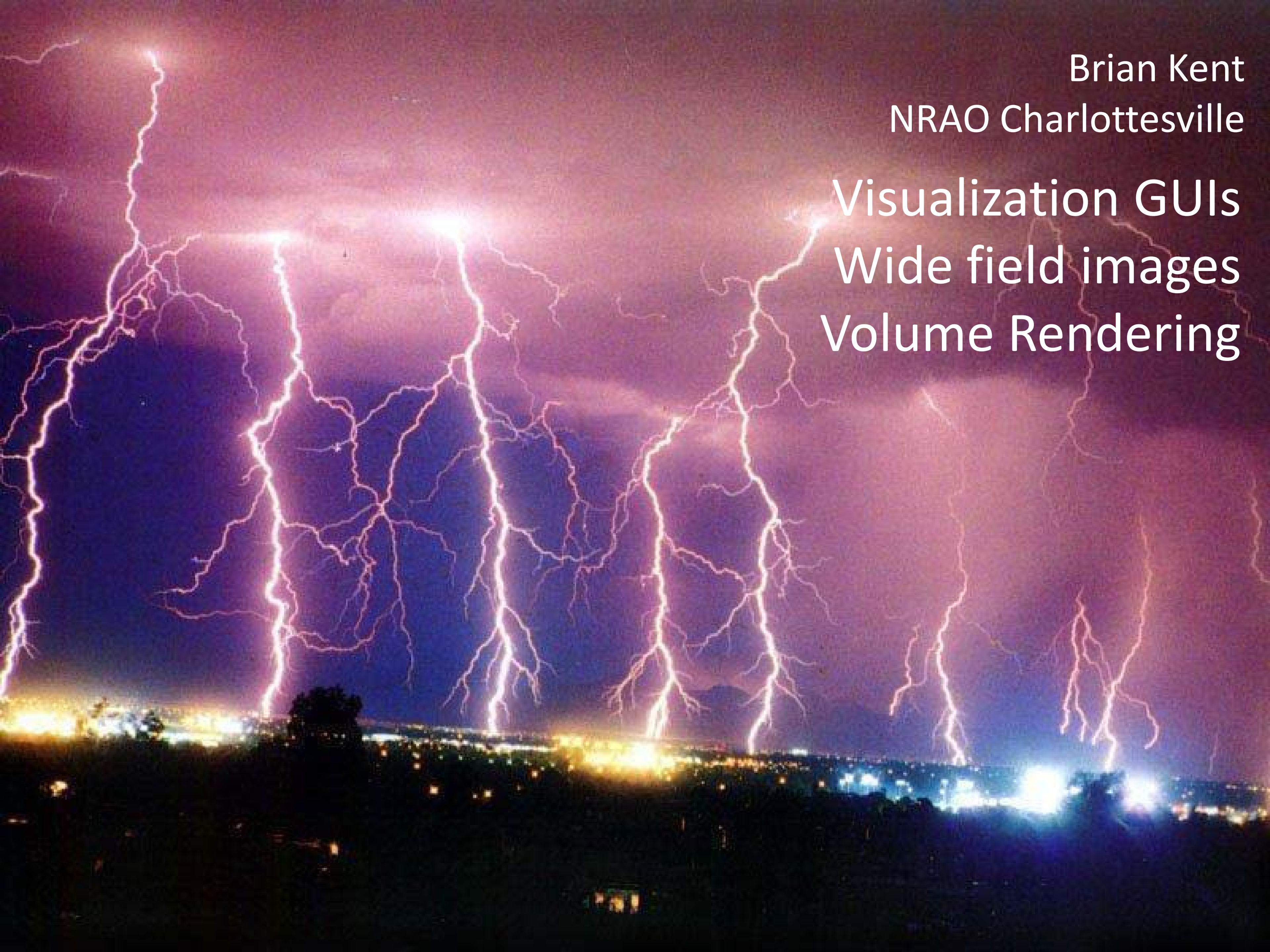


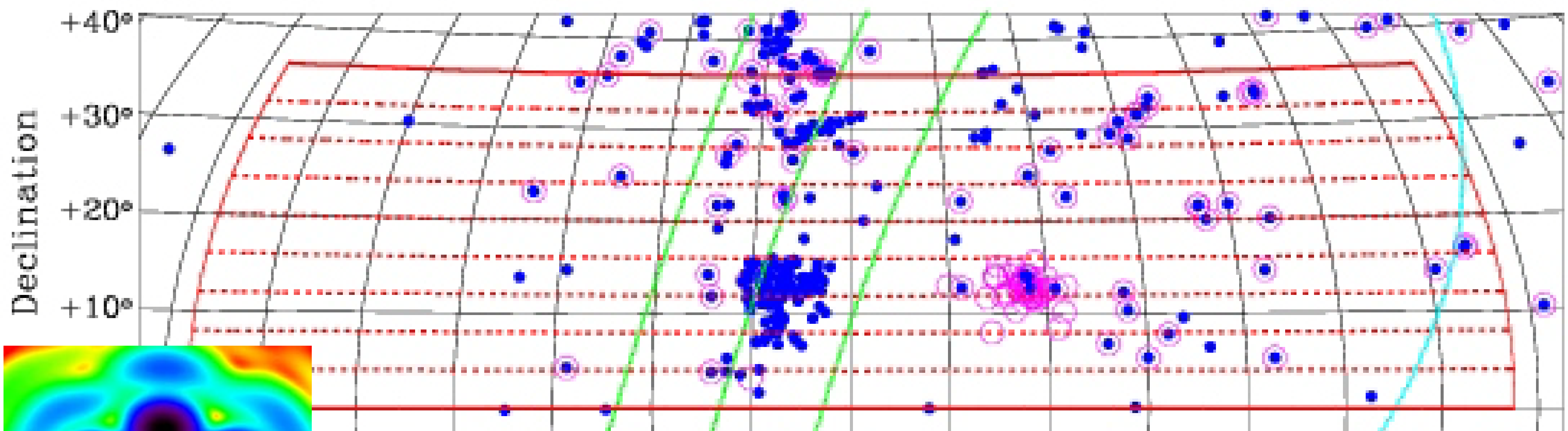
Brian Kent
NRAO Charlottesville

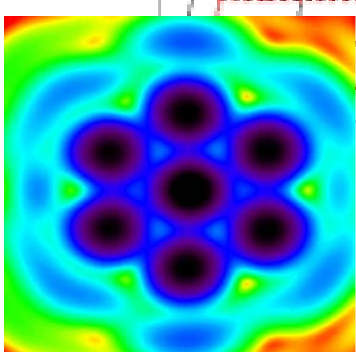
Visualization GUIs
Wide field images
Volume Rendering

