

ALFALFA

The Arecibo Legacy Fast ALFA Survey
of Extragalactic HI

Riccardo Giovanelli
Cornell University



ALFALFA



ALFALFA is a collaboration of >50 people, from 34 institutions in 19 countries. ALFALFA is an **open** collaboration: anybody with a valid scientific interest and a hardworking disposition can join.

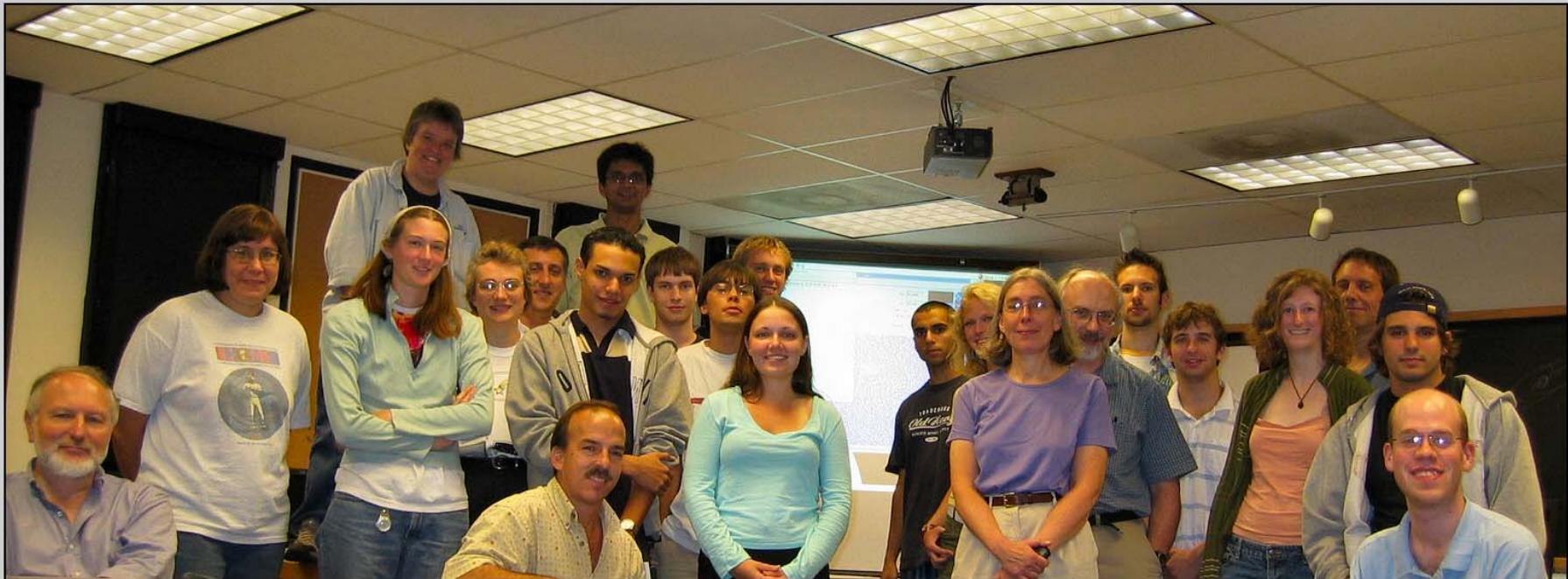
- An extragalactic HI line survey covering 7000 sq deg
- 1345-1435 MHz (-2000 to + 17500 km/s) with 5 km/s res
- 2-pass, drift mode (total integration time per beam \sim 40 sec)
- 1.5-2 mJy rms
- 4000 hrs of telescope time, 5-6 years
- started Feb 2005

<http://egg.astro.cornell.edu/alfalfa>

and Giovanelli et al. 2005a AJ 130,2598 and astro-ph



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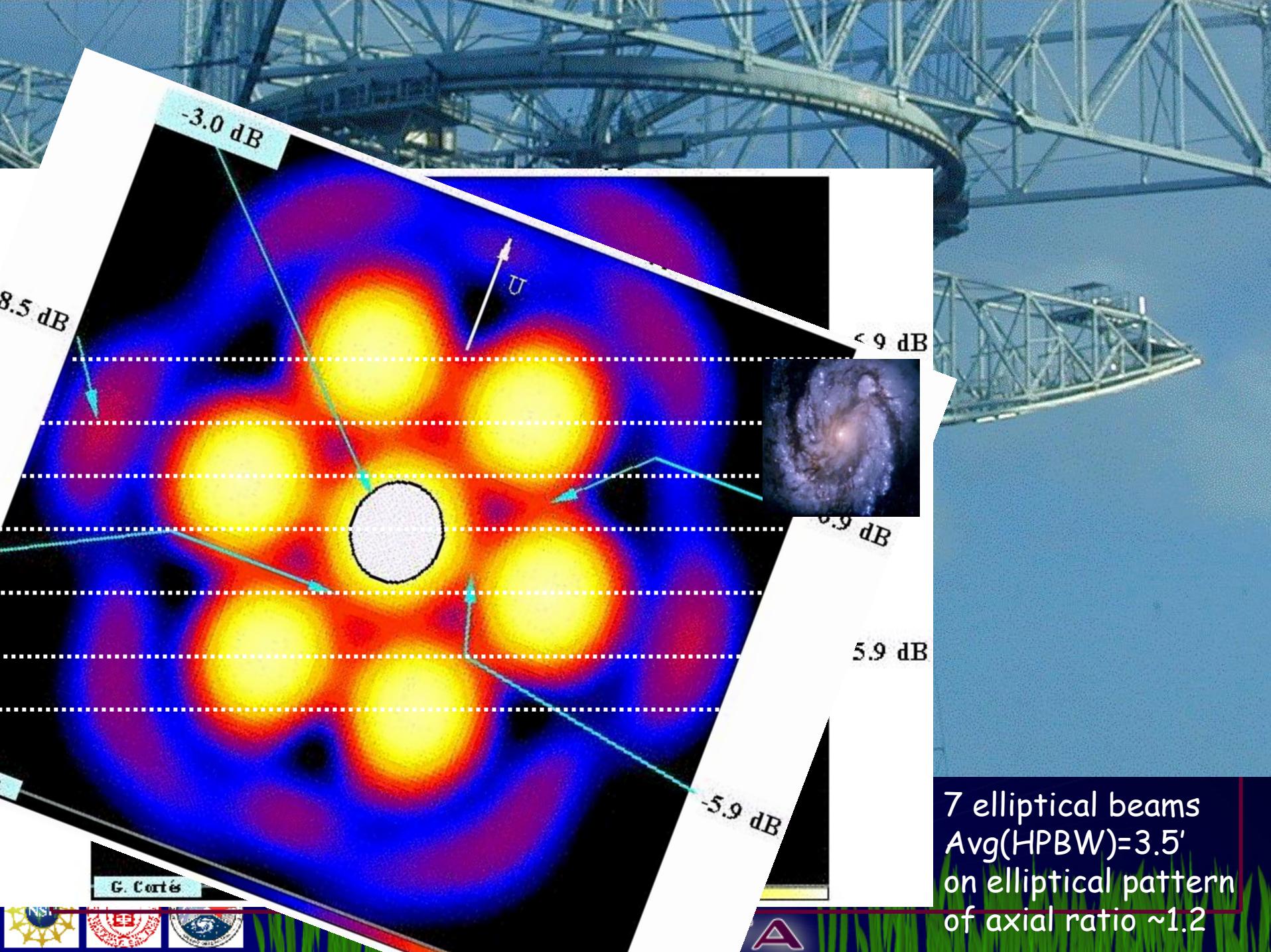
First ALFALFA Undergraduate Workshop
Schenectady, New York
July 2005



See poster by Koopmann et al.



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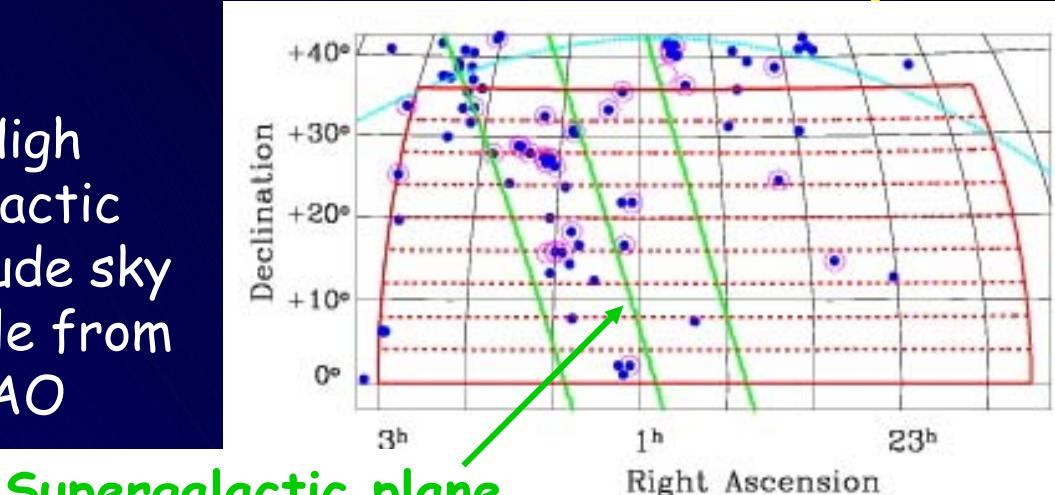


