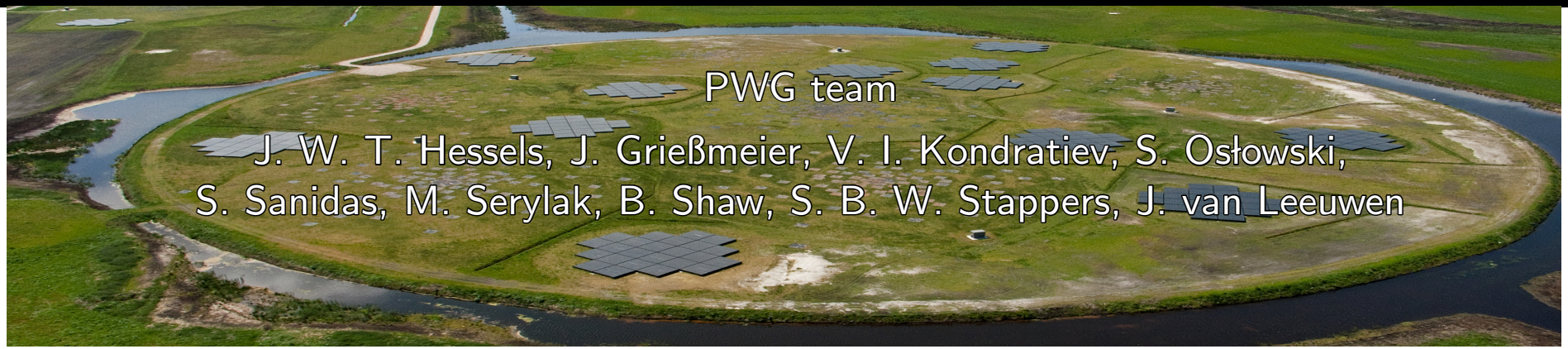


# Emission and rotation evolution of pulsar PSR B2217+47

Daniele Michilli

UvA / ASTRON

04-04-2016

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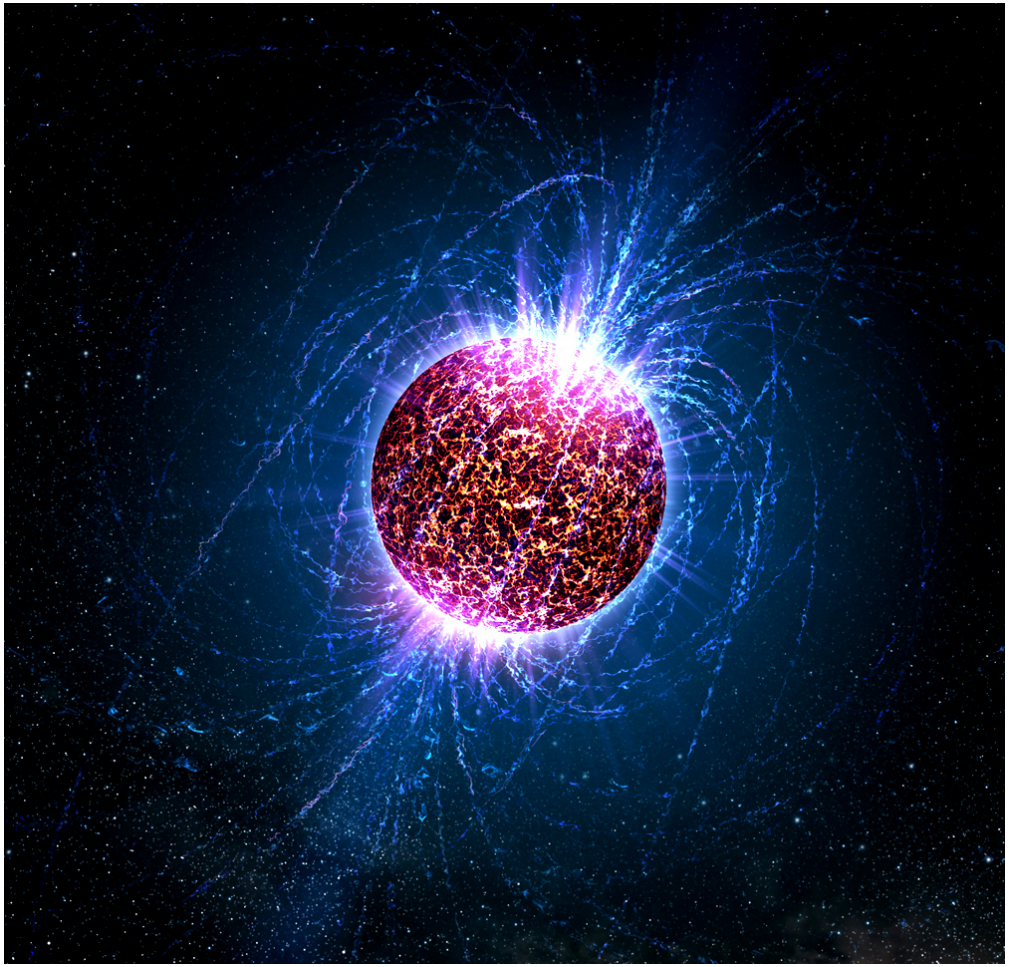
# Pulsars as clocks

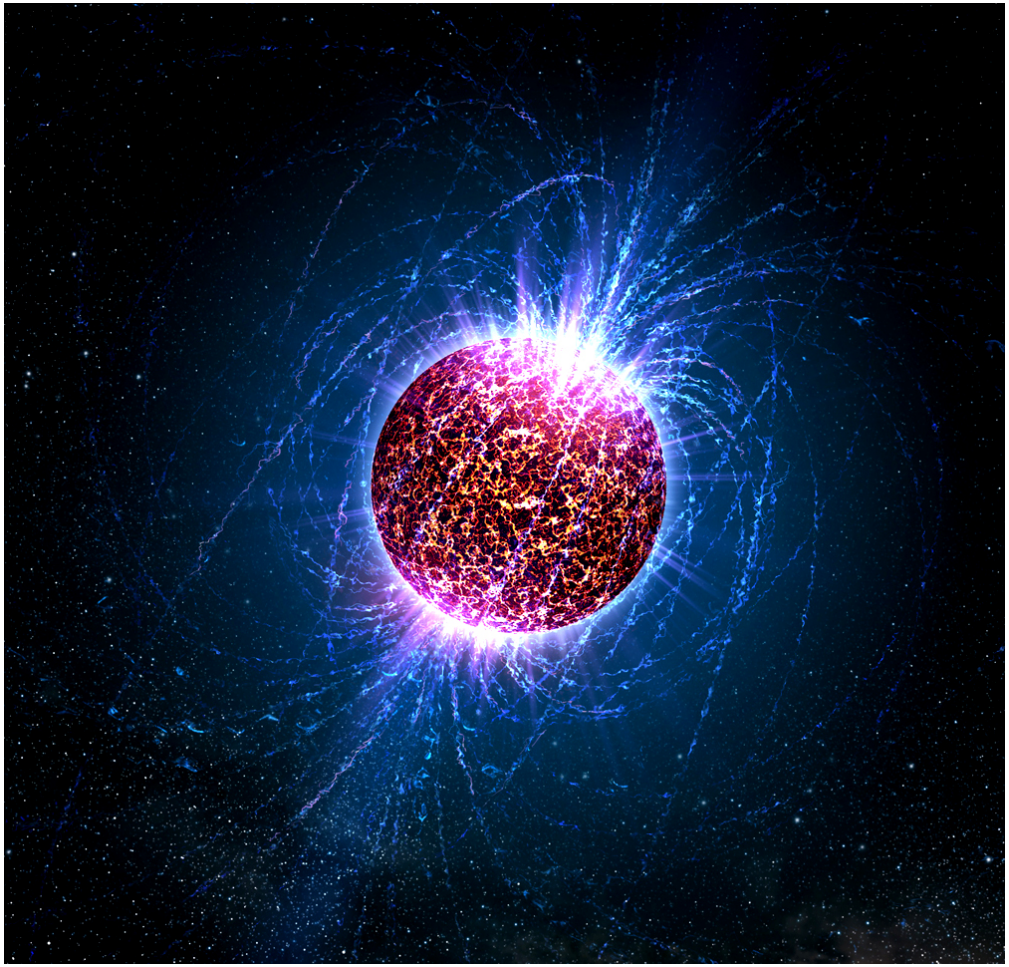
- Pulsating emission $\Rightarrow$ Used as celestial clocks in timing experiments



