

Abstract

We report the discovery of a new pulsar PSR J1839+15, having a period of 549 ms and a DM of 68 pc-cm⁻³. We also present the timing solution and would like to report intermittent behavior.

GMRT Galactic Plane Pulsar and Transient Survey

This survey was aimed at searching for normal and transient pulsars along the Galactic plane. The survey was carried out using GMRT in the incoherent array (IA) mode. In the survey that spanned two observation cycles of GMRT, 10 % of the sky area between 45° < l < 135° and |b| < 5° was observed. The observational area was divided into circular fields of radius 1°

Some important survey parameters are as given below:

Observation Frequency	325 MHz
Receiver Bandwidth	16 MHz
Filterbank Channels	256
Sampling Time	256 μs
Integration Time Per Field	1800 s

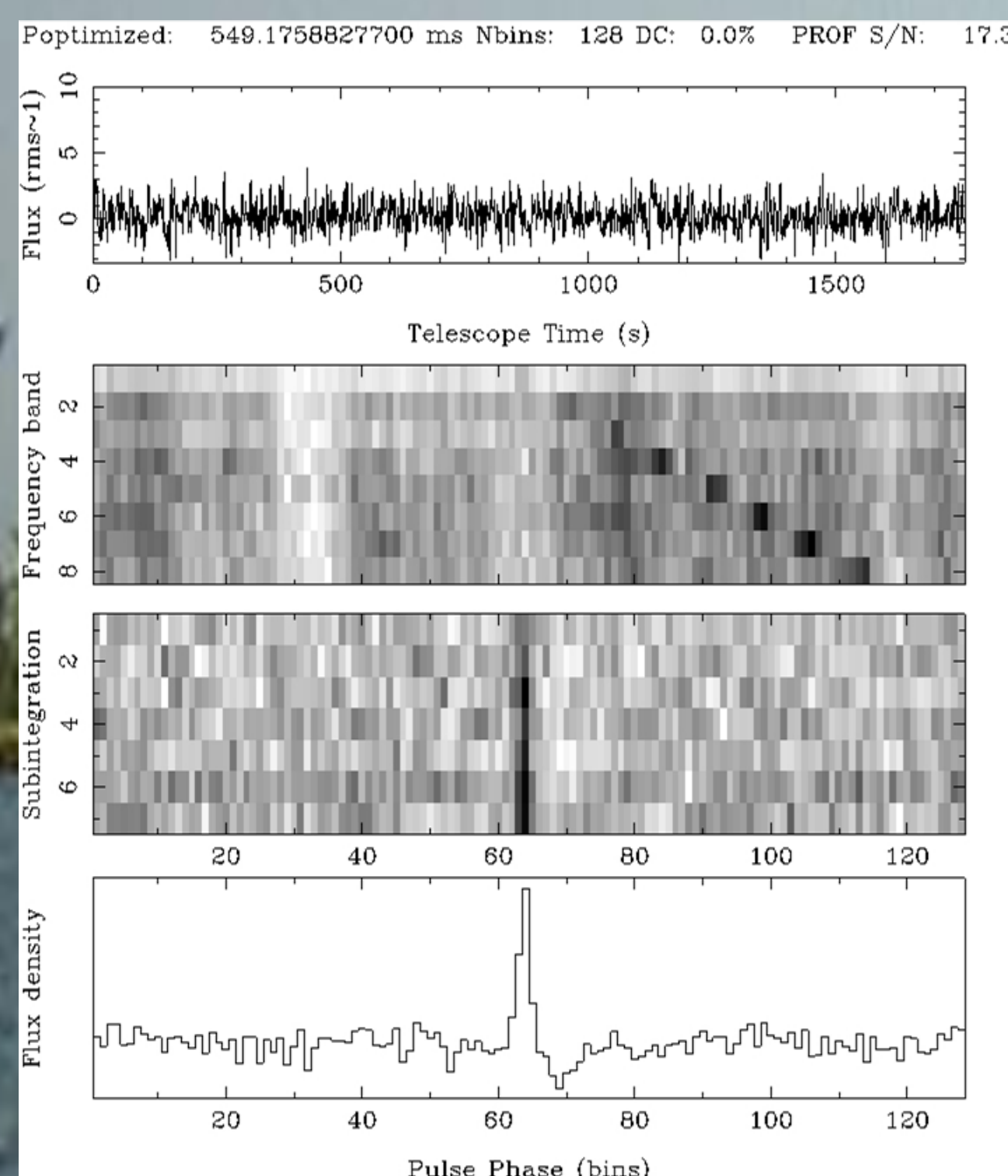
Analysis

The data were analysed on a high performance computing cluster with 64 dual core nodes at NCRA. The trial DM range was 0-1200 pc-cm⁻³. Pulsar search was done using SIGPROC (www.sigproc.sourceforge.net) with extensive RFI excision algorithms. The diagnostic plots were manually inspected to select the best candidates.