ALFALFA Survey

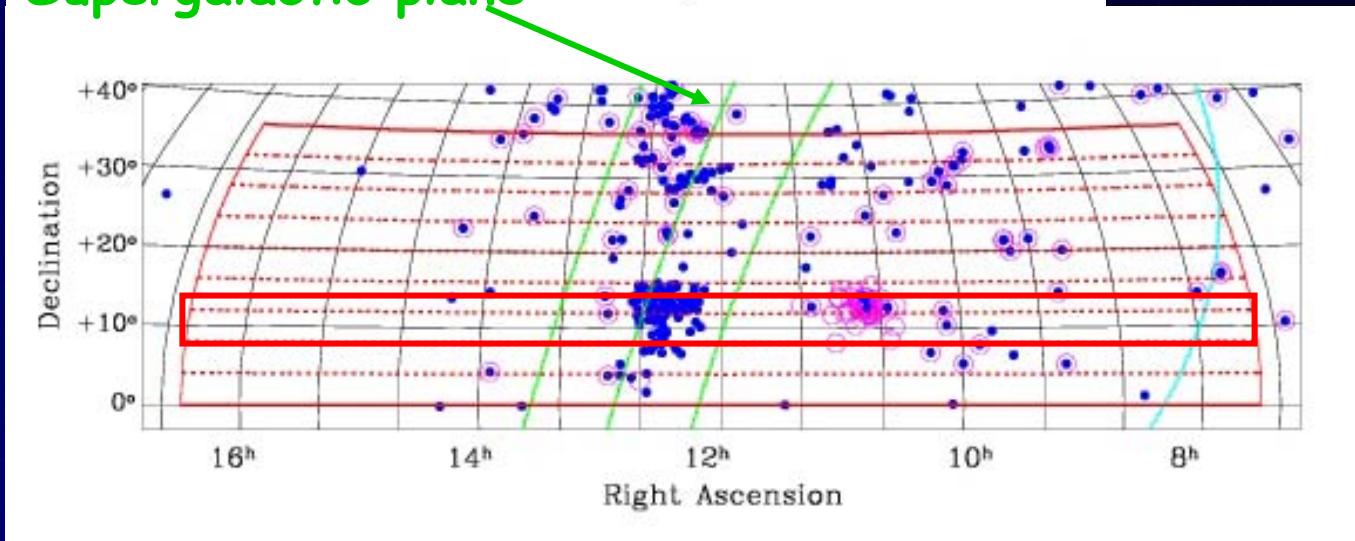


High
galactic
latitude sky
visible from
AO

Supergalactic plane



- Commensal with TOGS HI
- Does not compete with galactic plane surveys



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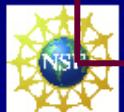
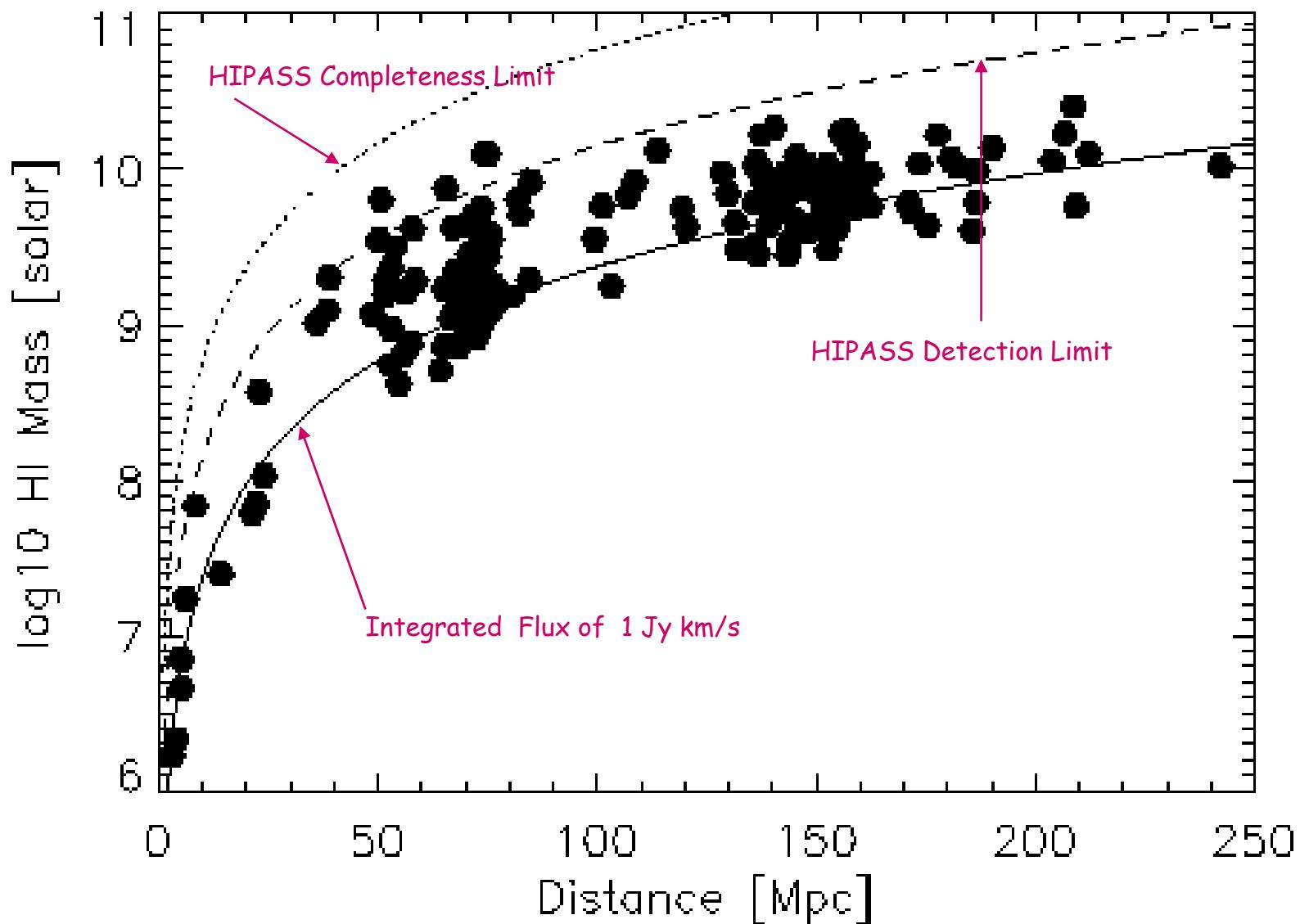
Comparison of blind HI surveys



Survey	Beam arcmin	Area sq. deg.	rms (mJy @ 18 km/s)	min M_{HI} @ 10 Mpc	N_{det}	t_s sec	N_{los}
AHISS	3.3	13	0.7	2.0×10^6	65	var	17,000
ADBS	3.3	430	3.3	9.6×10^6	265	12	500,000
HIPASS	15.	30,000	13	3.6×10^7	4315	460	1.9×10^6
HIJASS	12.	(TBD)	13	3.6×10^7	(?)	3500	(TBD)
J-Virgo	12	32	4	1.1×10^7	31	3500	3200
HIDEEP	15	32	3.2	8.8×10^6	129	9000	2000
ALFALFA	3.5	7,000	1.7	4.4×10^6	20,000?	40	7×10^6

ALFALFA is ~ 1 order of magnitude better than HIPASS in both sensitivity and areal resolution.

ALFALFA Precursor Run



ALFALFA



a1946 Detections: Query Results - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

User Record Viewer

<http://egg.astro.cornell.edu/precursor/detectionsresults.php?source=a1946>

A1946: ALFALFA Precursor

Query | View catalog | SQL Table Schema | VO Table | Velocity Distribution | ALFALFA

Galleries: Optical | 2MASS: J | H | K

a1946 Detections: Query Results

Number of entries returned: 8

Sourcename	R.A.(J2000)	Dec.(J2000)	ϵ_{α}	ϵ_{δ}	ϵ_{cz}	err stat	err sys	W	ϵ_w	rms	Flux	ϵ_f	Map Flux	LBW	Notes
	hh mm ss.s	dd mm ss	sec	"	km/s	km/s	km/s	km/s	km/s	mJy	Jy km/s	Jy km/s	Jy km/s		
H1014105.8+272007	01 41 05.8	+27 20 07	1.3	18	280	2	0	27	4	2.03	0.64	0.06	0.00	L	*
H1014214.9+262202	01 42 14.9	+26 22 02	1.7	23	364	1	0	21	1	1.82	1.06	0.08	0.00		*
H1014441.4+271707	01 44 41.4	+27 17 07	0.7	10	430	2	0	38	2	1.82	2.02	0.15	2.89		*
H1014640.9+264754	01 46 40.9	+26 47 54	2.3	31	370	2	0	21	3	2.09	0.68	0.06	0.00		*
H1014729.9+271958	01 47 29.9	+27 19 58	0.0	0	351	2	0	117	3	1.88	54.39	3.81	0.00		*
H1014753.9+272555	01 47 53.9	+27 25 55	0.0	0	436	2	0	175	3	1.77	69.25	4.85	0.00		*
H1015519.24+275645	01 55 19.2	+27 56 45	1.0	13	219	1	0	21	2	2.11	0.79	0.07	0.00		*
H1021404.34+275302	02 14 04.3	+27 53 02	0.8	12	594	2	0	81	3	1.91	3.87	0.29	6.28	L	*



