Hα Observations of UAT Groups

- ★ Groups project
- ★ Follow-up for comparison to HI ALFALFA content and to trace gas distributions
- ★ Follow-up star-forming galaxies without ALFALFA detections
  - ★Low-mass
  - ★HI-depleted

KPNO WIYN 0.9m MOSAIC

- ★ 1 square-degree 0.9m MOSAIC field
- ★ MOSAIC: 8 CCD, 16 amp
- ★ Cover group center, field nearby
- ★ R, r, Hα

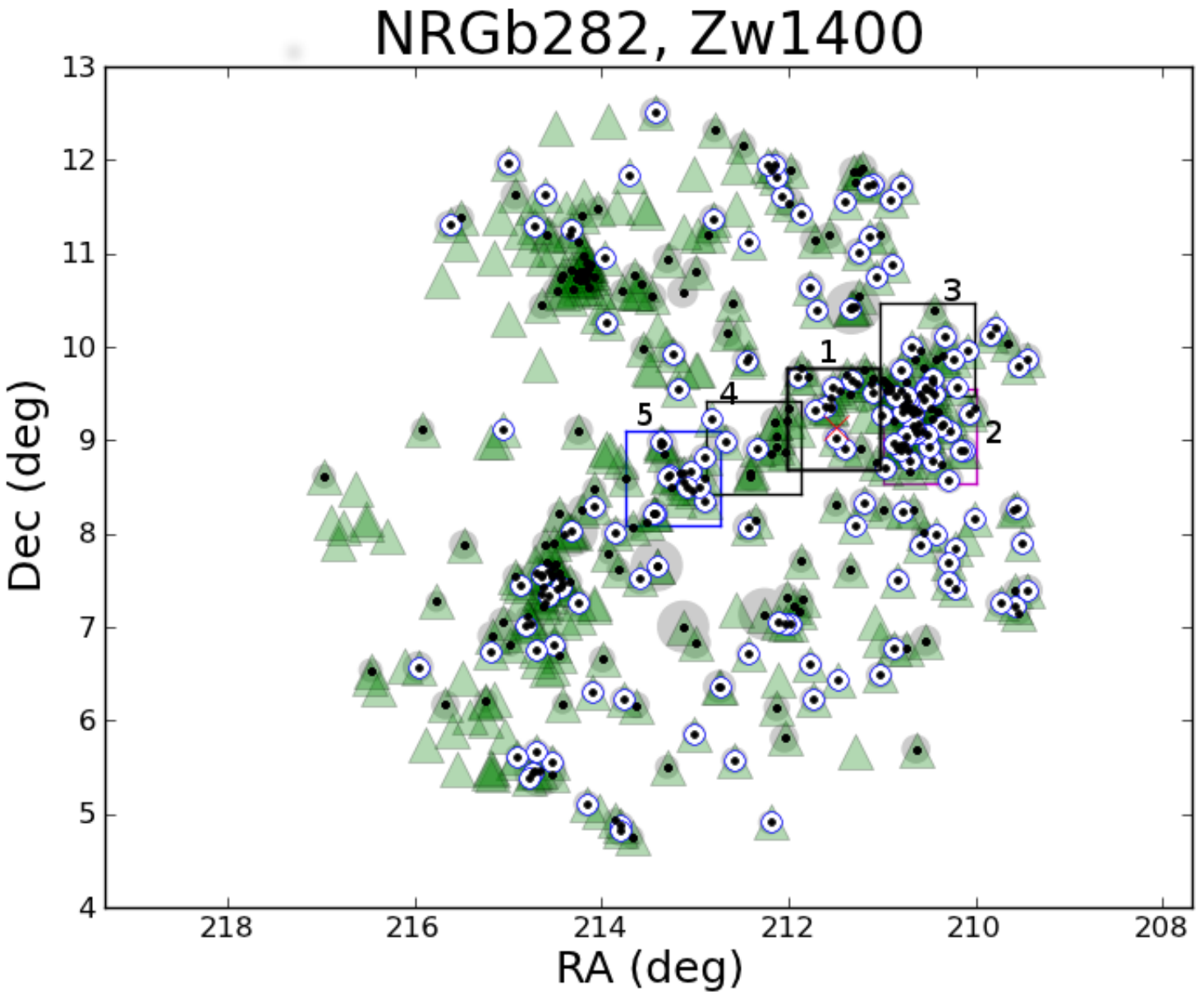
Runs

- ★ April 2011: 11 nights (7 NOAO, 4 WIYN-UWSP)
  - ★ Lost 3-4 nights
- ★ April 2012: 6 nights (WIYN-UWSP)
  - ★ 1 night bad seeing
- ★ April 2013: 5 nights (WIYN-UWSP)
  - ★ Lost ~1.5 nights to equipment problems, weather
- ★ Koopmann, Durbala, Finn, O'Donoghue & Students

Team	Group	Alternate Name	# Fields Observed	# Fields Reduced
GSU	WBL 226	NRGb041	2	1
Siena	MKW 10	NRGb151	2	2
SLU	HCG 59	NRGb157	2	2
Hartwick	WBL 368	NRGb168	2	2
UWSP	WBL404/406	NRGb206	4	4
Skidmore/ Siena	MKW 11	NRGb247	2	2
Colgate/SLU/ WTA&M	Zw 1400+09	NRGb282	5	4
St. Mary's	WBL 509	NRGb301	2	1
Siena/Colgate	WBL 251	NRGs076	1	0 (part missing)
Union	NGC 5846		7	7
Lafayette	WBL 477	NRGs272	1	1
Siena LCS	NGC 6107	NRGs385	1	0
Siena LCS	MKW 8		1	1

3 new groups in 2013

Team	Group	Alternate Name	# Fields Observed	# Fields Reduced
	Abell 779	NRGb032	2	1
		NRGb054	1	0
		NRGb331	1	0



Fields shown at
https://sites.google.com/site/alfalfaugradgroups/halpha-observations/halpha-fields

