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Pulse Fluctuation Properties at 35 MHz

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A few bright pulsars were observed at 35 MHz for $\gtrsim$ 1000s using the Gauribidanur Radio Telescope, and the data were analysed to study their single-pulse fluctuation properties (Asgekar & Deshpande, 1999a; & ref.s therein).

The well-known drifter **B0943+10** shows a well resolved two-component profile at 35 MHz. The longitude-resolved fluctuation spectrum (Fig 1) shows a stable phase modulation feature (aliased) at 0.459 c/P_1, consistent with its drifting pattern seen at higher radio-frequencies. Using the "Cartographic Transform" technique (Deshpande & Rankin, 1999; hereafter DR), we have mapped the pattern of its polar emission at 35 MHz (Asgekar & Deshpande, 1999b) as shown in fig 1. Helped by the larger cone radius at lower frequencies, the subbeams can be sampled in their full radial extent at 35 MHz. These results combined with those at higher frequencies (DR) suggest a steadily rotating system consisting of 20 emission-columns in the polar region as that responsible for the observed fluctuations over the entire range of observed frequencies.

The fluctuation spectrum of **B0834+06** exhibits a feature at $0.461c/P_1$ related to amplitude modulation (fig 2) and has relatively low Q-value. We estimate the circulation time associated with the underlying rotating pattern of subbeams based on the fluctuation frequency (as well as phase) and the viewing geometry for this pulsar. This estimate depends crucially on the polarization PA-sweep rate and we note that the polarization data presently available may be somewhat unreliable. A preliminary polar-emission map made using our estimates shows distinct subbeams delineating the emission cone (fig 2). More importantly, the subbeam spacing is not as uniform as in the case of B0943+10, consistent with the low Q of the features in the fluctuation spectra.

We have also examined the fluctuation spectra of **B1919+21** & **B0950+08** at 35 MHz. In both cases, the fluctuation spectra agree well with those seen at higher radio-frequencies. B0950+08 shows a featureless spectrum, but with a bifurcated profile of modulated intensity. A closer examination shows that more intense pulses from B0950+08 seem to bifurcate preferentially.

References

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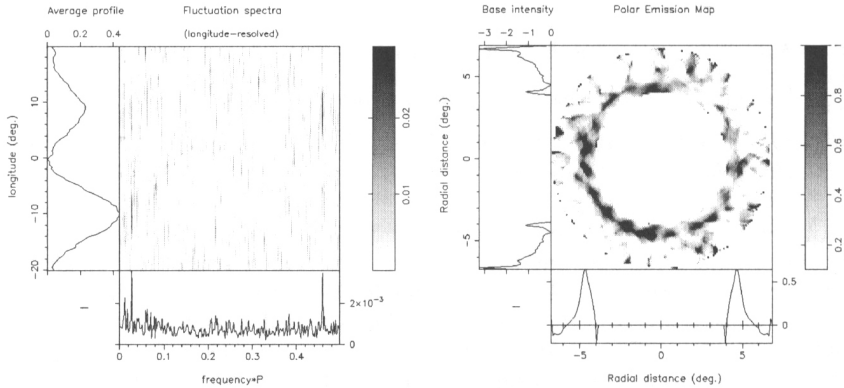

Figure 1. Longitude-Resolved Fluctuation Spectrum (left) of B0943+10 & the map of the polar emission pattern at 35 MHz.

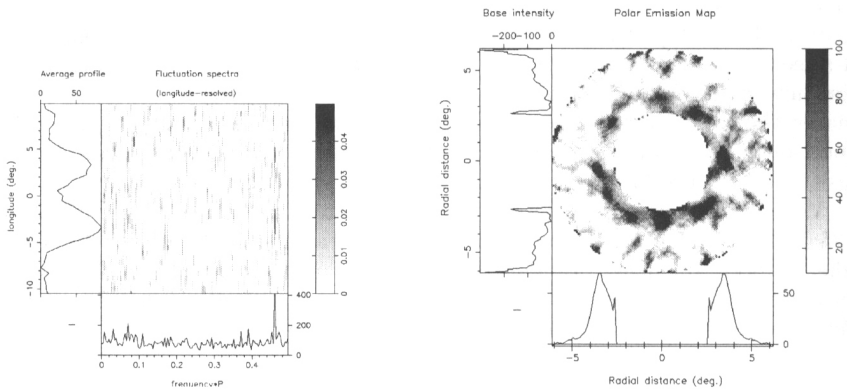

Figure 2. Longitude-Resolved Fluctuation Spectrum (left) & polar emission map of B0834+06 at 35 MHz. ($\alpha = 30°, \beta = -3.0°$)

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