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ALFALFA Posters

- Ayala et al. (179.21)
- Giovanelli et al. (179.22)
- Haynes et al. (179.23)
- Kent et al. (179.20)
- Koopmann et al. (179.24)
- Saintonge et al. (187.02)
- Spekkens et al. (179.25)
- Stierwalt et al. (187.03)

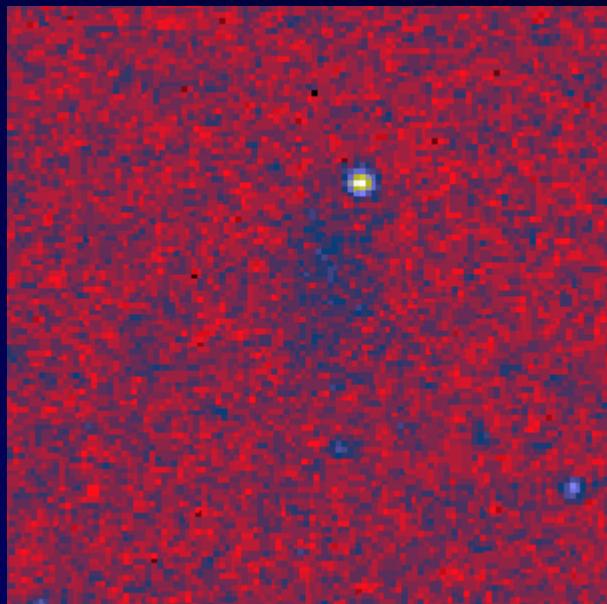




A Few examples of ALFALFA Detections



ALFALFA



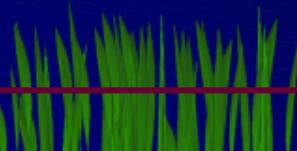
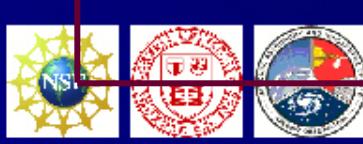
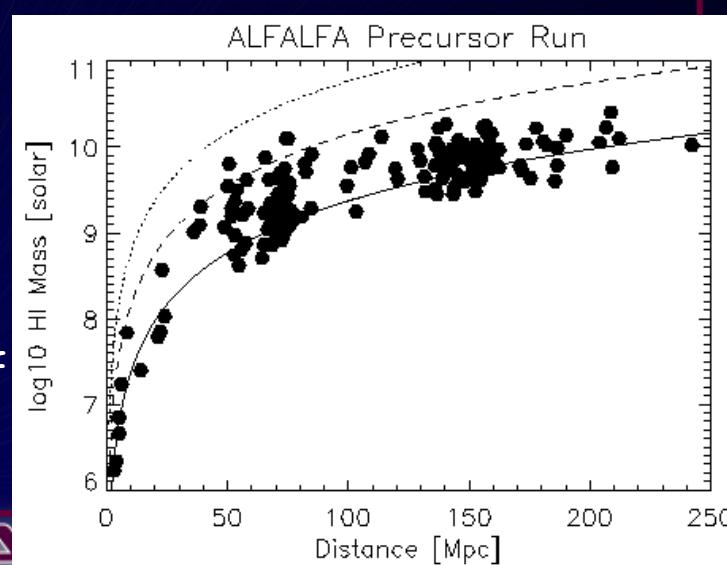
HPBW=3.8'x3.3'

800 pc

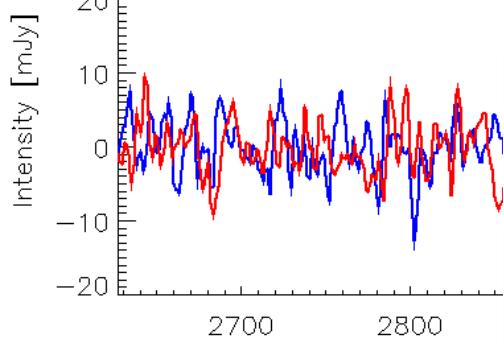
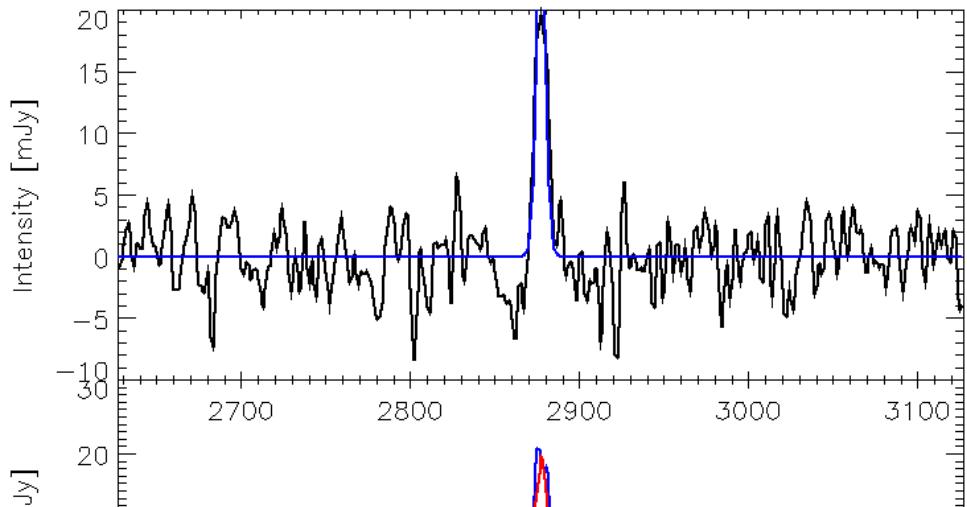
Distance ~ 8 Mpc

$M_{\text{HI}} = 2.8 \times 10^6 \text{ Msun}$

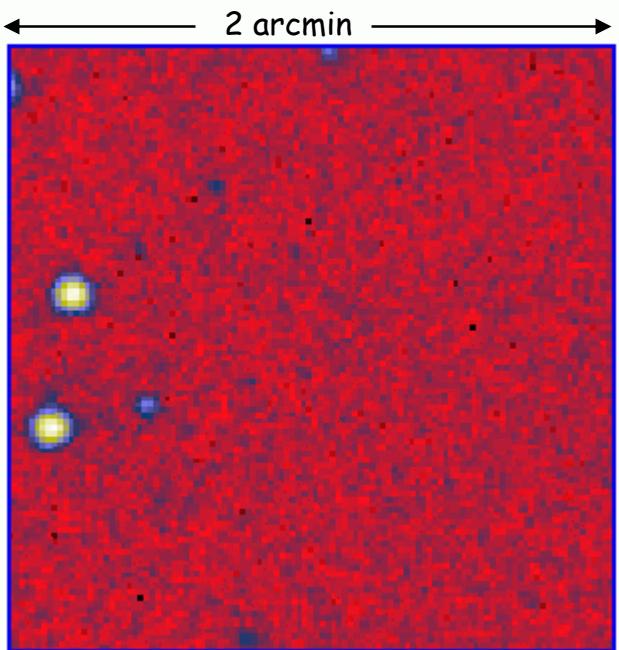
Giovanelli et al. (2005b, AJ 130, 2614): results of



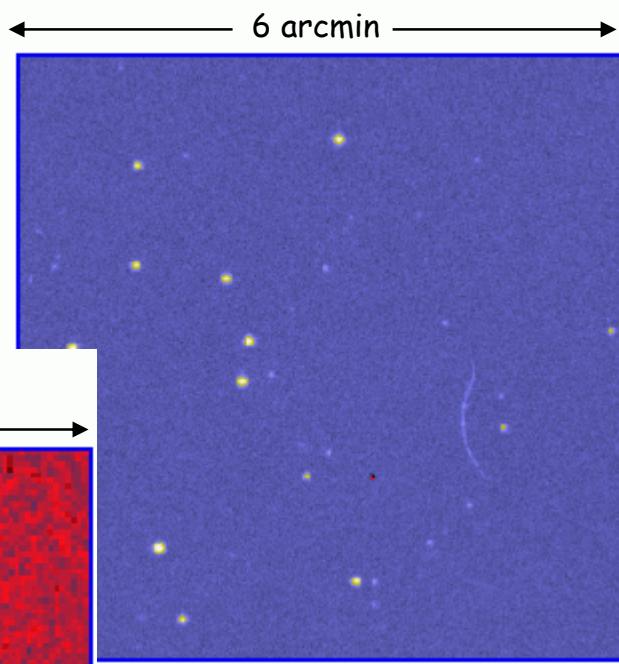
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DSS2 Blue



