

The word "ALFA" is written in a large, white, stylized, italicized font with a slight shadow effect, set against a red background with a green grass-like texture at the bottom. In the top left corner, there is a small inset image of a building at night with lights. In the top right corner, there are three circular logos: a blue one with a globe, a red one with a shield, and a yellow one with a sun-like pattern.

ALFA

The background of the slide is a dark blue image of a large radio telescope dish, likely the Arecibo telescope, with its complex metal structure and cables visible against a dark sky.

Zwicky Galaxy Cluster 1400+0949

Aileen O'Donoghue & Jeff Miller

Department of Physics

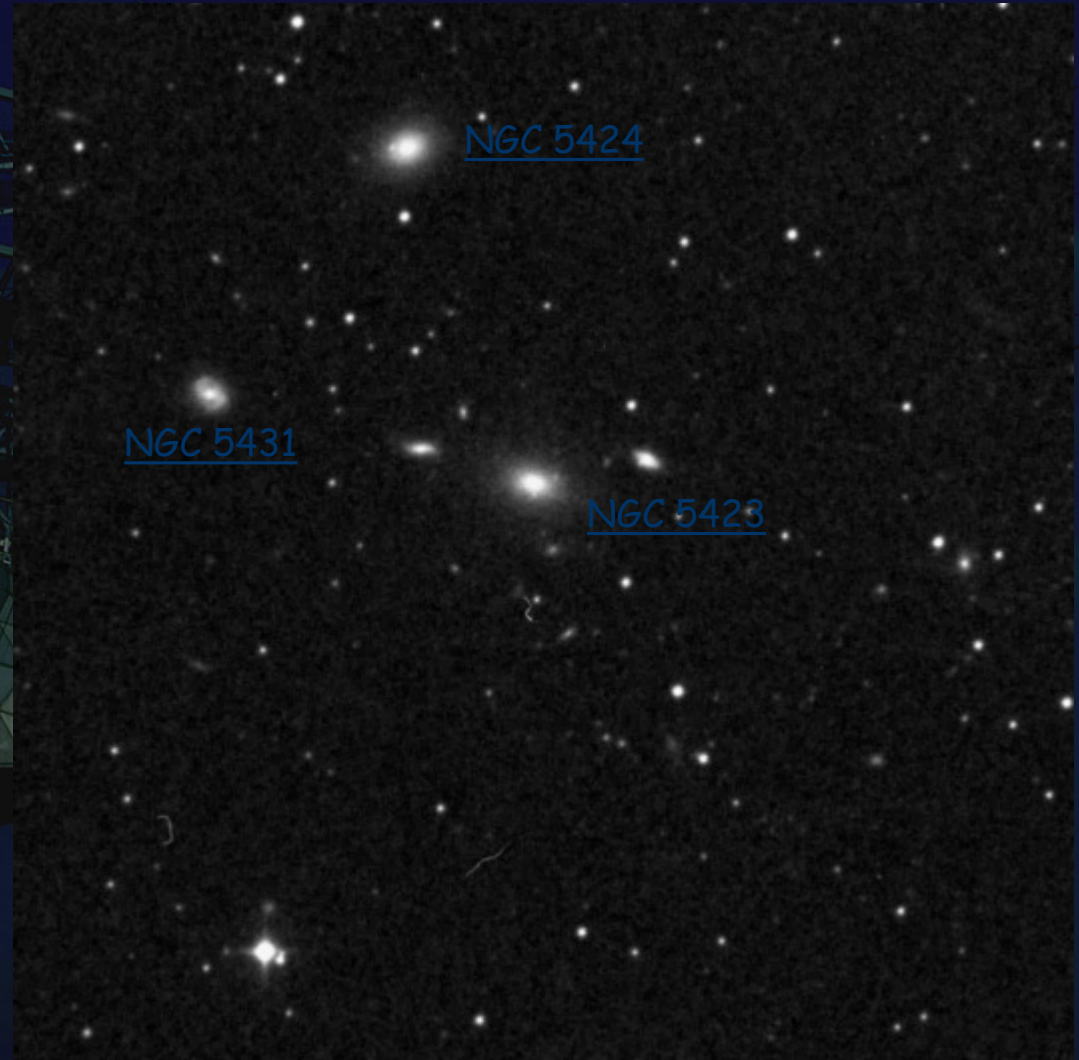
St. Lawrence University, Canton, NY

ST. LAWRENCE UNIVERSITY

Original POSS Red Plate

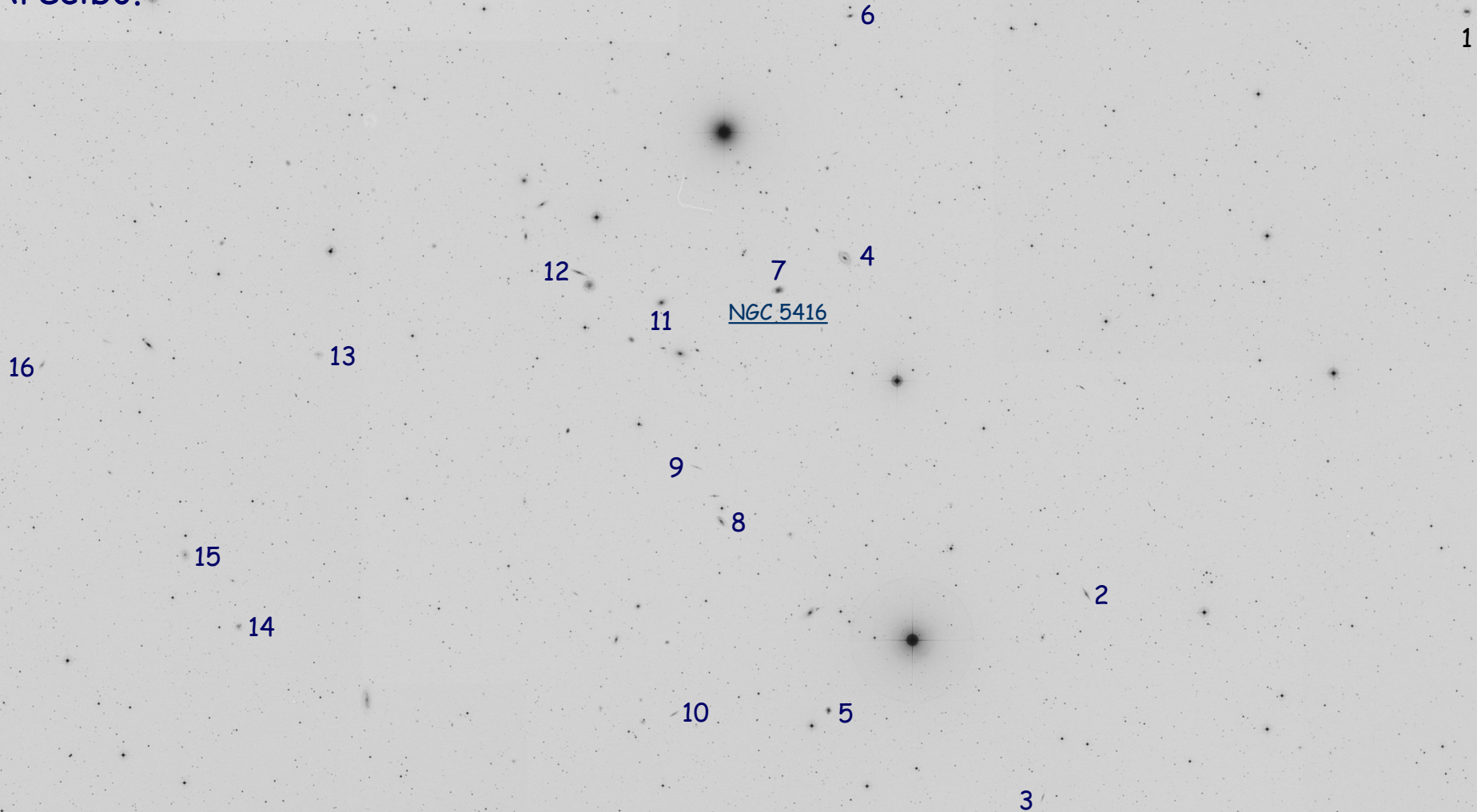
 $14^{\text{h}}02^{\text{m}}48^{\text{s}} +09^{\circ}19'48''$ (J2000)

Zwicky, Herzog, Wild,
Karpowicz & Kowal,
1961-1968. Catalog of Galaxies
and Clusters of Galaxies,
Vols. 1-6. Pasadena: California
Institute of Technology



