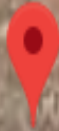


A Re-Analysis of PAPER-64 with the SimpleDS Pipeline

Matthew Kolopanis

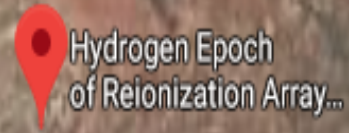
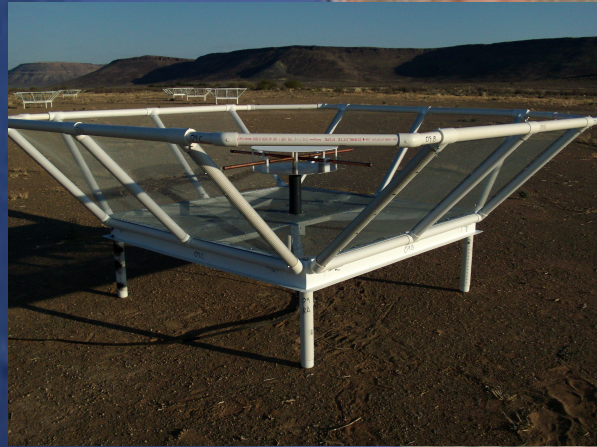
Arizona State University
matthew.kolopanis@asu.edu



Hydrogen Epoch
of Reionization Array...

Lesotho

South Africa



Hydrogen Epoch
of Reionization Array...

