All-sky, full-polarization imaging with dipole arrays

Griffin Foster (and Gianni Bernardi)
RATT Group, Rhodes University

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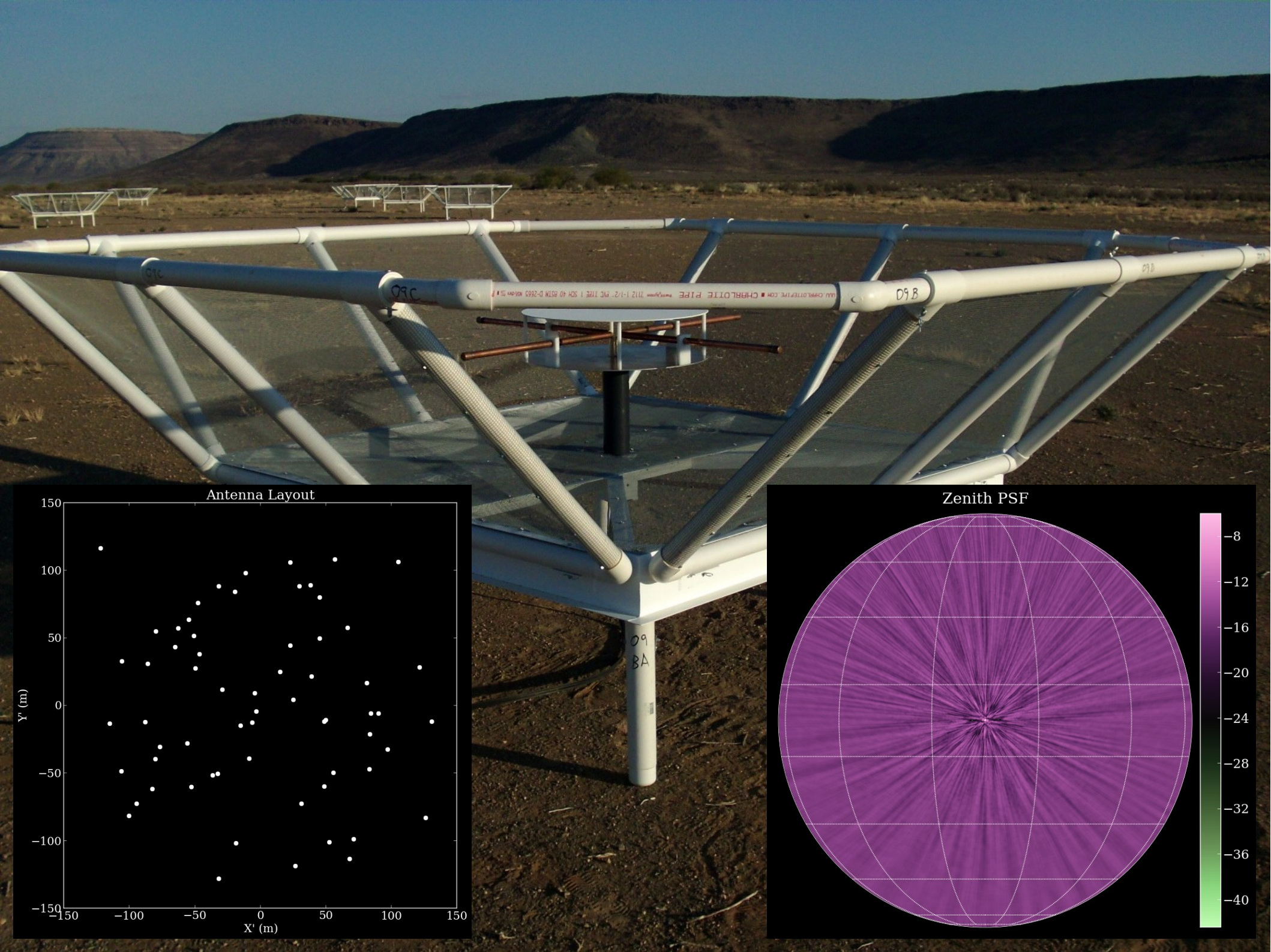
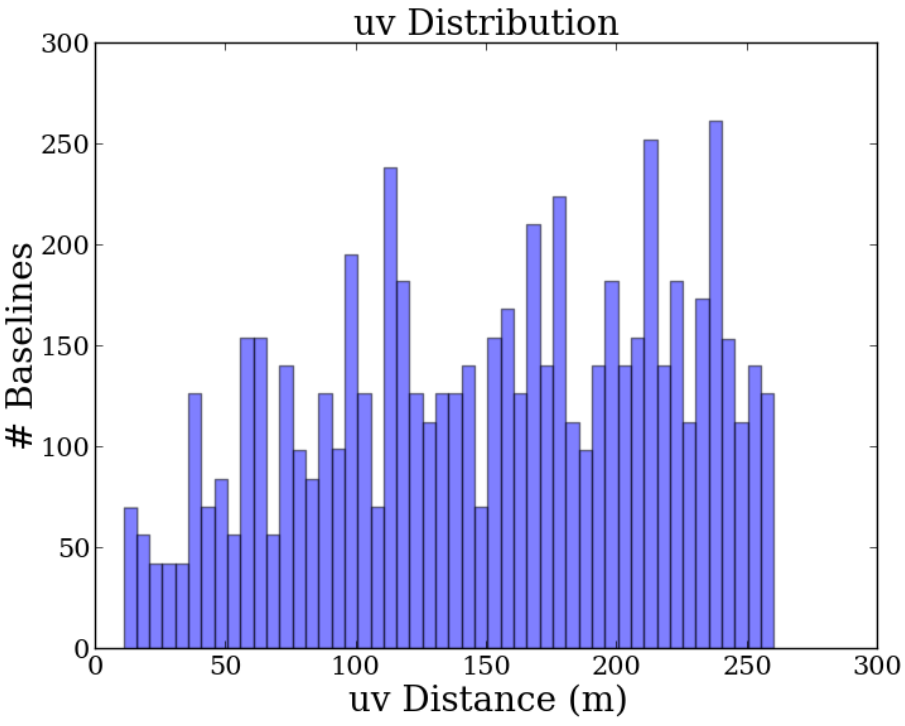
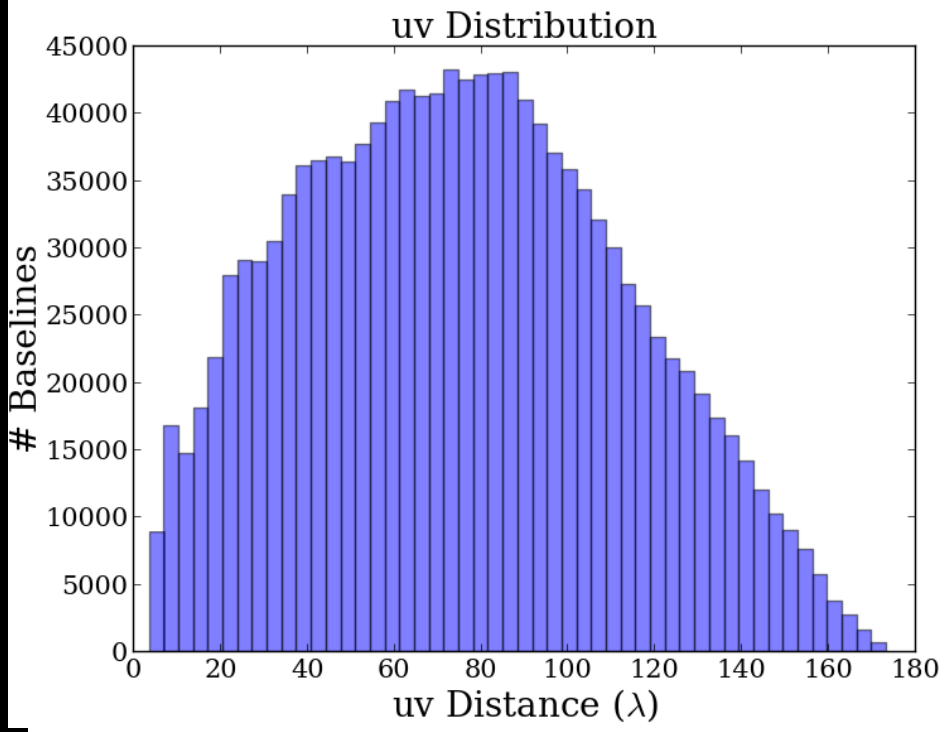
Quick Overview of Talk

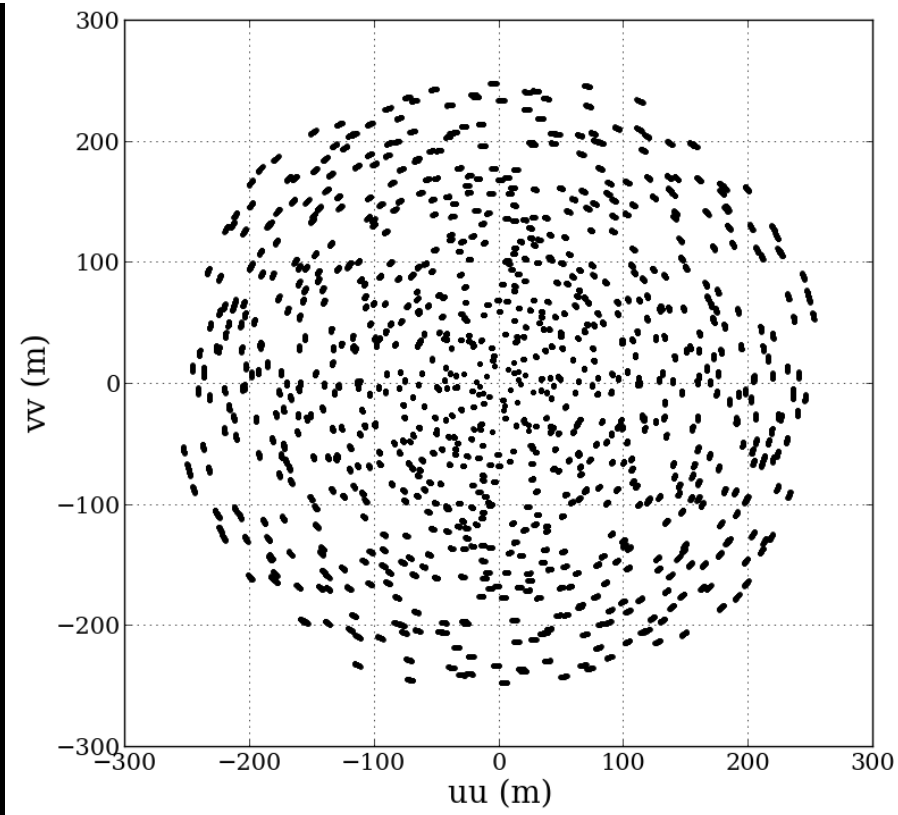
1. Calibration and Imaging with the PAPER minimally redundant array configuration

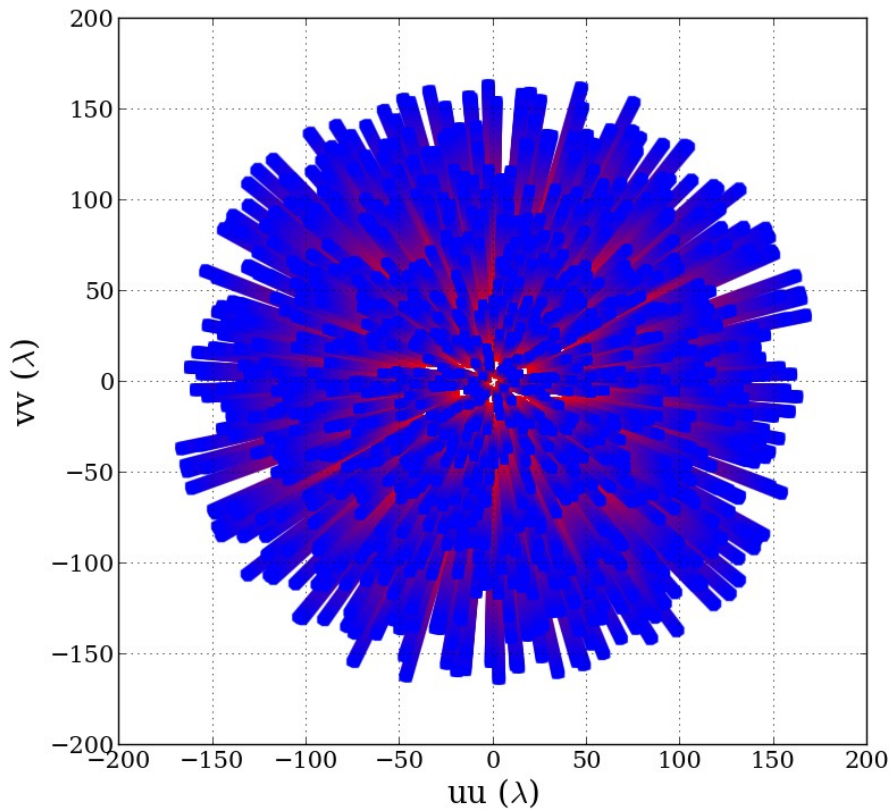
2. Current Work: Primary beam model, Galactic Structure

