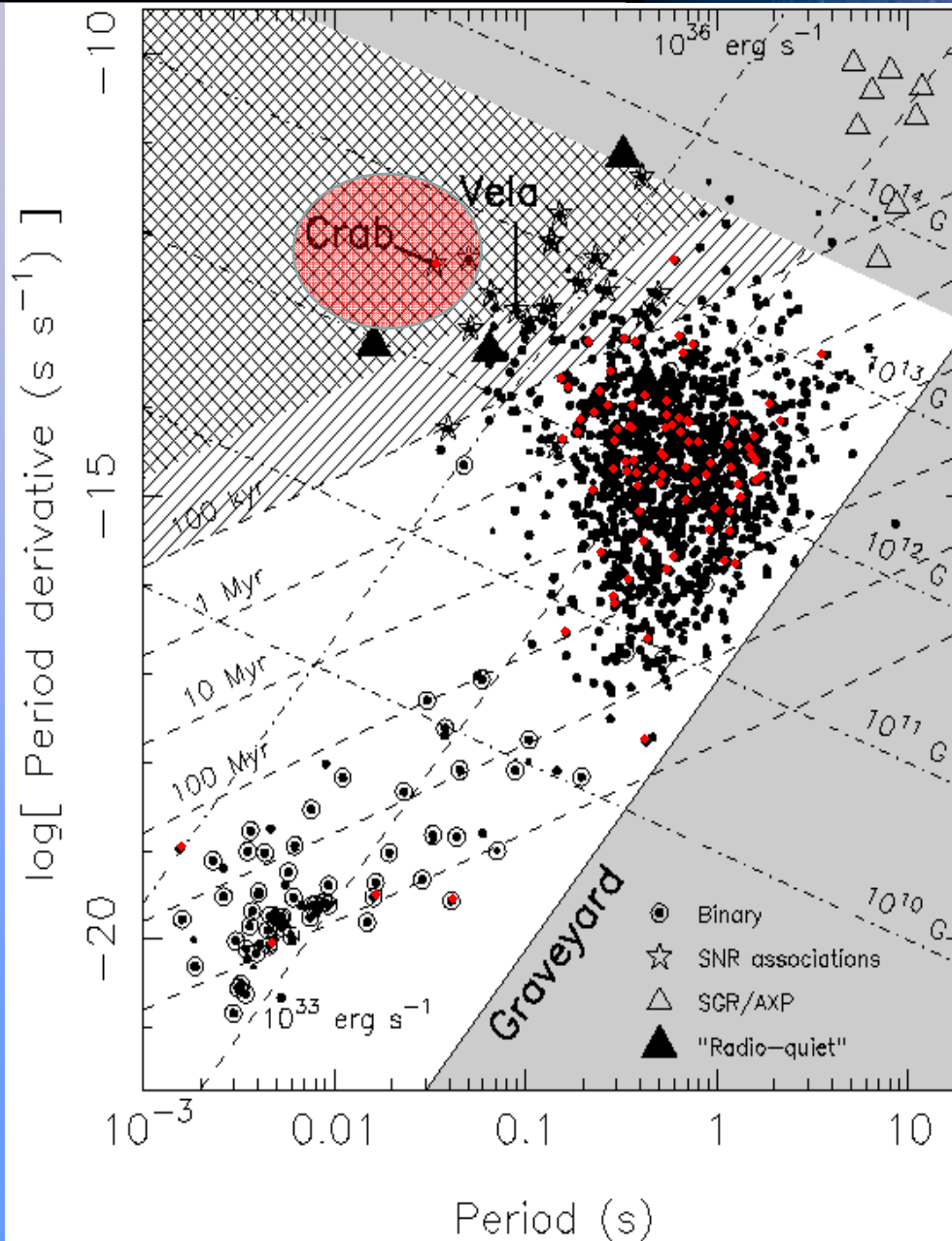
Pulsar Toolchain



Plot of spindown rate vs.
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(PPdot diagram)

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Graph from:
Duncan Lorimer, Michael Kramer
Handbook of Pulsar Astronomy
Cambridge University Press, 2005