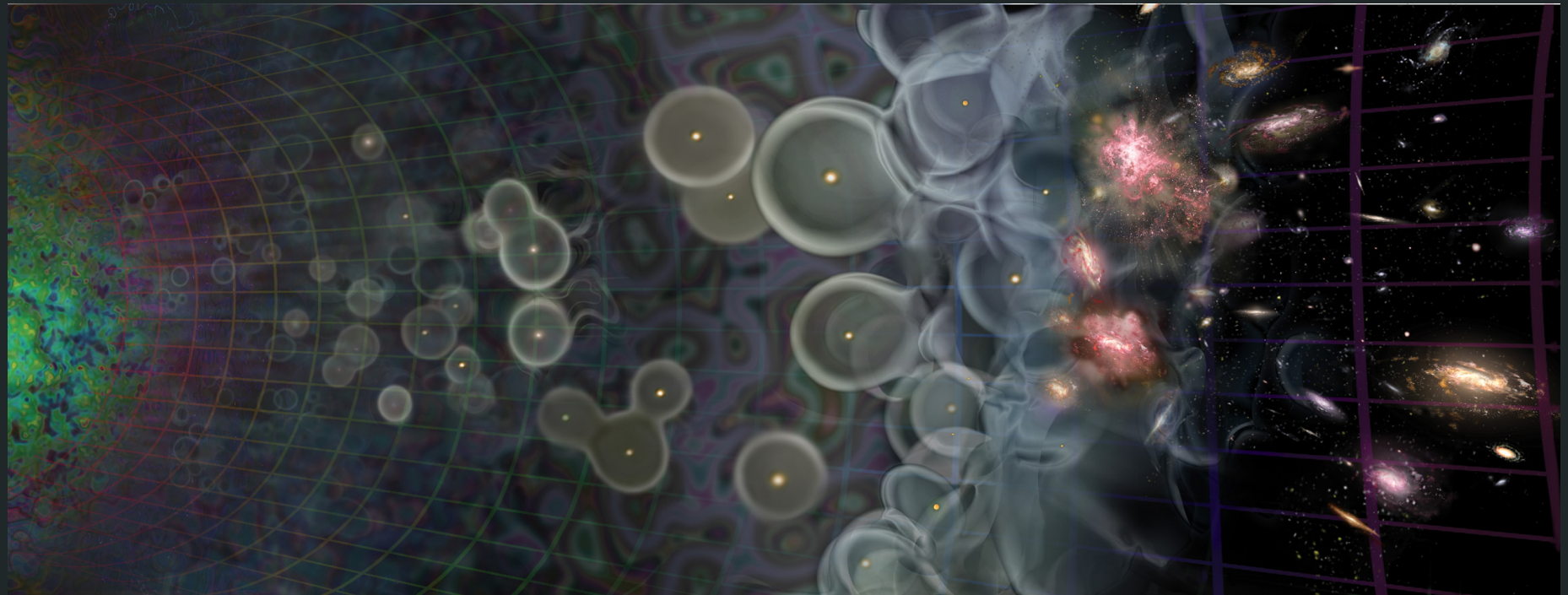
South Africa

Lesotho

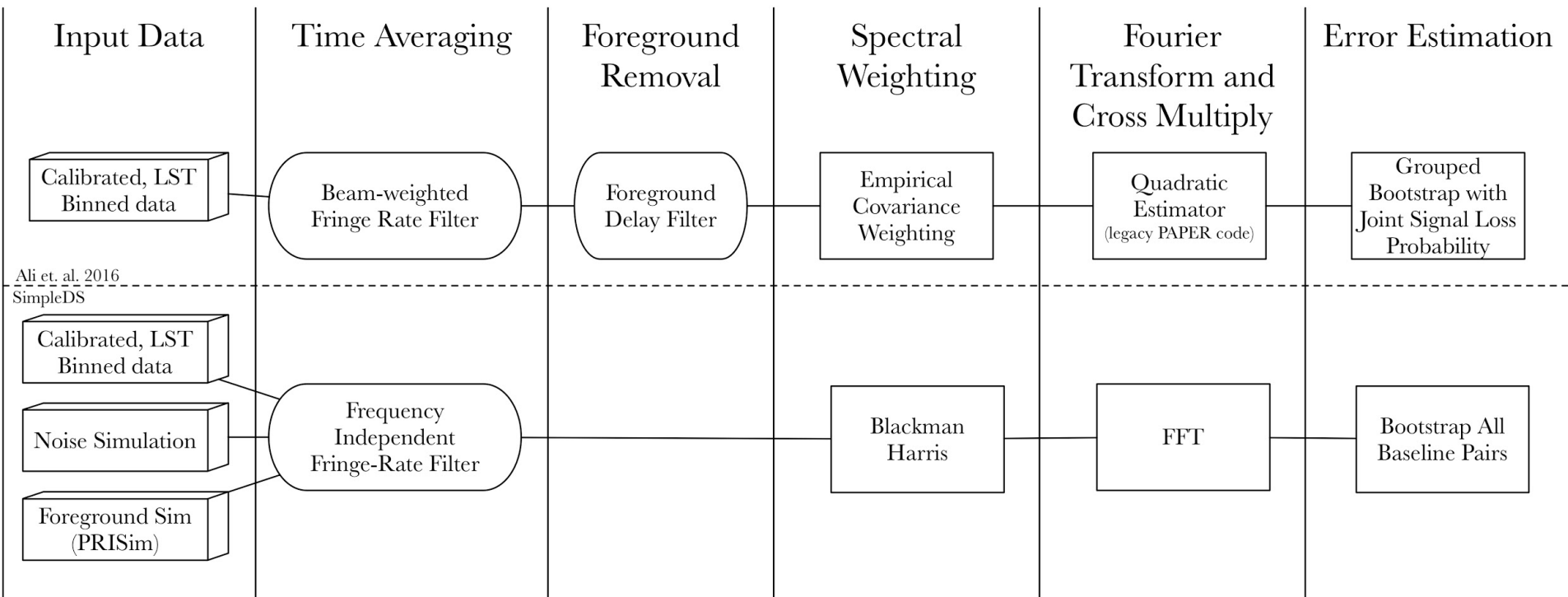
Google



Google



Simplifying and Removing analysis steps

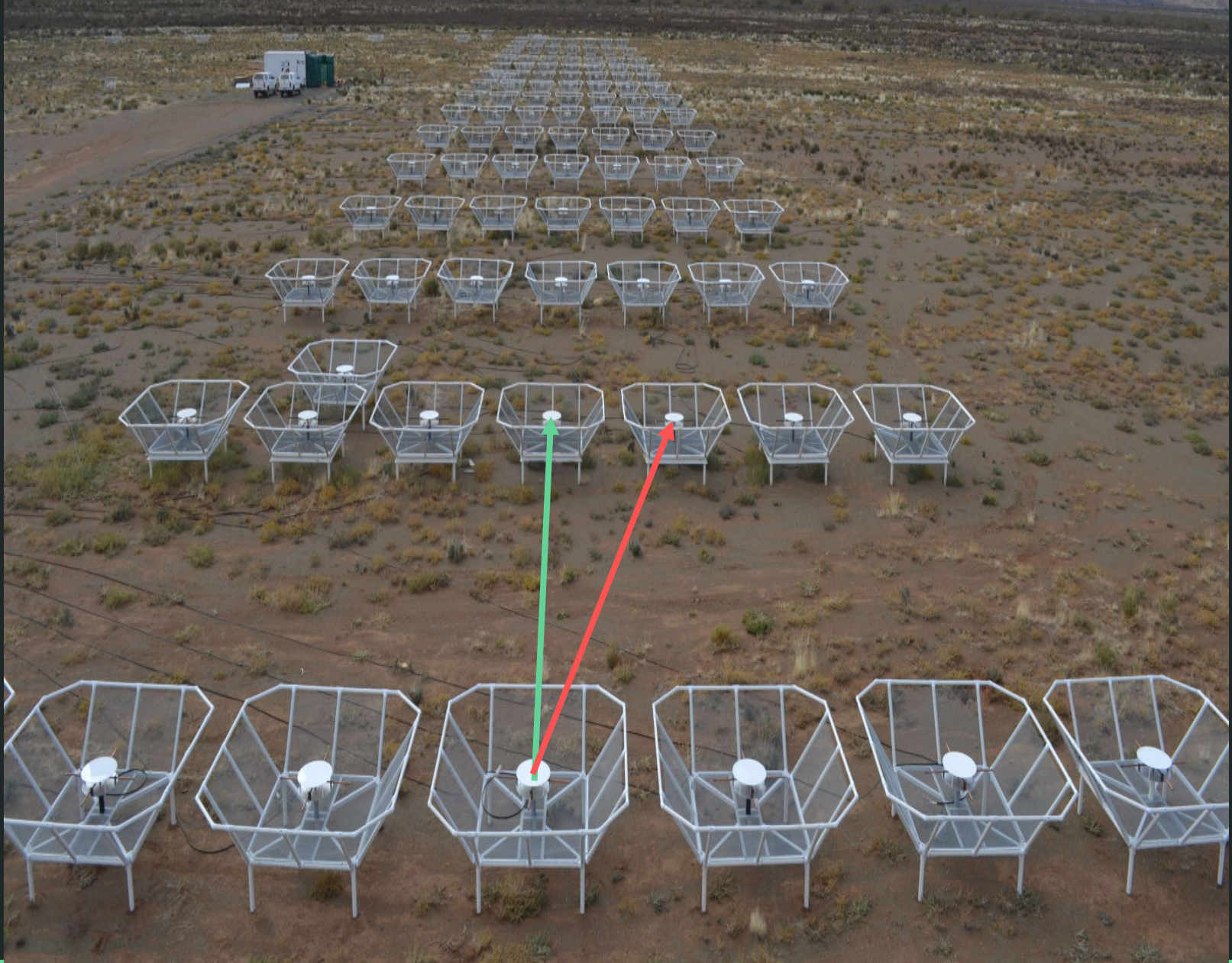


