

Milky Way WG/ IC342 field

Cameron Van Eck
Marijke Haverkorn

MKSP Meeting
9 March 2015

Image: IC342 in the optical
Credit: Stephen Leshin (APOD 18 July 2013)



MKSP Galactic Science Working Group

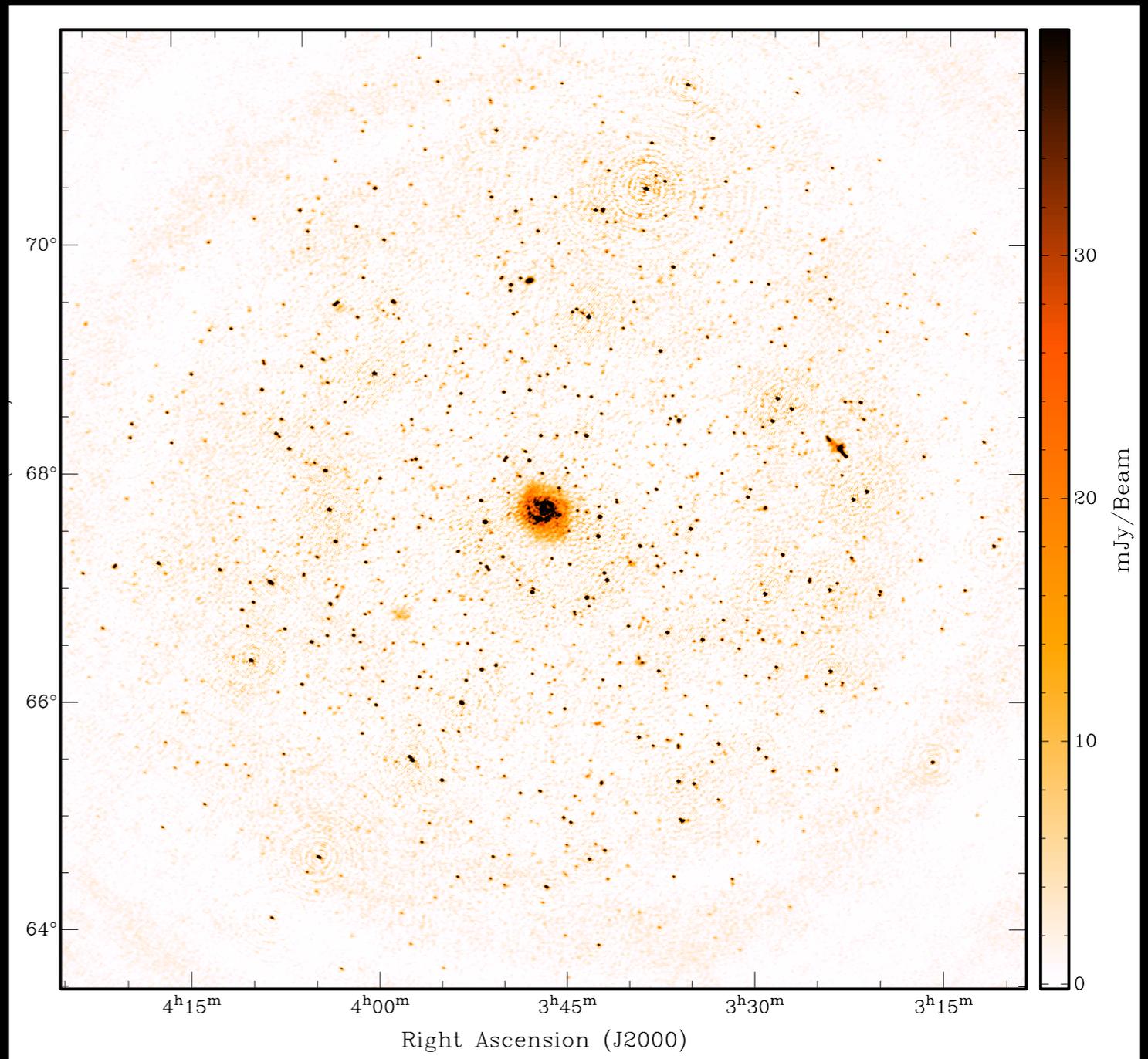
- **Members:** Marijke Haverkorn (chair), Gianni Bernardi, Michiel Brentjens, Ger de Bruyn, Ettore Carretti, Lauranne Fauvet, Katia Ferrière, Andrew Fletcher, Marco Iacobelli, Tess Jaffe, Vibor Jelić, David Jones, Emanuela Orrú, Roberto Pizzo, Wolfgang Reich, Carl Shneider, Dominic Schnitzler, Cameron Van Eck, Wouter Vlemmings
- **Projects:**
 - IC342 foregrounds (Cameron Van Eck, this talk)
 - M51 foregrounds (David Jones/Cameron Van Eck; data from David Mulcahy)
 - Galactic foregrounds in A2255 (Roberto Pizzo, Manu Orru, Marco Iacobelli, Marco 's talk)
 - Reprocessing FAN region data (Marco Iacobelli, Manu Orru, Roberto Pizzo)
 - Modeling M51, NGC 6946 and Milky Way (Carl Shneider, Marijke Haverkorn)
 - MSSS Galactic polarization (David Mulcahy, David Jones, Andreas Horneffer)
- **Collaborations with other KSPs:**
 - Vibor Jelic and Ger de Bruyn (EoR): Galactic polarized foregrounds in EoR deep fields (see Vibor's talk)
 - Tim Shimwell and Huub Röttgering (SKSP): Galactic polarized foregrounds in Tier1 SKSP data

IC342: Data and Science

- Data:
 - 2x 5 hour HBA observations: **Now mostly processed**
 - 2x 5 hour LBA observations: untouched?
- Science:
 - IC342: magnetic field, Far infrared-radio correlation, cosmic ray diffusion (Rainer)
 - **Milky Way: polarized foregrounds (myself)**
 - Transients: search for radio transients (Gosia Pietka, Southampton)