DSS2 Blue



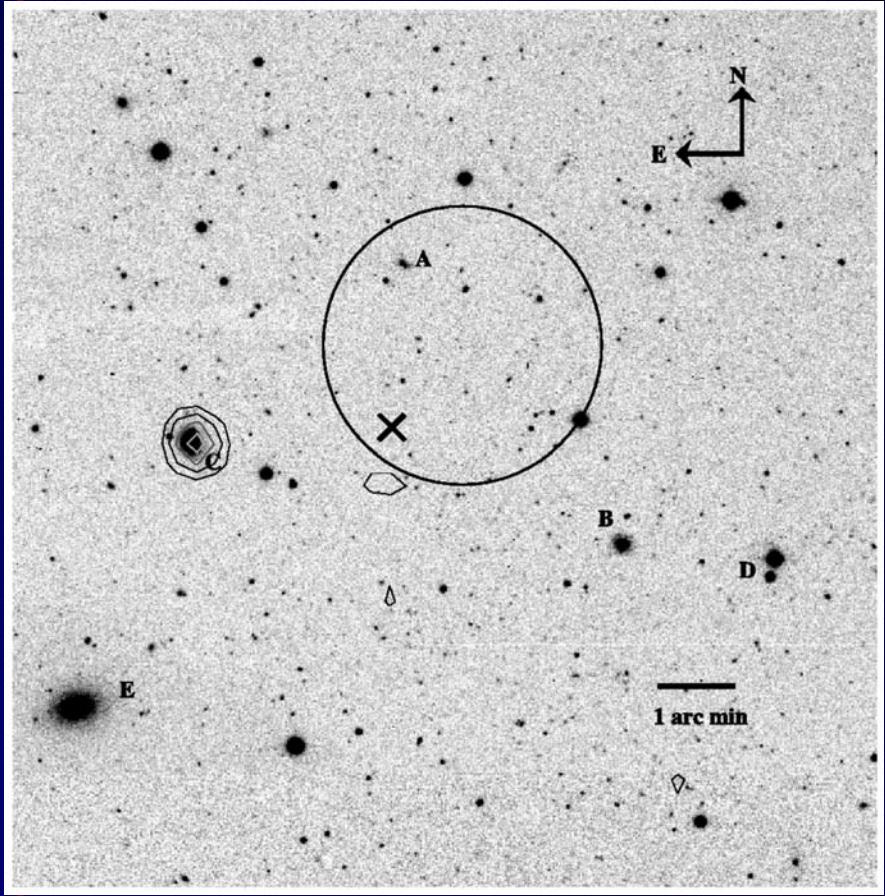
$cz = 3264 \text{ km/s}$
 $M_{\text{HI}} = 3.5 \times 10^8 \text{ Msun}$

See posters by
 Saintonge et al.
 Kent et al.
 Stierwalt et al.



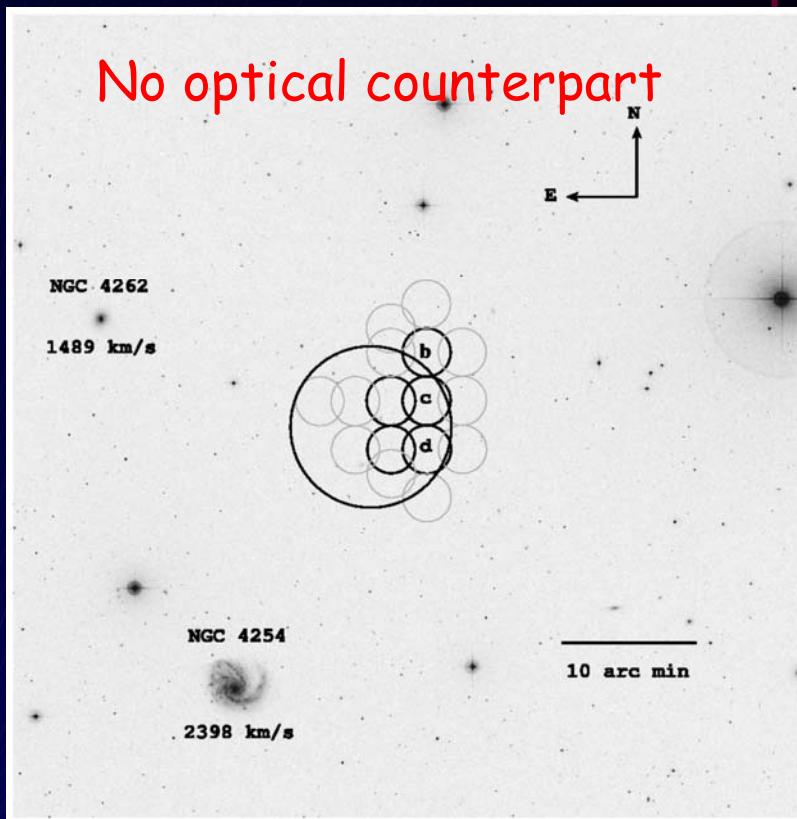
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An isolated "dark cloud" in Virgo?

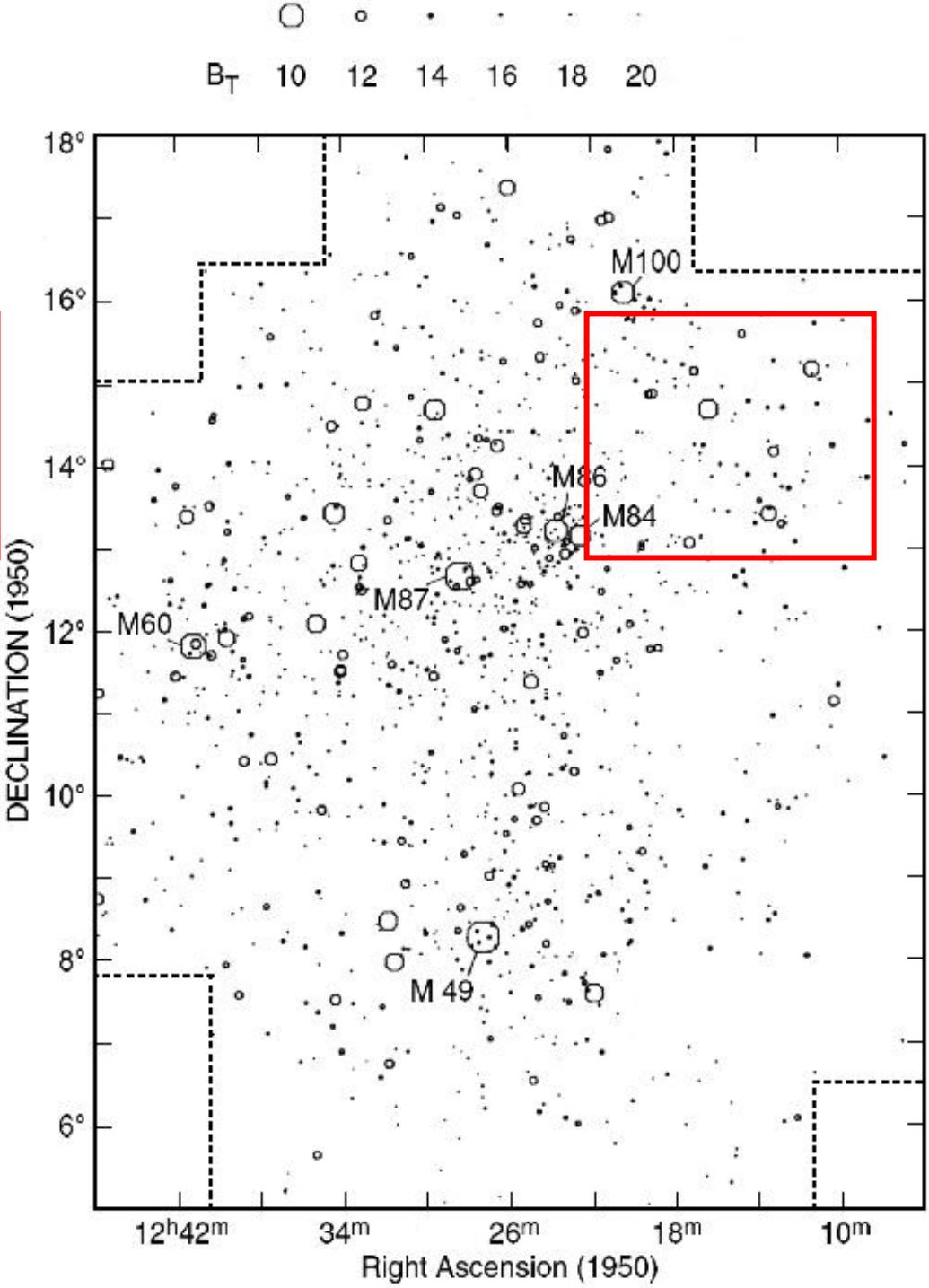
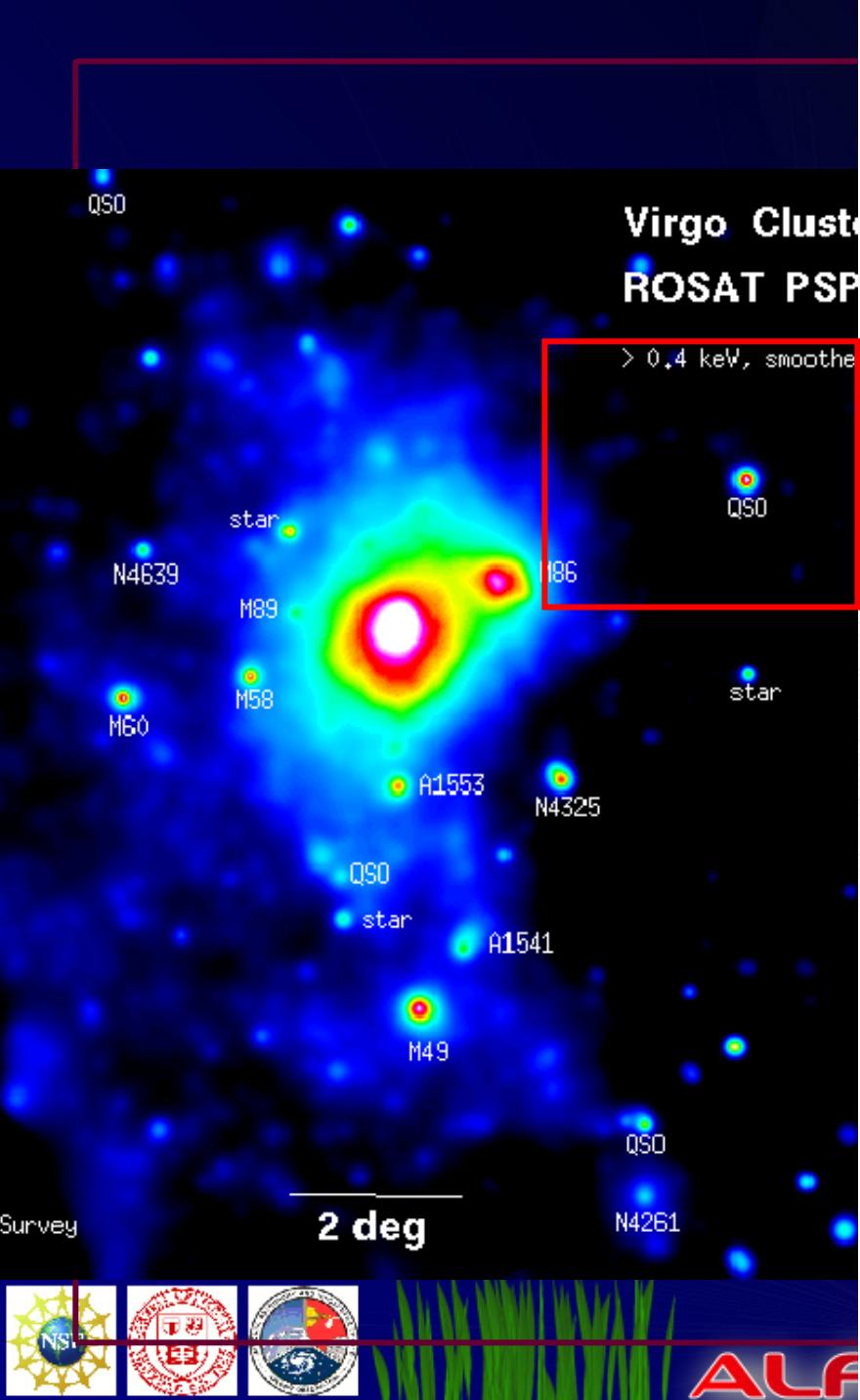


