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HI properties of galaxies in Ursa Major and Perseus-Pisces

the effect of the environment

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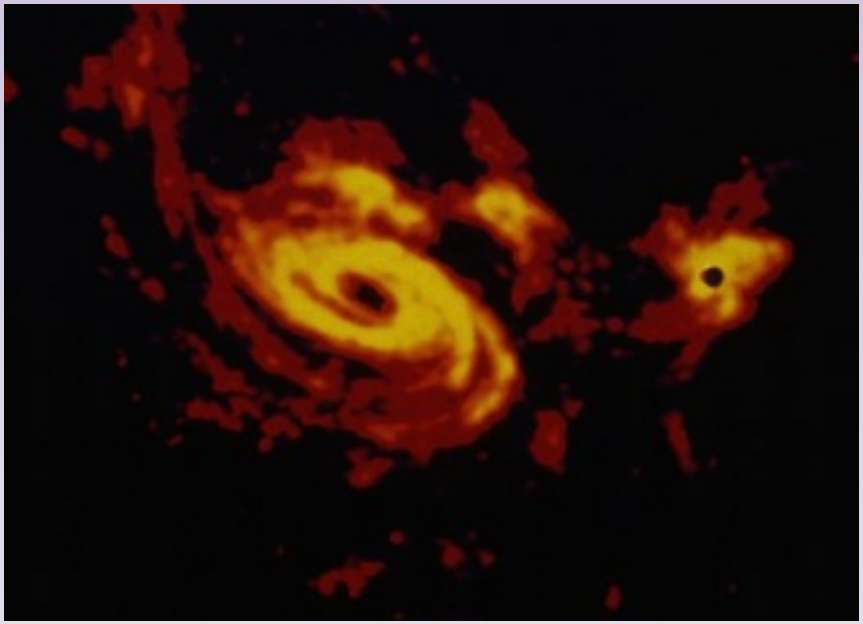
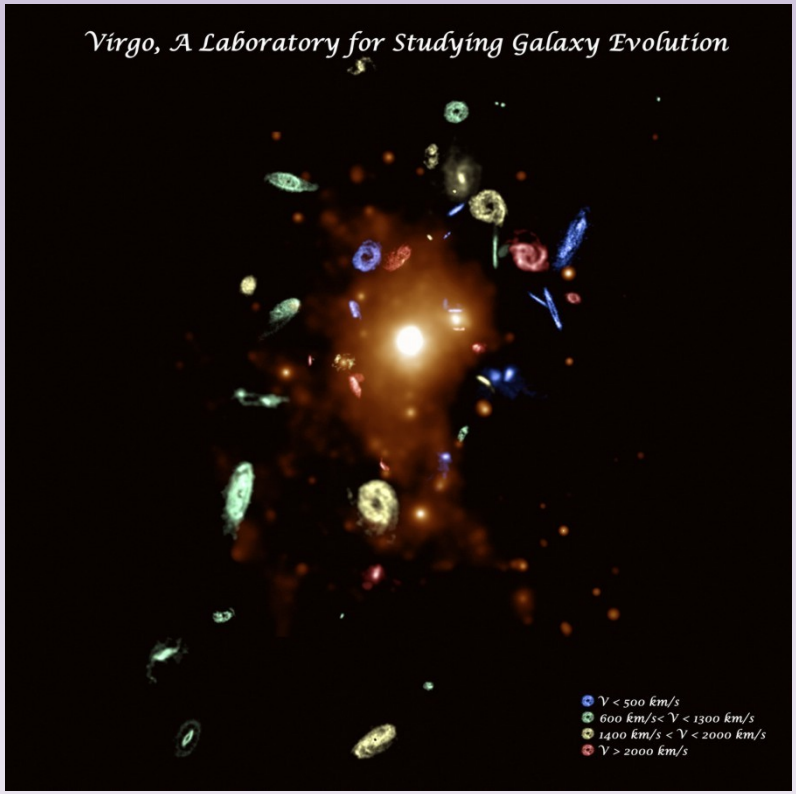
Scientific motivation

What is the influence of the environment on the HI content of galaxies?