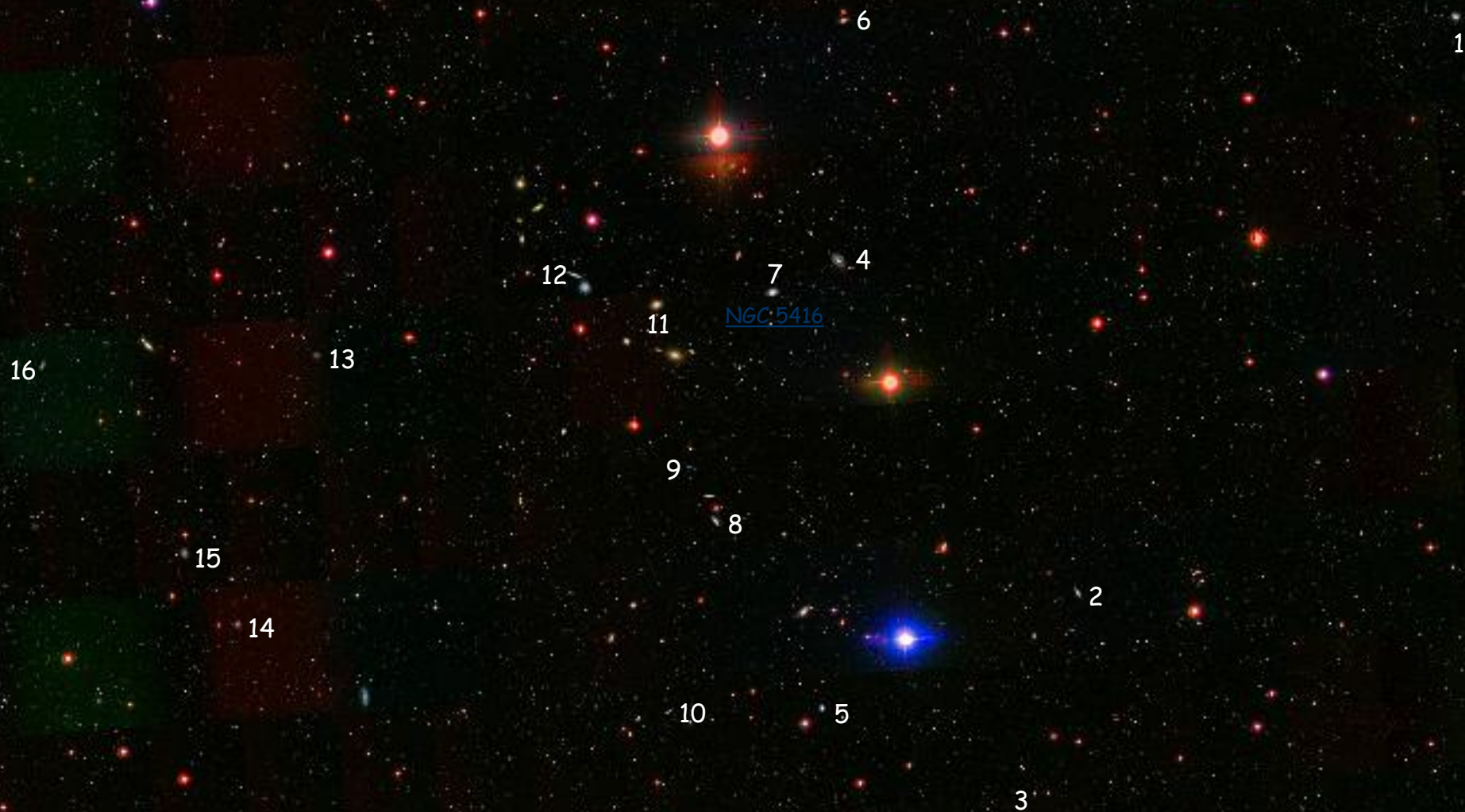
Palomar blue
plates showing
galaxies
detected at
Arecibo.

POSS2 Blue Plate



DR7 Frames

DR7 frames
showing galaxies
detected at
Arecibo.



POSS Blue Plate

☒☒☒ Arecibo Observations 1978

Palomar blue plate showing galaxies detected at Arecibo.

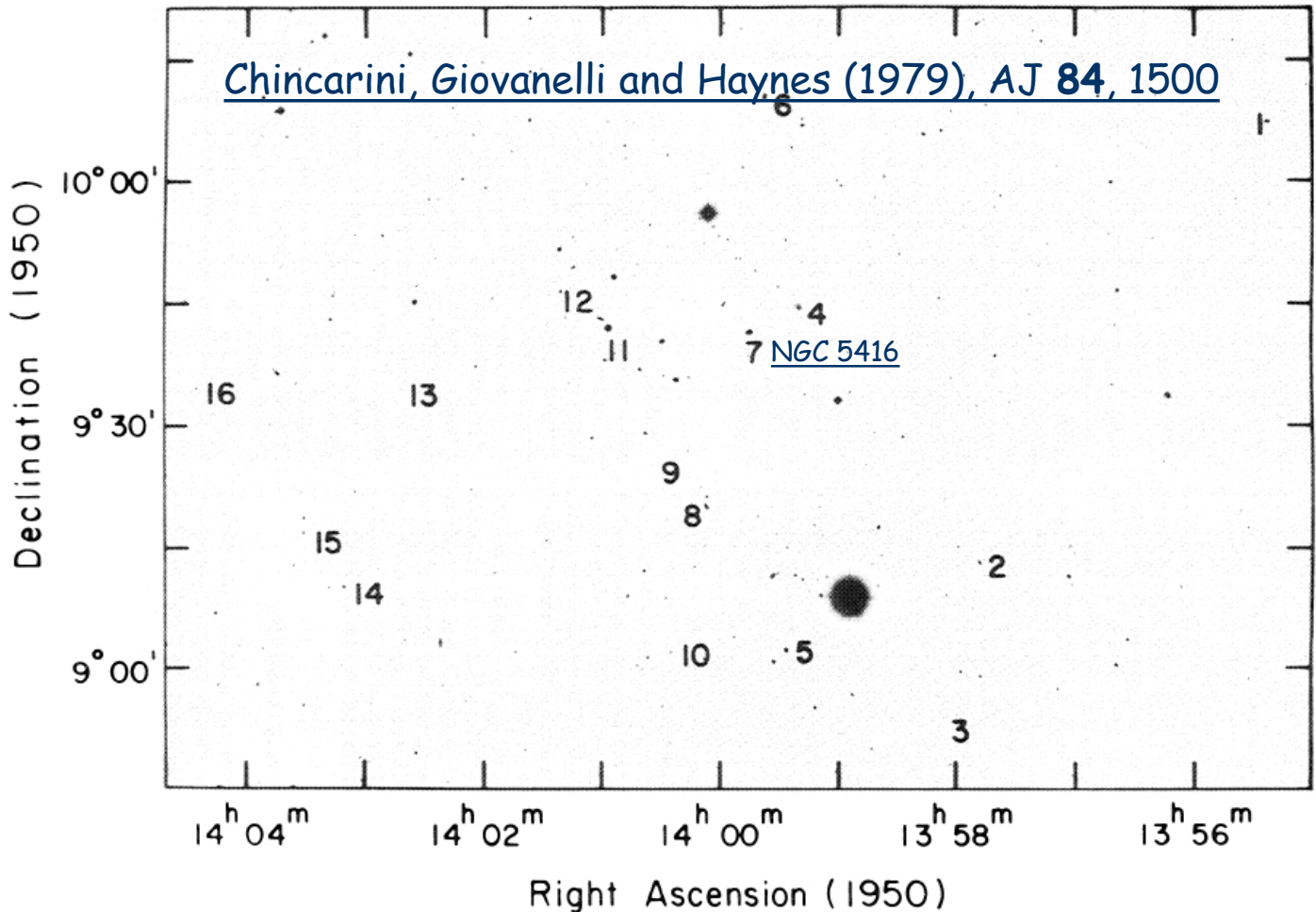


FIG. 1. An enlargement of the Palomar Observatory Sky Survey blue print is shown, and the detected galaxies are indicated by their program number, as coded in Table I. NGC 5416 is galaxy number 7.

SDSS Image


 $14^{\text{h}}02^{\text{m}}48^{\text{s}} +09^{\circ}19'48''$ (J2000)

 **DR7**
[Home](#) | [Help](#) | [Tutorial](#) | [Chart](#) | [List](#) | [Explore](#)

Parameters

ra	<input type="text" value="210.7"/> deg
dec	<input type="text" value="9.33"/> deg
opt	<input type="text" value="L"/>

Get Image 

Drawing options

- Grid
- Label
- Photometric objects
- Objects with spectra
- Invert Image

Advanced options

- Spectroscopic Targets
- Outlines
- Bounding Boxes
- Fields
- Masks
- Deltas

SDSS DR7
ra: 210.700 dec: 9.330
scale: 6.3379 arcsec/pix
image zoom: 1:64



Selected object

ra	210.28695
dec	9.77294
type	GALAXY
u	26.62
g	22.40
r	21.57
i	21.51
z	21.21

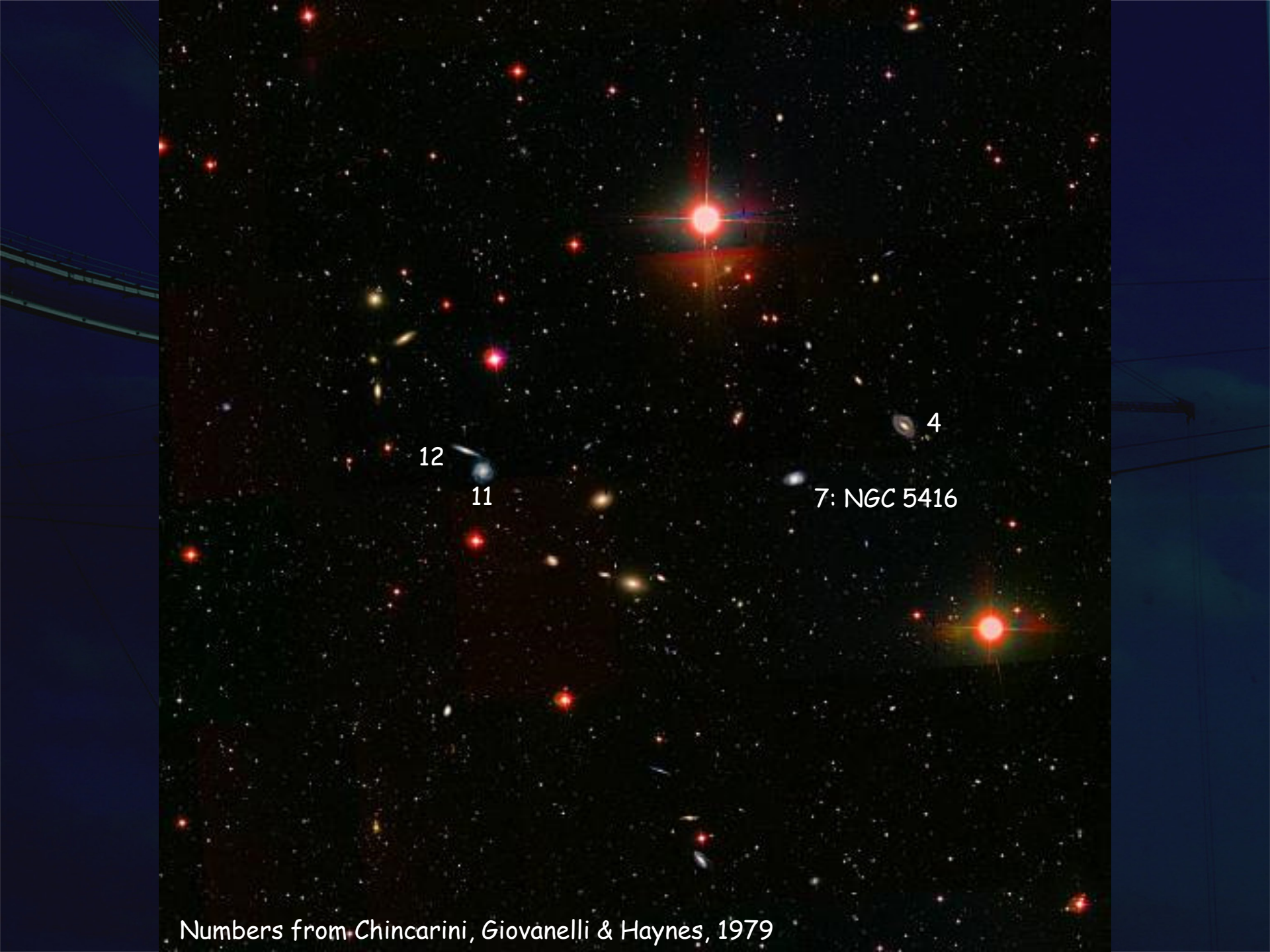


-  Quick Look
-  Explore
-  Recenter
-  Add to notes
-  Show notes



Click to open Sky Maps ?

