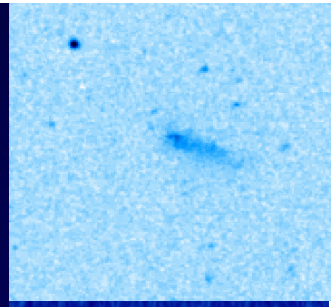
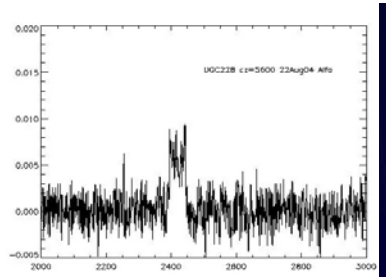
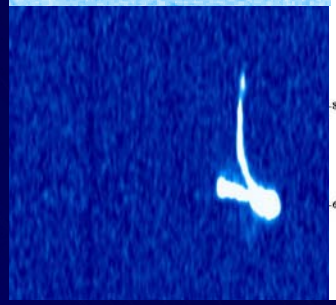
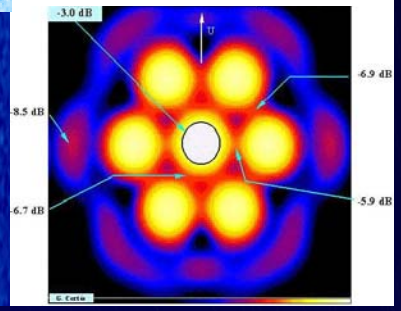








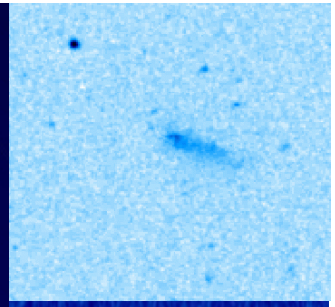
ALFALFA:

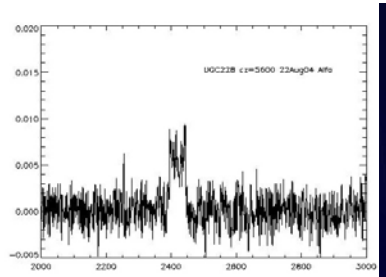
The Arecibo Legacy Fast ALFA Survey:

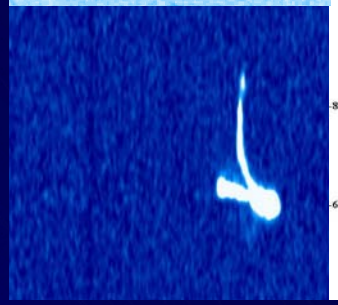
Martha Haynes (Cornell)

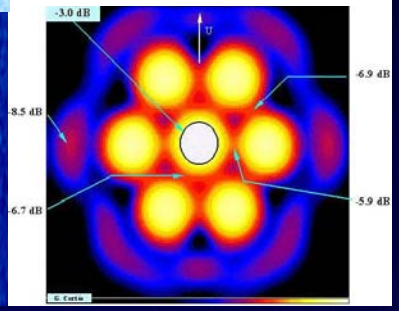
1. Determination of the faint end of the HI Mass Function and the abundance of low mass gas rich halos
2. Environmental variation in the HI Mass Function
3. Blind survey for HI tidal remnants
4. Determination of the HI Diameter Function
5. The low HI column density environment of galaxies
6. The nature of HVC's around the MW (and beyond?)
7. HI absorbers and the link to Ly α absorbers
8. OH Megamasers at intermediate redshift $0.16 < z < 0.25$