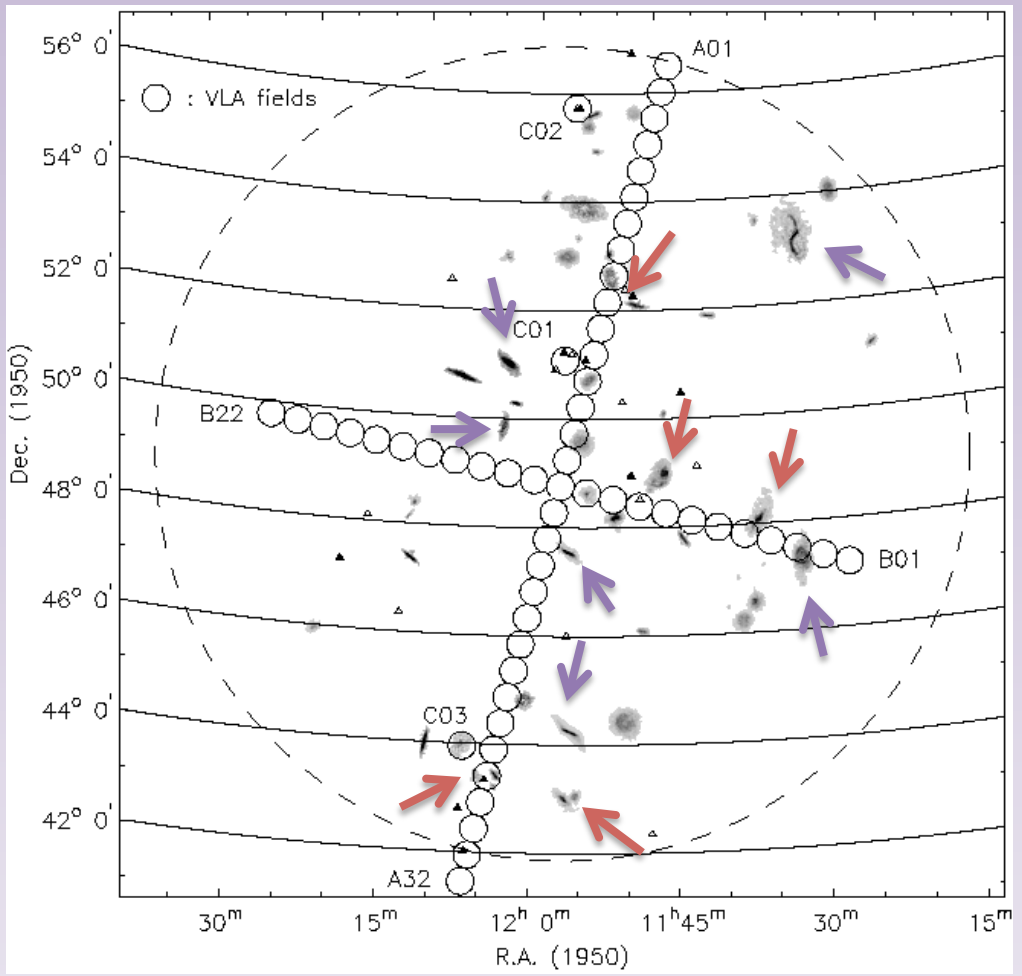


Outline

- Ursa Major region
  - HI survey
  - Blind imaging mosaic
  - HI Mass Function
- Perseus-Pisces filament
  - HI survey
  - Blind imaging mosaic
- Future work
- Conclusion