To see Sky Maps, install th



12

11

4

7: NGC 5416

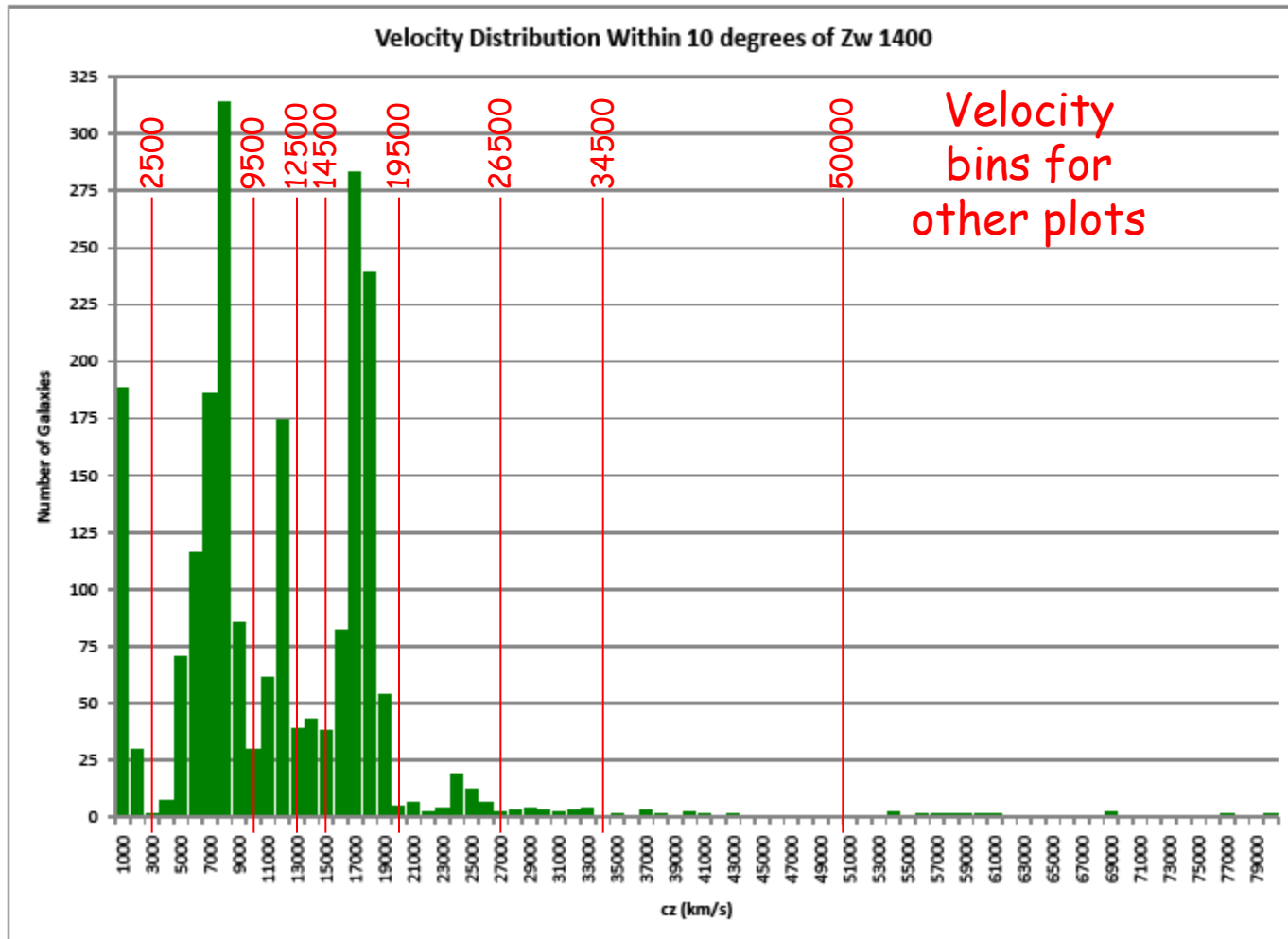
Numbers from Chincarini, Giovanelli & Haynes, 1979