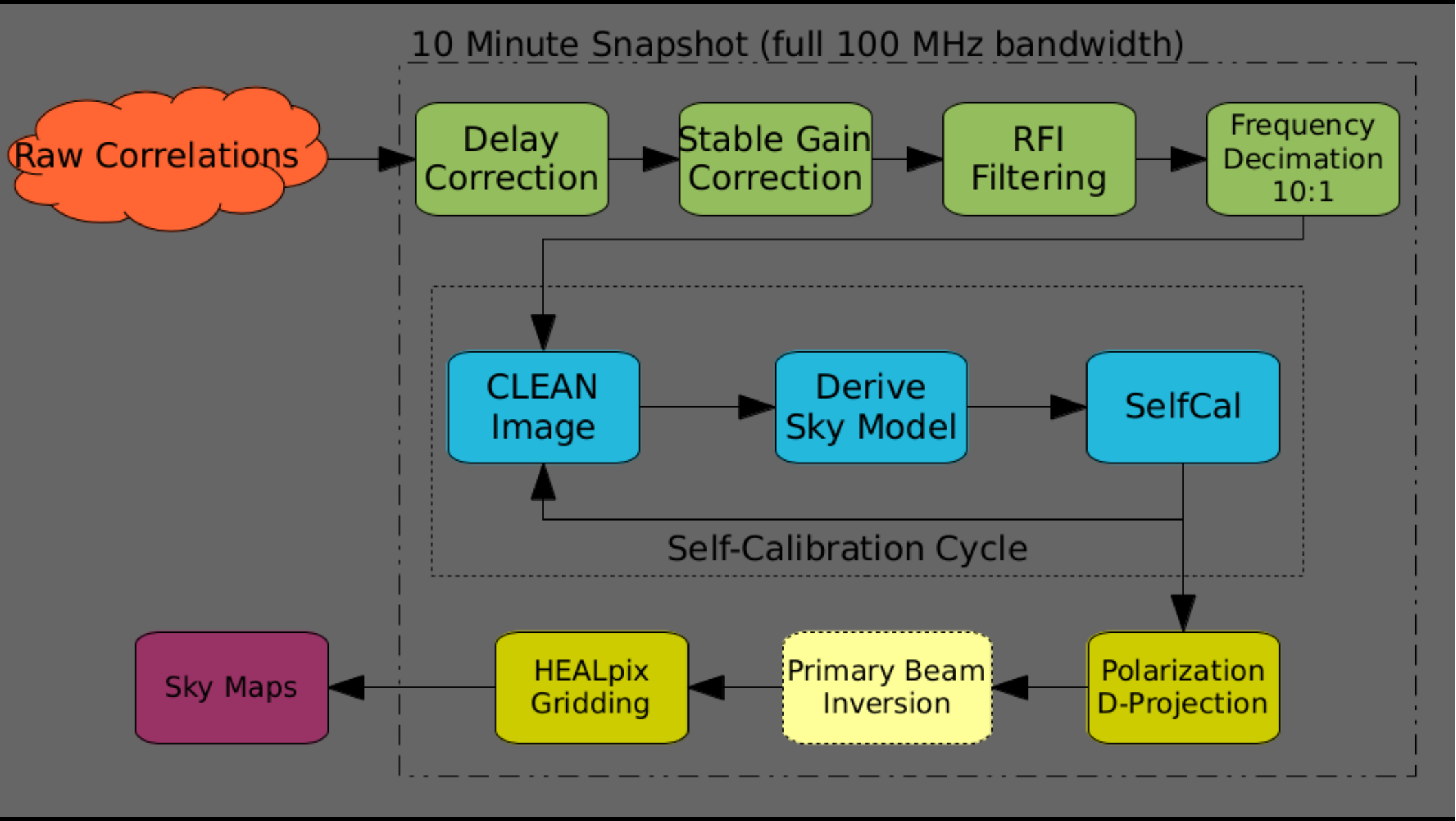

Antenna Layout
Y' (m)
X' (m)
150
100
50
0
−50
−100
−150
−150
−100
−50
0
50
100
150
Zenith PSF
−8
−12
−16
−20
−24
−28
−32
−36
−40

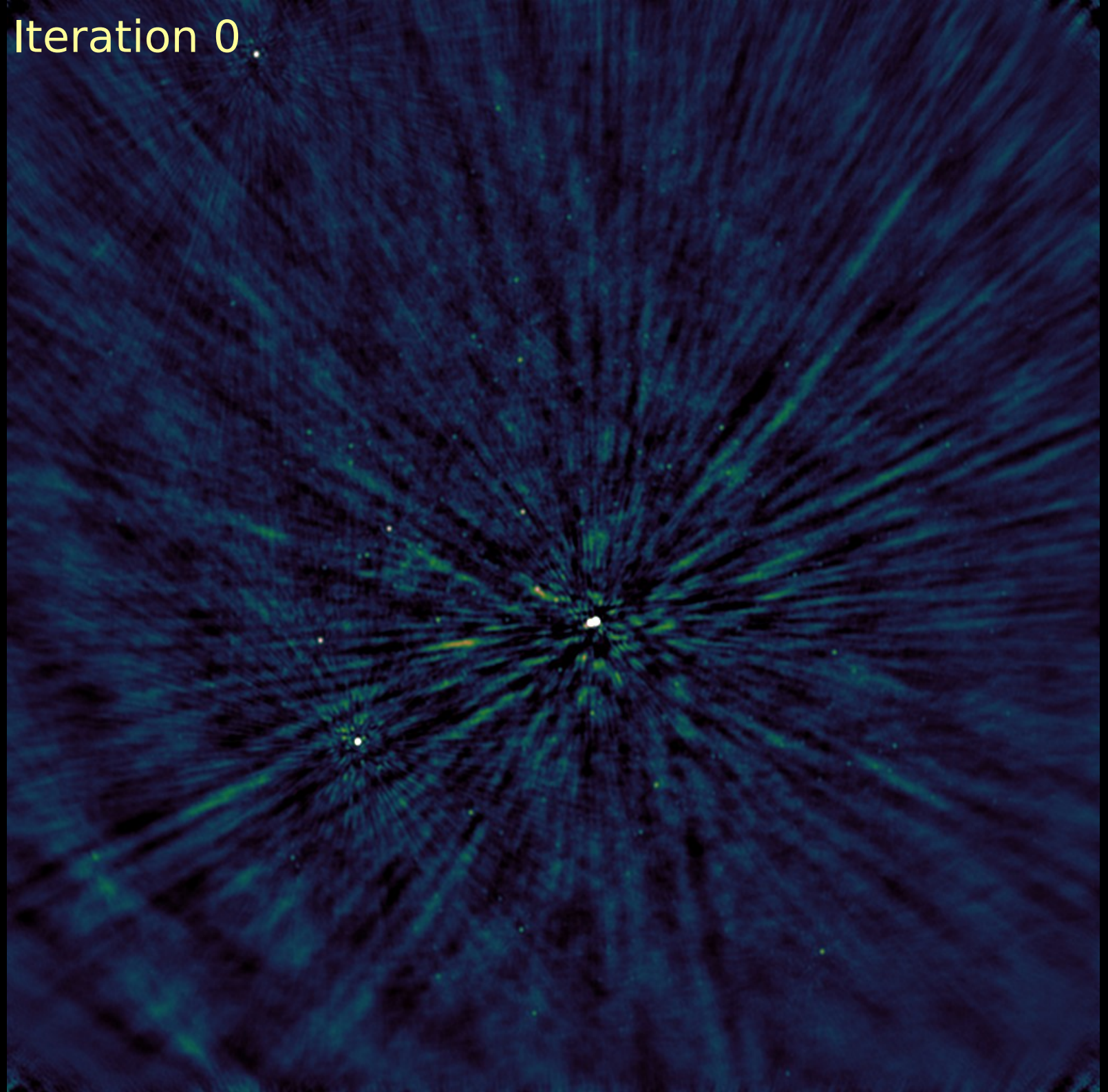

uv Distribution
Baselines
uv Distance (m)
0
50
100
150
200
250
300

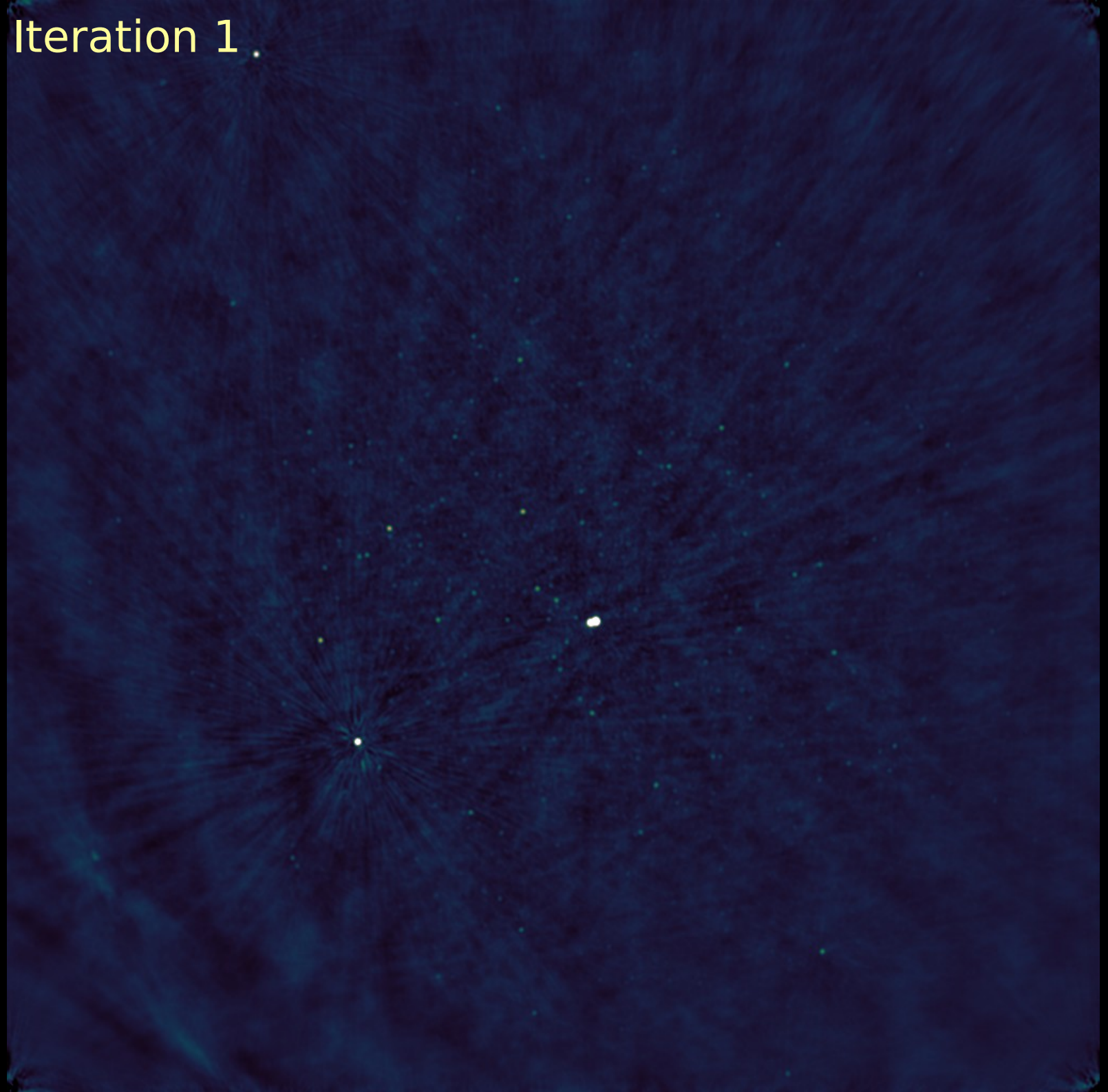

uv Distribution
Baselines
uv Distance (λ)
0
5000
10000
15000
20000
25000
30000
35000
40000
45000
0
20
40
60
80
100
120
140
160
180