Casey Reed - Penn State University

# Pulsars as clocks

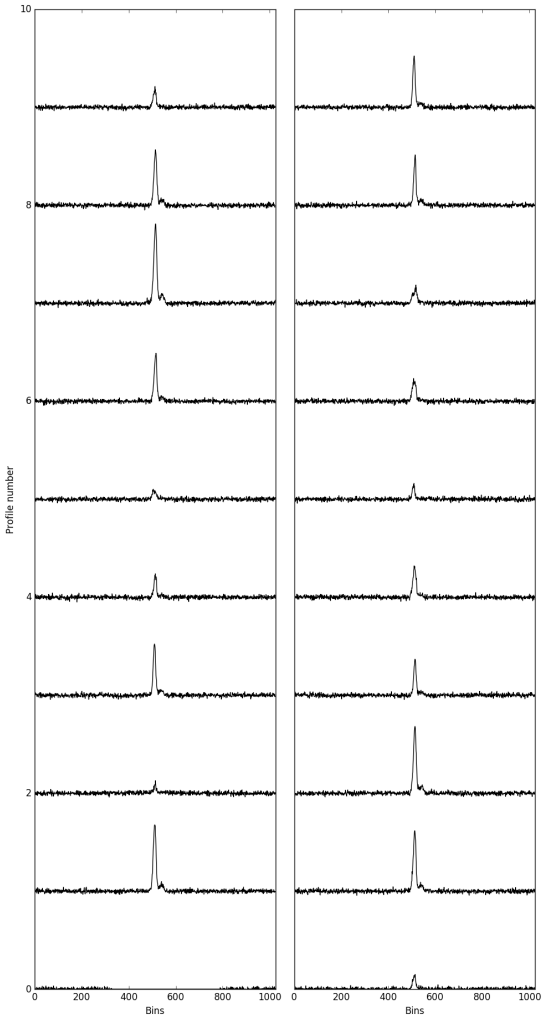
- High moment of inertia $\Rightarrow$ Rotation stability



