IfA Extragalactic Research

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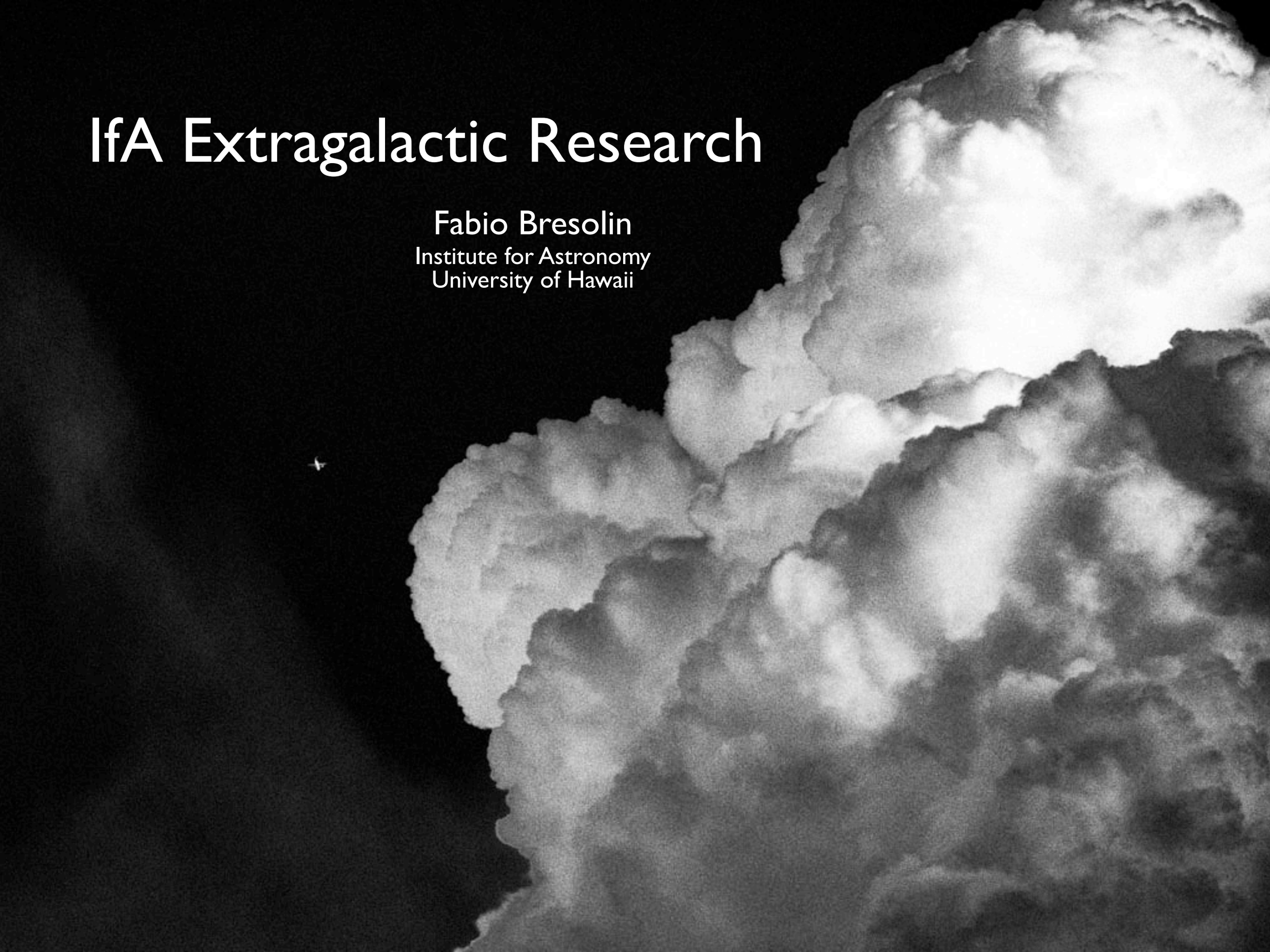
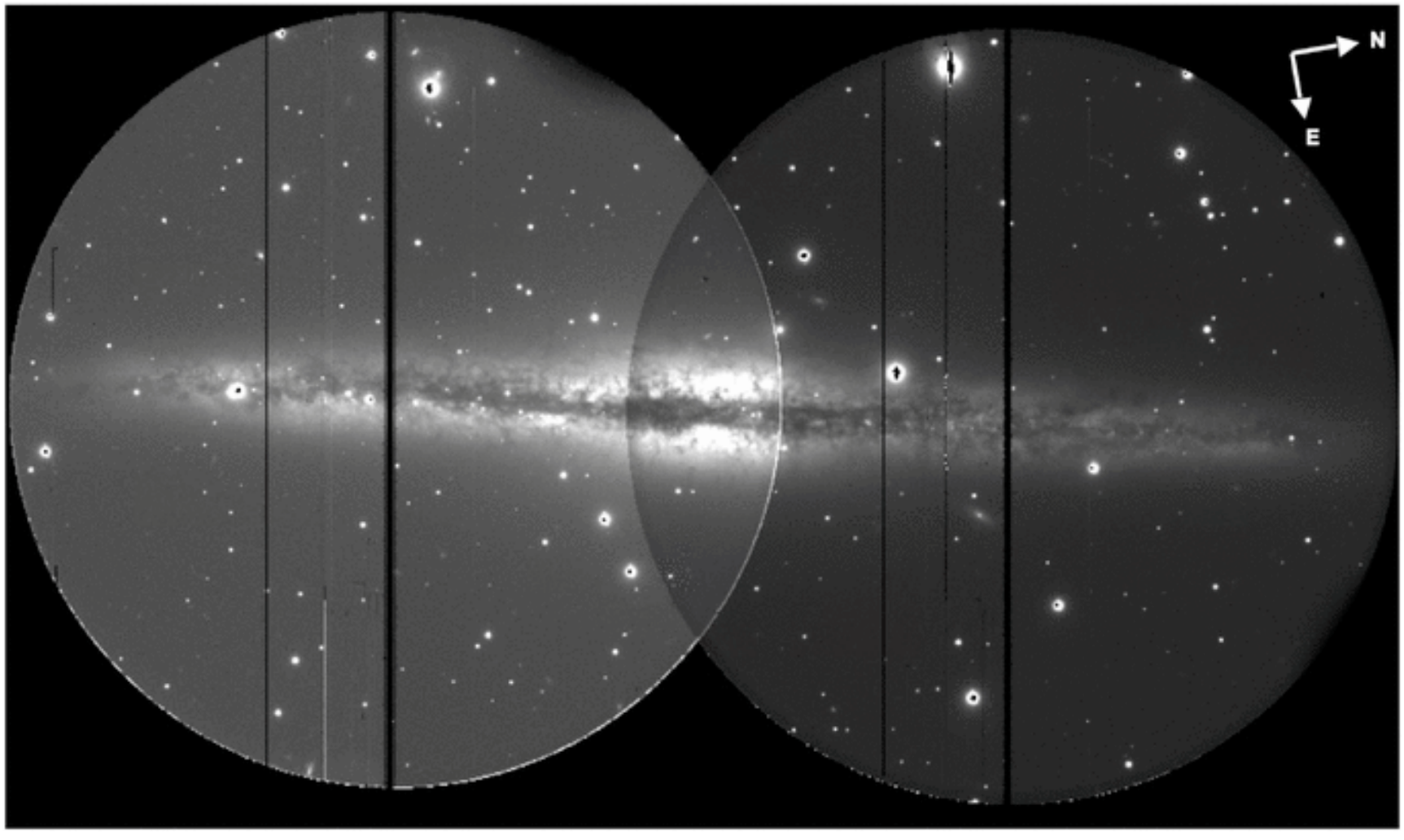


Kinematics of PNe and possible stellar streams in NGC 891

Shih & Mendez 2010, ApJ, 725, L97

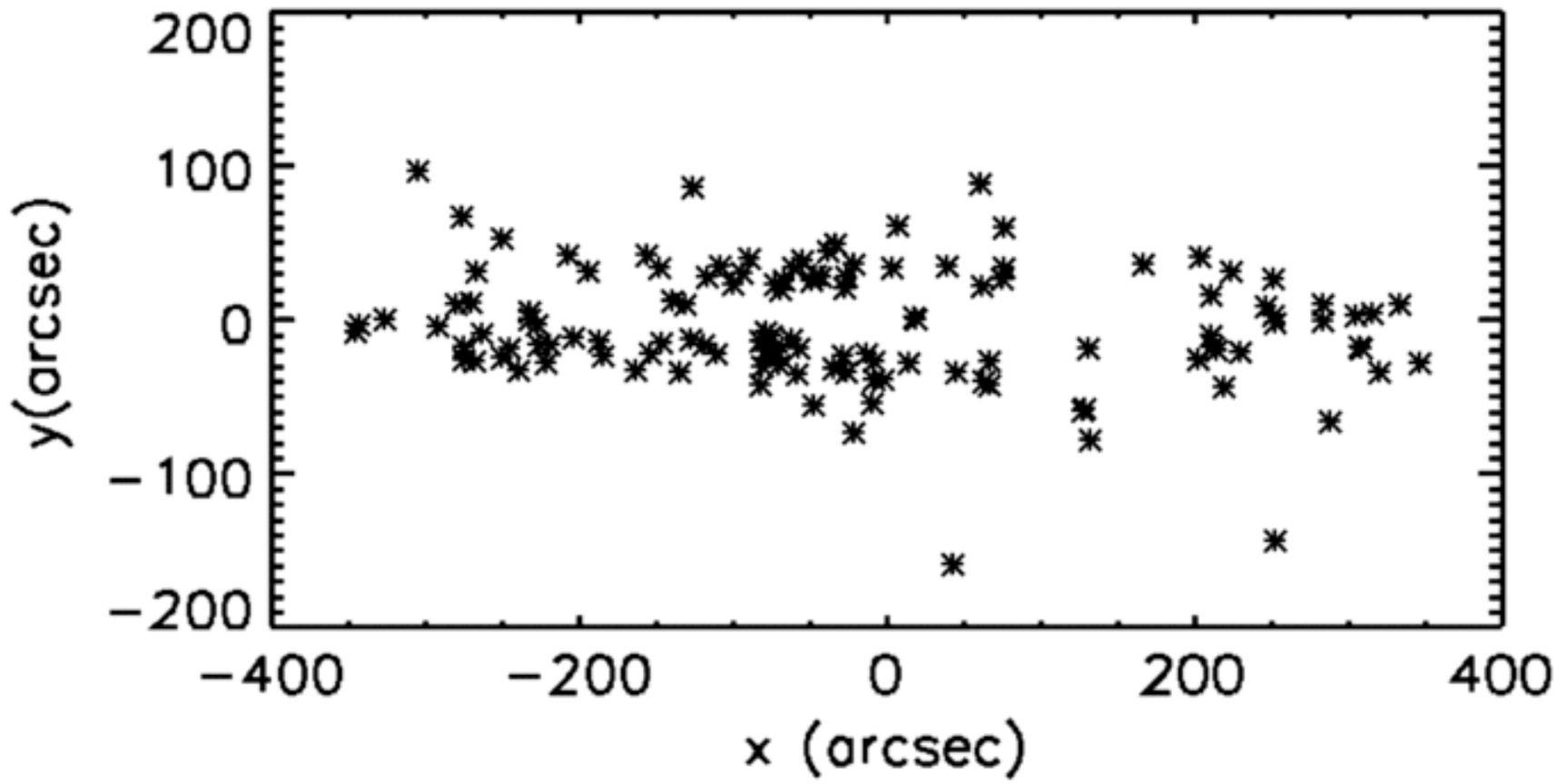
FOCAS

on- and off-band [OIII]5007 images
+
dispersed images (slitless spectroscopy) for radial velocities (σ = 20 km/s)