ALFALFA





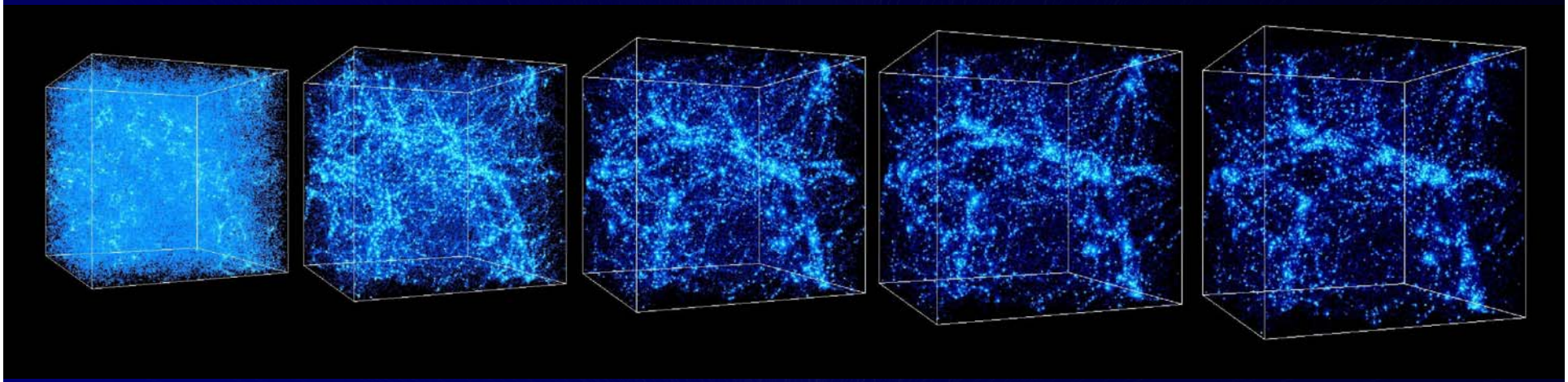




ALFALFA:

The Arecibo Legacy Fast ALFA Survey:

Martha Haynes (Cornell)



ALFALFA

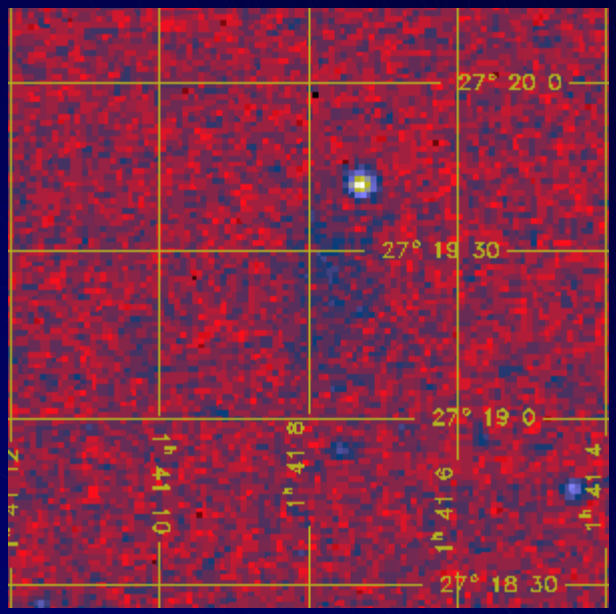
ALFALFA Strategy

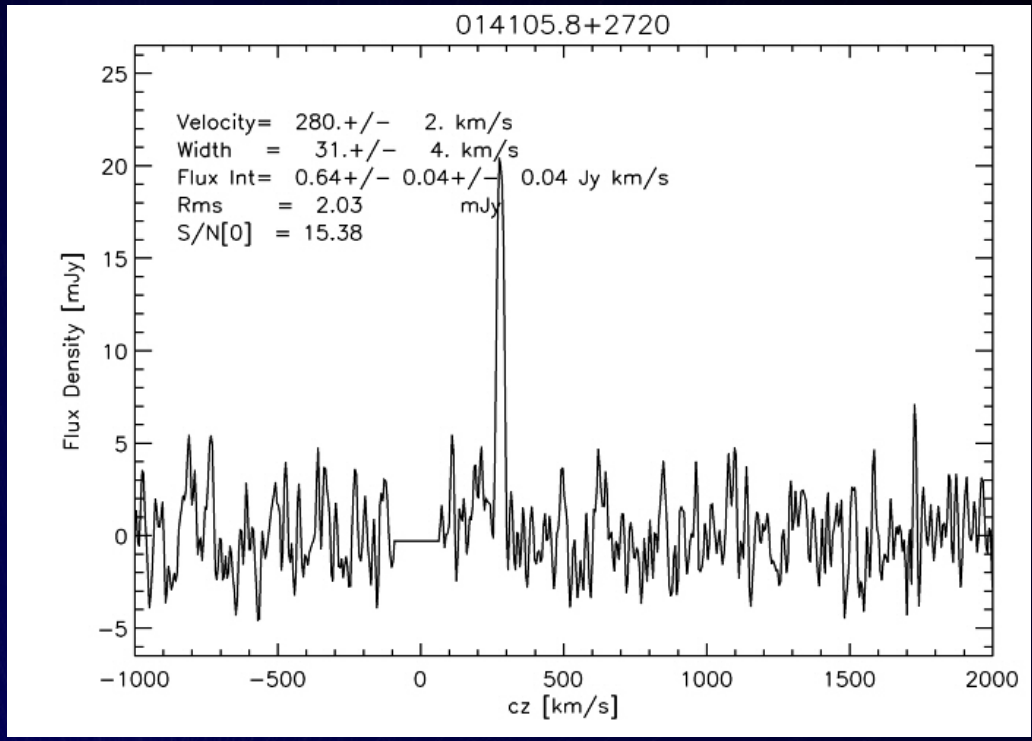
- 7000 square degrees of high galactic latitude sky
- ALFA + WAPPS
- 100 MHz, centered at 1385 MHz, 24.4 kHz/chan
- No Doppler tracking
- "almost" fixed azimuth drift mode:
  - Track Decl. J2000 at fixed azimuth
- 2-pass strategy, 3-9 months apart
- Highly efficient: 99% "open shutter" time
  - Main overhead is telescope slew to position (at beginning of run: 5-15 minutes)
  - Cal fired 1 sec every 600 secs (takes 4-6 secs)
- Commensal observing: TOGS ("Turn On the GALFA Spectrometer") HI in Milky Way @ 0.1 km/s res.
  - Currently limited by availability of multiple backends
- Data reduction in IDL; distributed; heavy use of VO protocols