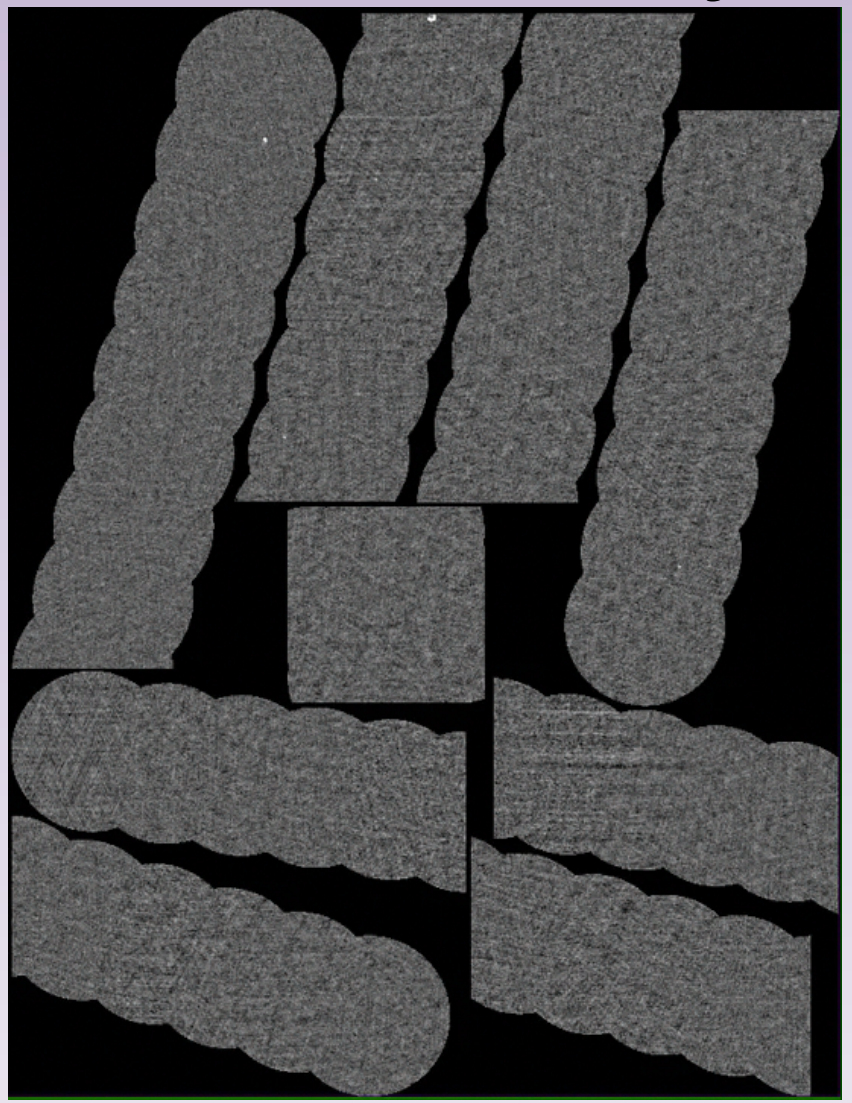
HI imaging surveys of Ursa Major

- Ursa Major region
  - 17.4 Mpc
  - Dominated by late-types
  - No X-ray radiation
- Targeted survey WSRT
  - complete sample $M_B < -16.8$
  - 56 galaxies
- Blind survey VLA-D
  - 54 pointings
  - 16% of volume
  - Θ = 45'', Δv = 10.3 km/s, σ ~ 0.4 mJy/beam)