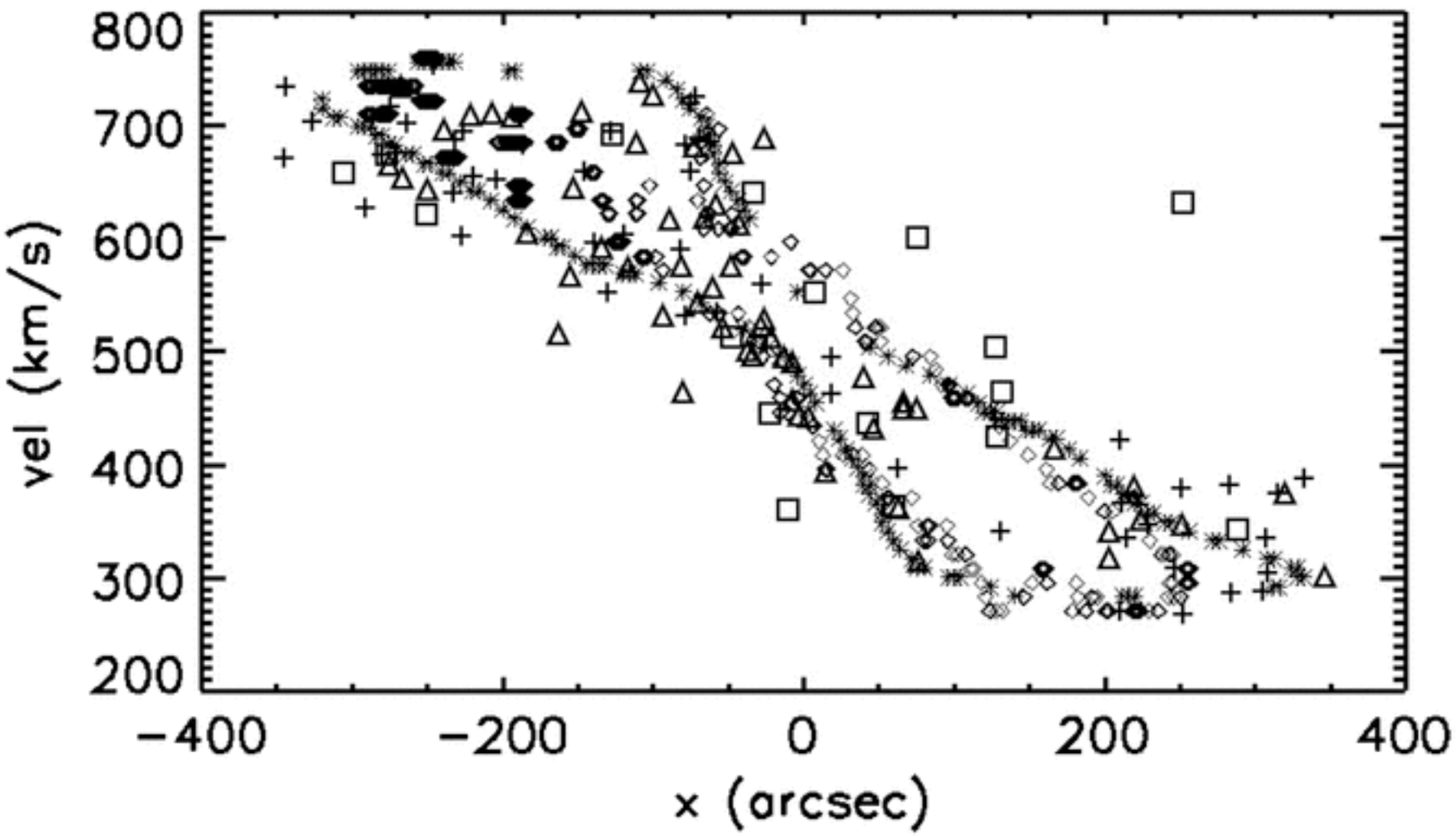


125 PNe: unusual vertically extended distribution

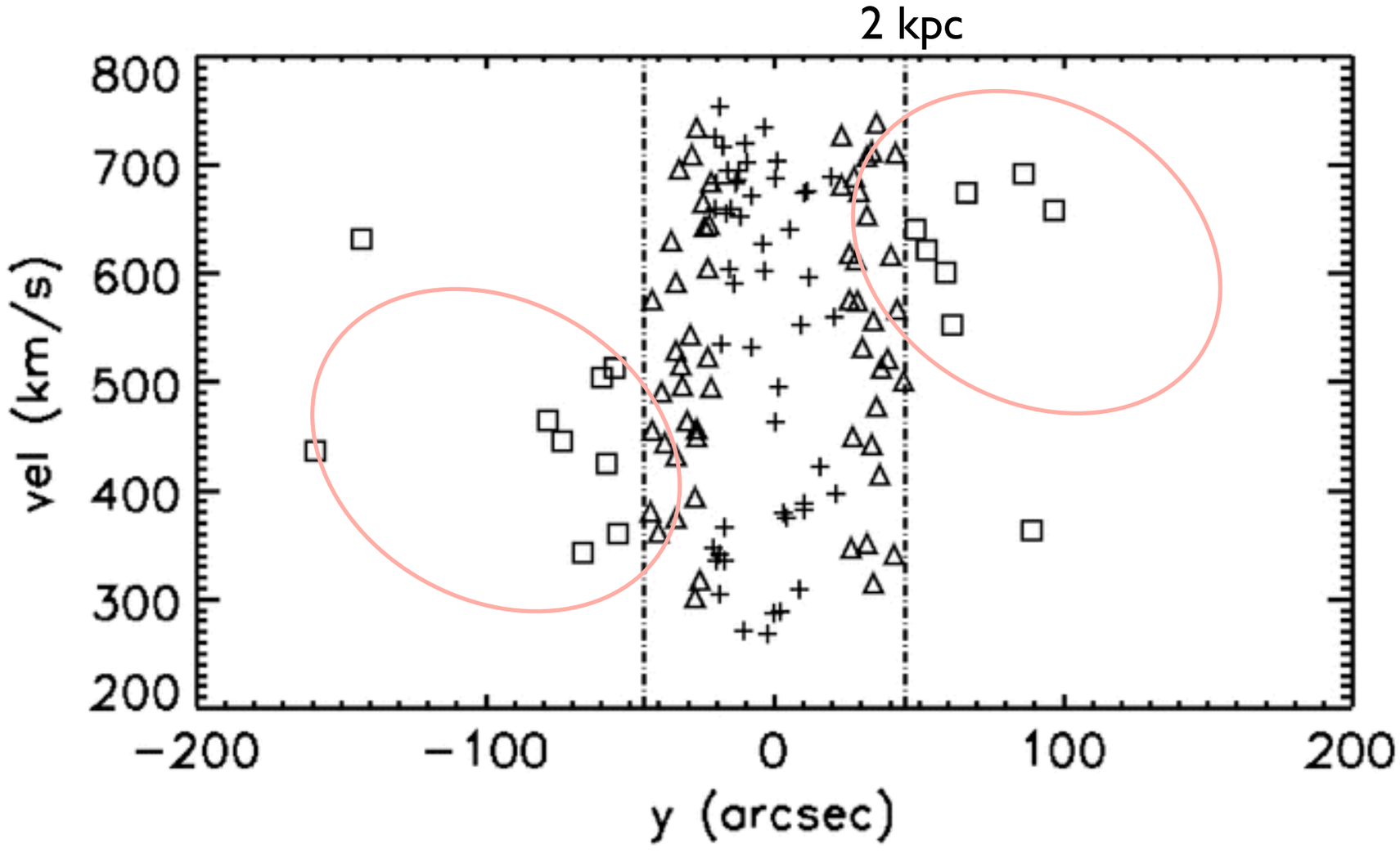
extended to 4.6 kpc (exponential scale height = 1.1 kpc)
agrees with thick disk component (Ibata et al 2009)



PN velocity gradient along x-axis agrees with HI and Hα kinematical data (rotating disk)



PN velocity gradient along y-axis
asymmetric distribution hints at presence of stellar streams (from minor mergers?)

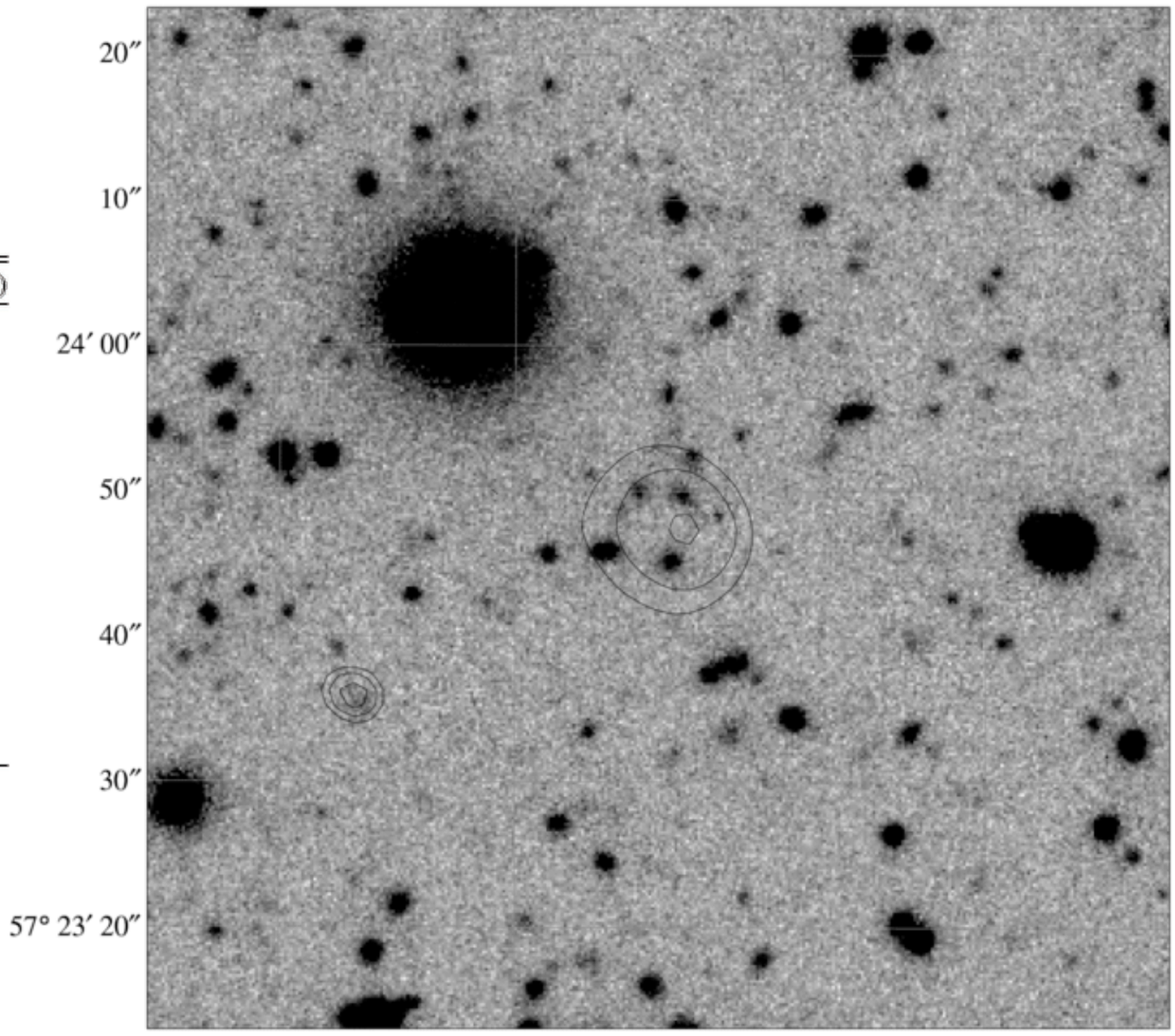


An X-ray-selected galaxy cluster at z=1.753

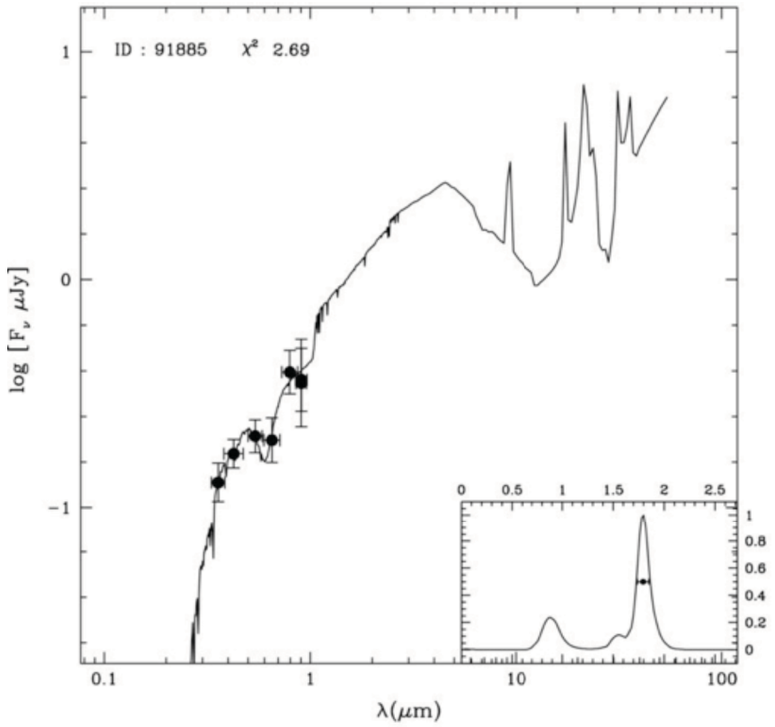
Henry et al. 2010, ApJ, 725, 615

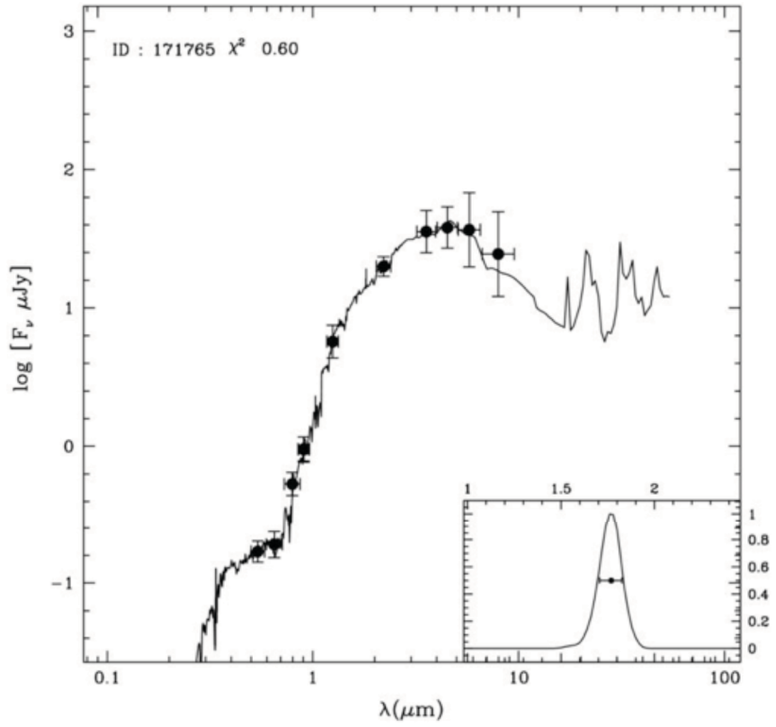
Filter	Telescope	Limit (AB)[a]	Exposure (s)	Seeing (″)
$U_{\rm LBC}$	LBT	26.4	49,680	1.06
B_J	LBT	26.6	19,972	0.90
V_J	LBT	26.5	9,540	0.95
R_c	Subaru	26.5	3920	0.90
I_c	Subaru	25.2	6,235	0.98
z'	Subaru	25.4	10,640	0.96
z'	LBT	24.0	14,400	1.06
J	UKIRT	23.4	8,960	0.84
K	UKIRT	22.9	13,740	0.73
IRAC1	*Spitzer*	22.6	500	1.7
IRAC2	*Spitzer*		500	1.7
IRAC3	*Spitzer*		500	1.9
IRAC4	*Spitzer*		500	2.0

LH146 SuprimeCam I

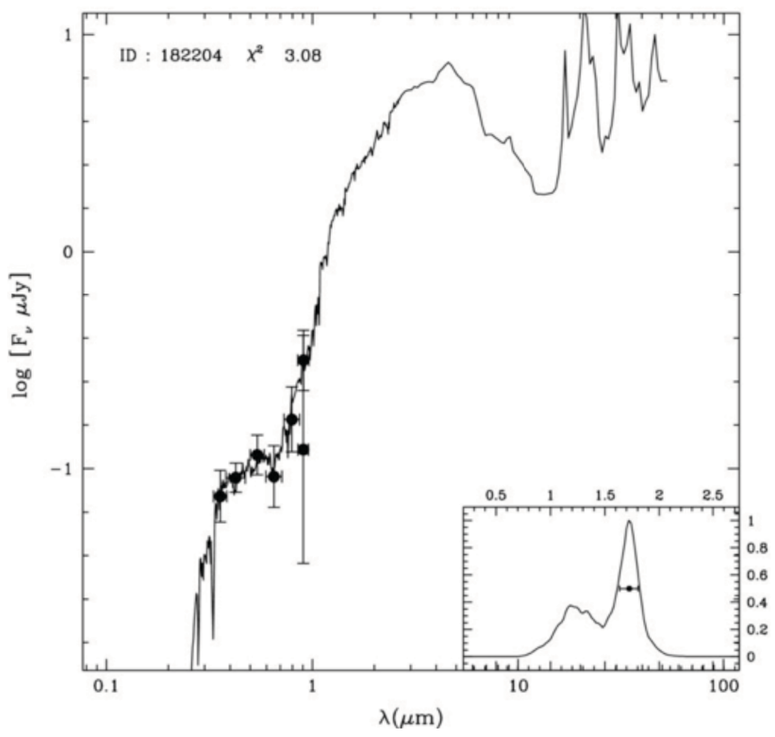


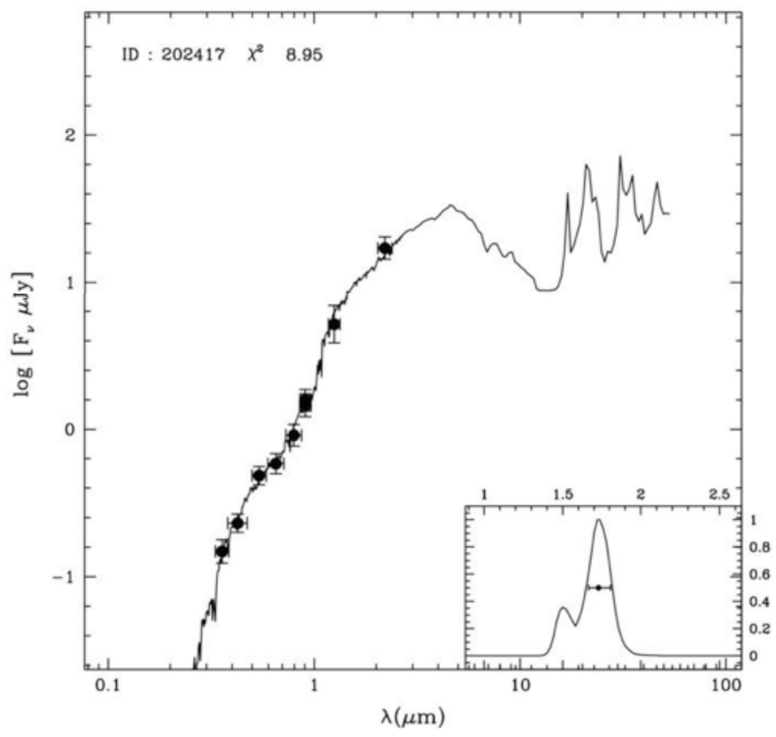
photometric redshifts of 8 galaxies around BCG