Redundancy in PAPER 64

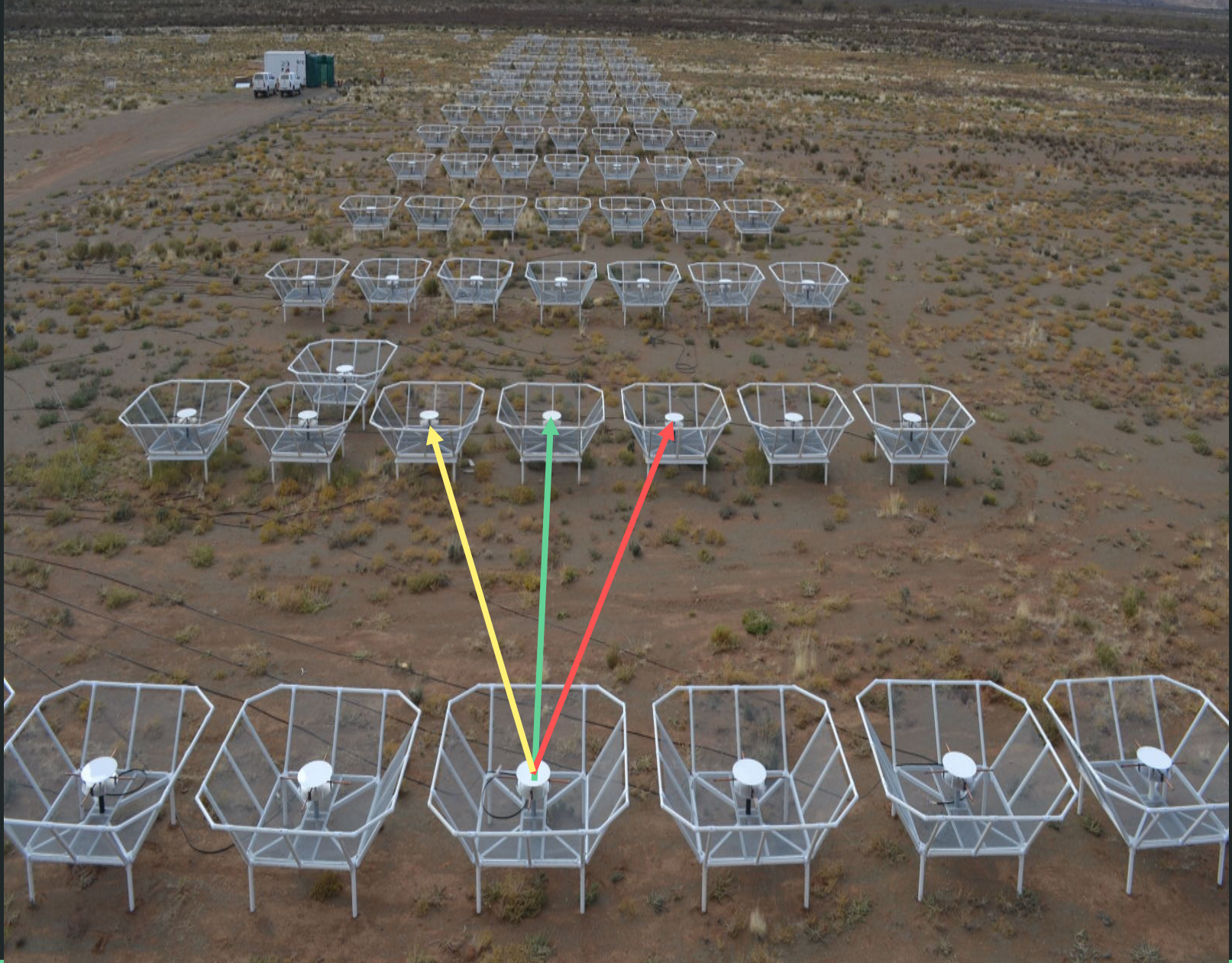
Identify groups of redundant baselines



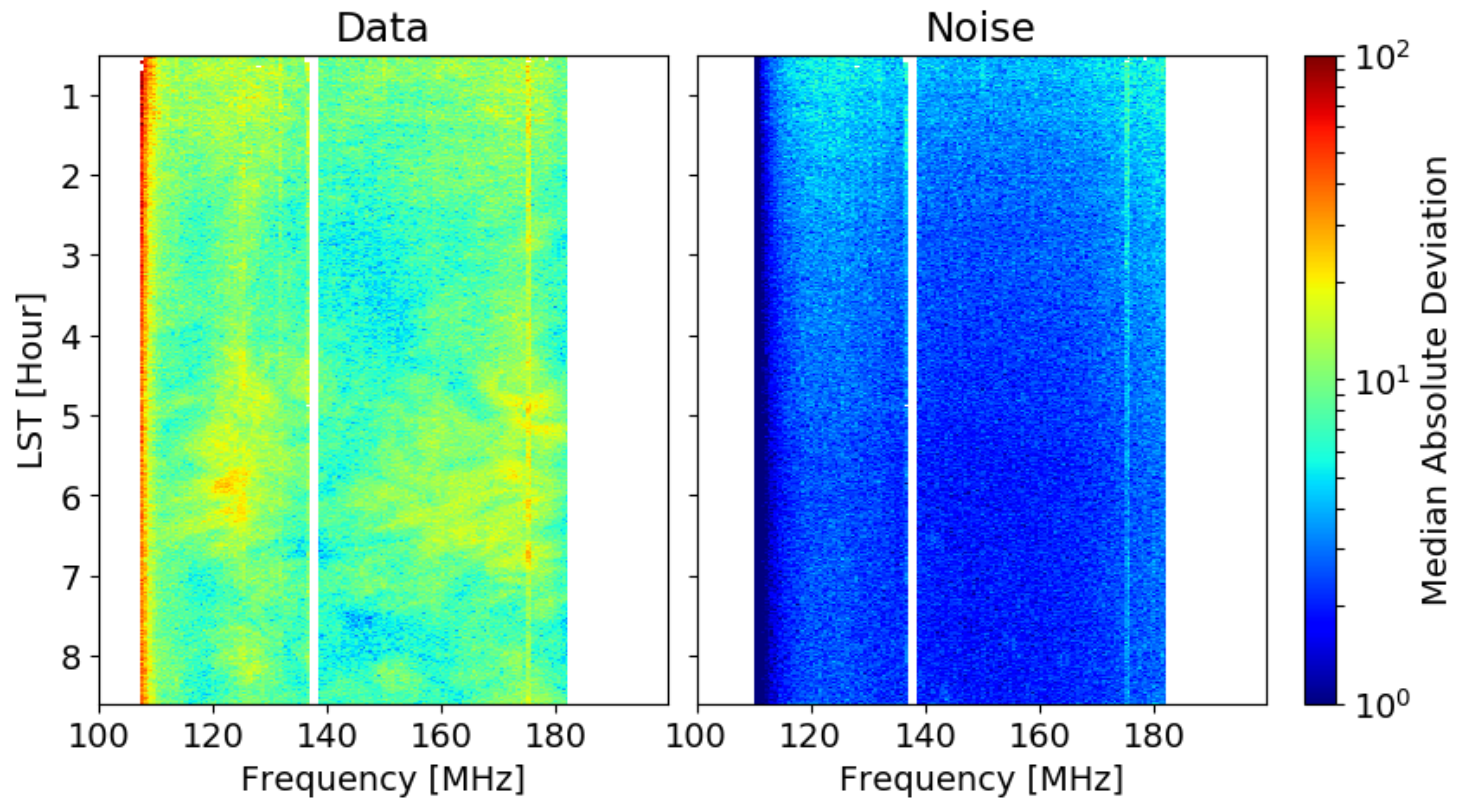
Identify groups of redundant baselines



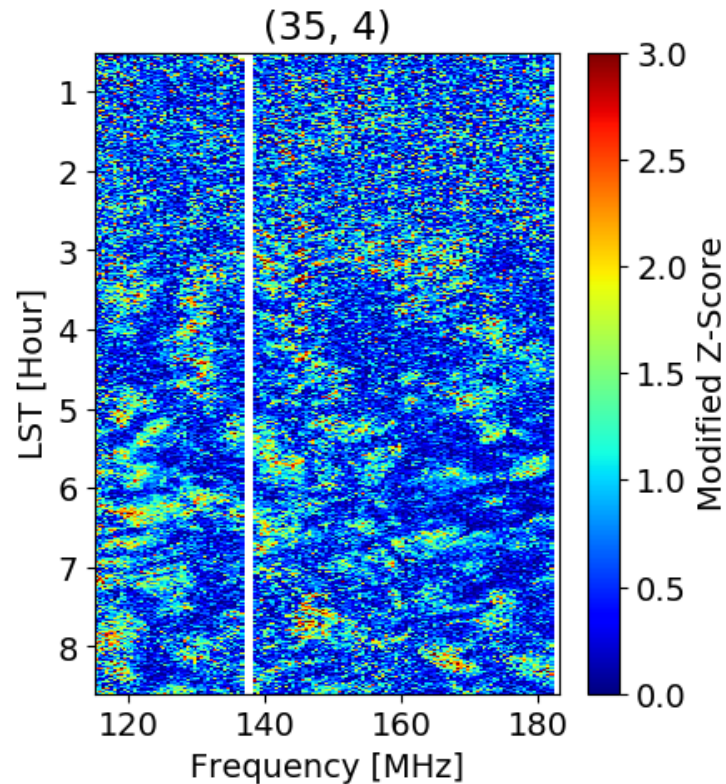