The Arecibo radio telescope and the ALFA receiver

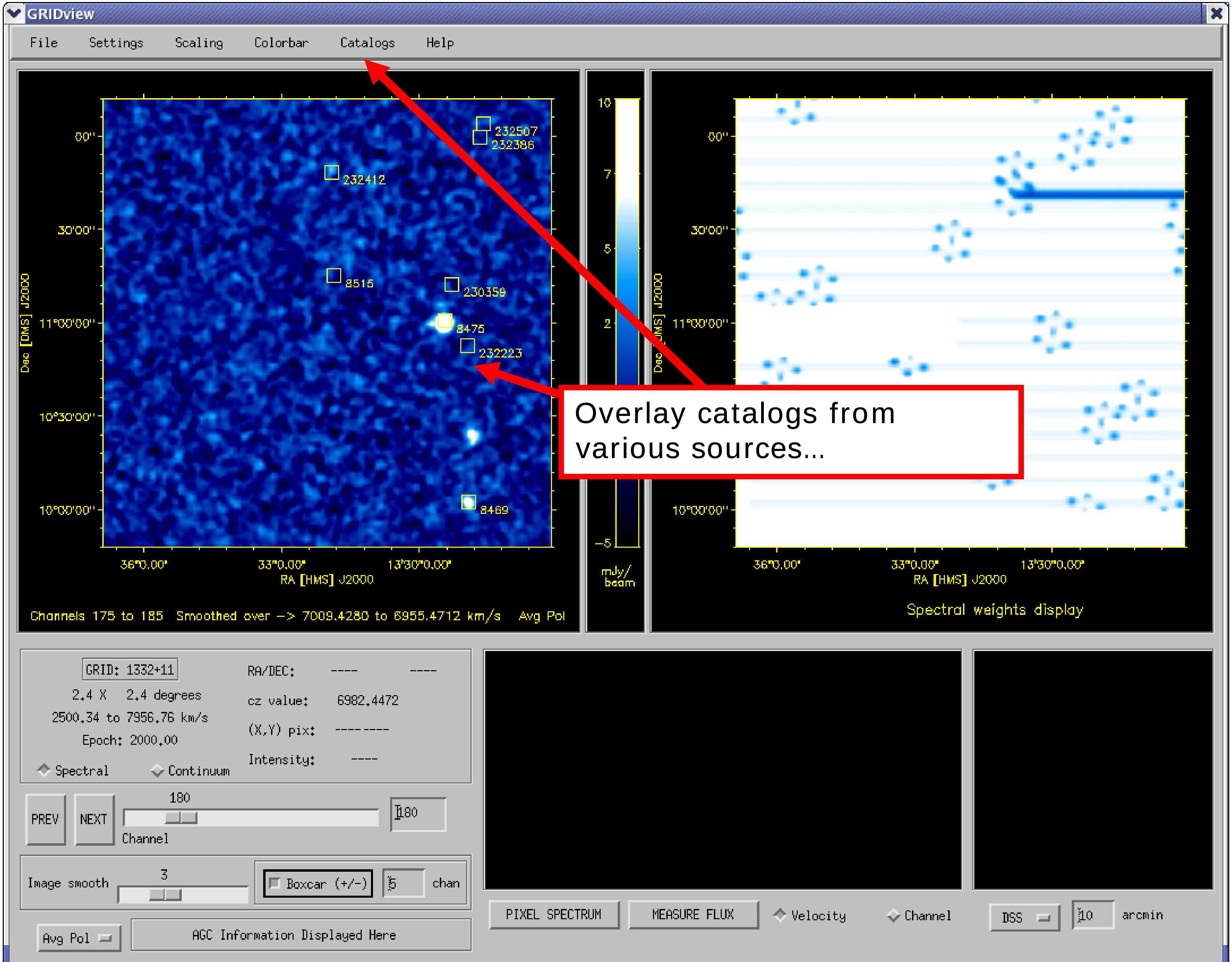
ALFALFA: Brief Overview

- The extragalactic HI survey will cover 7000 square degrees of the high galactic latitude sky out to a distance of ~ 250 Mpc. (Credit to the entire ALFALFA team!)
- Observations have covered ~130 deg^2 towards Virgo region at 12^h 12^o to the supergalactic plane.
- An extragalactic HI survey affords advantages over optical surveys, namely *detection of gas-rich extragalactic systems that may not have initiated star formation, as well as blind tidal interactions traced by HI.*