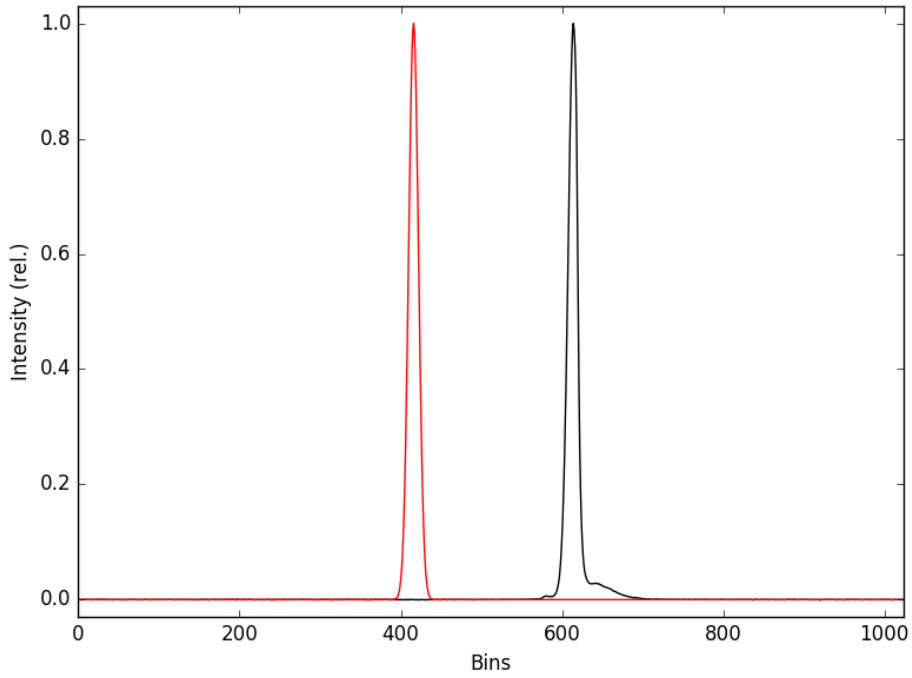
Casey Reed - Penn State University

# Pulsars as clocks

- Variable single pulses

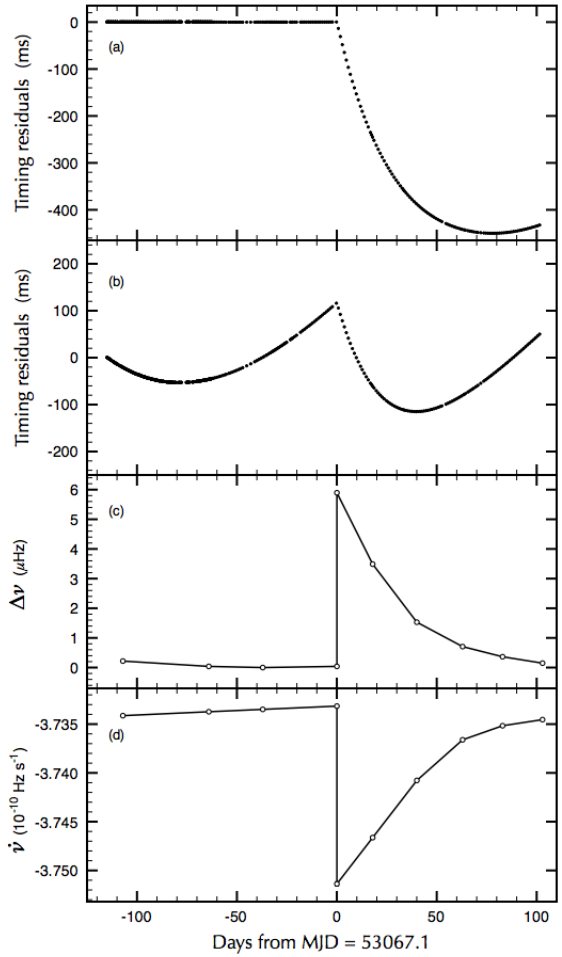



- Stable integrated profile



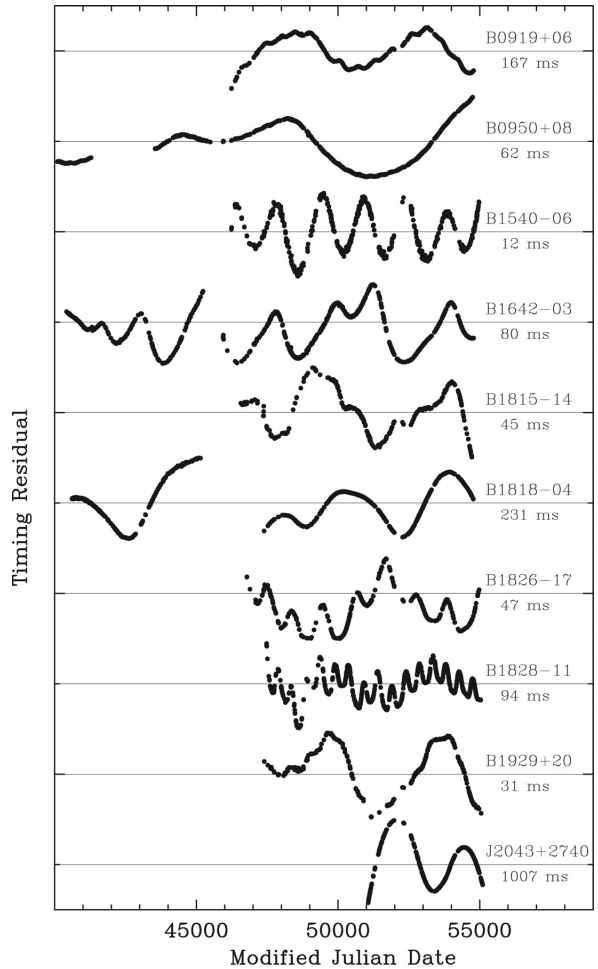
# Rotation variabilities

- Glitches



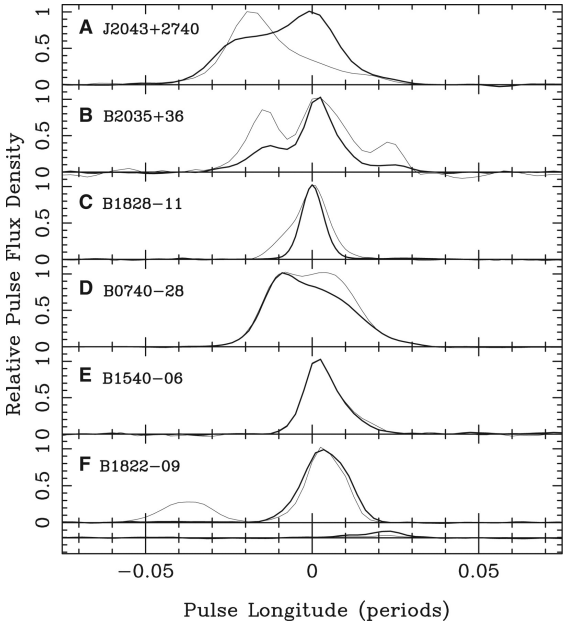

Espinoza et al. 2011

- Timing noise

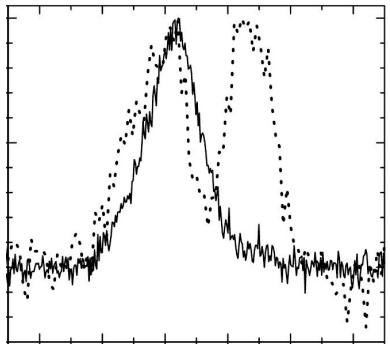