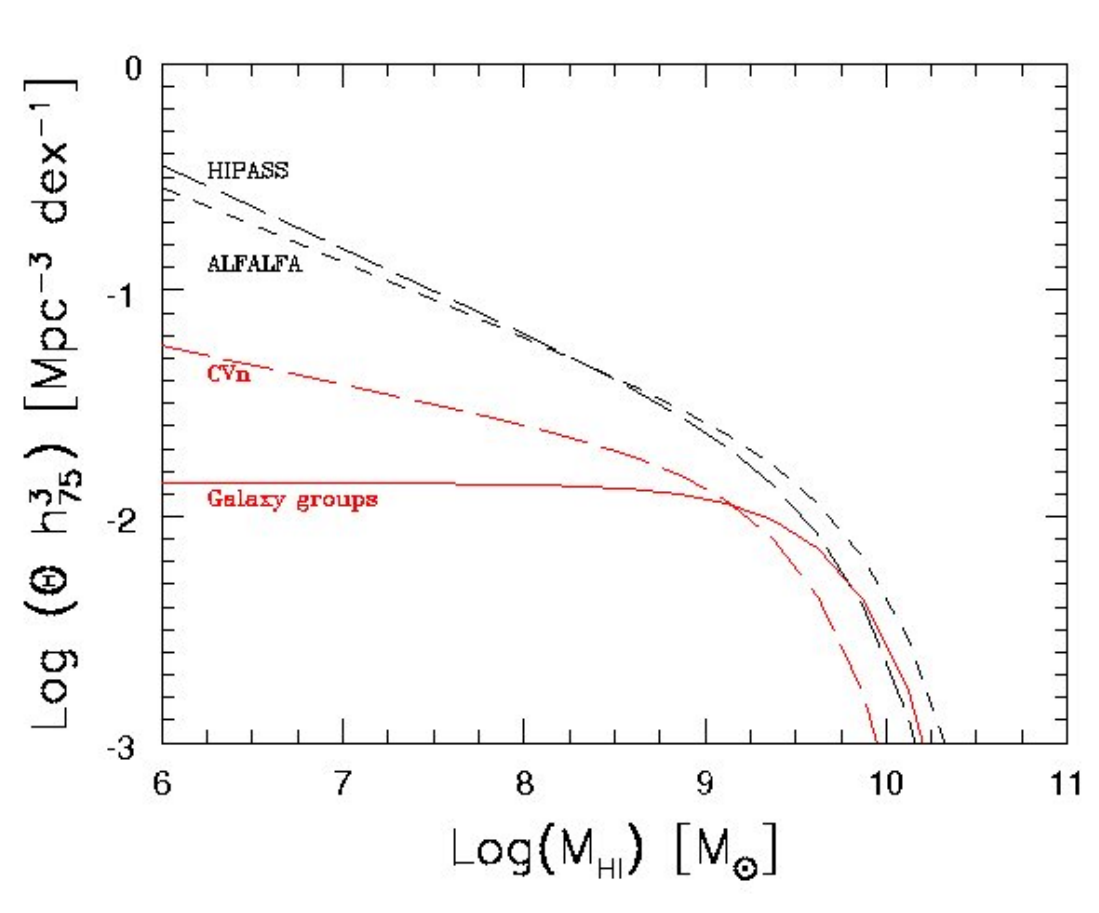
VLA imaging mosaic of Ursa Major

- 41 galaxies detected ($M_{HI,\,min} \sim 10^7\ M_{sun}$)
- Science goals:
  - Study HI morphology and kinematics
  - Slope of HIMF



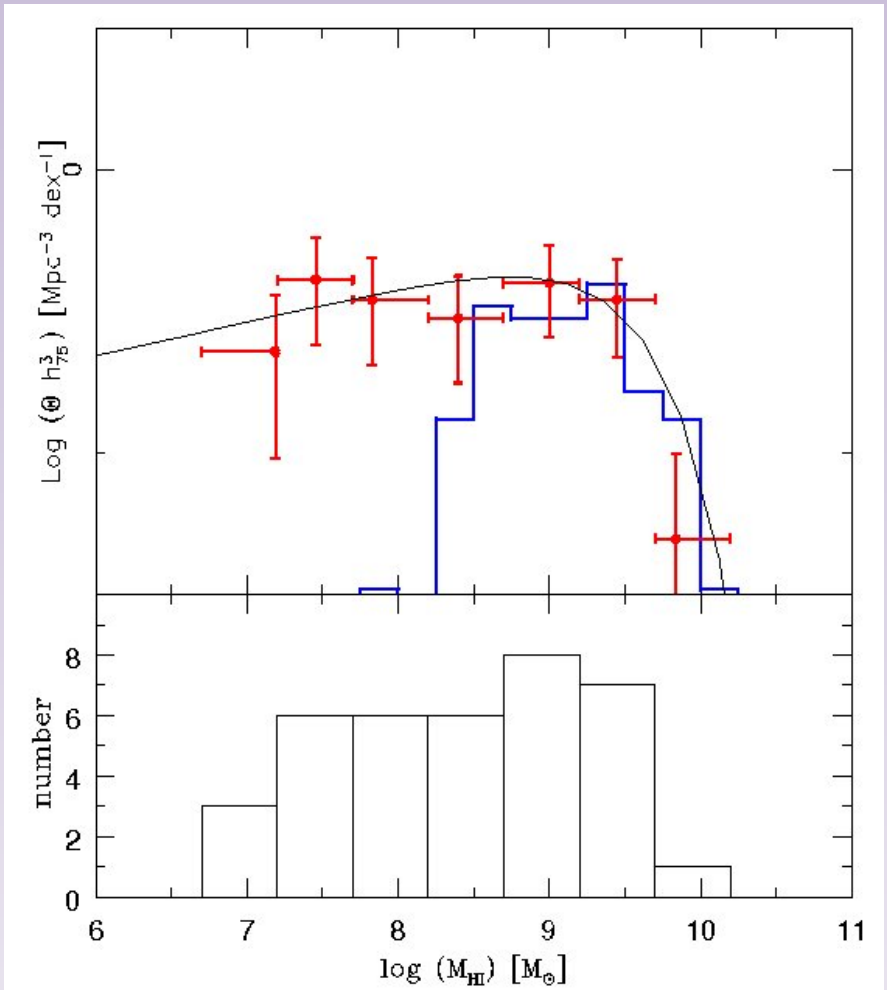
HI mass function

- Galaxy formation and evolution
  - Slope quite different from theoretical prediction
- Environmental dependence
- Statistics:
  - HIPASS: 4,315
  - ALFALFA: 10,119
  - CVn: 70
  - Galaxy groups: 31