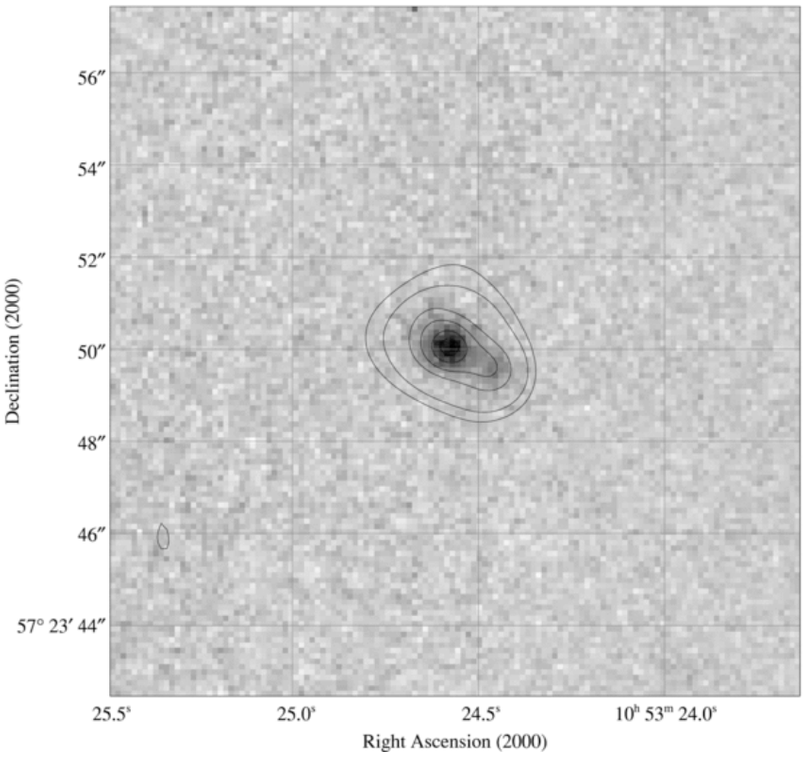
Brightest Cluster Galaxy
z(phot) = 1.77 ± 0.06



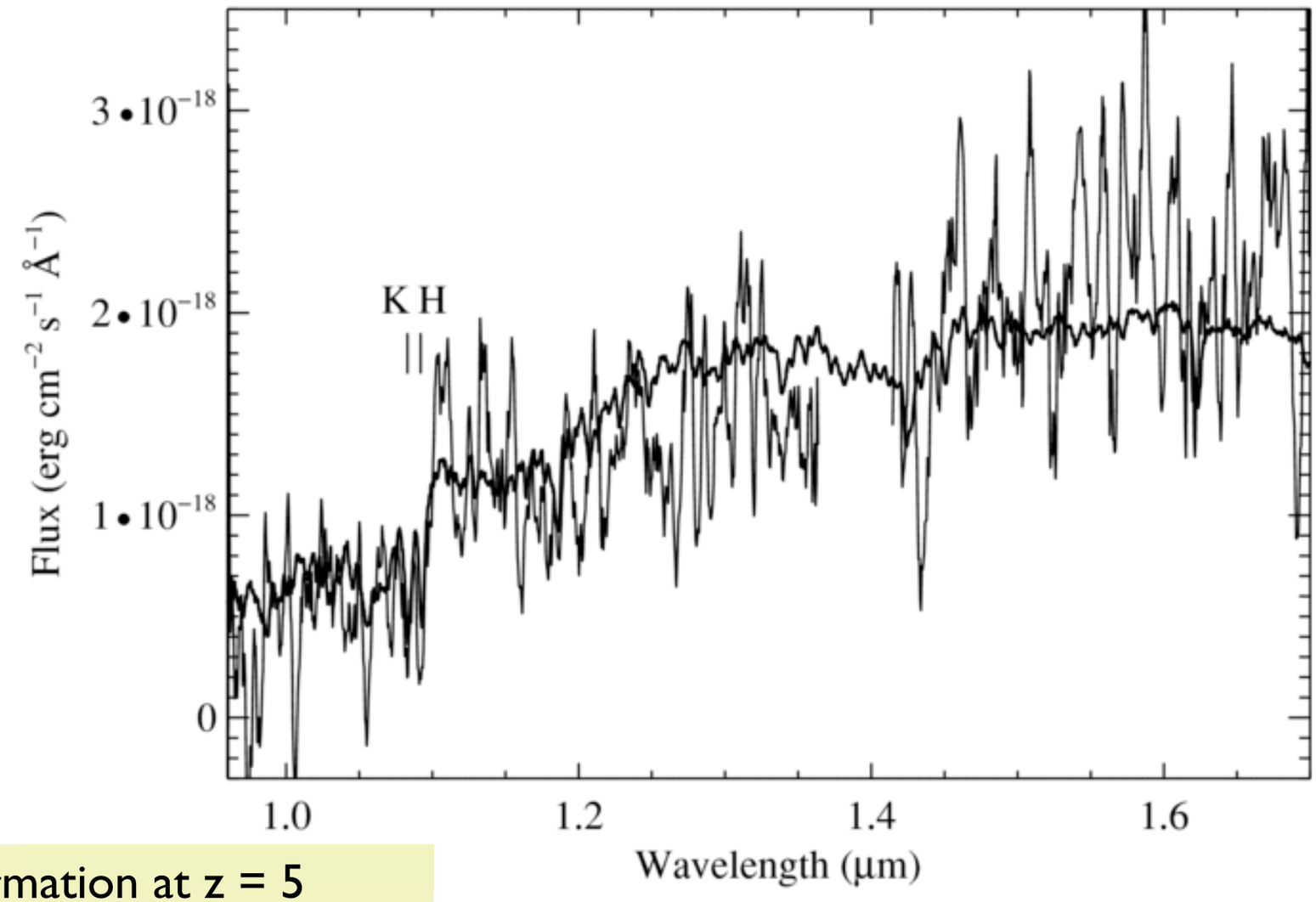


MOIRCS spectroscopy of BCG
(25800s exposure, zJ500 grating 0.8 arcsec slits)

Ks image



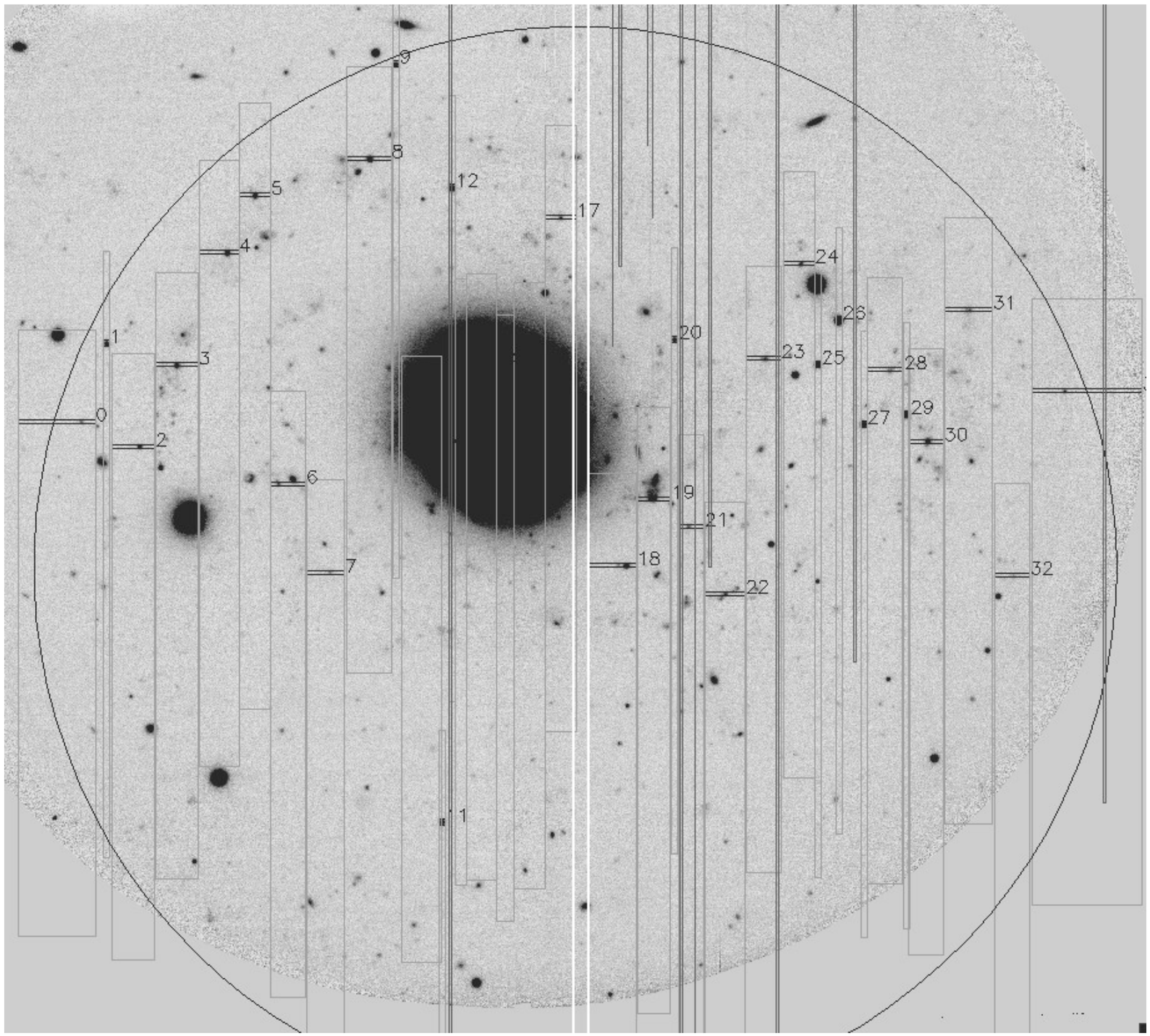
observed spectrum + average elliptical spectrum
z = 1.753



optical/IR properties imply a cluster formation at z = 5
monolithic collapse scenario preferred over hierarchical assembly at later times

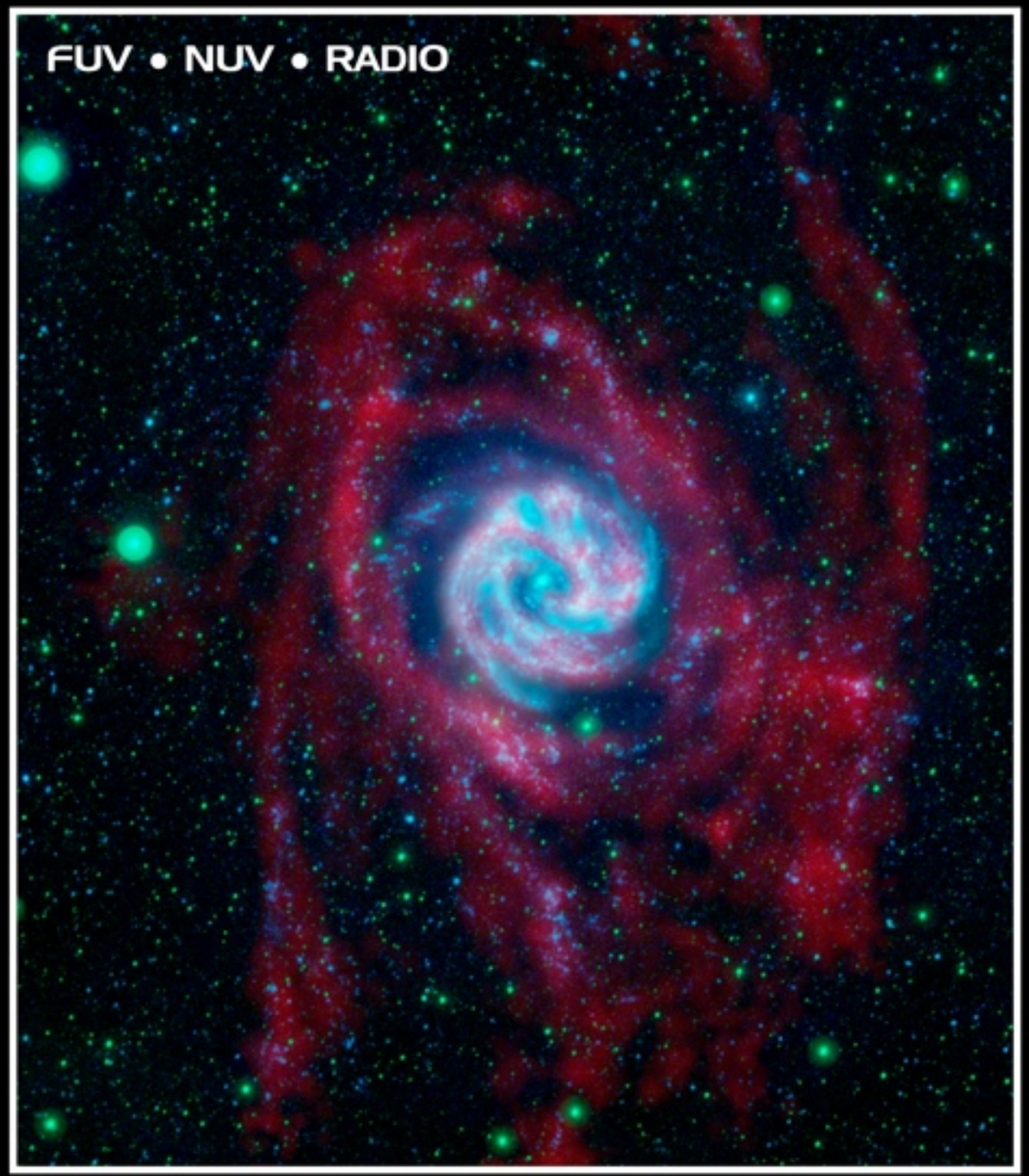
Metallicity of outer galaxy disks: NGC 4625

