

Searching for Jellyfish Galaxies with MeerKAT

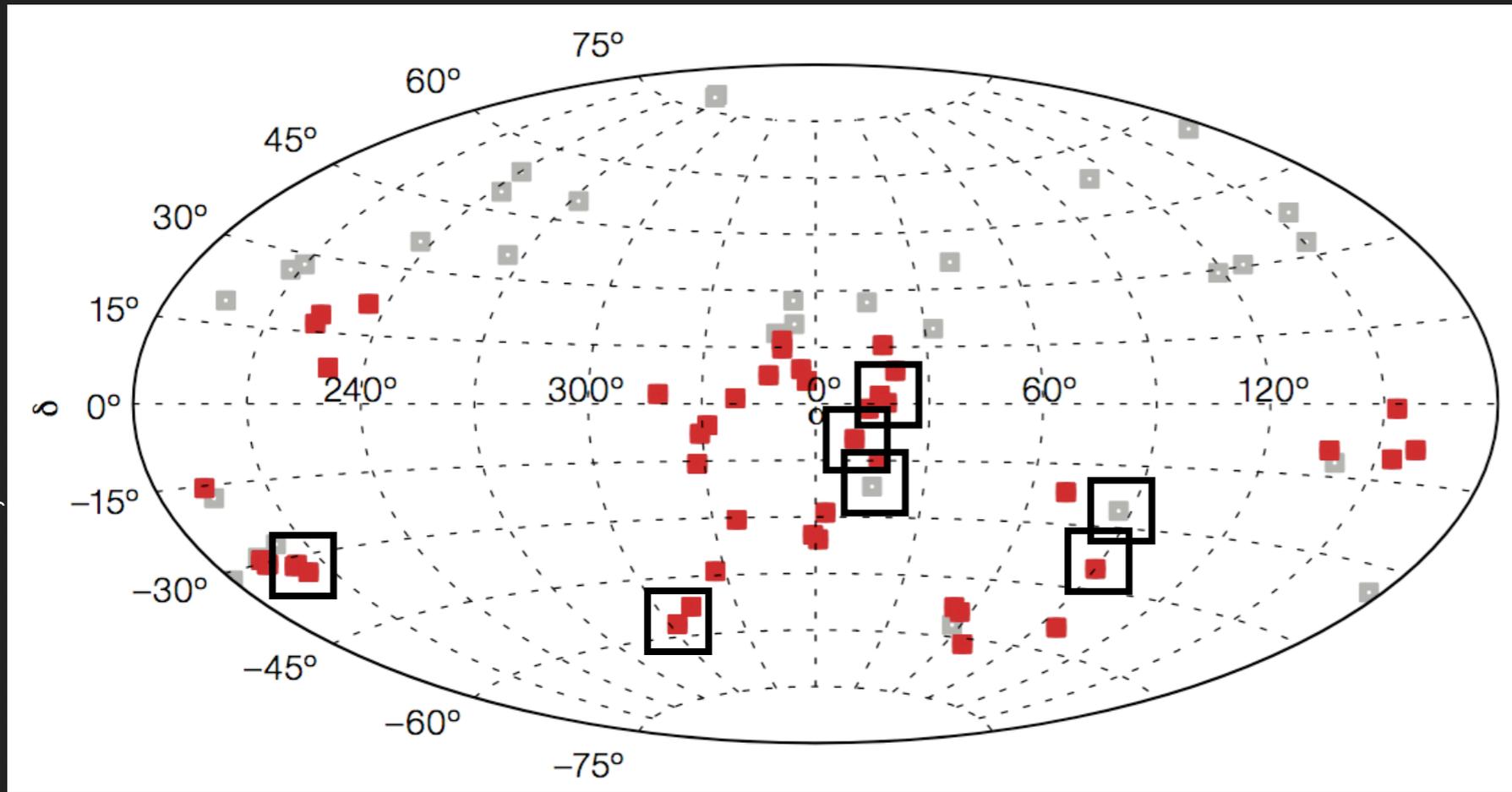
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GASP and MGCLS teams

Wide-field Nearby Galaxy-cluster Survey (WINGS)

