PSA-64 POWER SPECTRUM

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ABSTRACT

Subject headings:

1. INTRODUCTION

The Donald C. Backer Precision Array for Probing the Epoch of Reionization (PAPER) is a dedicated experiment to measure the power spectrum of highly redshifted 21 cm emission from the Epoch of Reionization.

2. OBSERVATIONS

Here, we describe the features of the data set used in this analysis. We used the maximally redundant configuration of the PAPER array (see Figure 1 for this analysis, relying on all of the redundant baselines for the calibration procedure, but only using a subset of the baselines for the power spectrum analysis. For the power spectrum analysis we are using the baselines that correspond to the width between two columns (e.g. 49-41) as well as those that correspond to over and up and down one antenna (e.g. 10-41 and 10-58, respectively). These 154 baselines are used in the power spectrum analysis because they are instantaneously redundant and therefore they measure the same Fourier modes on the sky. The sensitivity of the array is mostly captured by these baselines.

The observation of the 64 antenna data set spanned a 135 day period that commenced on 2012 November 8 (JD62456240) and ended 2013 March 23 (JD62456375). Each baseline instantaneously measured the 100-200 MHz band which was divided into 1024 frequency channels of resolution 97.66 kHz and integrated for 10.7 seconds.

3. CALIBRATIONS

3.1. *General*

The calibration pipeline included a rough calibration based on logarithmic and linear redundant calibration, as well as self calibration. A rough pass of log cal was first applied to the data on the basis of redundancy to match up baselines of the same separation. This included a gain calibration that set the flux scale to PictorA (Jacobs, 2013).

3.2. *Gain Calibration*

Gain calibration was derived on the basis of redundancy and self calibration.

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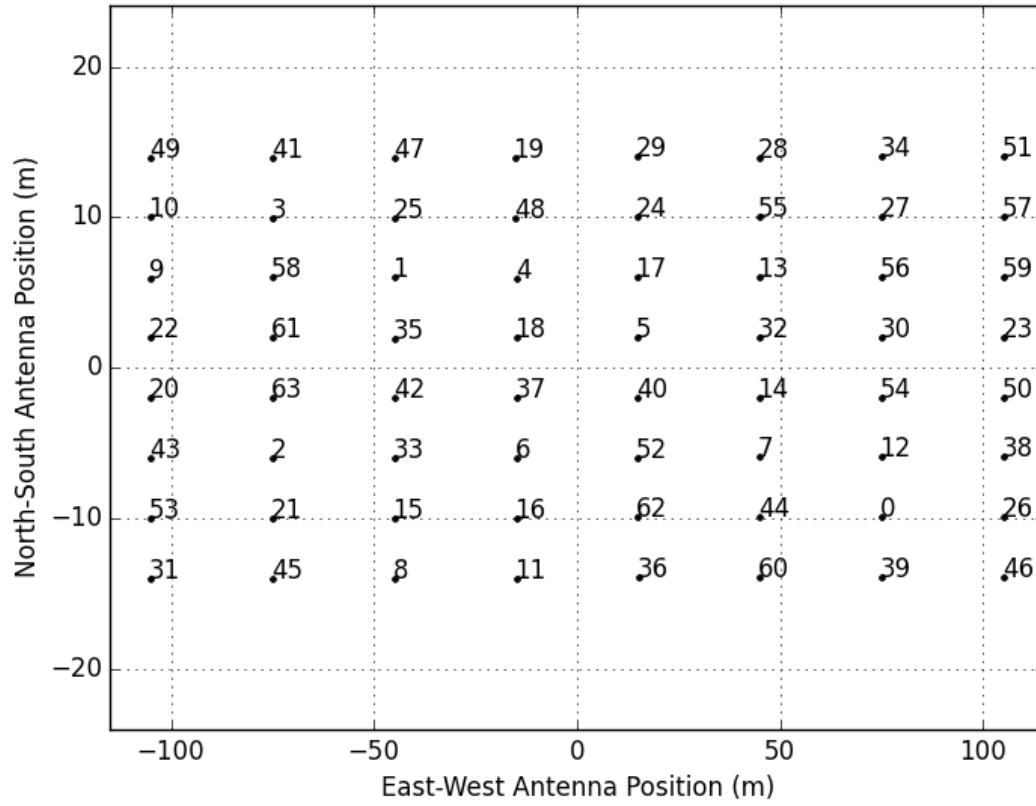[8] School of Earth and Space Exploration, Arizona State U., Tempe, AZ

FIG. 1.— Antenna positions for the PAPER 64 observation run.