Identify groups of redundant baselines



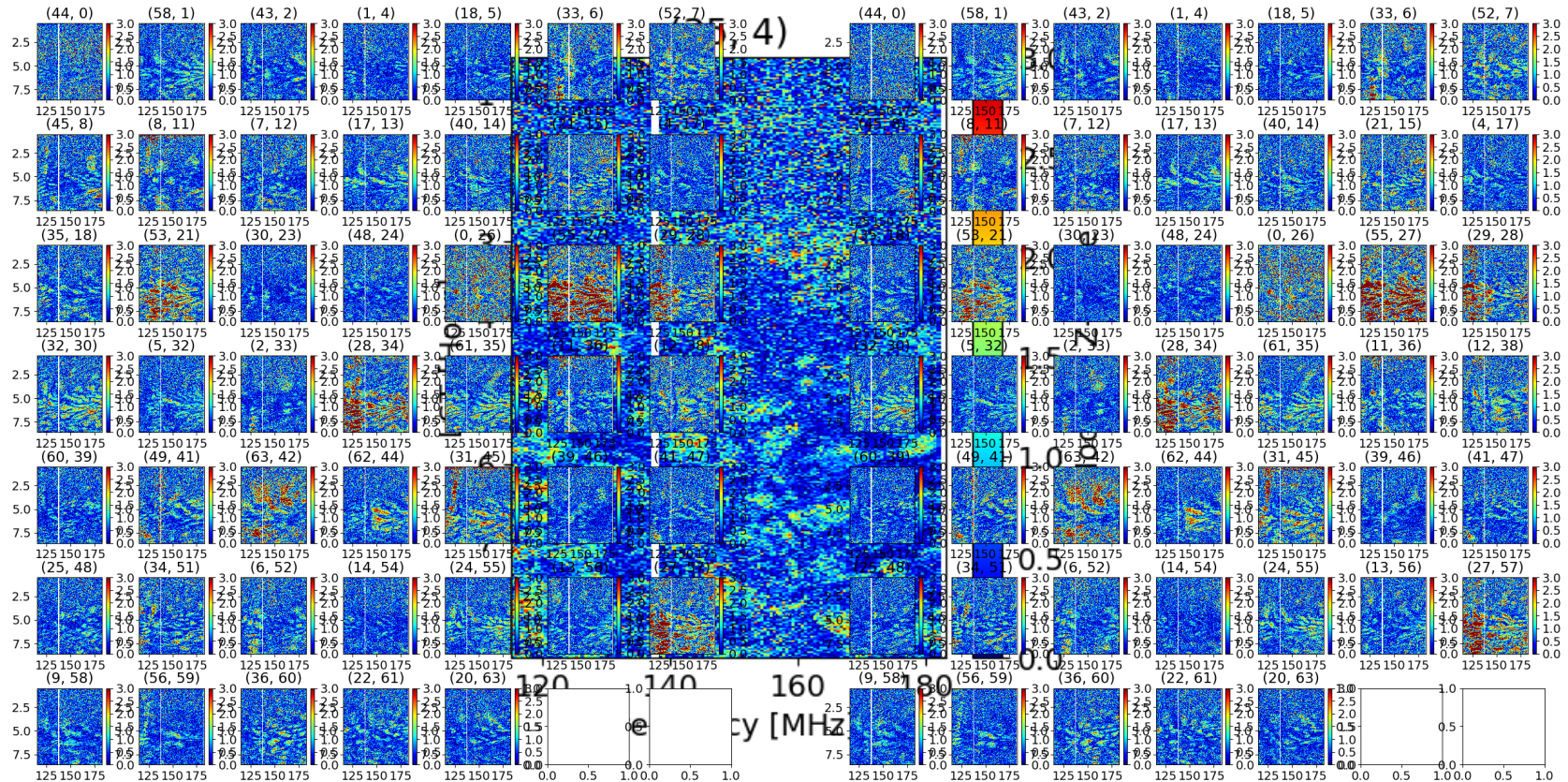
M.A.D. hints at non-redundant baselines



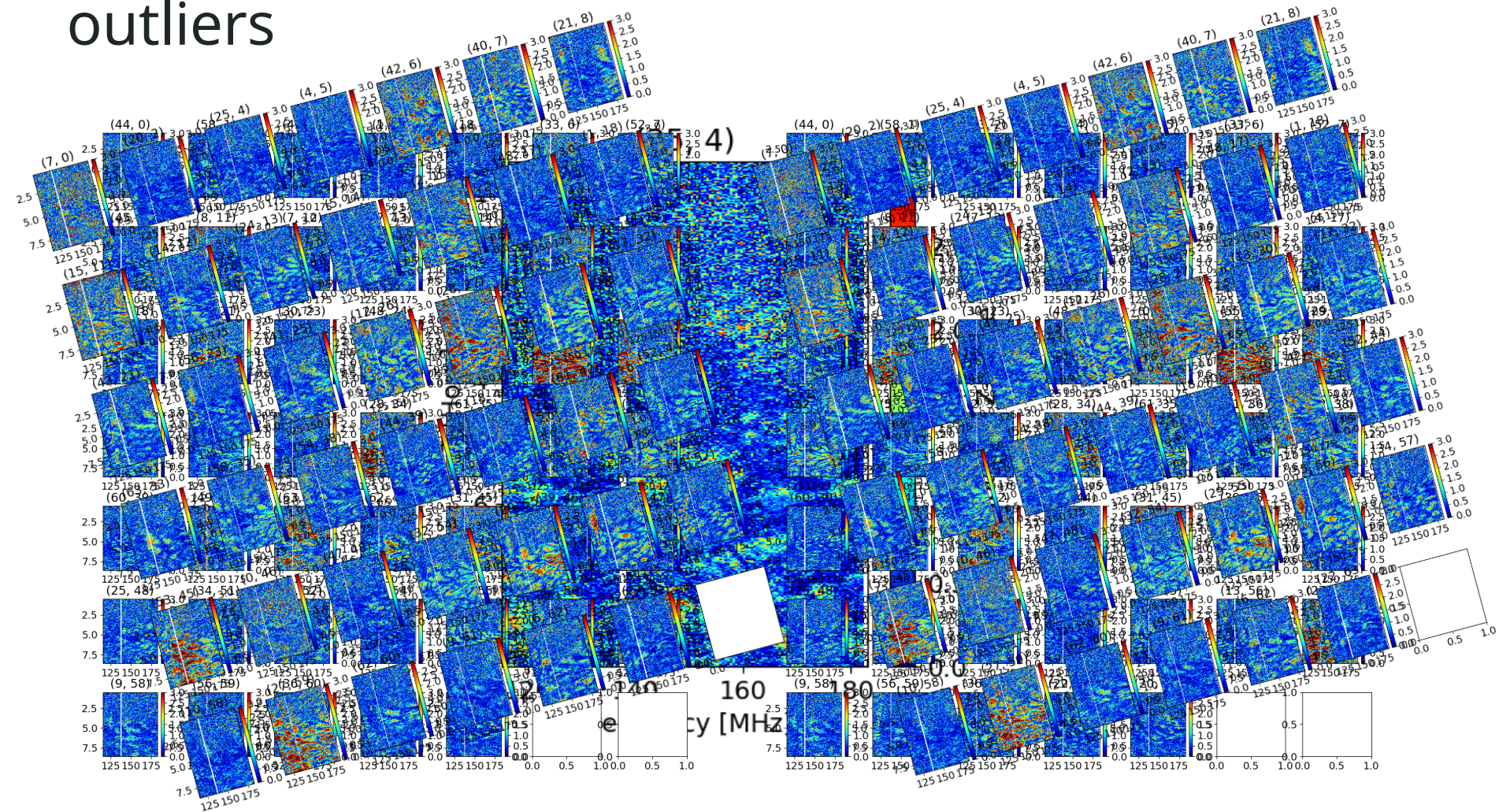
Produce modified Z-Score waterfalls to find outliers