Gullieuszik et al, 2015



MGCLS + (Omega)WINGS

~ 7 overlapping clusters

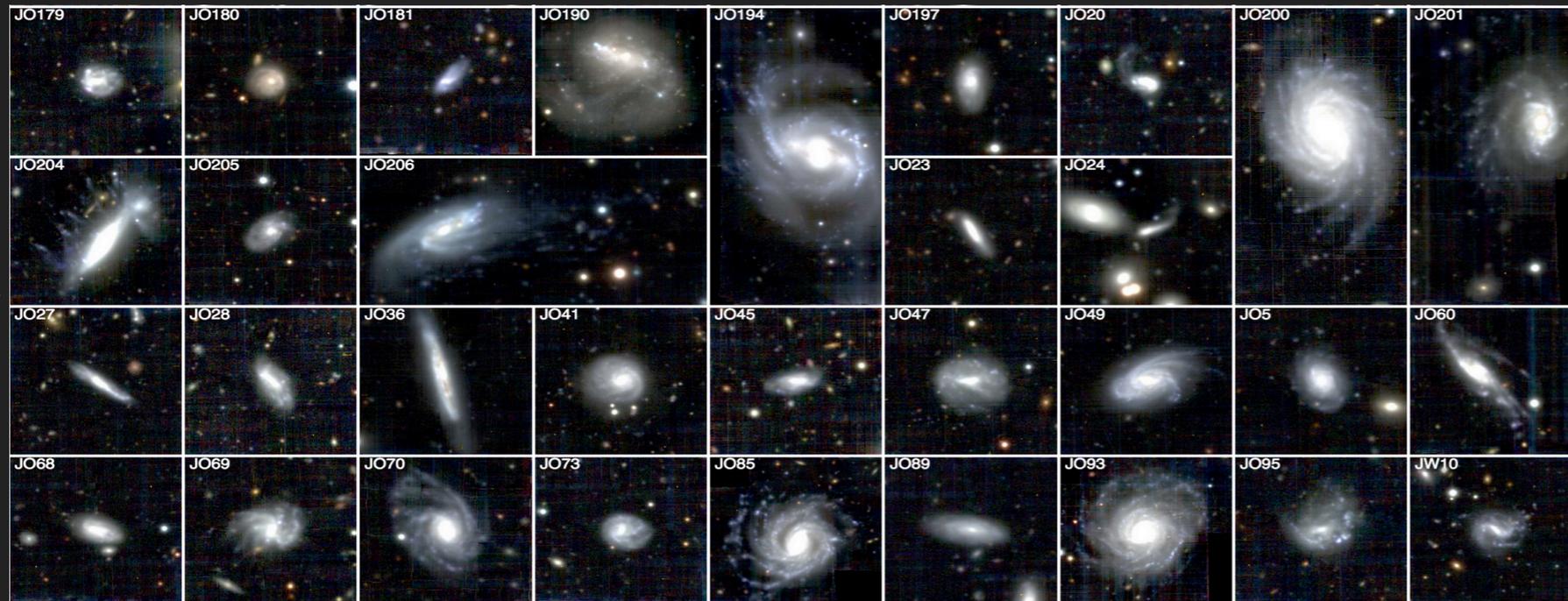
Abell:

