

Observations Of MHONGOOSE Galaxies With KAT-7

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Galactic ecosystem

- SKA: *The Evolution of Galaxies* – *how do galaxies assemble and evolve?*
- Nearby universe: where a detailed study can be made
- Flow of gas into galaxies
- How is star formation regulated?
- How are outer disks and *cosmic web* linked?



MHONGOOSE... the survey

- *MHONGOOSE*: MeerKAT HI Observations of Nearby Galactic Objects: Observing Southern Emitters
- HI mapping of galaxies with
$$\left\{ \begin{array}{l} 10^7 \lesssim M_{HI} \lesssim 10^{11} M_{\odot} \\ D < 20 \text{ Mpc} \\ -12 < M_R < -22 \\ 30 < v_{\text{rot}} < 300 \text{ km/s} \end{array} \right.$$
- 30 galaxies, 200 hrs/gal
- High surface brightness sensitivity: down to $5 \times 10^{17} \text{ cm}^{-2}$
(at 5σ & $\vartheta = 1.5'$)

This Project...

- Observe MHONGOOSE galaxies with KAT-7
- KAT-7 short baselines:
 - Unique opportunity of observing low NHI gas in/around galaxies
- Characterise the HI content of the sample
- Observe different calibrators → identify best cal.

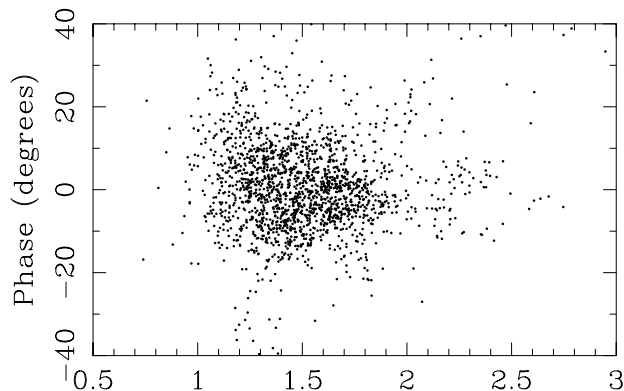
Observations

For each galaxy:

- ~12 hours observation
- 2 flux calibrators
- 3 phase calibrators
- Channel bandwidth: 0.64 km/s

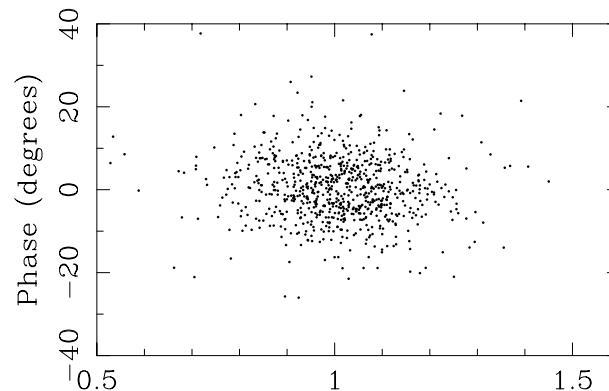
Best calibrator:

- Calibrator with the least scatter in *amp. vs phase* plot



0332-403

Amplitude (Jy)



0220-349

Amplitude (Jy)

Preliminary results

Output from observations:

- angular resolution:

$$\theta \sim 3.5'$$

- typical noise level at 3σ & 2.6 km/s :