"Minimum intrusion" strategy

ALFALFA

Very nearby dwarf: A low mass halo?





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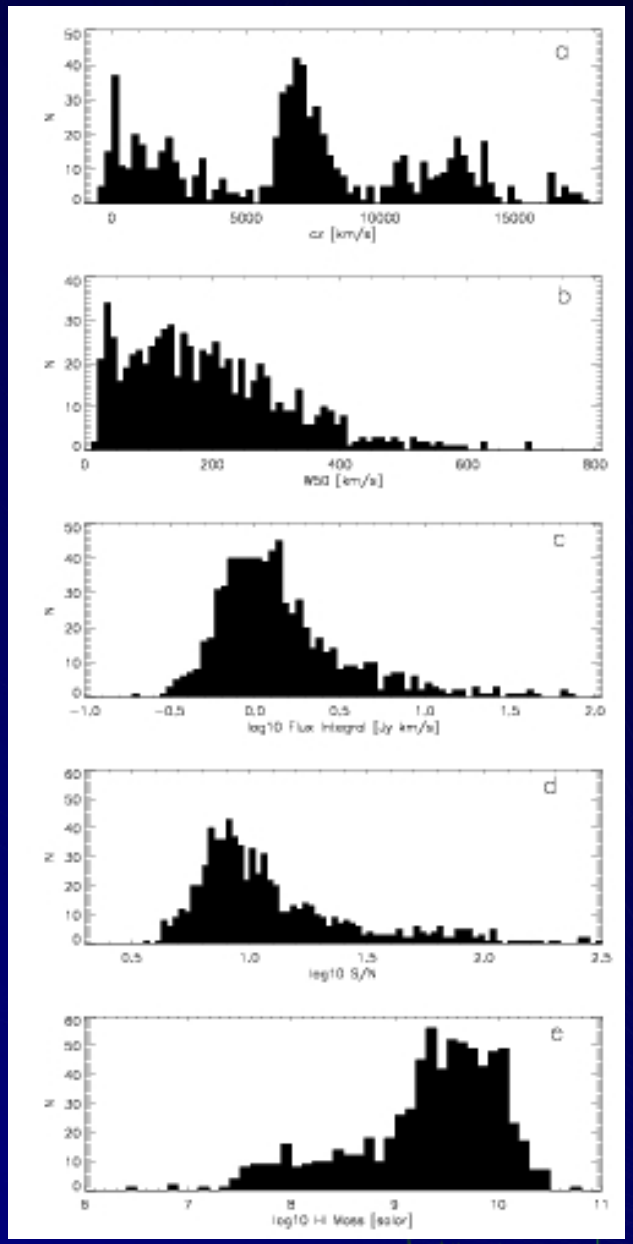
First 120 deg^2 (1/50th)



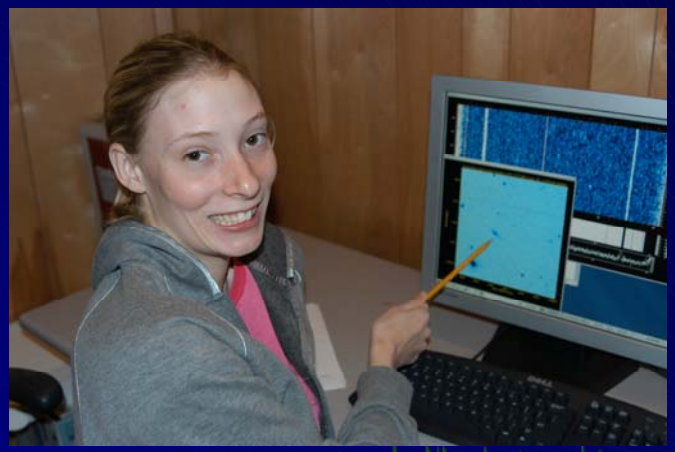
- 70% of targets not detected in HI before, even though Virgo heavily targeted by pointed observations.
- High positional accuracy => optical ID
- <cz> ~7000 km/s; very high M_{HI}/L.
- Very different view than optically selected sample.
- Important for future SKA survey to understand local large scale structure traced by HI selected sample.
- Ram pressure/harassment; "dark galaxies", "Cosmic web"?