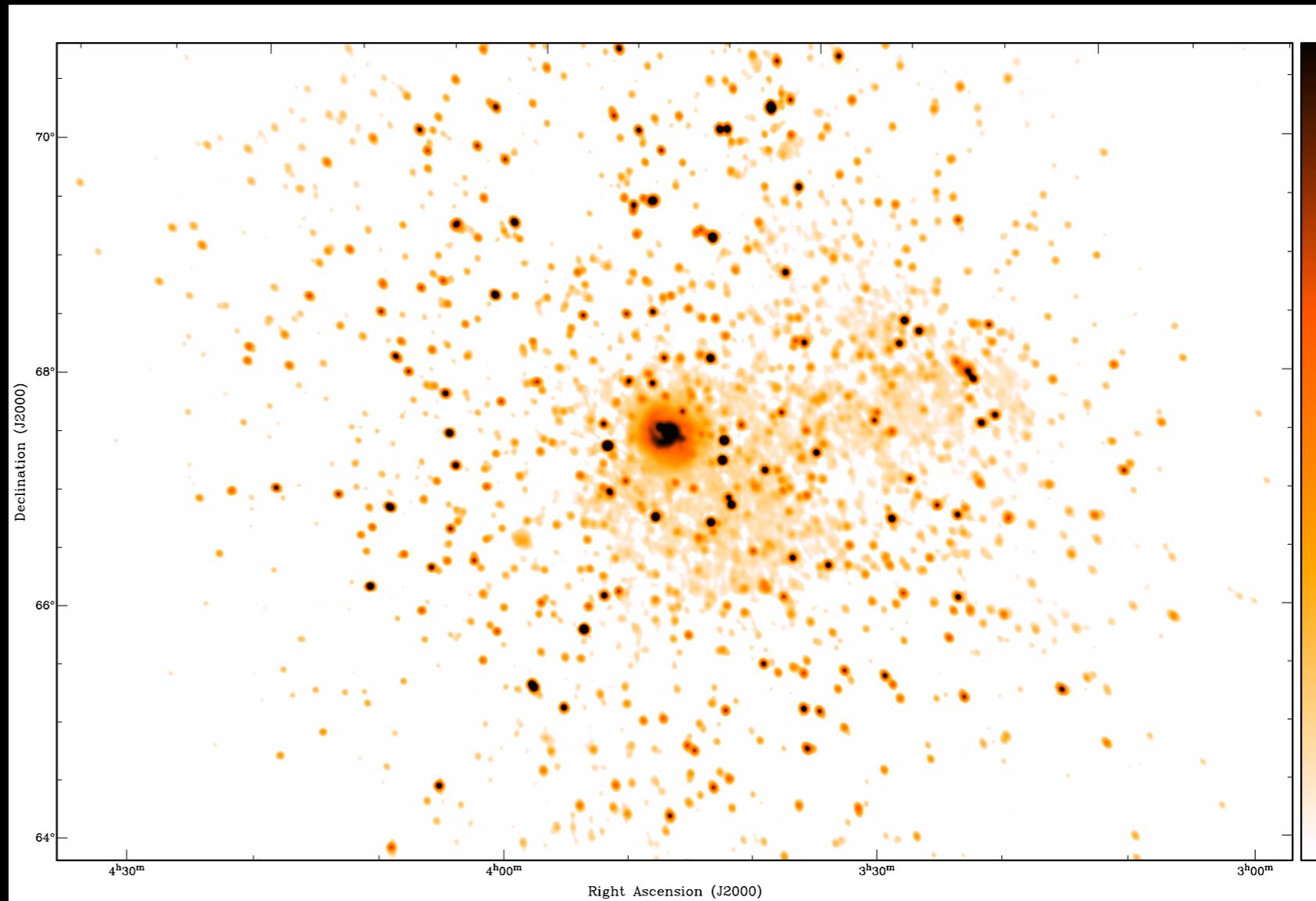
Initial results

- 3.8 hr x 27 SB, after phasecal
- All baselines
- ~ 1 arcminute resolution, natural weighting
- Noise level ~ 2.5 mJy ($\sim 17\times$ thermal)



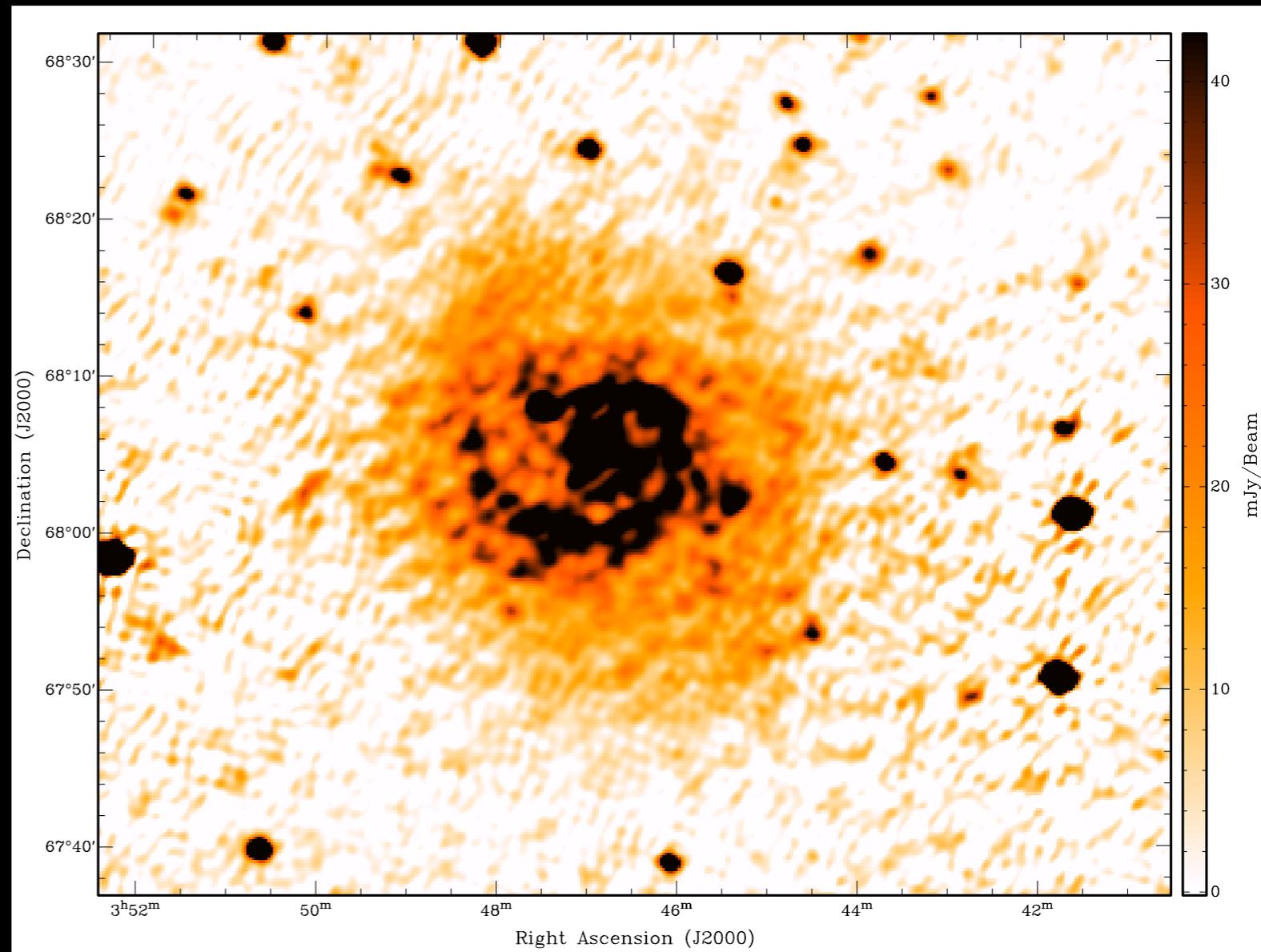
Current results

- 3.8 hr x 27 SB, after phasecal
7.6h x 324 SB
- All baselines
Core + shortest remote
- ~1 arcminute resolution,
natural weighting
2.4' resolution, robust=1.0
- Noise level ~2.5 mJy (~17x
thermal)
Confusion limited: ~ 5 mJy
Image noise ~0.6 mJy