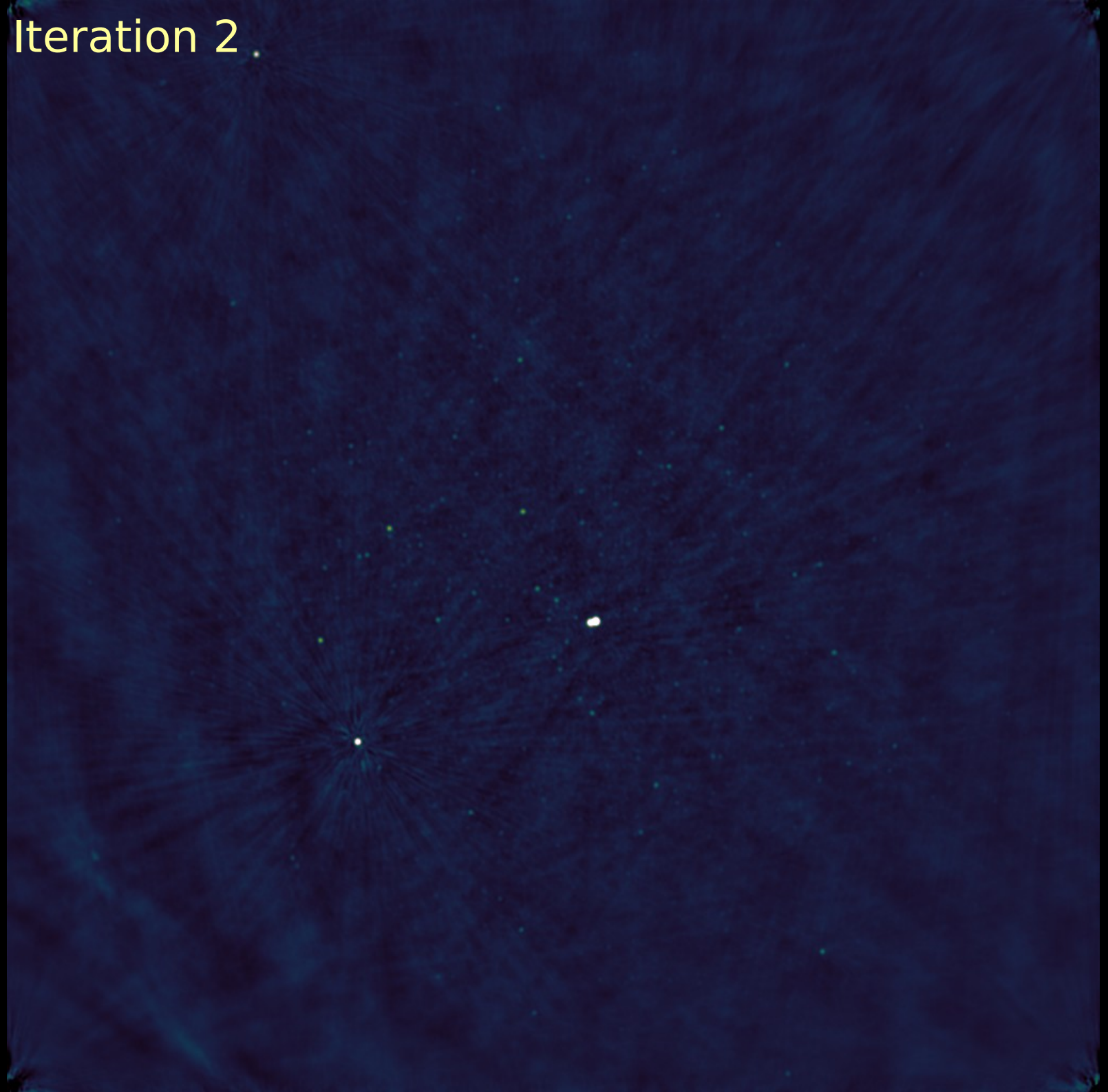

vv (m)
uu (m)
−300
−200
−100
0
100
200
300

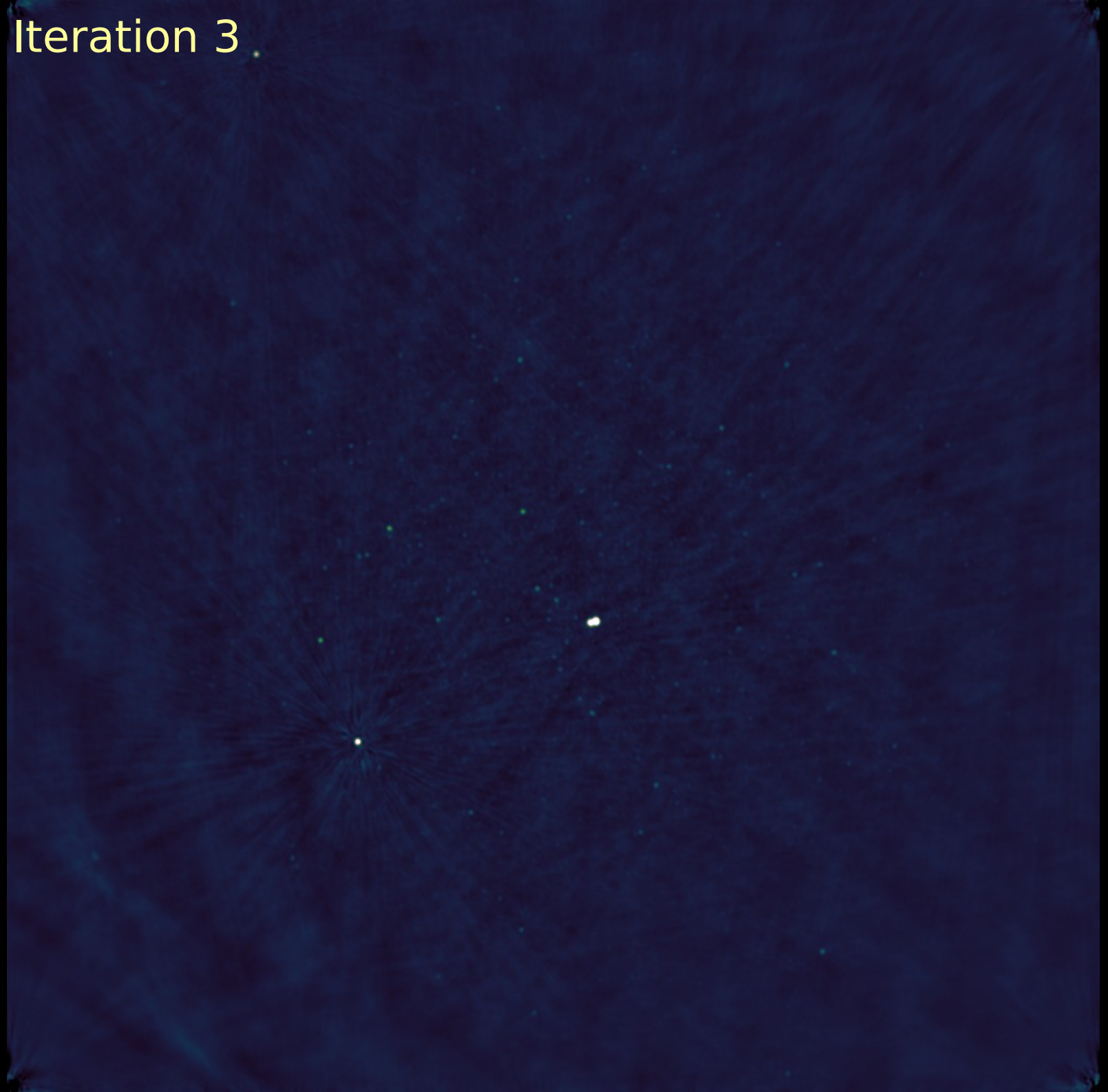

vv (λ)
uu (λ)
−200
−150
−100
−50
0
50
100
150
200


10 Minute Snapshot (full 100 MHz bandwidth)
Raw Correlations
Delay Correction
Stable Gain Correction
RFI Filtering
Frequency Decimation 10:1
CLEAN Image
Derive Sky Model
SelfCal
Self-Calibration Cycle
Sky Maps
HEALpix Gridding
Primary Beam Inversion
Polarization D-Projection

