

# Radio Frequency Interference Measurement and Mitigation with the Production Test Array

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The Production Test Array is a three element interferometer that prototypes systems for the Allen Telescope Array. The PTA uses the 6.1-m offset Gregorian antenna, log-periodic feed, broadband LNA and optical signal path of the ATA. The system has continuous frequency coverage from 500 MHz to 11 GHz. We are using the PTA to test the capability of the ATA to implement radio frequency interference mitigation schemes in the environment of Hat Creek Radio Observatory.

Initial results from optical pointing indicate that the PTA antennas have a pointing stability of  $\sim 10$  arcsec, which is substantially better than the specification. This is important, though, because amplitude miscalibration is a critical failure mode in interferometric nulling schemes.

We are also making measurements of the interference environment. This includes the effects of self-interference. We intend to make angular RFI patterns that will allow us to determine the location of interferers. We can compare these results with interference measurements made with an isotropic antenna also located at Hat Creek. These measurements permit us to test the frontend for saturation in the presence of powerful interferers.

A test correlator will be installed in the Spring which will allow us to do high throughput RFI experiments, as well. The four-station correlator will process 100 MHz of bandwidth continuously. Earlier experiments with the software correlator of the Rapid Prototyping Array were limited by low bandwidth, low throughput and unstable bandpasses. We expect to see the limits of algorithms such as the postcorrelation method much more readily.