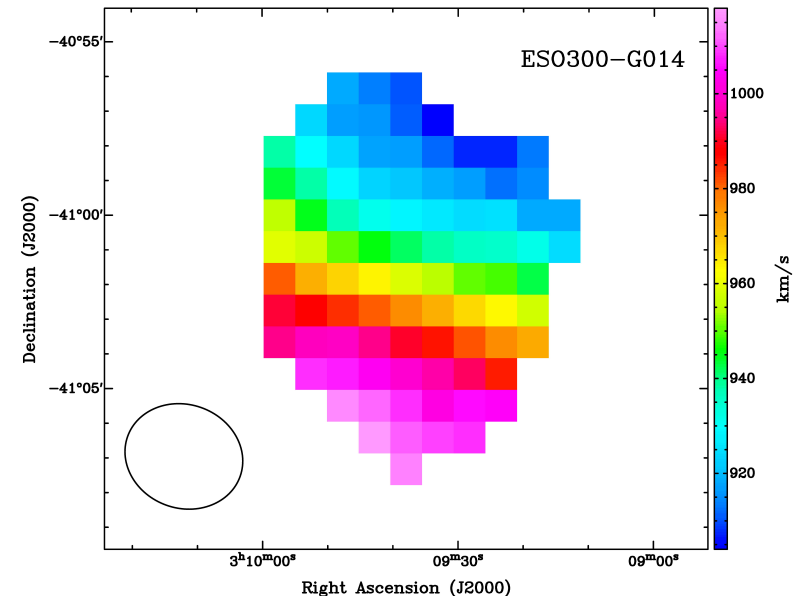
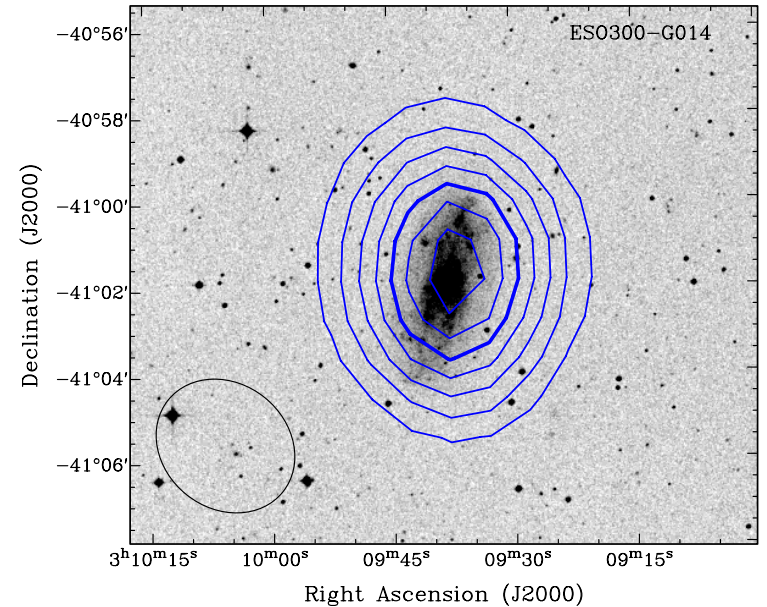
$$\sim 9 \text{ mJy beam}^{-1} \quad \text{or} \quad \sim 6 \times 10^{17} \text{ cm}^{-2}$$

First 5 galaxies...

ESO300-G014

- Flux calibrator:
0407-658
- Phase calibrator:
0220-349
- Lowest contour (3σ):
 $6 \times 10^{19} \text{ cm}^{-2}$
- Measured HI flux:
 $S_{\text{HI}} = 25.8 \text{ Jy}$
- HIPASS HI flux:
 $S_{\text{HI}} = 26.7 \text{ Jy}$