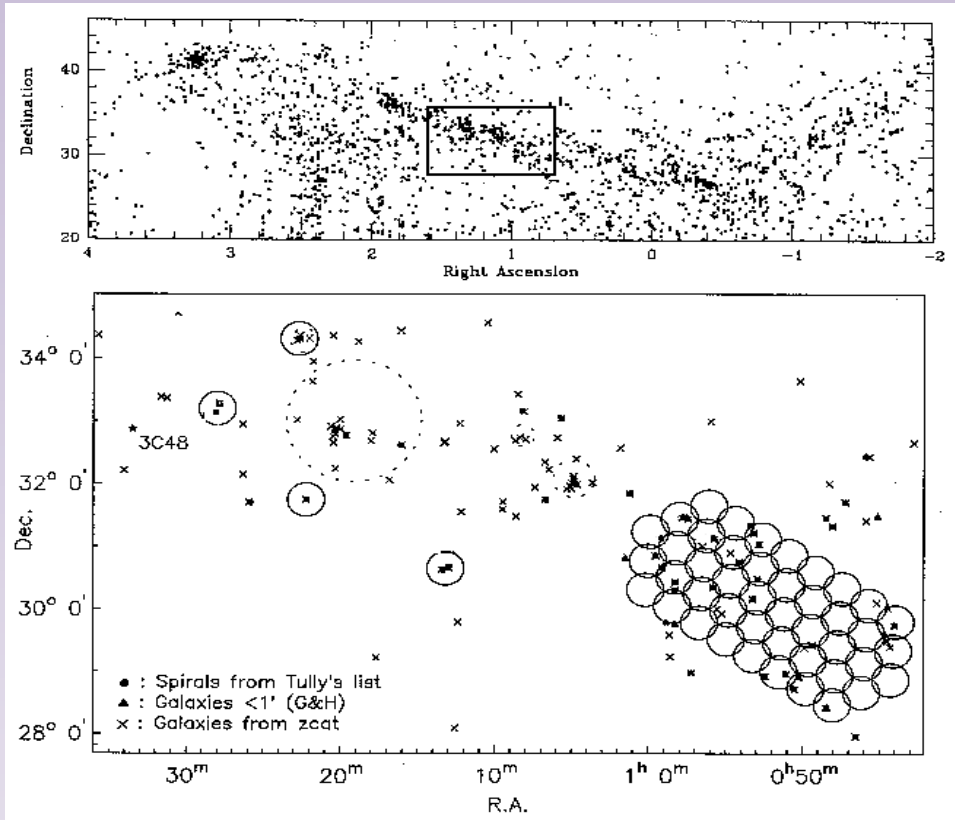
- Completion correction:V/V_{max} method