Produce modified Z-Score waterfalls to find outliers



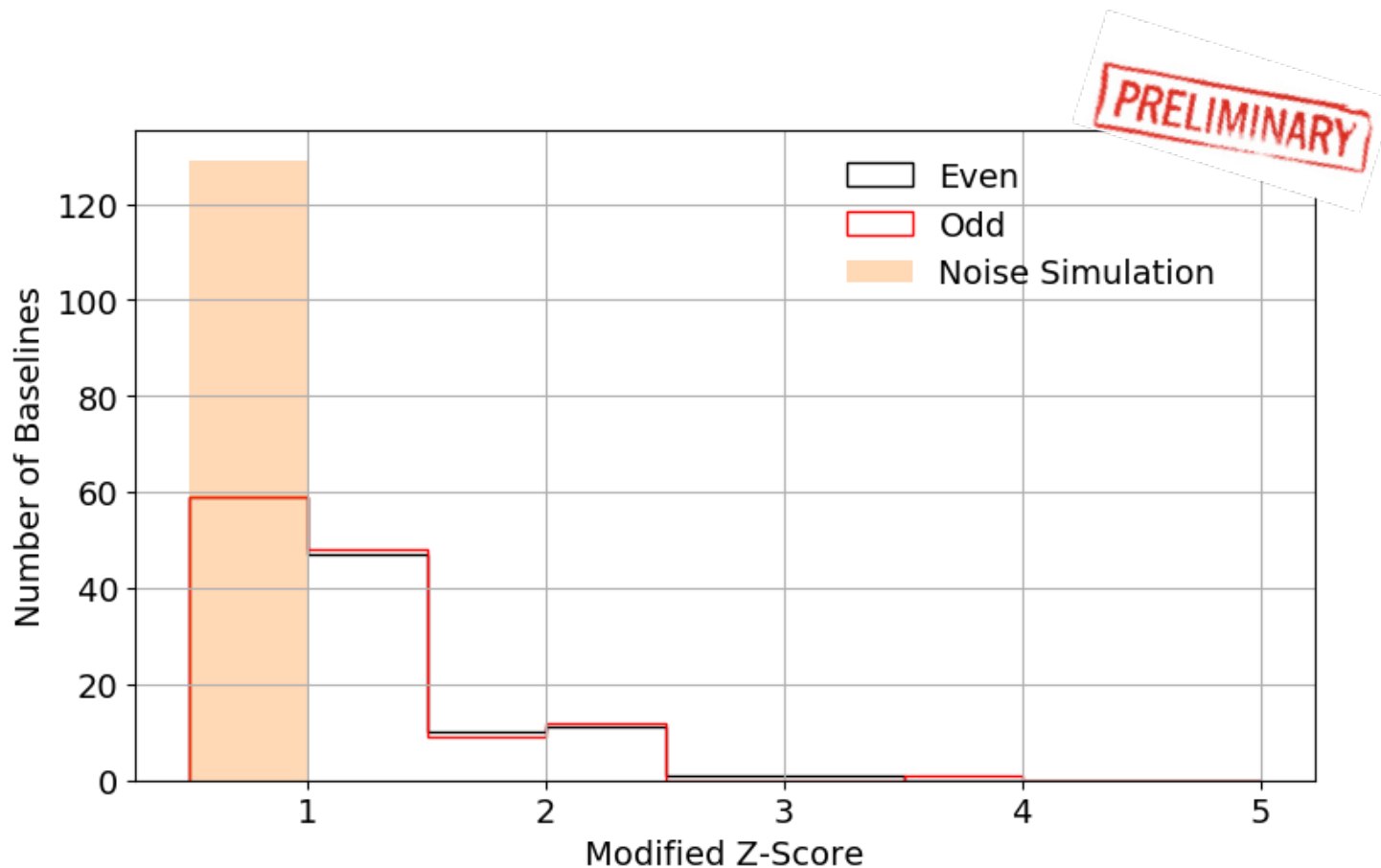
Produce modified Z-Score waterfalls to find outliers