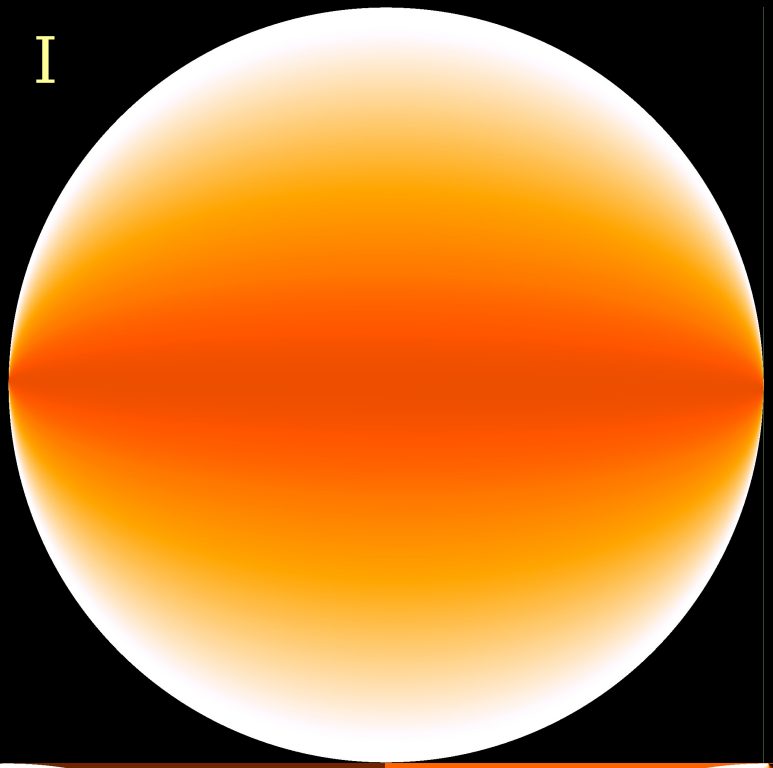

Iteration 0

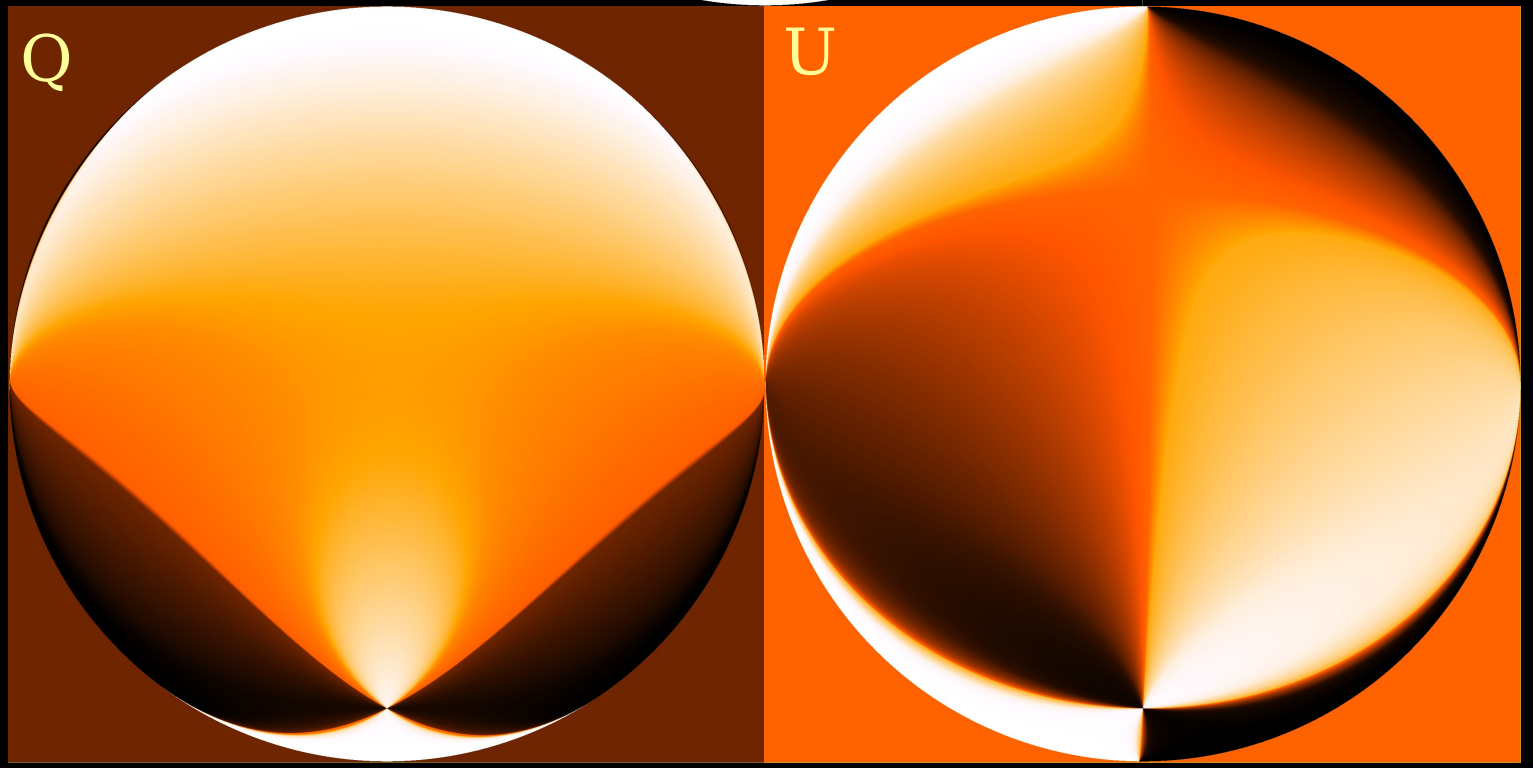

Iteration 1


Iteration 2

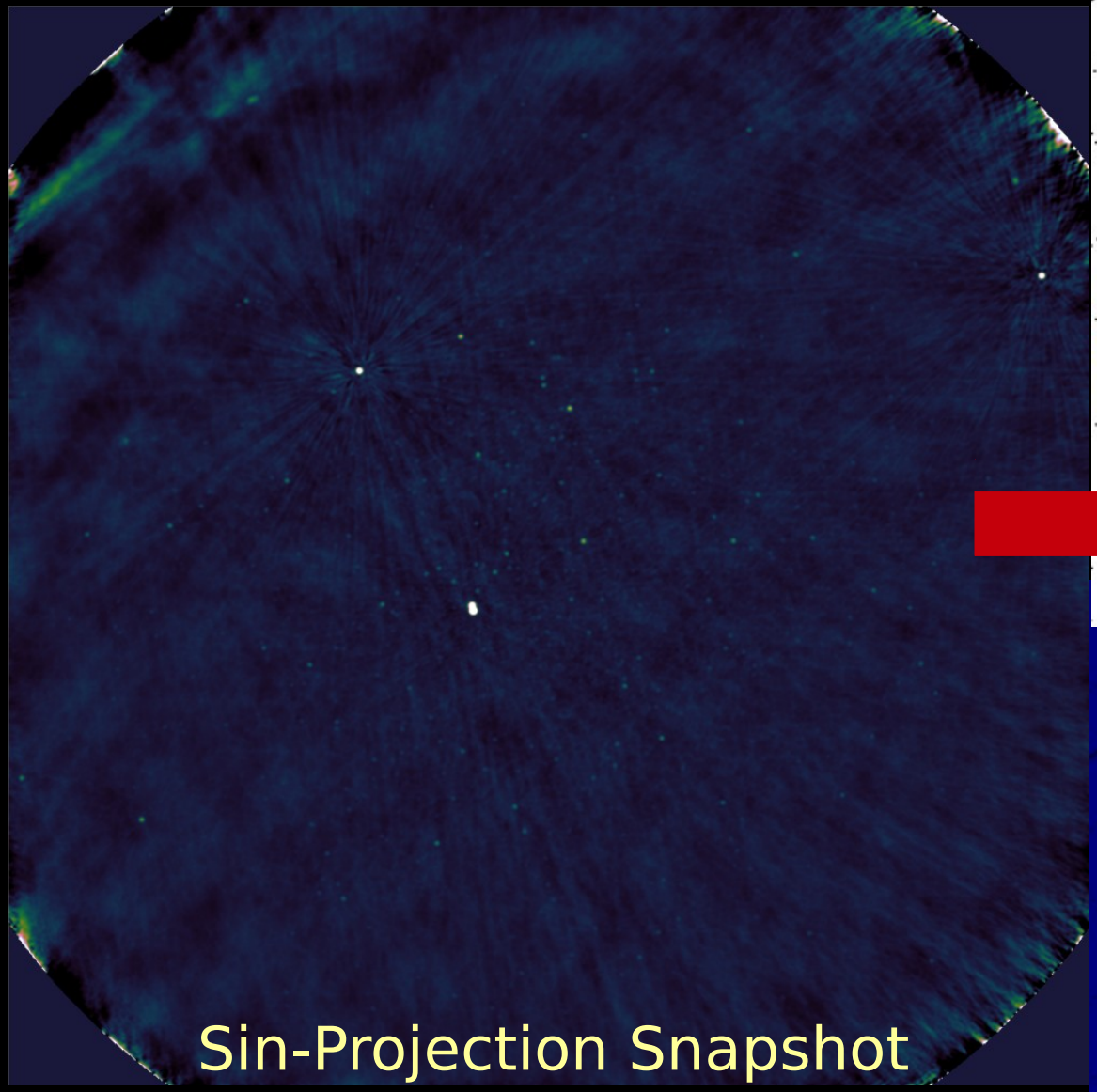

Iteration 3

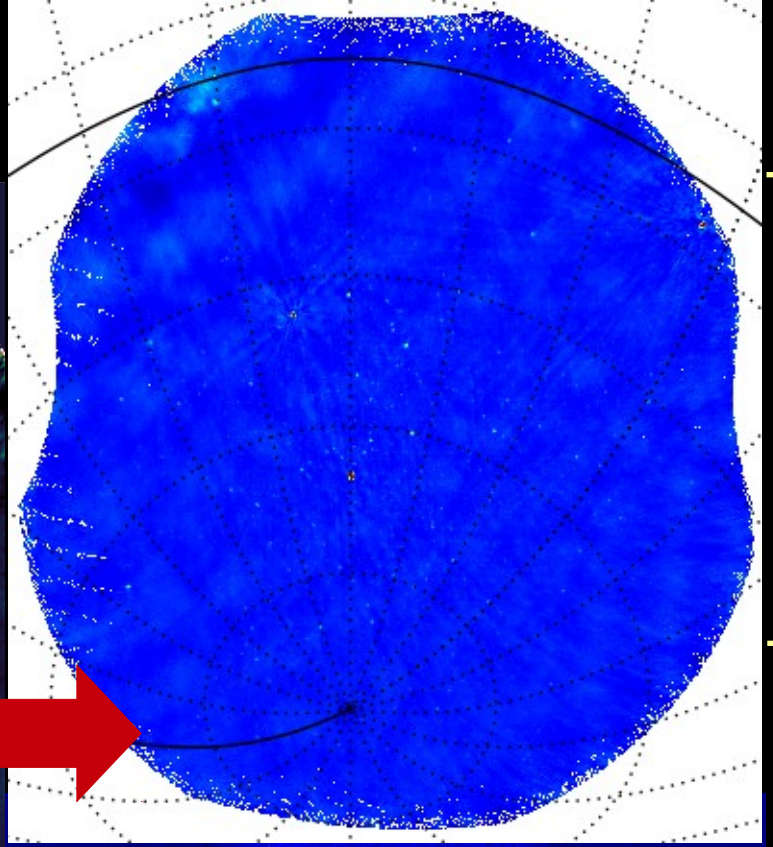
Dipole
Projection
