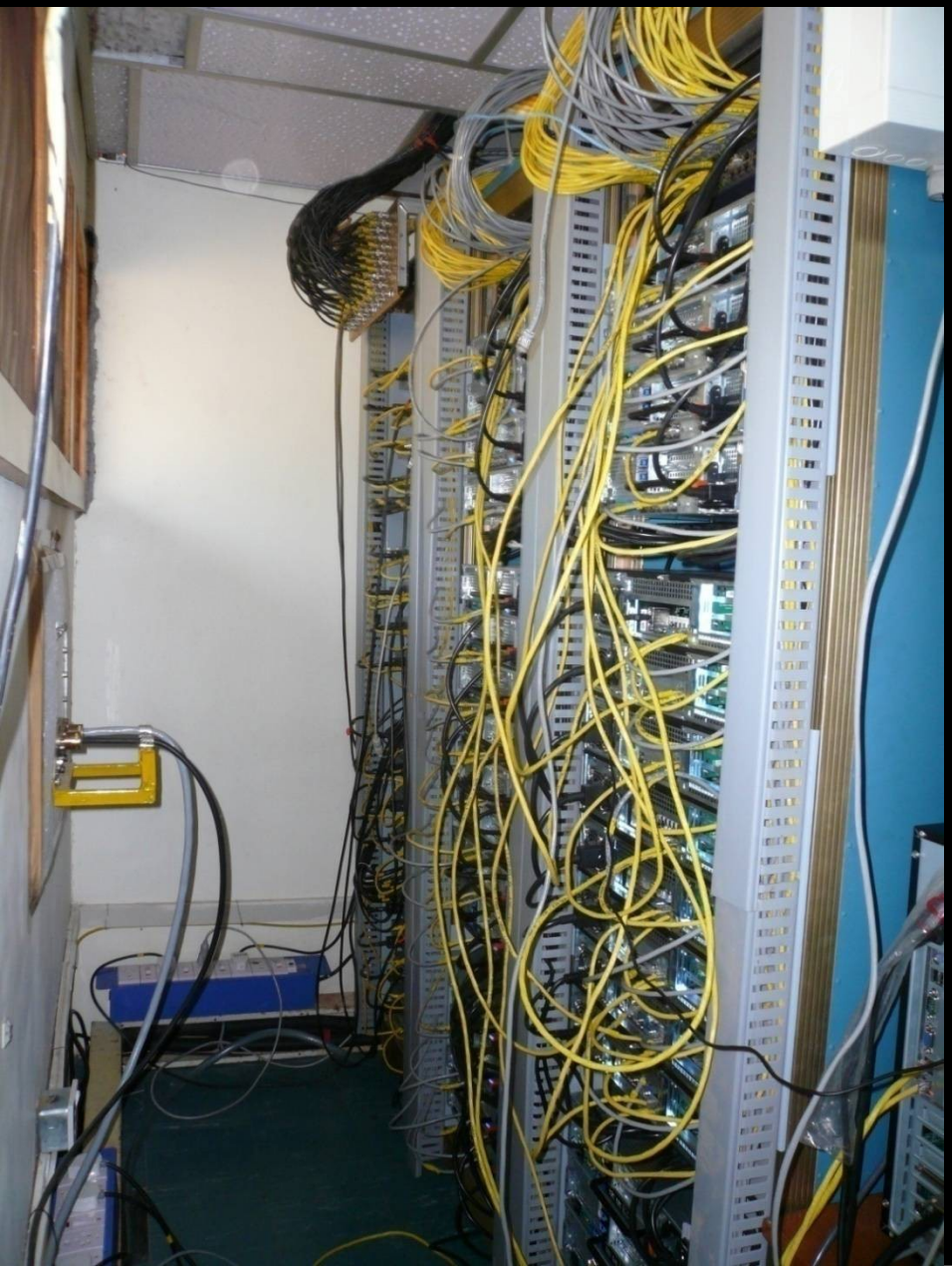
RFI mitigation at GMRT&GBT

- Interferometric localization of RFI and physical removal.
- Phase closure solution and cancellation.
- Use of software backends.
- Uses SVD-PCA based strategy: model visibilities as $V_{ij}(t)=g_i g_j T(t)$
- Analogous to peeling – can fill in missing measurements.
- Needs 2 reference antenna for GBT, or cross polar information for GMRT.