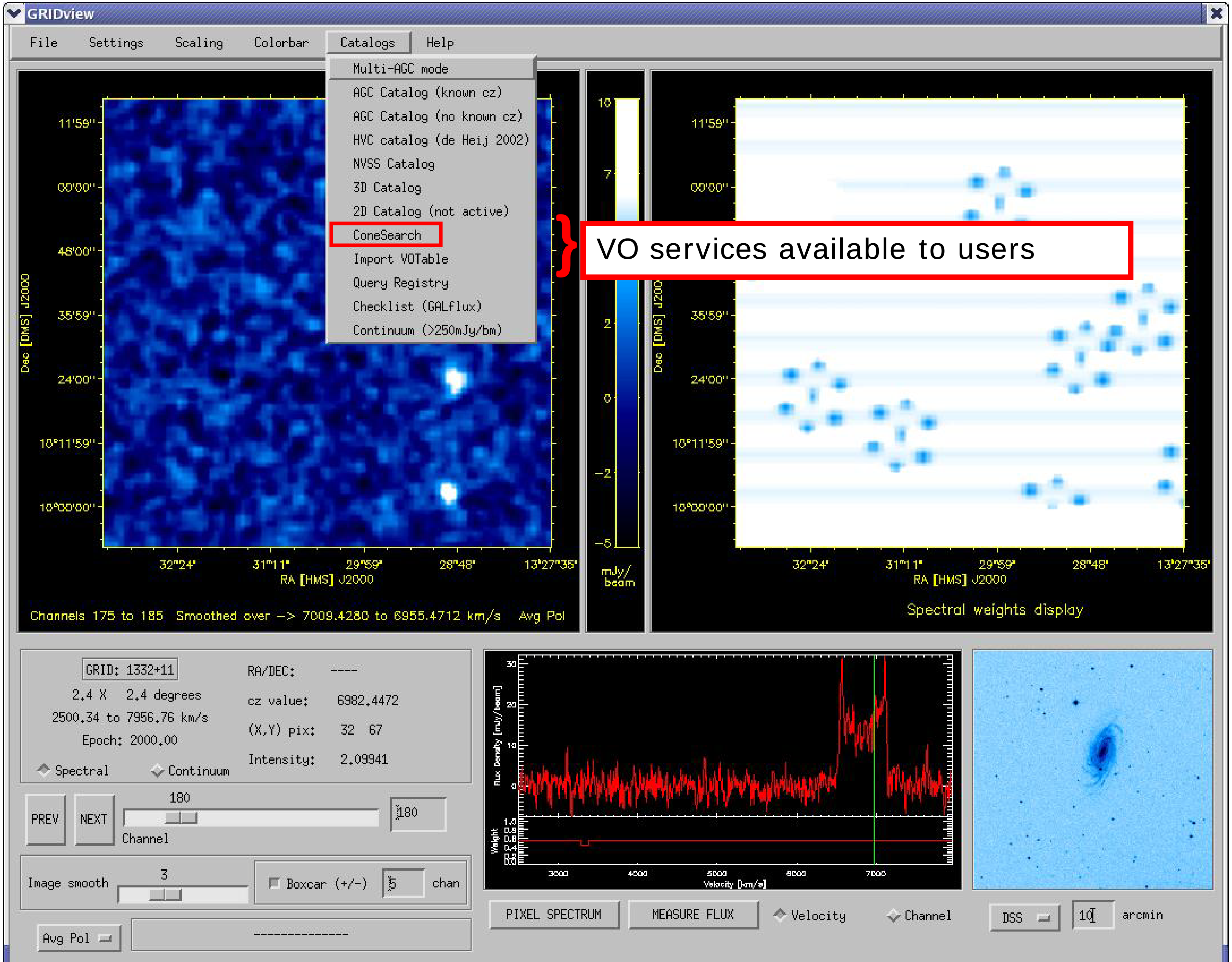


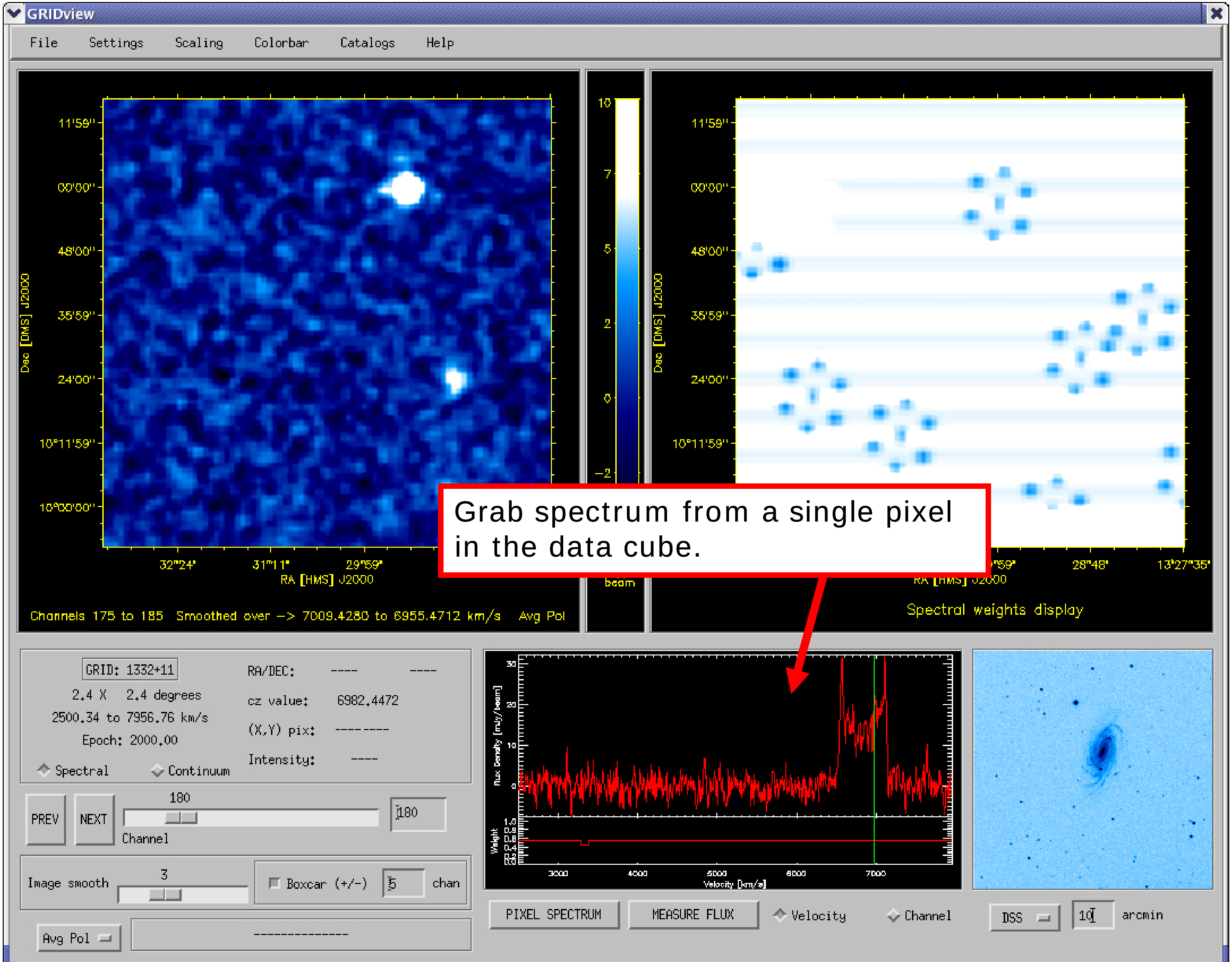


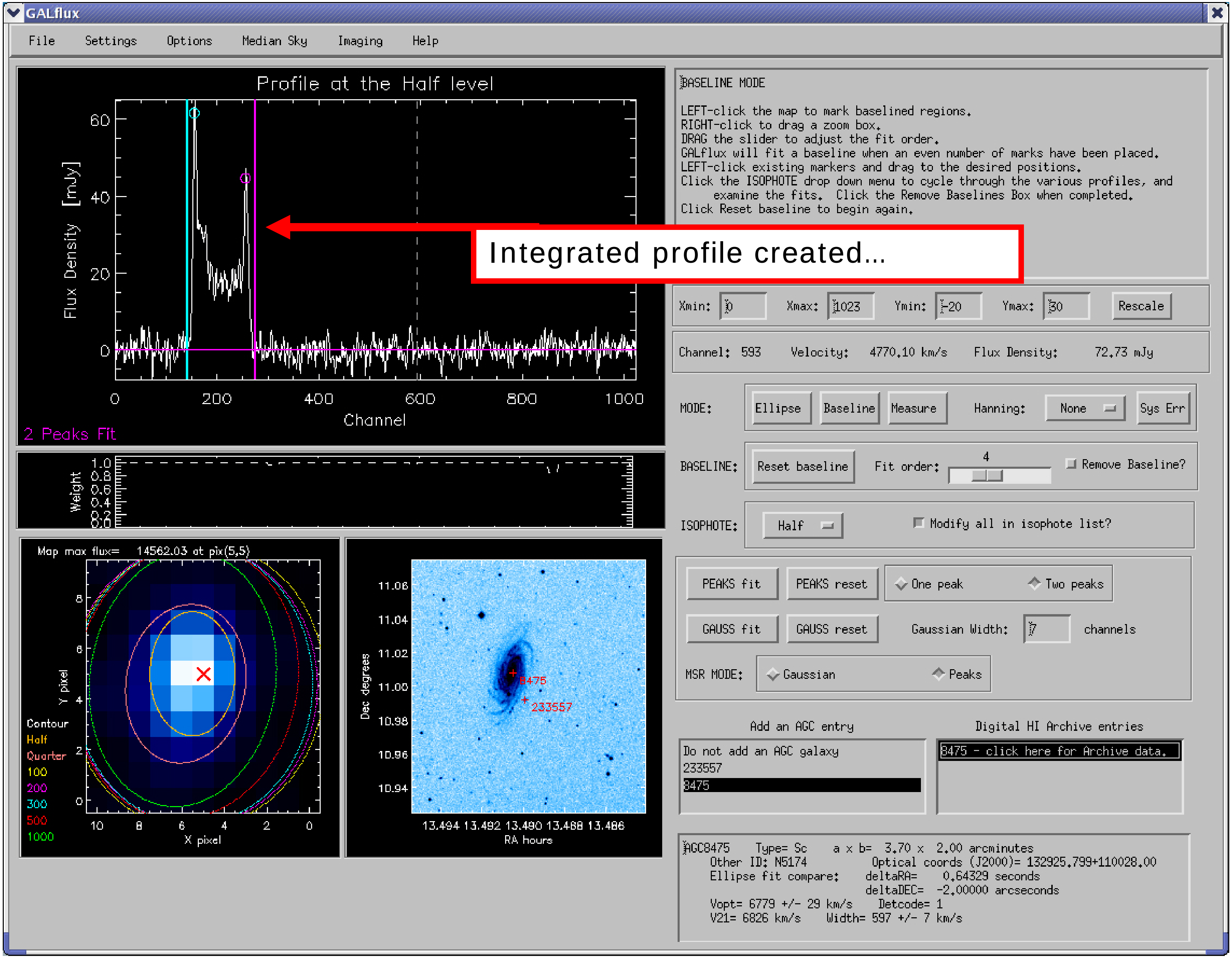
ALFALFA



GRIDview
File Settings Scaling Colorbar Catalogs Help
232507
232386
232412
8515
230359
8475
232223
8469
Overlay catalogs from various sources...
RA [HMS] J2000
Dec [DMS] J2000
mJy/beam
Channels 175 to 185 Smoothed over --> 7009.4280 to 6955.4712 km/s Avg Pol
Spectral weights display
GRID: 1332+11
2.4 X 2.4 degrees
2500.34 to 7956.76 km/s
Epoch: 2000.00
RA/DEC: ---- ----
cz value: 6982.4472
(X,Y) pix: ---- ----
Intensity: ----
Spectral
Continuum
PREV
NEXT
180
Channel
Image smooth
3
Boxcar (+/-)
5
chan
Avg Pol
AGC Information Displayed Here
PIXEL SPECTRUM
MEASURE FLUX
Velocity
Channel
DSS
10
arcmin