Goddard, Bresolin, Kennicutt et al. 2011, MNRAS, in press



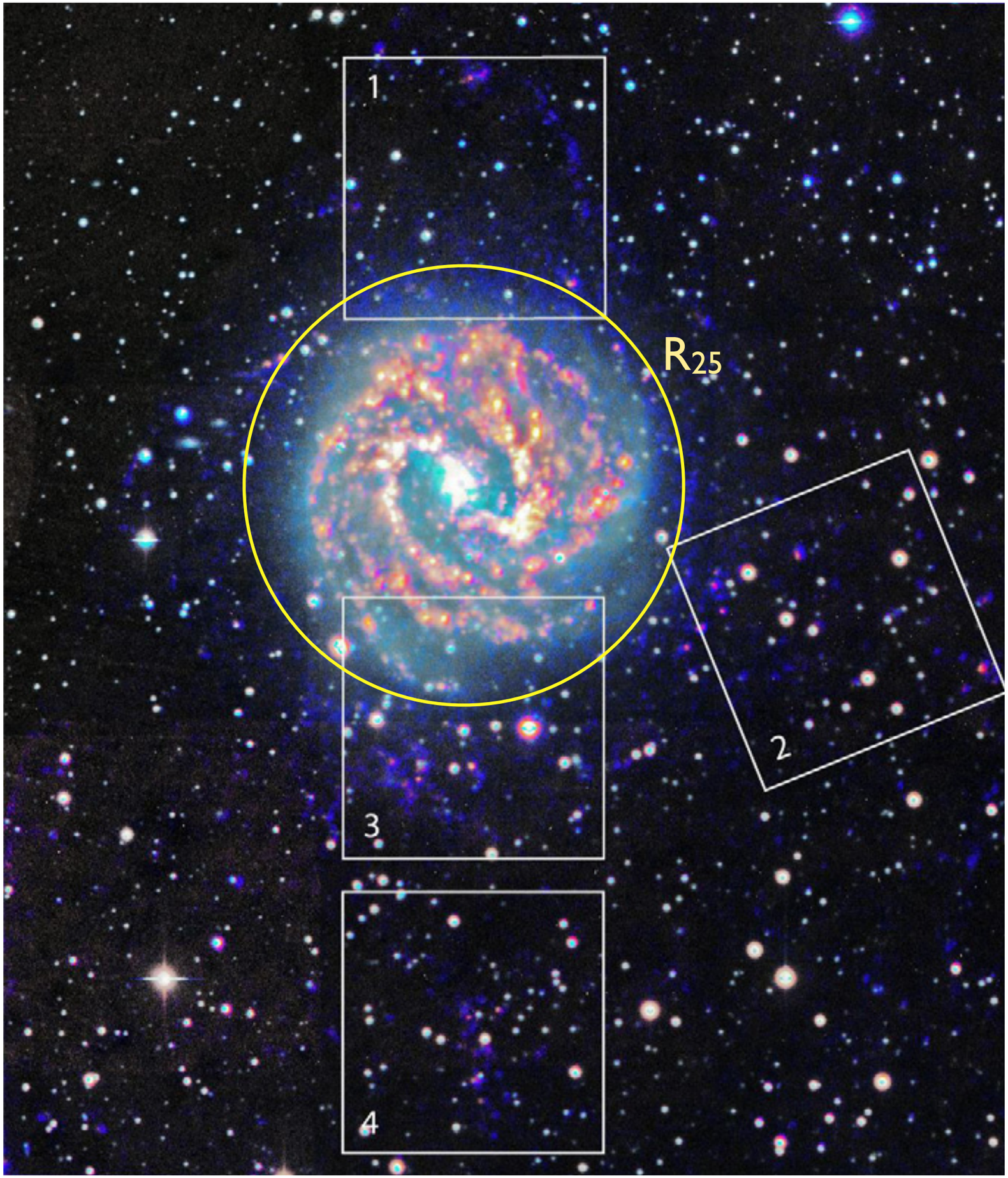
FOCAS

GALEX Galaxy Evolution Explorer



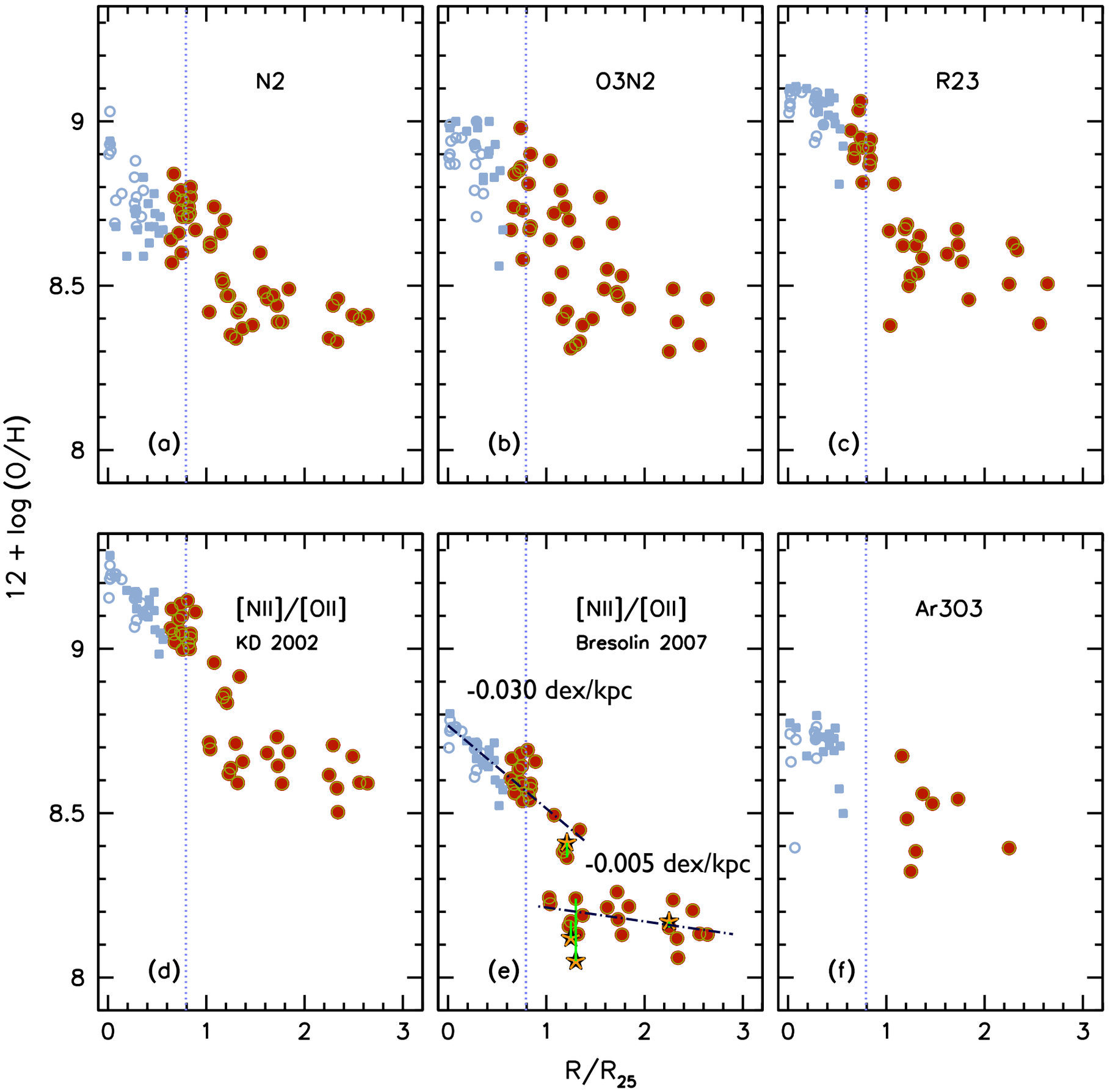
Extended Disk of Galaxy M83

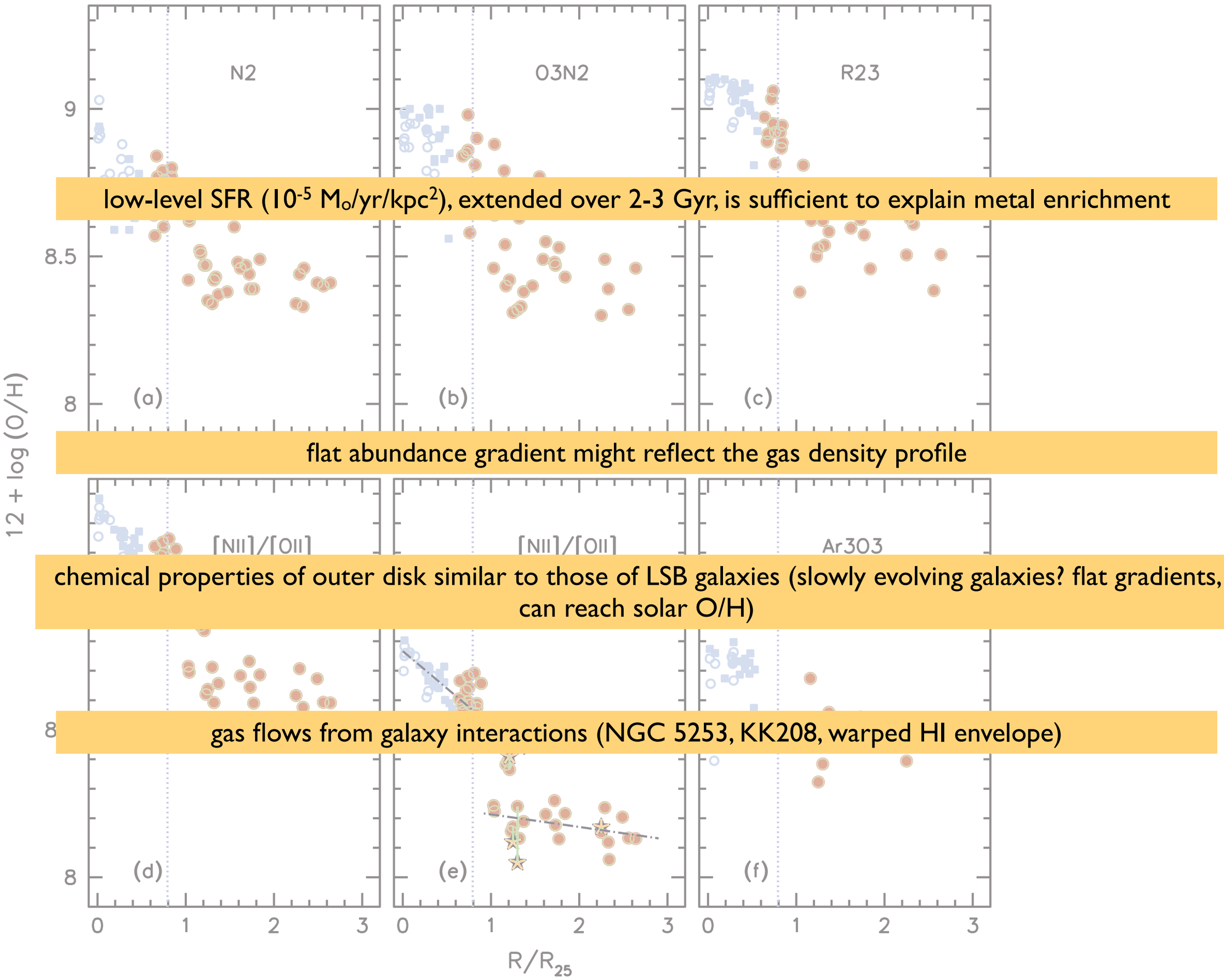
GALEX • NUV • FUV
VERY LARGE ARRAY • RADIO



M83

Bresolin, Ryan-Weber,
Kennicutt & Goddard 2009


N2
O3N2
R23
(a)
(b)
(c)
9
8.5
8
12 + log (O/H)
[NII]/[OII]
KD 2002
[NII]/[OII]
Bresolin 2007
-0.030 dex/kpc
-0.005 dex/kpc
Ar3O3
(d)
(e)
(f)
0
1
2
3
R/R25



low-level SFR (10^{-5} M_o/yr/kpc^2), extended over 2-3 Gyr, is sufficient to explain metal enrichment

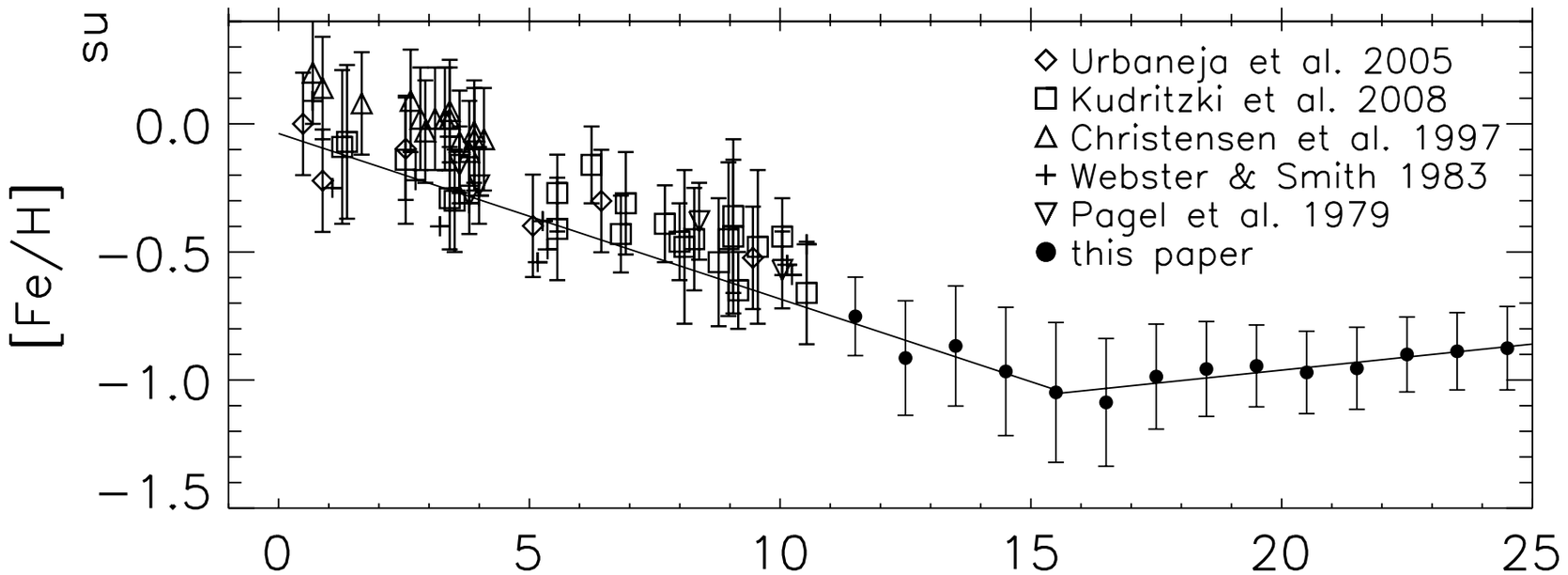
flat abundance gradient might reflect the gas density profile