HIMF of the Ursa Major region

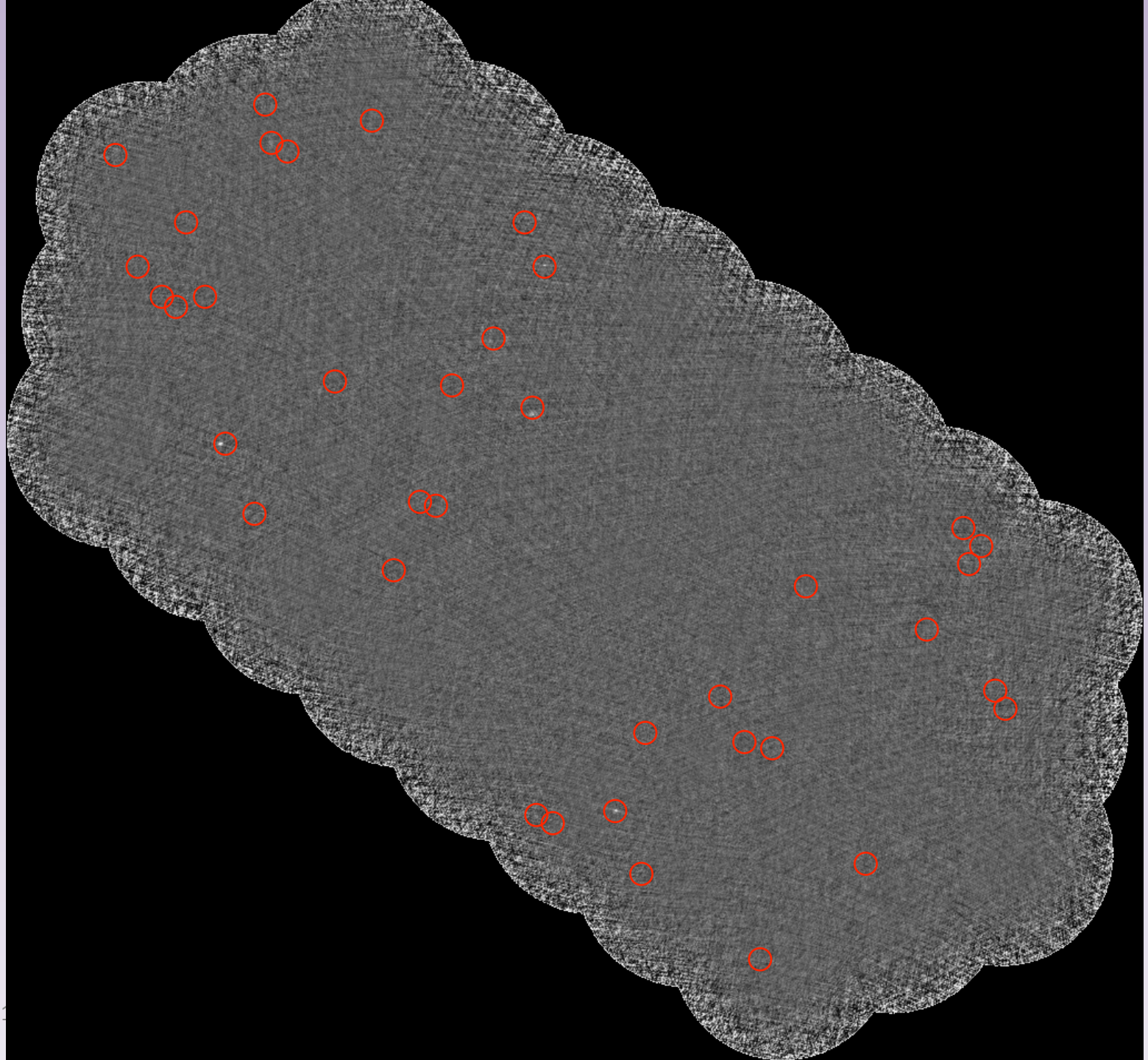


- HIMF of the Ursa Major region:
  - The slope is declining
  - Slope is quite different than HIPASS and ALFALFA
- Environmental dependence