GRIDview
File
Settings
Scaling
Colorbar
Catalogs
Help
Multi-AGC mode
AGC Catalog (known cz)
AGC Catalog (no known cz)
HVC catalog (de Heij 2002)
NVSS Catalog
3D Catalog
2D Catalog (not active)
ConeSearch
Import VOTable
Query Registry
Checklist (GALflux)
Continuum (>250mJy/bm)
VO services available to users
Channels 175 to 185 Smoothed over --> 7009.4280 to 6955.4712 km/s Avg Pol
Spectral weights display
GRID: 1332+11
2.4 X 2.4 degrees
2500.34 to 7956.76 km/s
Epoch: 2000.00
RA/DEC: ----
cz value: 6982.4472
(X,Y) pix: 32 67
Intensity: 2.09941
Spectral
Continuum
PREV
NEXT
Channel
Image smooth
Boxcar (+/-)
chan
Avg Pol
PIXEL SPECTRUM
MEASURE FLUX
Velocity
Channel
DSS
arcmin

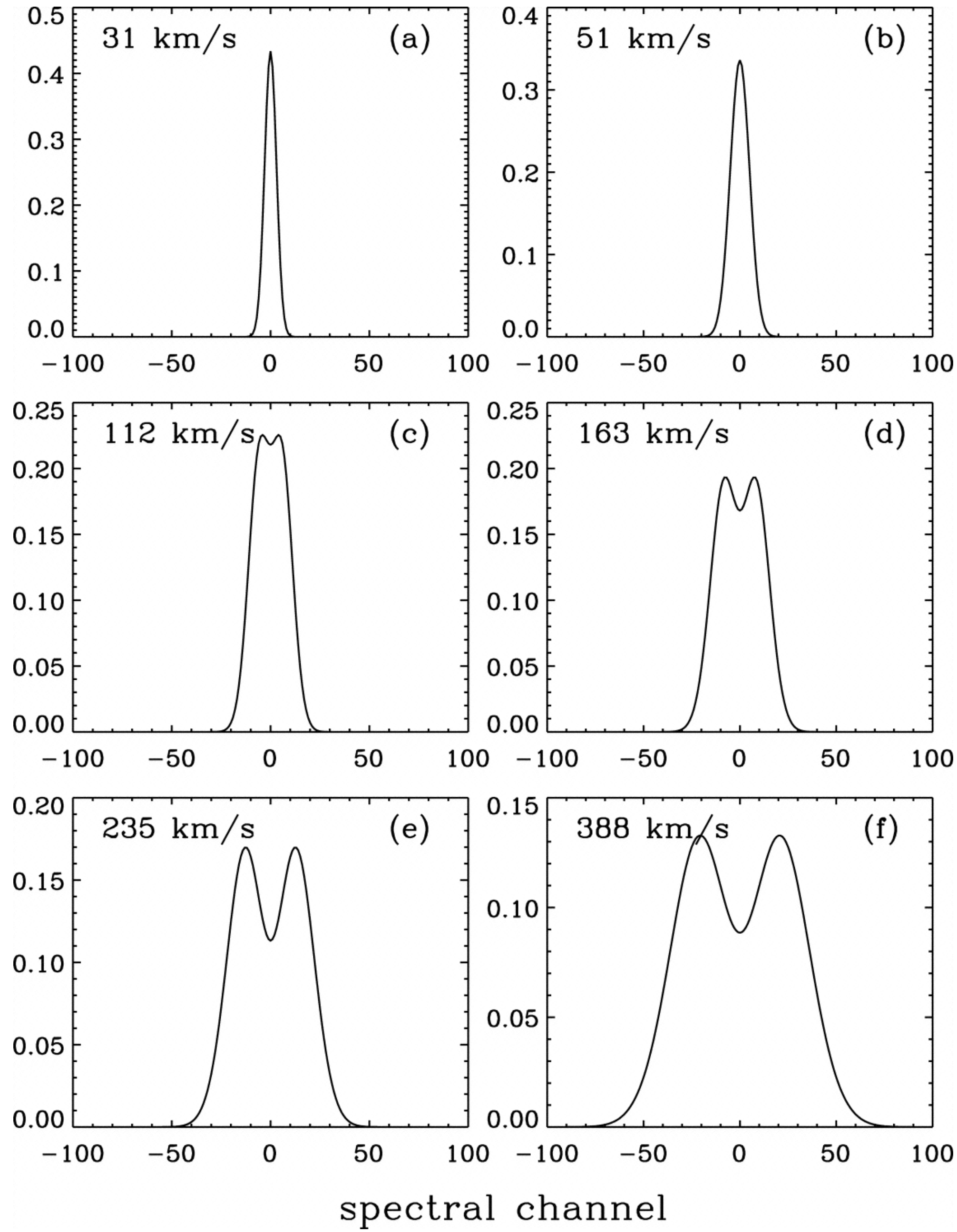

GRIDview
File
Settings
Scaling
Colorbar
Catalogs
Help
Dec [DMS] J2000
RA [HMS] J2000
Channels 175 to 185 Smoothed over --> 7009.4280 to 6955.4712 km/s Avg Pol
beam
Spectral weights display
GRID: 1332+11
2.4 X 2.4 degrees
2500.34 to 7956.76 km/s
Epoch: 2000.00
RA/DEC: ---- ----
cz value: 6982.4472
(X,Y) pix: --------
Intensity: ----
Spectral
Continuum
PREV
NEXT
180
Channel
Image smooth
3
Boxcar (+/-)
chan
Avg Pol
Flux Density [mJy/beam]
Weight
Velocity [km/s]
PIXEL SPECTRUM
MEASURE FLUX
Velocity
Channel
DSS
10
arcmin
Grab spectrum from a single pixel in the data cube.