RFI localization

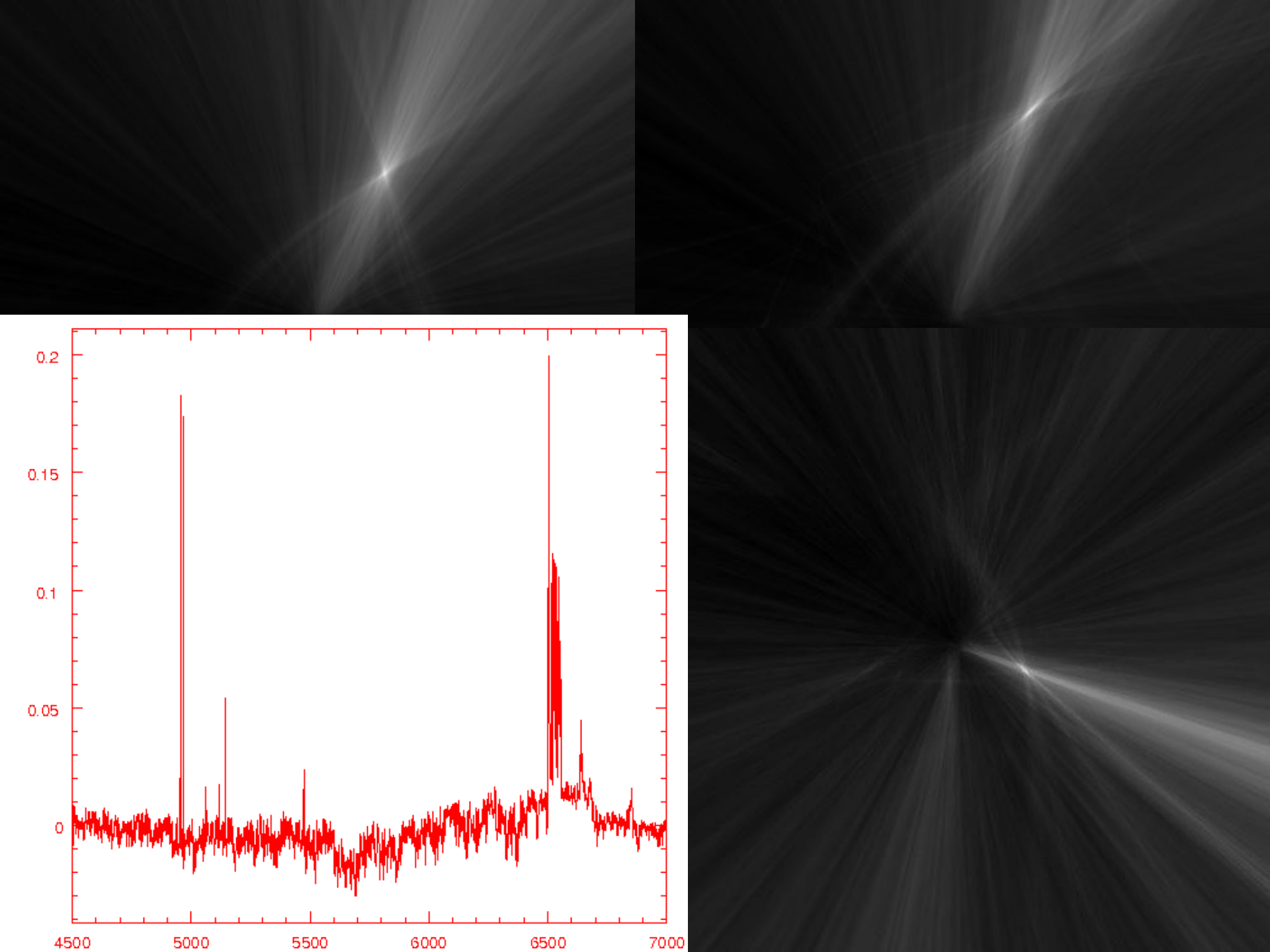
- Interferometer intrinsically measures positions
- Requires different imaging and calibration strategies in the near field
- GSB and EoR project developed identification strategies.
- Guppi and RFI reference antennae at GBT (Fisher, Ford)
- Collaboration w/Nityananda, Gupta.