Velocity Histogram

ALFALFA

Zw1400b Histogram

AOD 7/13/2010

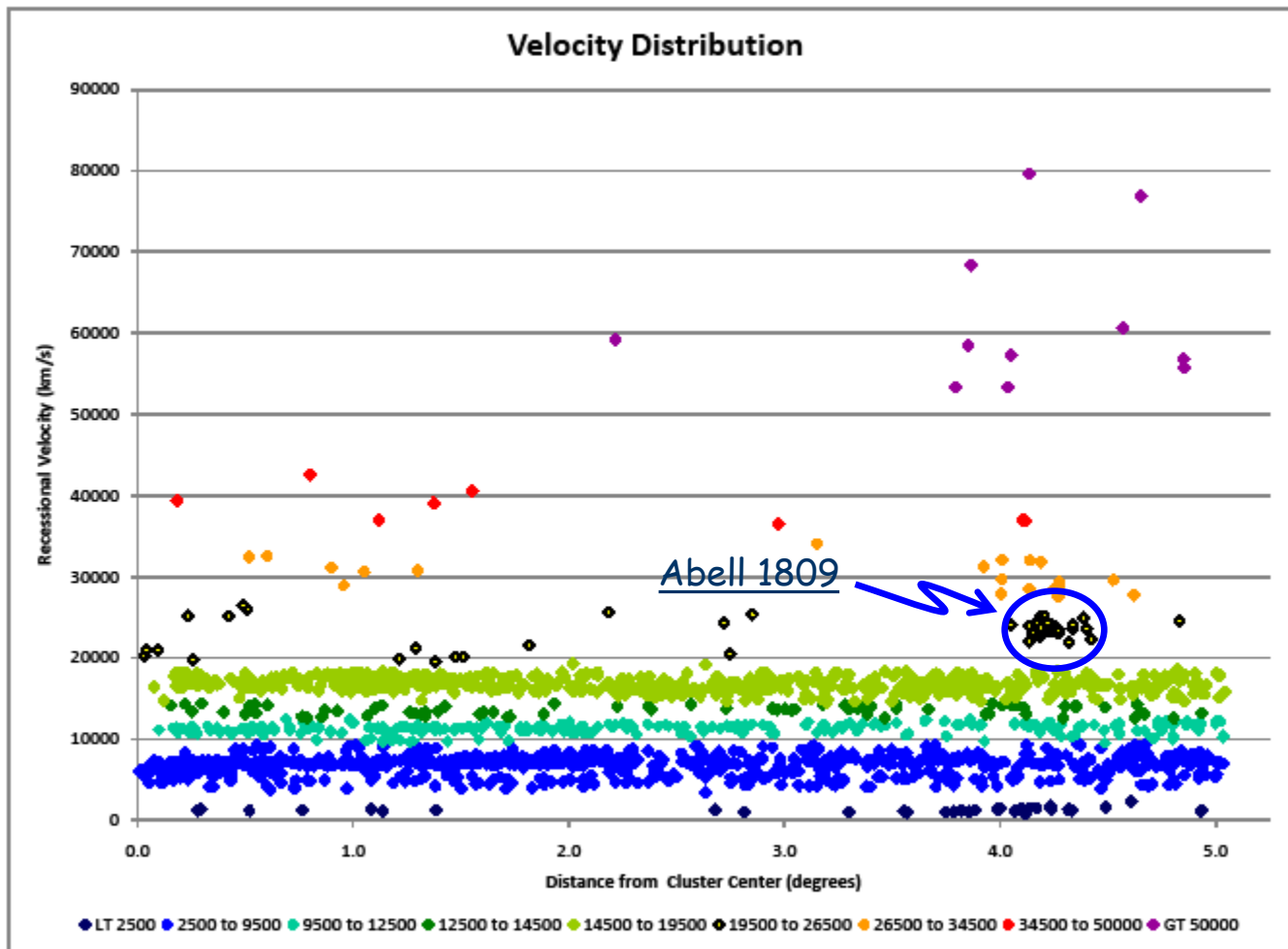


Velocity & Radial Distance

ALFALFA

Zw Cl 1400.4+0949

AOD 7/13/2010

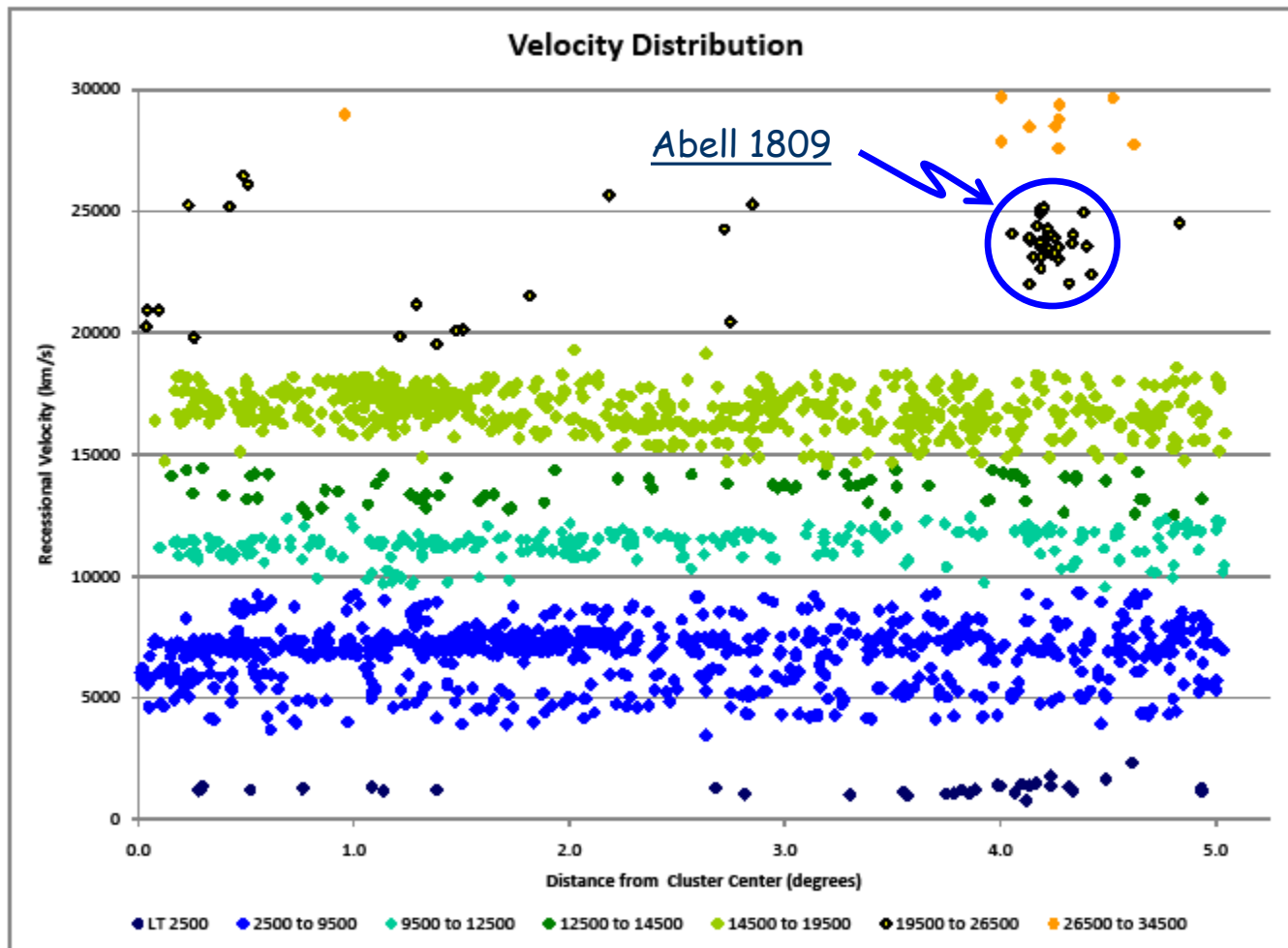


Velocity & Radial Distance

ALFALFA

Zw Cl 1400.4+0949

AOB 7/13/2010

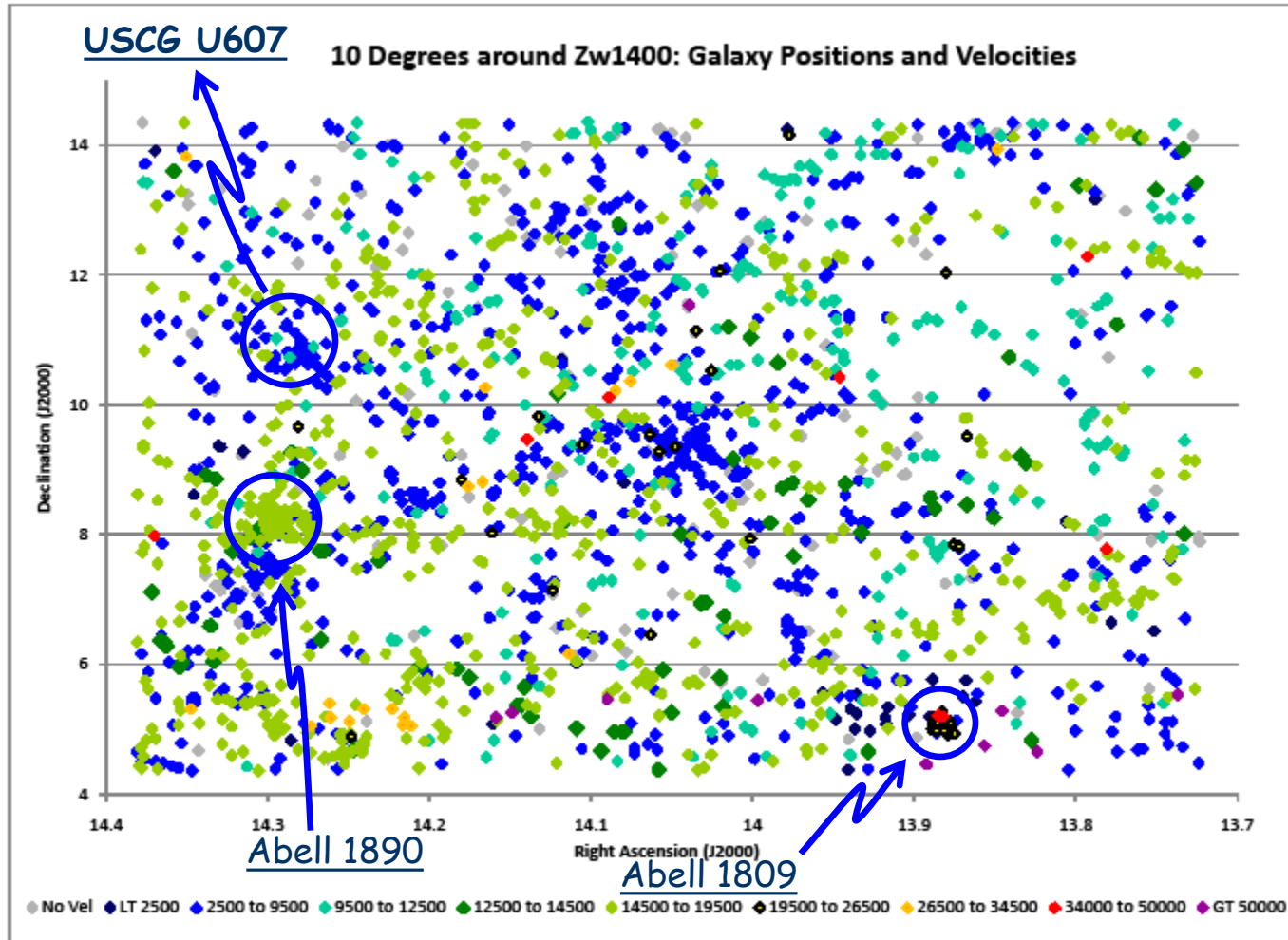


Sky Position with Velocity