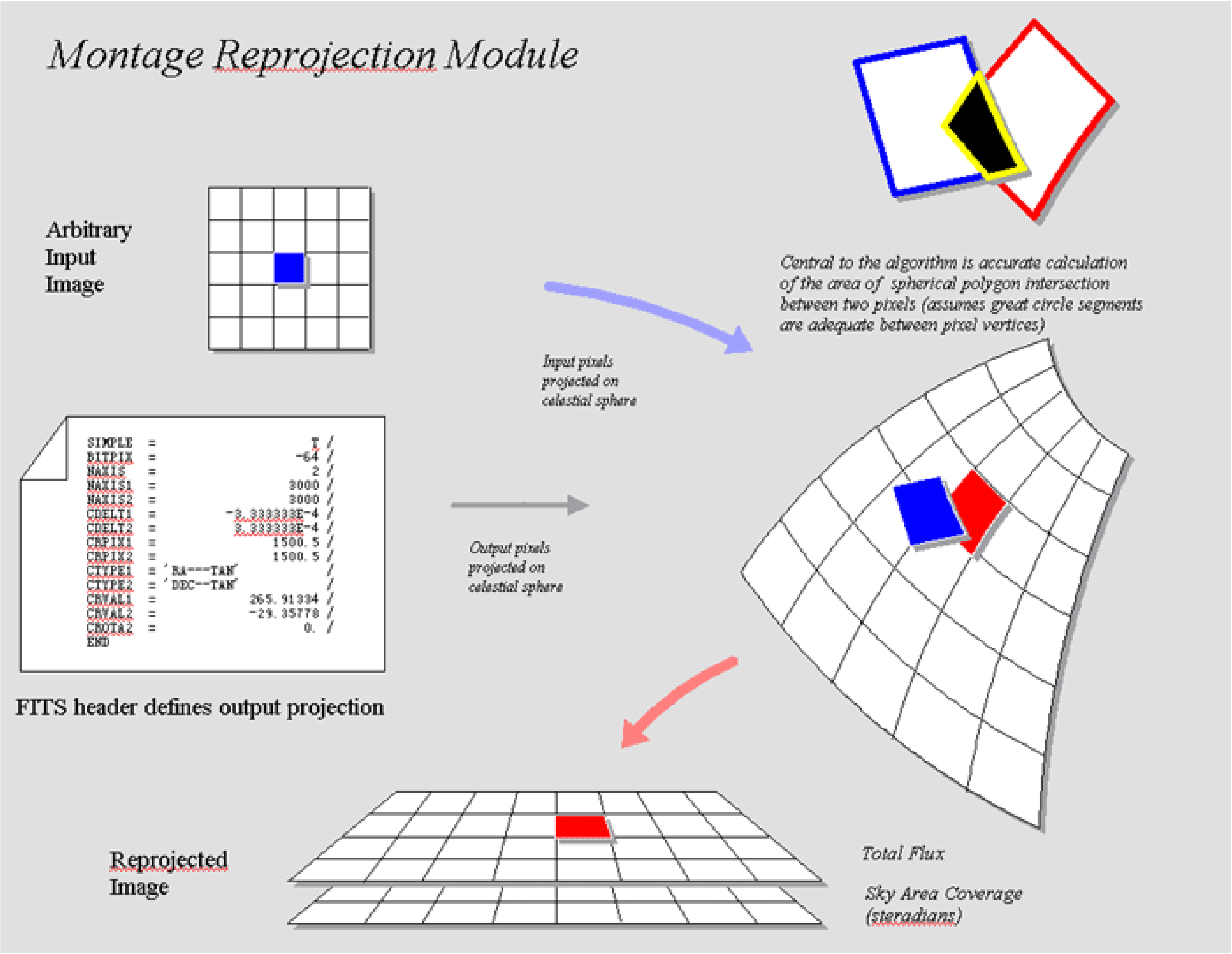

GALflux
File
Settings
Options
Median Sky
Imaging
Help
Profile at the Half level
Flux Density [mJy]
Channel
2 Peaks Fit
Integrated profile created...
Weight
Map max flux= 14562.03 at pix(5,5)
Y pixel
X pixel
Contour
Half
Quarter
100
200
300
500
1000
8475
233557
Dec degrees
RA hours
BASELINE MODE
LEFT-click the map to mark baselined regions.
RIGHT-click to drag a zoom box.
DRAG the slider to adjust the fit order.
GALflux will fit a baseline when an even number of marks have been placed.
LEFT-click existing markers and drag to the desired positions.
Click the ISOPHOTE drop down menu to cycle through the various profiles, and examine the fits. Click the Remove Baselines Box when completed.
Click Reset baseline to begin again.
Xmin: 0
Xmax: 1023
Ymin: -20
Ymax: 30
Rescale
Channel: 593
Velocity: 4770.10 km/s
Flux Density: 72.73 mJy
MODE:
Ellipse
Baseline
Measure
Hanning:
None
Sys Err
BASELINE:
Reset baseline
Fit order: 4
Remove Baseline?
ISOPHOTE:
Half
Modify all in isophote list?
PEAKS fit
PEAKS reset
One peak
Two peaks
GAUSS fit
GAUSS reset
Gaussian Width: 7 channels
MSR MODE:
Gaussian
Peaks
Add an AGC entry
Do not add an AGC galaxy
233557
8475
Digital HI Archive entries
8475 - click here for Archive data.
AGC8475 Type= Sc a x b= 3.70 x 2.00 arcminutes
Other ID: N5174 Optical coords (J2000)= 132925.799+110028.00
Ellipse fit compare: deltaRA= 0.64329 seconds
deltaDEC= -2.00000 arcseconds
Vopt= 6779 +/- 29 km/s Detcode= 1
V21= 6826 km/s Width= 597 +/- 7 km/s

3D Matched filter signal extraction in the Fourier domain

Templates built using an orthogonal set of basis functions with Hermite polynomials