Lyne et al. 2010

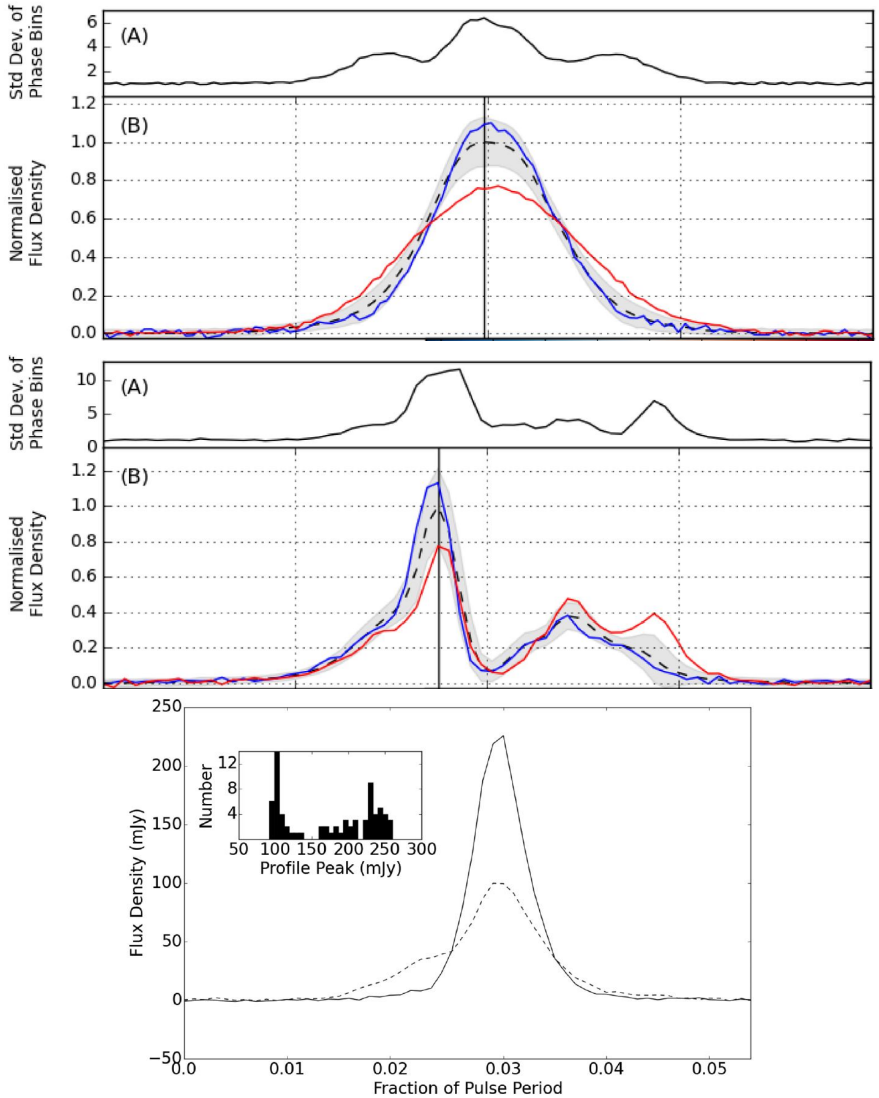
# Pulse profile variations




Lyne et al. 2010



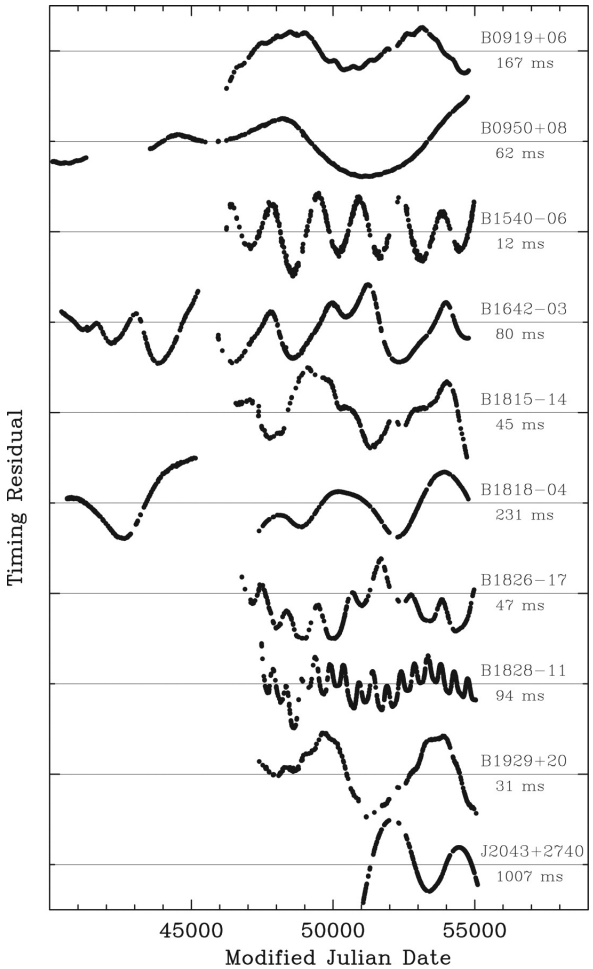
Weltevrede et al. 2011

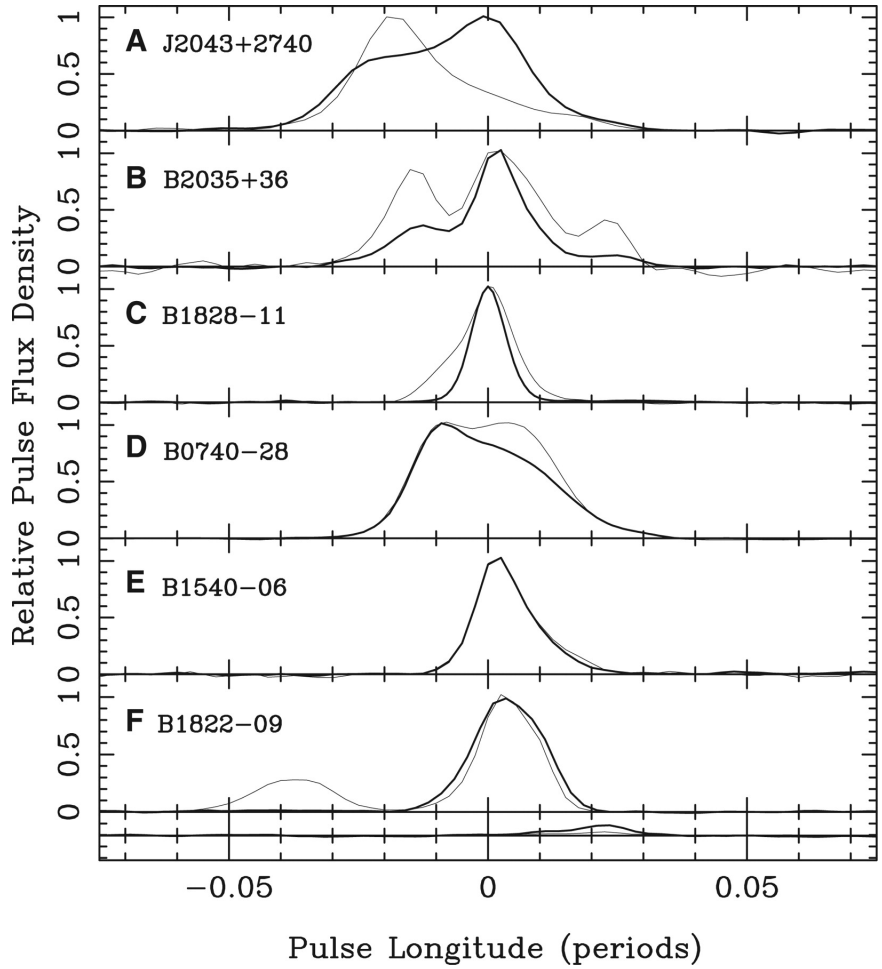



Brook et al. 2016

# Those instabilities seem to be linked to pulsar structure and/or emission

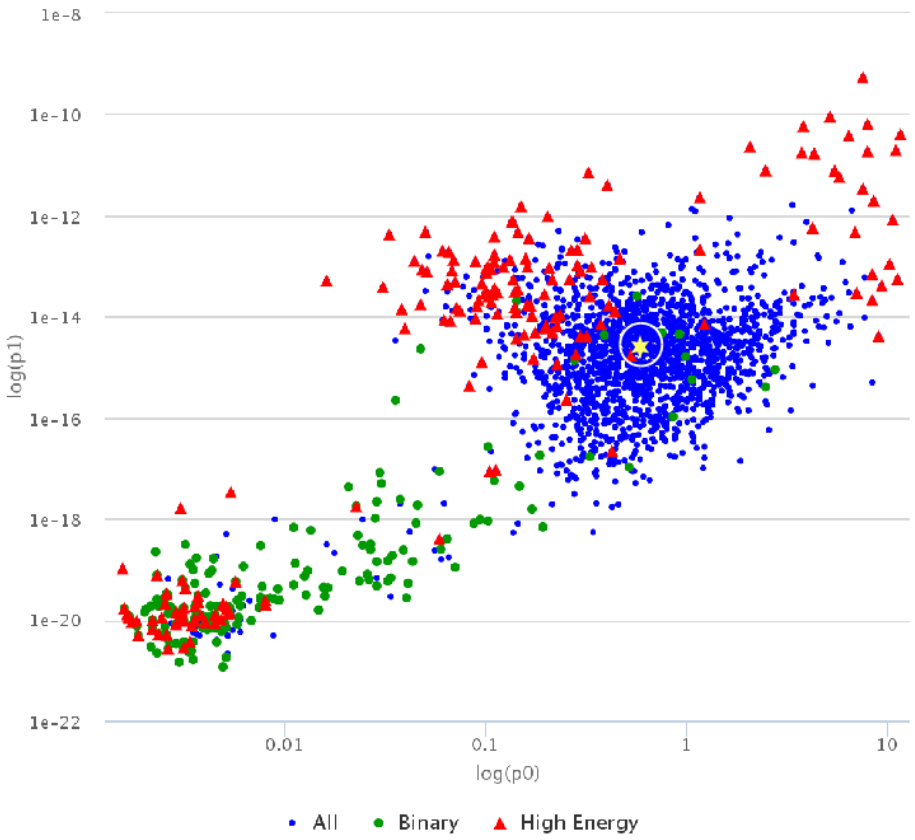
- May be possible to use them to study pulsars characteristics