85, 133, 3376, 3667, 3558,
548, 168

$z \sim 0.05$

GAs Stripping Phenomena (GASP) in galaxies with MUSE

Gullieuszik et al, 2015



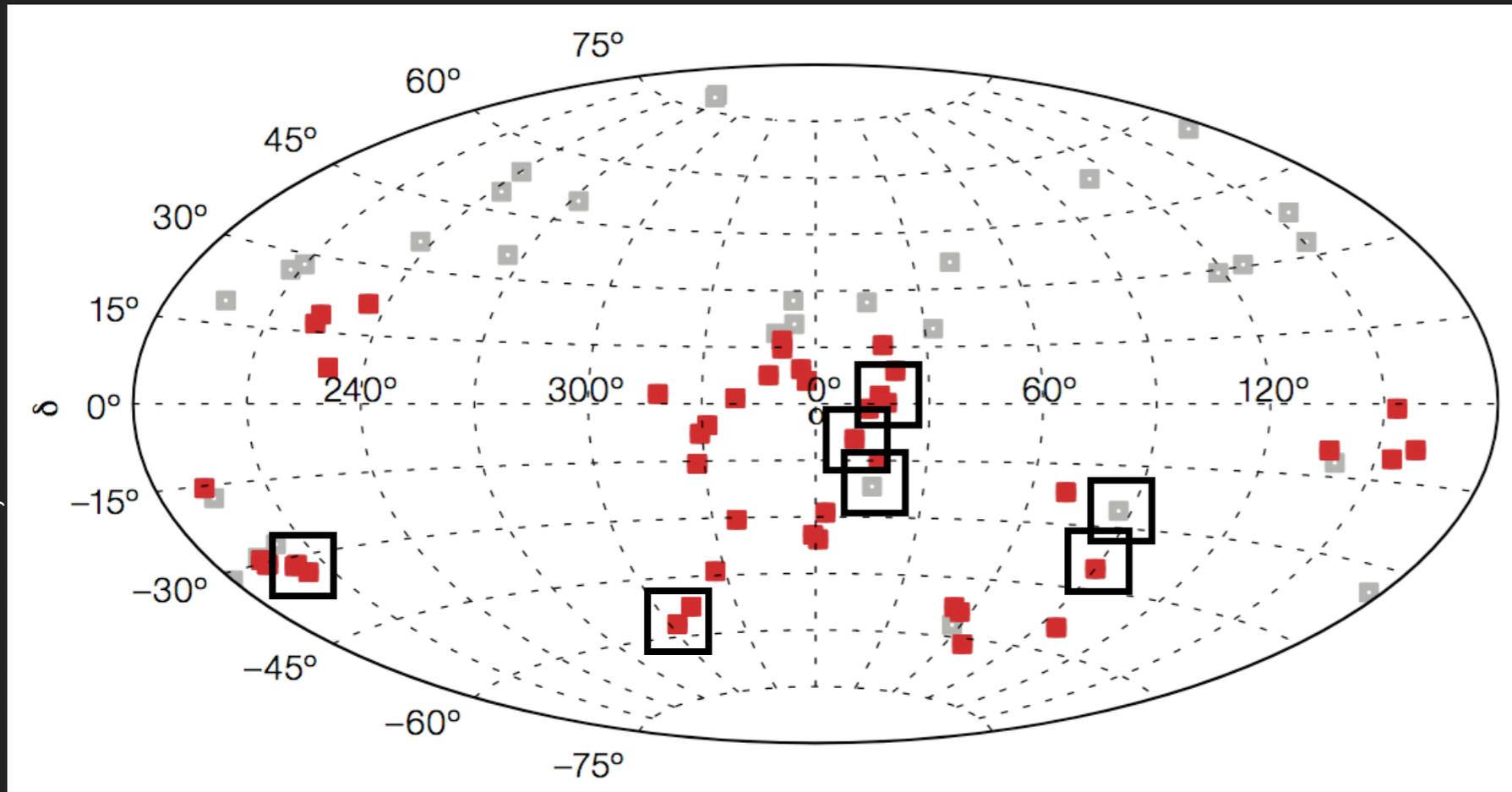
Jellyfish galaxies

Tentacles of material stripped
from the galaxy body

Extreme ram-pressure