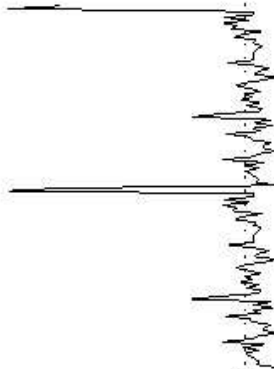


Taken from "Handbook of Pulsar Astronomy" by Lorimer & Kramer

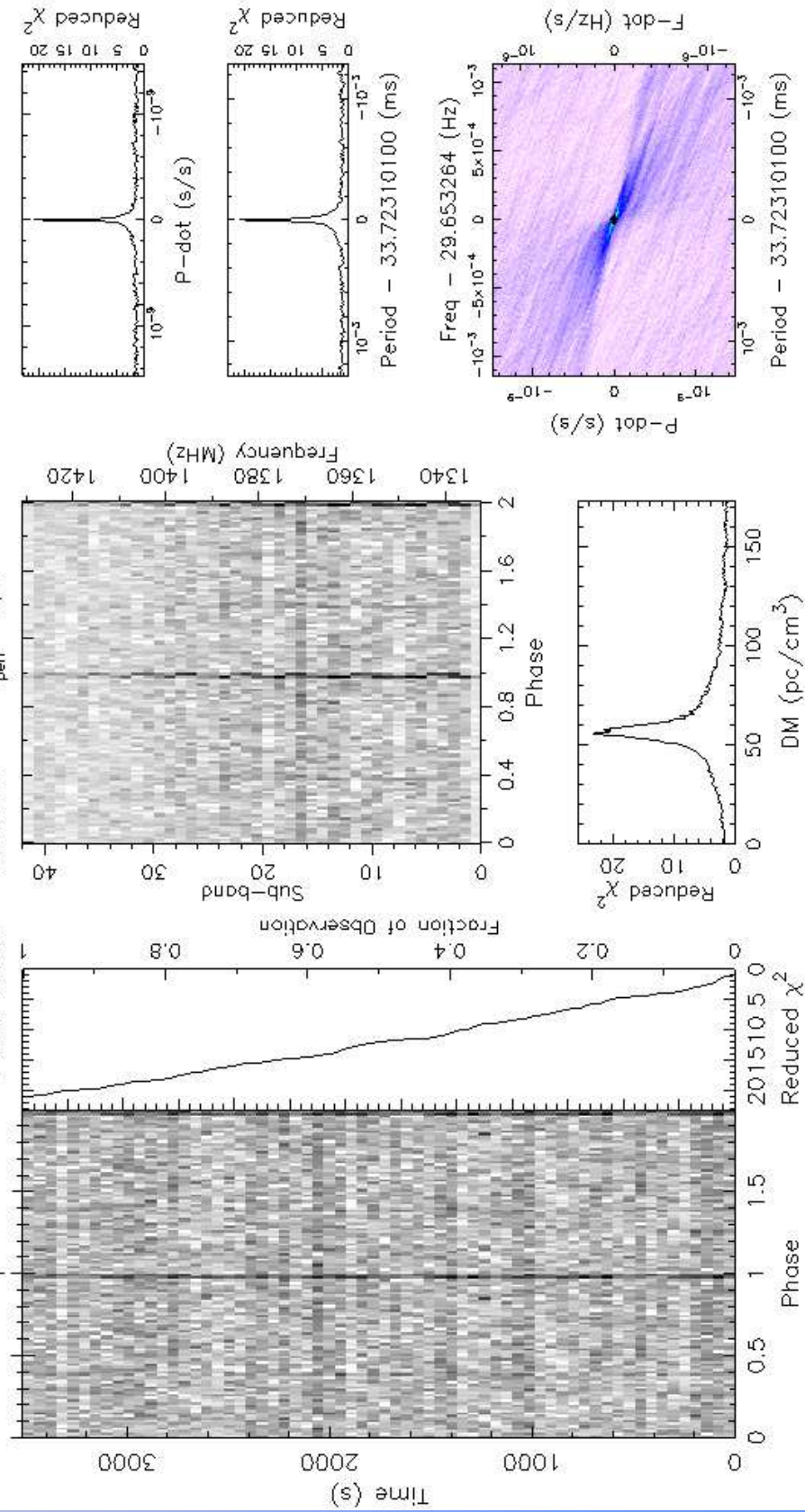


ASTROPEILER STOCKERT

2 Pulses of Best Profile



Search Information	
Candidate: 33.72ms_Cand	RA _{J2000} = 05:34:32.0000 DEC _{J2000} = 22:01:08.0000
Telescope: Stockert 25m	Folding Parameters
Epoch _{topo} = 57453.67605324090	DOF _{eff} = 58.61 χ^2_{red} = 20.939 P(Noise) < 2.45e-234 (32.7 σ)
Epoch _{bary} = N/A	Dispersion Measure (DM; pc/cm ³) = 57.274
T _{sample} = 0.00010923	P _{topo} (ms) = 33.7231010(18) P _{bary} (ms) = N/A