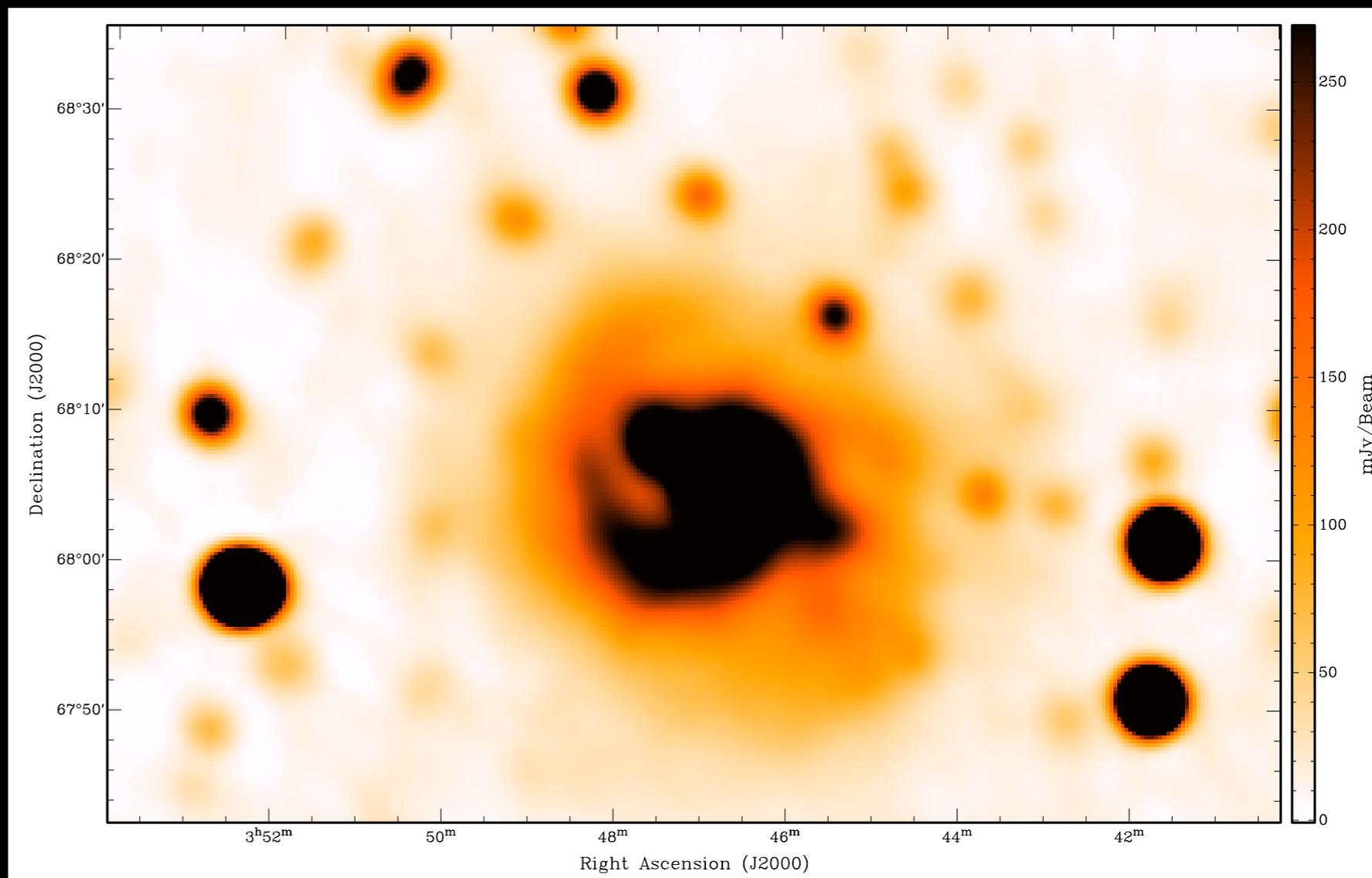
Initial results

- IC342



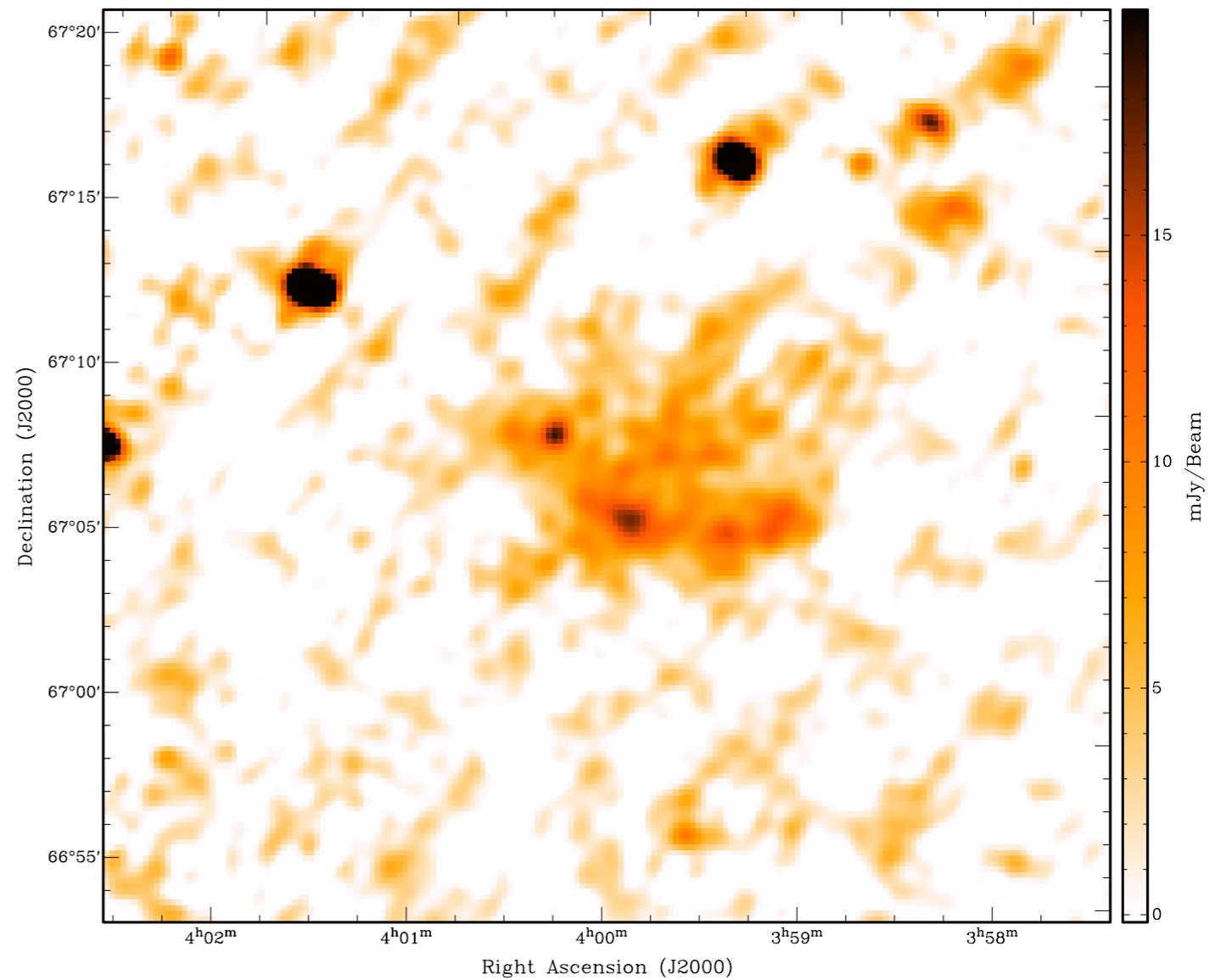