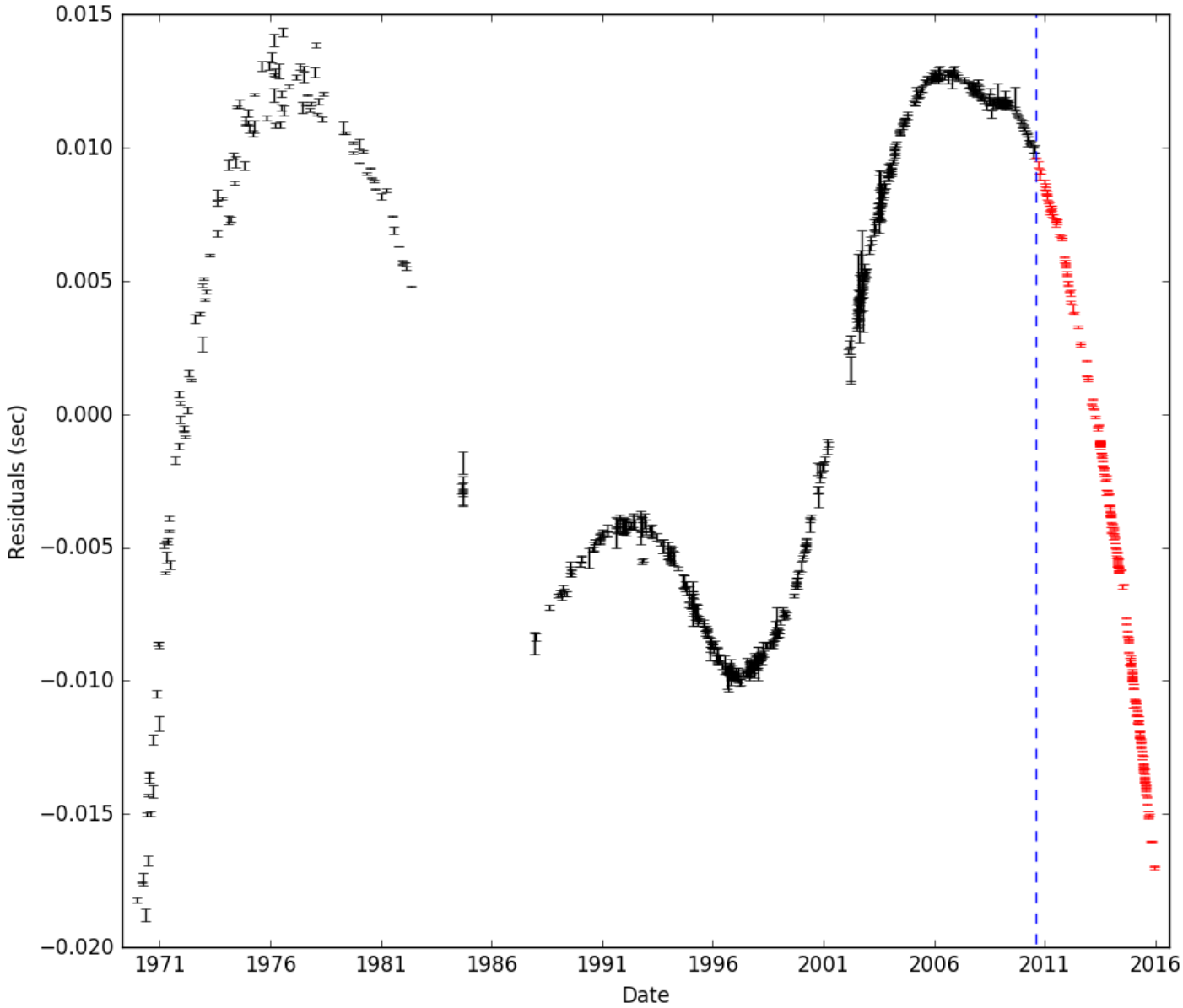

Lyne et al. 2010

| | |
|---|---|
| PSRB | B2217+47 |
| PSRJ | J2219+4754 |
| RAJ | 22:19:48.139 |
| DECJ | +47:54:53.93 |
| DM | 43.4975 |
| P0 | 0.5384688219194 |
| P1 | 2.765209E-15 |
| S400 | 42.0 |
| AGE | 3.09e+06 |
| BSURF | 1.23e+12 |