Contours levels: 3, 6, 9, 12, 15, 18 & 21σ

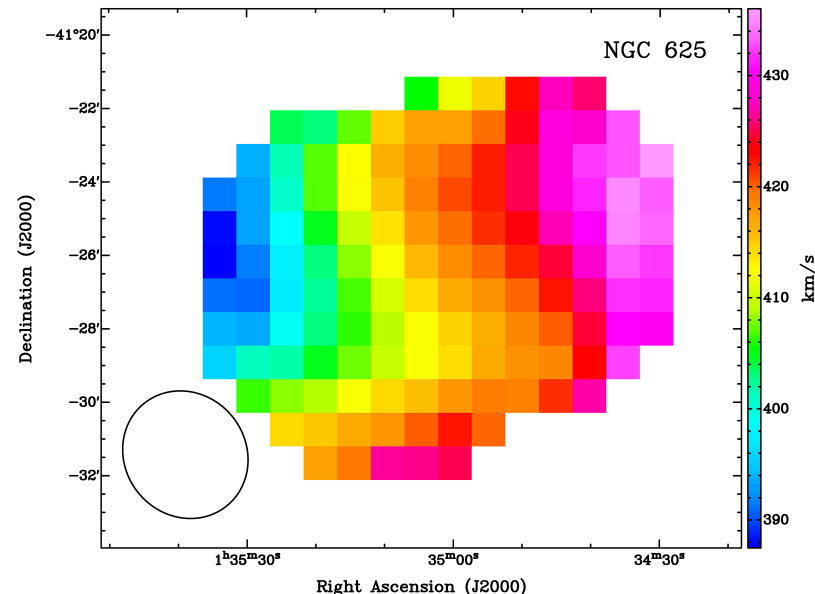
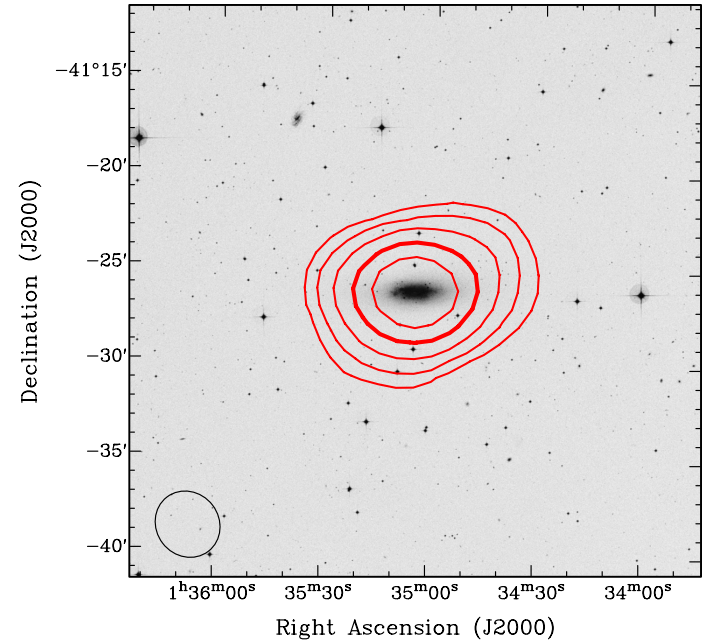


First 5 galaxies...

NGC 625

- Flux calibrator:
0407-658
- Phase calibrator:
0201-440
- Lowest contour (3σ):
 $4.8 \times 10^{19} \text{ cm}^{-2}$
- Measured HI flux:
 $S_{\text{HI}} = 35.0 \text{ Jy}$
- HIPASS HI flux:
 $S_{\text{HI}} = 34.8 \text{ Jy}$