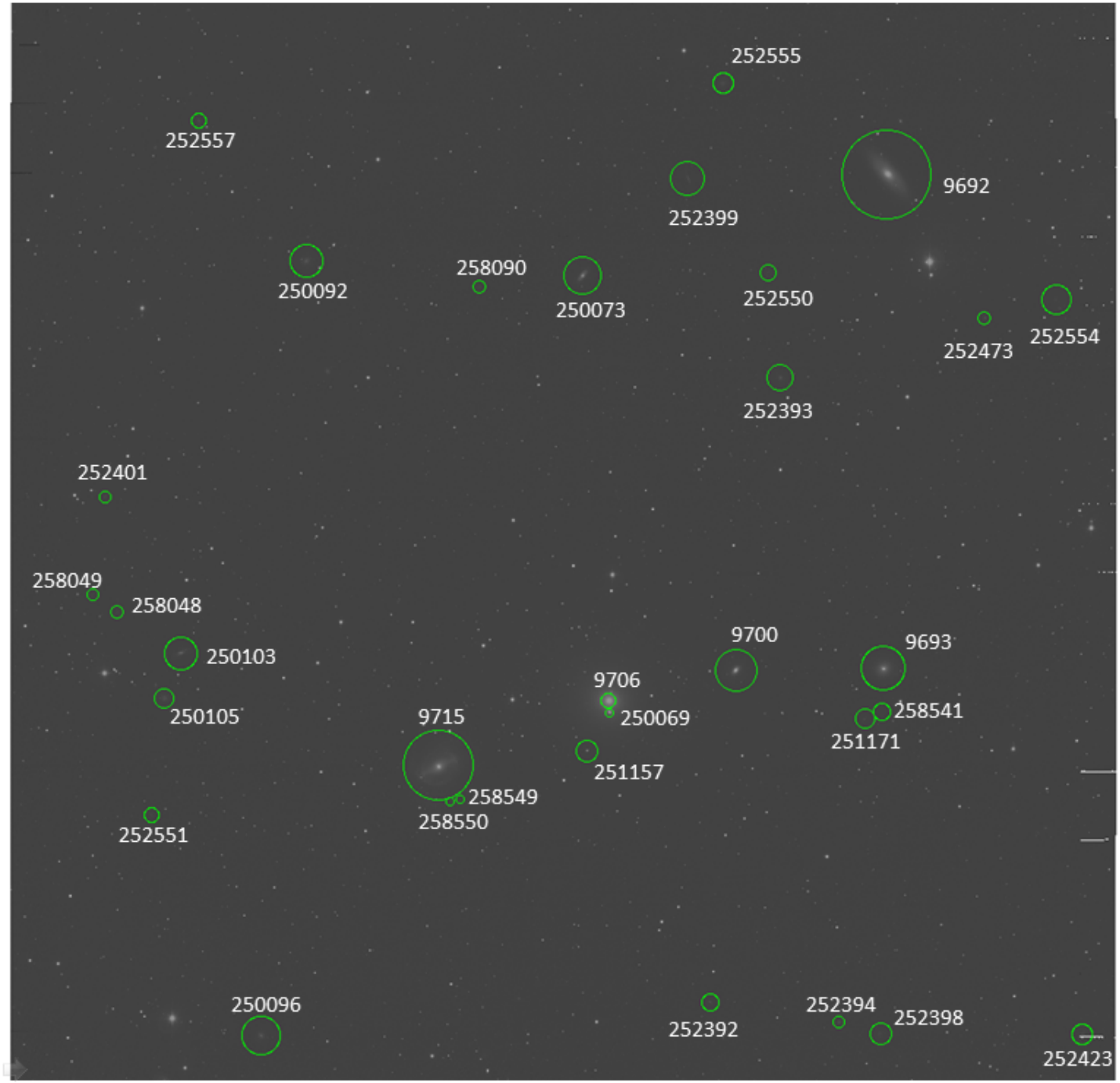
Reduction/Analysis Plan

★ Processing at Union/UWSP (image size BIG, CPU-intensive) **Nearing completion**

★ Each team receives images with dither gaps removed : R, r, Hα **Hartwick, WTA&M, Siena, Skidmore, SLU**

★Absolute flux calibration provided (unless non-photometric) **coming**

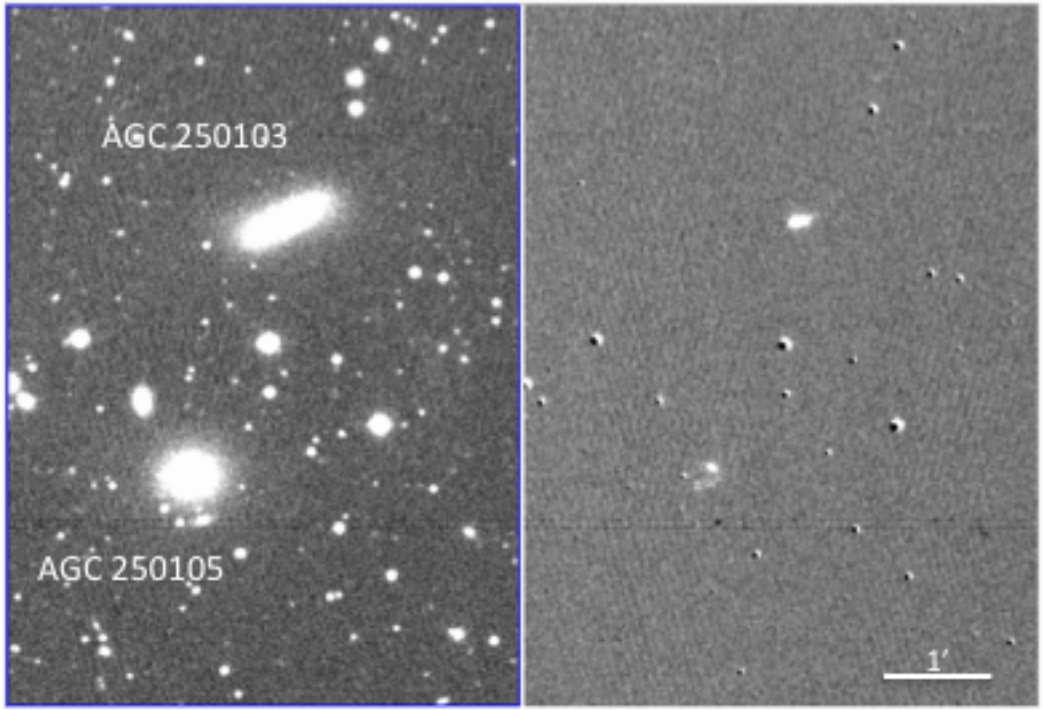
NGC 5846 Central Field



Reduction/Analysis Plan

- ★Reduction/Analysis to be completed:
  - ★Convolution to same seeing
  - ★Check sky subtraction
  - ★Combine R and Hα
  - ★Continuum-subtract Hα
  - ★Mask stars
  - ★Surface Photometry **- coming**
  - ★(Check photometry: literature, SDSS)
- ★Cookbook for Analysis in process
  - ★Kyle Murray tutorial