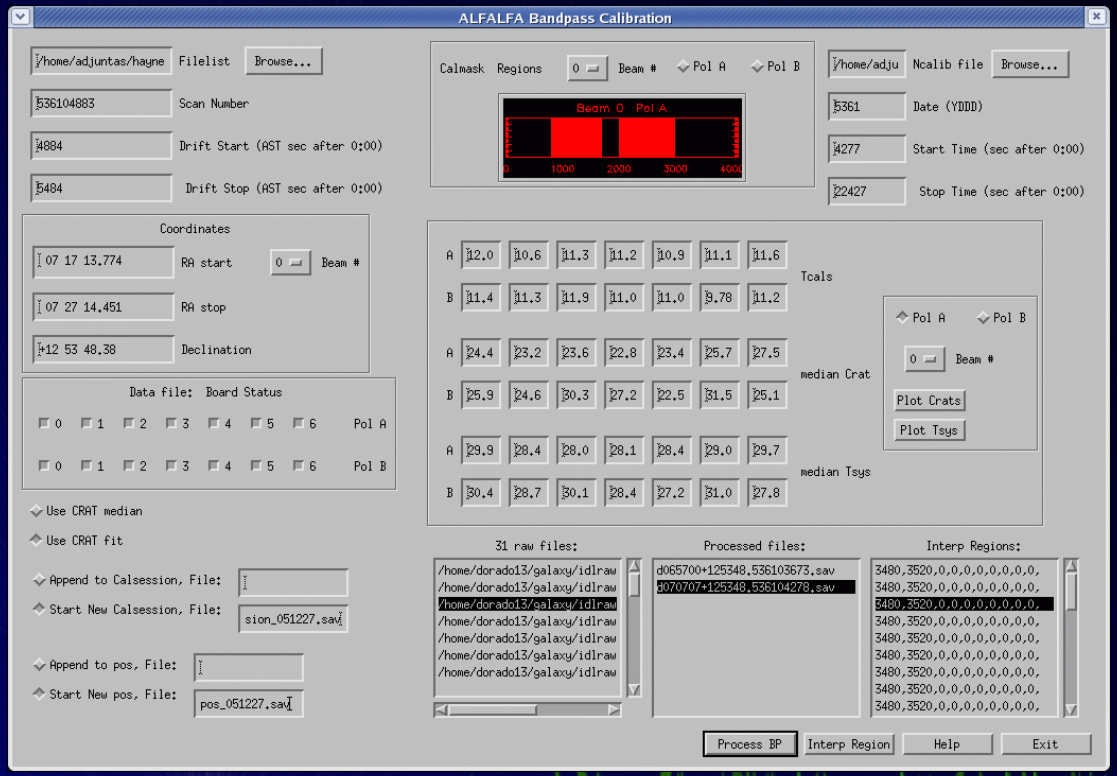
ALFALFA

Data Reduction in IDL

- Built on routines developed by Phil Perillat and other publicly available IDL code; further development at Cornell.
- Designed for use by whole ALFALFA team (incl. ugrad institutions)
- Running at Cornell, Arecibo, Indiana, Lafayette, Union, Colgate, Humboldt State, U. Minnesota & Wesleyan to date.