Current results

- IC342



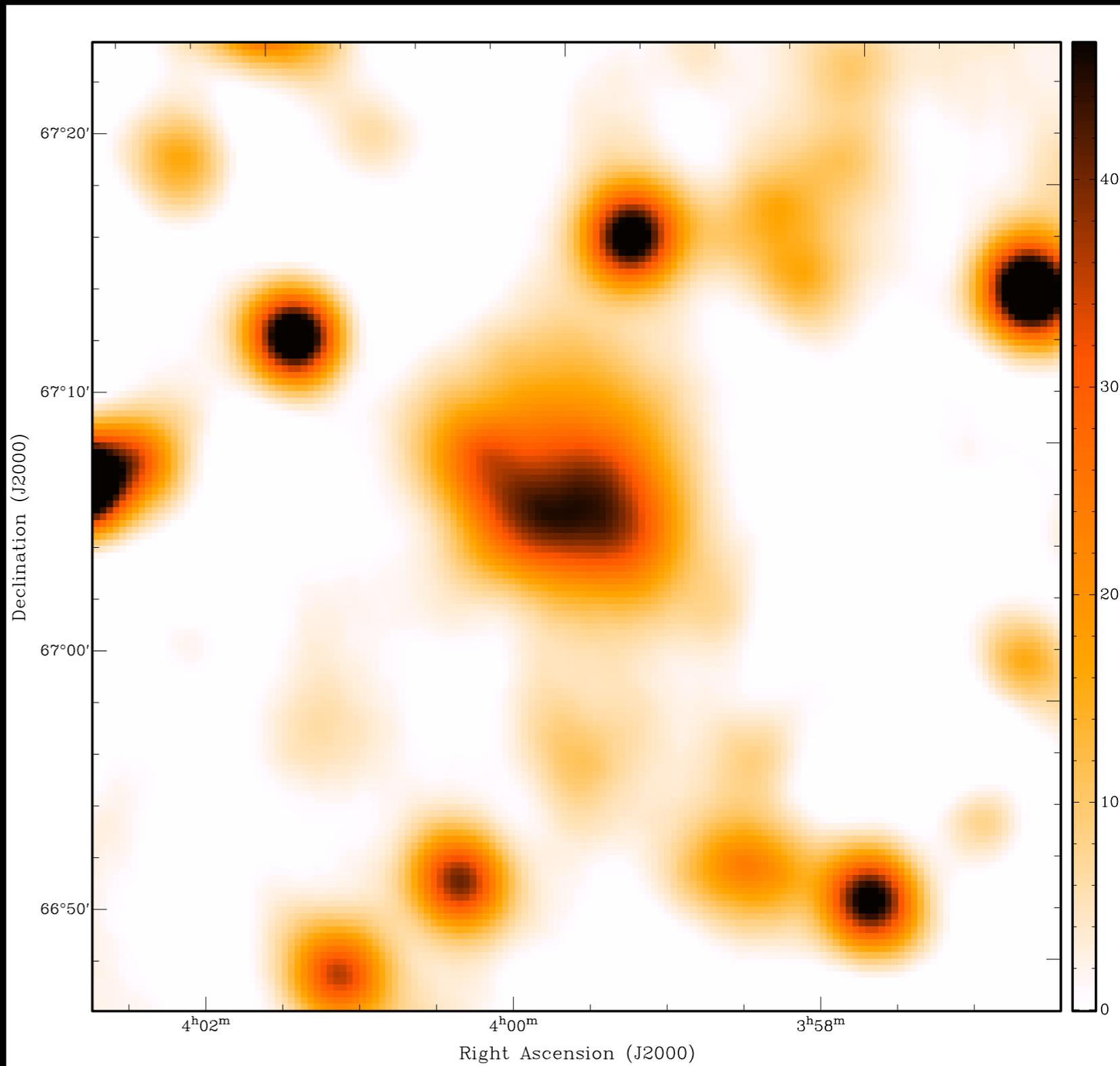
Initial results

- IC342