stripping

Wide-field Nearby Galaxy-cluster Survey (WINGS)

Gullieuszik et al, 2015



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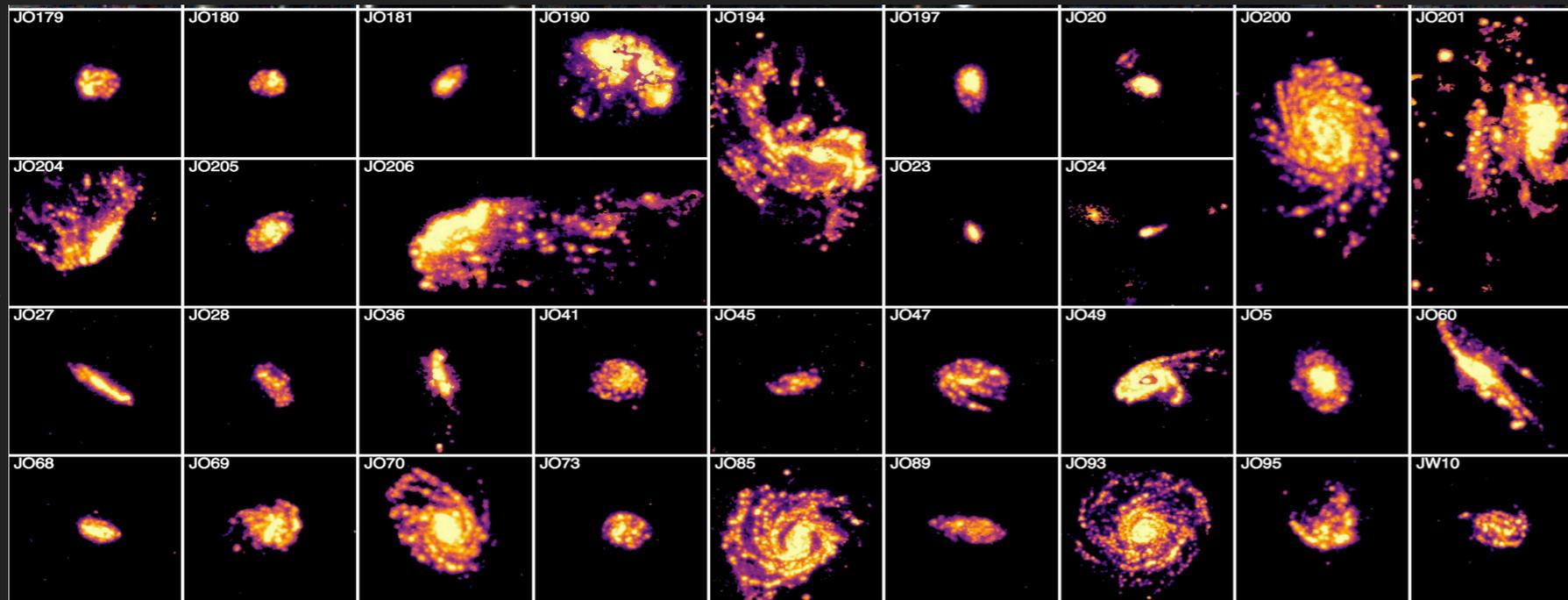
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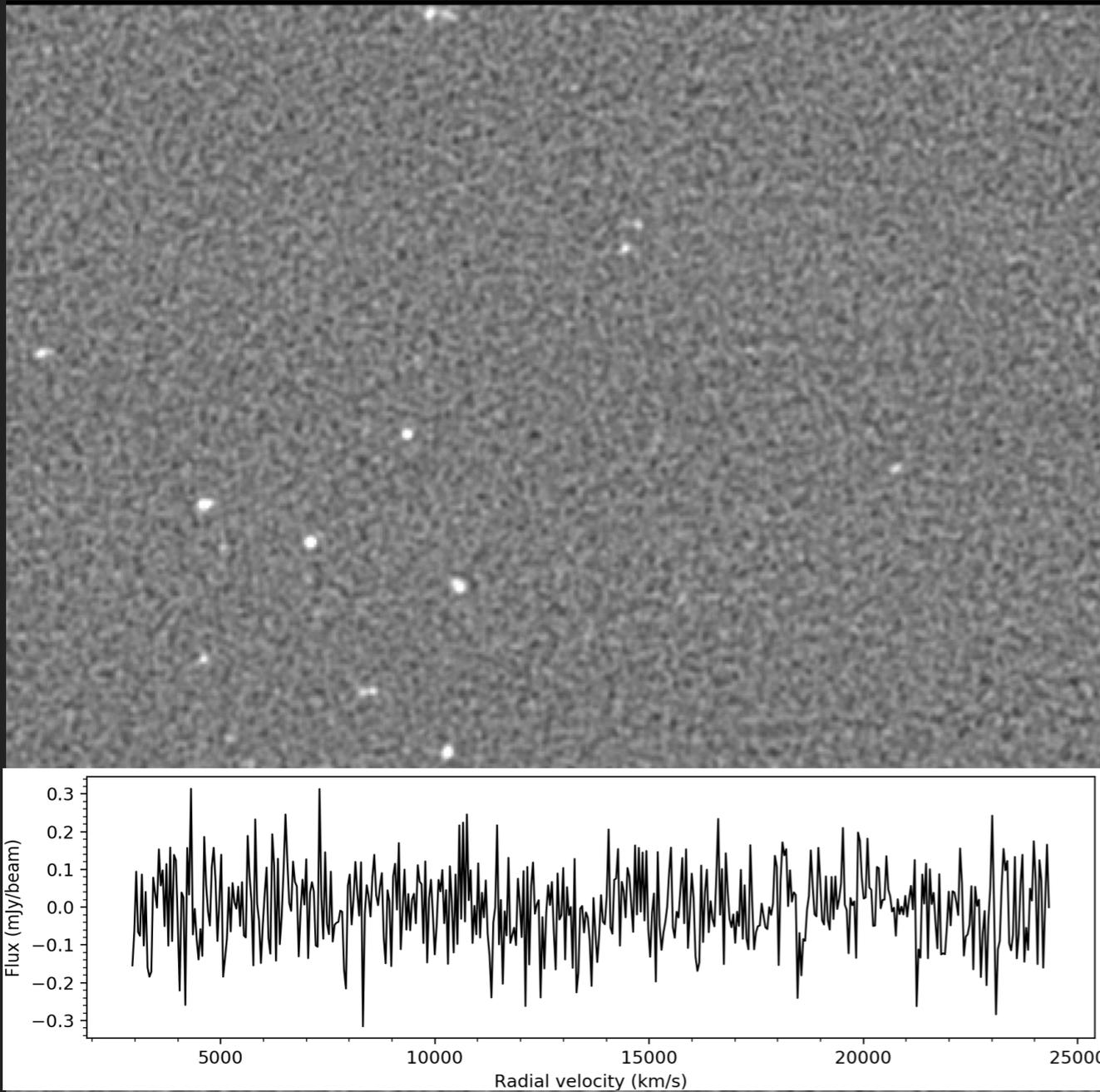