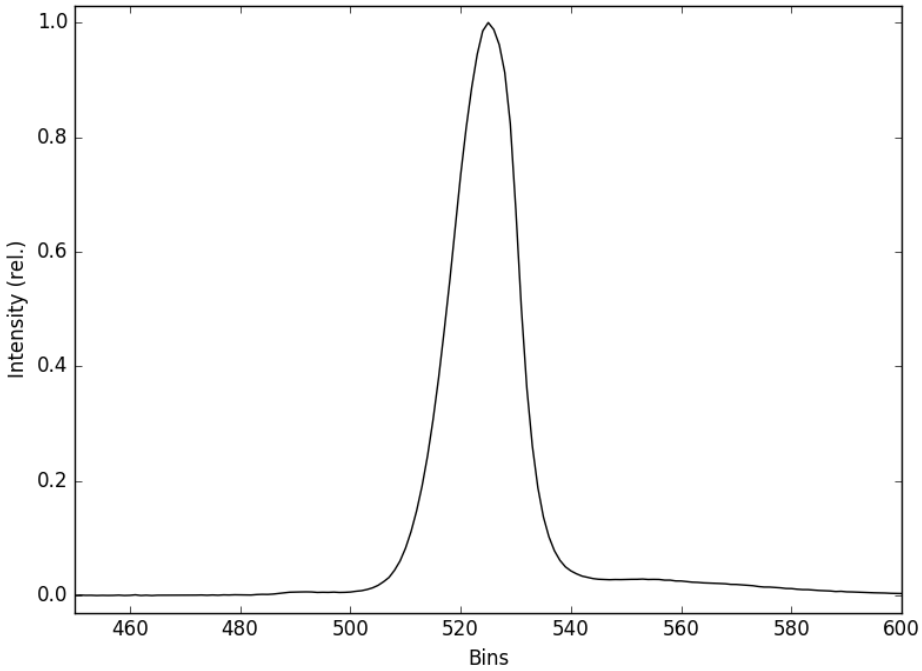

ATNF Pulsar Catalogue, Manchester et al. 2005

# Glitch and timing noise of the source

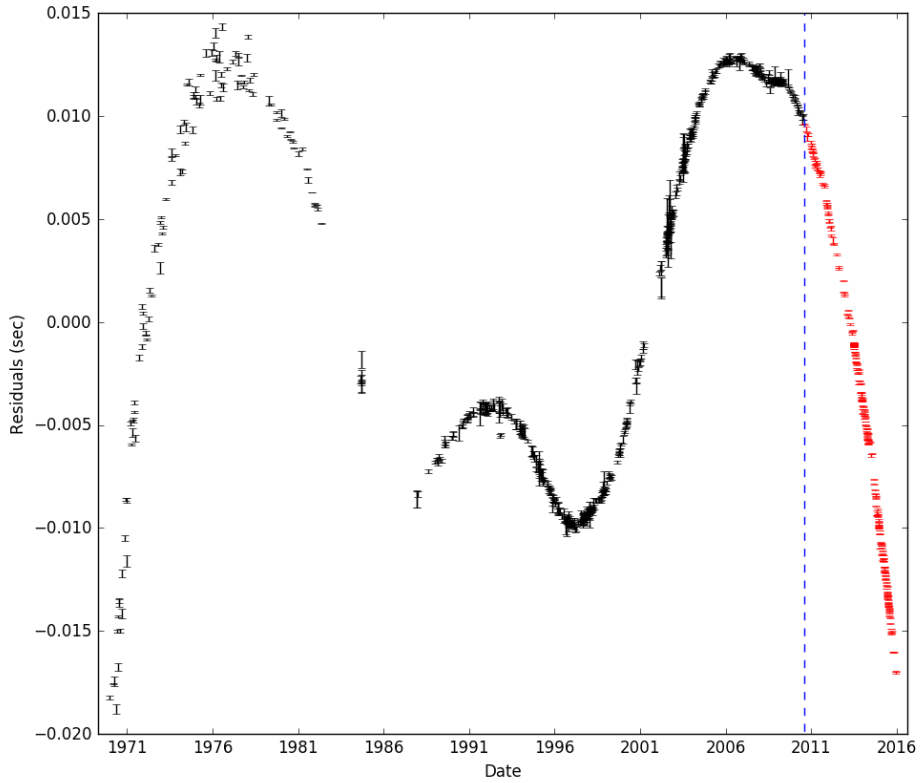


# Profile evolution

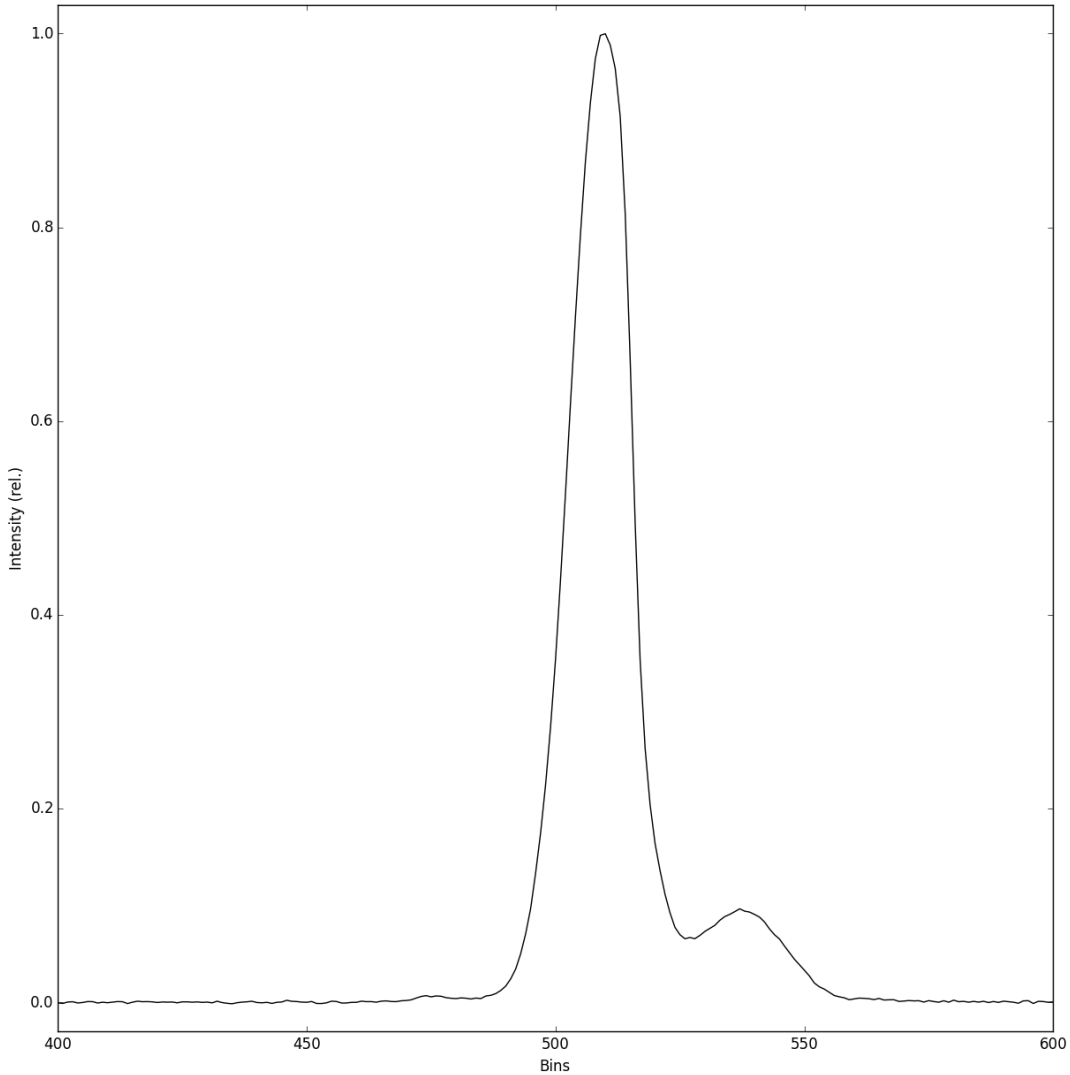
- Shifting postcursor
- Rising weak components
- Shrinking main component