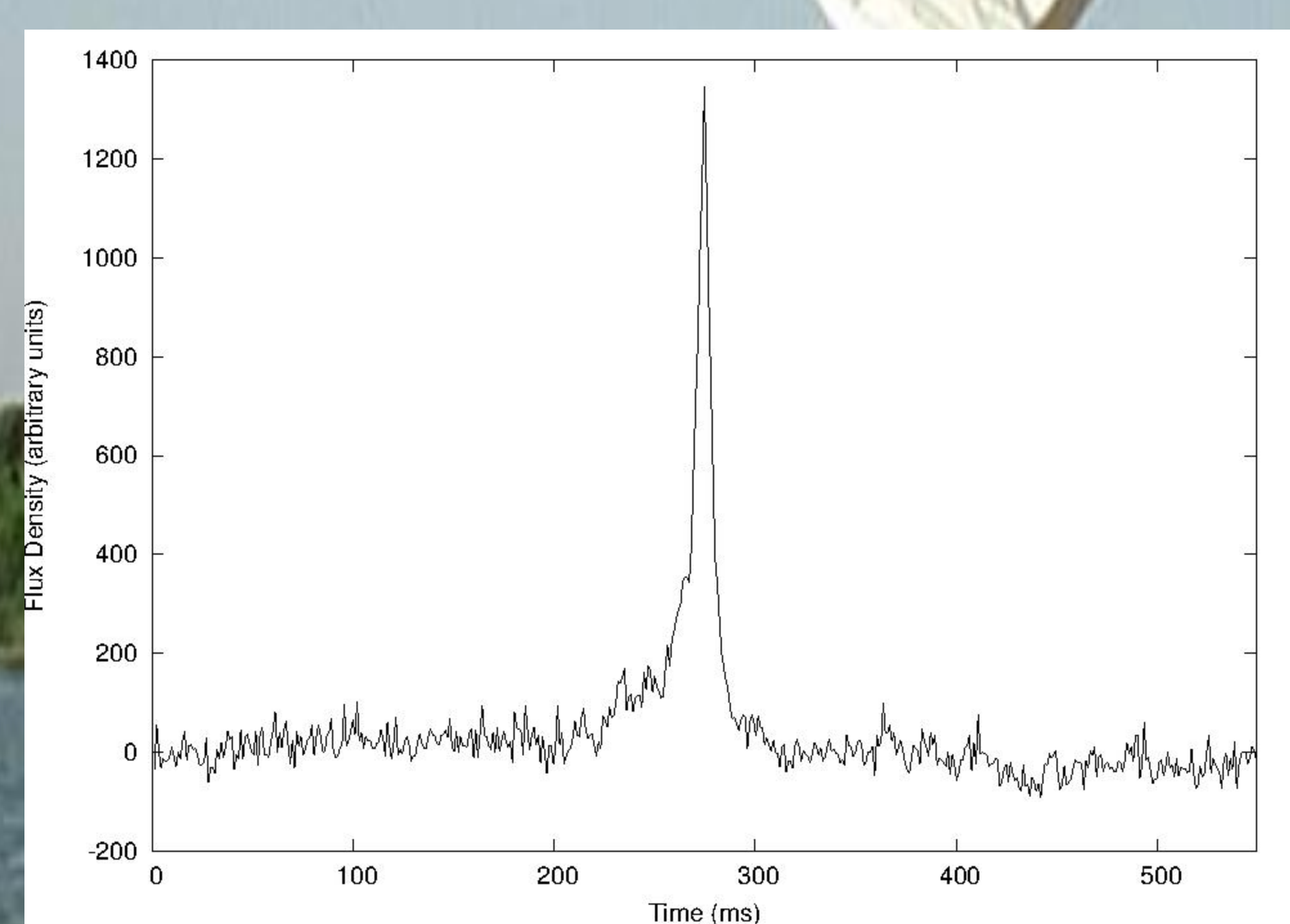
PSR J1839+15 was a strong candidate and was subsequently confirmed. During follow-up timing observations, it was not detectable for 278 days, confirming intermittency. The timing analysis was done using TEMPO2 (www.atnf.csiro.au/research/pulsar/tempo2)