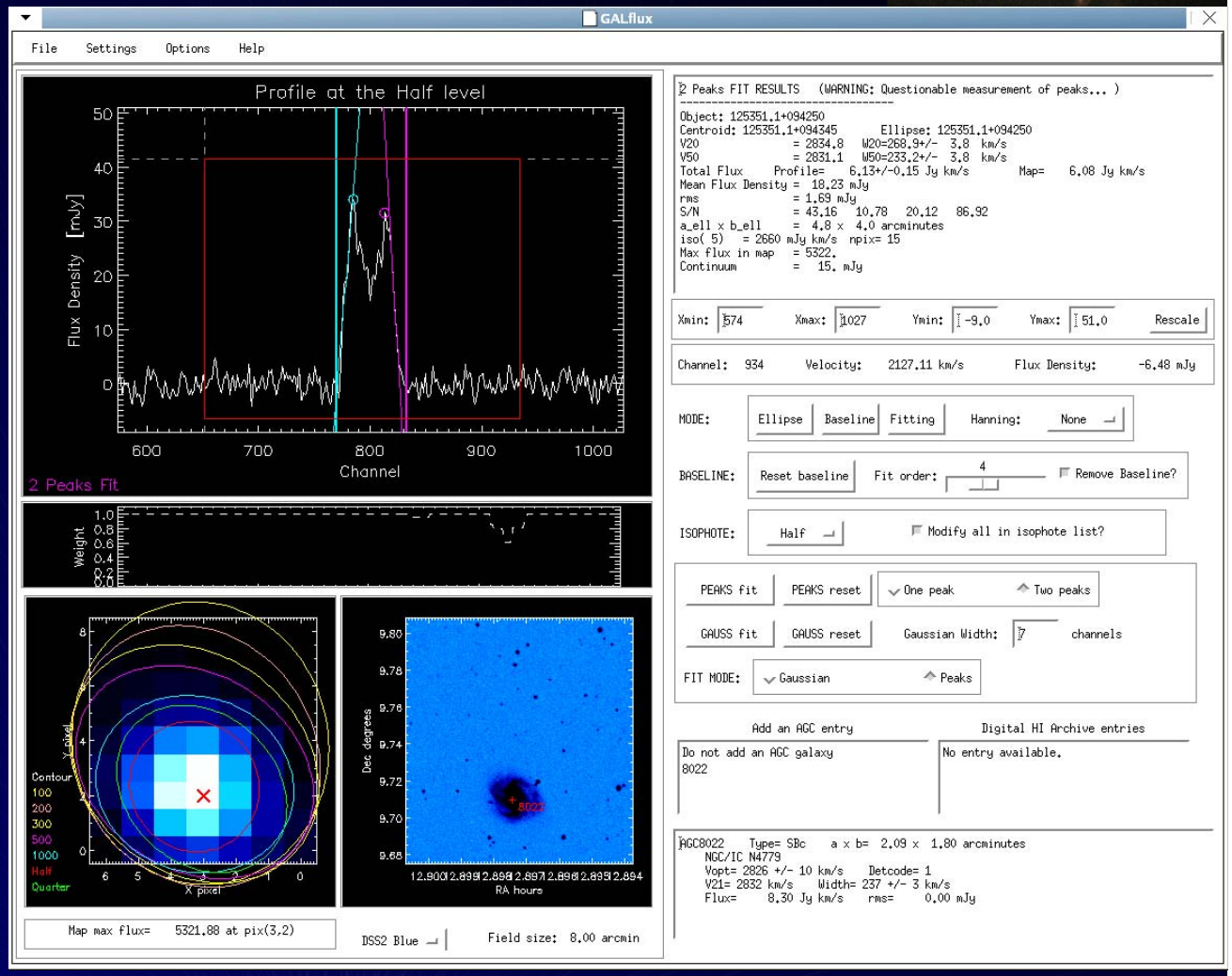
Heavy involvement of students in software development as well as observing, data reduction, and science.





Flux measurement => Data products

- Centroid positions are determined
- Ellipse parameters are calculated.
- Integrated profiles are created – measurements are recorded in src (source) structures
- Data are compared with database archives; optical ID recorded
- ALL this info then becomes the public data product along with catalog
- Need permanent archive access (CTC)
- Need web-based visualization of 3-D



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ALFALFA Data Products

- Precursor data available since Dec 2005.
- SQL database
- PHP interface
- Download catalog in XML/VOTable format
- Spectra
- Cross reference with DSS, 2MASS and SDSS images

a1946 Detections: Query Results - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://egg.astro.cornell.edu/precursor/detectionsresults.php?sourcen