Blind survey of the Perseus-Pisces filament

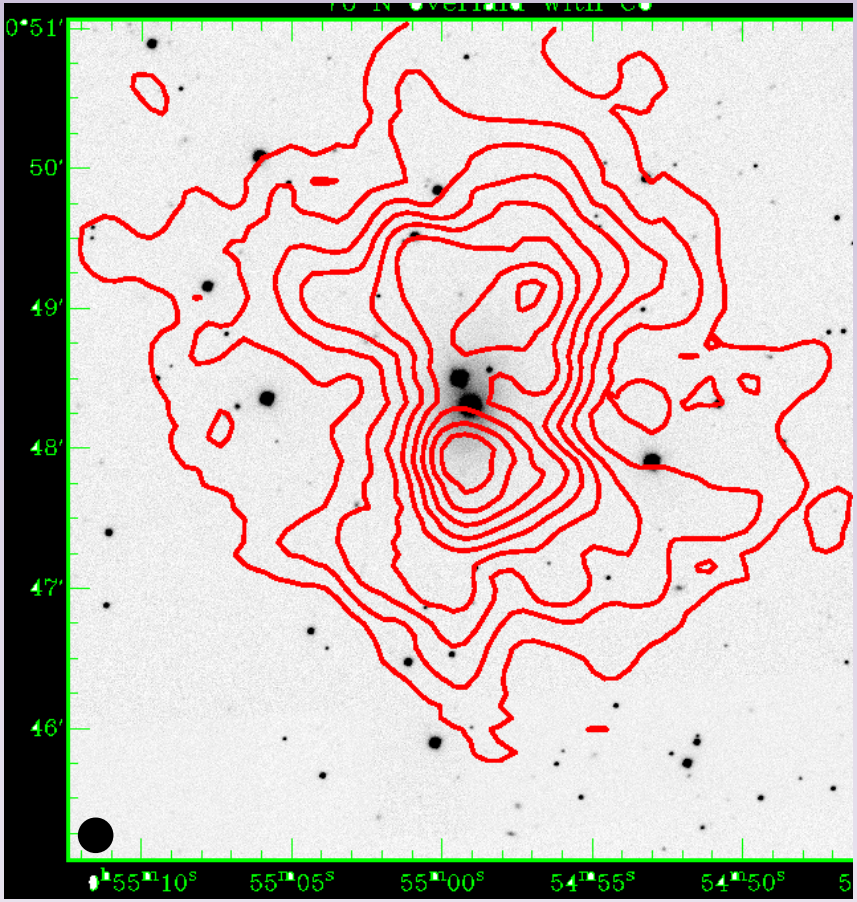


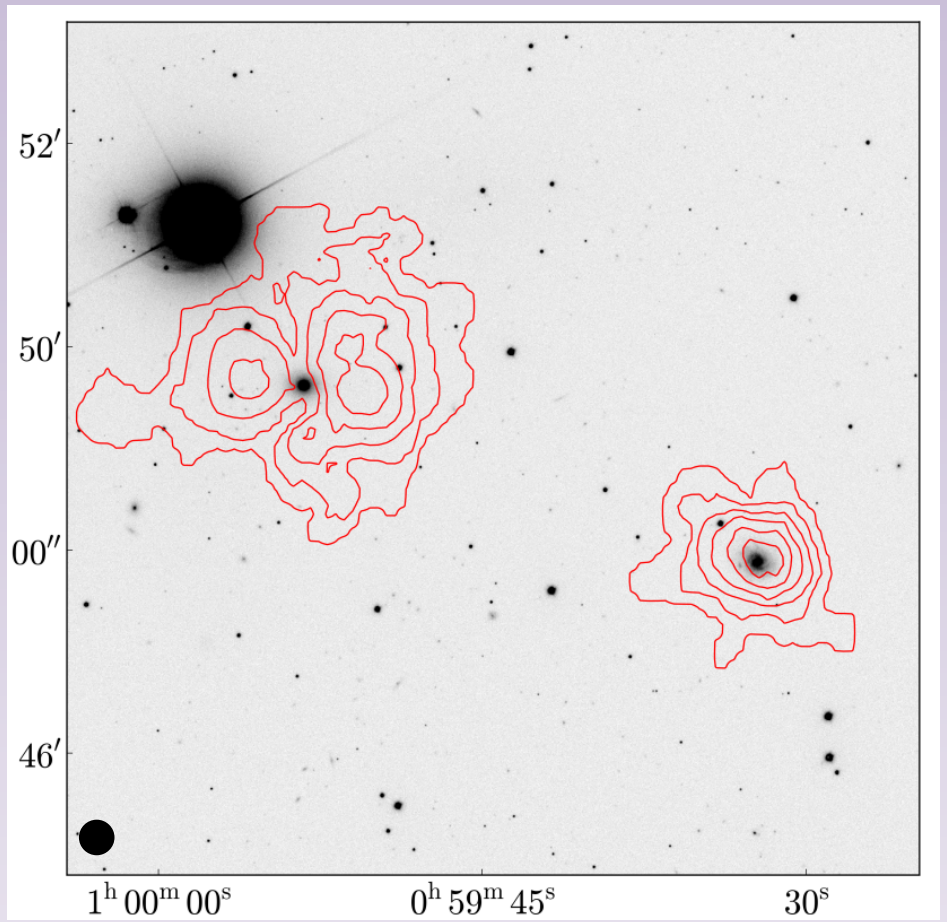
- Blind survey of part of the PP filament
- VLA-C (Θ ~ 15``, Δv ~ 20 km/s, σ ~ 0.8 mJy/beam)
- 44 pointings
- $M_{HI,\,min} = 5 \times 10^8\ M_{sun}$
- Expected ~ 150 galaxies
- 2x4 deg