Data Folded = 32163840	P _{topo} (s/s) = 0.0(3.9)x10 ⁻¹² P _{bary} (s/s) = N/A
Data Avg = 1.299e+11	P _{topo} (s/s ²) = 0.0(7.2)x10 ⁻¹⁵ P _{bary} (s/s ²) = N/A
Data StdDev = 1.024e+09	Binary Parameters
Profile Bins = 64	P _{orb} (s) = N/A e = N/A
Profile Avg = 6.528e+16	a ₁ sin(i)/c (s) = N/A ω (rad) = N/A
Profile StdDev = 7.258e+11	T _{peri} = N/A



crab_2.fil





Single pulse results for 'crab_2'

Source: TAU_A

Telescope: Stockert 25m

Instrument: Unknown

RA (J2000): 05:34:32.0000

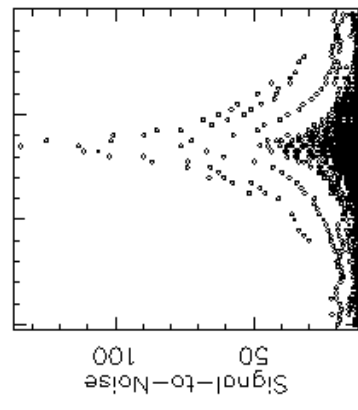
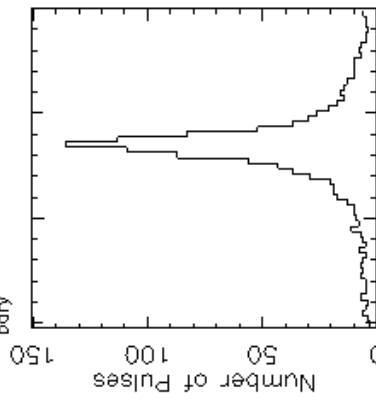
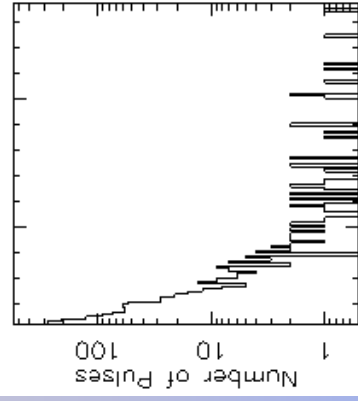
DEC (J2000): 22:01:08.0000

