

Pulse Properties of a few Southern Pulsars at 150 MHz

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Abstract. We present 150 MHz observations of the bright millisecond pulsar J0437-4715, and pulsars J1453-6413 and J1752-2806, made with the Mauritius Radio Telescope (MRT). We use single-pulse sequences to derive some preliminary results on the pulse morphologies.

1. Introduction

We have used MRT (Golap et al. 1998) for pulsar observations (Issur 1997) at 151.6 MHz, in one circular polarization. Signal voltages were 2-bit sampled (at Nyquist rate of ≈ 2 MHz) and recorded (over ~ 8 minutes) using a Portable Pulsar Receiver (Deshpande et al. 1999) and processed offline. This involved 1. Producing *spectrometer data* 2. Removing interference 3. Dedispersion and removal of spurious periodicities 4. Calibration & extraction of single-pulse & average profiles 5. Single-pulse analysis using the SPULSES software (Deshpande 1998).

2. The Millisecond pulsar J0437-4715

The 150 MHz MRT profile of J0437-4715 is displayed in Fig 1a. along with higher frequency ones (Bell et al. 1997) with the highest peak aligned. The *conal* components on the left evolve strongly to become comparable to the *core* (highest) component at 150 MHz. Gil & Krawczyk (1997) find 7 components in the profile but up to 12 components have been quoted. We have tried to identify *physical components* in the MRT profile using the LCORR function of SPULSES on a good set of 39,000 single pulses. We find $> 10\sigma$ correlation between fluctuations at different longitudes throughout, perhaps indicating pulsed emission over the entire longitude range as predicted by Gil & Krawczyk's model. However, we do not find any clearly defined components in the correlation map. A similar analysis on the same data using 500 subfolds begins to suggest ≈ 7 features of slightly enhanced correlation around the noise diagonal (Fig 1b).

3. The 'core single' pulsars J1453-6413 and J1752-2806

Profiles of both these pulsars, classified as *core singles*, show metre wavelengths narrowing (Rankin 1983a). The maps of correlations in fluctuation using single-pulse data (along with the average profiles) are shown in Fig 2a,b. The J1453-6413 MRT average profile is indeed narrower than higher frequency ones with a hint of a 2nd component (Issur 1997), but the correlation map (Fig 2a) shows only one *narrow* peak. In the case of J1752-2806, the correlation map (Fig 2b) shows, surprisingly, two well defined features (and hence components) in the pulse window, although the average profile appears "single".

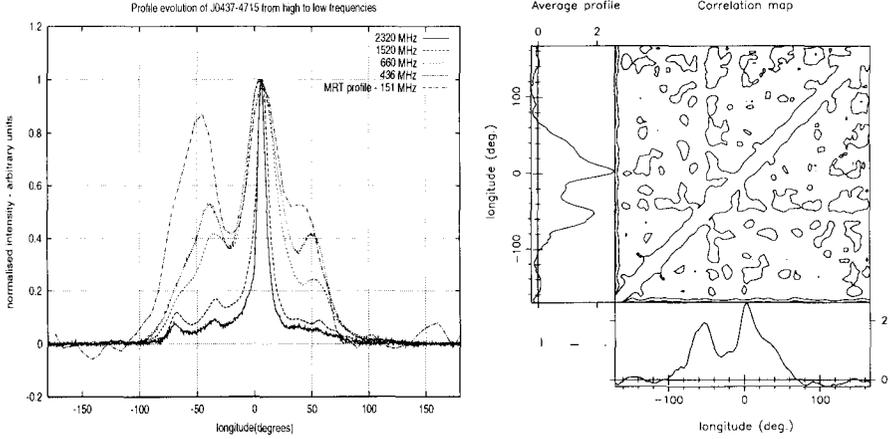


Figure 1. PSR J0437-4715 : (a) Profile evolution (b) Map of correlations in fluctuations

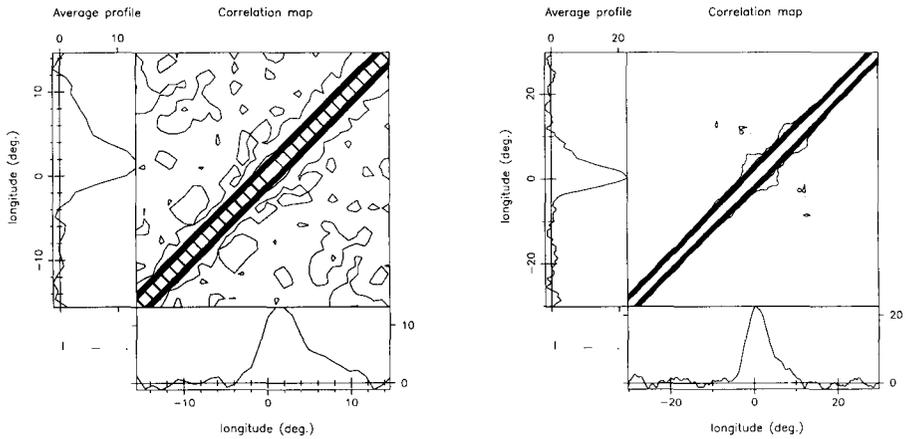


Figure 2. Map of correlations in fluctuations for (a) J1453-6413 and (b) J1752-2806

References

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