Automated in pyraf programs by Ryan Muther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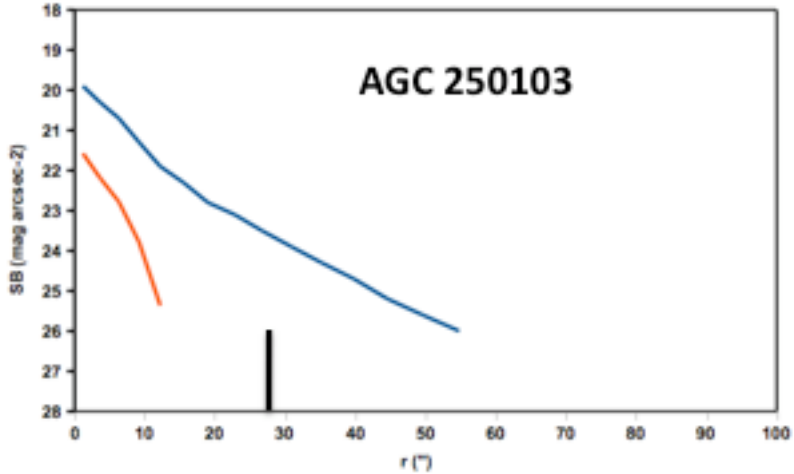
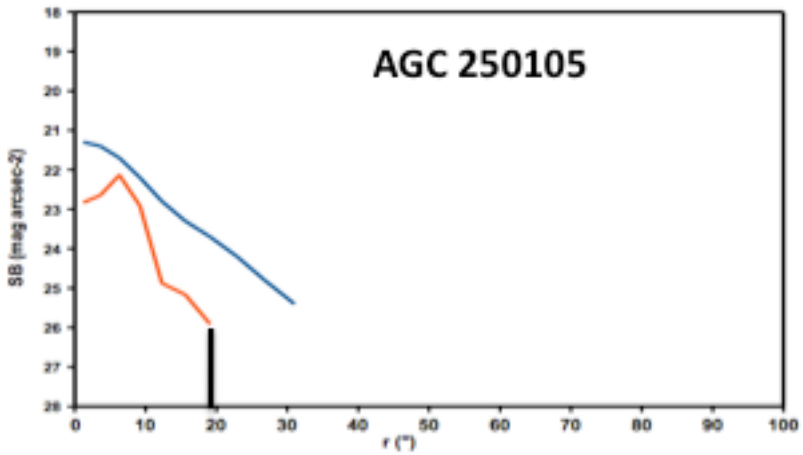
AGC 250105
1′

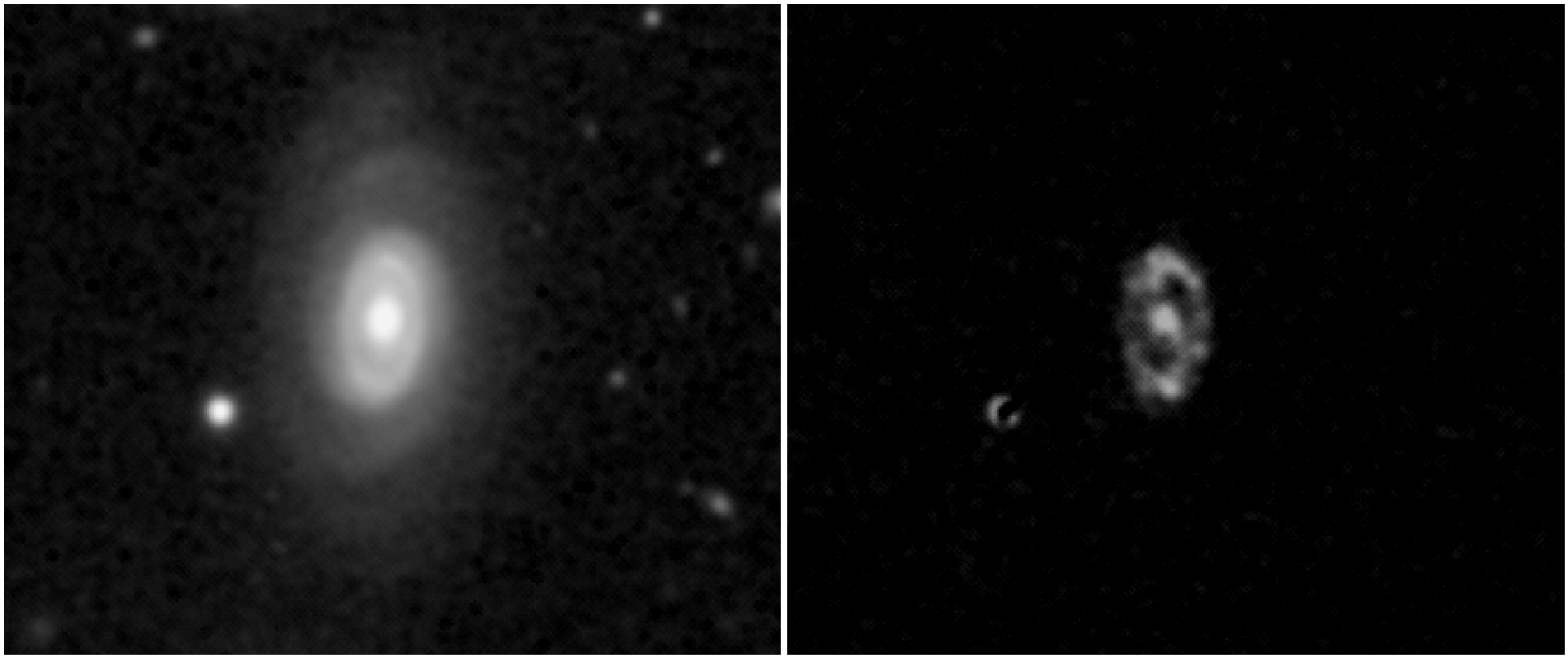

AGC 250103
SB (mag arcsec-2)
r (")


AGC 250105
SB (mag arcsec-2)
r (")