Go

sity + relation + dwarf

User Record Viewer

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**

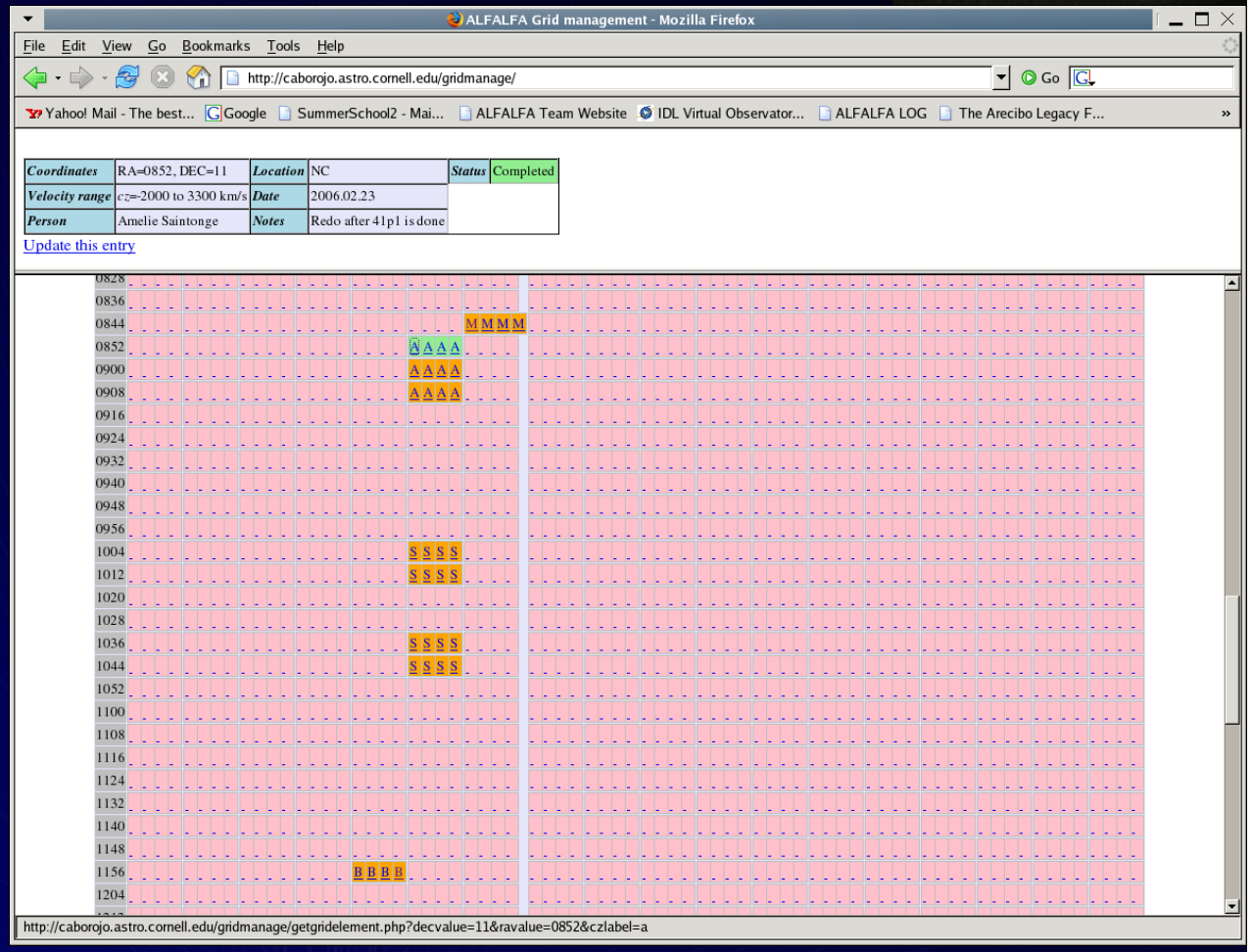
Sourcename	R.A.(J2000)	Dec.(J2000)	ε_α	ε_δ	cz	err stat	err sys	W	ε_w	rms	Flux	ε_f	Map Flux	LBW	Notes
	hh mm ss.s	dd mm ss	sec	"	km/s	km/s	km/s	km/s	km/s	mJy	Jy km/s	Jy km/s	Jy km/s		
HI014105.8+272007	01 41 05.8	+27 20 07	1.3	18	280	2	0	27	4	2.03	0.64	0.06	0.00	L	*
HI014214.9+262202	01 42 14.9	+26 22 02	1.7	23	364	1	0	21	1	1.82	1.06	0.08	0.00		*
HI014441.4+271707	01 44 41.4	+27 17 07	0.7	10	430	2	0	38	2	1.82	2.02	0.15	2.89		*
HI014640.9+264754	01 46 40.9	+26 47 54	2.3	31	370	2	0	21	3	2.09	0.68	0.06	0.00		*
HI014729.9+271958	01 47 29.9	+27 19 58	0.0	0	351	2	0	117	3	1.88	54.39	3.81	0.00		*
HI014753.9+272555	01 47 53.9	+27 25 55	0.0	0	436	2	0	175	3	1.77	69.25	4.85	0.00		*
HI015519.2+275645	01 55 19.2	+27 56 45	1.0	13	219	1	0	21	2	2.11	0.79	0.07	0.00		*
HI021404.3+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	*

NVO work led by Brian Kent

ALFALFA

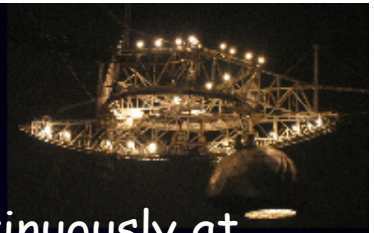
Distributed grid production/analysis

- Grids are logged via a web interface with current status, ALFALFA user, completion dates, and file comments
- Grids produced at CU; analyzed elsewhere
- Individuals contribute to the project processing; then use team dataset for own projects
- Quality control involves both training, regular oversight and final checkout by senior members