ALFALFA

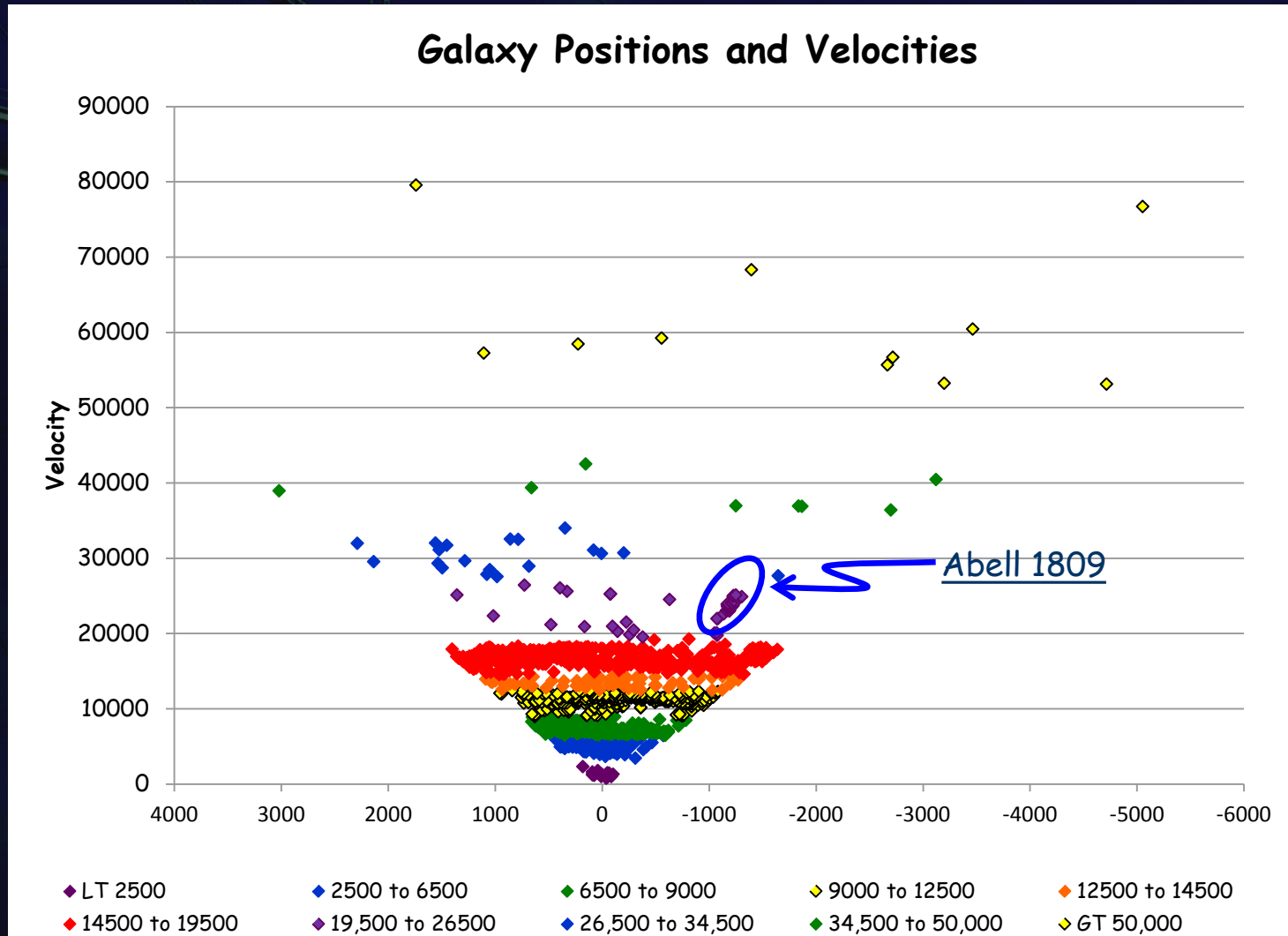
Zw Cl 1400.4+0949

AOD 7/13/2010



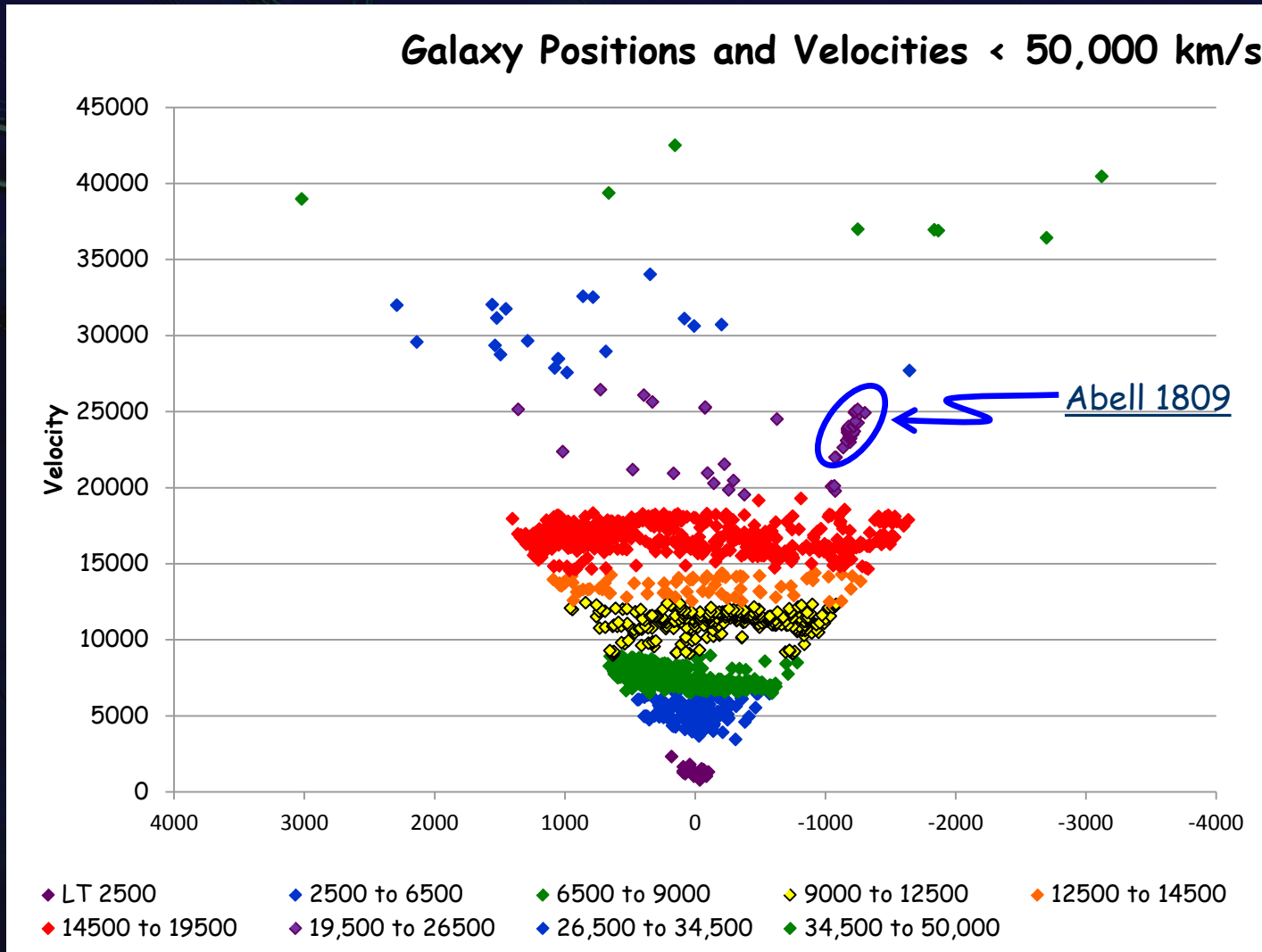
Wedge Plot

☐ Taking $z = r$, $x = r \sin(\alpha - 14.075^h)$, $y = r \cos(\alpha - 14.075^h)$



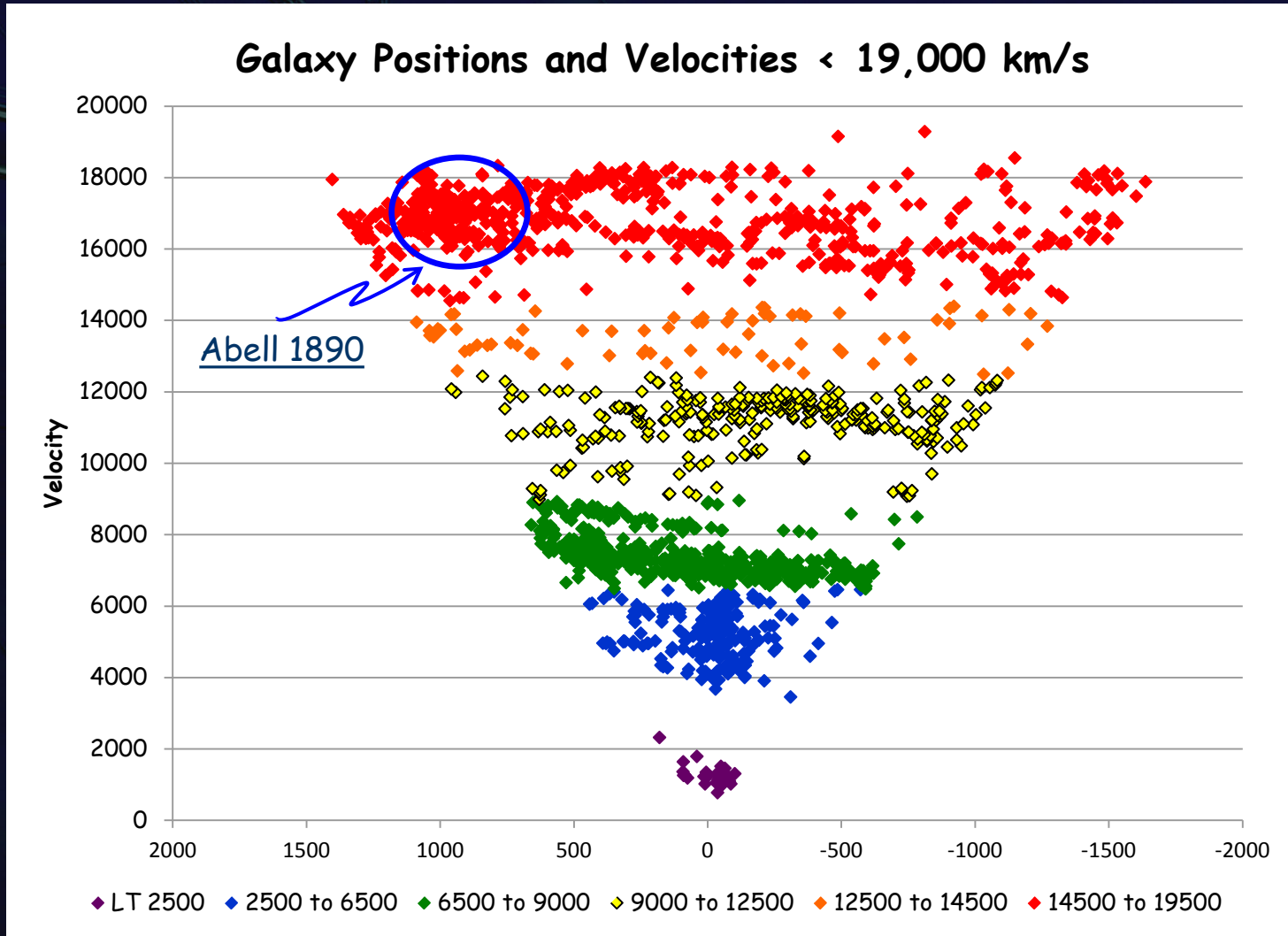
Wedge Plot

☐ Taking $z = r$, $x = r \sin(\alpha - 14.075^h)$, $y = r \cos(\alpha - 14.075^h)$