Contours levels: 3, 6, 12, 24 & 42 σ

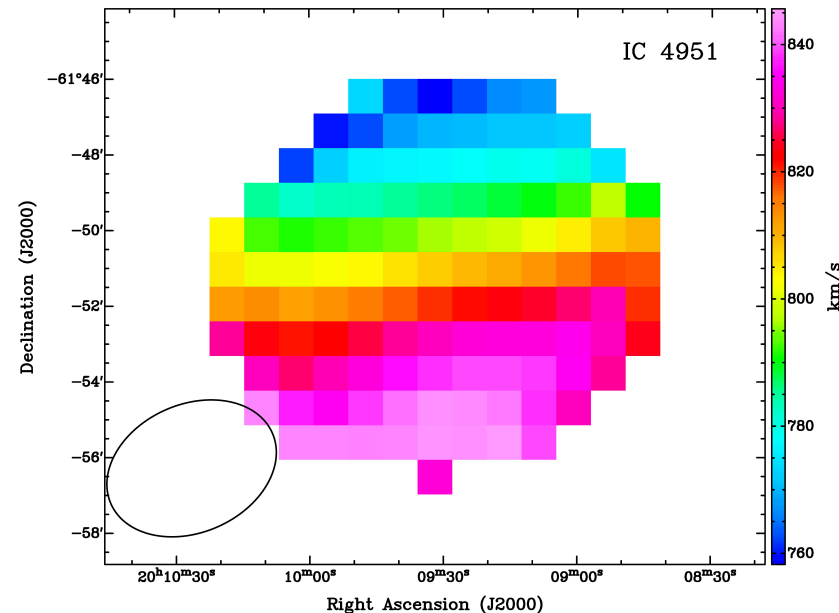
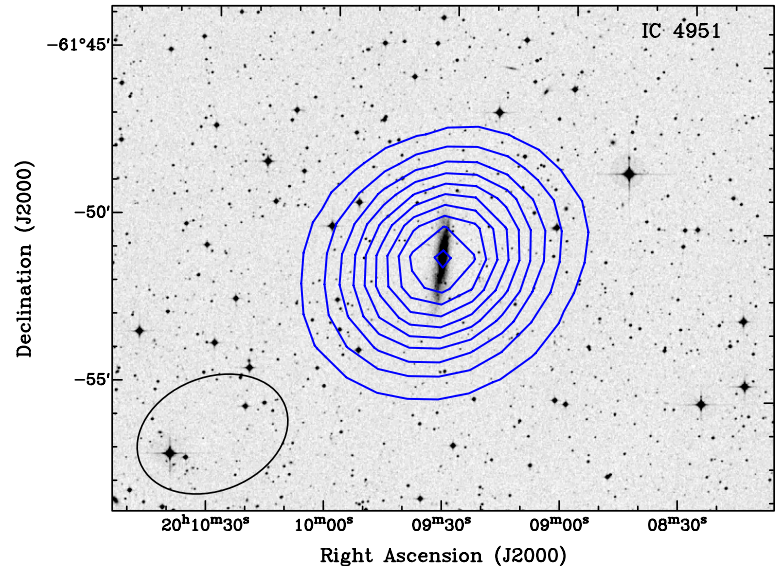


First 5 galaxies...

IC 4951

- Flux calibrator:
0407-658
- Phase calibrator:
PKS 1934-638
- Lowest contour (3σ):
 $3.9 \times 10^{19} \text{ cm}^{-2}$
- Measured HI flux:
 $S_{\text{HI}} = 26.1 \text{ Jy}$
- HIPASS HI flux:
 $S_{\text{HI}} = 24.6 \text{ Jy}$