- Dwarf galaxy, UGCA 86

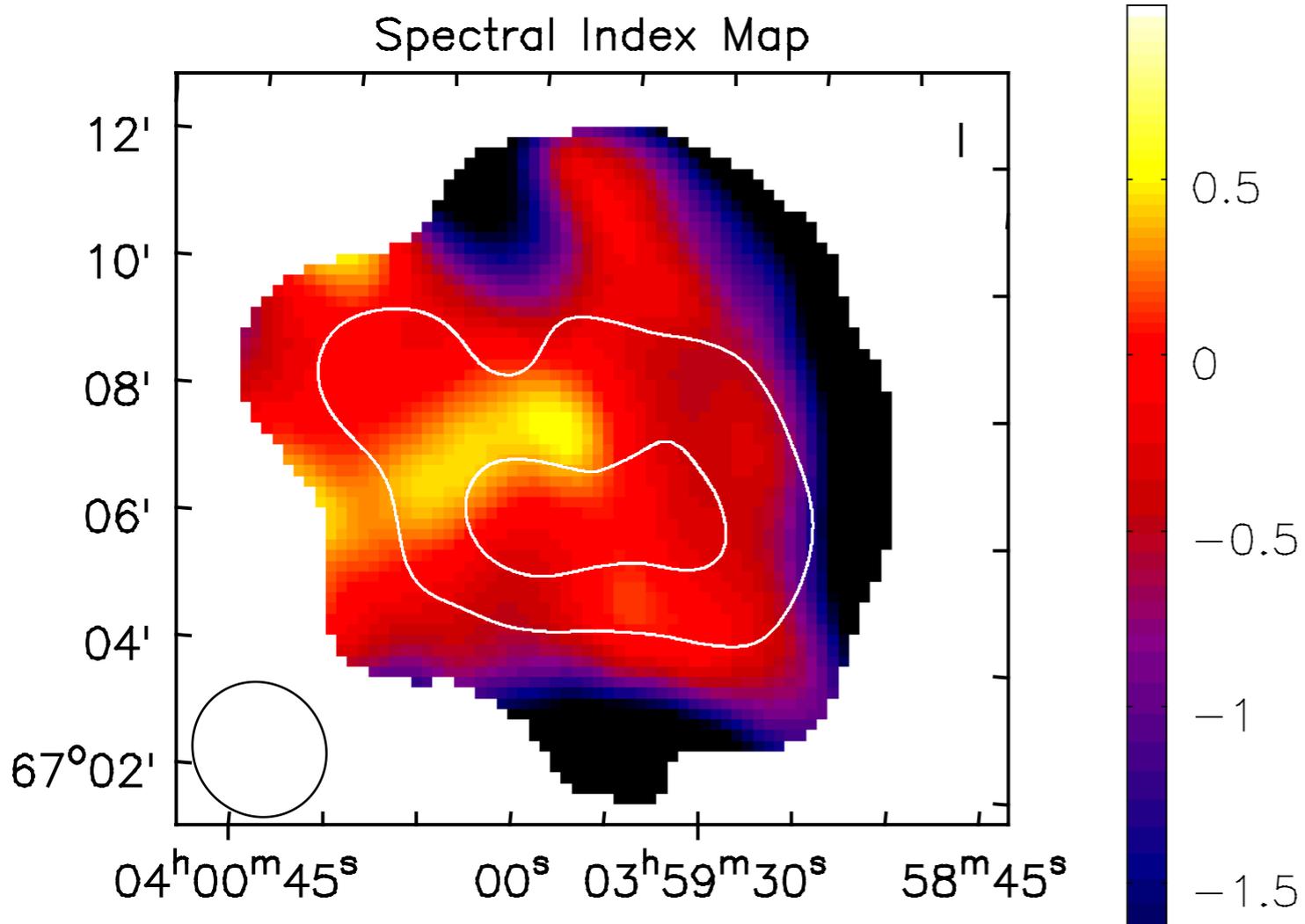
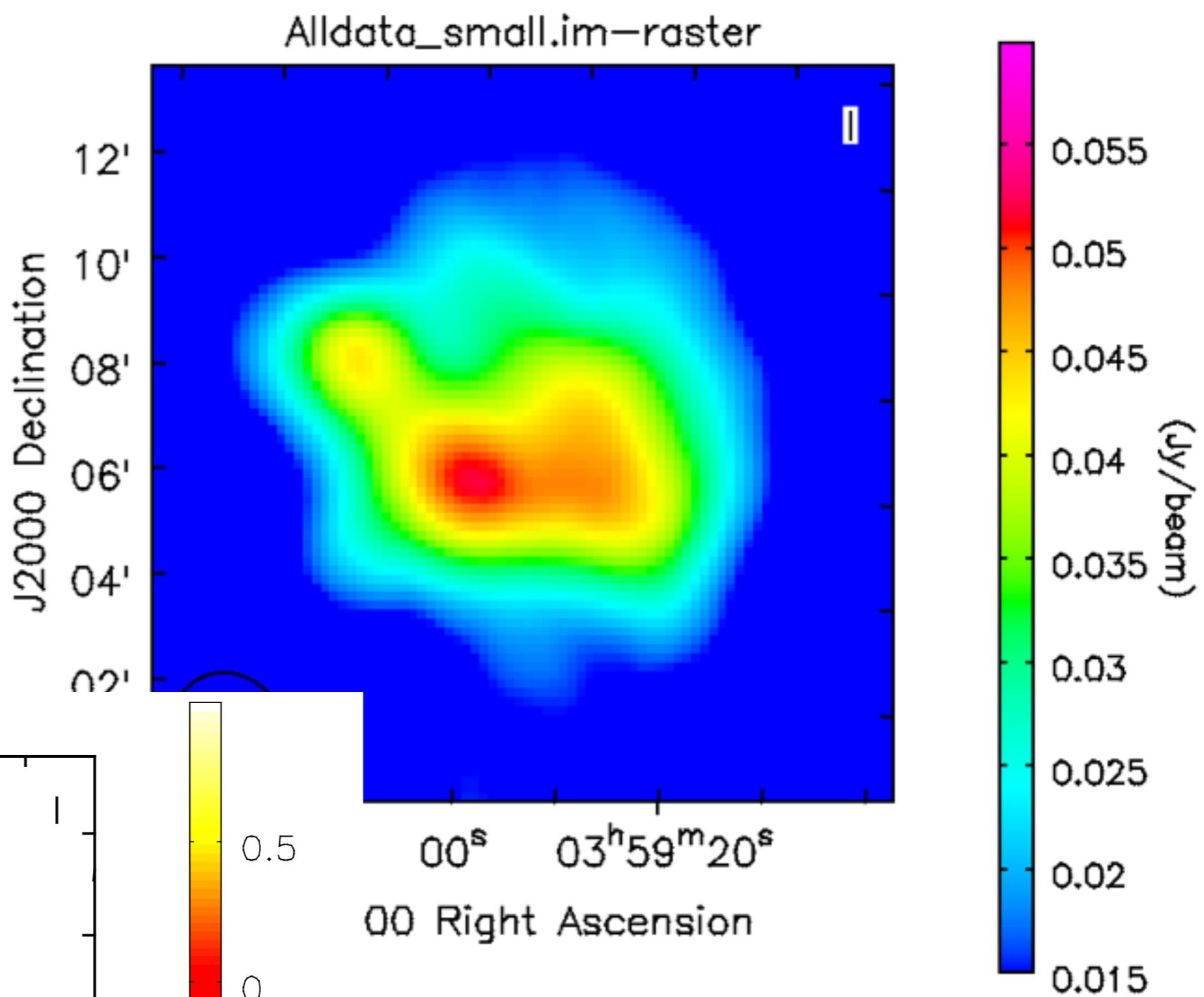