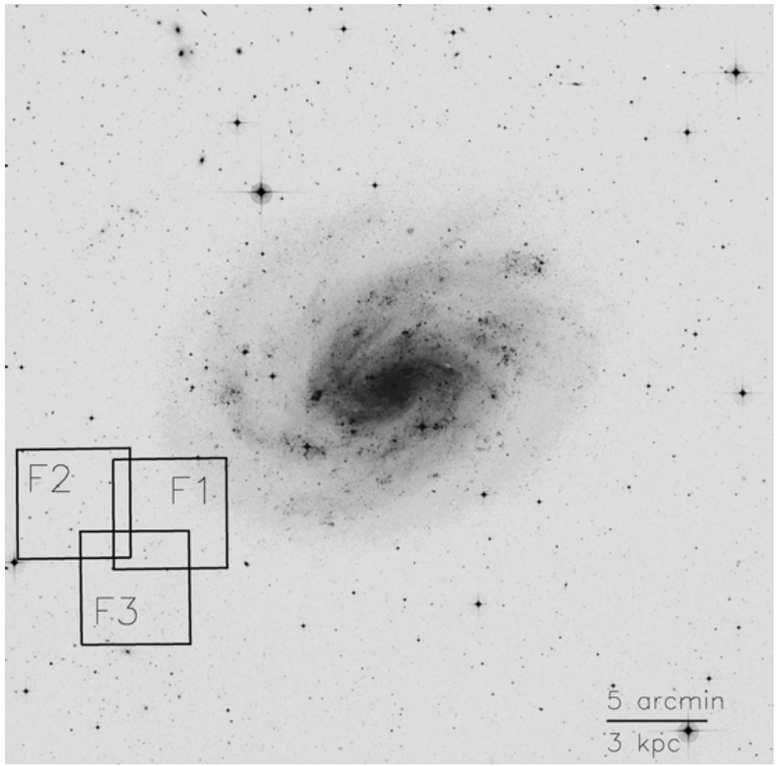
chemical properties of outer disk similar to those of LSB galaxies (slowly evolving galaxies? flat gradients, can reach solar O/H)

gas flows from galaxy interactions (NGC 5253, KK208, warped HI envelope)