## Only visible at LOFAR frequencies

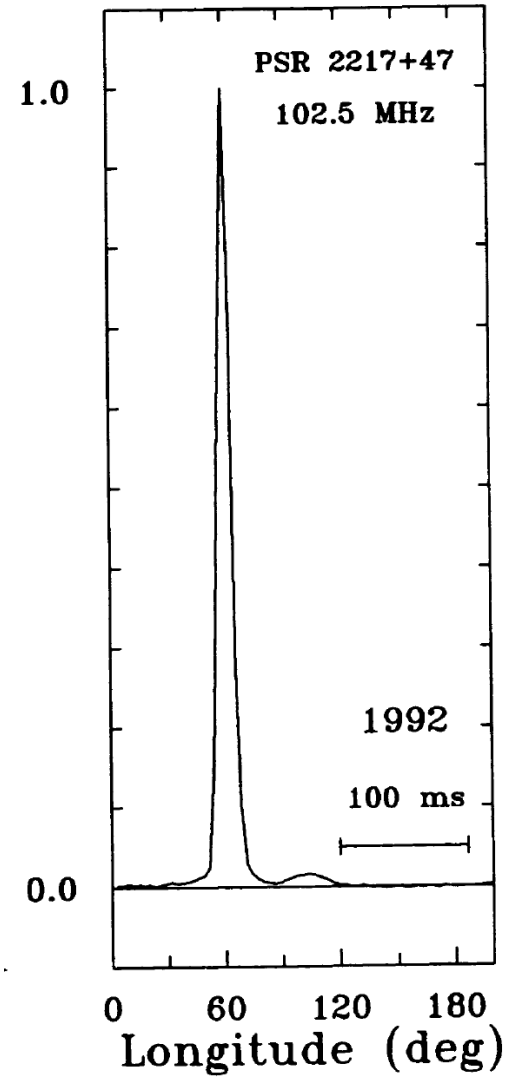


# Profile evolution I - Shifting component

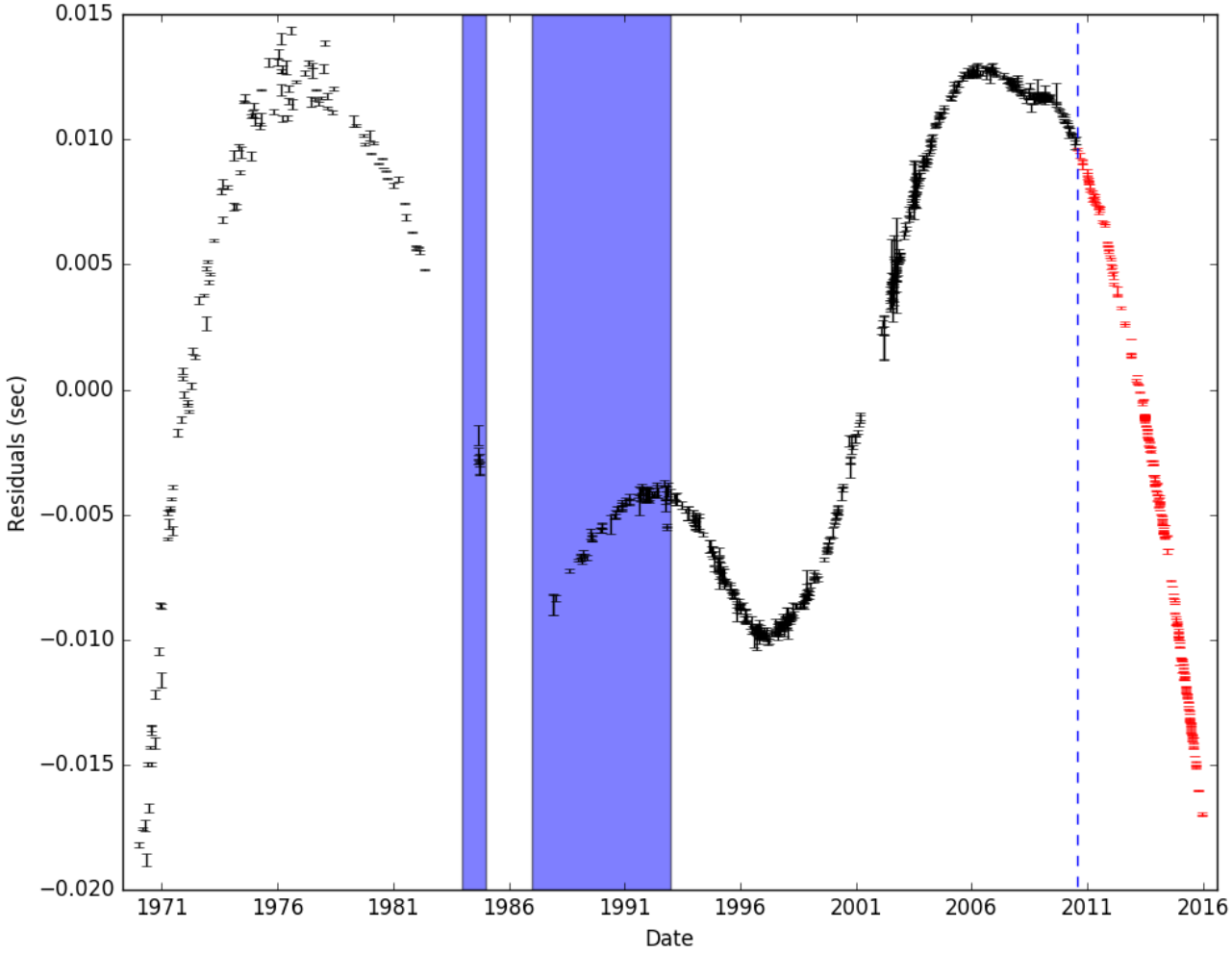



Pilia et al. 2015, `www.epta.eu.org/epndb`

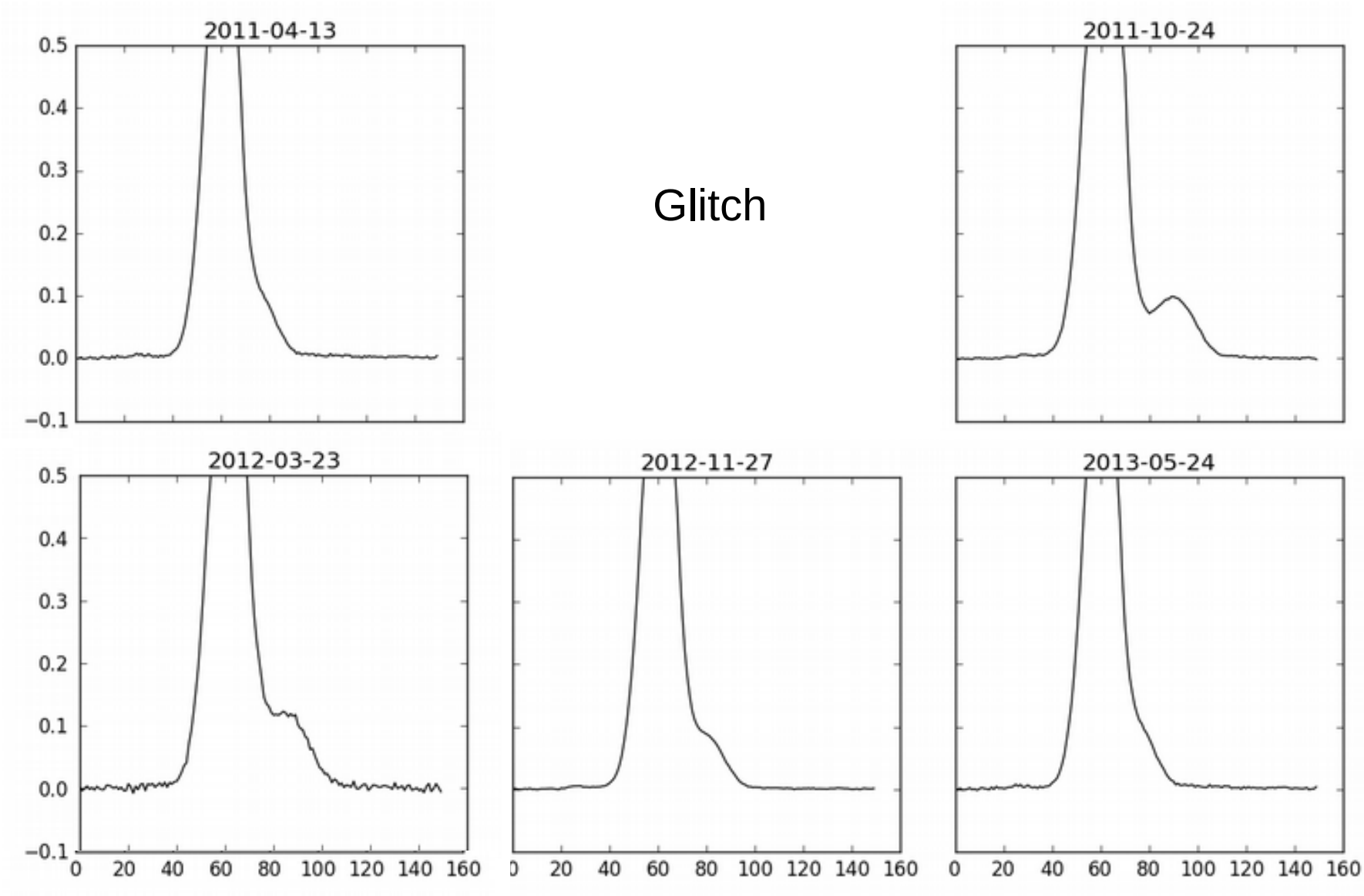
# Profile evolution I - Shifting component