MJD_{bary}: 57453.677630993123

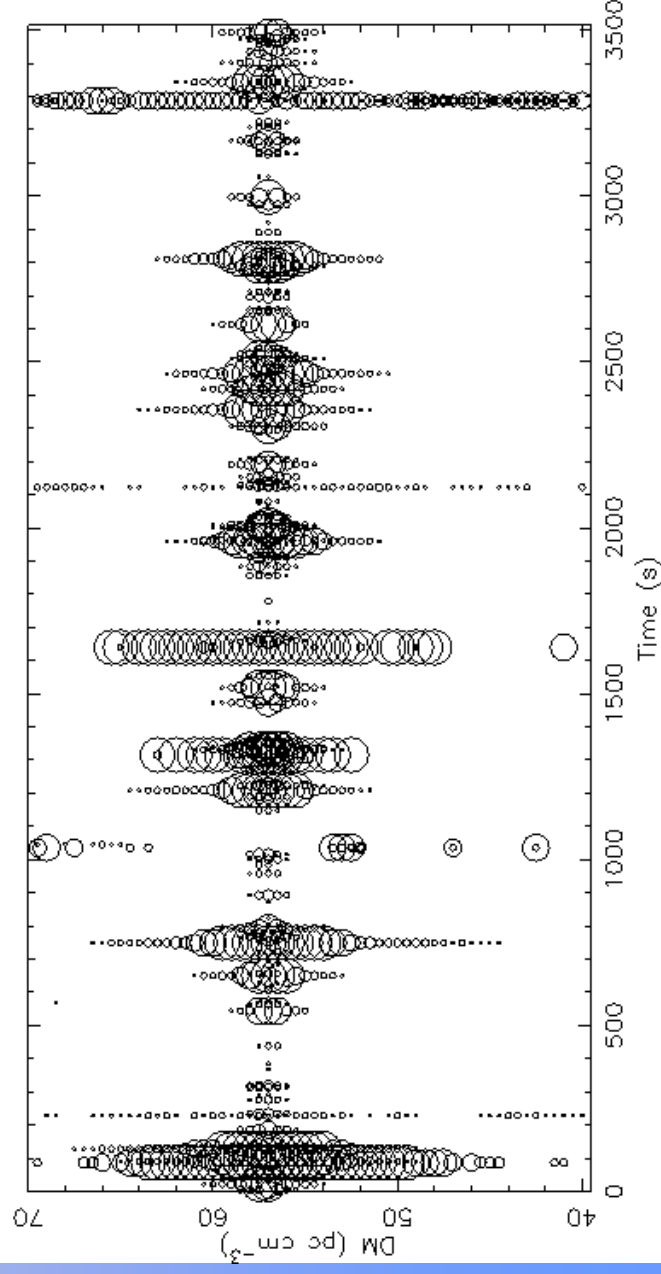
N samples: 32172187

Sampling time: 109.23 μ s

Freq_{ctr}: 1381.5 MHz



Signal-to-Noise





How “big” is the biggest Giant Pulses from this Observation?