Current Parameters

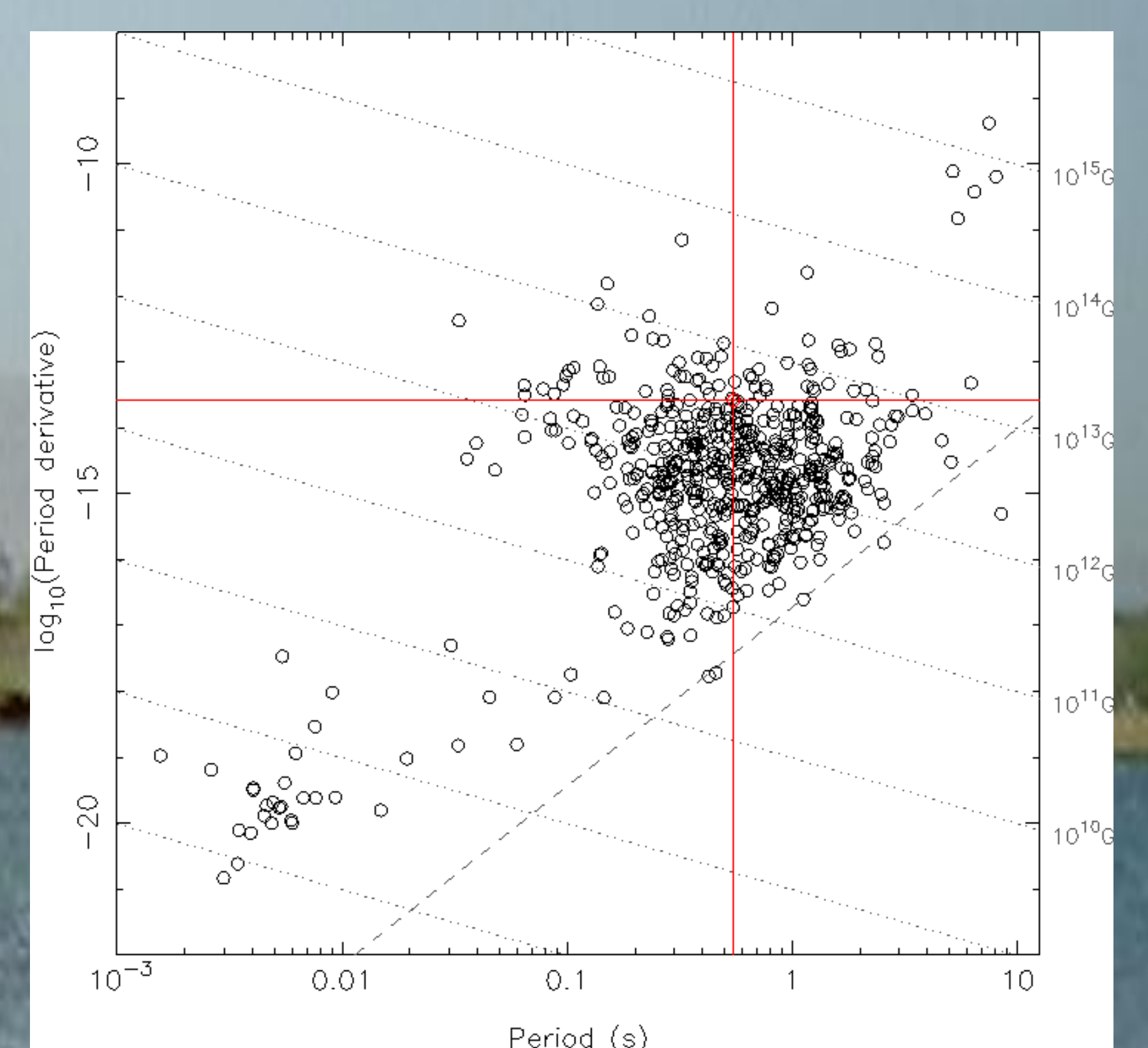
RA	18h39m06s
Dec	+15°06'57"
Period	0.54916053388(4) s
Period Derivative	2.6129(3)×10 ⁻¹⁴ s-s ⁻¹
Characteristic Age	0.33 Myr
Surface Magnetic Field	3.83×10 ¹² G



First Detection of PSR J1839+15



Accumulated Pulse Profile at 325 MHz



PSR J1839+15 on the P-P_{dot} Diagram

Summary

We have detected a new pulsar PSR J1839+15 having a period of 549 ms and a DM of 68.06 pc-cm⁻³.