H α : The gas in the tail is ionized

... (in most cases) by massive young stars

Cold gas fuelling SF \rightarrow HI in the tail and disc?

MeerKAT HI observations



sky area ≈ 2.0 sq.deg.
~80 MHz centred at cluster freq
Vel. $\approx 3000 - 25000$ km/s
 $\Delta V = 44.5$ km/s

Data reduction



Robust parm: 0, taper: 20"
Rms ~ 0.15 mJy/beam
 $\theta = 24'' \times 25''$ restoring beam.

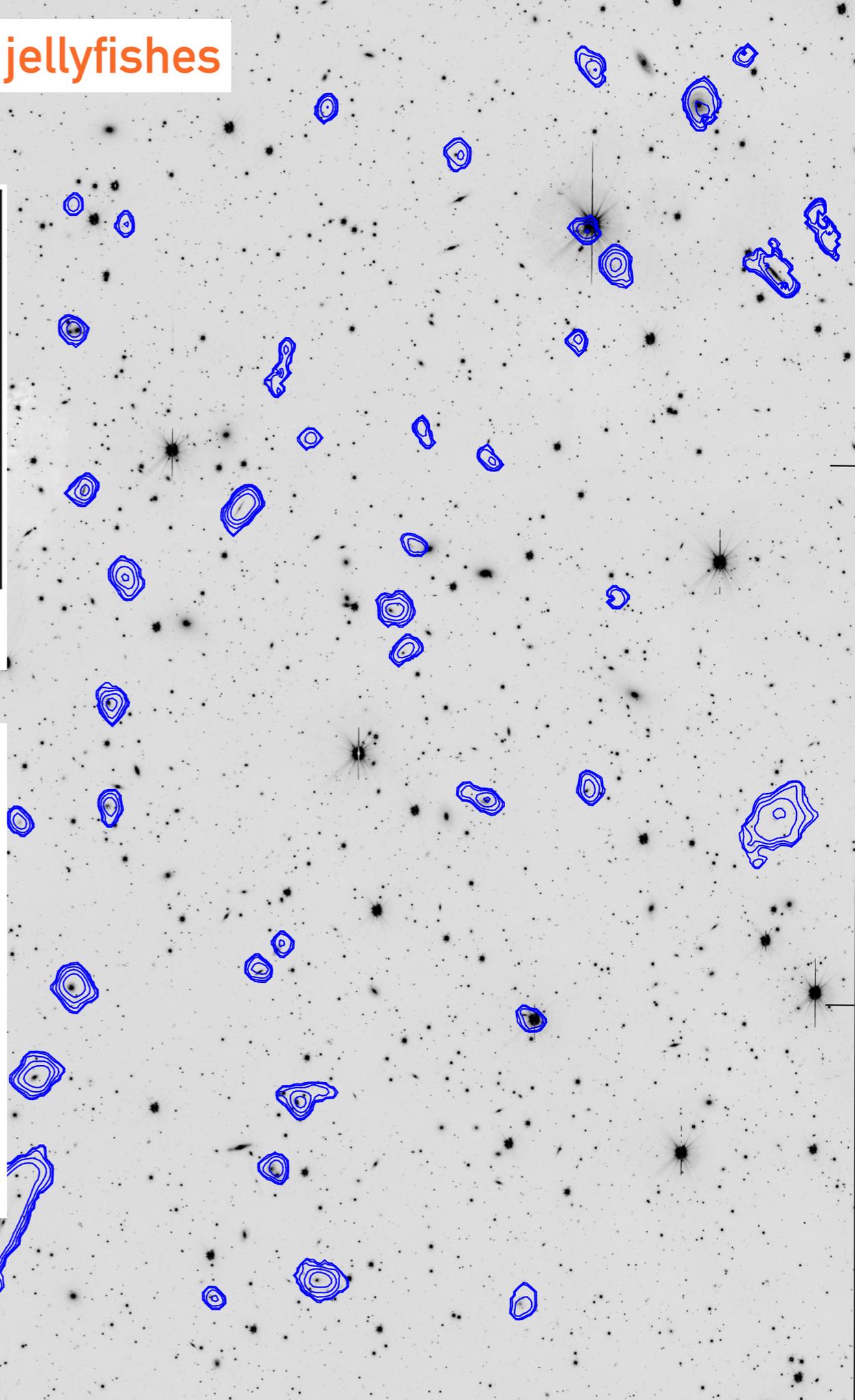
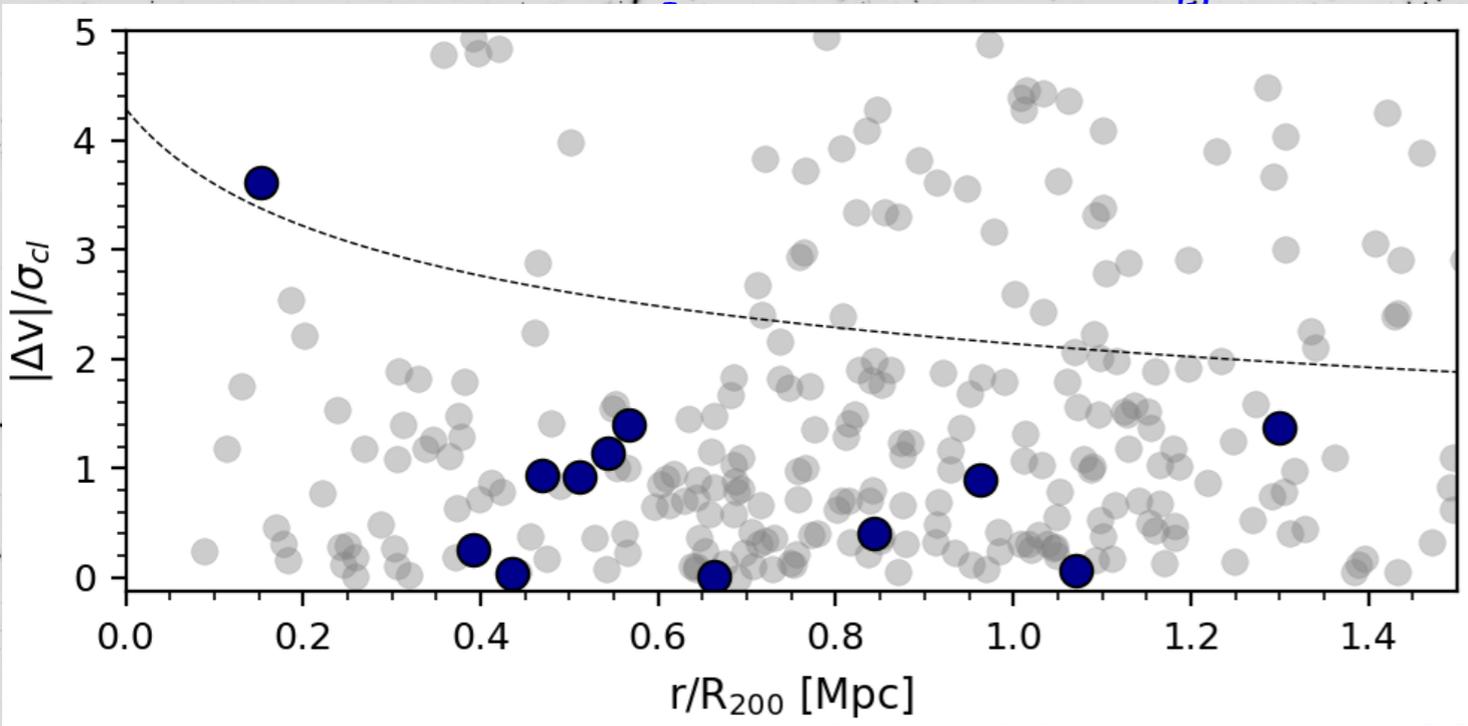
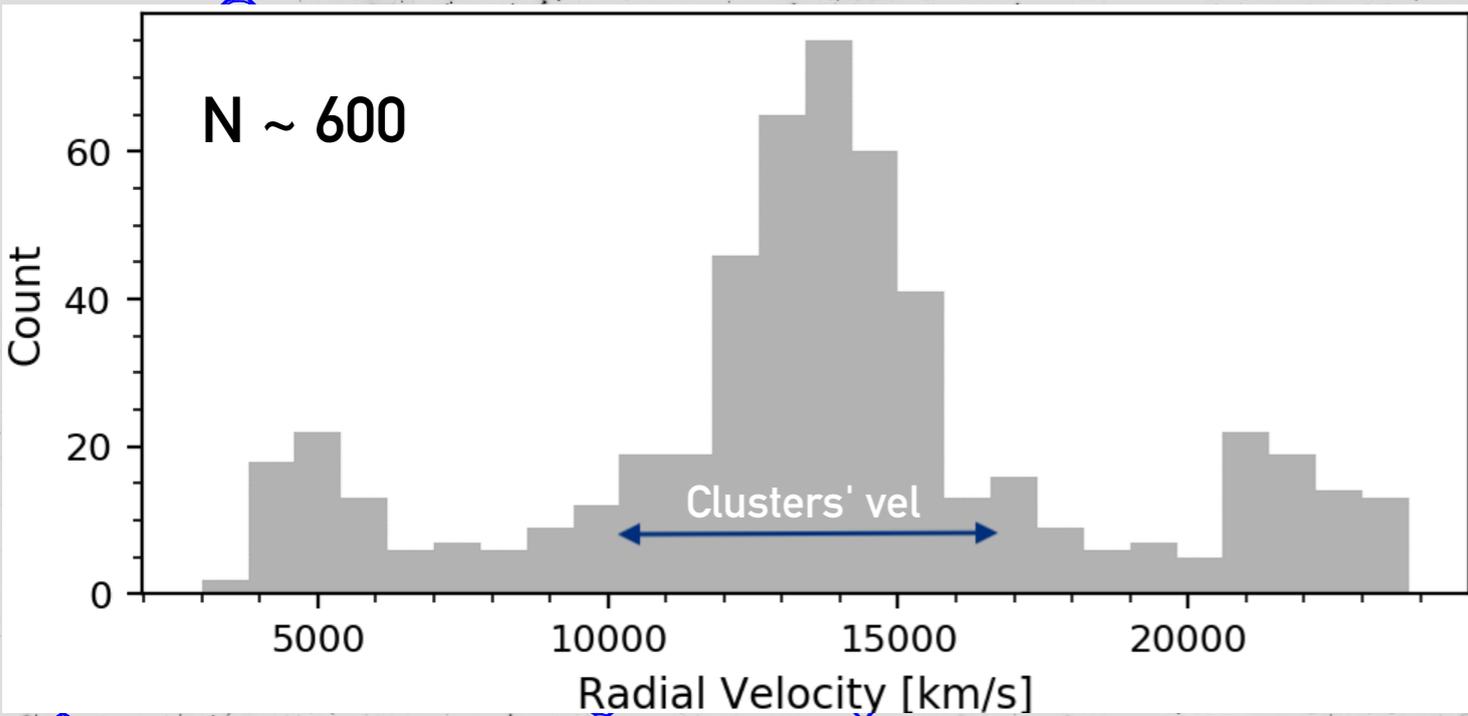
$N_{\text{HI}} \sim 1.5 \times 10^{19} \text{ cm}^{-2}$ (3σ , 45 km/s)