$$T_{rms} = \frac{T_{sys}}{\sqrt{\Delta\nu \cdot \Delta t}}$$

Incl. contribution
from Crab nebula
background: 177K

Time resolution:
109 μ s

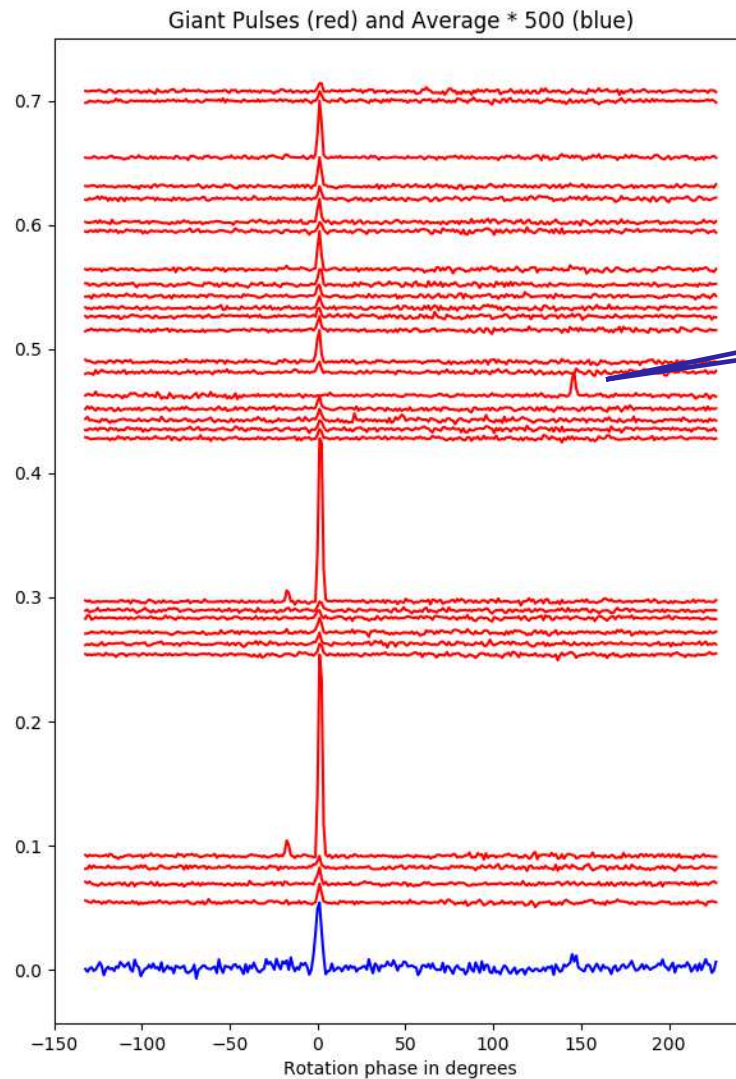
Bandwidth:
100 MHz

1.7 K

1.7 K * 150 = 255 K

Sensitivity of Astropeiler 25m dish: ~0.1 K/Jy

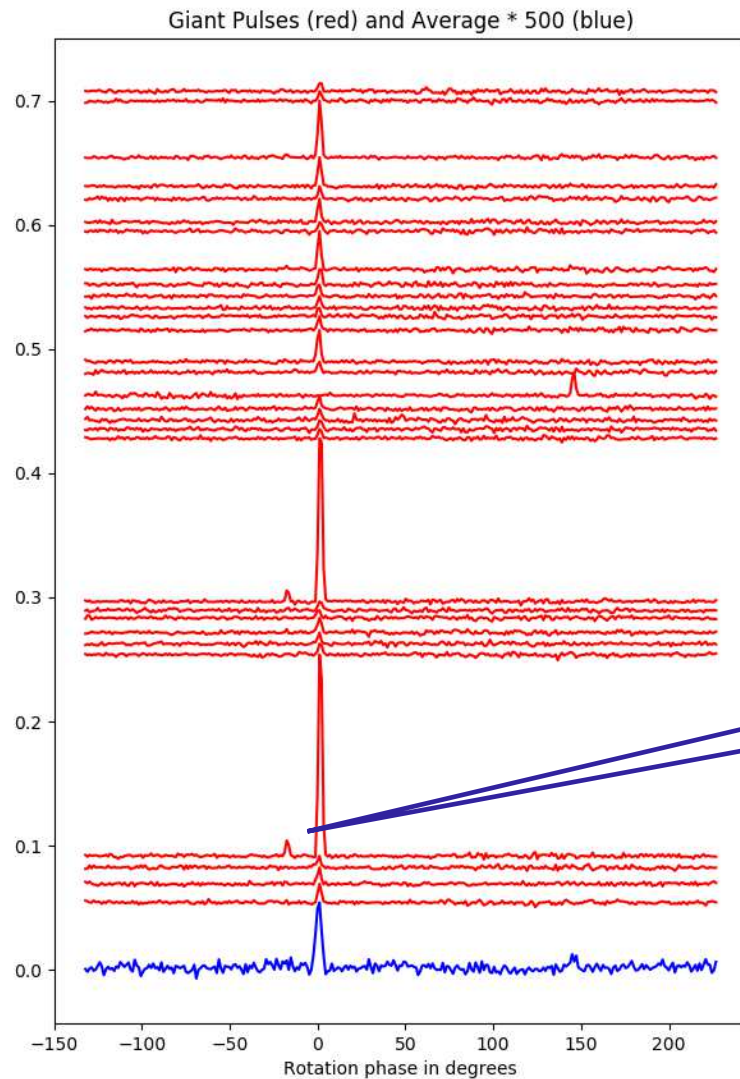
=> 2550 Jy



Giant pulse at the phase of the interpulse

Giant pulses

Average profile (x 500)



Now what is this precursor?



Precursor: Real or Instrumental Artefact?

Pro Real

- Consistent observation
- Precursor known at lower frequencies, albeit with slightly different timing
- Some potential artefact causes ruled out

Pro Artefact

- Not reported in the literature
- Precursor seen also on strong interpulse giants with same timing and amplitude relation

More work needed to resolve the question



Examples of Observations

- Search for Fast Radio Bursts





Speculative Project: Fast Radio Bursts

What are Fast Radio Bursts?