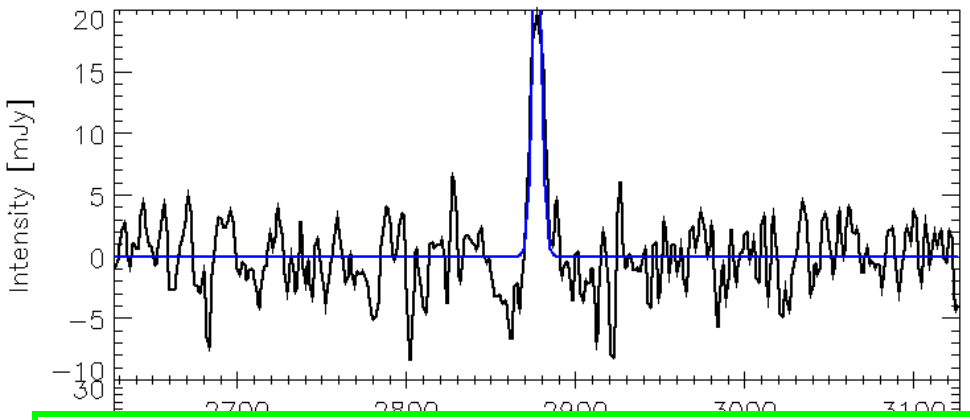
ALFALFA

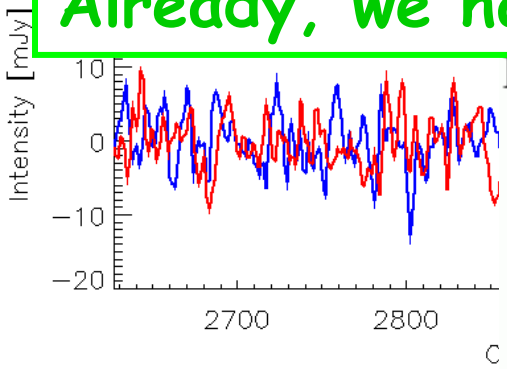
ALFALFA Legacy dataset



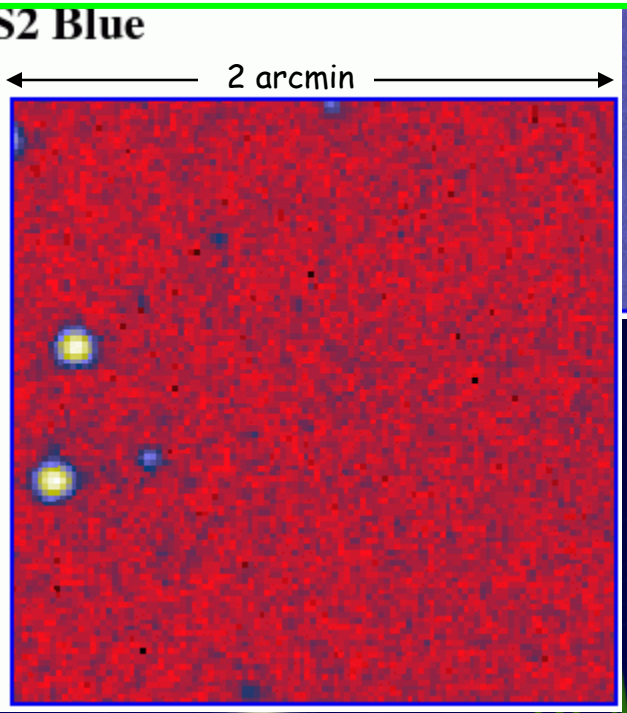
- As a drift scan survey, ALFALFA acquires science spectra continuously at ~99% efficiency at a rate of 16 4096-channel spectra/sec
- Amounts to ~1 GB/hour of observing X 4000+ hours of raw data
- Because of RFI, no smoothing is applied
- Level I products (bandpassed, calibrated, flagged for RFI) produced within days-weeks
- Level II products (gridded cubes, spectra, HI source catalogs, continuum catalog) available after completion of "tile"; 8000 cubes eventually. First release planned for fall 2006.
- Followup/complementary datasets contributed by team to ALFALFA dataset.
- Most significant issues revolve around:
  - Long-term storage and public access to 3-D cubes, spectra, and catalogs
  - Efficient/accurate tools for grid manipulation and visualization and cross-reference with other datasets
  - Continued development of signal detection and RFI excision algorithms