Effects

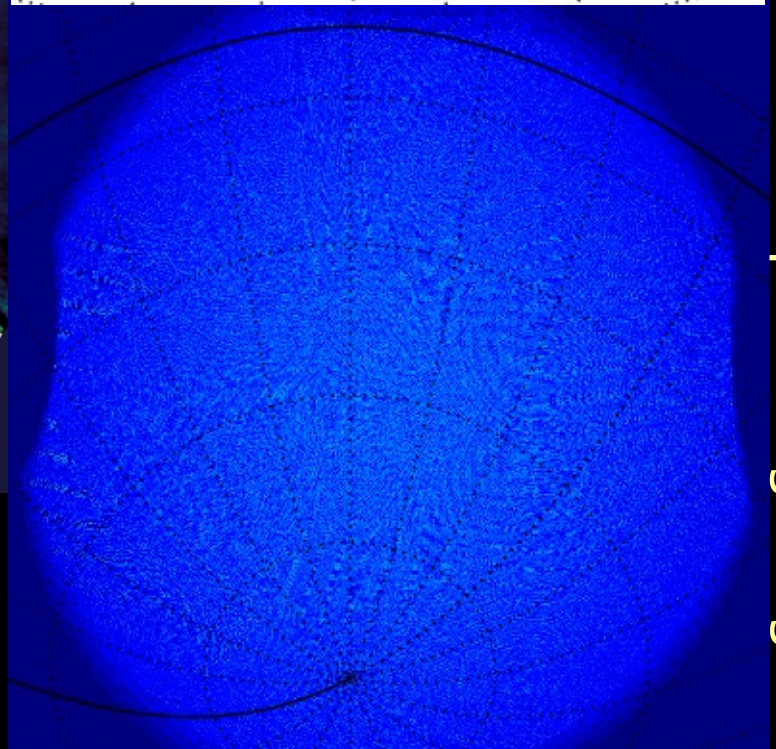


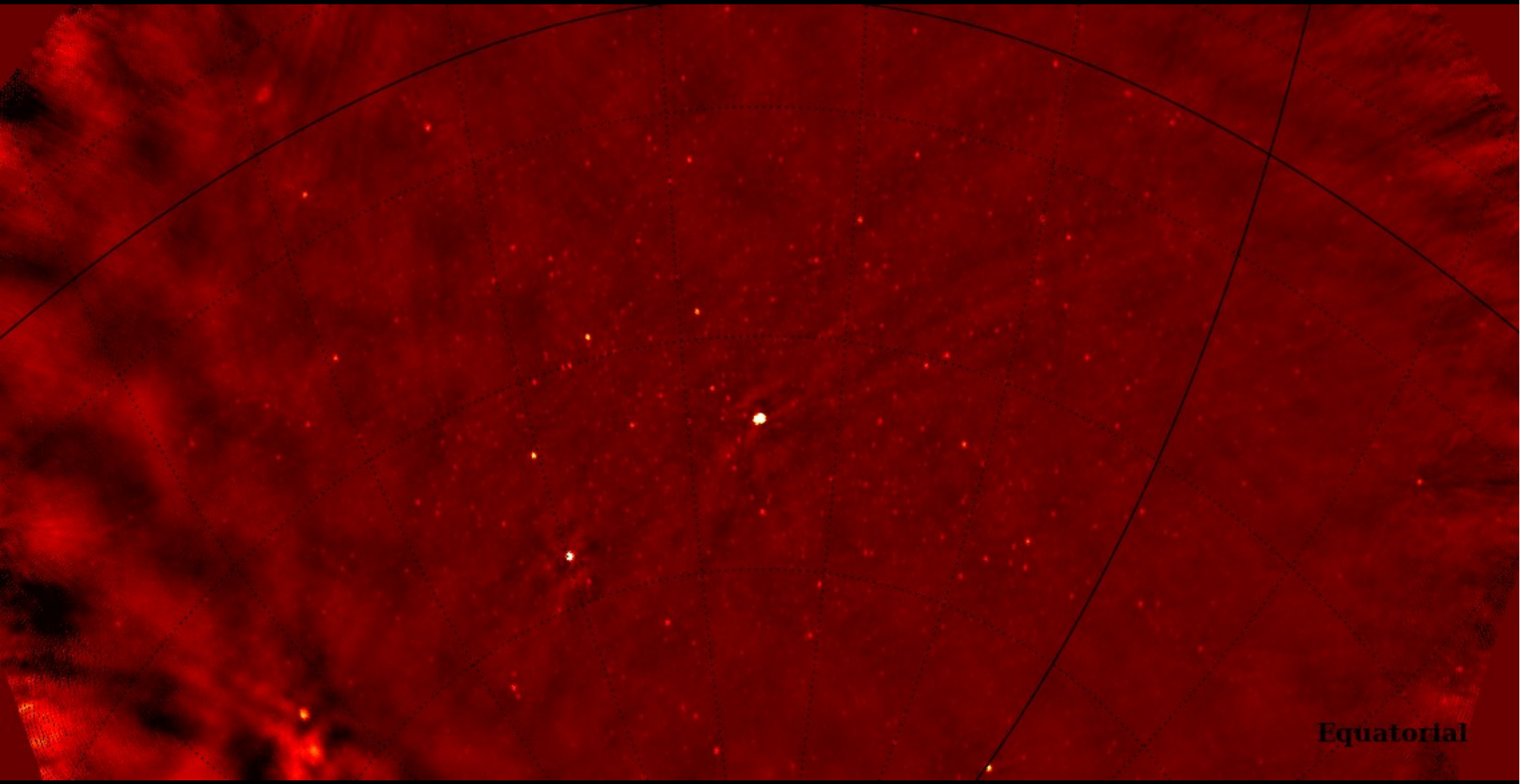


HEALpix Re-Gridding

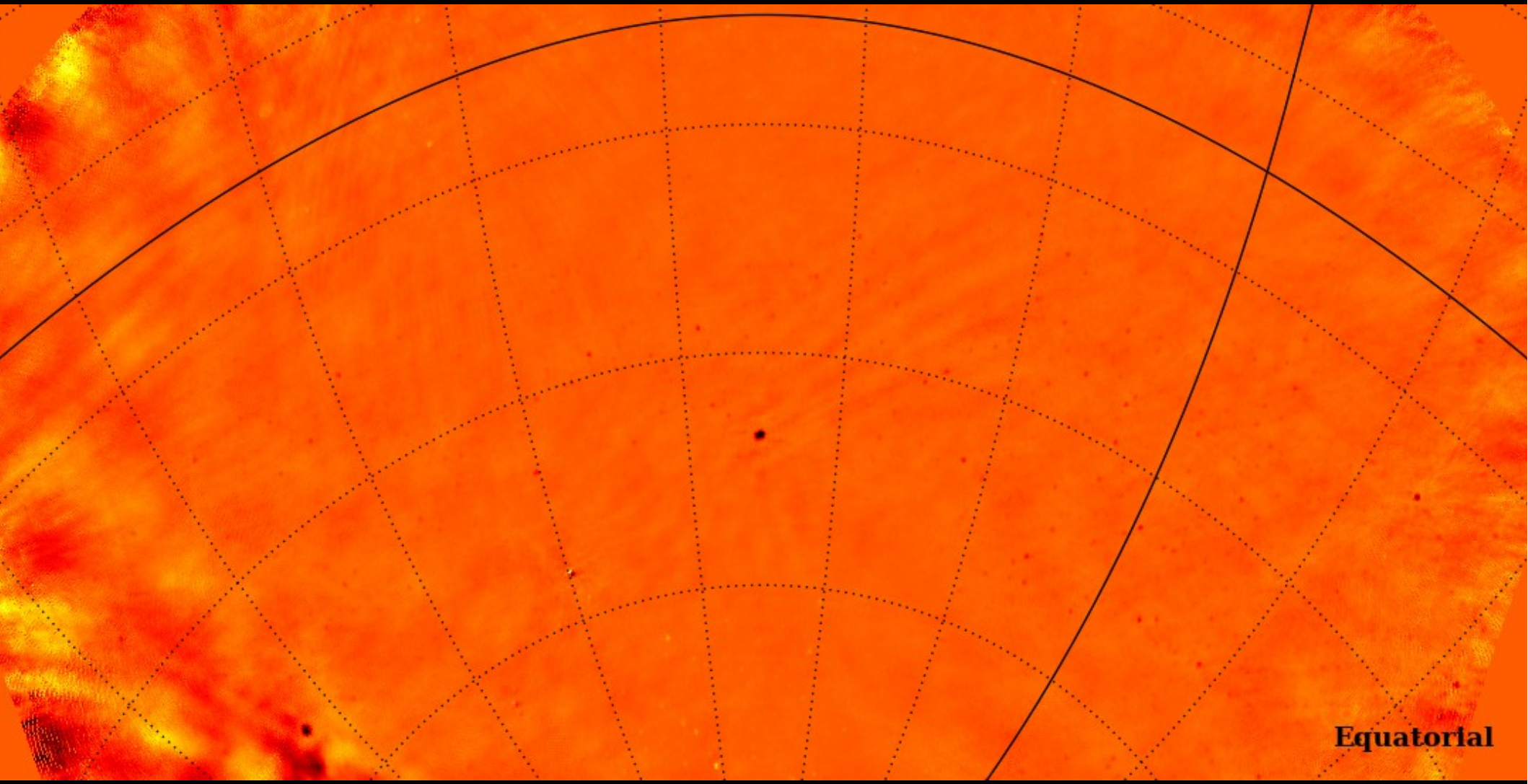




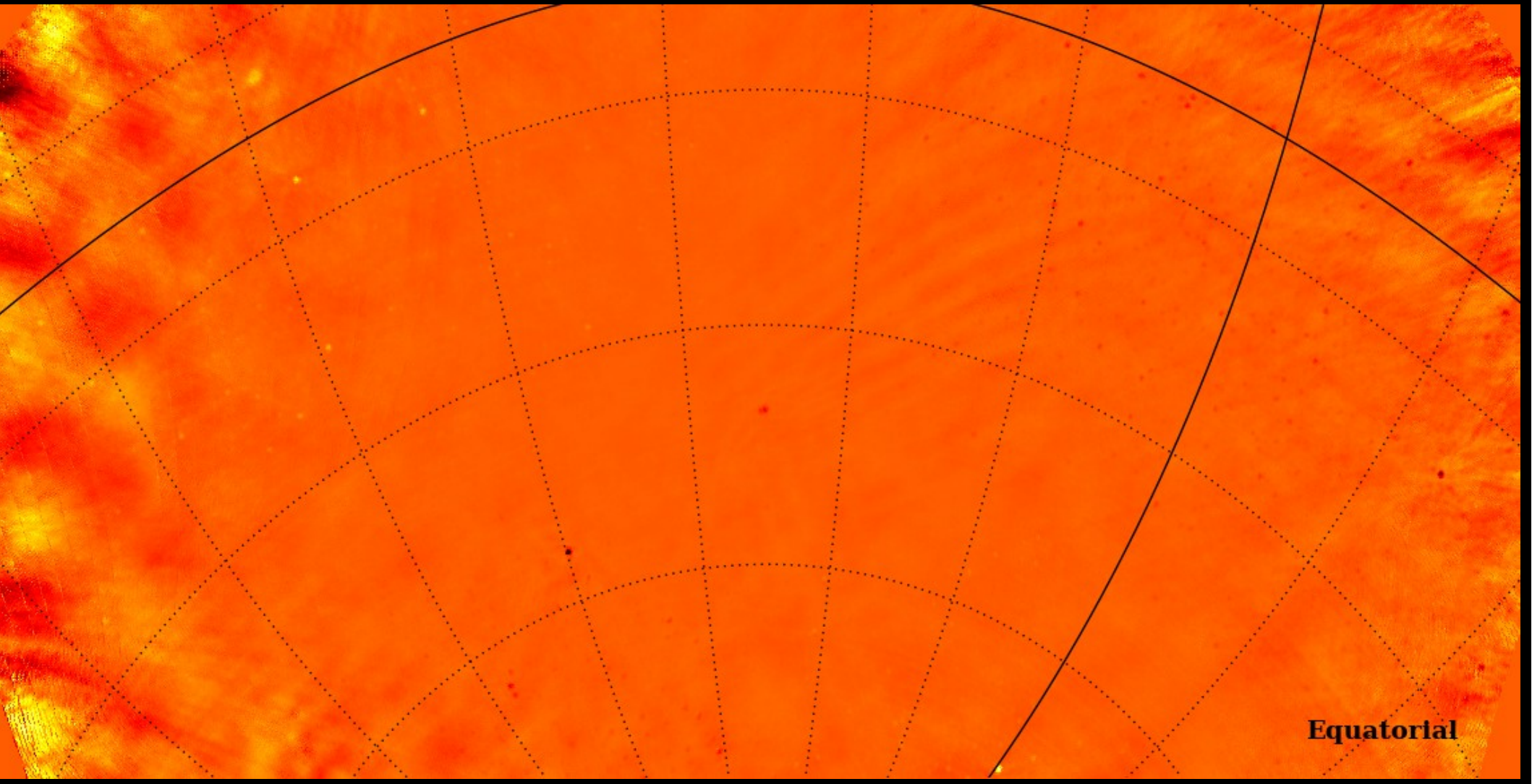




Stokes I

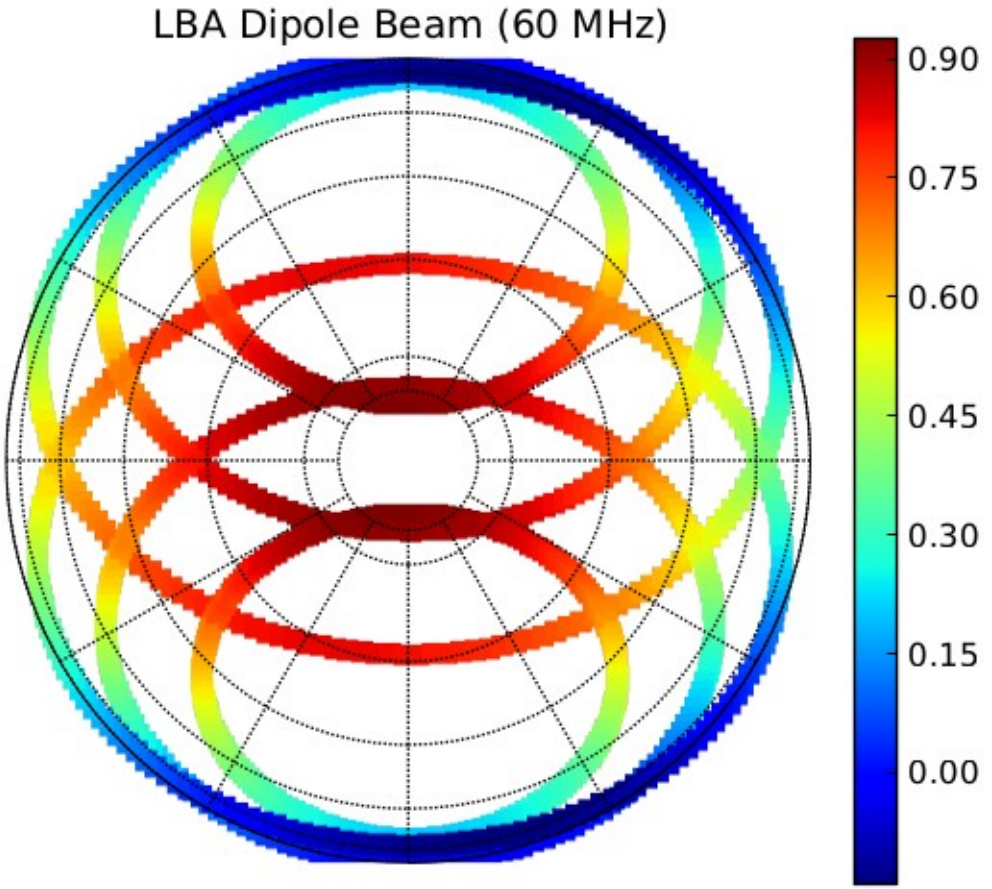