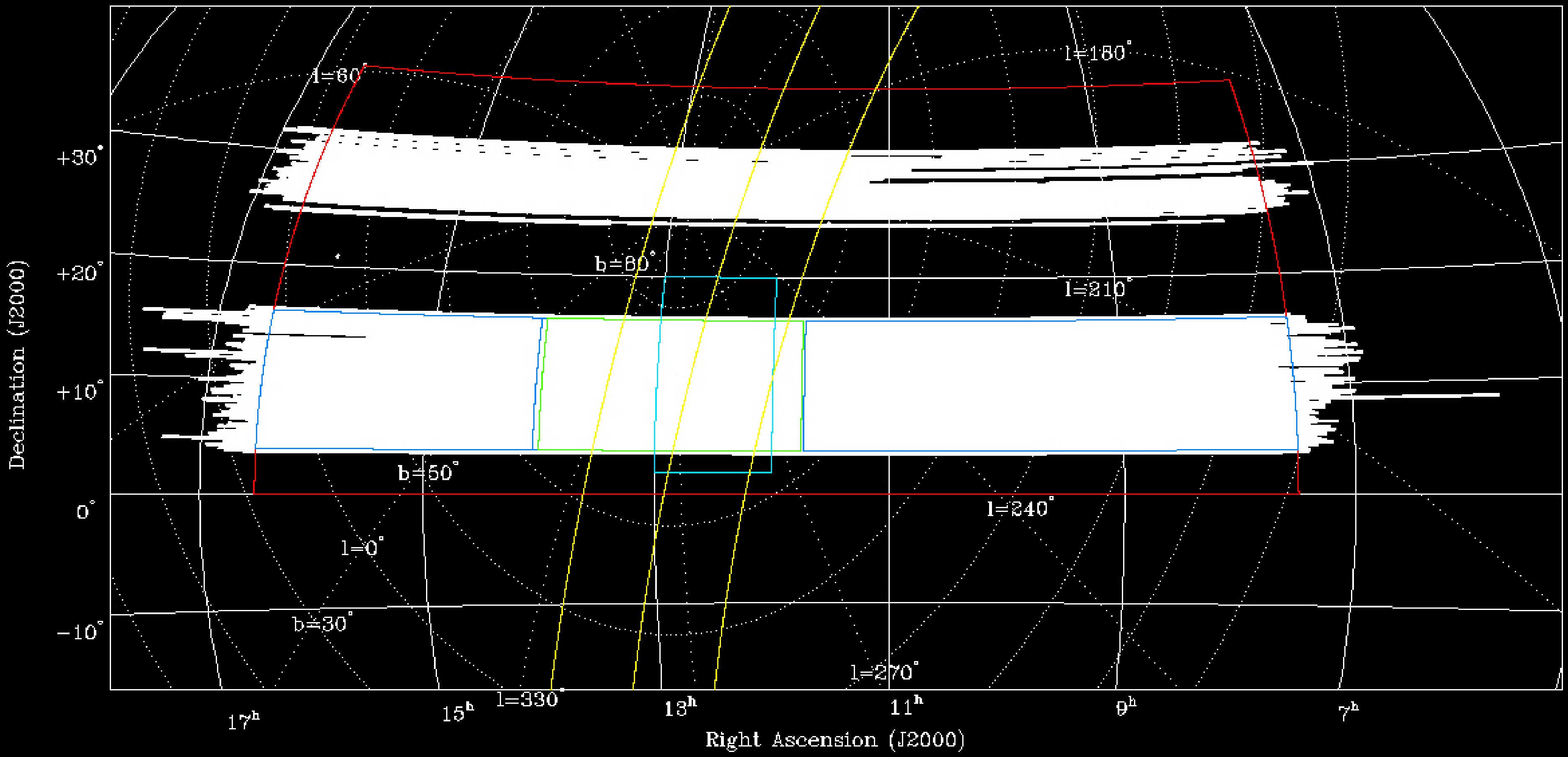
See Saintonge 2007 AJ





Berriman et al. 2006

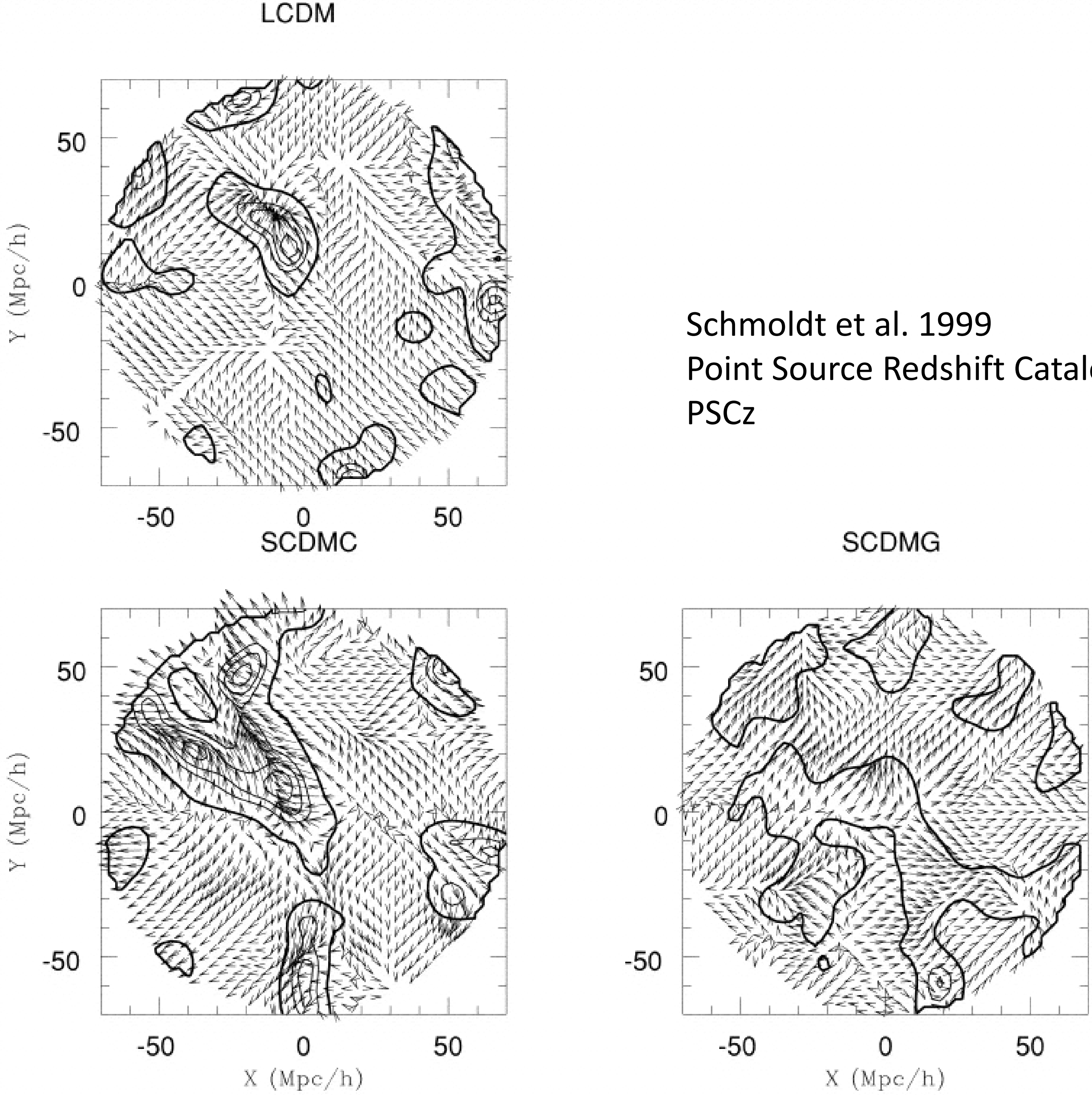
ALFALFA In Prep Thesis Level I Virgo SGP(±10°)