Contours levels: 3, 6, 9, ..., 30σ

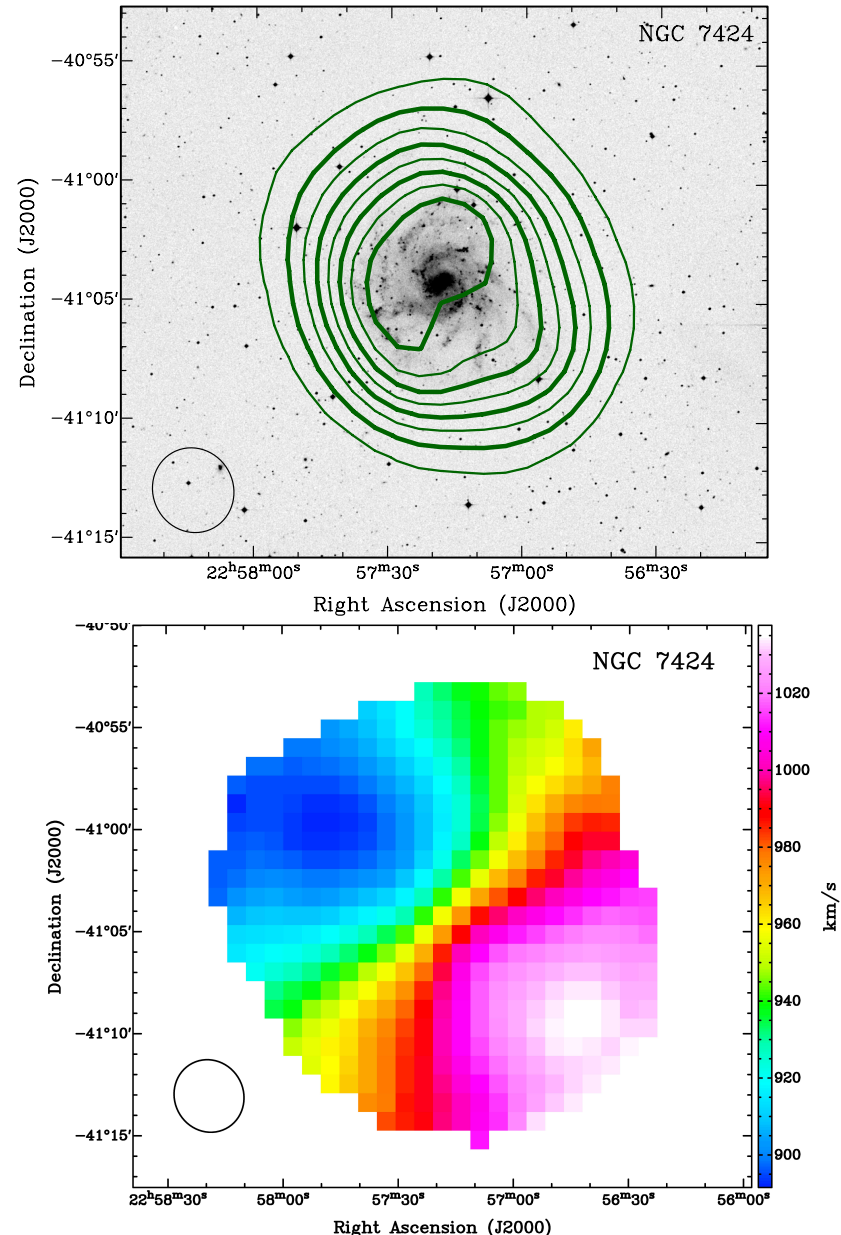


First 5 galaxies...

NGC 7424

- Flux calibrator:
PKS 1934-638
- Phase calibrator:
2259-375
- Lowest contour (3σ):
 $1 \times 10^{20} \text{ cm}^{-2}$
- Measured HI flux:
 $S_{\text{HI}} = 269.0 \text{ Jy}$
- HIPASS HI flux:
 $S_{\text{HI}} = 279.5 \text{ Jy}$