- **Single events of high intensity radio bursts**
 - High dispersion, larger than explainable by our own galaxy
 - Therefore believed to be of extragalactic origin
 - Typical duration ~ 1 msec
- **About 30 events known so far**
- **Many theories of what might be the cause**
 - More theories than observations
- **One FRB stands out from the crowd: FRB121102 repeats irregularly**



Speculative Project: Fast Radio Bursts

Can our 25m dish observe FRBs?

- Only few of the FRBs known are intense enough
- The „repeater“ FRB121102 is not among them

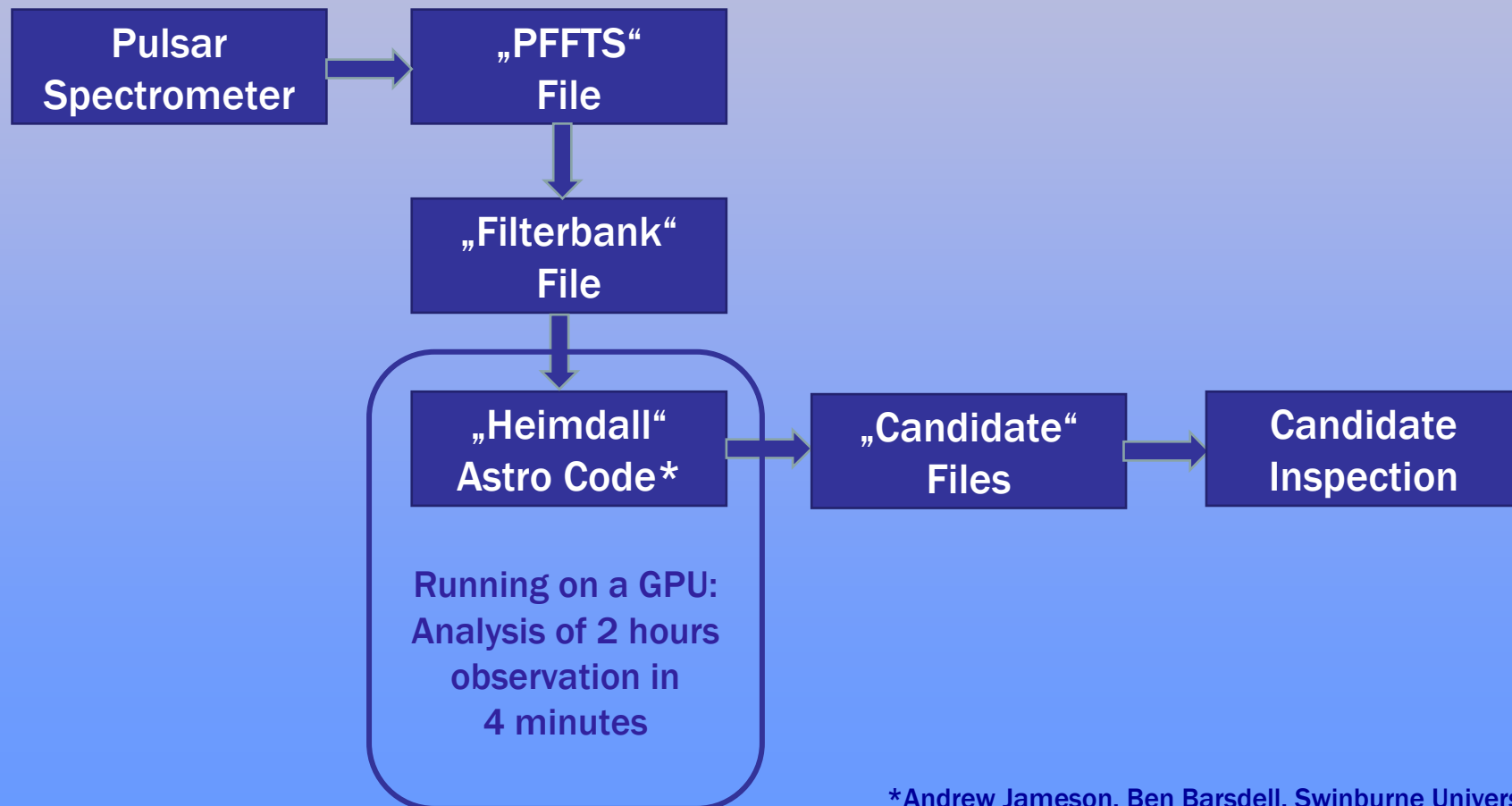
Speculation

- Maybe the FRB121102 has sometimes a stronger pulse which might be detectable
- We can use time when the telescope is parked to look for other FRBs