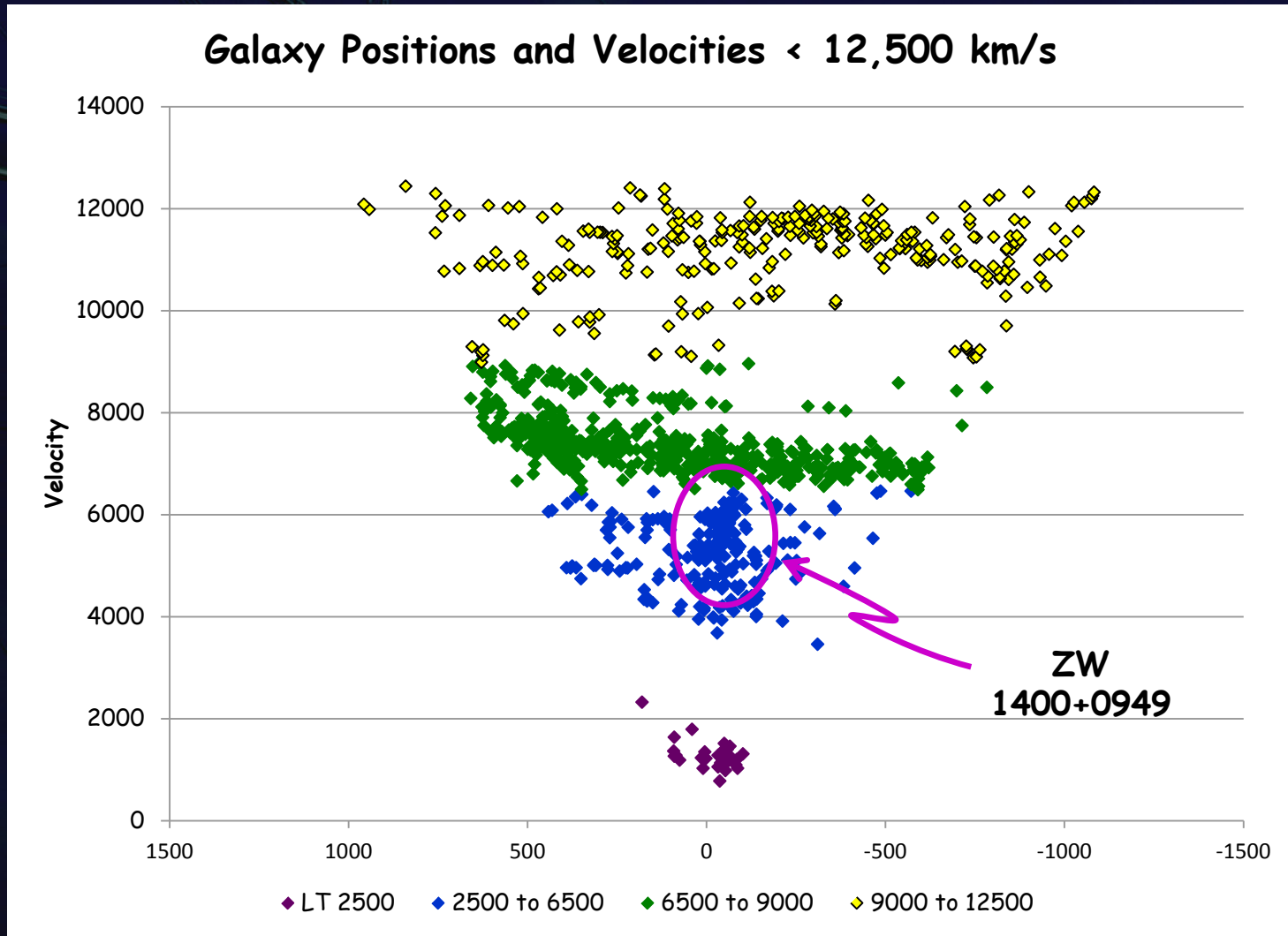
Wedge Plot

✎ Taking $z = r$, $x = r \sin(\alpha - 14.075^h)$, $y = r \cos(\alpha - 14.075^h)$