Searching for HI emission

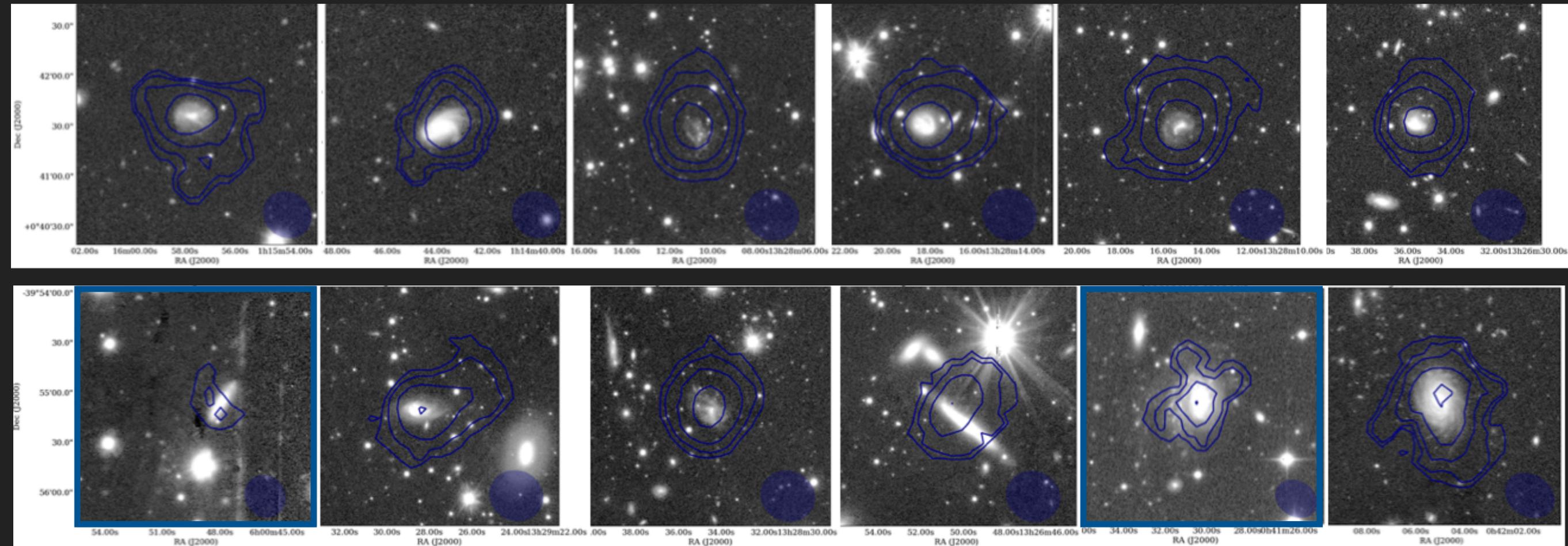


"Blind" source detection

Normal galaxies and jellyfishes



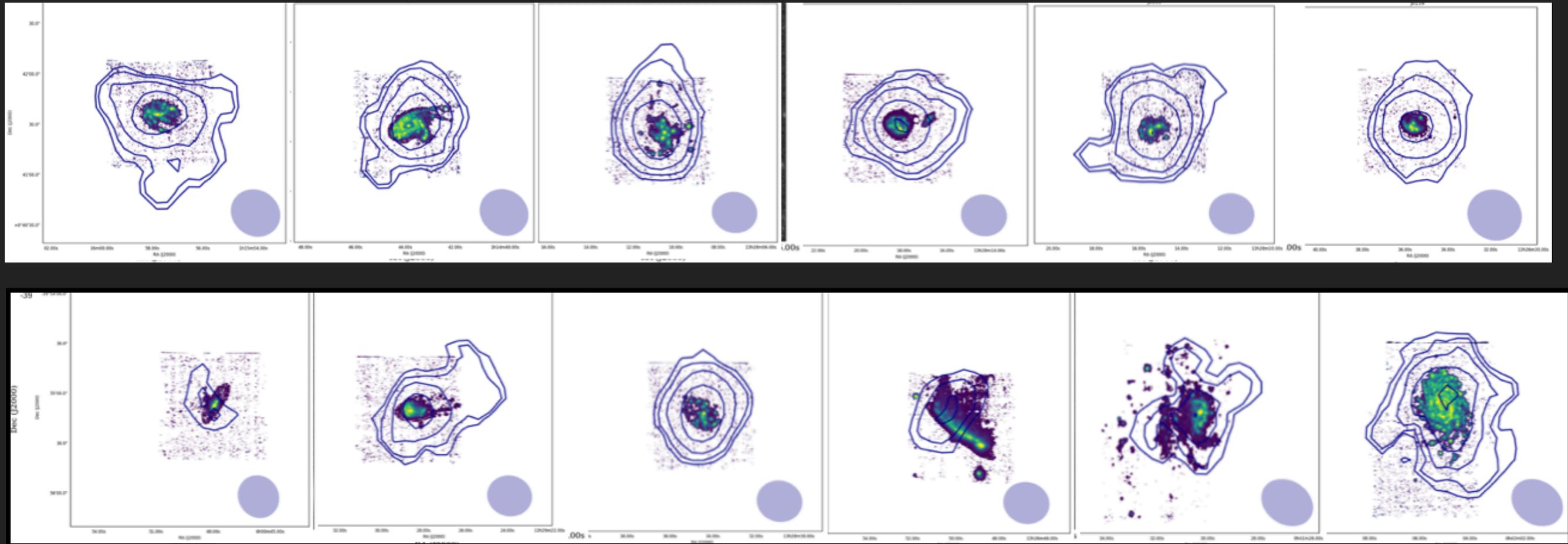
The impact of the ram stripping event on the neutral ISM of JF