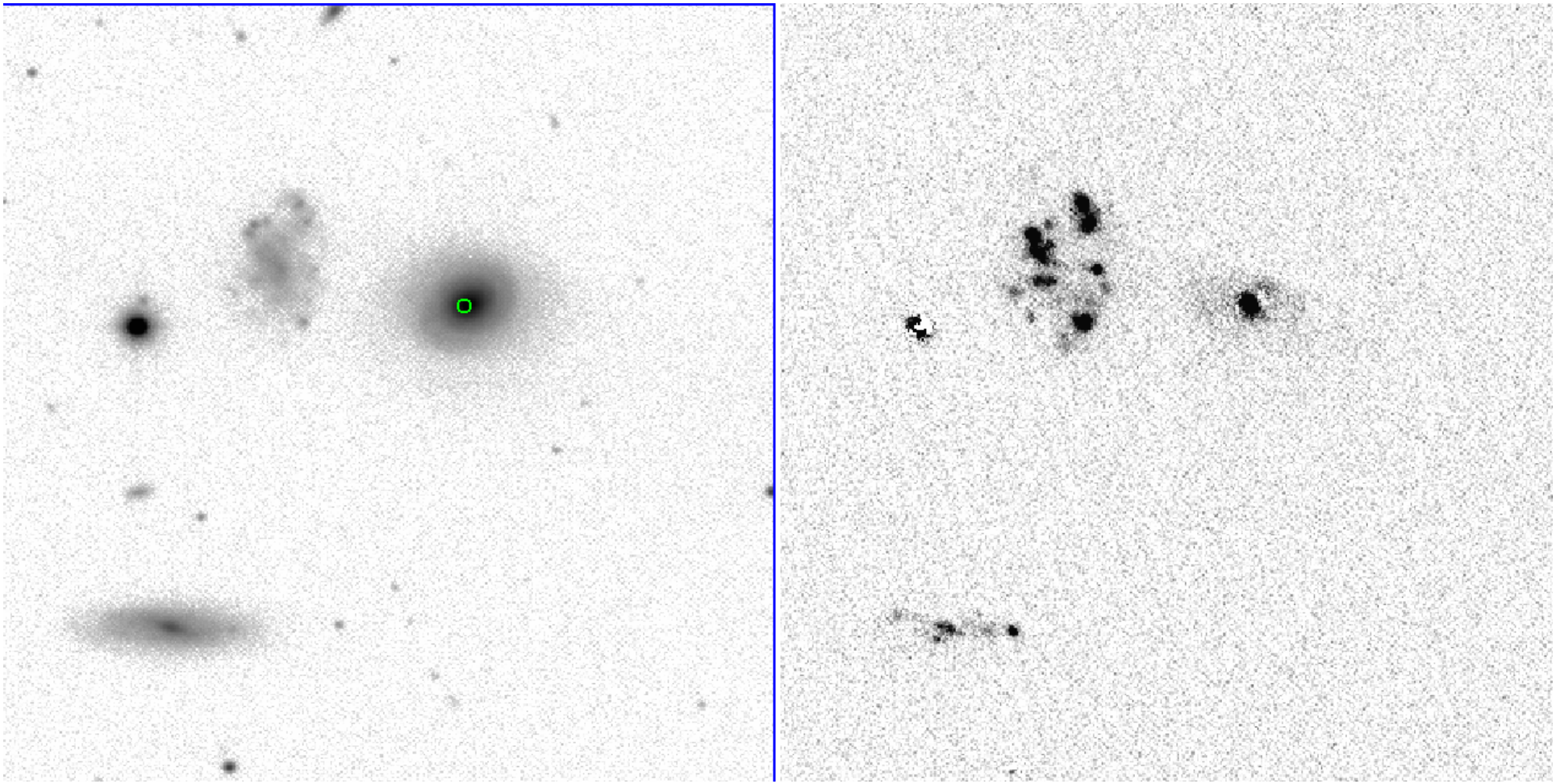
Quantities to Derive

- ★SFR: global, inner vs outer
- ★SFR Distribution
- ★Morphology, e.g., central concentration, B/D
- ★Compare, e.g.,
  - ★HI content
  - ★position w.r.t. group
  - ★morphology
- ★Compare to other groups, previous work