Contours levels: 3, 6, 9, ..., 24σ

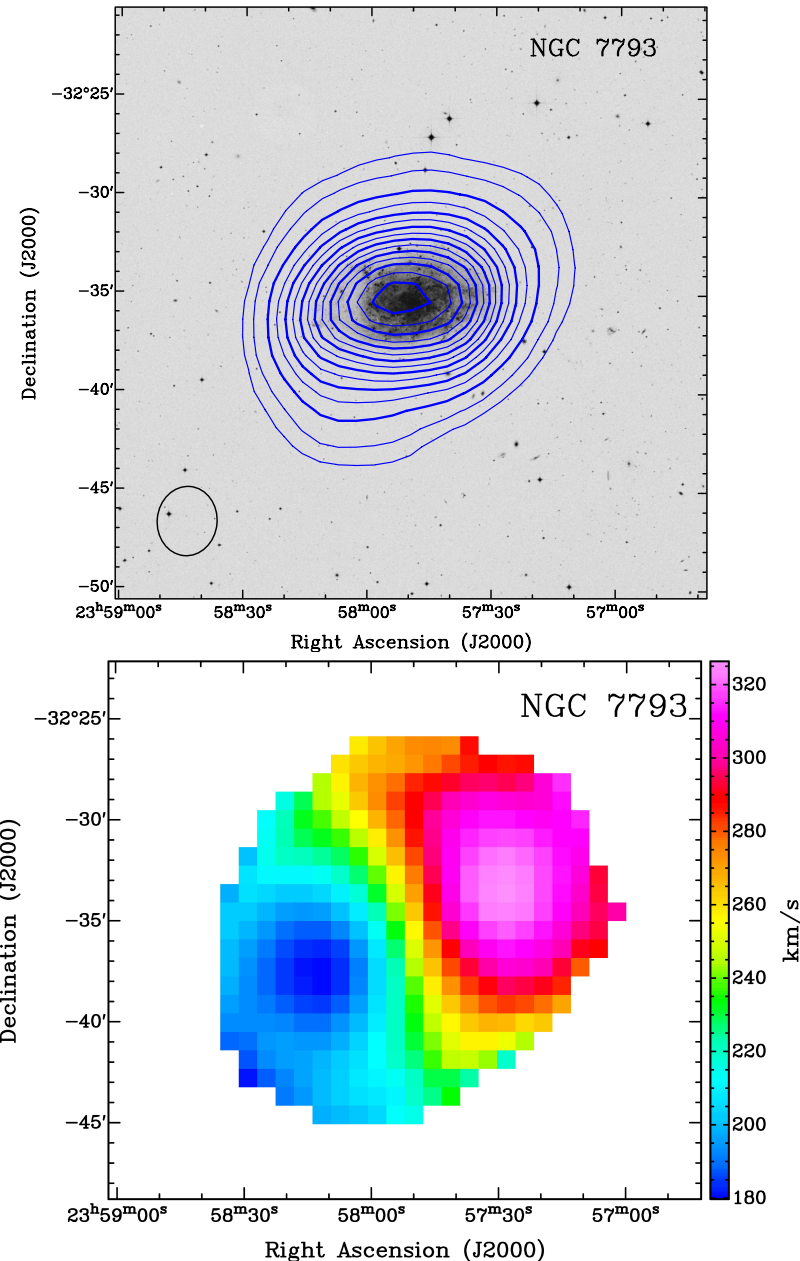


First 5 galaxies...

