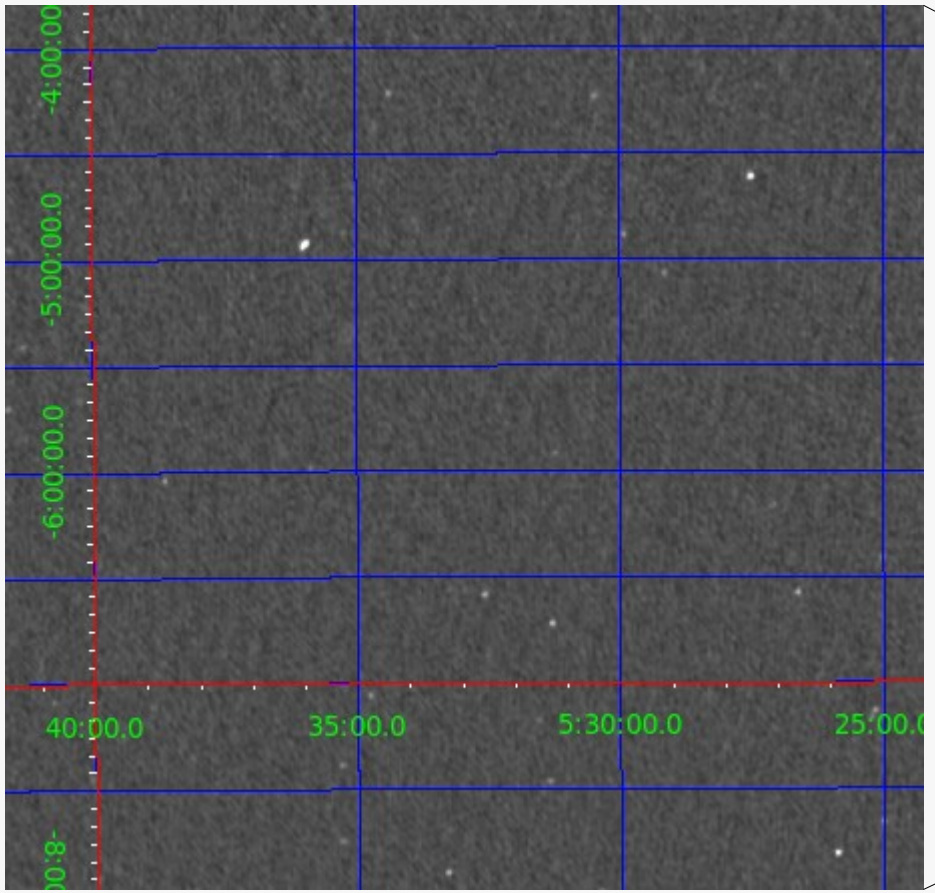
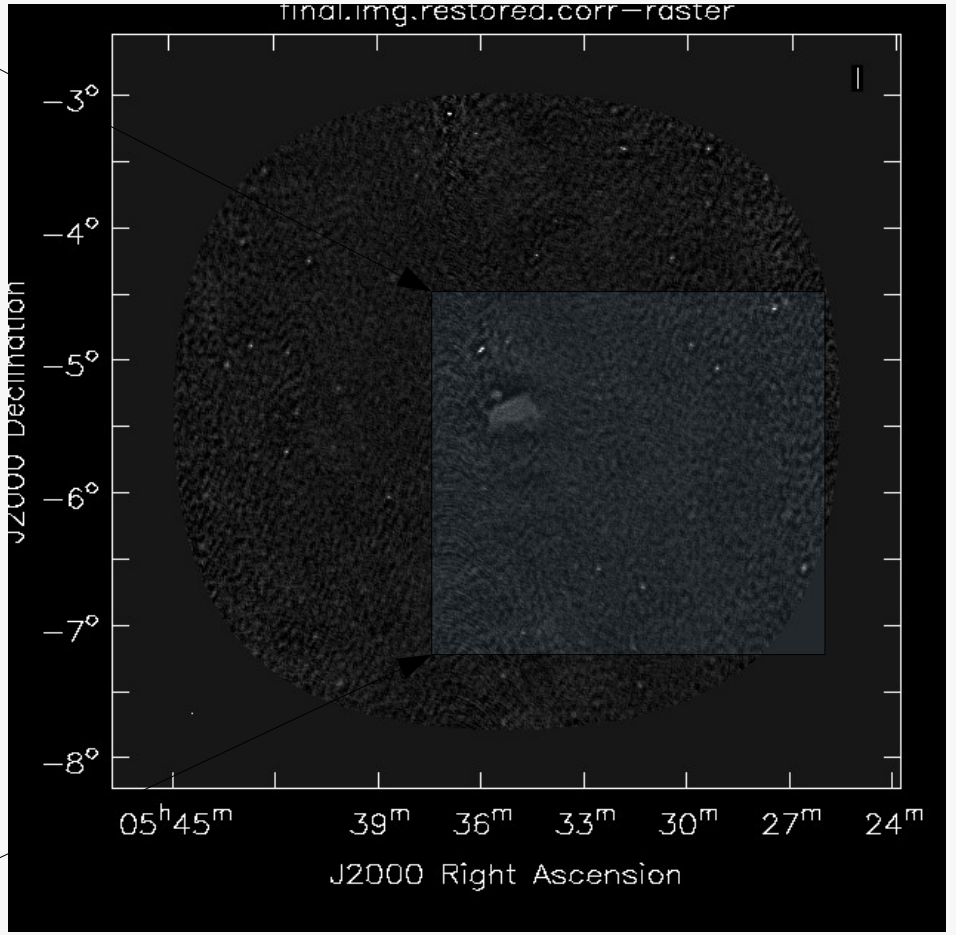
Galactic Science Imaging With Bright Diffuse Emission