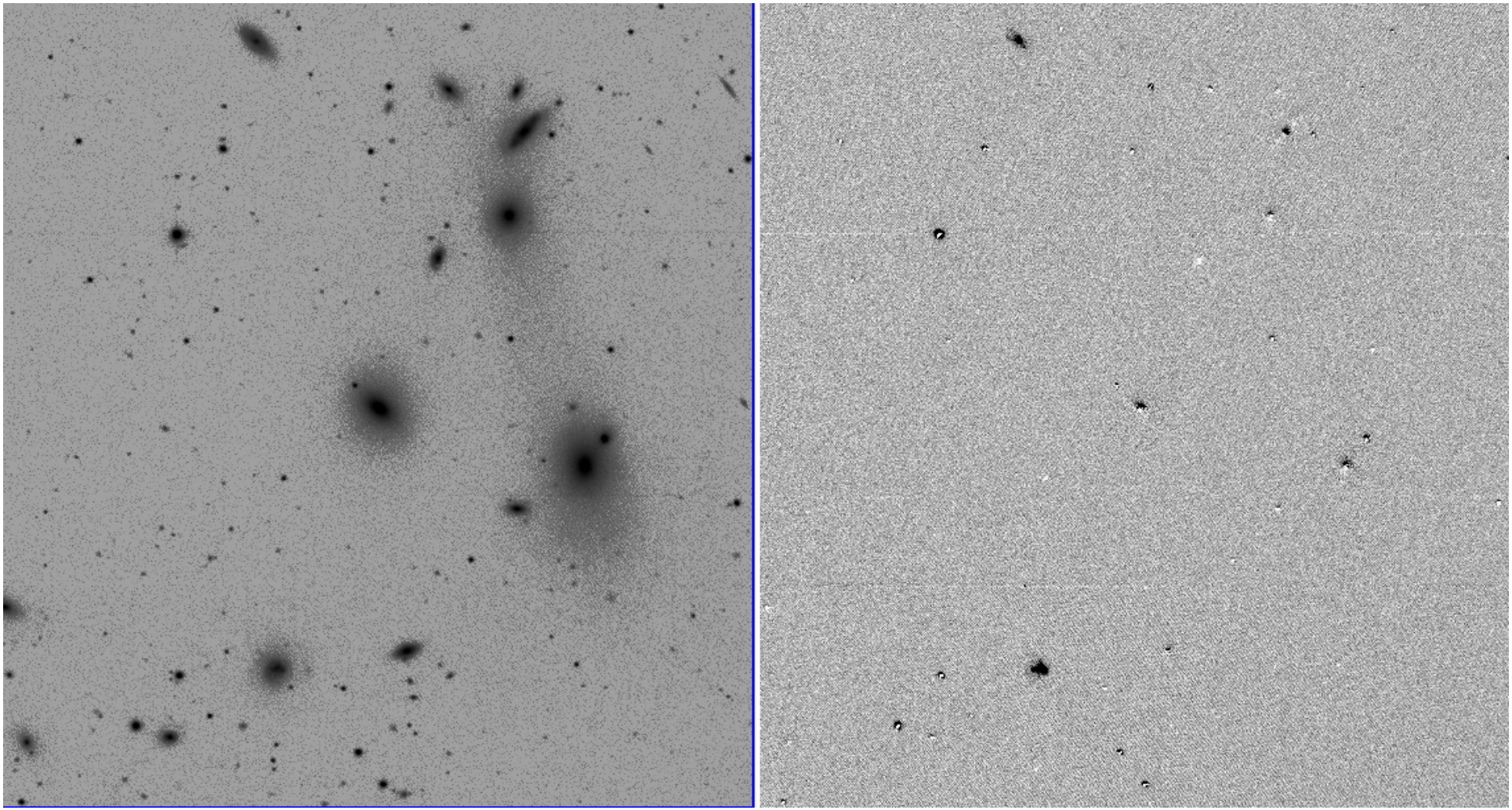
AGC 8478



AGC210802 (HCG059)

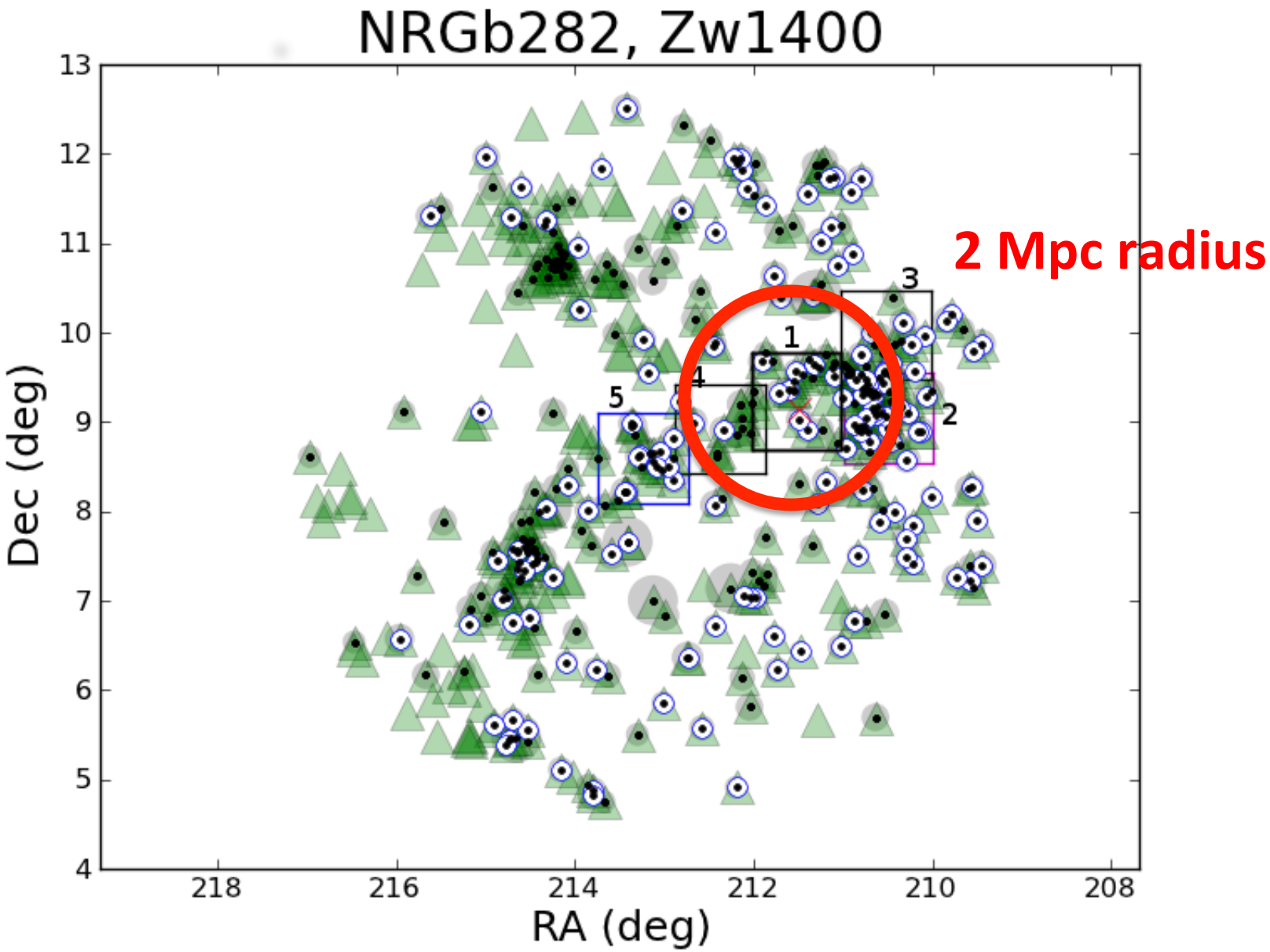


AGC 230366 Field (MKW11)