Current results

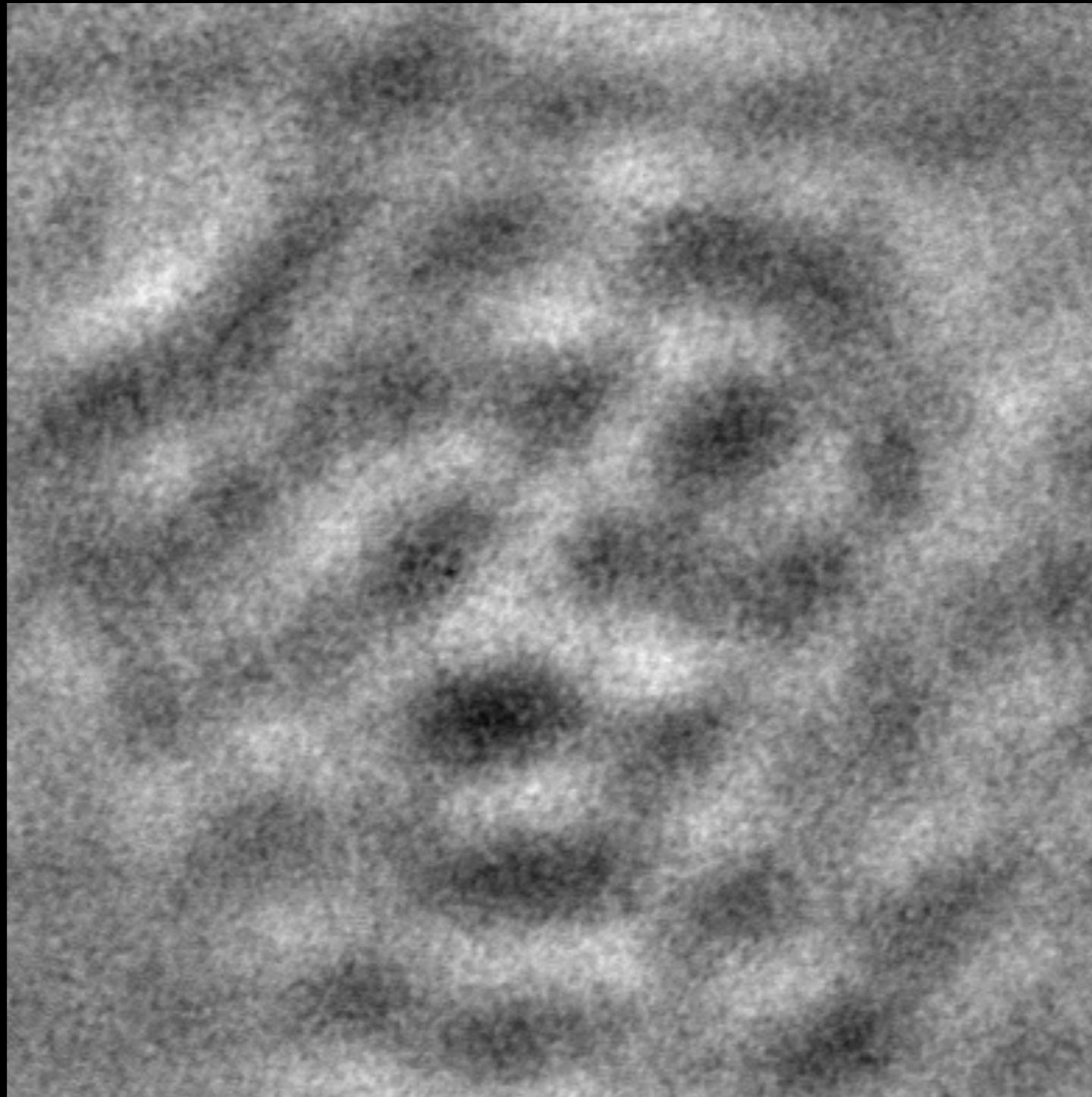
- IC342
- Dwarf galaxy, UGCA 86



Current results

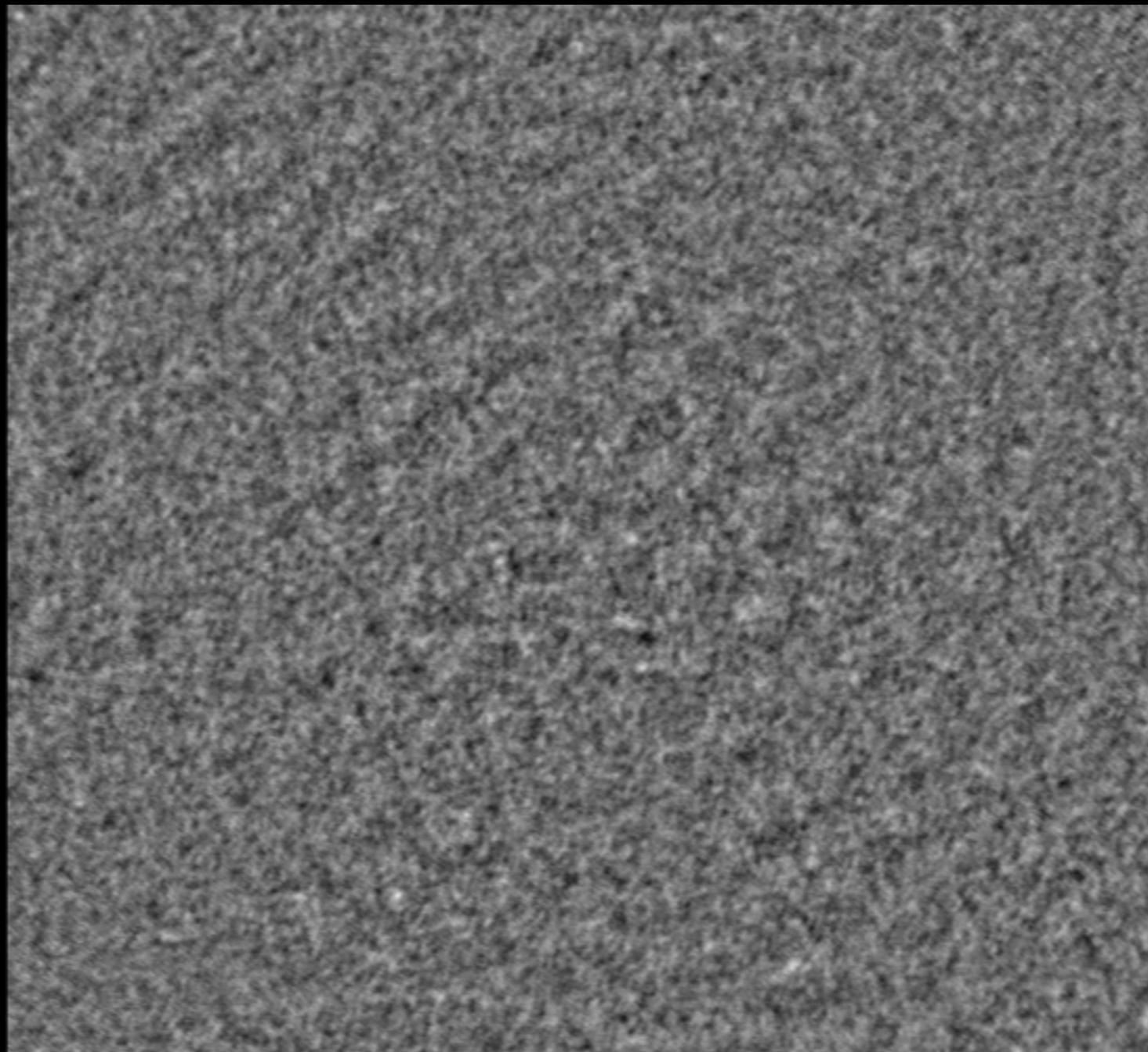