Preliminary results from mosaic

Early-types with large HI disks

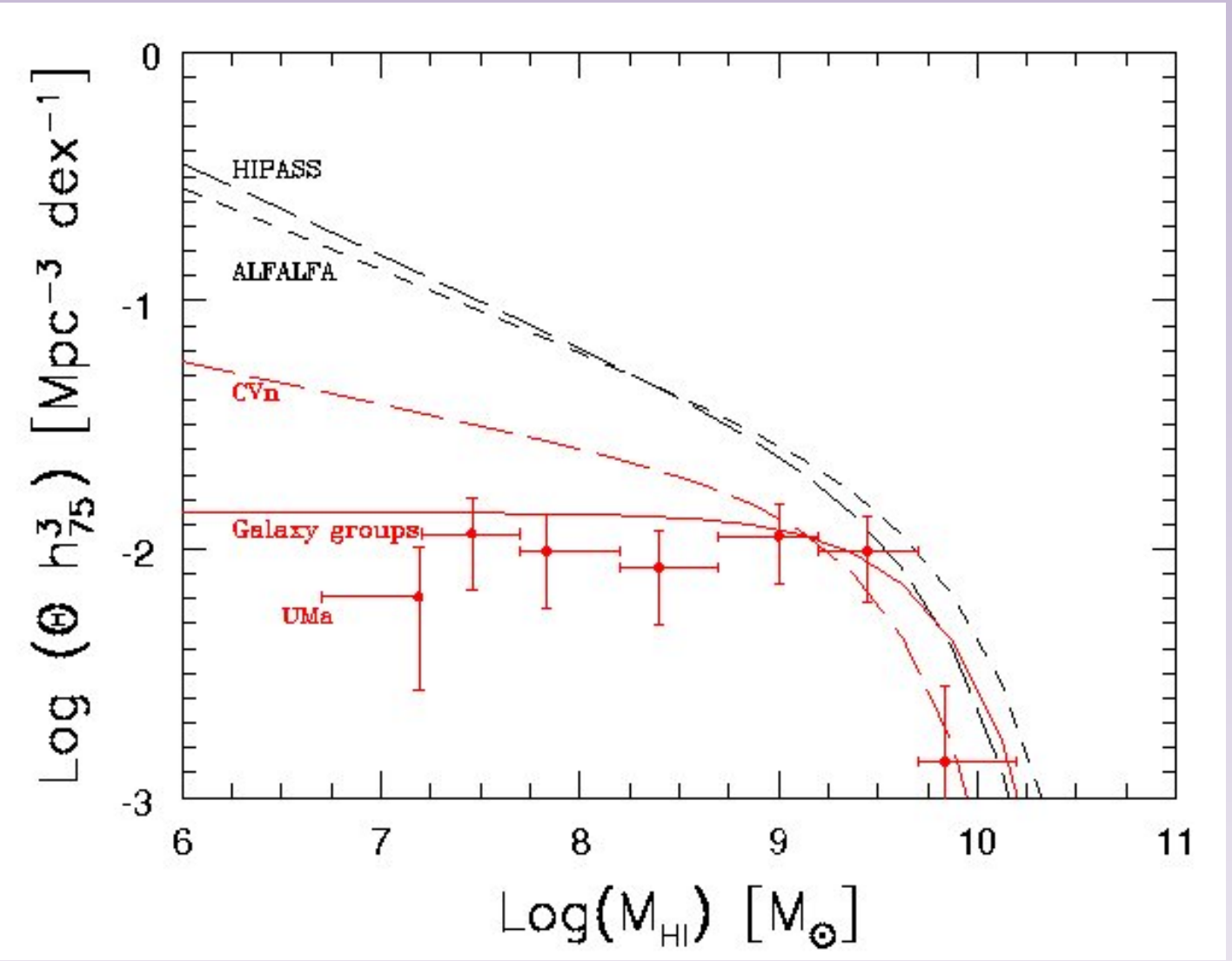




Future work

- Source finding and characterization
- Definitions of environments
- Compare the HI properties of galaxies in Ursa Major and Perseus-Pisces
- Compare to other environments like CVn, Virgo, and Coma

Conclusion


HIPASS
ALFALFA
CVn
Galaxy groups
UMa
Log (Θ h$^3_{75}$) [Mpc^{-3} dex^{-1}]
Log(M$_{HI}$) [M$_\odot$]
0
-1
-2
-3
6
7
8
9
10
11

Thank you!

References:

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