outliers



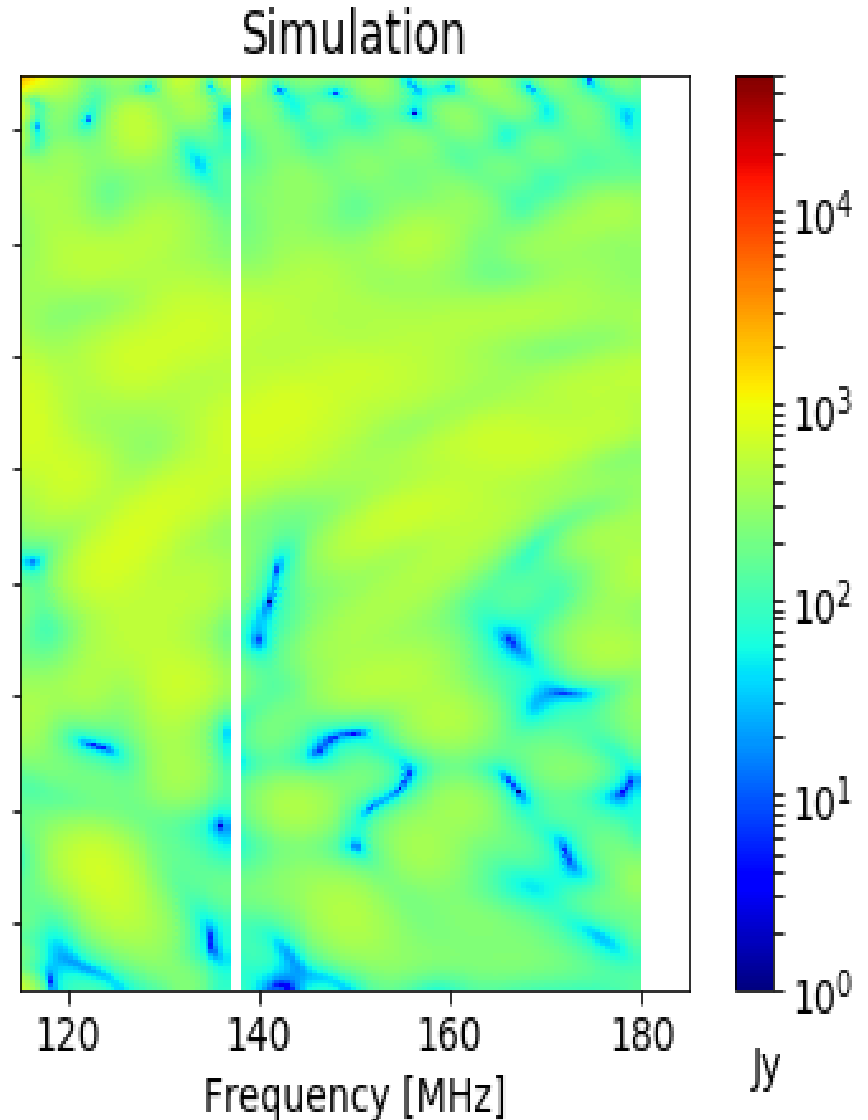
Histogram bin to identify outliers



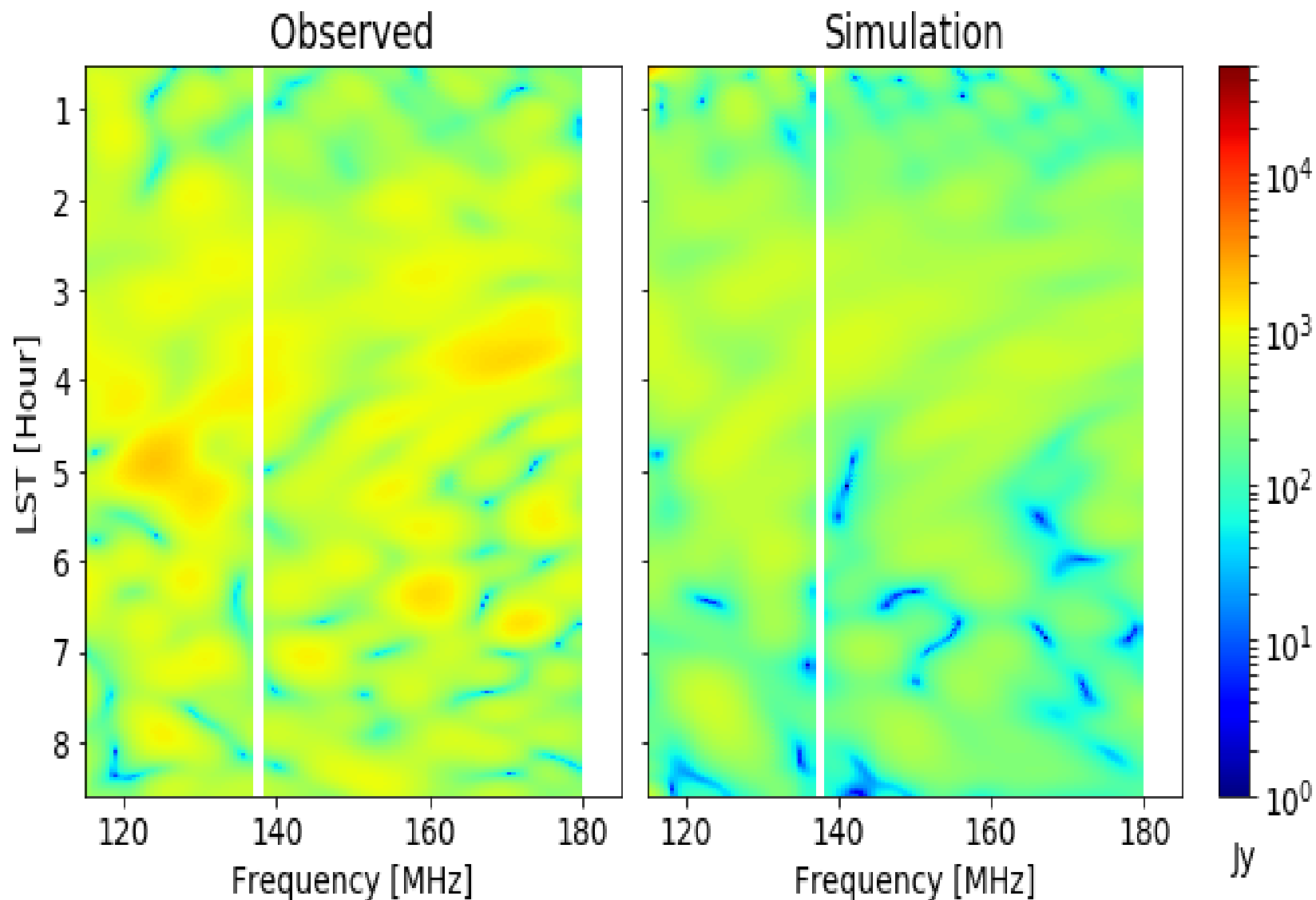
Simulation and Model

PRISim simulation

- GSM
 - (Oliviera-Costa *et al.* 2008)
- GLEAM
 - Sources with flux > 1Jy @ 150MHz
 - (Wayth et al. 2015, Hurley-Walker et al. 2017)
- Fornax A
 - Model used in FHD (Patti Carroll)
- Pictor A
 - Source peeling from Gleam