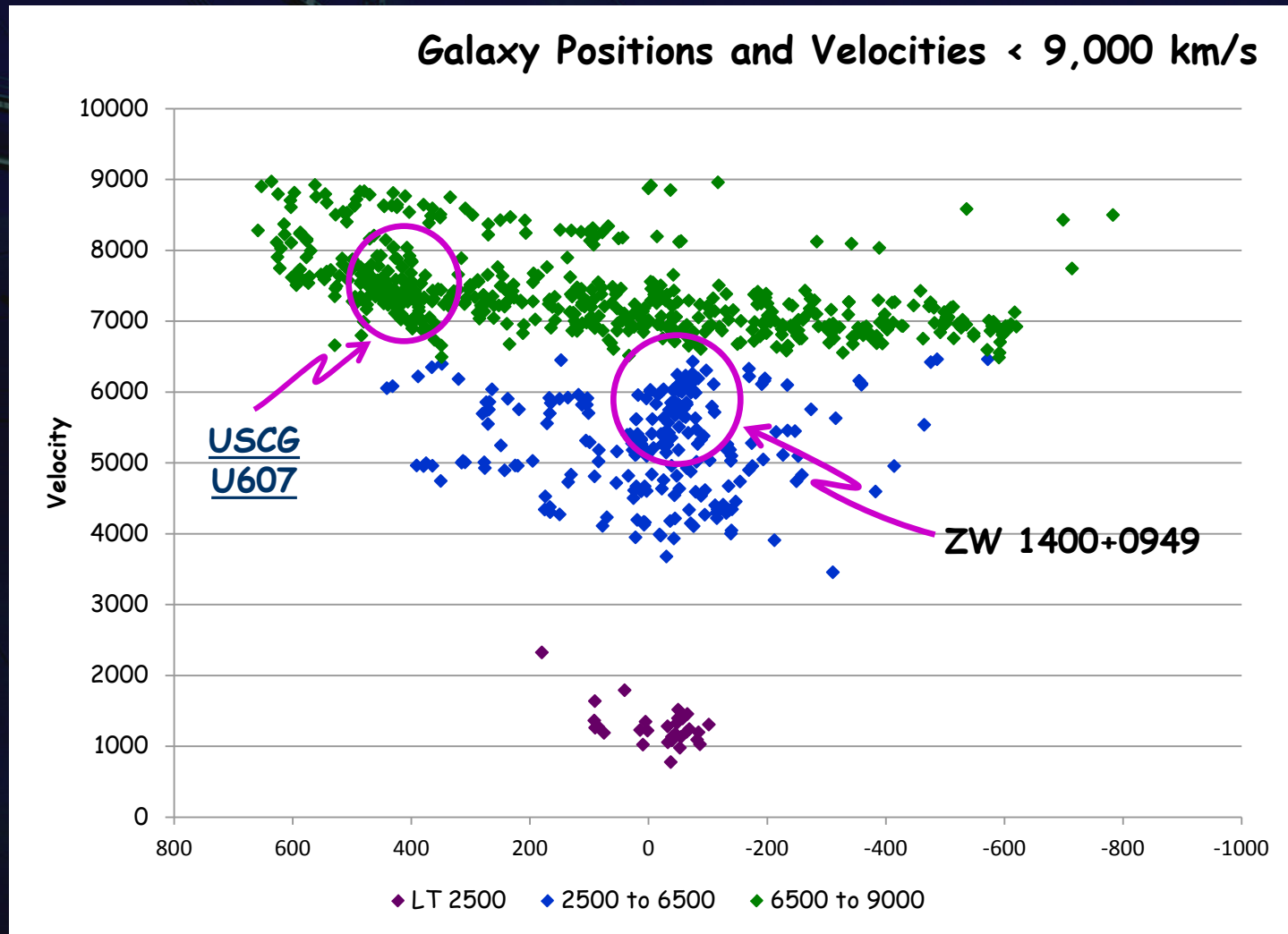
Wedge Plot

Taking $z = r$, $x = r \sin(\alpha - 14.075^h)$, $y = r \cos(\alpha - 14.075^h)$



Wedge Plot

Taking $z = r$, $x = r \sin(\alpha - 14.075^h)$, $y = r \cos(\alpha - 14.075^h)$

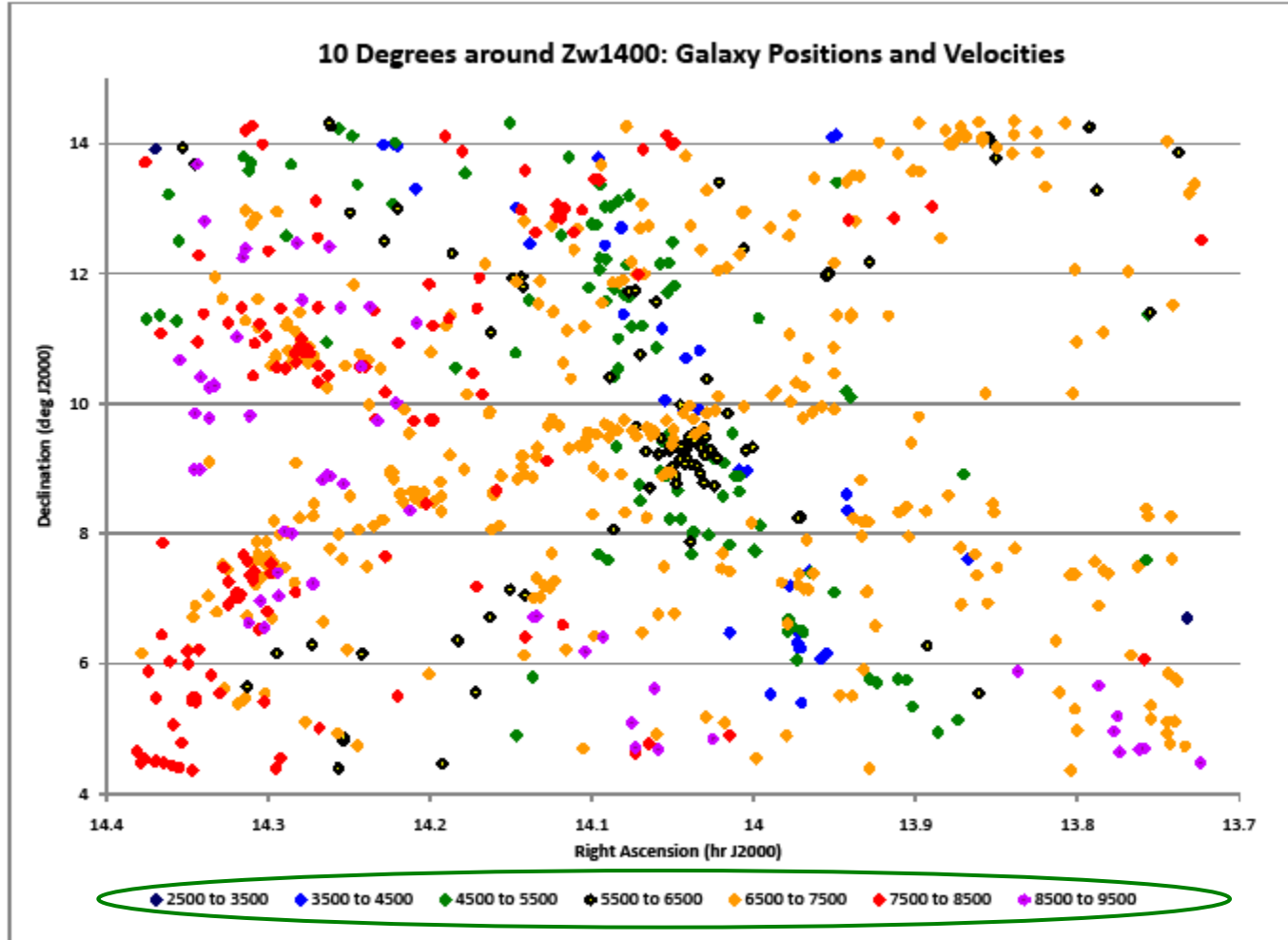


Sky Position with Velocity

ALFALFA

Zw Cl 1400.4+0949

AOD 7/13/2010



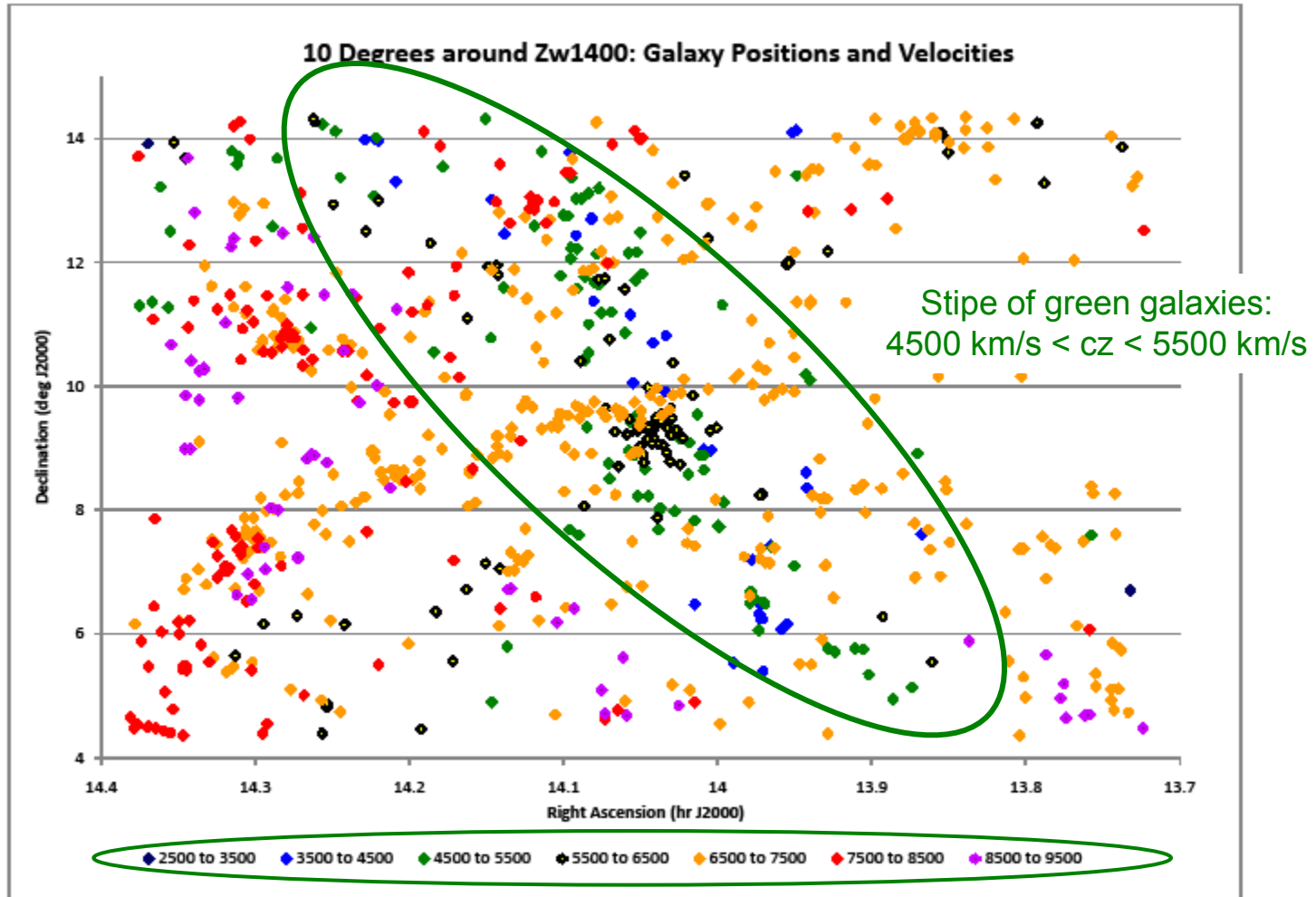
Velocities in histogram's Zw1400 "hump" between 2500 and 9500 km/s

Sky Position with Velocity

ALFALFA

Zw Cl 1400.4+0949

AOD 7/13/2010



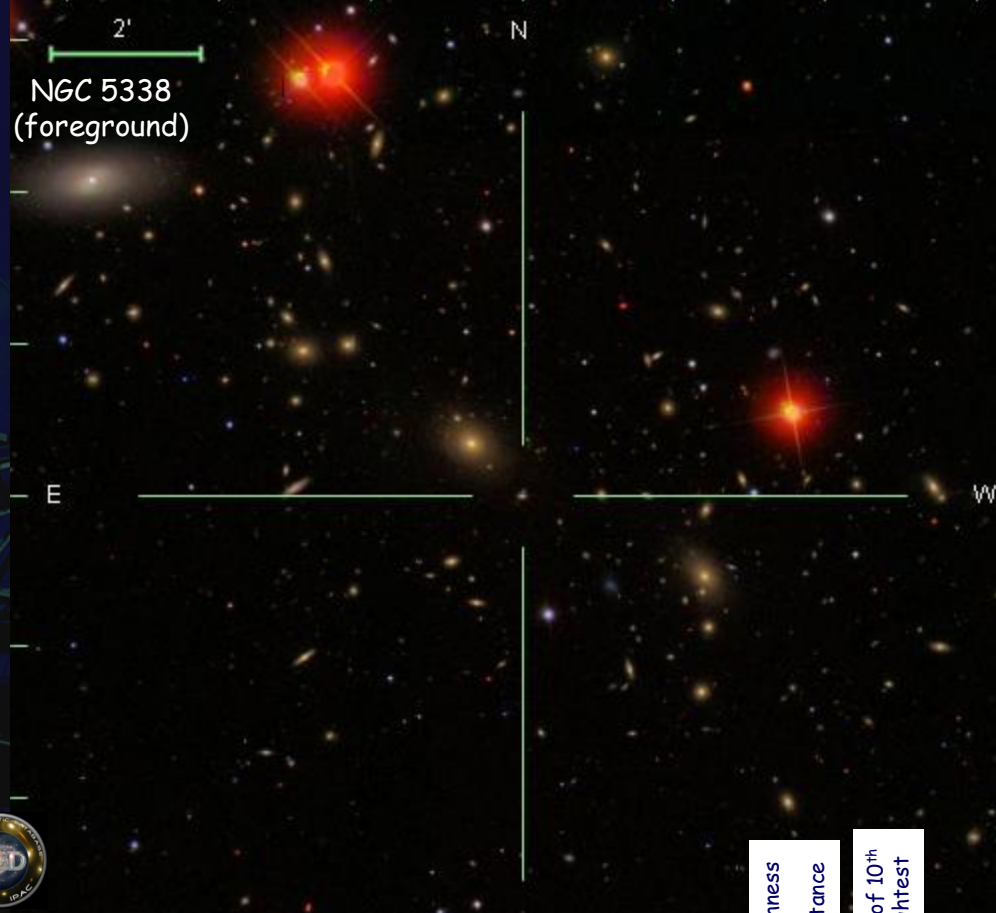
Velocities in histogram's Zw1400 "hump" between 2500 and 9500 km/s

Abell 1809

13 53 03.7 +05 08 17.7

$cz = 23721 \text{ km/s}$

2'
NGC 5338
(foreground)



Abell, Corwin & Olowin 1989 p. 37



Richness
Distance
mag of 10th
brightest

Abell	RA(1950)Dec	RA(2000)Dec	<i>l</i>	<i>b</i>	<i>x</i>	<i>y</i>	T_{B-M}	C	<i>z</i>	R	D	m
			galactic coords		POSS coords		B-M Type	Members		Classes		
1809	1350.8+0524	1353.3+0509	339.54	63.54	39	168	II:	78	0.0788	1	4	15.8
1810	1350.4+3630	1352.6+3615	71.85	74.14	318	228	III	65		0	5	17.2

Ebeling et al, 1998 p. 24 (ROSAT cluster Sample)

<i>z</i> , contam. extent, serend. flag	cluster name	α (J2000) [deg]	δ (J2000) [deg]	n_H [10 ²⁰ cm ⁻²]	RASS exp. time [s]	VTP count rate [s ⁻¹]	r_{VTP} [arcmin]	final count rate [s ⁻¹]	count rate error [s ⁻¹]	kT [keV]	<i>z</i>	f_X (0.1–2.4 keV) [10 ⁻¹² erg cm ⁻² s ⁻¹]	L_X (0.1–2.4 keV) [10 ⁴⁴ erg s ⁻¹]	<i>z</i> reference
VS	A1800	207.365	28.106	1.2	441	0.84	8.2	1.00	0.14	5.1 ^e	0.0748	12.8	3.05	(20)
V	A1809	208.275	5.158	2.0	407	0.35	5.8	0.41	0.09	3.9 ^e	0.0790	6.0	1.61	(20)
V	A1831	209.802	27.978	1.3	473	0.78	7.1	0.91	0.12	4.2 ^e	0.0612	11.9	1.90	(20)

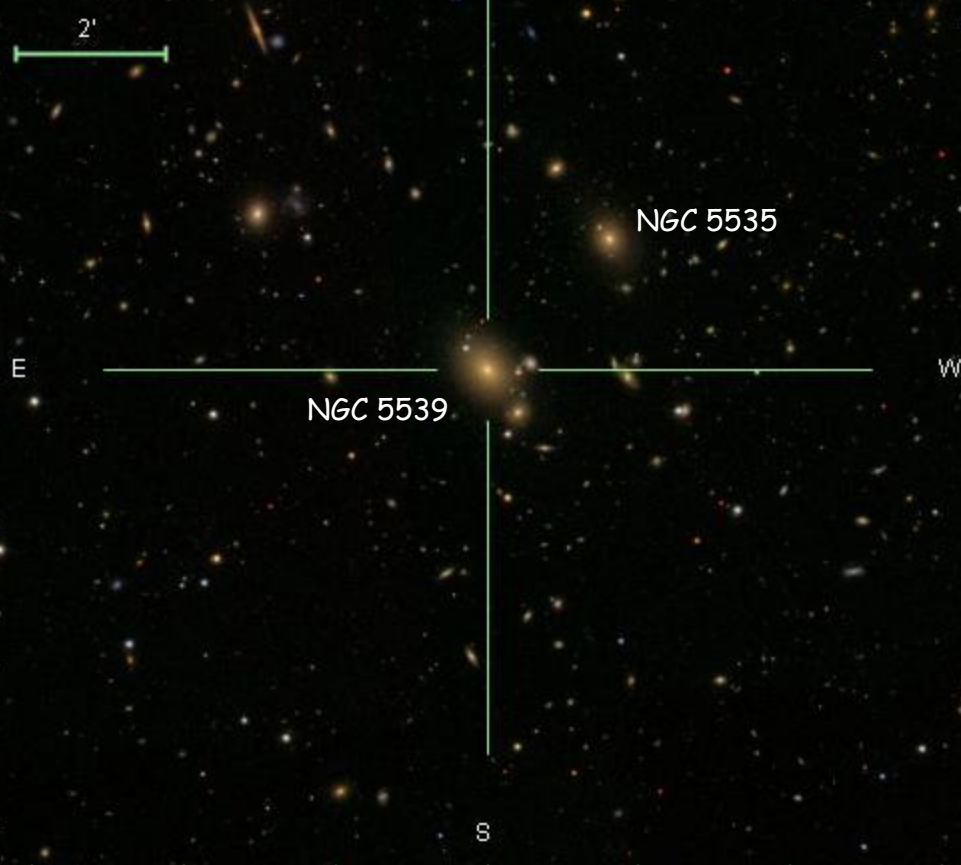
Abell 1890

14 17 37.7 +08 10 46.6

$cz = 17208 \text{ km/s}$

SDSS DR7
ra: 214.407 dec: 8.180
scale: 1.5845-arcsec/pix
image zoom: 1:4

NGC 5338
(foreground)