Polarization



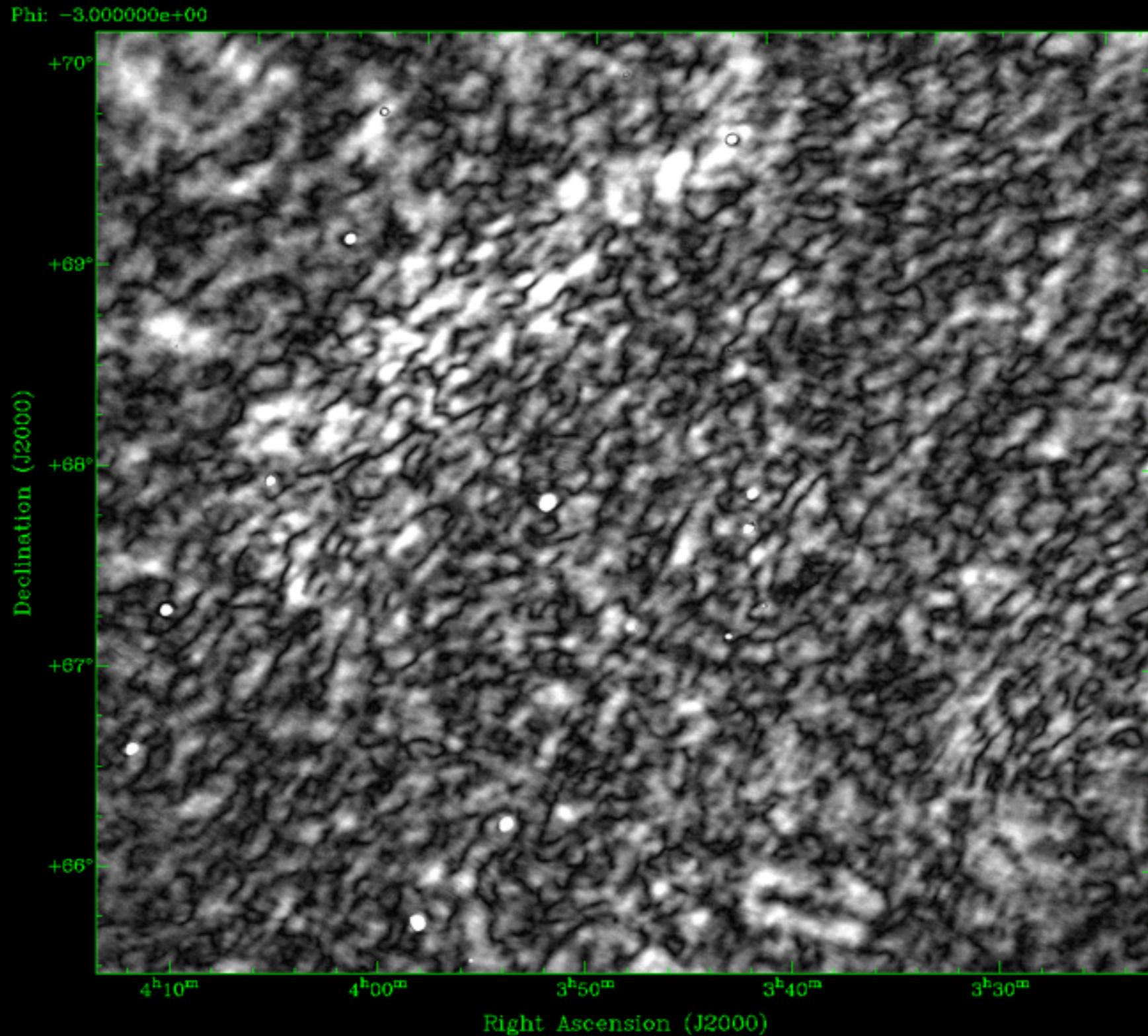
Stokes Q,
1 channel
($\sim 1/10368$
of the full
data)