NGC 300

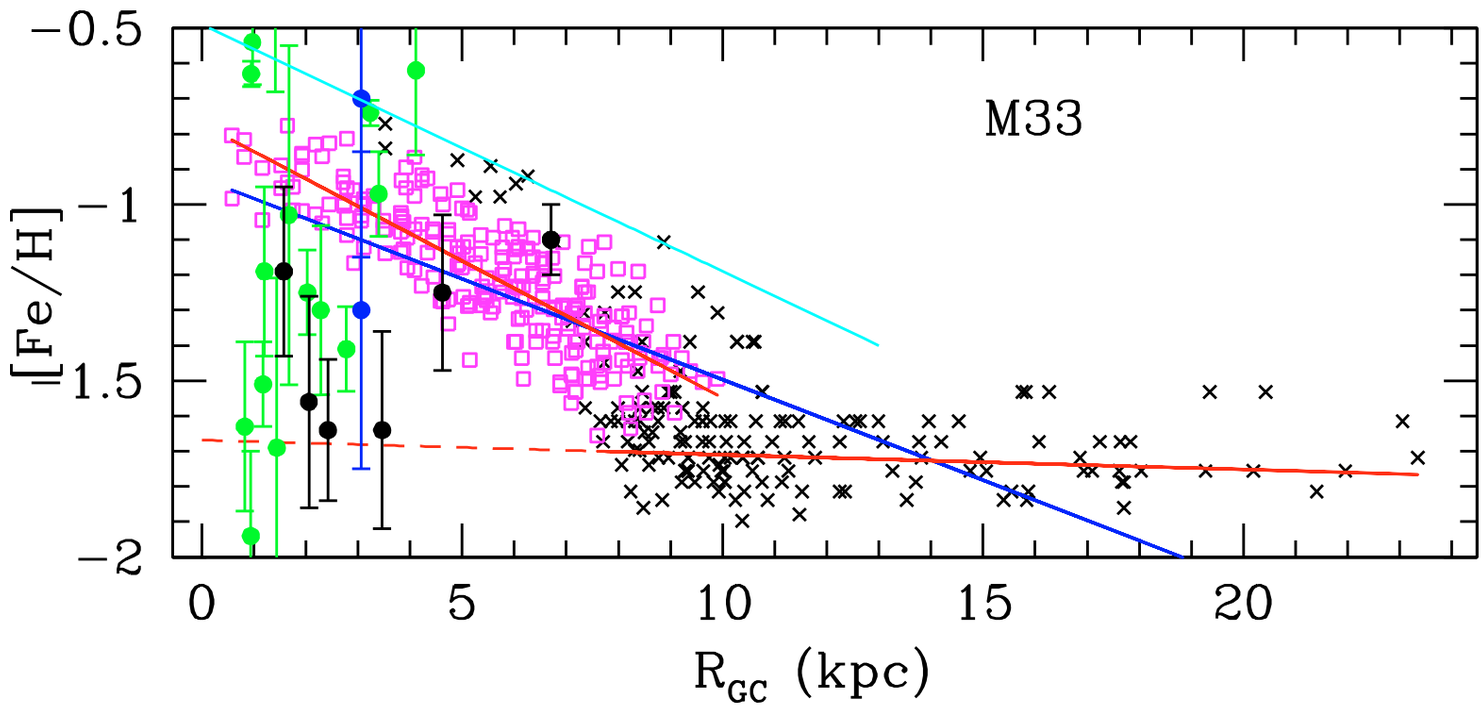
Vlajic, Bland-Hawthorn & Freeman 2009



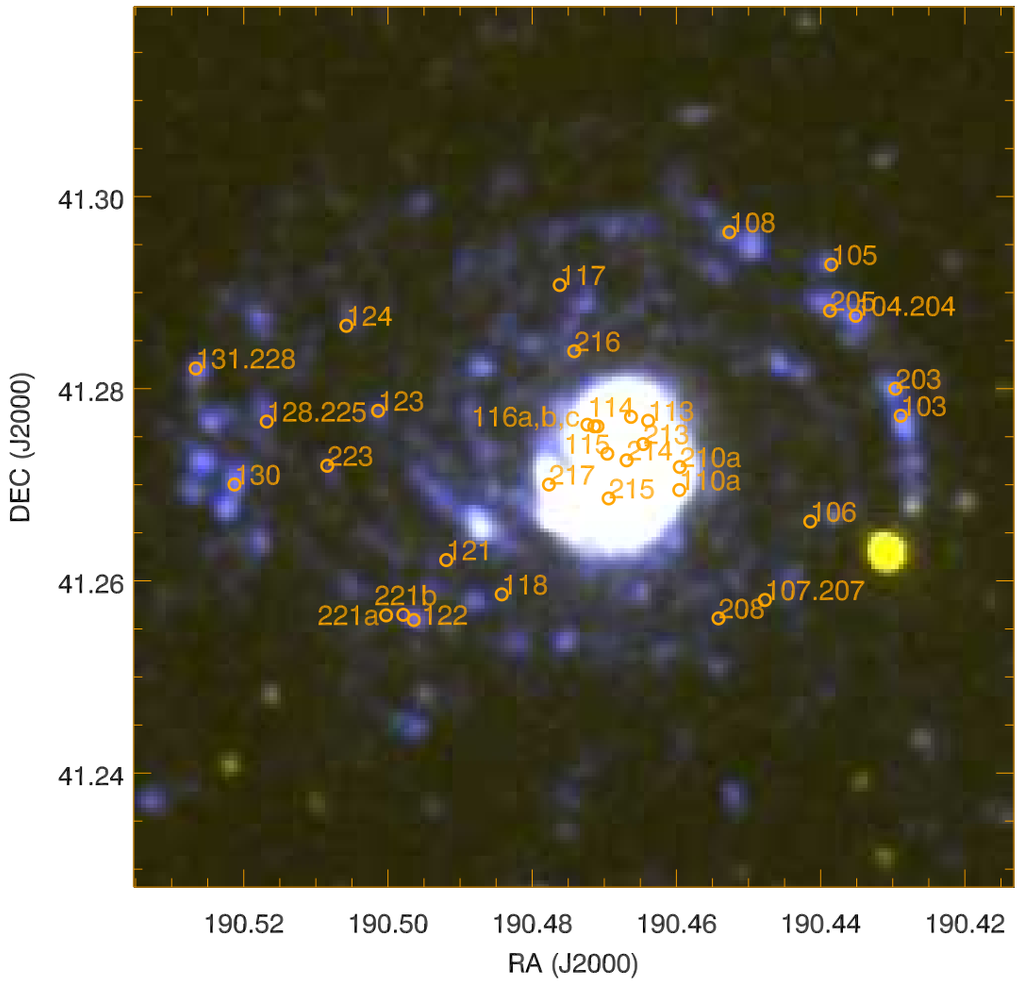


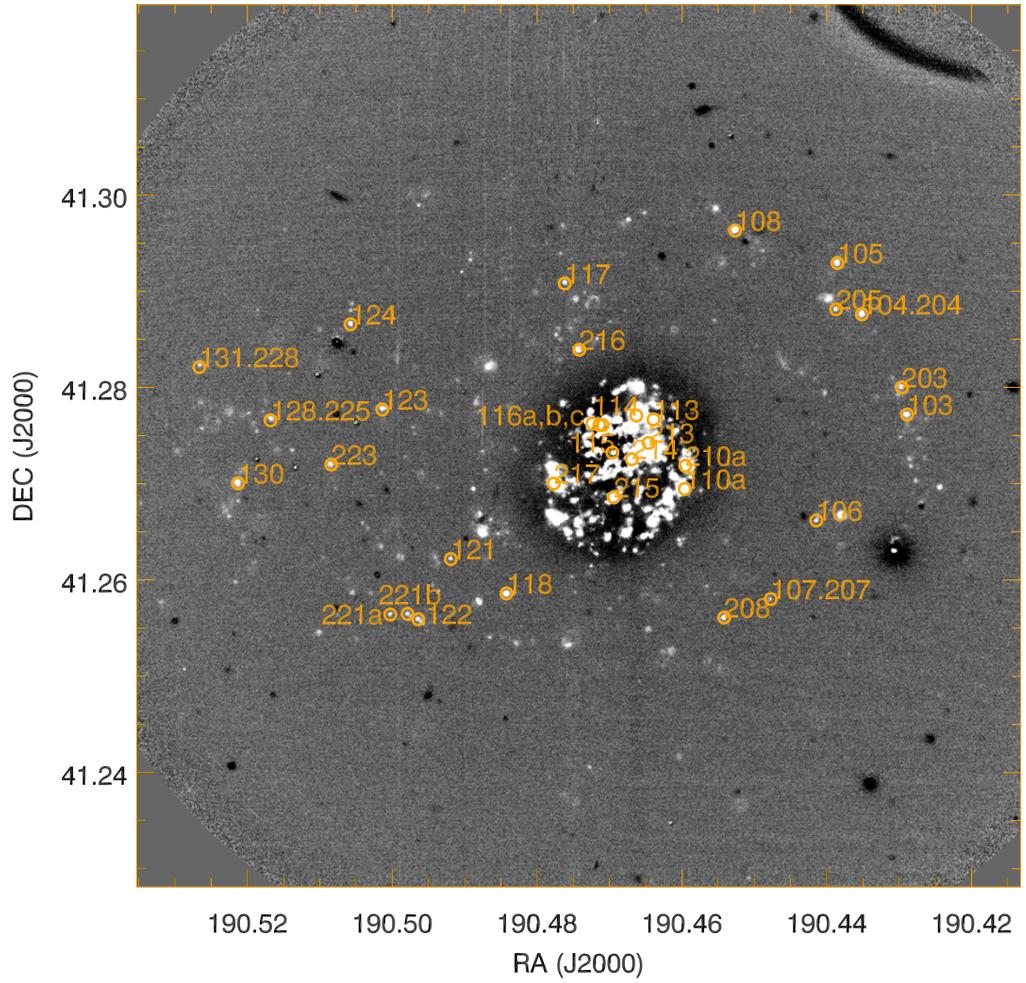
M33

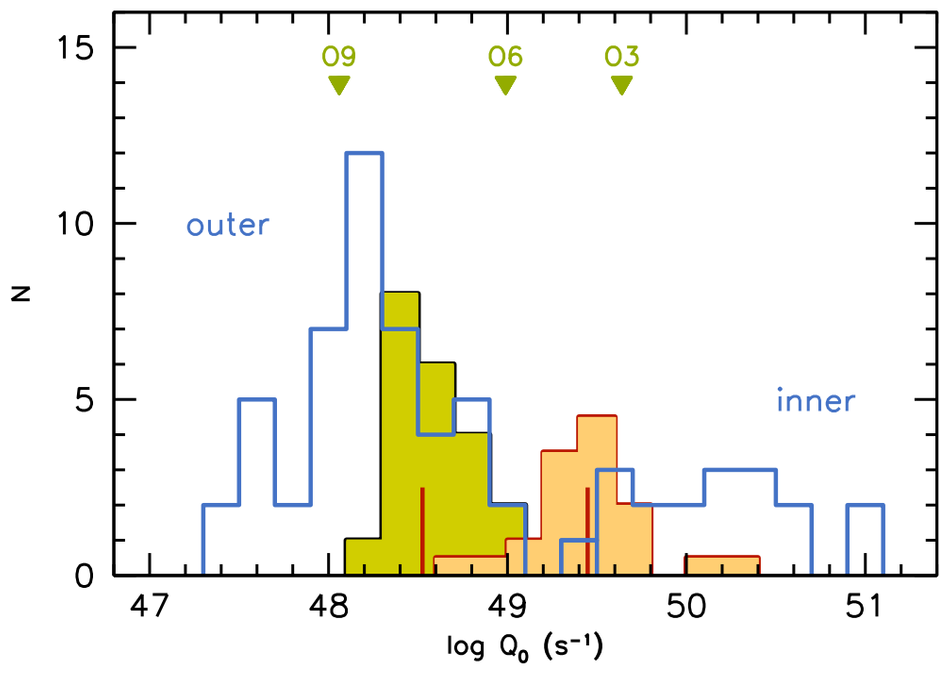
Cioni 2009

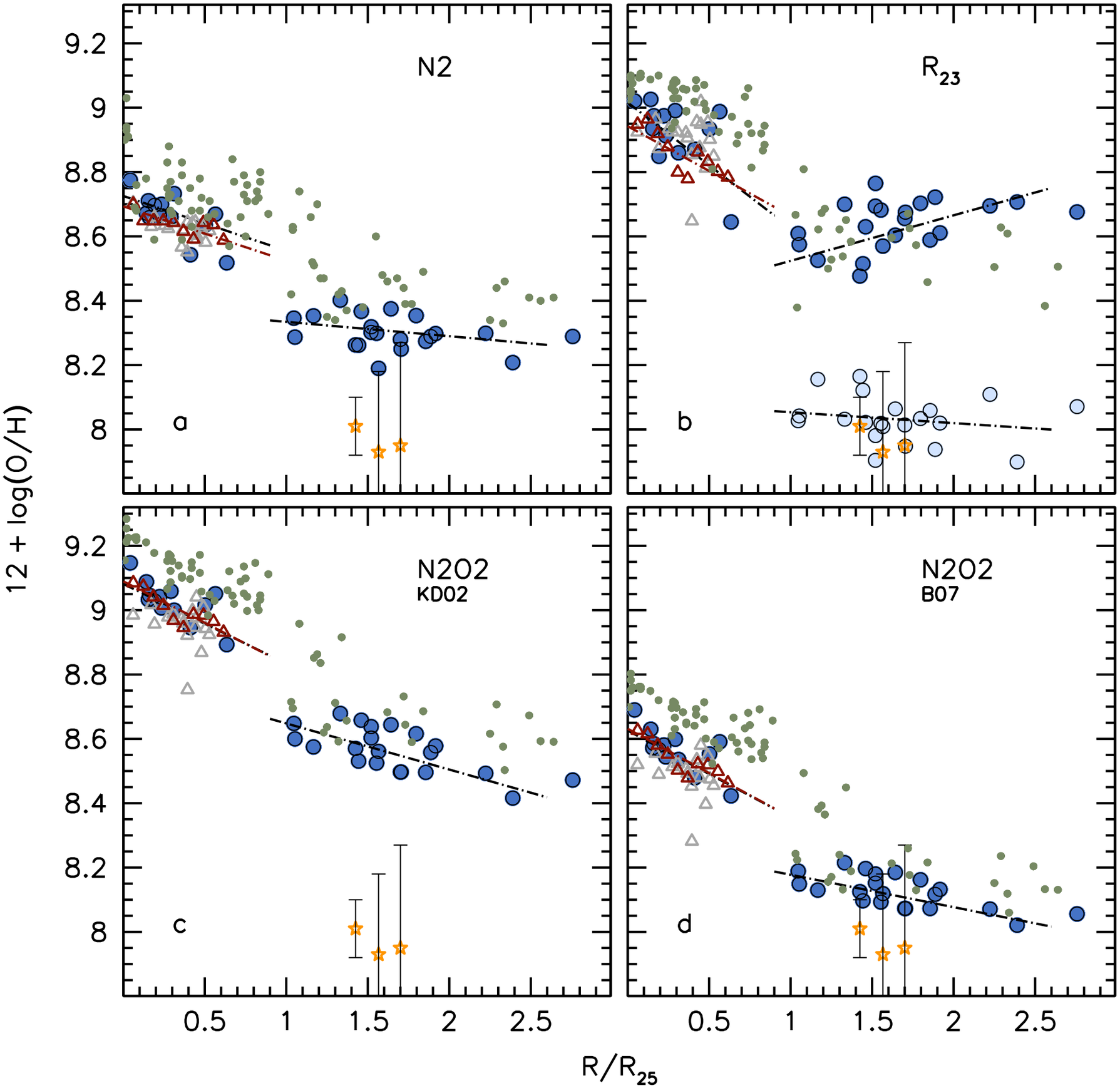


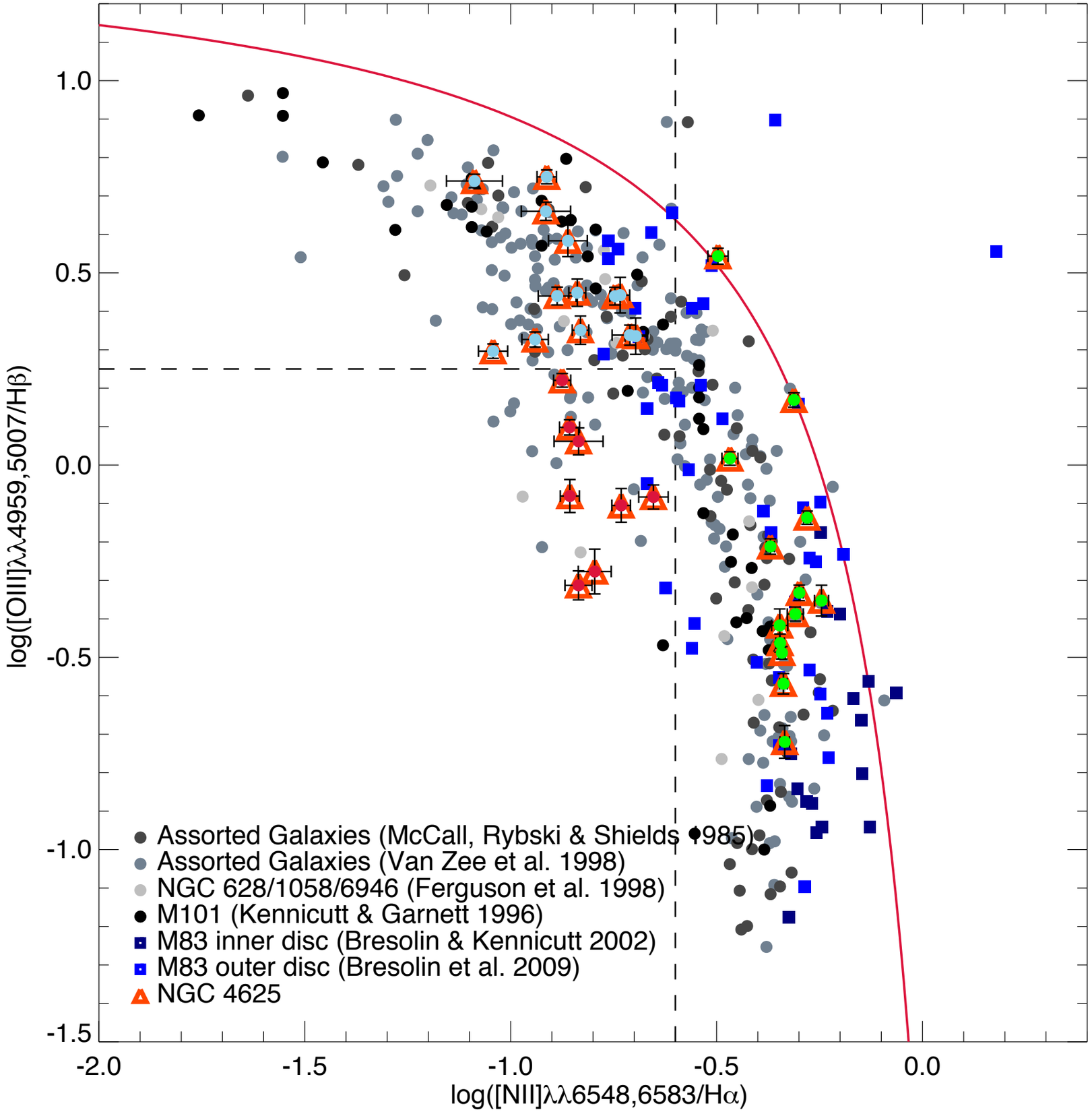
NGC 4625


41.30
41.28
41.26
41.24
DEC (J2000)
190.52
190.50
190.48
190.46
190.44
190.42
RA (J2000)
108
105
117
205
204.204
124
216
131.228
203
103
128.225
123
116a,b,c
114
113
115
213
214
210a
223
130
217
215
210a
106
121
118
221b
221a
122
208
107.207


41.30
41.28
41.26
41.24
DEC (J2000)
190.52
190.50
190.48
190.46
190.44
190.42
RA (J2000)
108
105
117
205
204.204
124
216
131.228
203
103
128.225
123
116a,b,c
223
130
210a
106
121
118
221b
221a
122
208
107.207


15
10
5
0
N
09
06
03
outer
inner
47
48
49
50
51
log Q_0 (s^{-1})


N2
R_{23}
N202
KD02
N202
B07
a
b
c
d
12 + log(O/H)
R/R_{25}
9.2
9
8.8
8.6
8.4
8.2
8
0.5
1
1.5
2
2.5



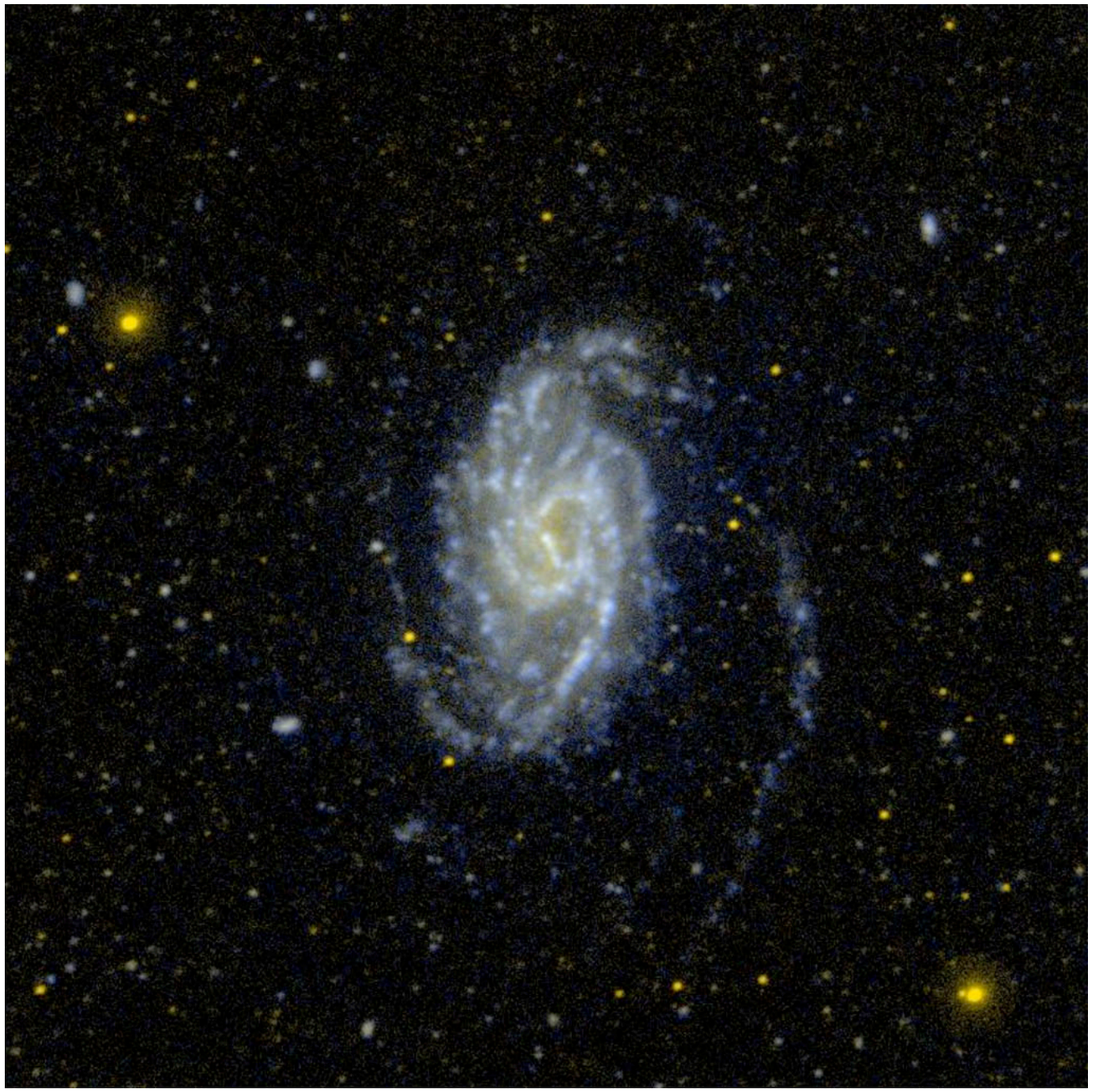
comparison with photoionization models indicate possible solution:

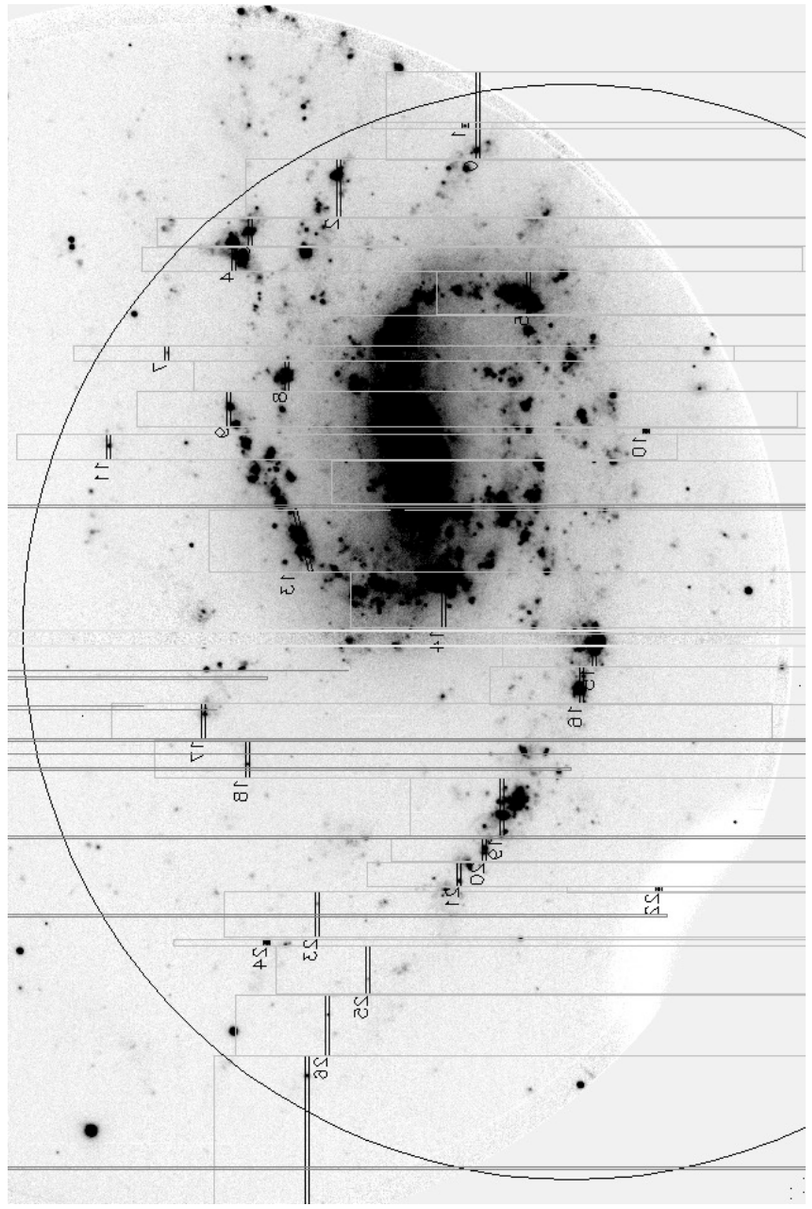
- stochastic variations in the upper IMF and

