

DEUTERIUM ARRAY MEMO #043

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To: Deuterium Array Group

From: Alan E.E. Rogers

Subject: Daily checks on the operation of each 5x5

The volume of data will expand rapidly as we add more stations and consequently we need checks that can be run on the output files to ensure high quality data and help spot problems. The following daily tests are being run.

These test involve using observations of the pulsar PSR0355+54 to check the relative aperture efficiencies of the arrays and to measure the offset of the 40 MHz crystals. Observations of Cygnus are used to also check the array performance and check the phasing of each element by correlating each element with the phased sum of the remaining elements. RFI checks are made by looking as the peak deviations and rms in the spectra from each element, the average spectrum from 24 elements and the spectra of the beams.

A script is used to provide one line per array per polarization per day with the following information:

Column

- |    |   |
|----|---|
| 0  | Filename  |
| 1  | Minimum motherboard temperature in 24 hour period dec C               |
| 2  | Maximum motherboard temperature in 24 hour period dec C               |
| 3  | Keyword psr   |
| 4  | PSR0355+54 strength in units of ppm                                   |
| 5  | Keyword f   |
| 6  | Frequency offset of receiver derived from pulsar ppm                  |
| 7  | Keyword del   |
| 8  | Number of spectral records deleted because signal exceeds a threshold |
| 9  | Keyword pwr   |
| 10 | Minimum power among all 24 elements in units of $10^4$                |
| 11 | Maximum power among all 24 elements in units of $10^4$                |
| 12 | Peak value of search through average spectrum of all 24 elements ppm  |
| 13 | rms of average spectrum ppm   |
| 14 | Frequency of peak in col 12   |
| 15 | Minimum of variation of power among all 24 elements percent           |
| 16 | Maximum of variation of power among all 24 elements percent           |
| 17 | Keyword bm  |

- 18 Minimum of normalized beam in boresight direction
- 19 Maximum of normalized beam in boresight direction
- 20 Peak value of search through spectrum of boresight beam ppm
- 21 rms value of search through spectrum of boresight beam ppm
- 22 Frequency of peak in col 20
- 23 Keyword r
- 24 Minimum of beam ratio for beams azel0/azel1
- 25 Maximum
- 26 Minimum phase deviation of correlation phases
- 27 Maximum phase deviation of correlation phases