new GMRT software correlator: imaging the full sky+horizon



Data Acquisition

- RFI locations are produced as a by-product of EoR observations, or by specific calibrated obervations with feeds pointed to the control building.
- Requires operation of software correlator to obtain sufficient lags: avoid bandwidth smearing for horizon-to-horizon imaging.


0.2
0.15
0.1
0.05
0
4500
5000
5500
6000
6500
7000


SH 2
Junnar
Arwi
Narayangaon
Pune Rd
Poona Rd
Ghod
Manchar
NH 50
Alkuti
Manjur
Chas
Vapahgaon
Kauthe
5 km
5 mi
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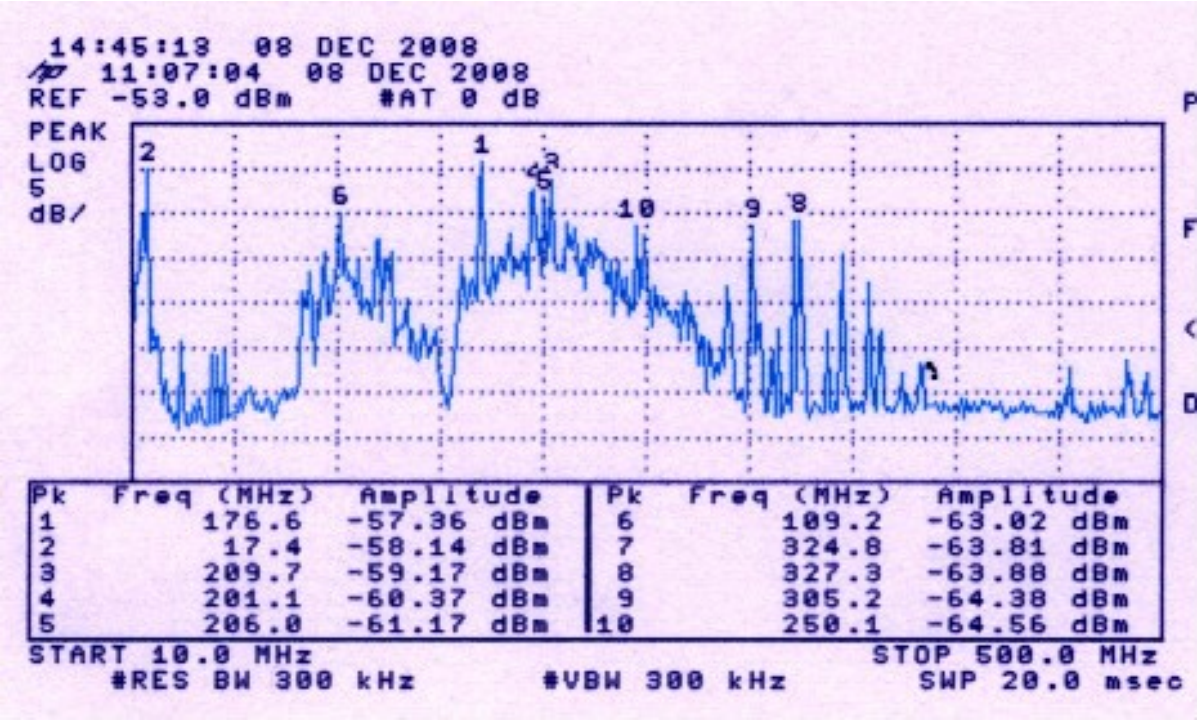
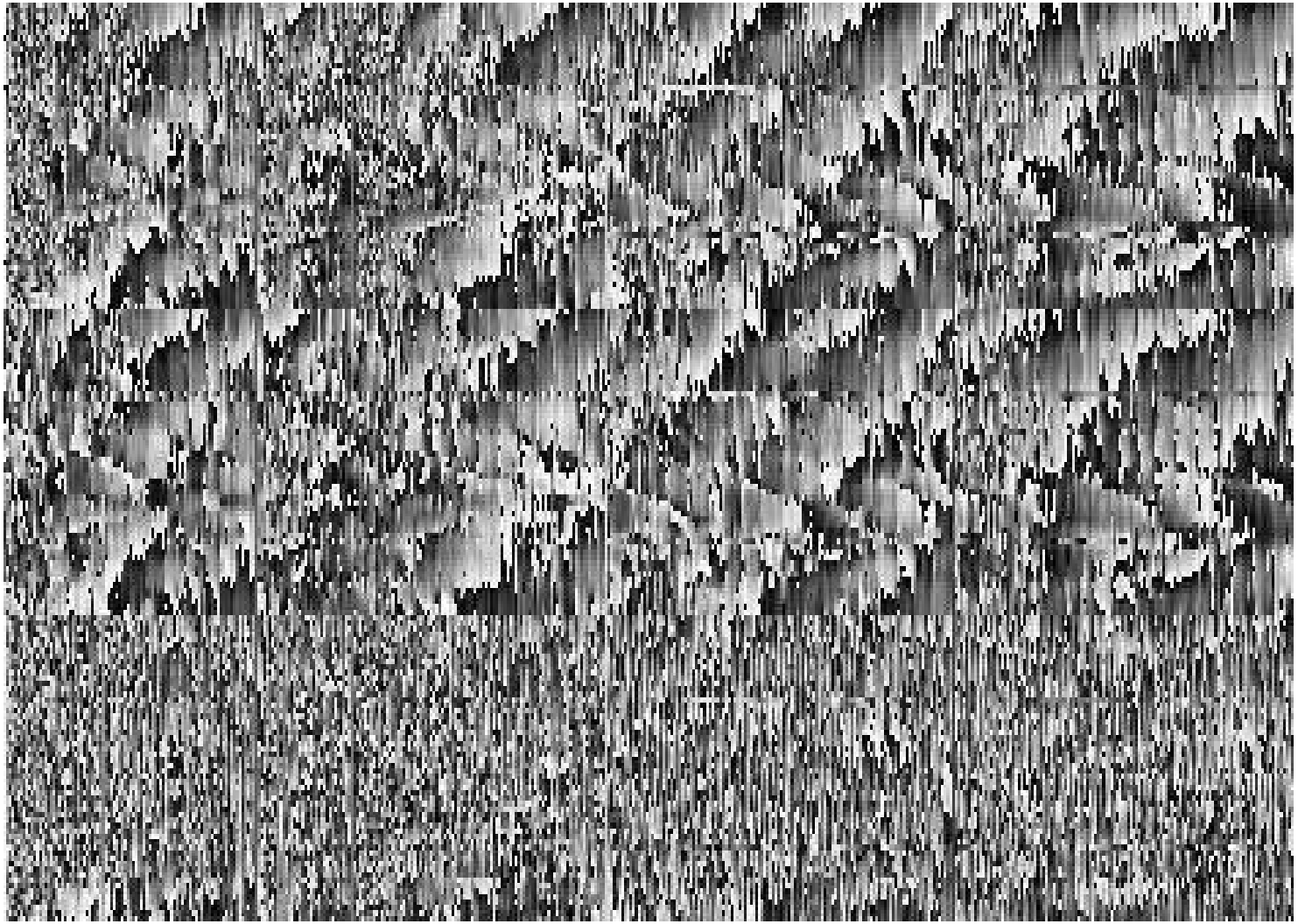
Multi-wavelength follow-up:
ultrasound, VHF, UV

Spectral identification

- Taken by P. Raybole with spectrum analyzer and power generator.





Raw data

Model

Clean data

Summary

- Interferometic RFI localization successfull at GMRT, conclusive identification of sources.
- RFI noise cancellation in astronomical data now part of GMRT EoR pipeline, and work in progress to implement at GBT (w/R. Fisher, J. Ford).