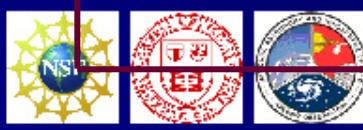
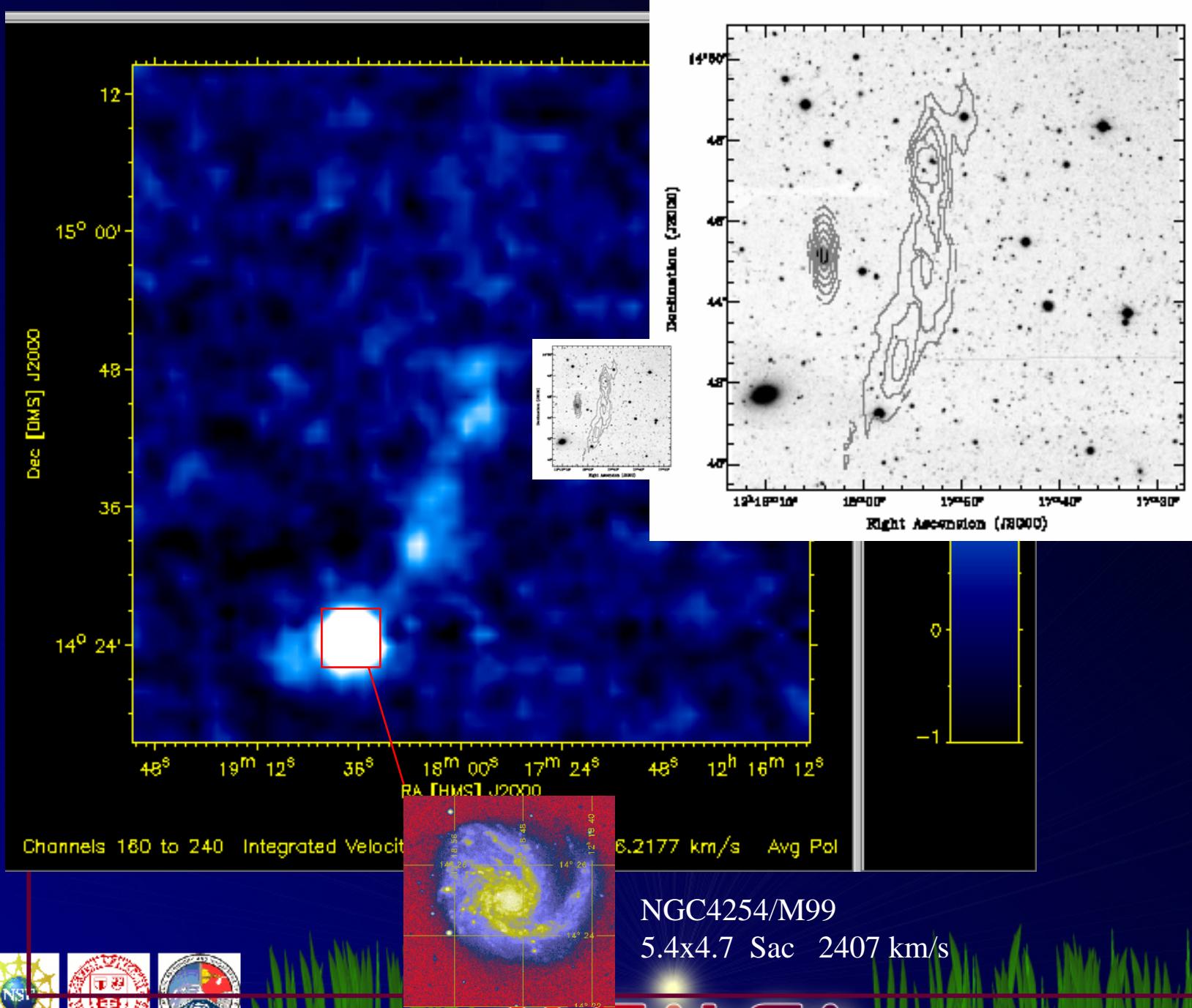
HI mass: $2 \times 10^8 M_{\odot}$
 $\Delta V = 220$ km/s; extends > 16 kpc