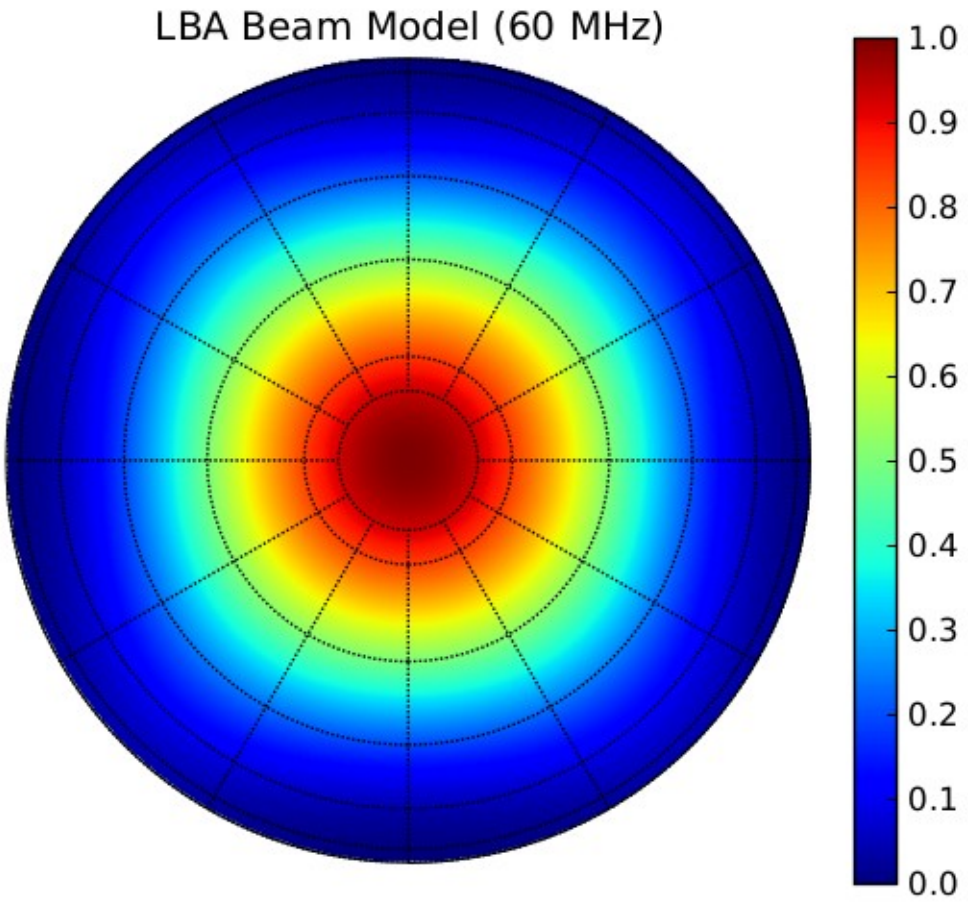
Stokes Q



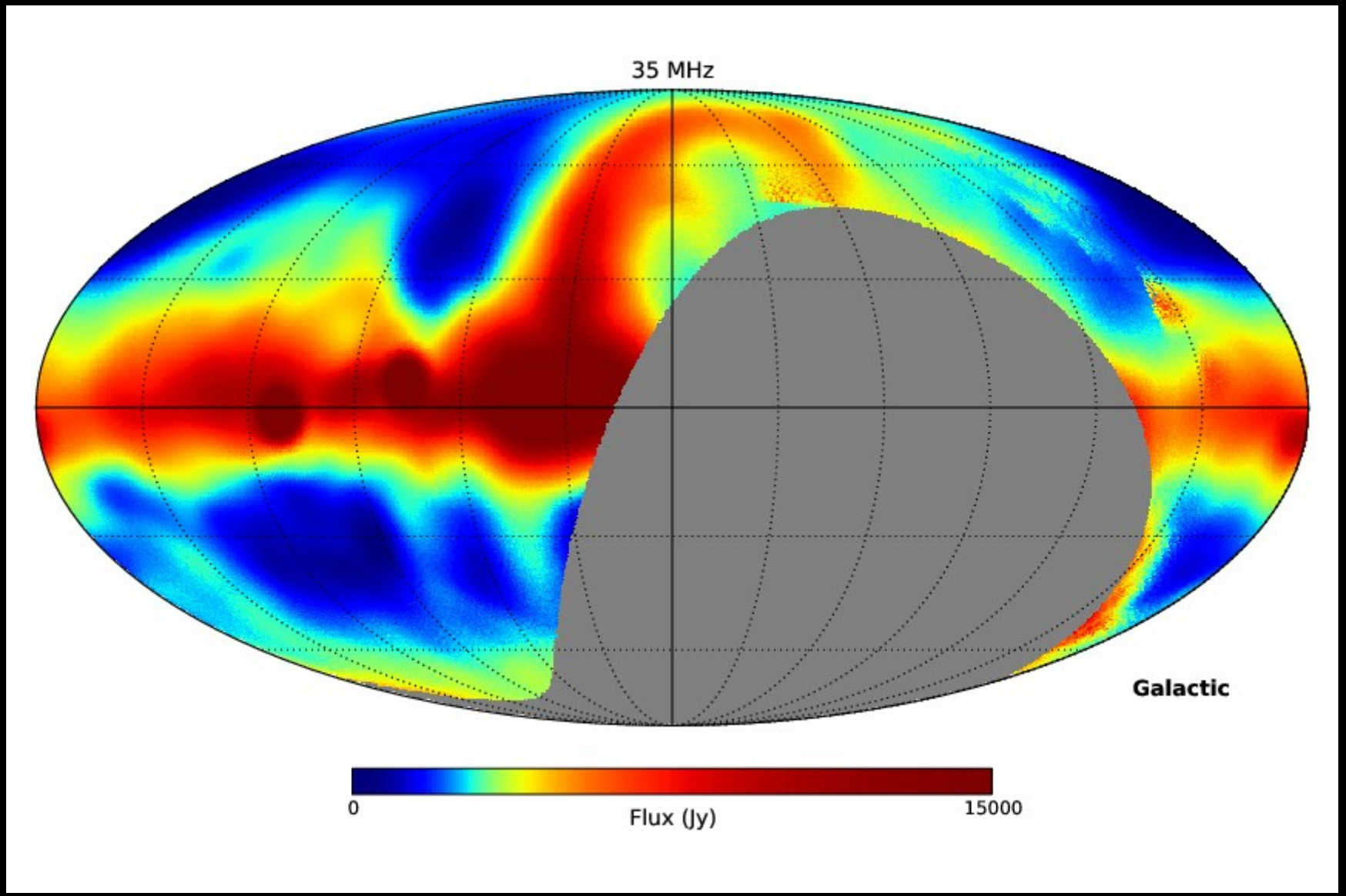
Stokes U

Primary Beam Measurement

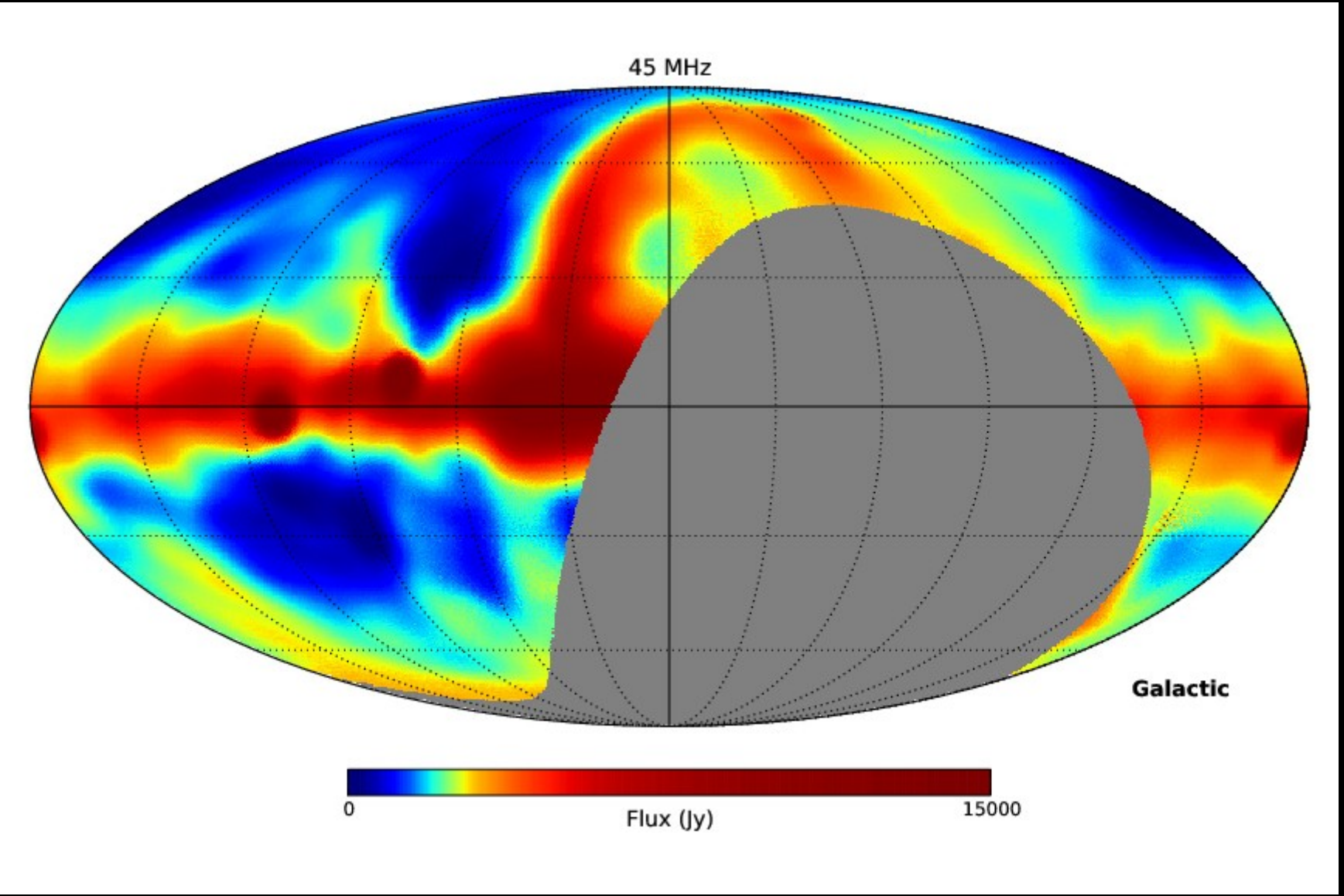




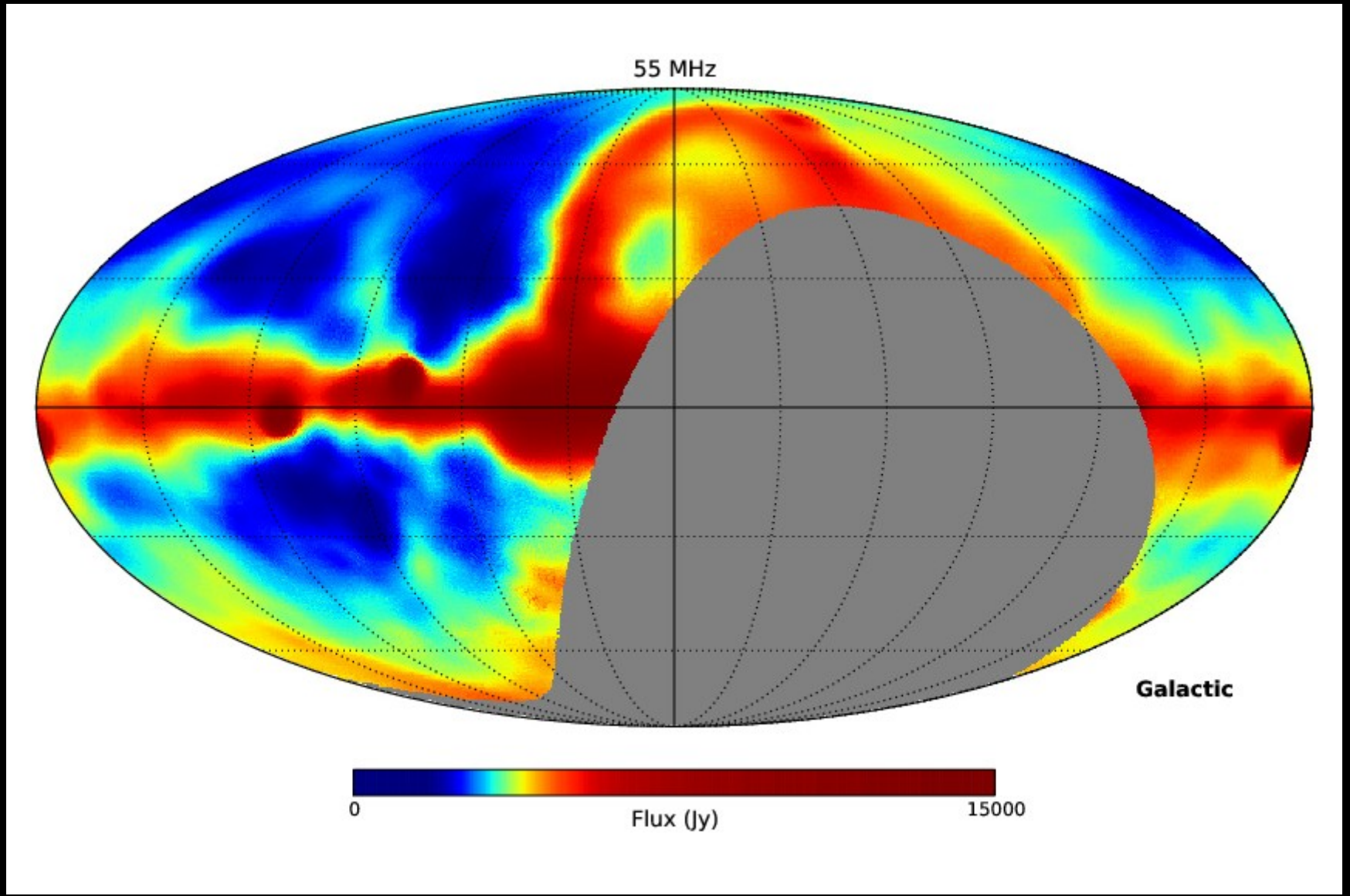