- Jon Gregson / Glenn White - Open University/ RAL

- Supernova Remnants
- Galactic Plane /Centre
- HII / Star Forming Regions
- Galactic Scale Foregrounds

Calibration With GSM Based SkyModel

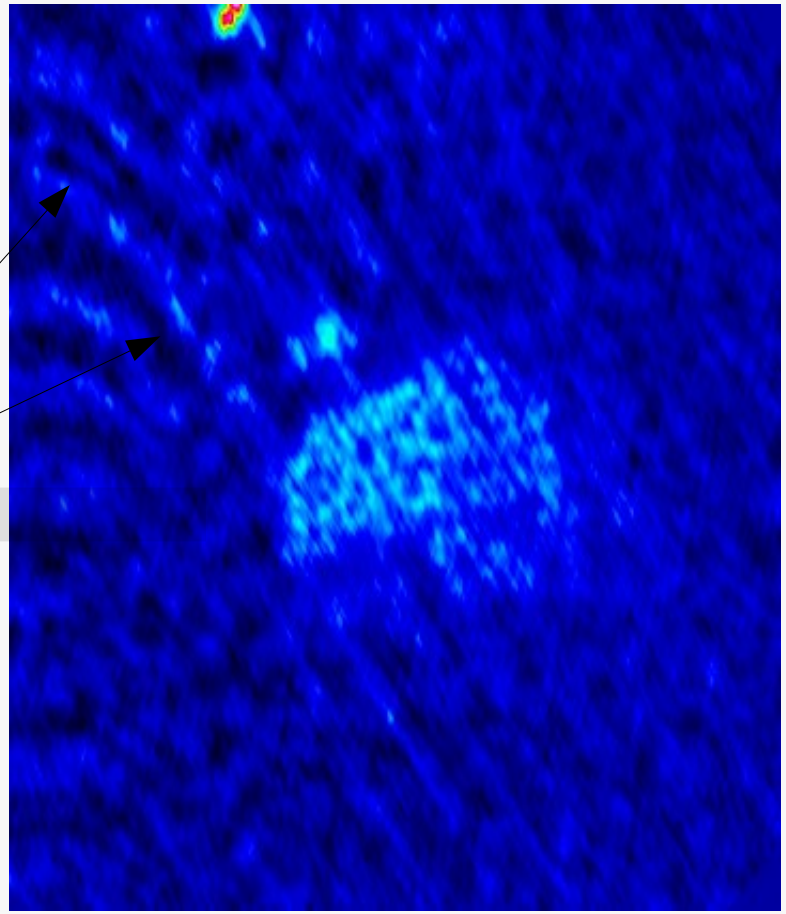




Rationale

- Purpose of GSM, MSSS or any other skymodel is to initiate a viable self cal loop!
- LOFAR has no physical optics, so if GSM initiated loops aren't viable, we can't do any science!!