**Chances are very slim,
but why not give it a try on both options?**

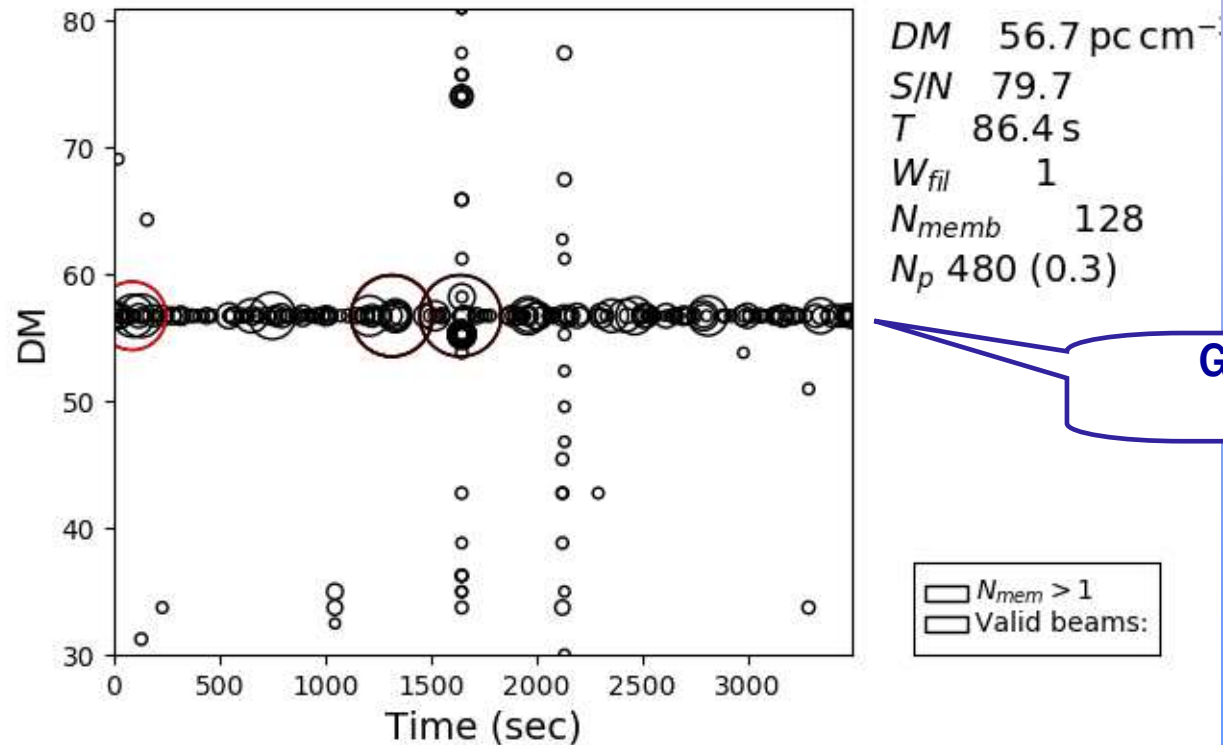
The Challenge of FRB Blind Searches: The Dispersion is Unknown

Approach: Use massive parallel processing to try different dispersion values



*Andrew Jameson, Ben Barsdell, Swinburne University

Testing the Toolchain with Gaint Pulses from the Crab Pulsar



Giant pulses properly
detected



Speculative Project: Fast Radio Bursts

Any results yet?