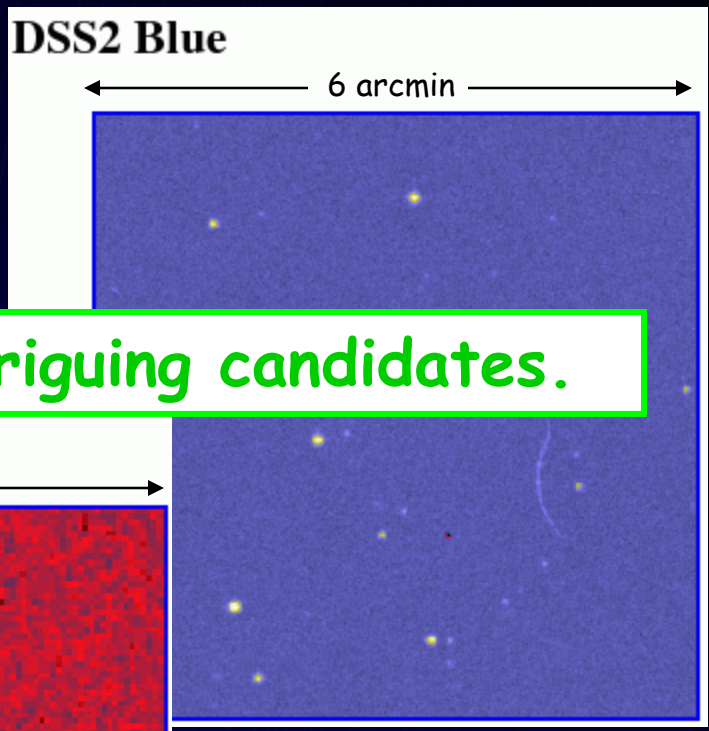
ALFALFA





Already, we have ~20 very intriguing candidates.





cz=3264 km/s

M_{HI} = 3.5x10^8 Msun

A dark galaxy?

ALFALFA

Followup team Wiki developed by Marco Scodeggio (Milano)

FollowupObservations

ALFALFA Follow-up Ongoing Projects

This page is meant to be the head-place for pages that describe **ongoing** follow-up projects, which **MUST** contain information on which objects have been observed, when, and how.

ALFALFA is finding lots of interesting galaxies which we hope to follow up with optical observations. Optical followup with 4 different telescopes are planned in the next months:

(1) Wise Obs (Israel), led by Noah Brosch: H-alpha imaging
(2) WIYN 0.9m (Kitt Peak), led by John Salzer: H-alpha imaging
(3) San Pedro Martir (Mexico), led by Peppo Gavazzi: H-alpha imaging SanPedro
(4) 1.93 Obs. Haute Provence (France), led by Alessandro Boselli, low resolution drift scan spectroscopy

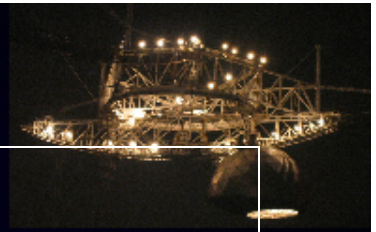
NOTE TO FOLLOWUP TEAM:

If you have observing time in the future, please list the dates and details here!

(a) Noah Brosch writing about observing time at the Wise Observatory. An observing run is starting tonight (March 29, 2006) for five nights. The observing will be with a Tektronix 1024x1024 chip, thinned and back-illuminated, using R and H-alpha shifted to 1050 km/s. We have a set of ~50A wide filters that we use for H-alpha imaging, which is described below:

Name ||λ|| cz || Δλ(Å) || Remarks/MFG/transmission ||

ALFALFA@GBT



1. ALFALFA will provide the SDSS/NVSS/FIRST for extragalactic HI (8+X more sensitive than HIPASS, 4X ang.res, 3X sp.res, 1.6X BW), with superior positional accuracy and higher gain => deeper, faster, with immediate optical ID. Future surveys must extend/exceed ALFALFA.
2. GBT covers important regions of the sky not visible to Arecibo (Andromeda , Ursa Major, more of ZOA many more).
3. GBT in NRQZ gives quieter environment; "manage" rfi
   - Spectrometer with higher N sampling/rfi excision
   - Faster dumping (but big impact on data rates)
4. Sidelobe purity of multibeam system? Data rates, data processing, manpower, archive, data products…
5. Need to muster community (+resources) to execute survey and pursue science (inc. non-radio followup) on short timescale
6. Archiving, software, multiwavelength, visualization tools,
7. Multiple backends: Commensality offers huge advantage in science potential for large surveys. WHY NOT?!

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