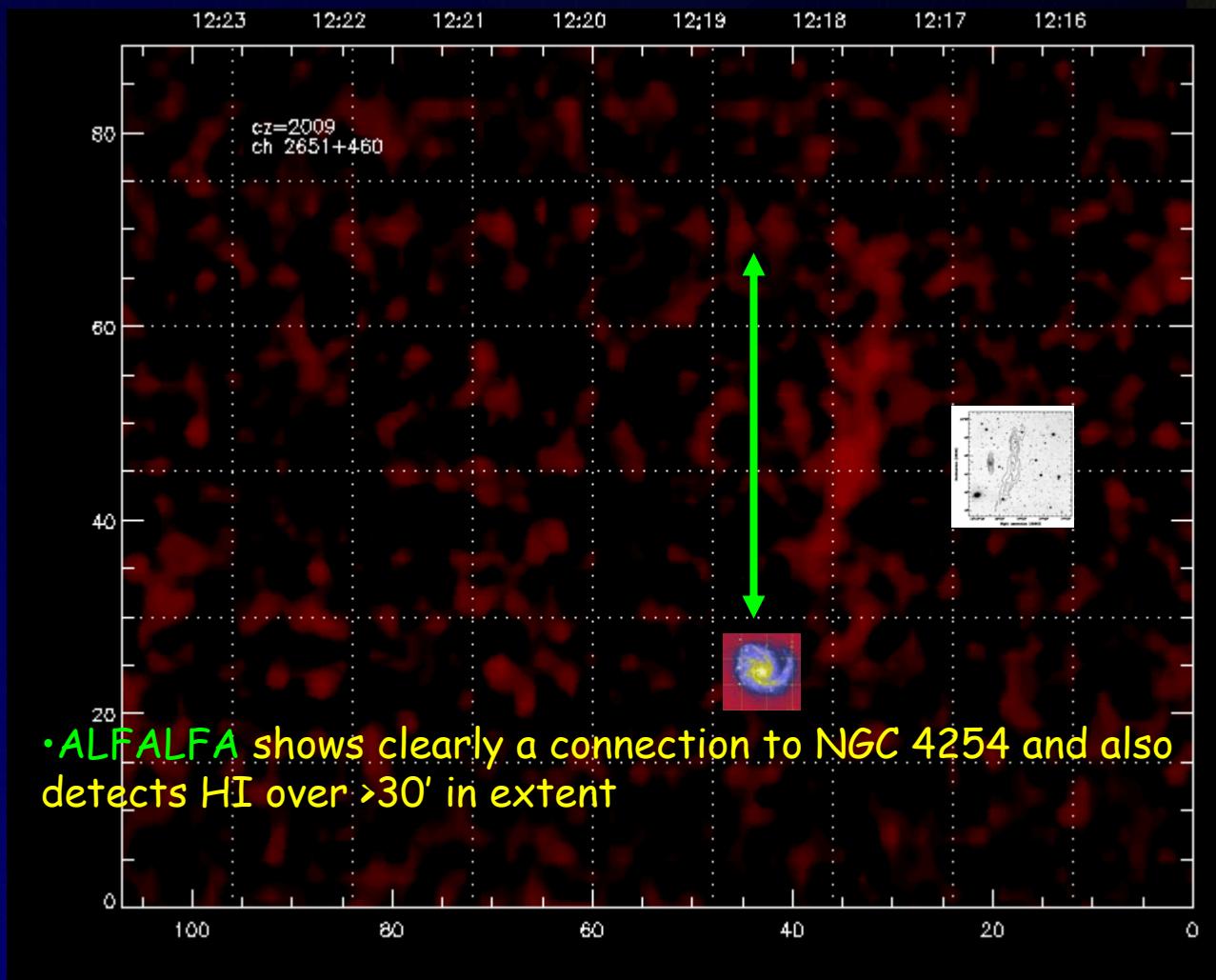
Davies et al 2004
Minchin et al 2005



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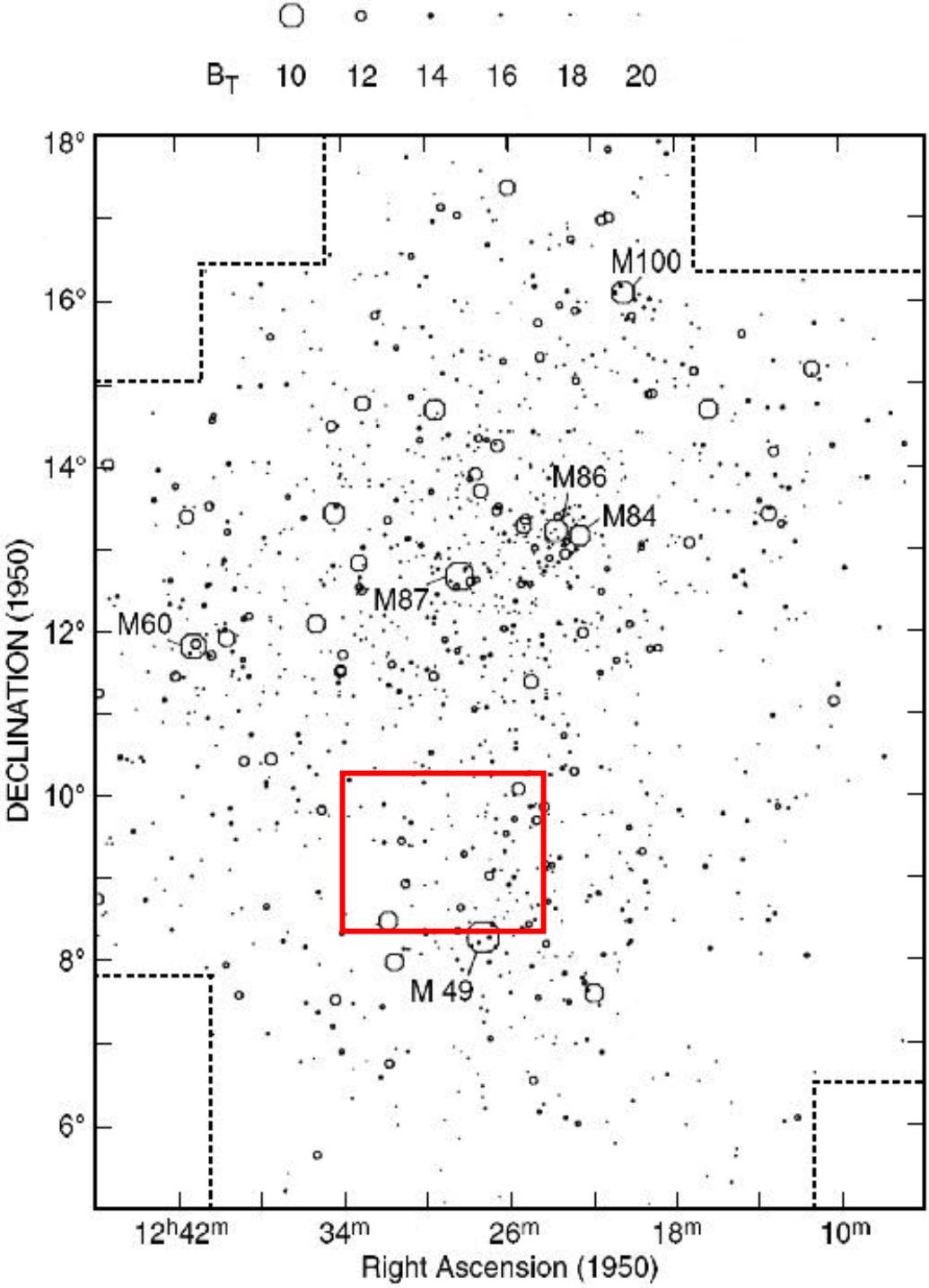
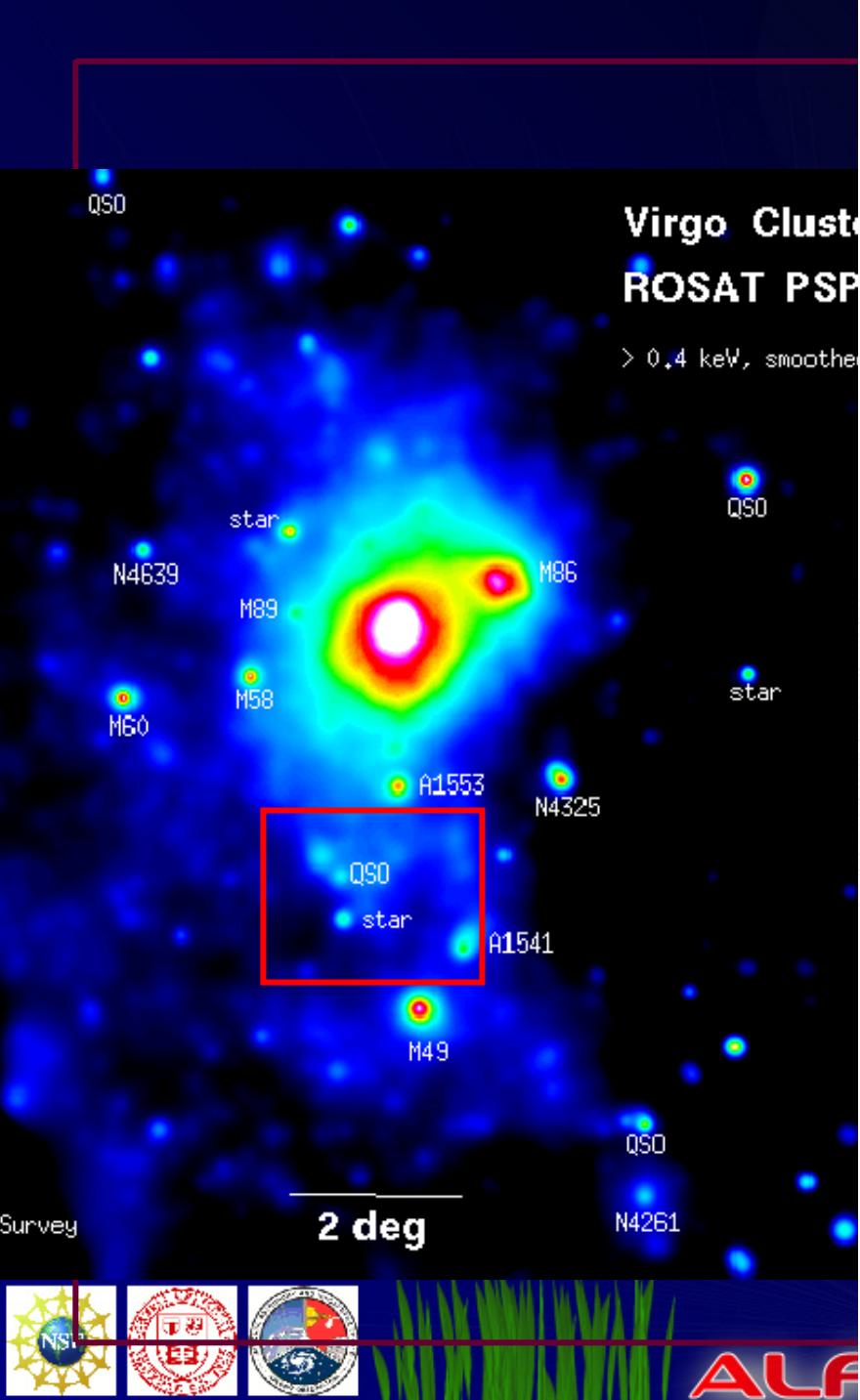