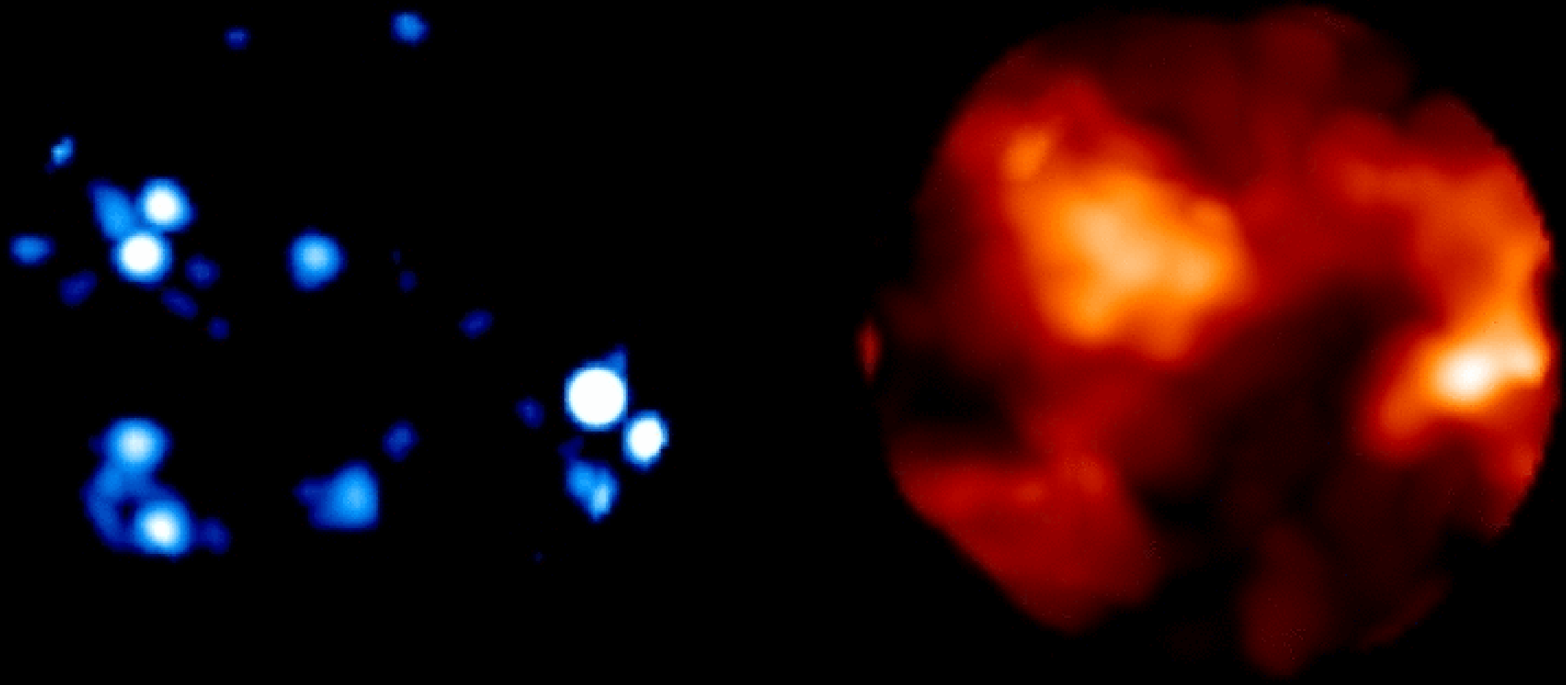
Survey status available at http://egg.astro.cornell.edu/alfalfa/

$-50 < v_{LSR} < 0$ km/s
$-25 < v_{LSR} < +25$ km/s
$0 < v_{LSR} < +50$ km/s

- RGB tri-color image created in the Montage toolkit (IPAC/VO libraries for mosaicking)
- 1200 images from 400 data cubes (2 pol each)
- 1500 deg^2 and ~5.5 million pixels of the "Spring" sky dataset
- At the time, I/O bound problem – getting the parts of the data cubes that are needed.
- Cubes have more than 3 dimensions in order to properly calibrate and/or reduce the data.
- Viewing data cubes is reaching the limit of "DS9 style" paradigm of opening a file/cube and "sliding" through it.



Schmoldt et al. 1999
Point Source Redshift Catalog
PSCz



http://www.cv.nrao.edu/~bkent/computing/