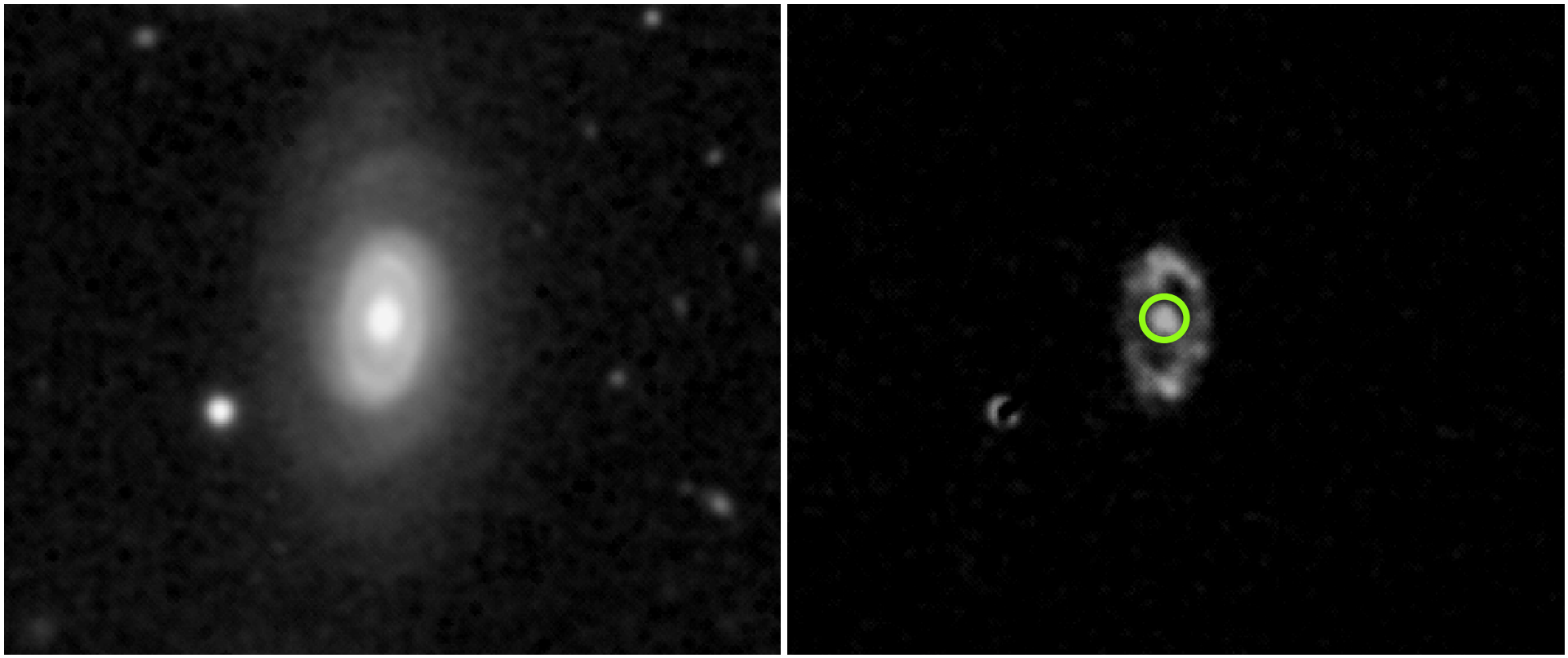


Follow-up with LBW

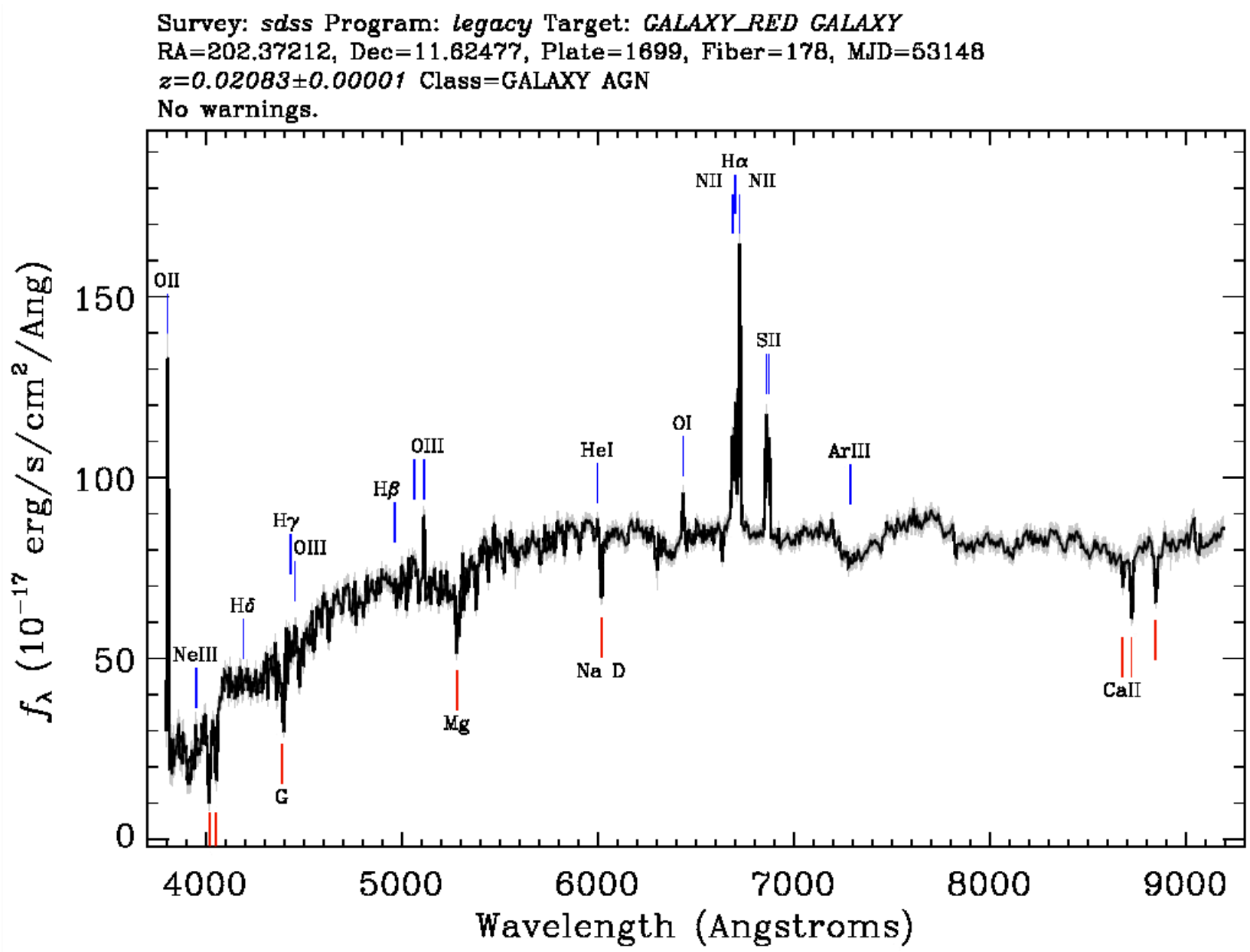
- ★Low mass galaxies and HI-depleted galaxies not detected by ALFALFA
- ★Star formation indicates gas is present
- ★Select galaxies for followup:
  - ★Hα emission in KP image
  - ★Galaxies w/in 2Mpc of group center and w/in reasonable velocity range that have SDSS emission lines indicating star formation


NRGb282, Zw1400
Dec (deg)
RA (deg)
13
12
11
10
9
8
7
6
5
4
218
216
214
212
210
208
1
2
3
4
5
2 Mpc radius