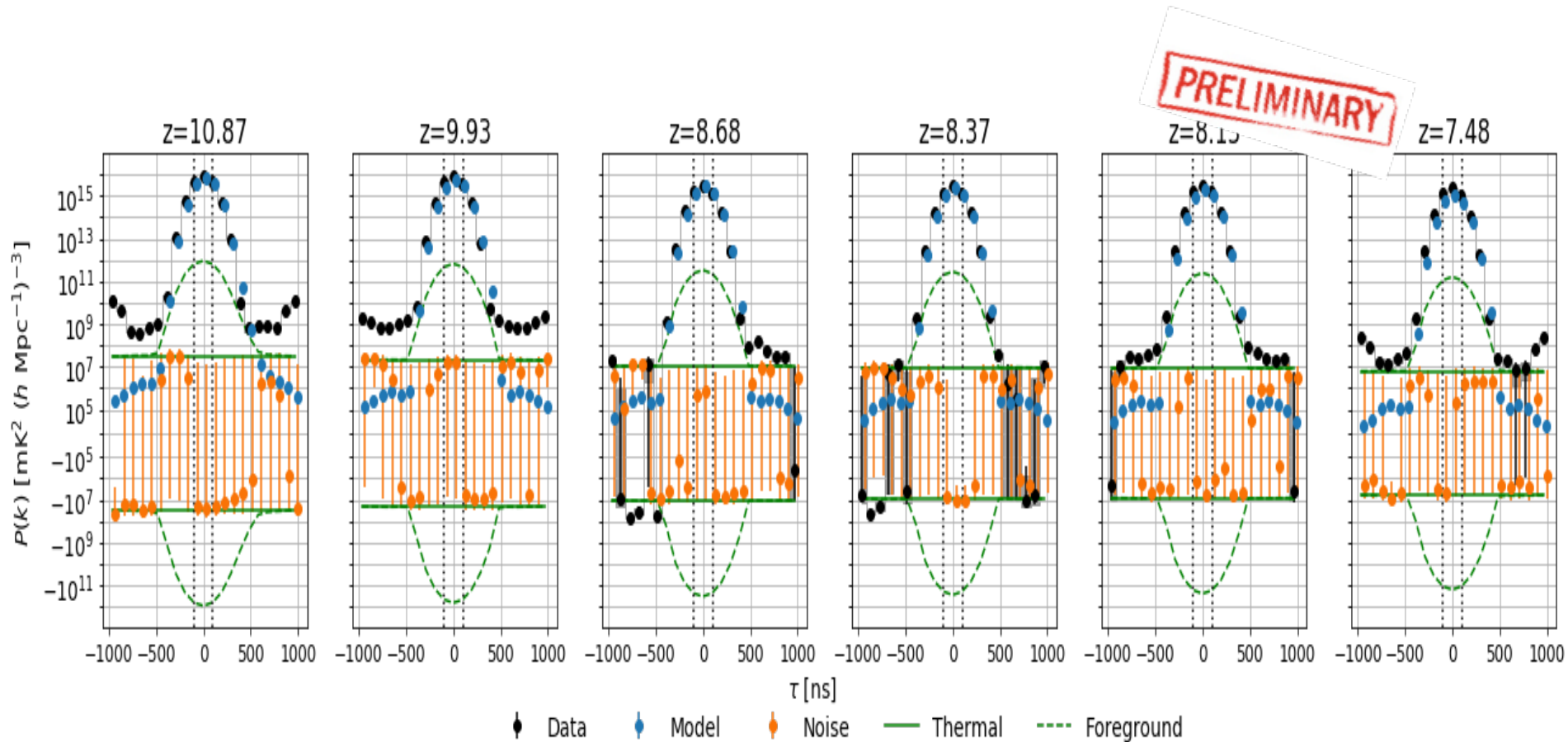


Simulation Agrees with large structures



Power Spectrum and Upper Limits

Model leakage agrees with observation

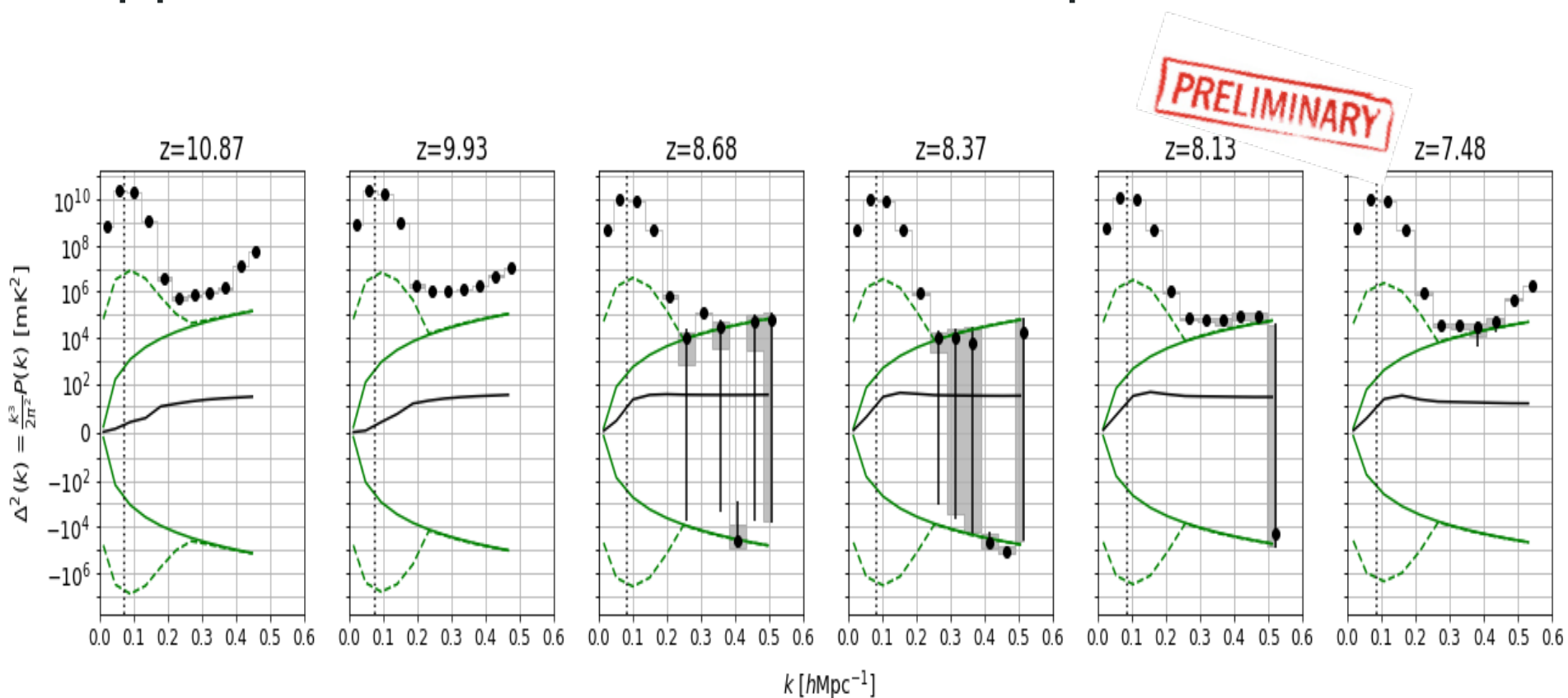


Investigate High Delay Detections

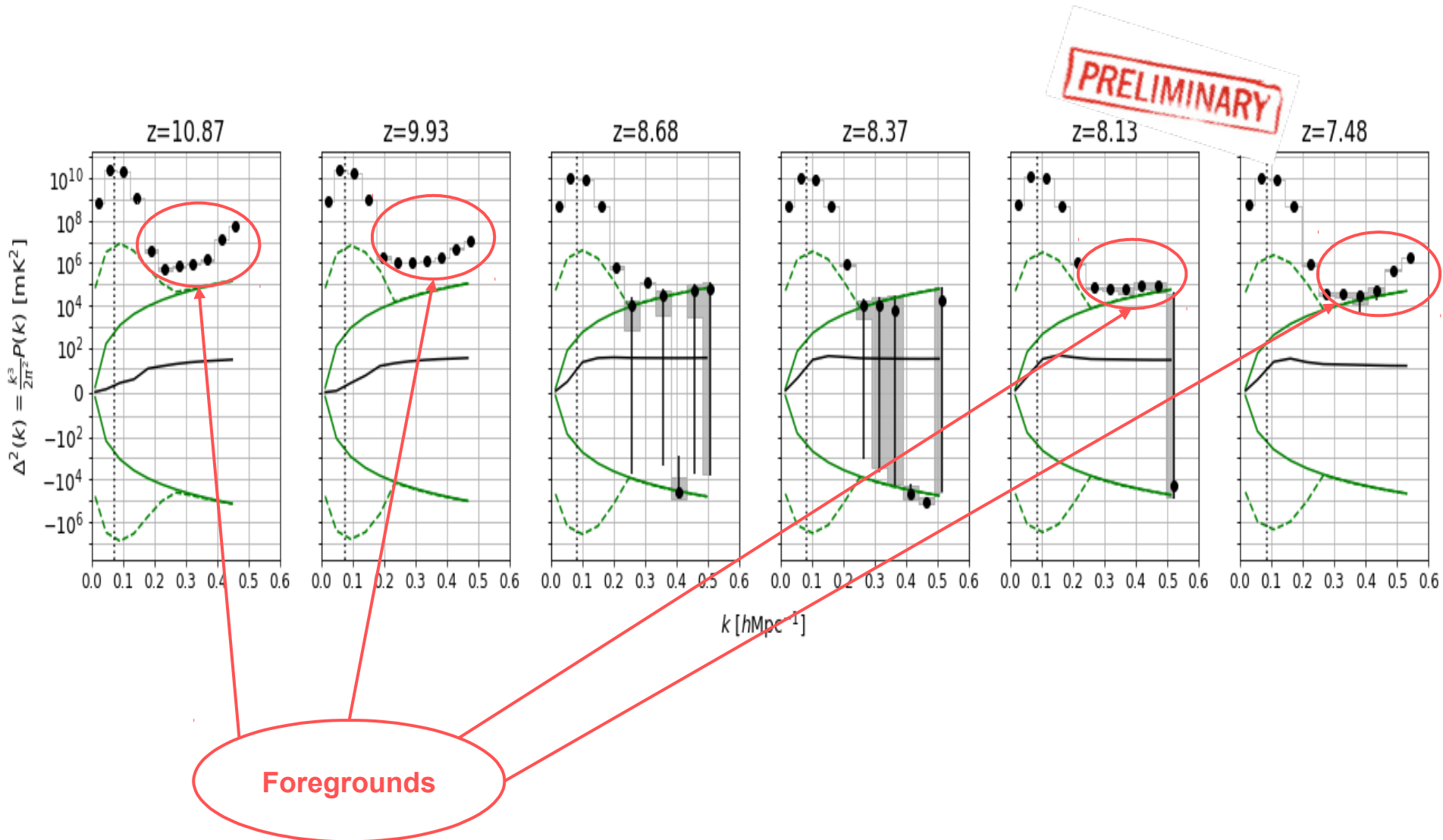
- Checks
 - Real and Imaginary Components
 - Compare Uncertainty Estimates
- Jackknifed Null-Test