- aging of HII region population

Abundance gradient breaks in spiral galaxies: NGC 3359

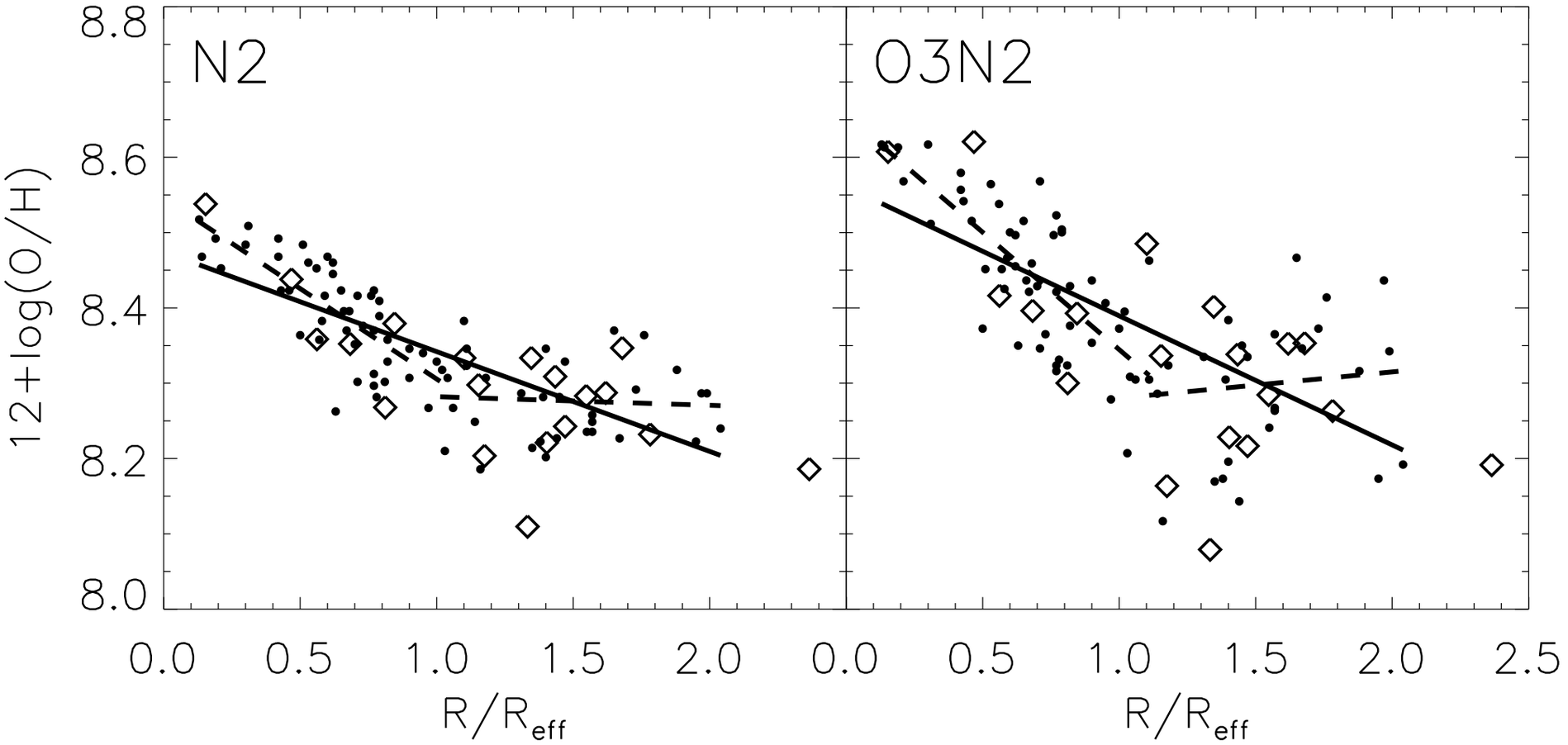
Zahid & Bresolin 2011, submitted





FOCAS

combine imaging spectrophotometry of Martin & Roy (1995)
with our MOS spectroscopy

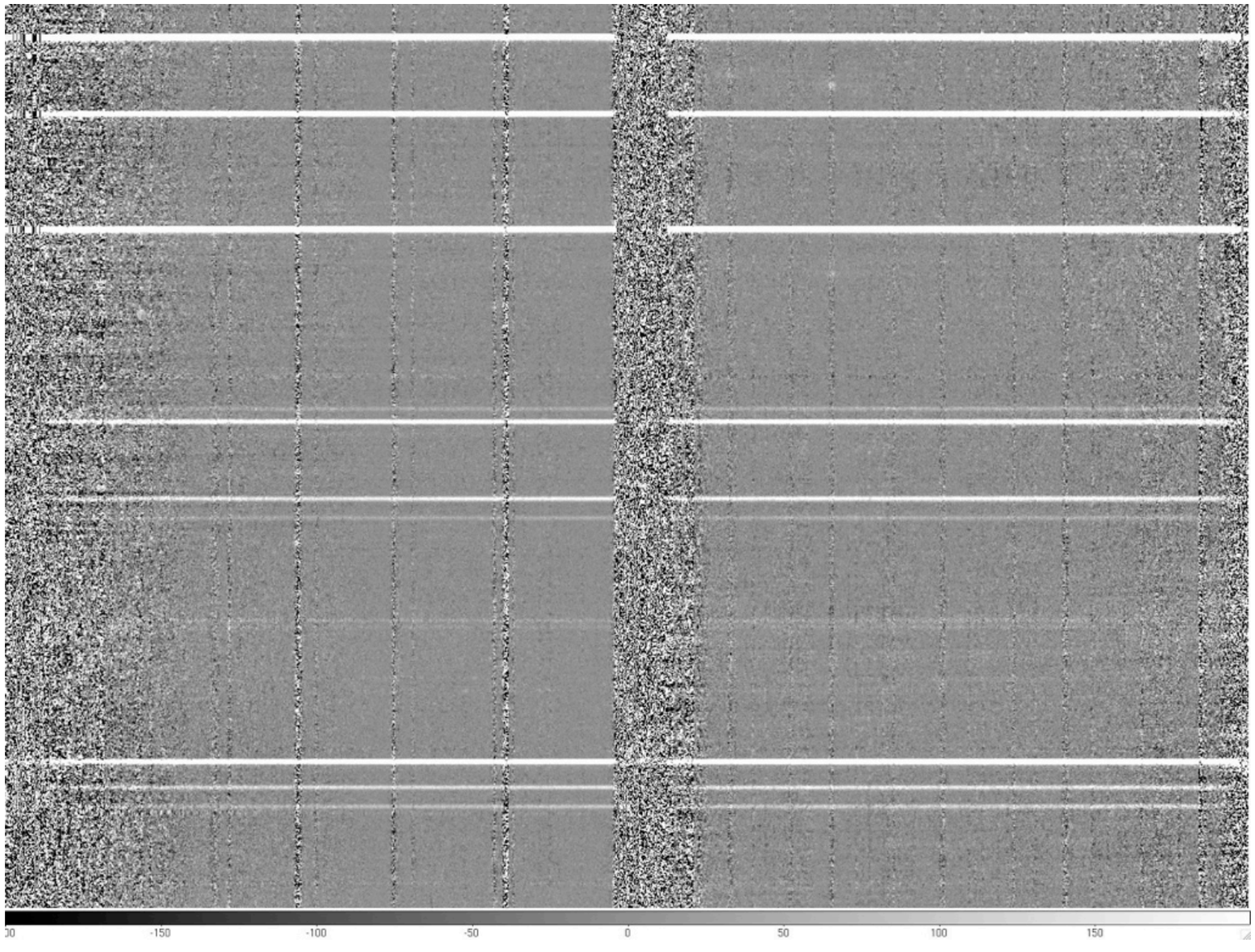


FMOS spectroscopy of obscured AGNs

Ezequiel Treister

Identification and redshift measurement of heavily obscured AGN candidates selected in the IR

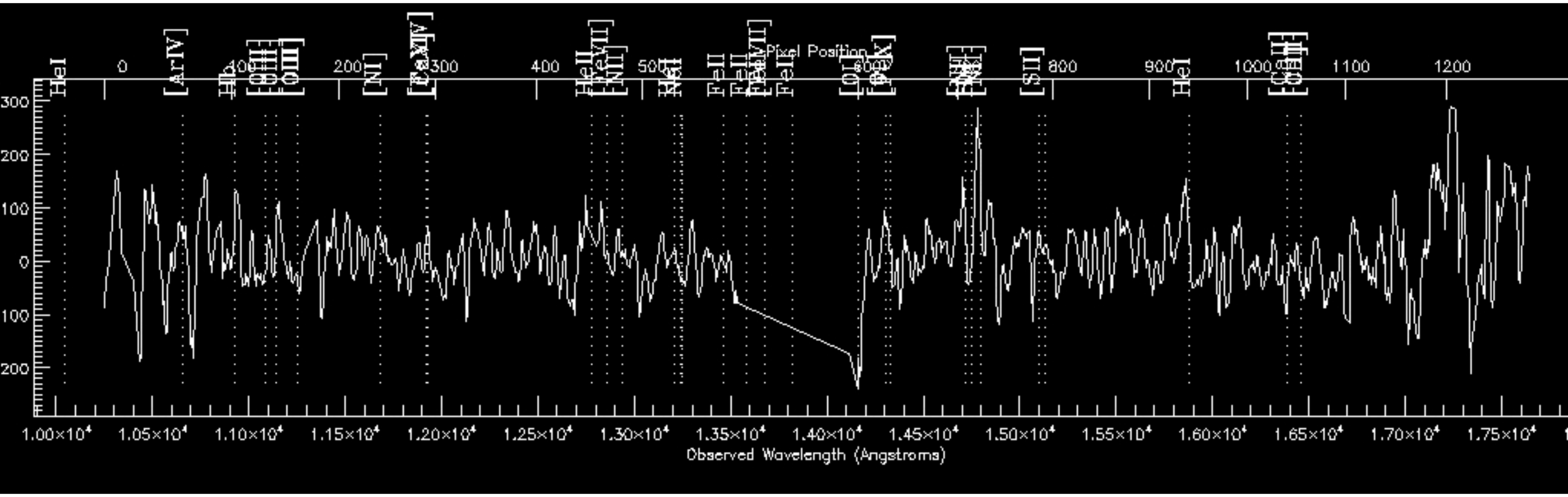
Expected z=1 to 3



3-hour exposure CDFS

COSMOS field

-80 -60 -40 -20 0 20 40 60 80



AGN in CDFS at z=1.25

Atlas of Lyα emitters at z=5.7, 6.5

Hu, Cowie, Barger et al. 2010, ApJ, 725, 394 (Dec 10, 2010)

Narrow-band imaging

(NB816, NB912, NB921)

λ_c = 8150Å, 9140Å

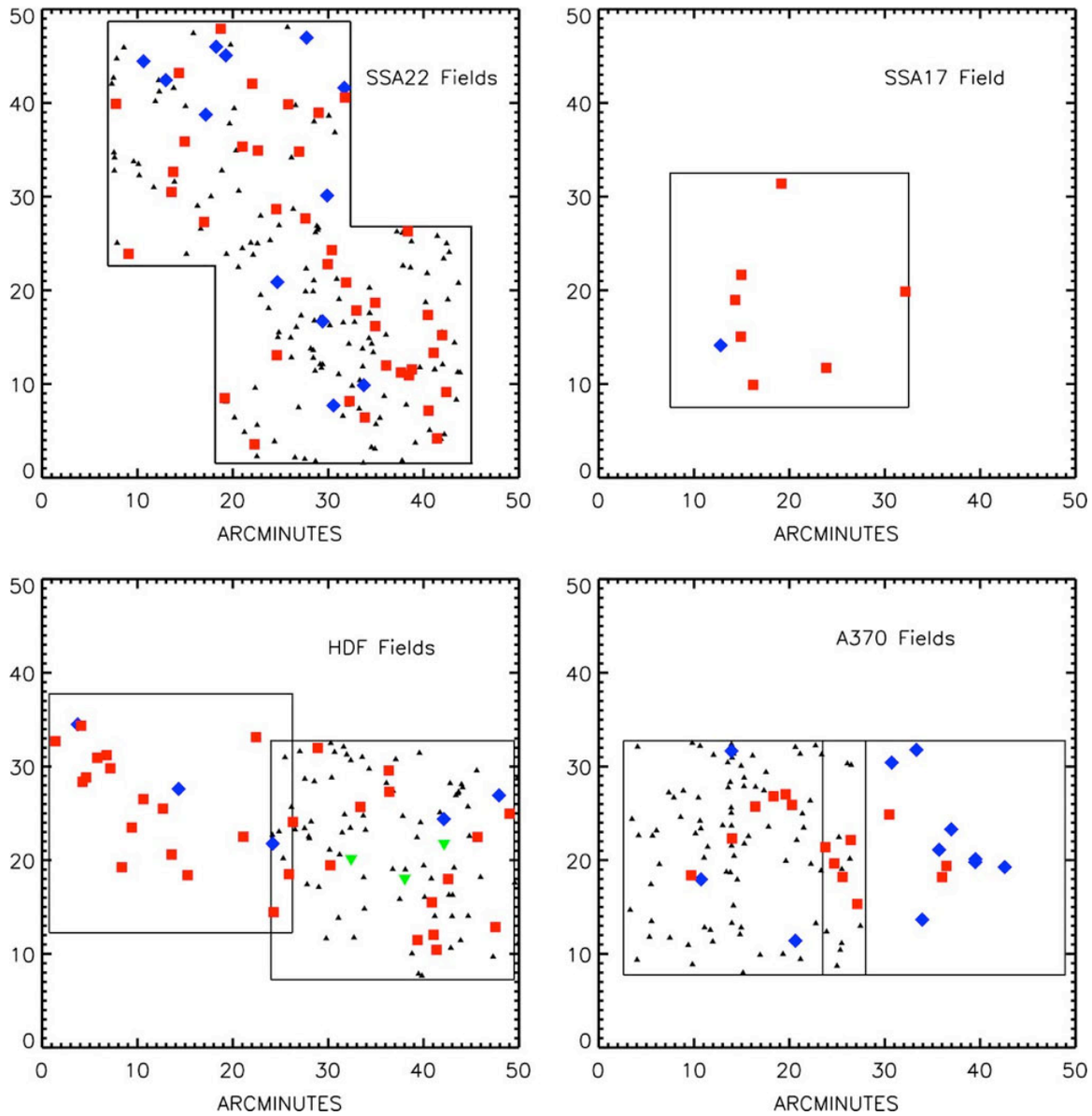
(gaps in sky emission)

+

BVRIz continuum imaging

Spectroscopic followup at Keck/ DEIMOS

SuprimeCam

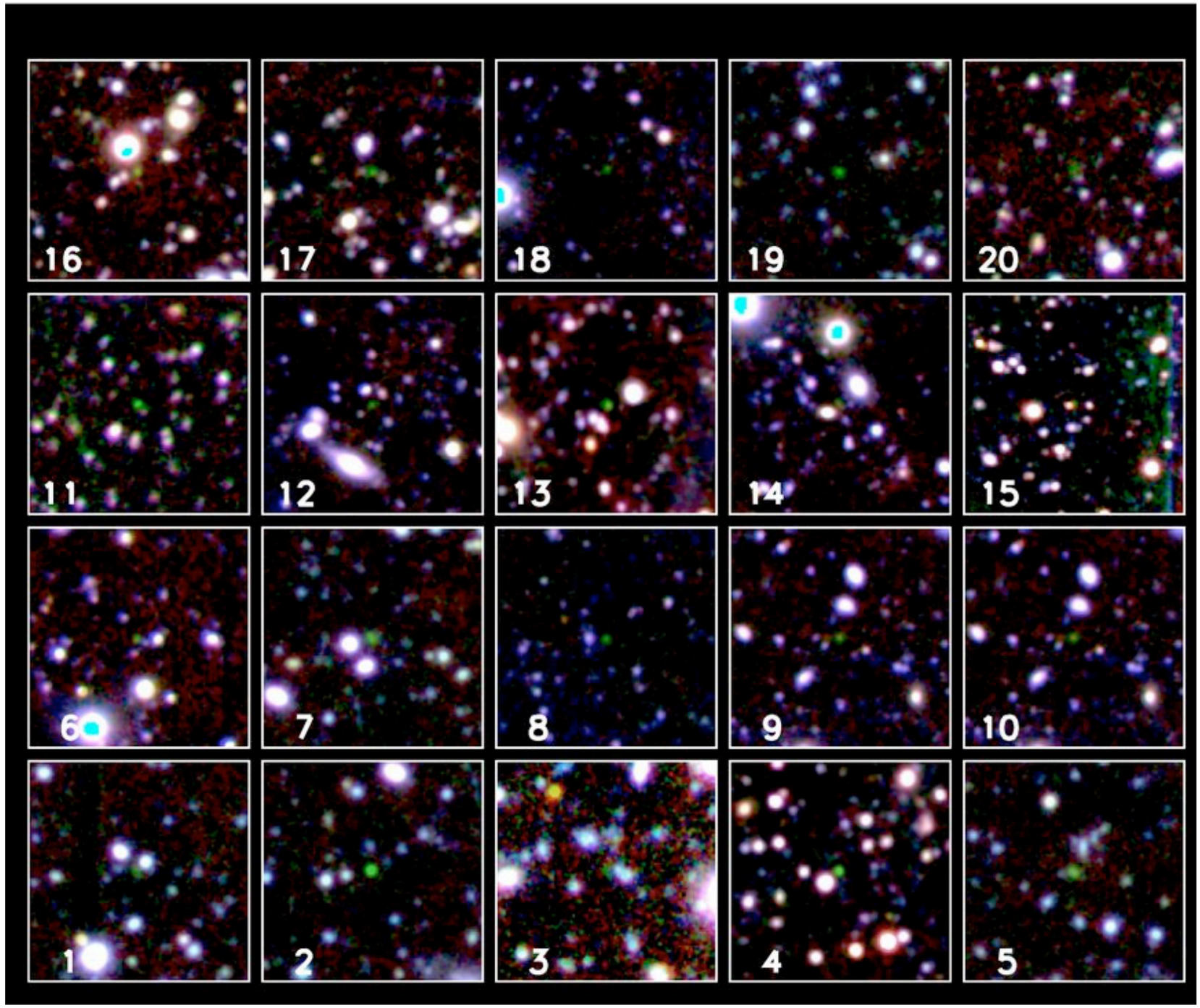


Largest sample of confirmed high-z galaxies:

88 z=5.7

30 z=6.5

spectroscopically confirmed emitters (green), 40 arcsec wide
blue=R, green=F816, red=z

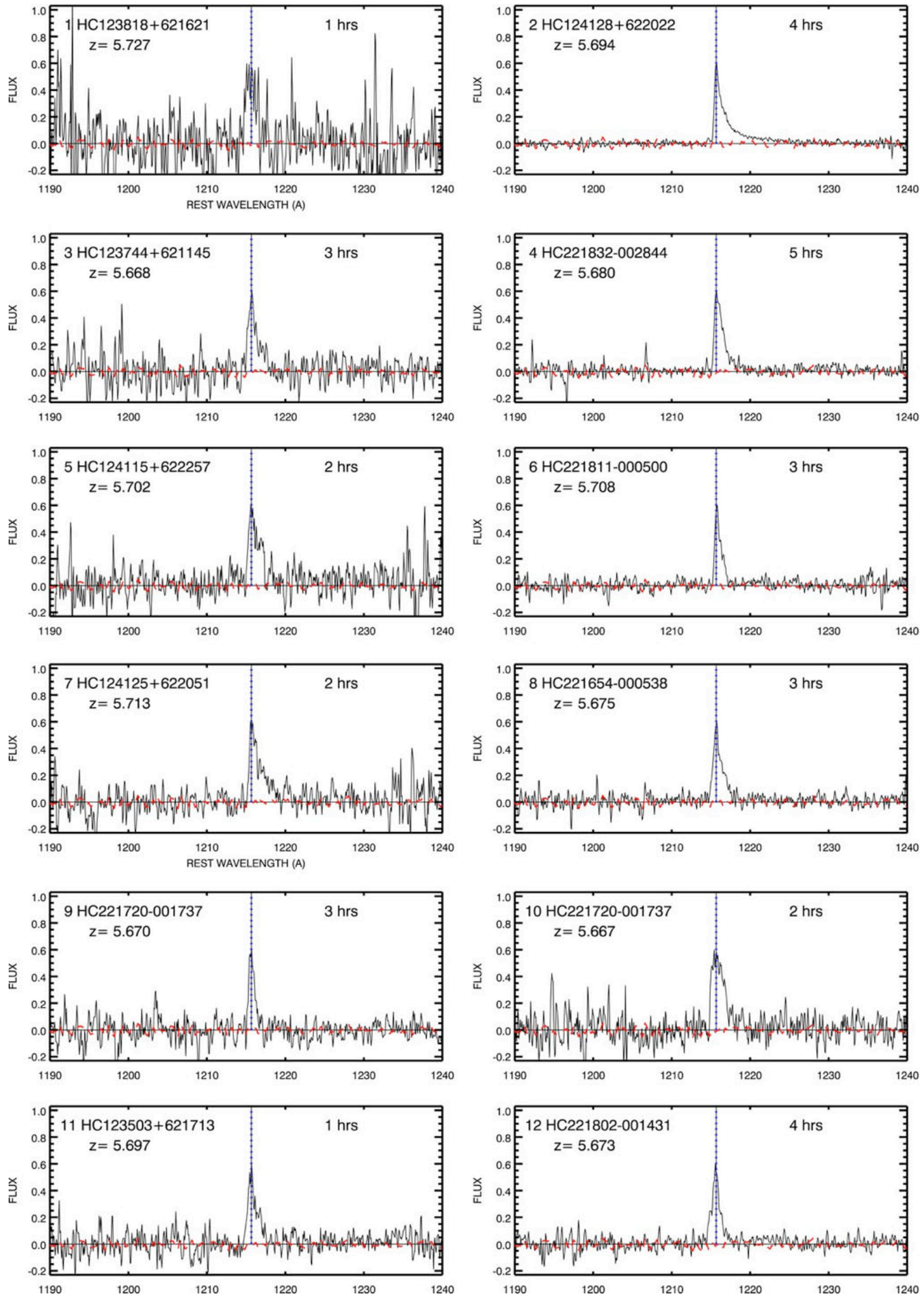


line profiles are very similar for many of the galaxies

composite spectra are almost identical for z=5.7 and z=6.5

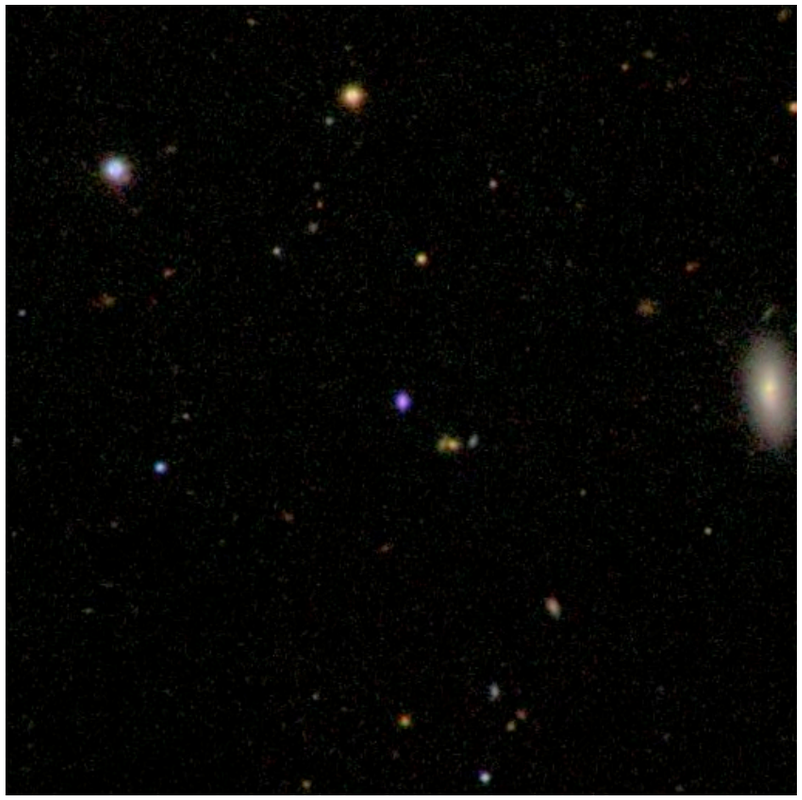
lines are narrower at higher z

lines are broader at large luminosity

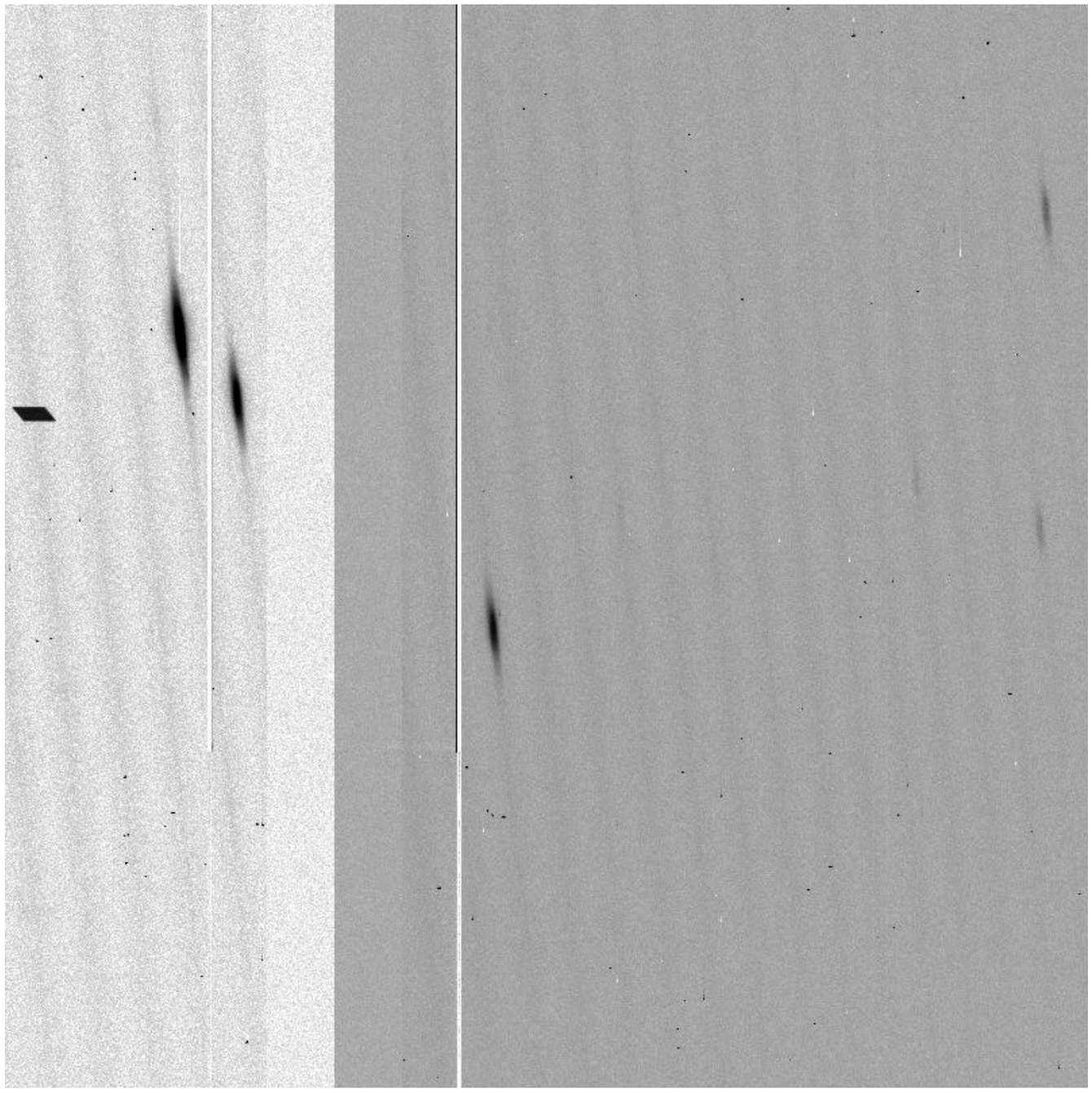


HII galaxies as standard candles

Chavez, Bresolin, Terlevich & Terlevich



HDS



turbulent velocity and
ionizing luminosity
increase with mass

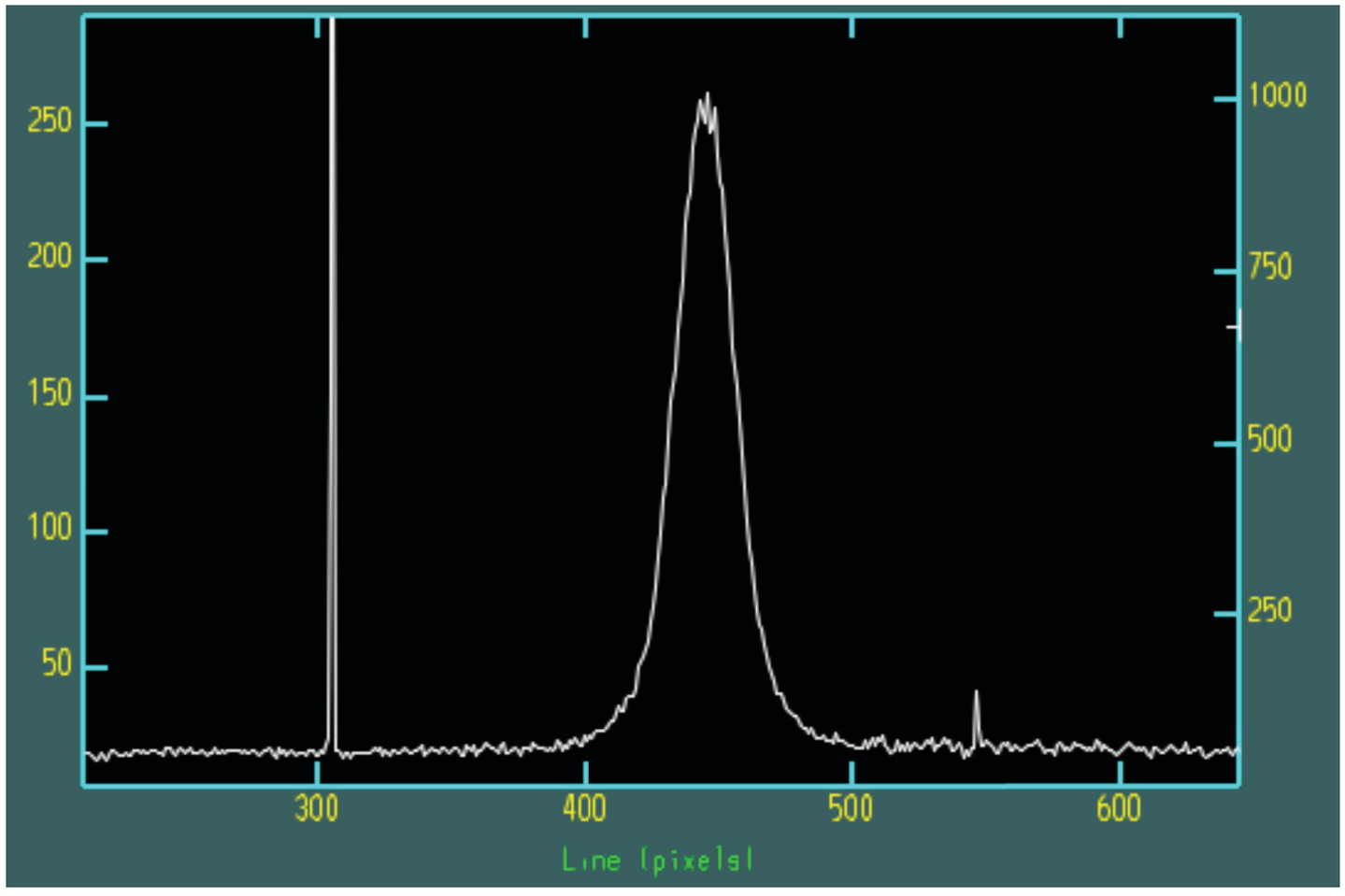
L(Hβ) $\propto$ line width σ^x

(Terlevich & Melnick 1981)

80 HII galaxies from
SDSS at z=0.01-0.2

spectra: Subaru HDS,
VLT UVES

images: San Pedro
Martir, Cananea



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