Abell, Corwin & Olowin 1989 p. 37



Richness
Distance
mag of 10th brightest

Abell	RA(1950)Dec	RA(2000)Dec	<i>l</i>	<i>b</i>	<i>x</i>	<i>y</i>	T_{B-M}	C	<i>z</i>	R	D	m
			galactic coords		POSS coords		B-M Type	Members		Classes		
1886	1412.5+2722	1414.7+2708	37.75	71.49	287	57	III	73		0	5	17.2
1887	1414.1+1749	1416.5+1735	11.43	68.19	50	189		36		0	0	17.2
1888	1414.7+1406	1417.1+1352	03.66	66.02	42	312		40		0	0	17.5
1889	1414.5+3057	1416.7+3043	48.91	71.03	260	249	III	112	0.1860	2	6	17.3
1890	1415.1+0825	1417.6+0811	354.04	62.17	35	328	I-II:	37	0.0570	0	3	15.5

USGC U607

14 16 27.4 +10 42 35

$cz = 7588 \text{ km/s}$

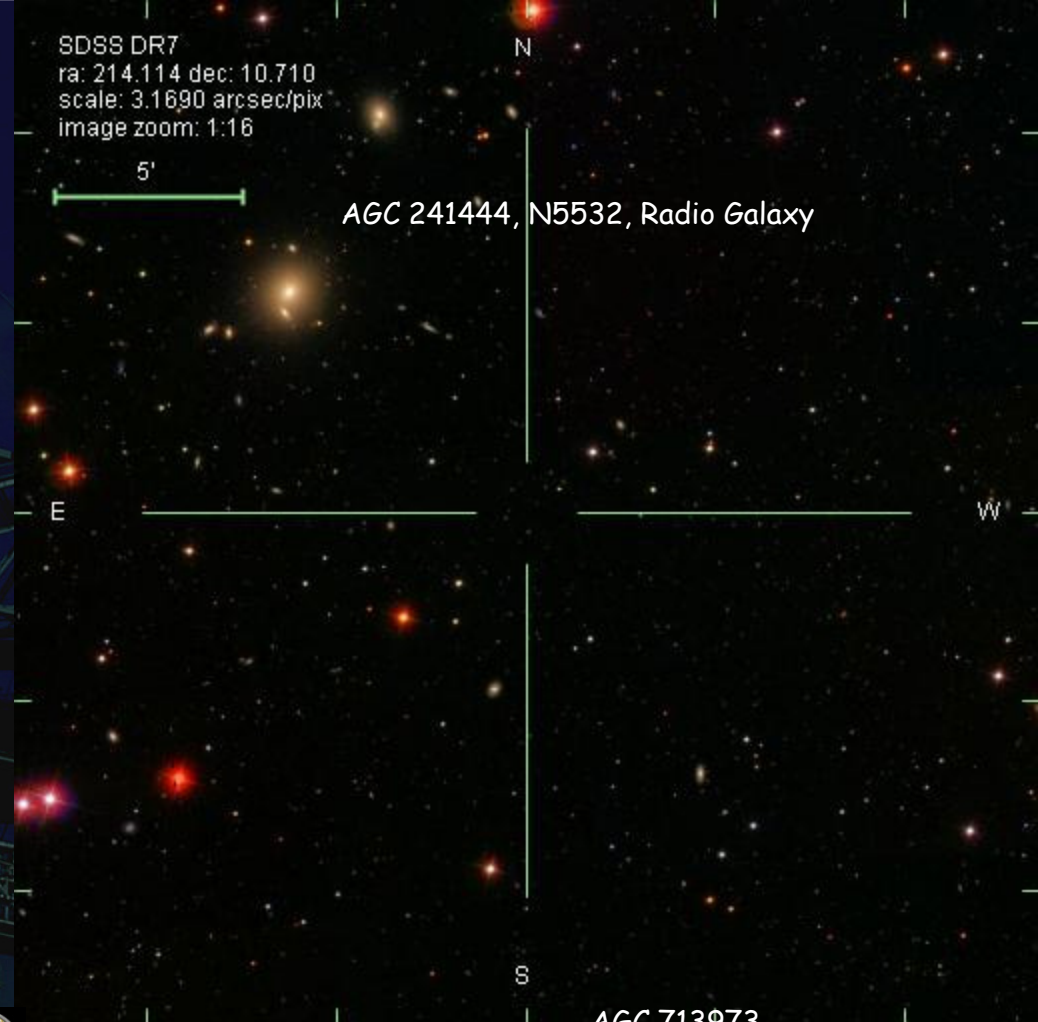


SDSS DR7
ra: 214.114 dec: 10.710
scale: 3.1690 arcsec/pix
image zoom: 1:16

5'

AGC 241444, N5532, Radio Galaxy

AGC 713973

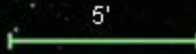


USGC U607

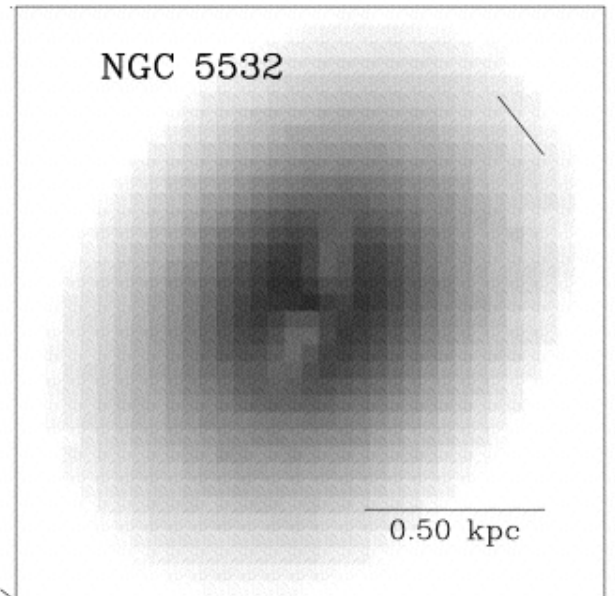
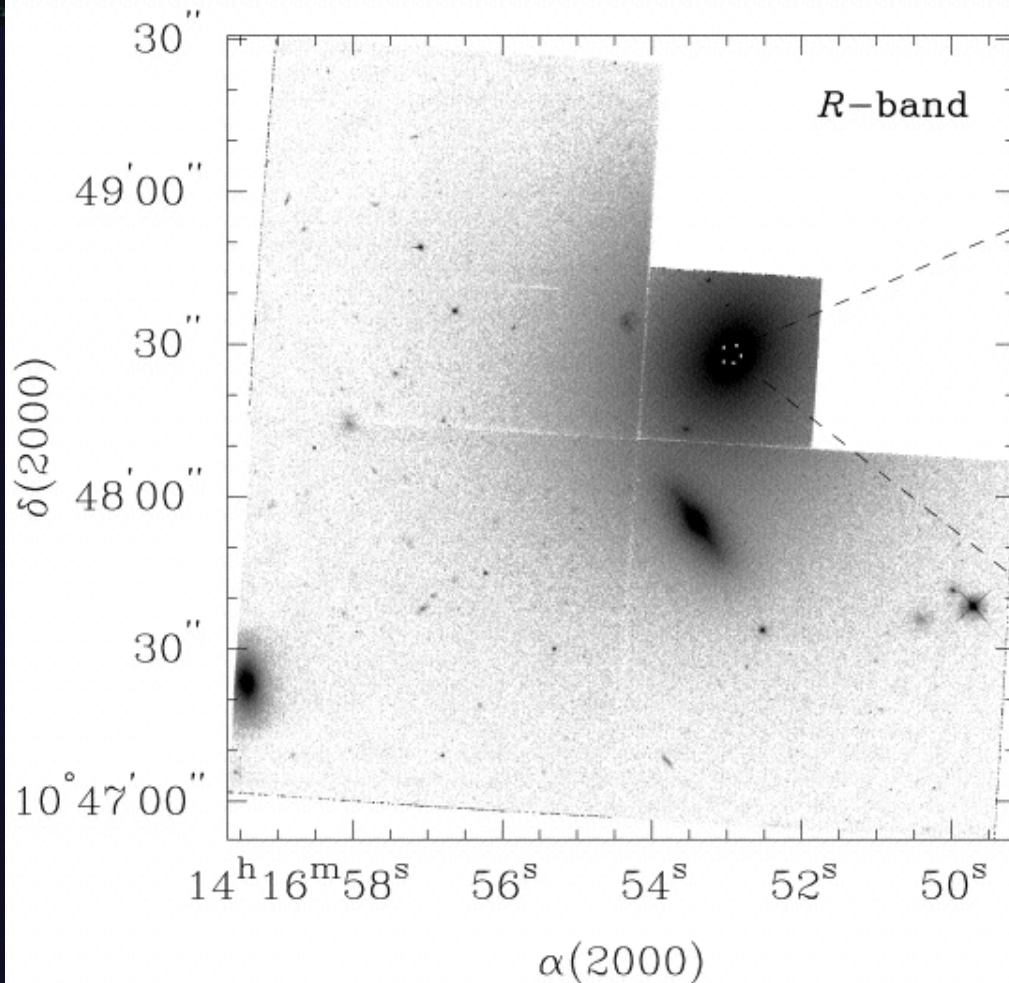
14 16 27.4 +10 42 35

$cz = 7588 \text{ km/s}$

SDSS DR7
ra: 214.114 dec: 10.710
scale: 3.1690 arcsec/pix
image zoom: 1:16



AGC 241444, N5532, Radio Galaxy



Martel et al, 2000