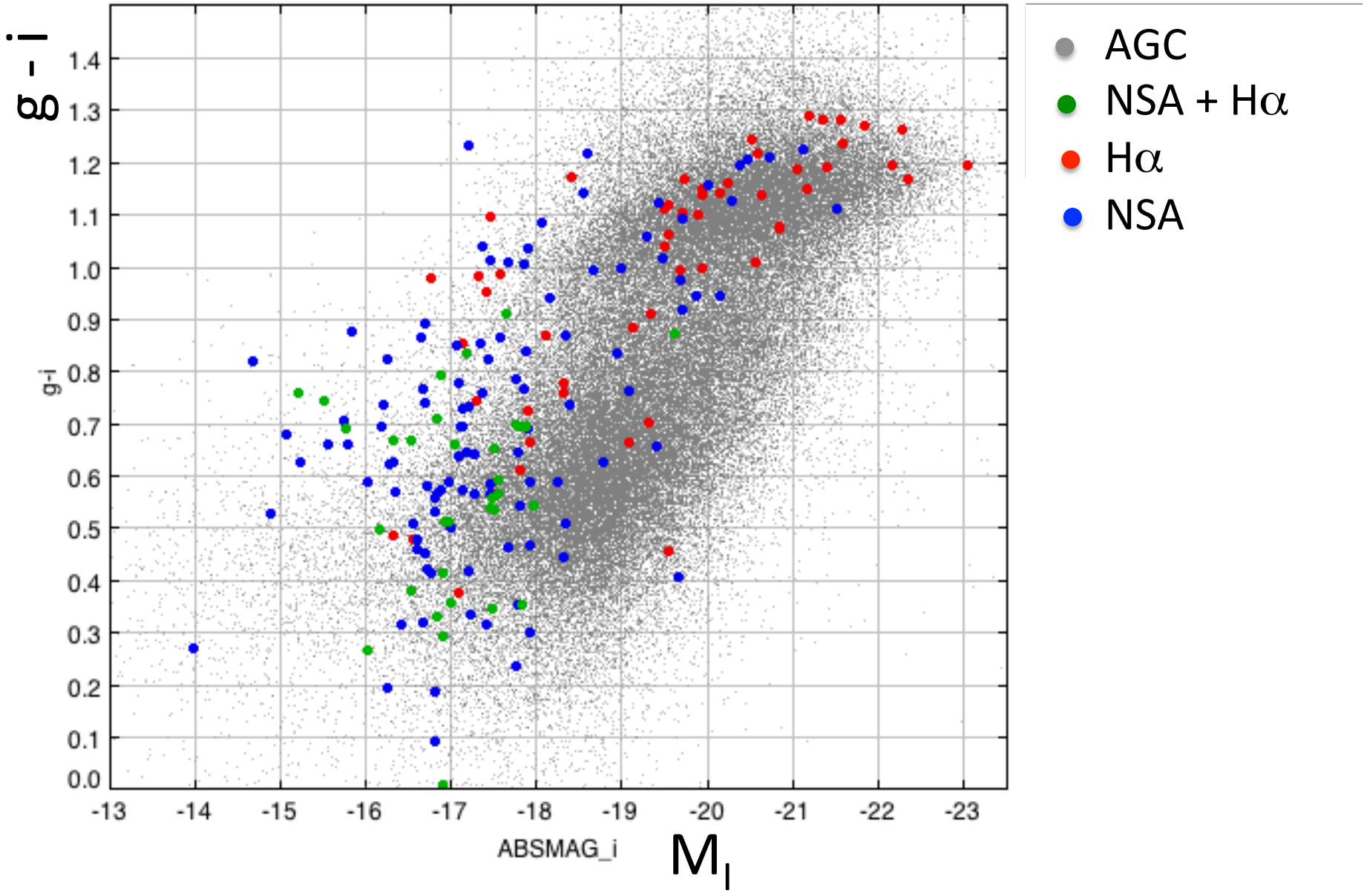
AGC 8478 (MKW 11)