Extended galactic structure



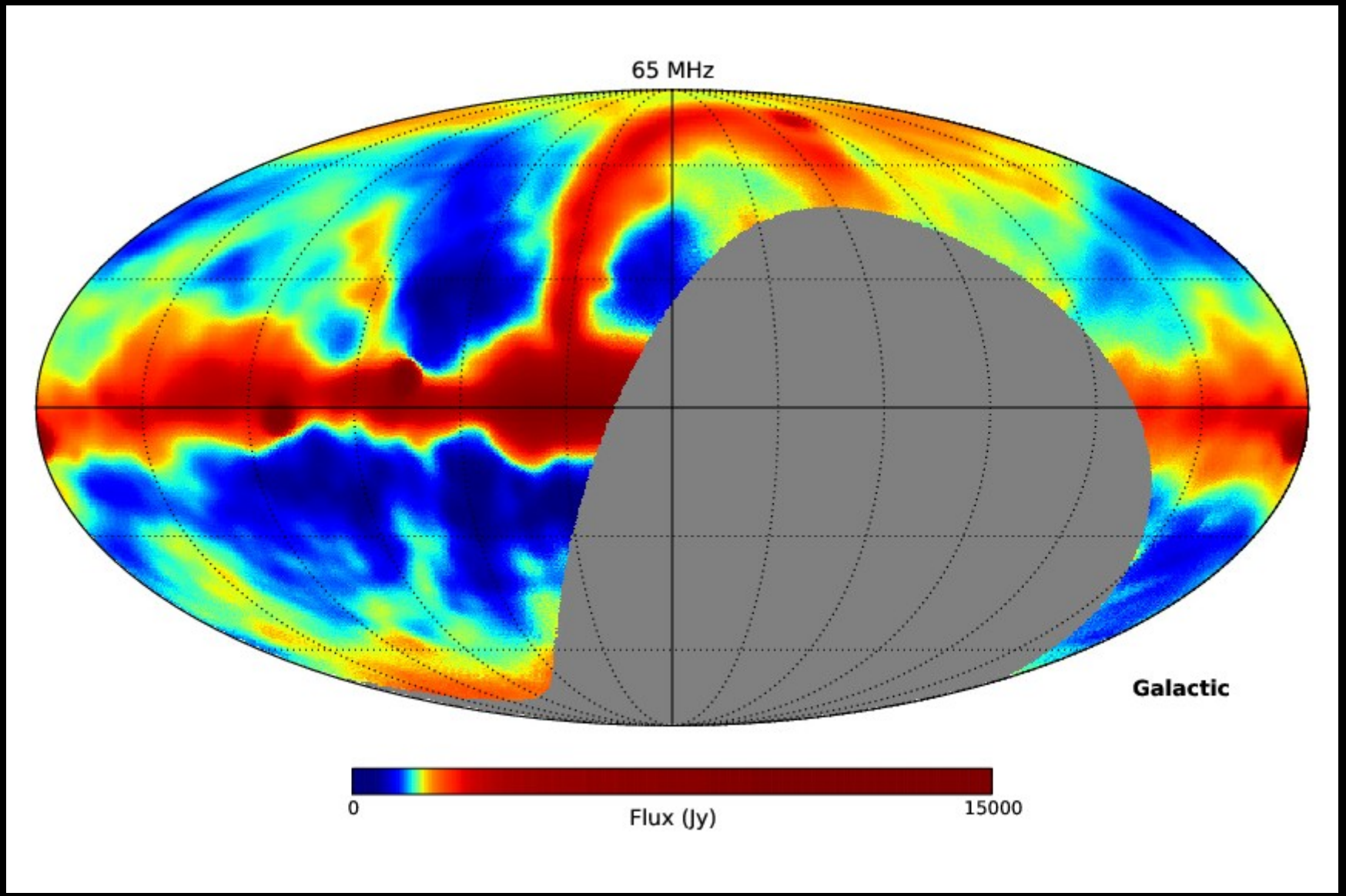
Extended galactic structure



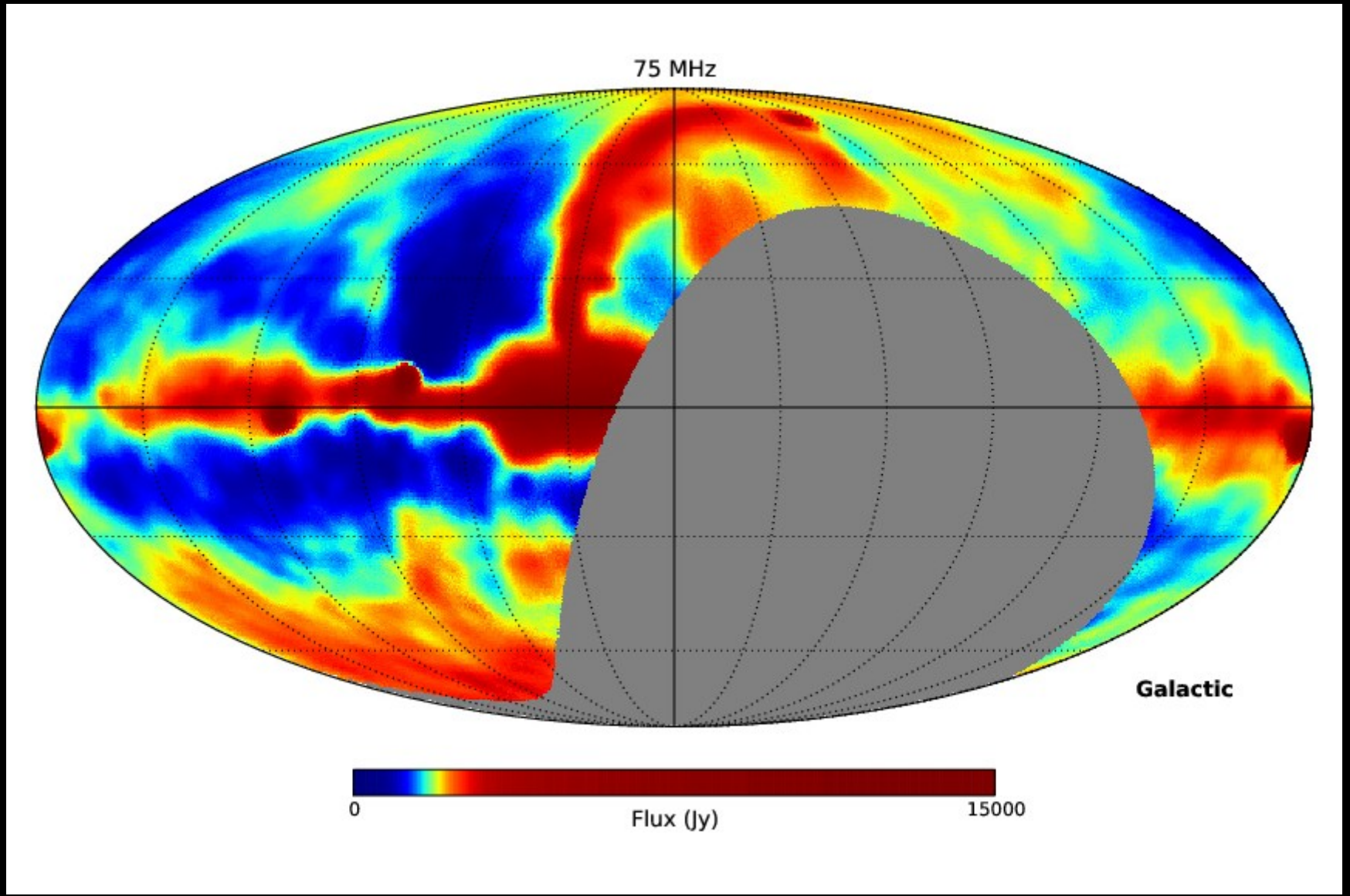
Extended galactic structure



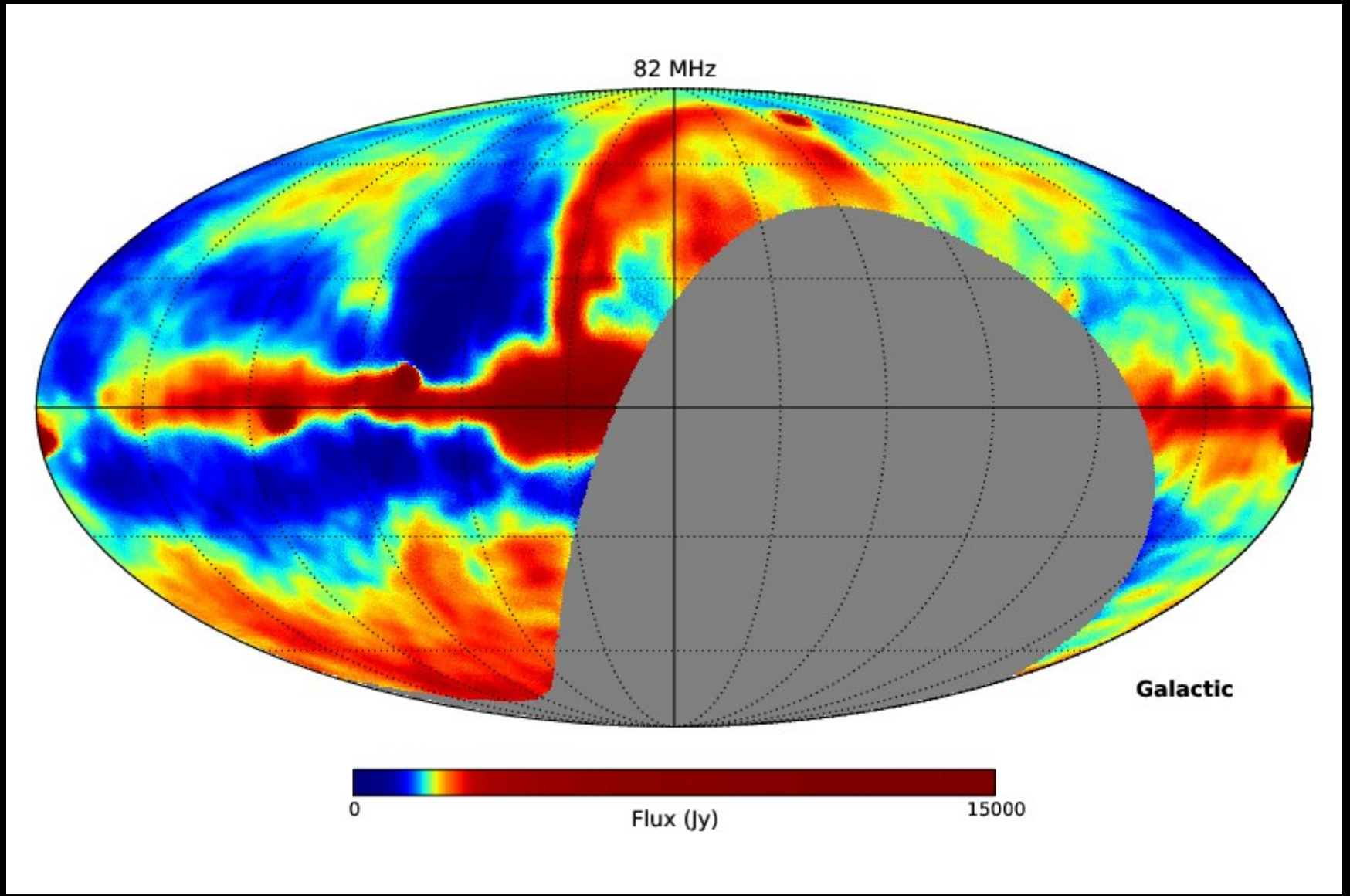
Extended galactic structure