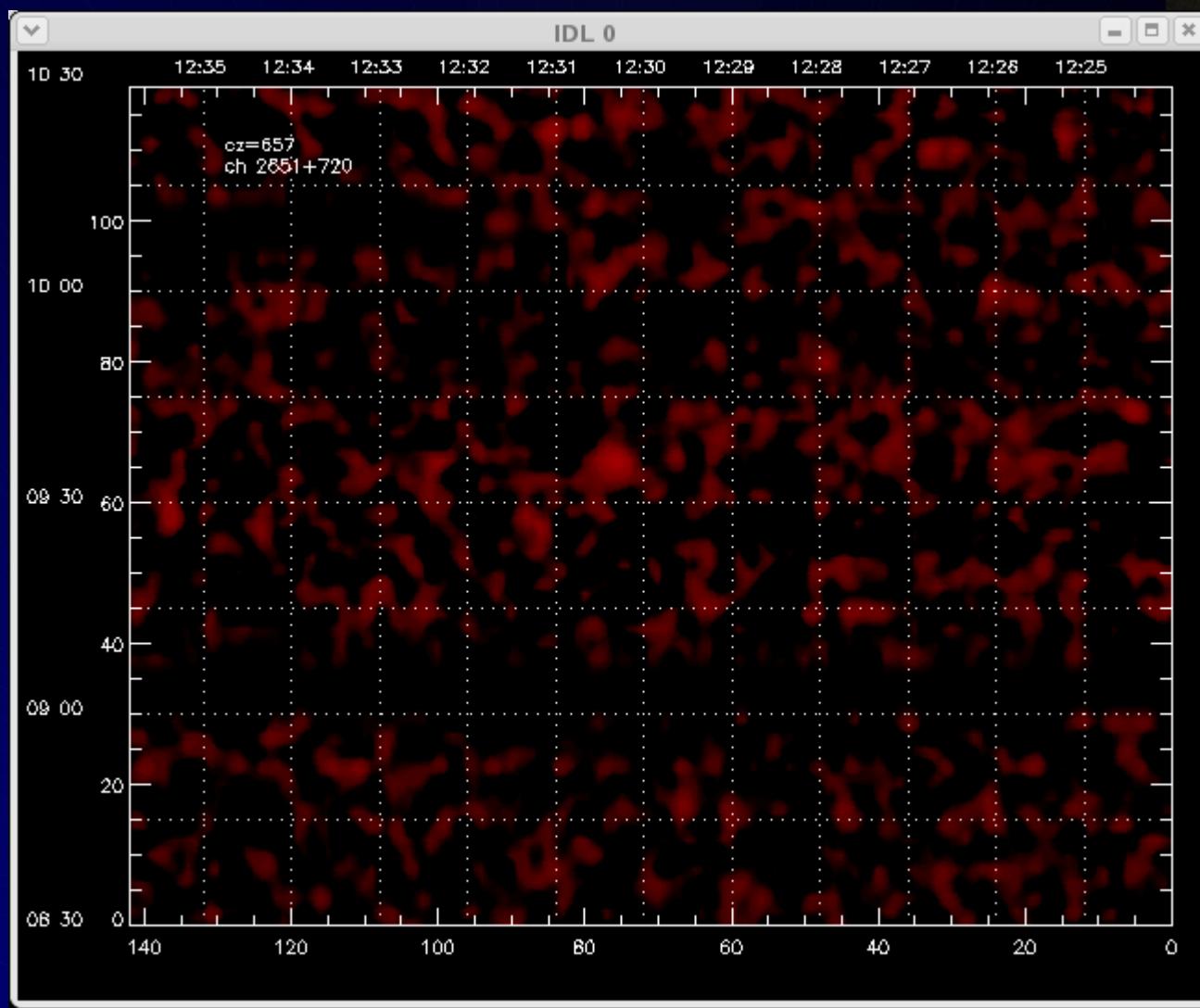


See poster by Haynes et al. for details

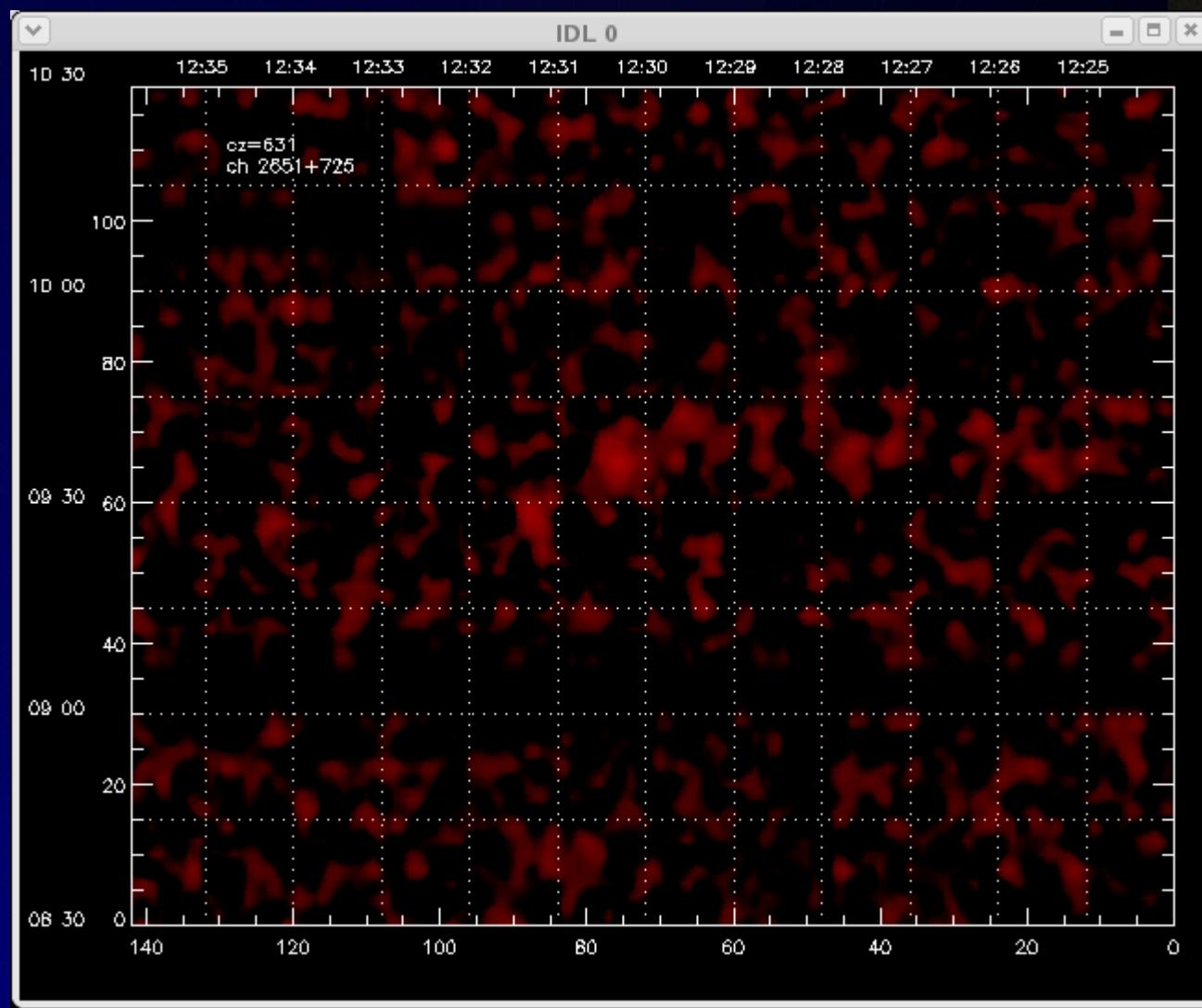


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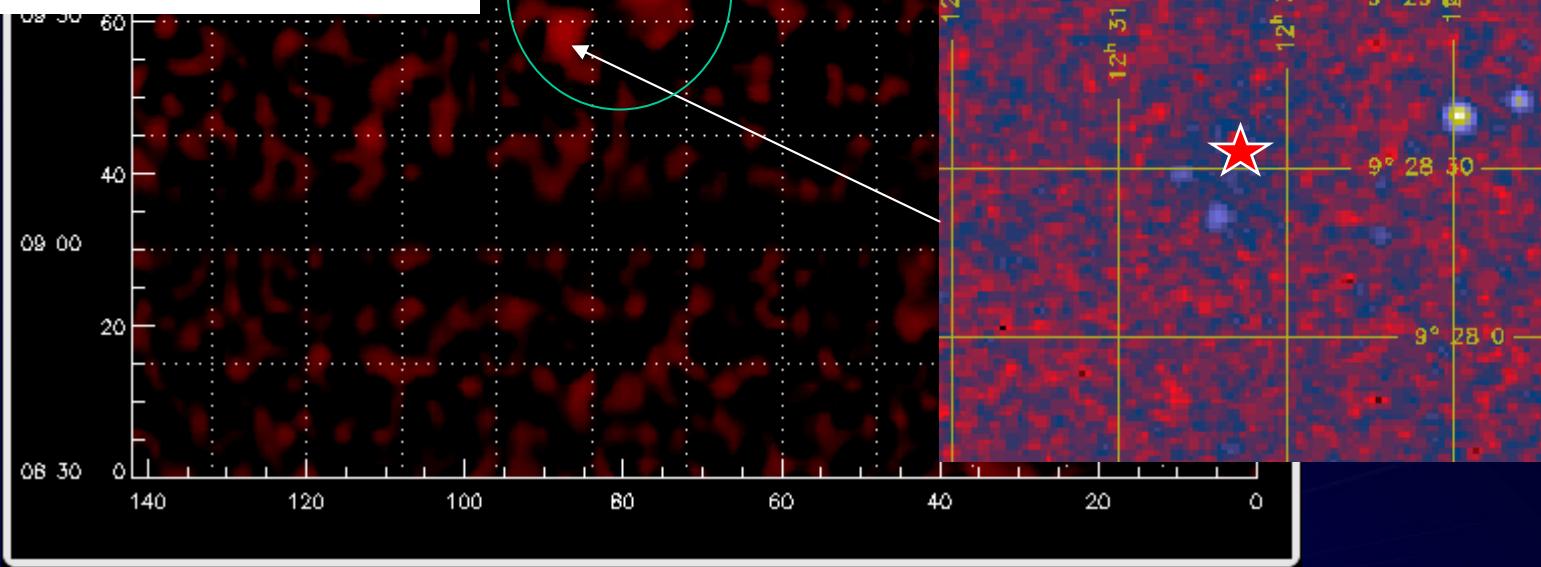
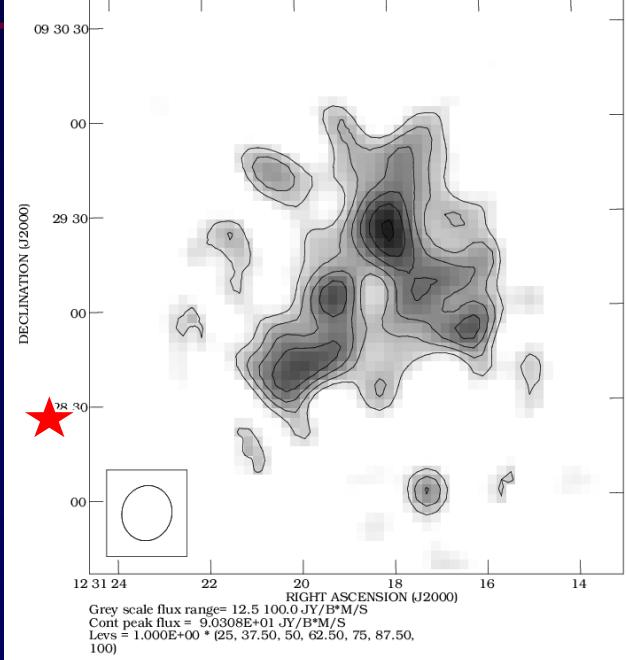