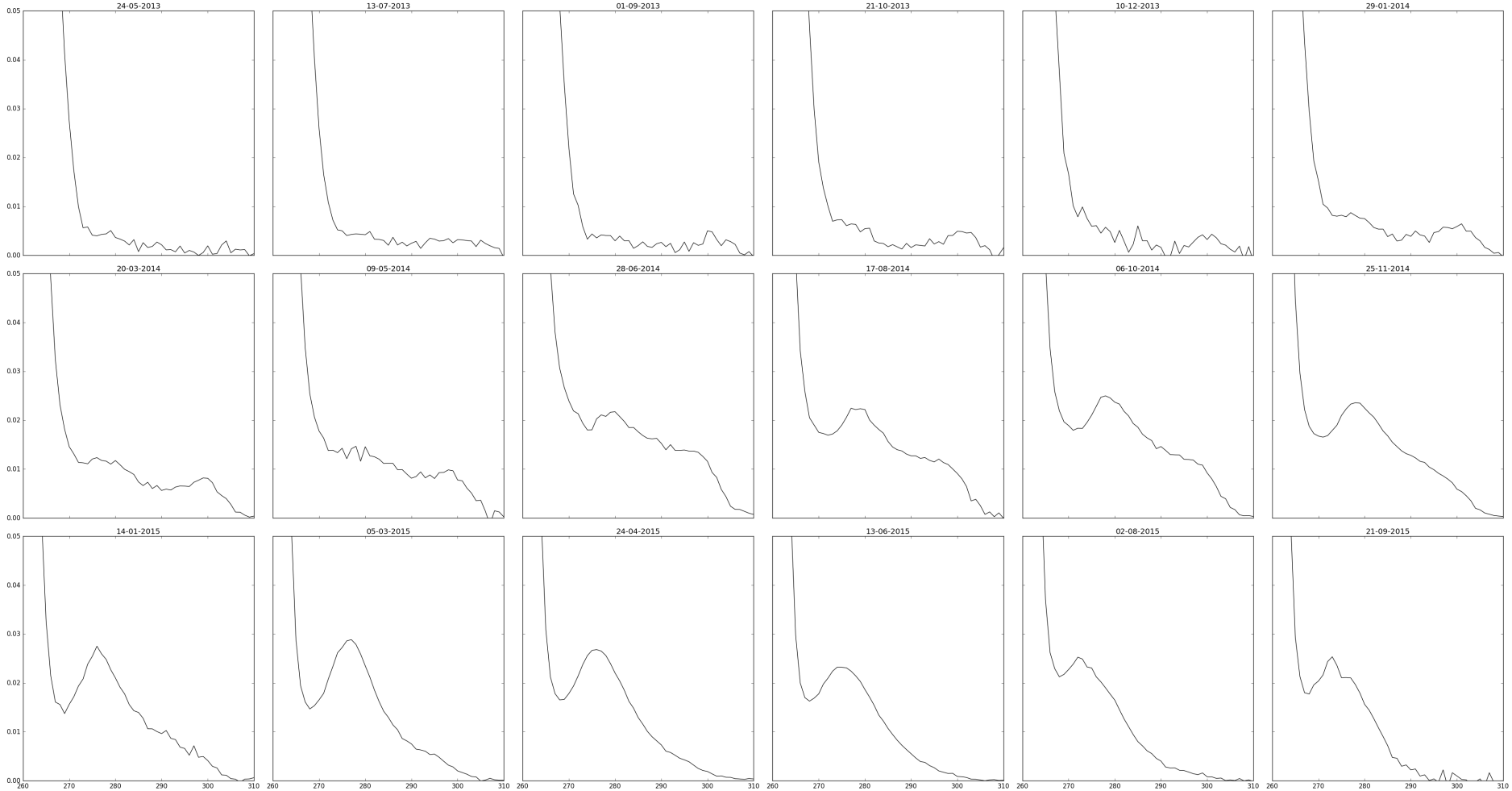

Suleymanova & Shitov 1994



# Profile evolution I - Shifting component



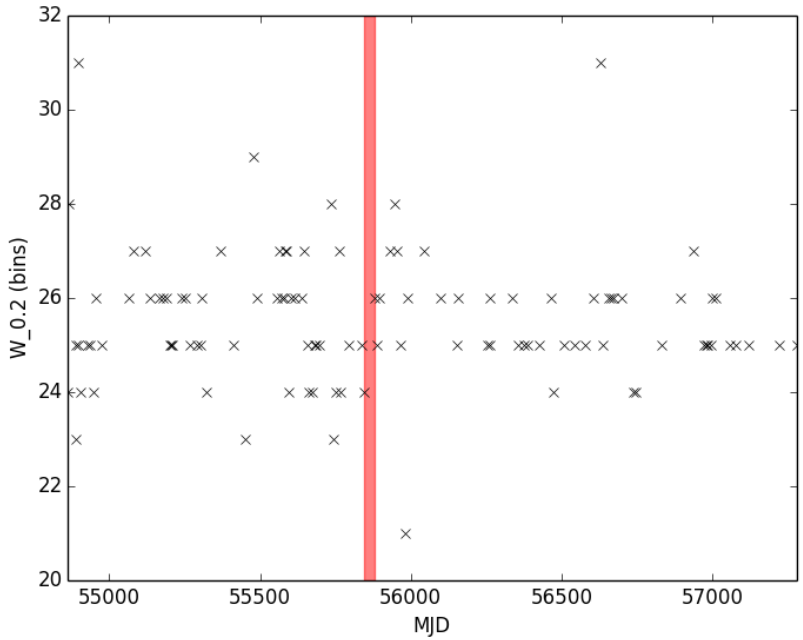
# Profile evolution II - Rising components



# Profile evolution III - Main component

- LOFAR


- Jodrell Bank




Ben Shaw

On-going work:

- Polarization analysis
- Flux calibration
- Single-pulse study
- Oldest LOFAR observations