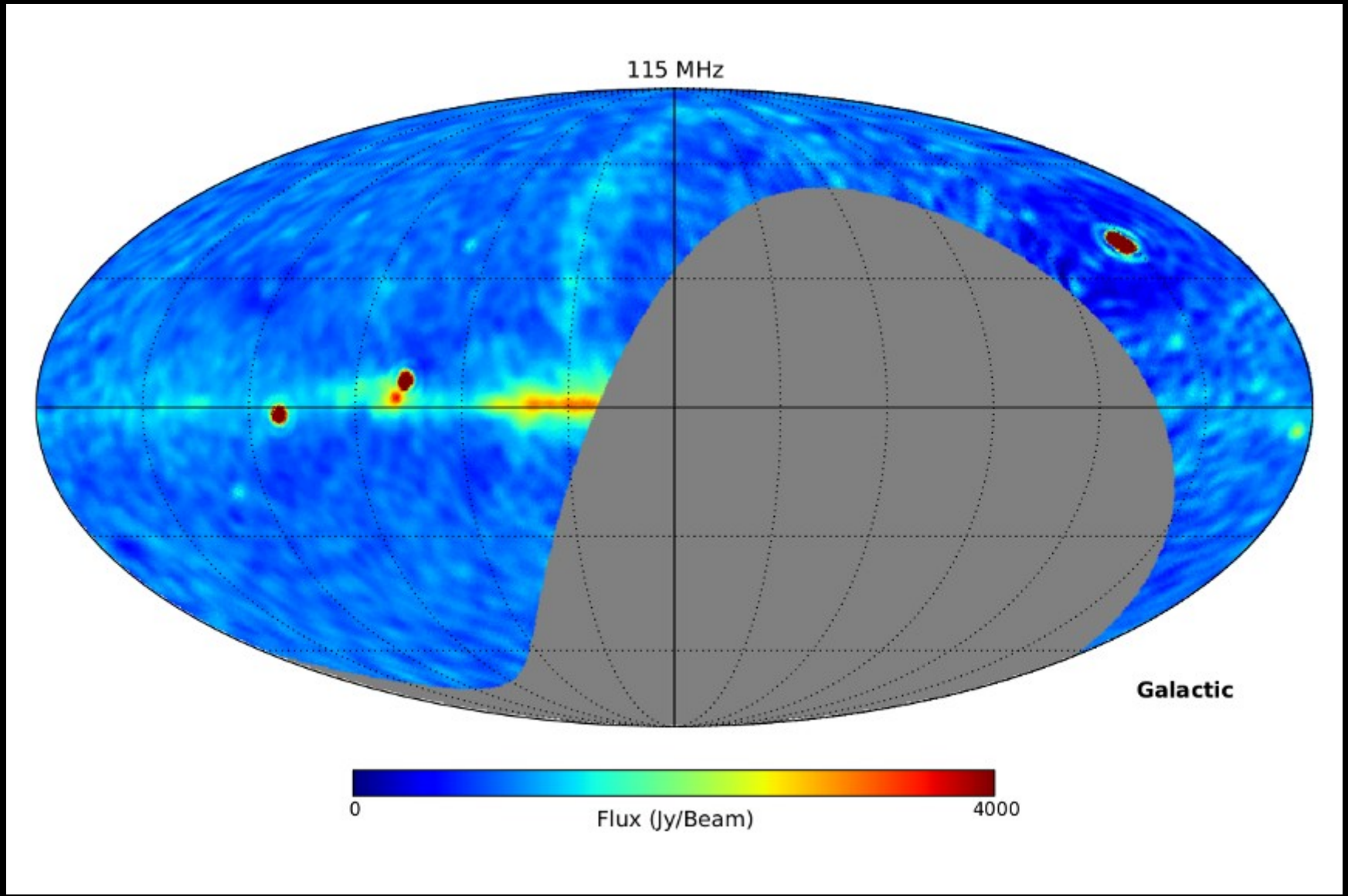
Extended galactic structure



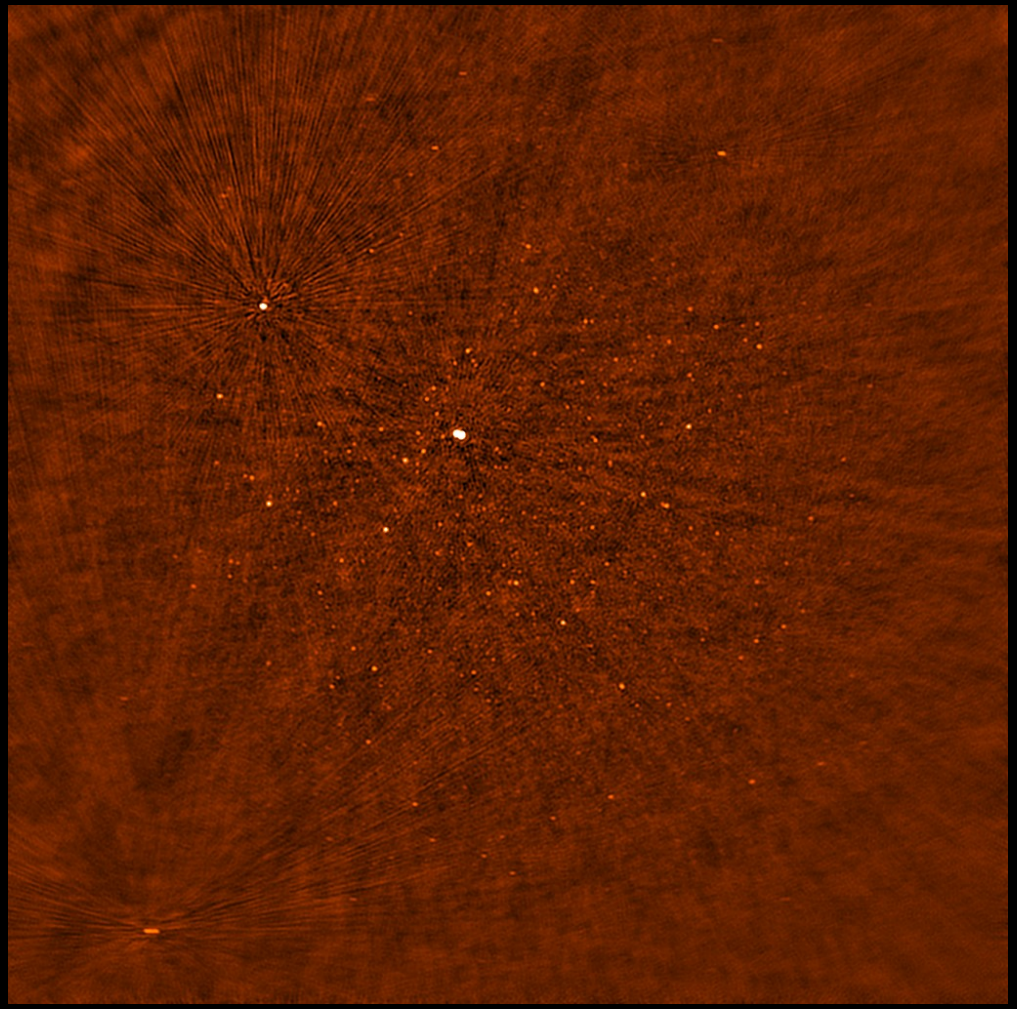
Extended galactic structure

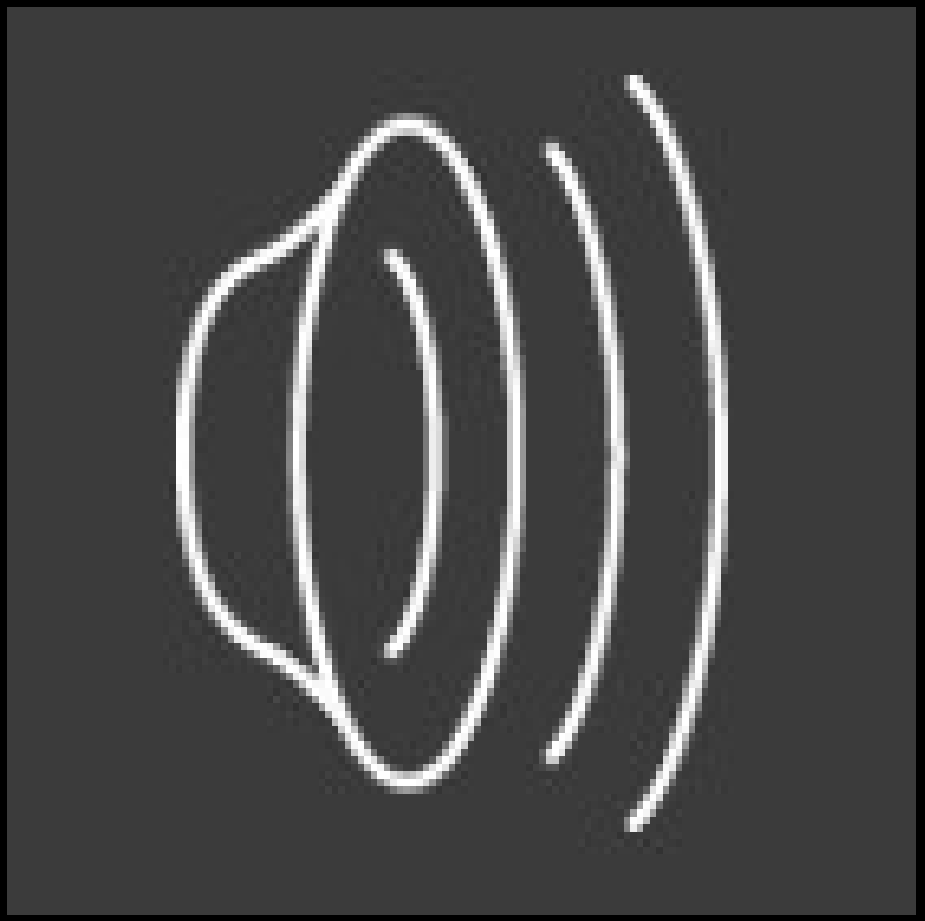


Extended galactic structure



Breaking up into Subbands





Done.