One sided HI compression + offset between the peak HI and optical centre

HI masses $\sim 10^8 M_{\odot} - 10^9 M_{\odot}$

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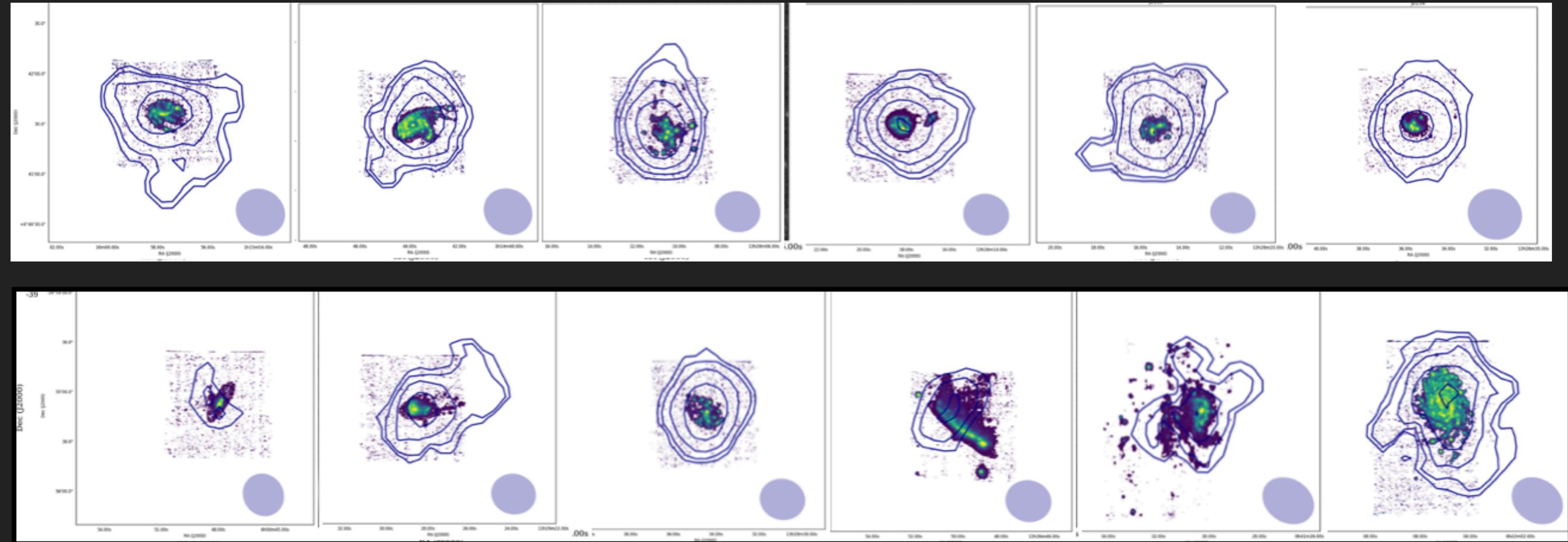


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Most cases: HI in the tails co-spatial with H α

The impact of the ram stripping event on the neutral ISM of JF



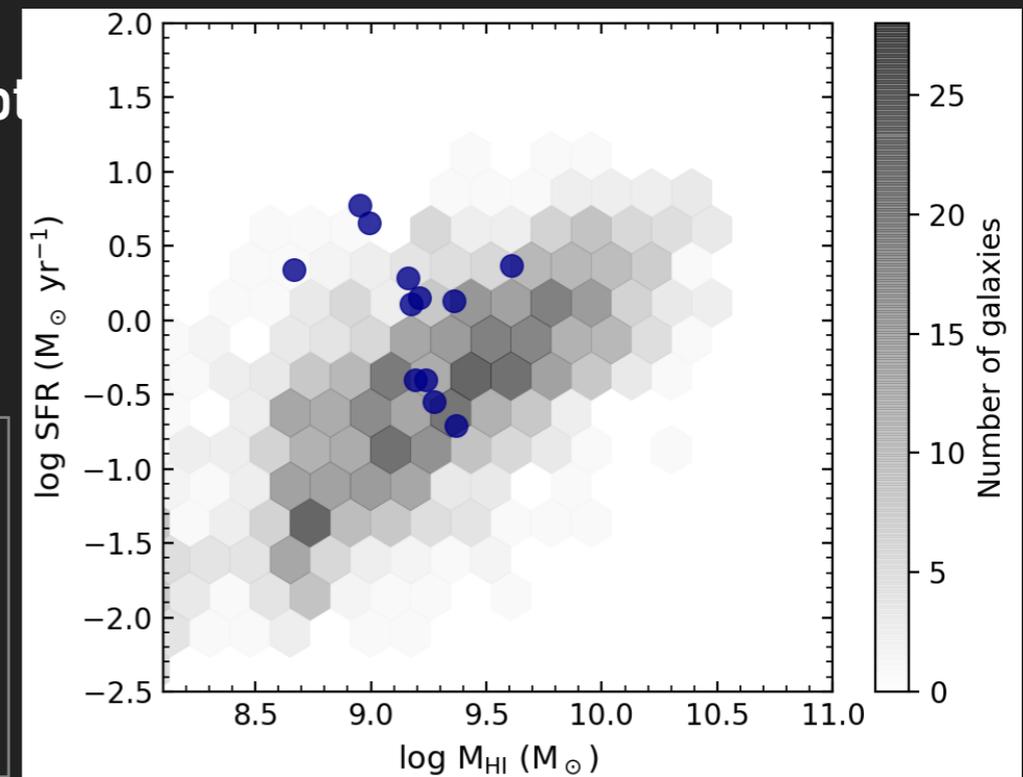
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Enhanced star formation rate for the amount of HI — globally

HI depletion time:
 $\tau_d = M_{\text{HI}}/\text{SFR} \sim 0.2 - 0.7 \text{ Gyr}$



Summary

- MGCLS + OmegaWINGS → GASP Jellyfish galaxies
- Jellyfish galaxies:
 - Retained their HI gas ($10^8 M_{\odot}$ - $10^9 M_{\odot}$)
 - The HI regions trace H α emission entirely (in most cases)
 - Enhanced SFE for the amount of HI detect

So many questions

- How → low-density HI gas cool adequately in the tails resulting in the dense gas and stars?
- how long and why → does HI survive long even when displaced from the disc? (Müller et al, 2021)
- Timescales for HI to H₂? How does it relate with ISM conditions?
- Is the dense gas directly stripped from the discs to produce these tails of young stars?