Polarization



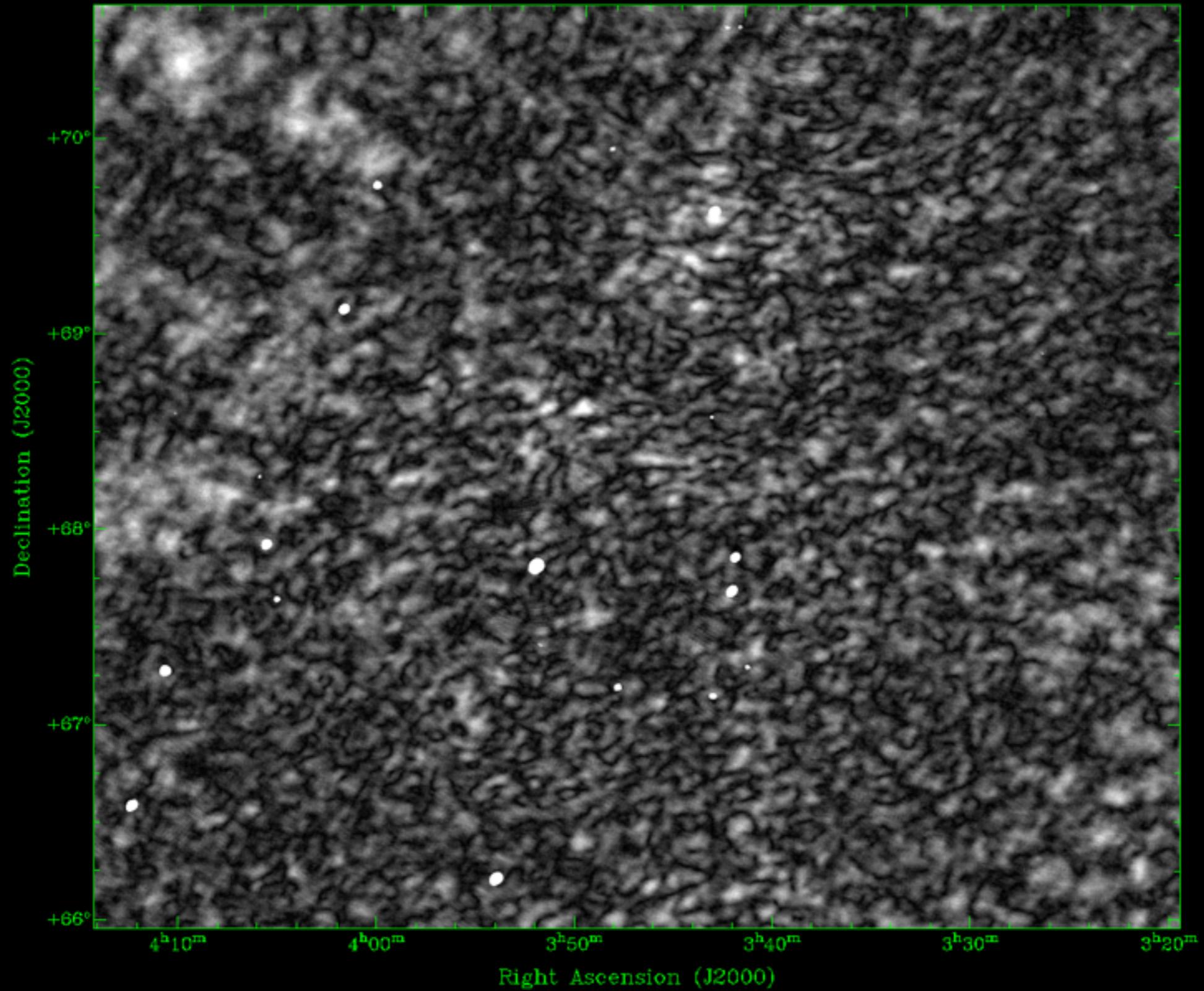
Stokes Q,
1 channel
 $UV_{\min} = 0.1k\lambda$
($< 0.5^\circ$ scales)

Faraday cube slices

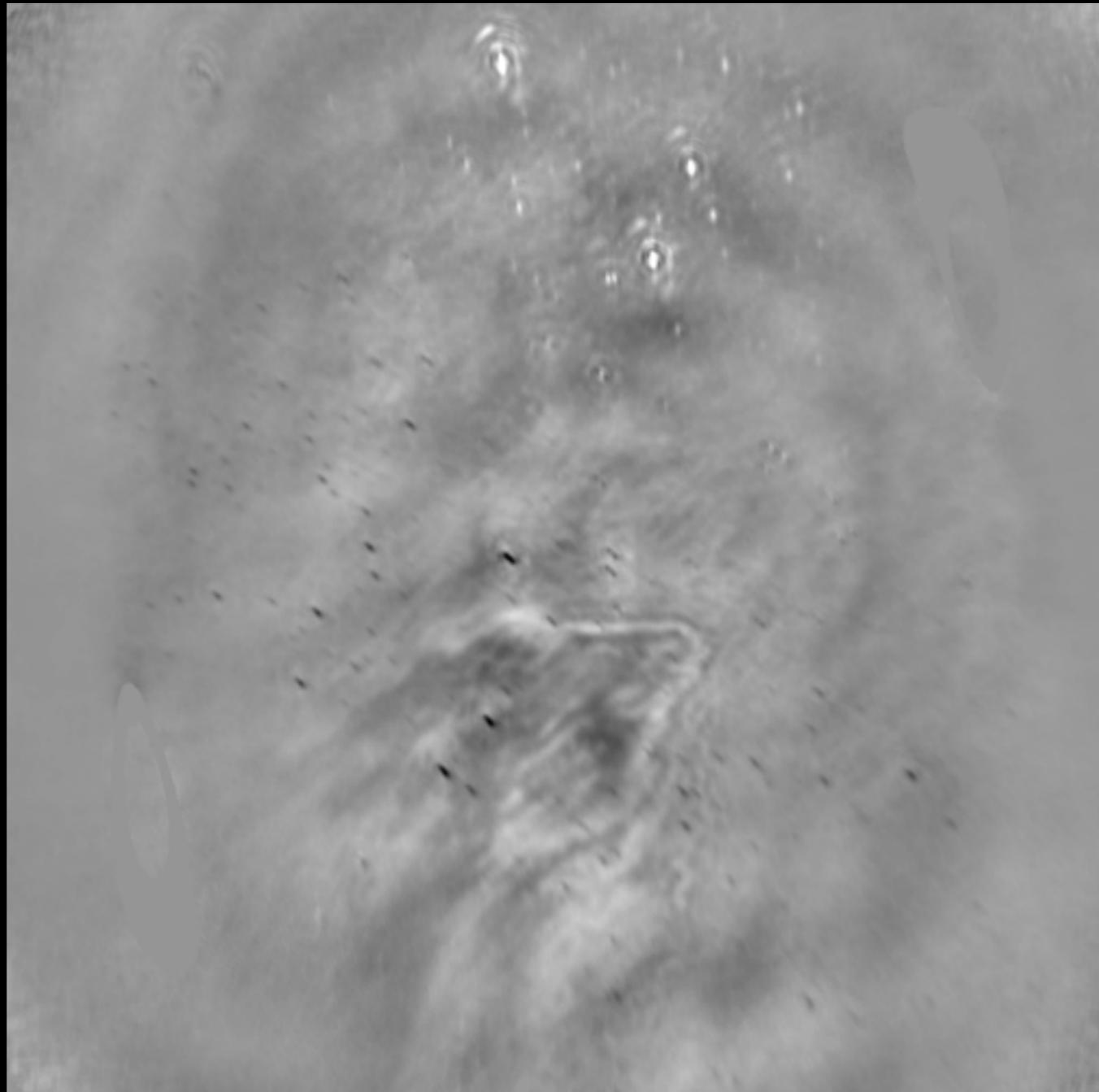


Faraday cube slices

Phi: 3.500000e+00



Full bandwidth polarization



Stokes Q,
all
channels

To do list:

- Analyze dwarf galaxy
- Try to solve polarization issues
- Make a high quality RM cube.
- Analyze foregrounds!

More data!

- Requesting processed fields
- Data requirements:
 - 8 channels/SB minimum
 - Well calibrated at $\sim 2'$ resolution (core stations)
- Thanks to David for his M51 data

Long term goal