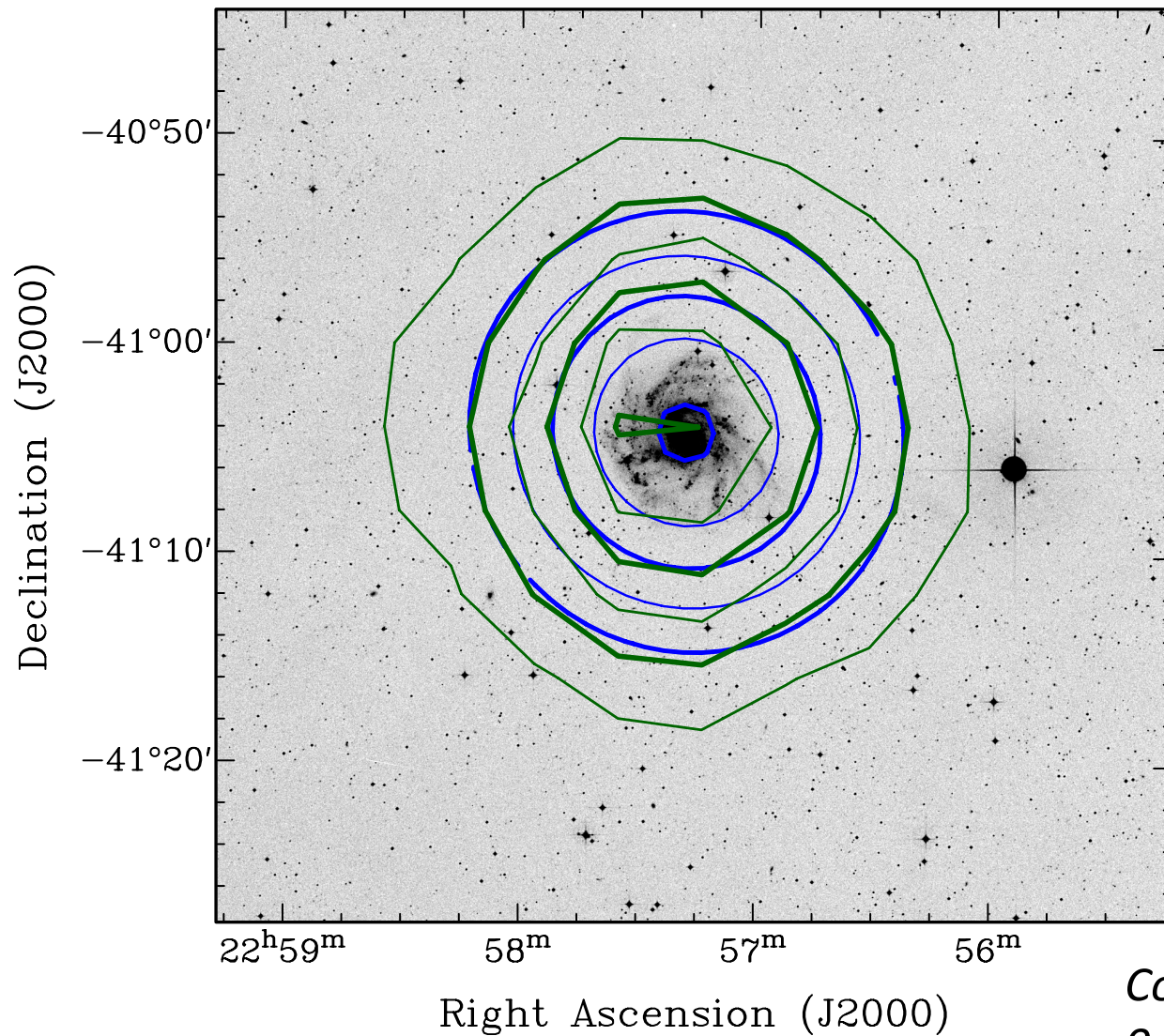
NGC 7793

- Flux calibrator:
PKS 1934-638
- Phase calibrator:
0008-421
- Lowest contour (3σ):
 $1 \times 10^{20} \text{ cm}^{-2}$
- Measured HI flux:
 $S_{\text{HI}} = 274.2 \text{ Jy}$
- HIPASS HI flux:
 $S_{\text{HI}} = 317.6 \text{ Jy}$