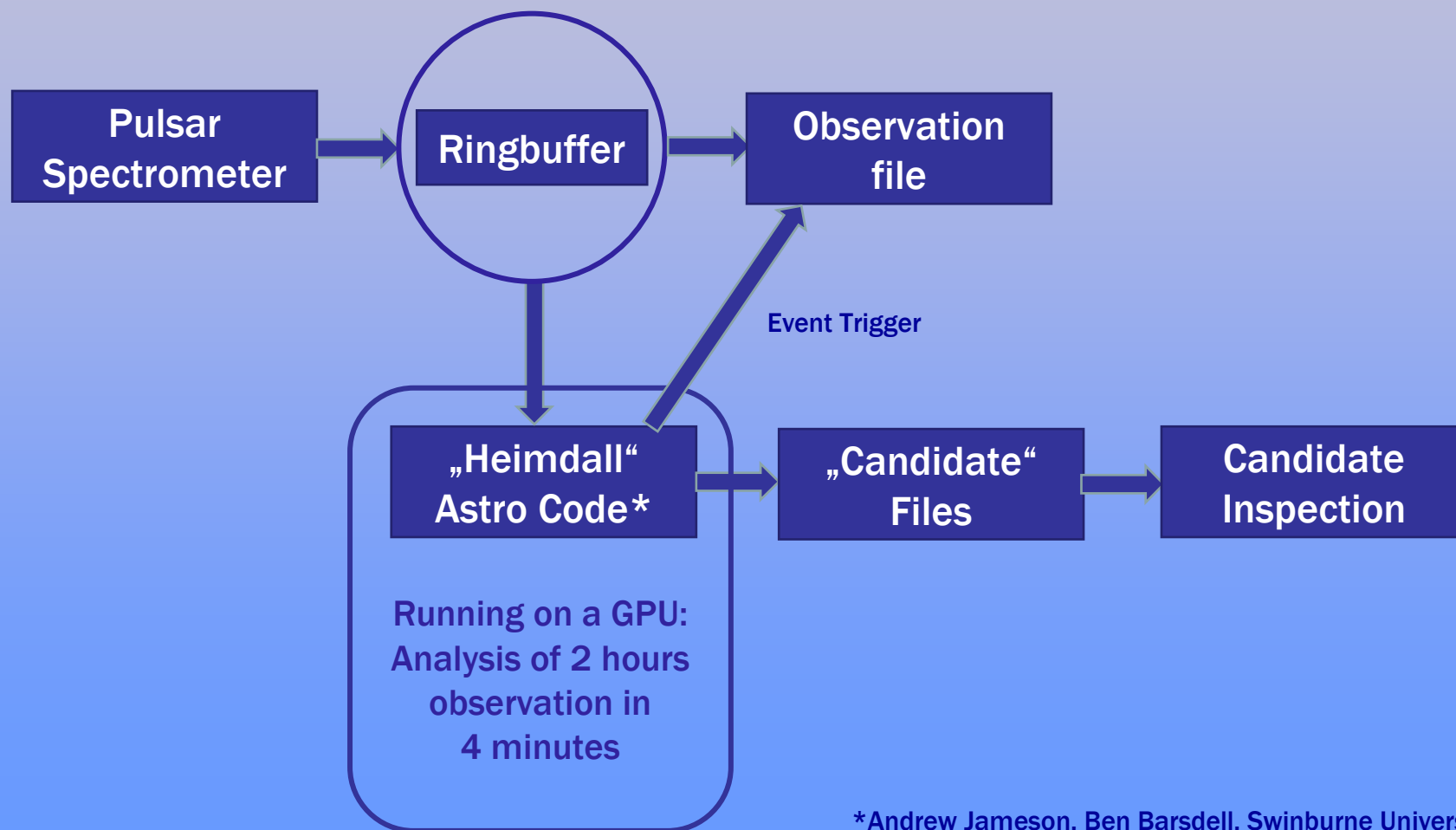
- ~240 hrs of observations without any sign from FRB121102
- Numerous hours of FRB blind search, none found

All this is expected as chances are slim

But if we don't observe, we won't see anything either

The Challenge of FRB blind Searches: The Dispersion is unknown

Upgrade Path: Ringbuffer instead of files to enable permanent observation



*Andrew Jameson, Ben Barsdell, Swinburne University

Summary

Selected Observations have been presented:

- Spectra of a scan of the galactic plane with audio conversion
- Absorption from extragalactic hydrogen
- OH maser monitoring program
- Giant pulses from the crab pulsar
- Efforts towards FRB detection