



ASTROPEILER STOCKERT e.V.

Historische Radiosternwarte

Pulsar Observations

Results achieved with the Stockert 25m telescope

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1 Observation Setup

1.1 Telescope and Frontend

Pulsars were observed using the 25m dish of the Stockert Radio Telescope at 21cm.

The receiver frontend is mounted in prime focus configuration and is receiving both orientations of linear polarizations. The bandwidth used is 55 MHz.

1.2 Backend

The backend is a Pulsar Fast Fourier Transform Spectrometer (PFFTS) with a frequency resolution of 0.58 MHz and a maximum time resolution of 54 μ s. This time resolution, however, was only used for the observation of millisecond pulsars. "Normal" pulsars were observed with a time resolution of 218 μ s.

This spectrometer is a development by the digital group of the Max Planck Institute for Radio Astronomy and is a modified version of the Fast Fourier Transform Spectrometer used for spectroscopic work¹. This modification is accomplished by an additional gigabit interface and loading a specific core into the FPGA of the device.

1.3 Post-processing

Post-processing was performed using the SIGPROC package developed by D. Lorimer².

¹ B. Klein, S. Hochgürtel, I. Krämer, A. Bell, K. Meyer, and R. Güsten. High-resolution wide-band fast Fourier transform spectrometers. *Astronomy and Astrophysics*, 542:L3, 2012

² <http://sigproc.sourceforge.net/>

The post-processing consisted of the following steps:

- Conversion of the PFFTS specific format to the filterbank format
- De-dispersion of the data using published values for the dispersion measure
- Folding the data by using a period either determined by a fourier transform (using "seek" from the sigproc package) or by calculating the applicable topocentric pulse period using the predictive mode of the TEMPO package³. Pulsar ephemerides for TEMPO were obtained from the ATNF pulsar data base⁴.

In most cases folding was done into 256 bins. The main exception is the millisecond pulsar where the time resolution of 54 μ s limits the number of available bins.

In a final step the folded profiles were adjusted in phase and offset by a program developed at the Astropeiler in order to produce the plotted profiles presented in this paper.

1.4 Integration times

Integration times varied by the expected flux of the pulsar to be observed, the time ranged from 1 minute to 30 minutes.

1.5 RFI Mitigation

No RFI mitigation measures were applied to the data sets. If data was found to be affected by RFI, the measurement was discarded.

³ <http://tempo.sourceforge.net/>

⁴ <http://www.atnf.csiro.au/people/pulsar/psrcat/>

Due to the exposed location of the Stockert Telescope this was not an infrequent event.

2 Observed Pulsars

At the time of writing of this paper, a total of 52 pulsars have been observed:

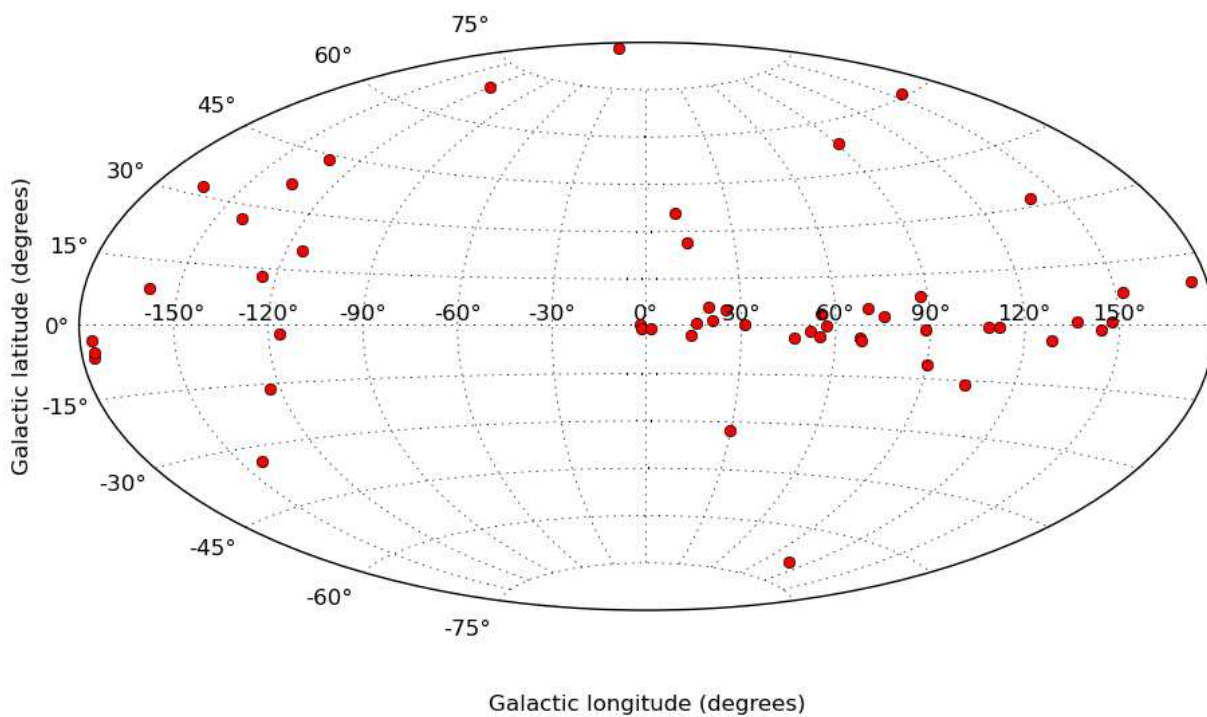
NAME	P0 (s)	DM (cm ⁻³ pc)	S1400 (mJy)
B0031-07	0,943	11,38	11,0
B0136+57	0,272	73,75	4,6
J0248+6021	0,217	370	13,7
B0329+54	0,715	26,83	203,0
B0355+54	0,156	57,03	22,9
B0450+55	0,341	14,602	12,9
B0450-18	0,549	39,93	5,3
B0525+21	3,746	50,94	9,0
B0531+21	0,034	56,791	14,4
B0540+23	0,246	77,698	8,9
B0609+37	0,298	27,14	4,0
B0628-28	1,244	34,36	23,4
B0656+14	0,384	13,997	3,7
B0740-28	0,1668	73,77	23,0
B0809+74	1,292	6,12	10,0
B0818-13	1,238	40,94	7,0
B0823+26	0,531	19,463	10,0
B0834+06	1,273	12,85	4,0
B0906-17	0,402	15,888	3,2
B0919+06	0,431	27,309	4,2
B0950+08	0,253	2,96	84,0
B1112+50	1,656	9,195	3,0
B1133+16	1,188	4,848	32,0
B1237+25	1,382	9,296	10,0
B1508+55	0,740	19,61	8,0
B1604-00	0,422	10,68	5,0

Table 1: List of observed Pulsars (Part 1)

NAME	P0 (s)	DM (cm ⁻³ pc)	S1400 (mJy)
B1642-03	0,388	35,73	21,0
B1737-30	0,606	153	6,4
B1742-30	0,367	88,8	14,1
B1749-28	0,563	50,37	18,0
B1804-08	0,164	112,38	15,0
B1815-14	0,291	622	7,1
B1818-04	0,598	84,38	8,0
B1822-09	0,769	19,46	10,8
B1826-17	0,307	217,11	7,7
B1845-01	0,659	159,53	8,6
B1919+21	1,337	12,46	6,0
B1929+10	0,227	3,18	36,0
B1933+16	0,359	158,52	42,0
B1937+21	0,0015	71,04	13,8
B1944+17	0,441	16,3	10,0
B1946+35	0,717	129,07	8,3
B2011+38	0,230	238,22	6,4
B2016+28	0,558	14,17	30,0
B2020+28	0,343	24,64	38,0
B2021+51	0,529	22,65	27,0
B2045-16	1,962	11,46	13,0
B2111+46	1,015	141,26	19,0
B2154+40	1,525	70,86	17,0
B2255+58	0,368	151,08	9,2
B2310+42	0,349	17,3	14,6
B2319+60	2,256	94,59	12,0

Table 1 (continued): List of observed Pulsars (Part 2)

The distribution of these pulsars over the galaxy is depicted below:



3 Plots of Individual Observations