Problems With Beams



Beam Ghosts

1 degree

Self Calibration Issues

What happens?

- No believable images produced/Beam Ghosts get higher in intensity.
- Self-cal stops working after 1 or 2 iterations. GSM model found to be cause

Why?

- Prior surveys suppress large scale diffuse.
- Missing Emission causes beam ghosts!

Reduction Methodology

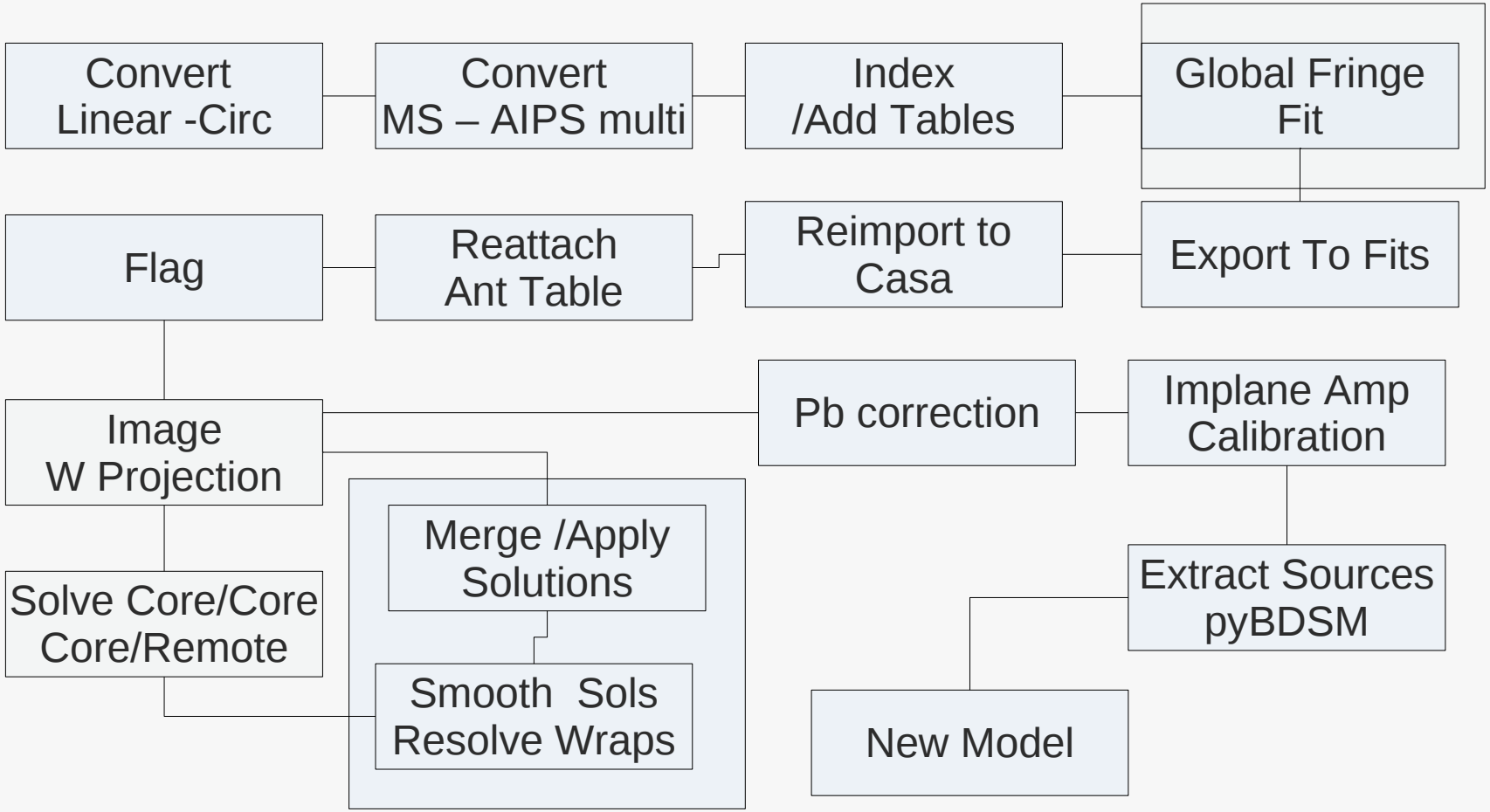
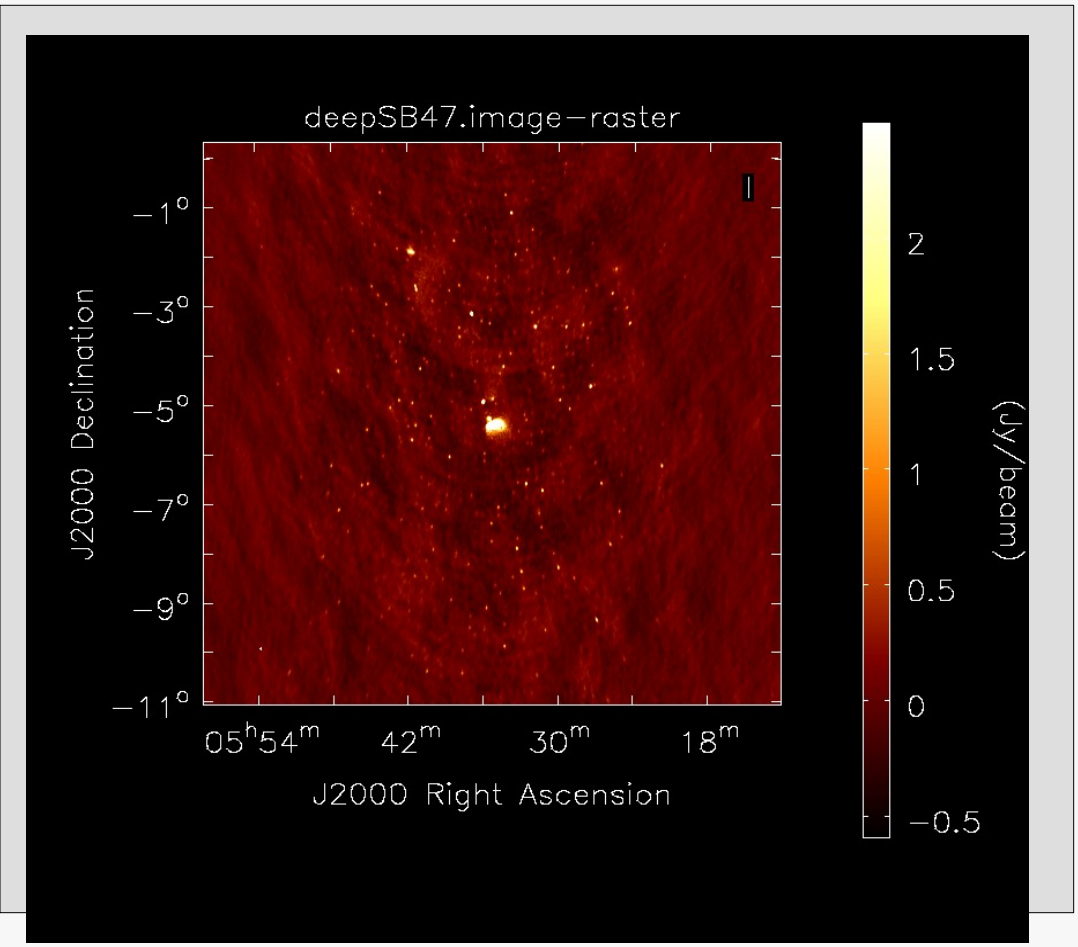
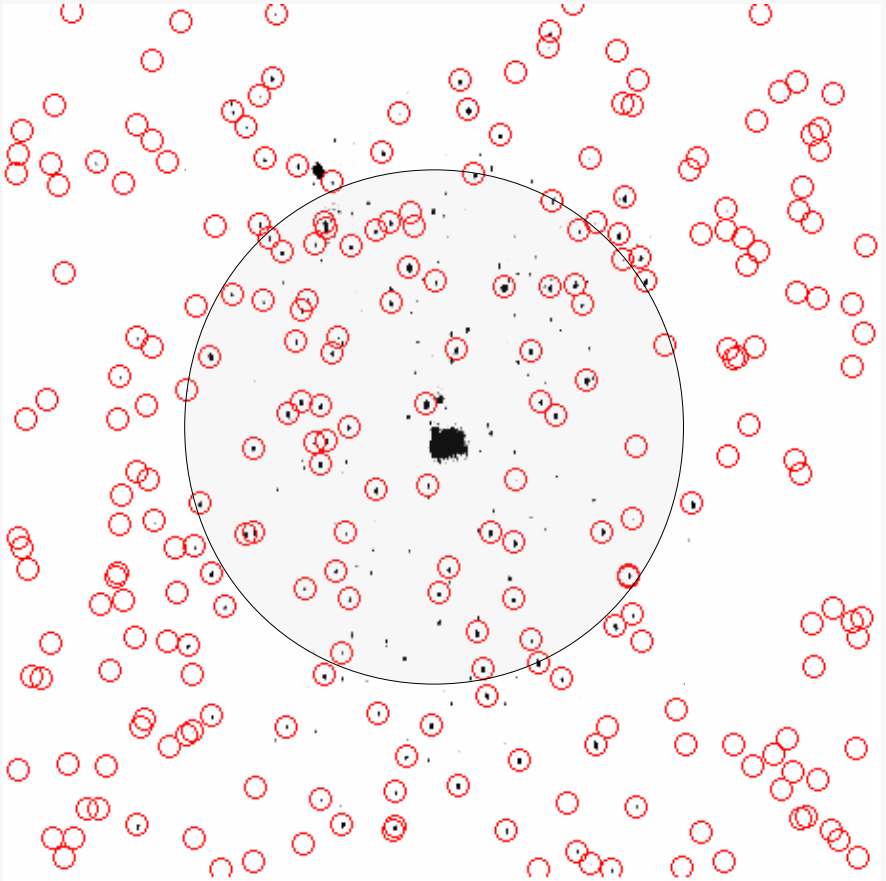
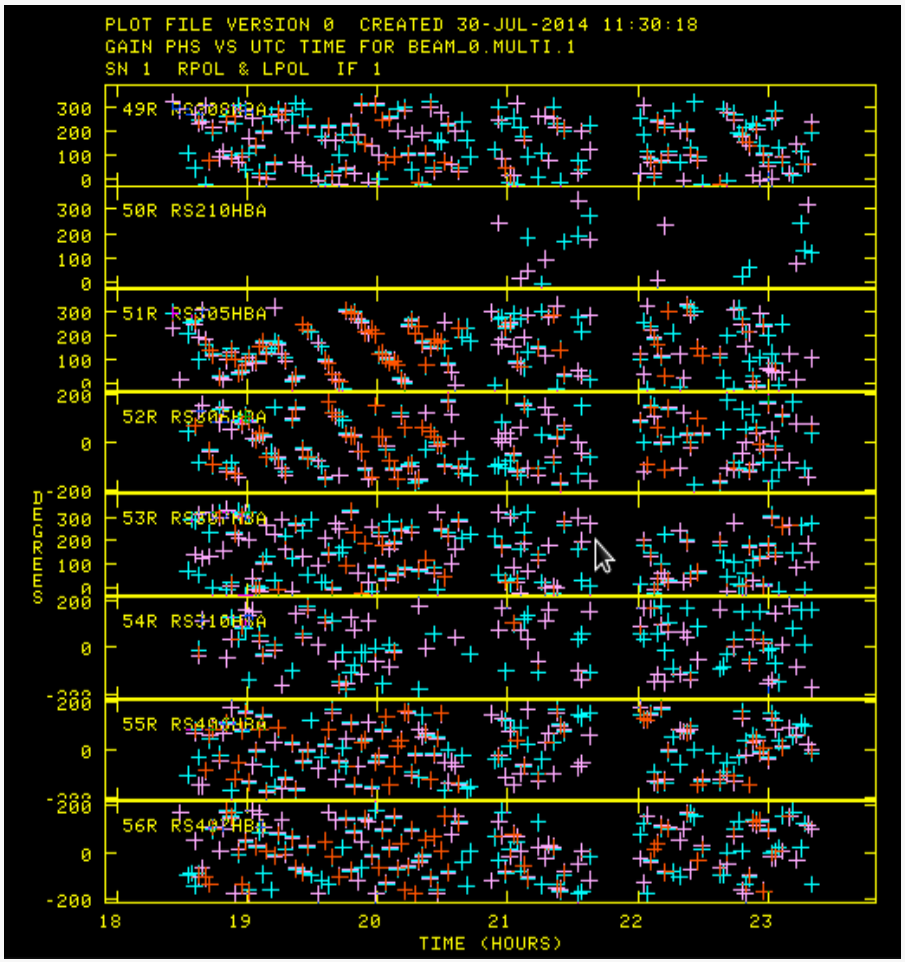