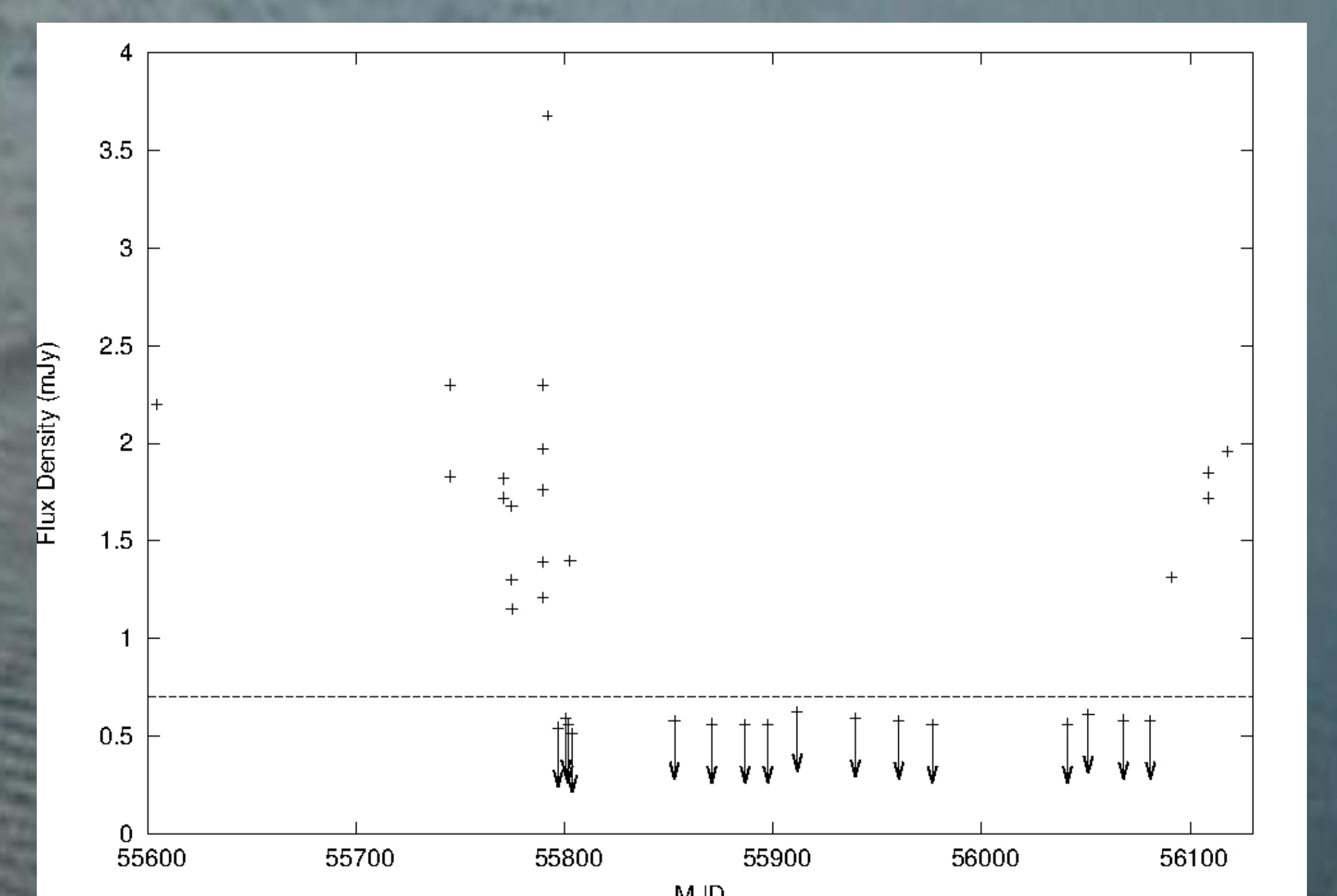
This pulsar was not detectable for 278 days and we are doing further observations and data analysis to confirm the intermittent nature and establish the ON-OFF cycle duration.

If confirmed, this will be the first intermittent pulsar discovered by GMRT and only the fourth overall (after B1931+24, J1832+0029s and J1841-0500)

This discovery brings up the serendipity associated with blind searches and provides a good motivation for continuing blind searches for new and interesting pulsars.

References

1. Camilo *et al* 2012, *ApJ* 746, 63.
2. Kramer *et al* 2006, *Science* 312, 549.
3. Lyne, A. G. 2009, *ASSL* 357, 67.



Flux Density As a Function of MJD
The Horizontal Line is Minimum Expected Flux Density and Arrows Indicate 8σ Detection Threshold.