Contours levels: 3, 6, 9, ..., 24σ



KAT-7 vs. HIPASS



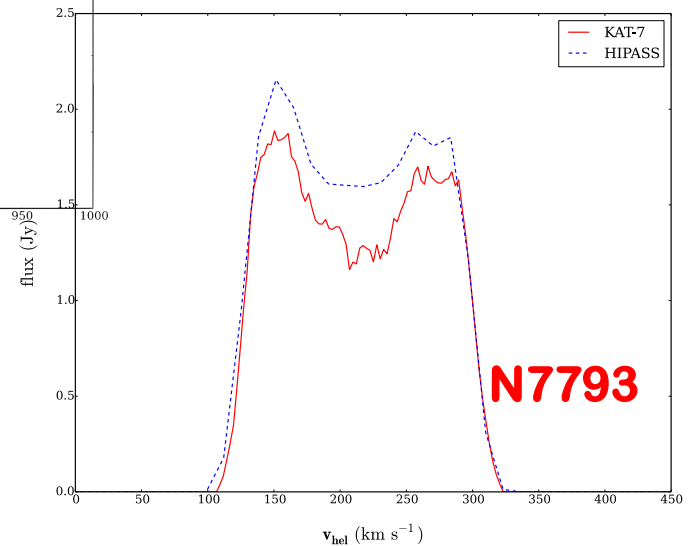
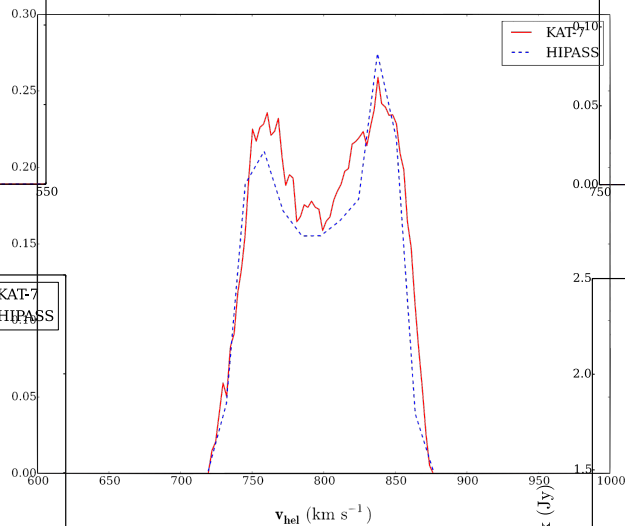
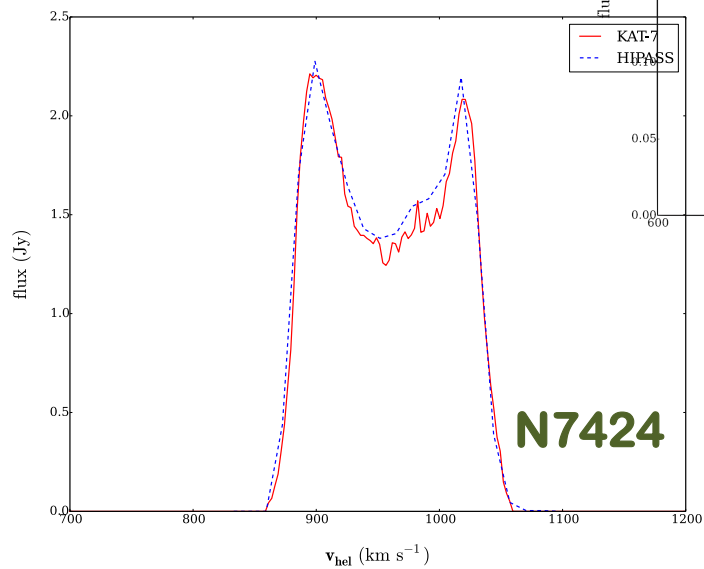
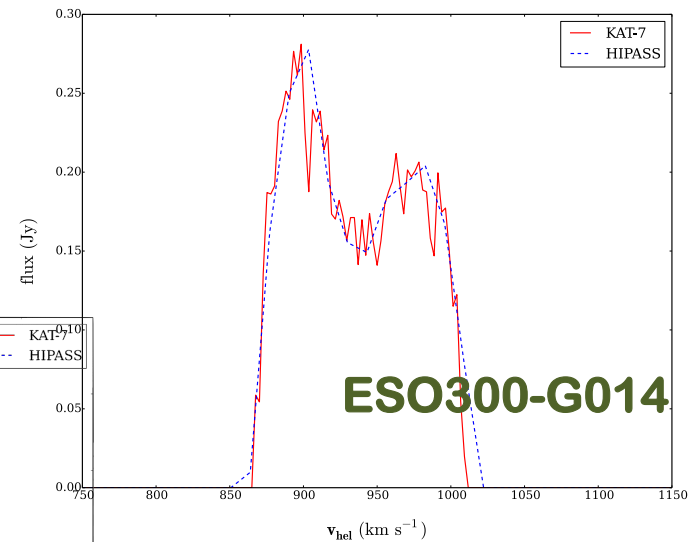
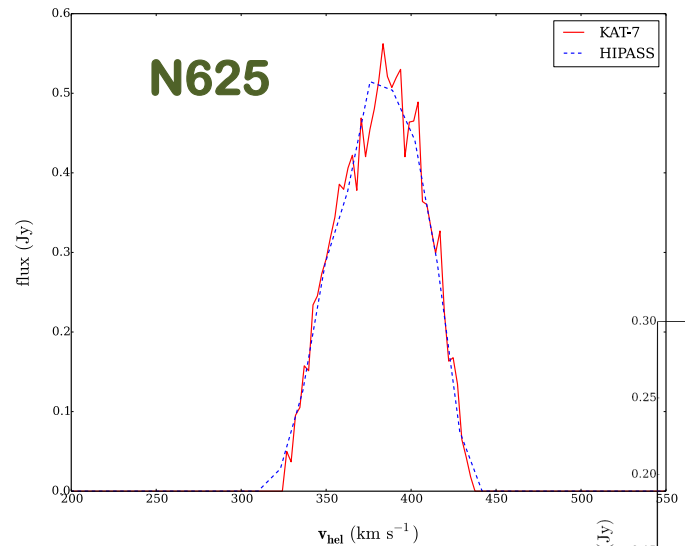
NGC 7424:

HIPASS

KAT-7

Contours levels:
 $0.5, 1.0, 1.5, \dots, 3.0 \times 10^{20} \text{ cm}^{-2}$

KAT-7 vs. HIPASS



Summary & Future prospects...

- KAT-7's done a good job... too bad it's down
- Observations *almost* as deep as HIPASS & more resolved
- Analysis underway...
- GBT proposal submitted to observe rest of galaxies

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Thank You!