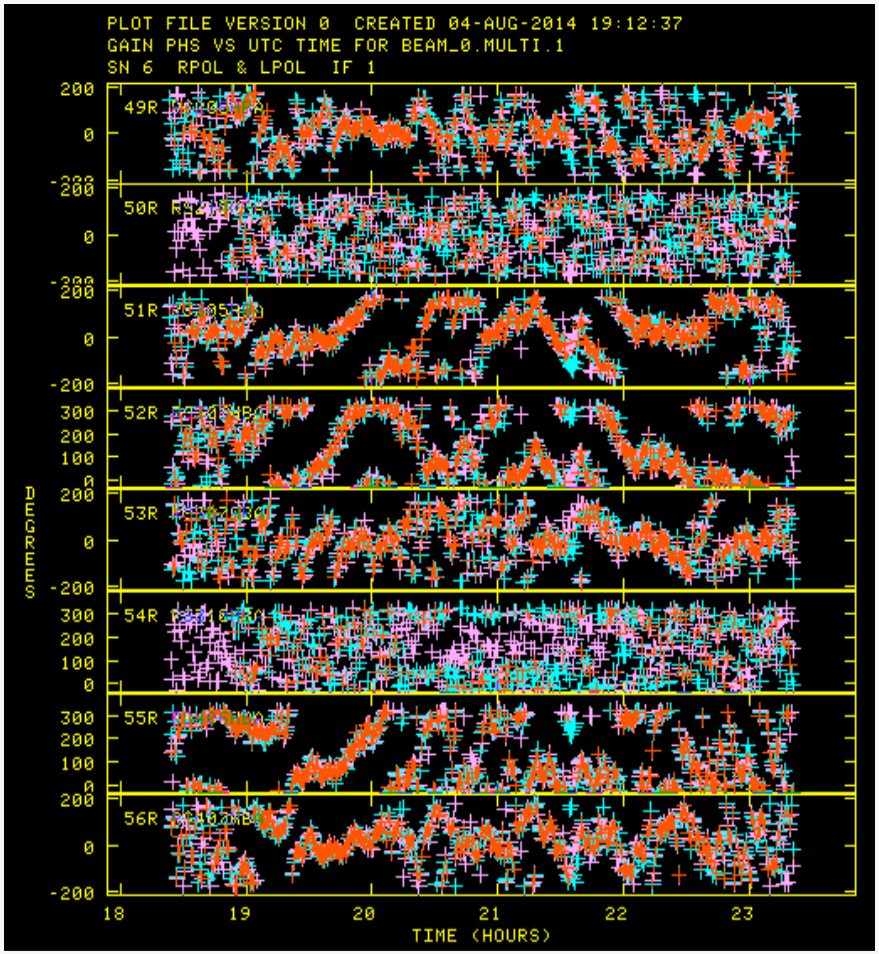
Image and Comparison with VLSSr



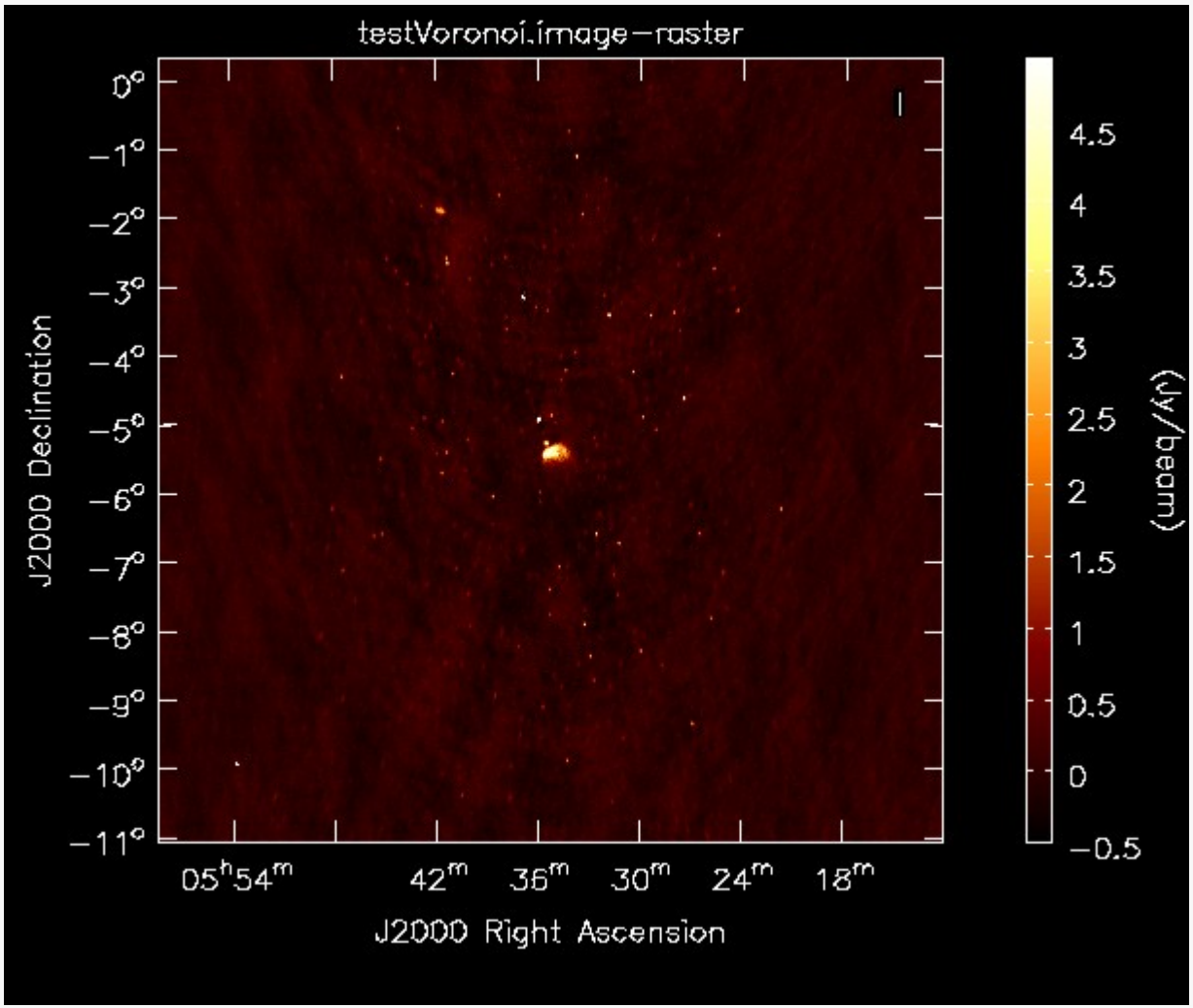


Phase Recovery

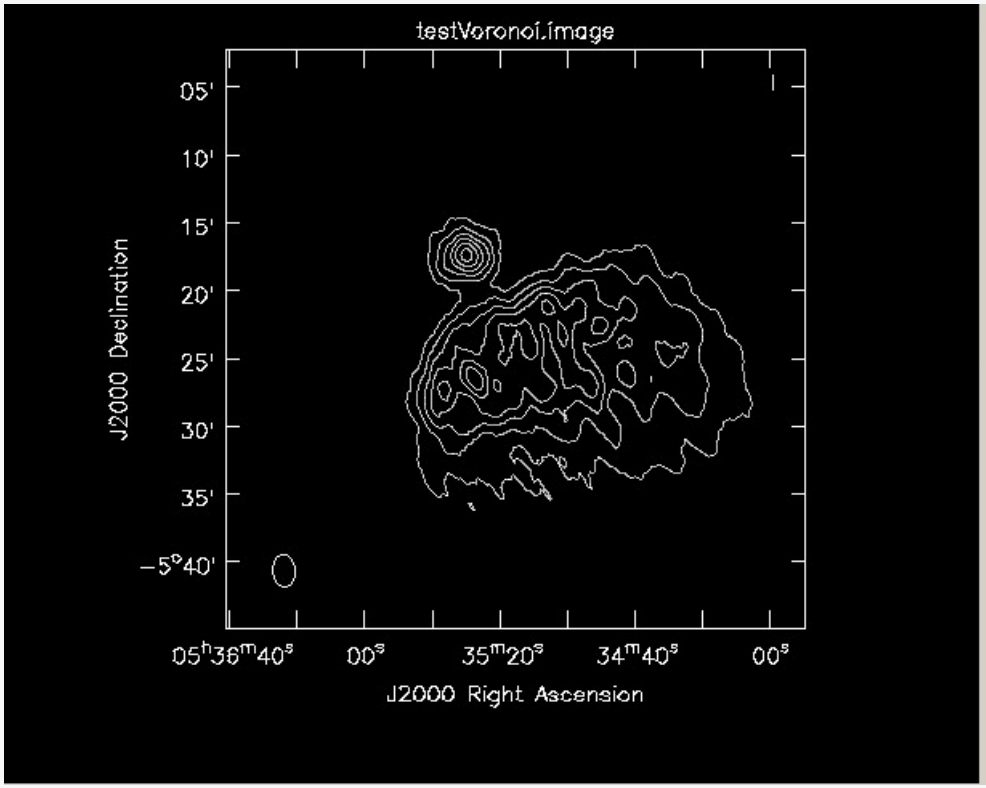


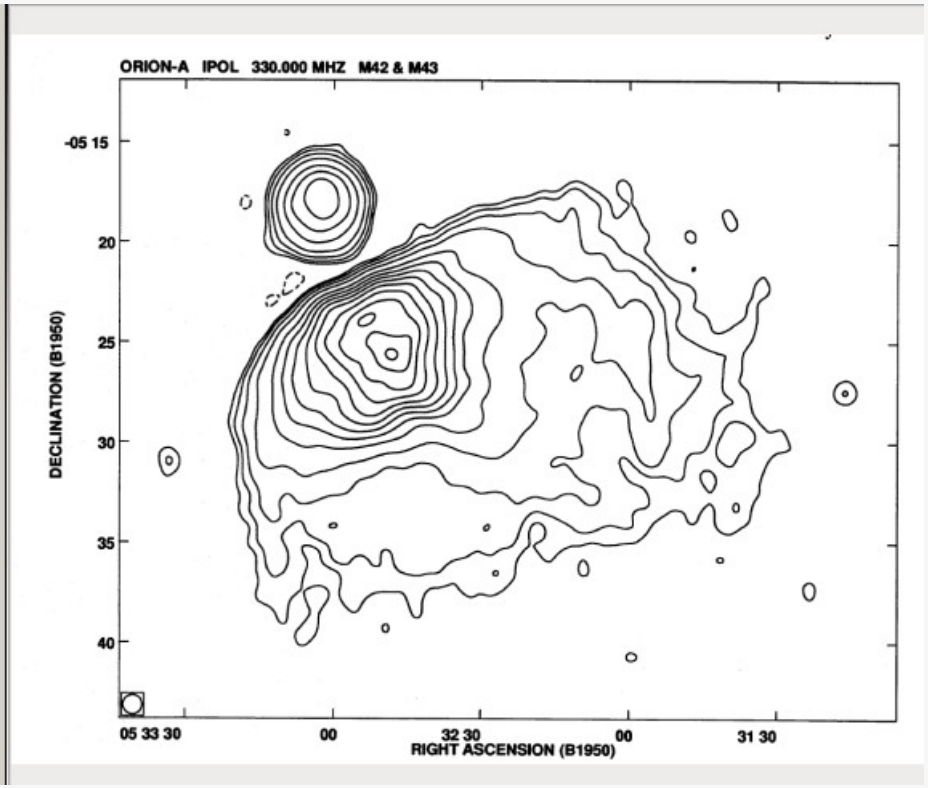


SelfCal Image



Diffuse Comparison





Summary

- Bright Diffuse Emssion – serious problem to initializing viable self-cal from GSM.
- Solution available to create viable skymodel:-

  Phase Up / Reconstruct / Implane Calibrate -Correct/ Extract
- Very Labour Intensive. End to end processing in LOFAR environ needs Global Fringe Fit in BBS and Unwrapping/ Merge in LOSOTO
- Proof of Concept Orion – same to follow IC443, Cygnus X and W51

Special Thanks to

- George Heald
- Adam Deller
- Olaf Wucknitz
- David Rafferty
- Roberto Pizzo
- Leah Morabito
- Anita Richards /Bob Laing
- And many more...