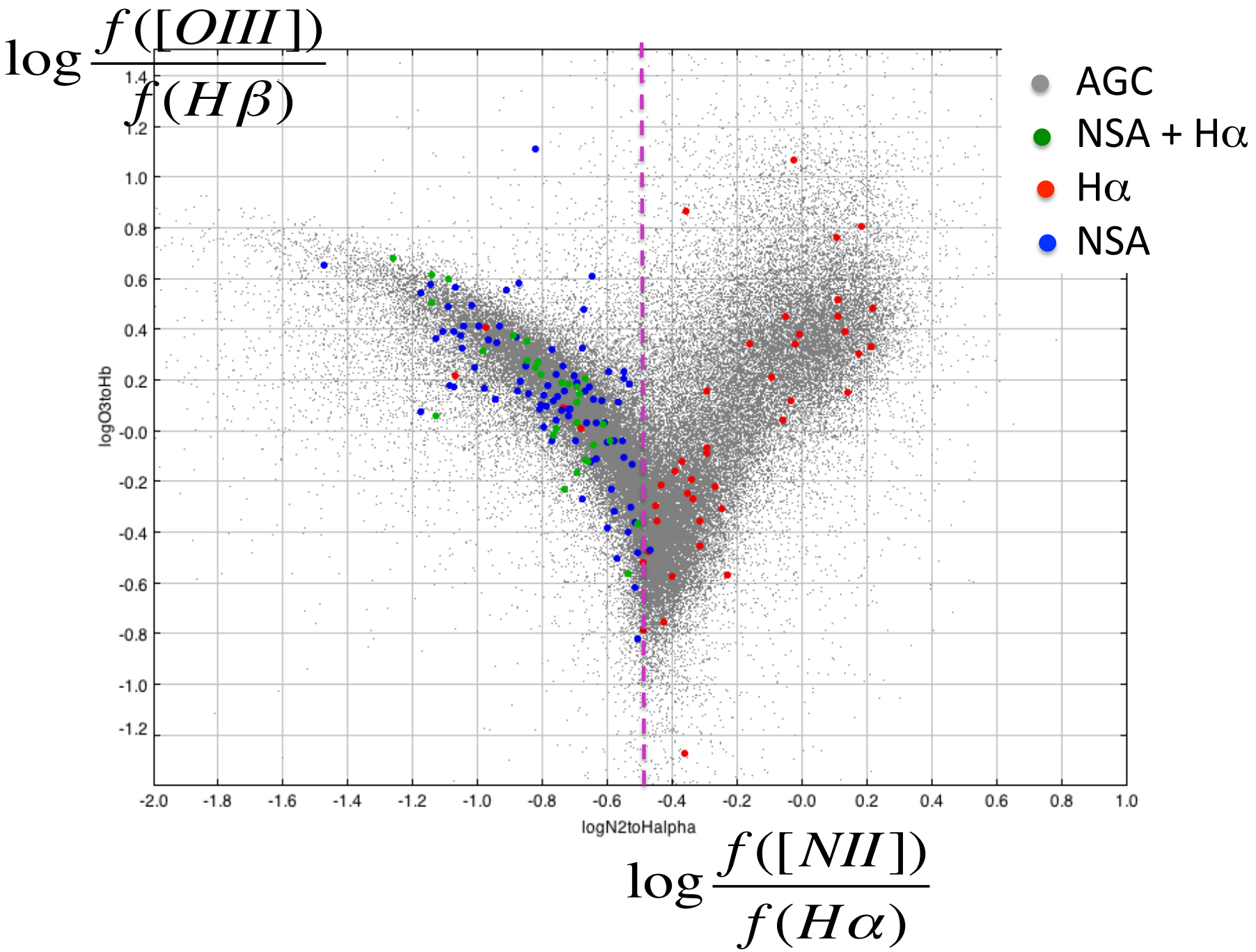


SDSS Fiber ~ 4’’ → central SF

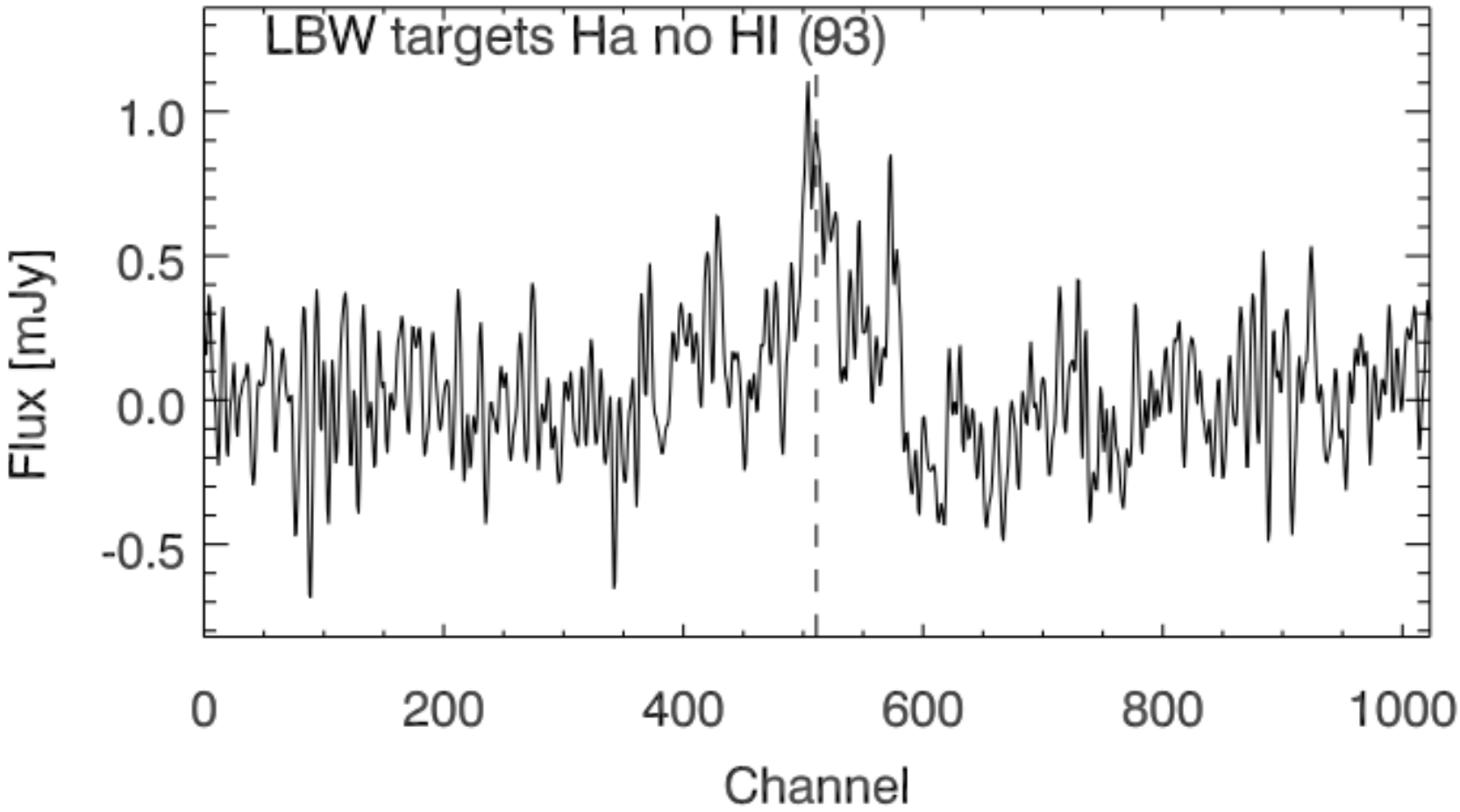

Survey: sdss Program: legacy Target: GALAXY_RED GALAXY
RA=202.37212, Dec=11.62477, Plate=1699, Fiber=178, MJD=53148
z=0.02083±0.00001 Class=GALAXY AGN
No warnings.
OII
NeIII
Hδ
G
Hγ
OIII
Hβ
OIII
Mg
HeI
Na D
OI
Hα
NII
NII
SII
ArIII
CaII
150
100
50
0
4000
5000
6000
7000
8000
9000
Wavelength (Angstroms)
f_λ (10^{-17} erg/s/cm^2/Ang)

Color-Magnitude Diagram




$\log \frac{f([OIII])}{f(H\beta)}$
AGC
NSA + Hα
Hα
NSA
logO3toHb
logN2toHalpha
$\log \frac{f([NII])}{f(H\alpha)}$

Stacking ALFALFA HI



Star Formation Extent as a Function of Gas Content in Spirals

- Outer extent of star formation (r_{SF}) normalized by $_{r24,R}$ vs HI Deficiency (Solanes et al. 1996)
- Isolated and Virgo data from Koopmann & Kenney 2004
- Preliminary Result: star formation extents of NGC 5846 spirals more similar to Virgo spirals for this small sample