



## Discovery and timing of PSR J1839+1521

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**Abstract.** We report on the follow-up timing of the new GMRT pulsar PSR J1839+15. After the initial non-detection for 280 days, it has shown random ON-OFF pattern of much shorter durations.

*Keywords :* Pulsars – general, Pulsars – individual – J1839+1521

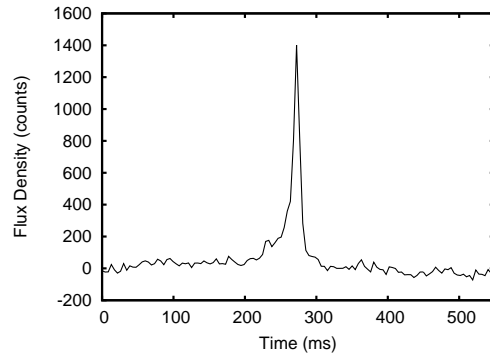
### 1. Observations of PSR J1839+1521

The GMRT Galactic Plane Pulsar and Transient Survey was aimed at searching for normal and transient pulsars along the Galactic plane. Carried out using GMRT in incoherent array (IA) mode, it spanned two observation cycles of GMRT, covering 10% of the sky area between  $45^\circ < l < 135^\circ$  and  $|b| < 5^\circ$ . The area was divided into circular fields of radius  $1^\circ$ . The survey was carried out at 325 MHz with a bandwidth of 16 MHz, divided into 256 filterbank channels. Each field was observed for 1800 s with a sampling time of  $256 \mu\text{s}$ .

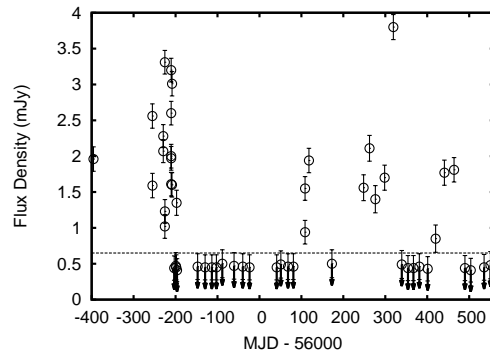
The pulsar search was carried out using SIGPROC ([www.sigproc.sourceforge.net](http://www.sigproc.sourceforge.net)) with extensive RFI excision algorithms on a high performance computing cluster having 64 dual core processors at NCRA. The range of trial dispersion measure (DM) was  $0 - 1200 \text{ pc-cm}^{-3}$ . In this analysis, PSR J1839+1521 came out as a strong candidate and was subsequently confirmed as a new pulsar with a period of 549 ms and DM of  $68 \text{ pc-cm}^{-3}$ . Follow-up timing observations were done using the GMRT software backend (GSB) with a sampling time of  $123 \mu\text{s}$  over a bandwidth of 33 MHz divided into 512 filterbank channels. During initial follow-up timing observations, it was not detectable for 280 days. This followed a random ON-OFF pattern of shorter durations as shown in Figure 2. The timing analysis was done using TEMPO2 ([www.atnf.csiro.au/research/pulsar/tempo2](http://www.atnf.csiro.au/research/pulsar/tempo2)). If confirmed, this will be the first intermittent pulsar discovered by GMRT and fourth overall (after B1931+24, J1832+0029

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**Figure 1.** Accumulated pulse profile for PSR J1839+1521 at 325 MHz, produced from 35 detections. The total data span is 800 days.



**Figure 2.** Flux density (with measurement errors) as a function of MJD. The horizontal line is minimum expected flux density from the variations in the measured values and arrows indicate  $8\sigma$  detection threshold.

and J1841–0500). This discovery provides a strong case for doing frequent, sensitive pulsar searches in all areas of the sky.

## References

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