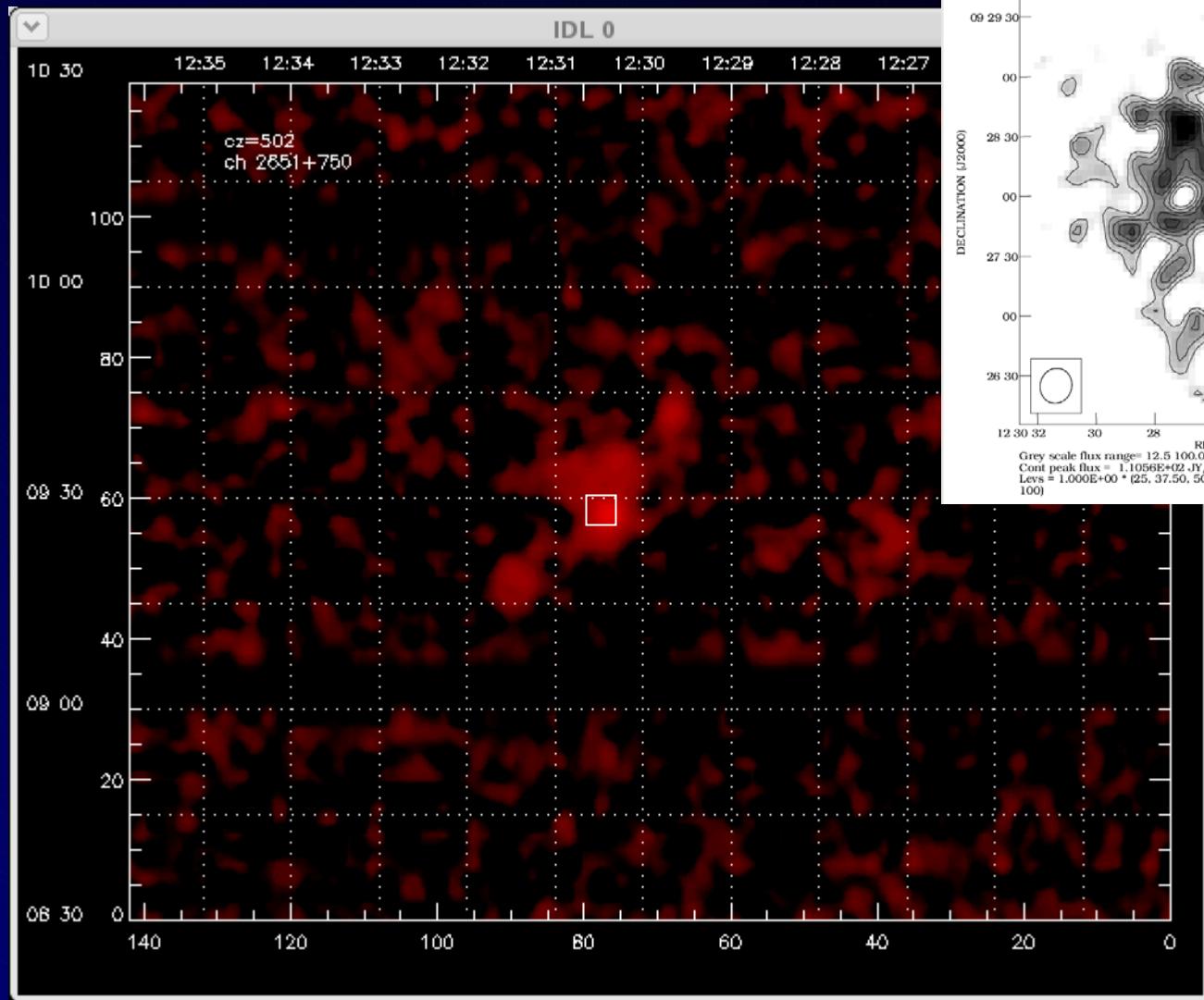
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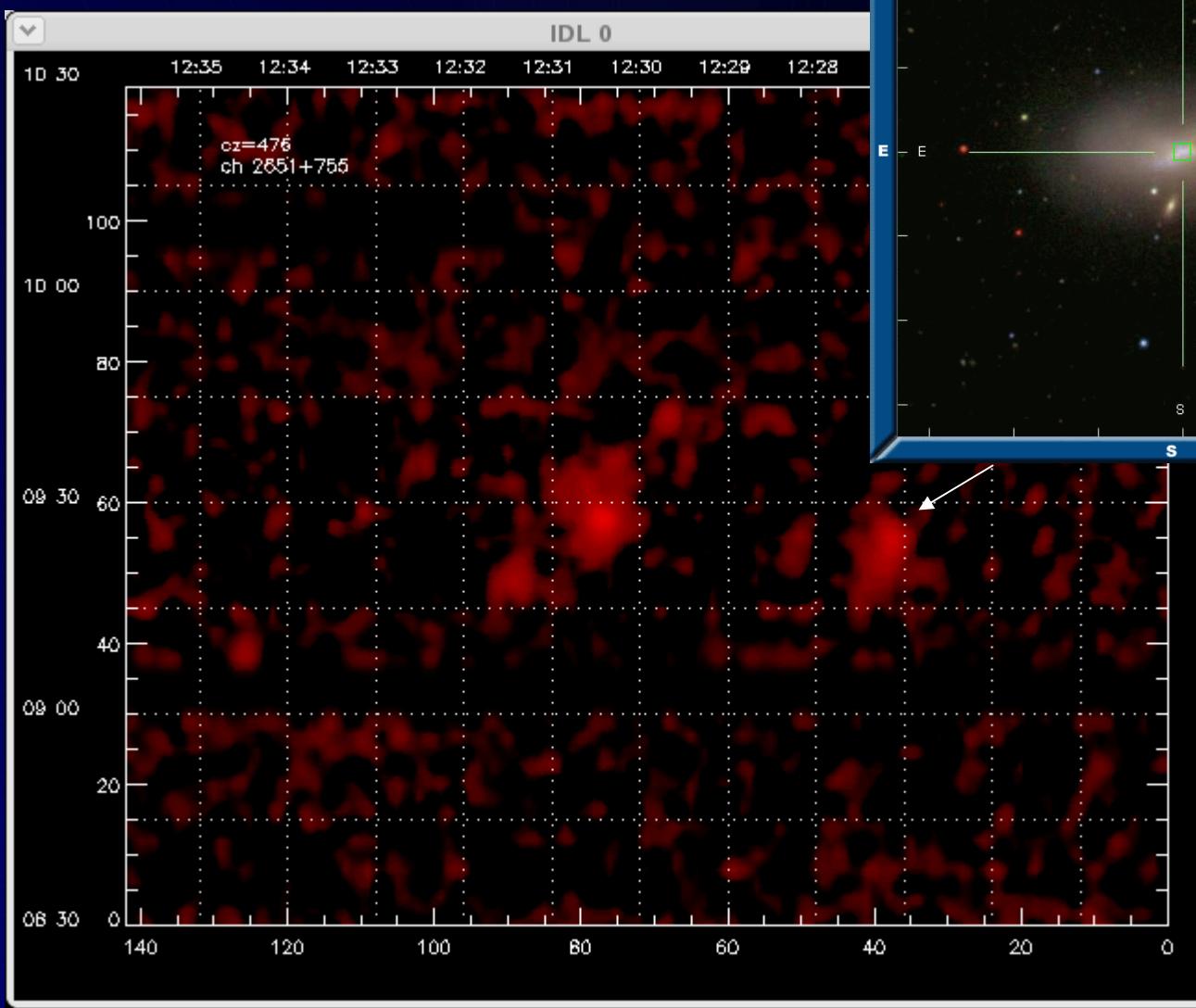


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See posters by Giovanelli et al. and Spekkens et al.
for details



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Virgo Clouds or MW HVCs?

Note: Additional slides shown in PPT



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