 - Even/Odd Differenced Power Spectra
 - LST jackknifed Differenced Power Spectra

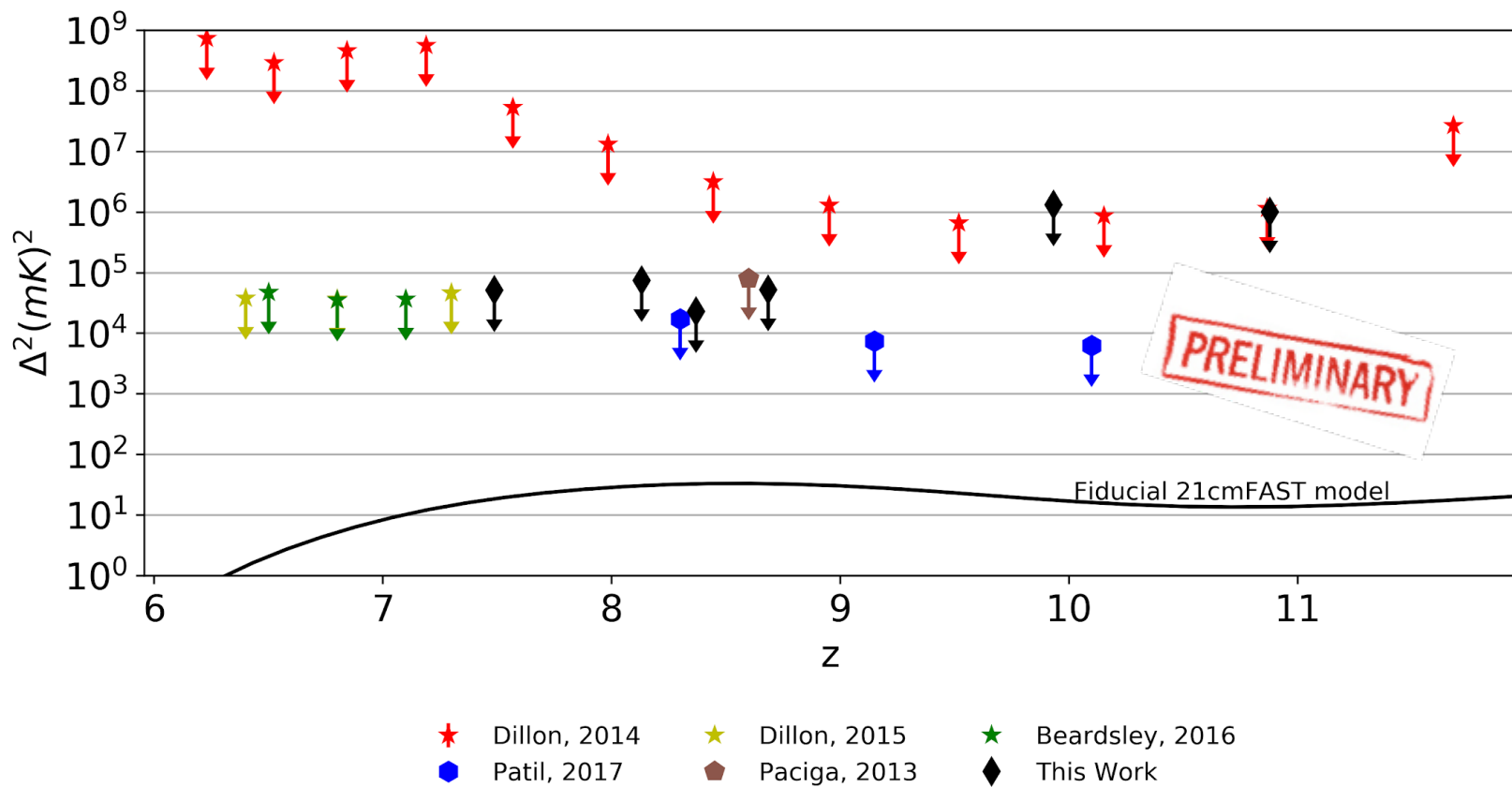
Mostly likely residual Foregrounds

Upper limits on the 21-cm Power Spectrum



Upper limits on the 21-cm Power Spectrum





Thank You

Preliminary results presented on behalf of the PAPER collaboration

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