Through a Glass Darkly: Star Formation(?) in Abell 2029

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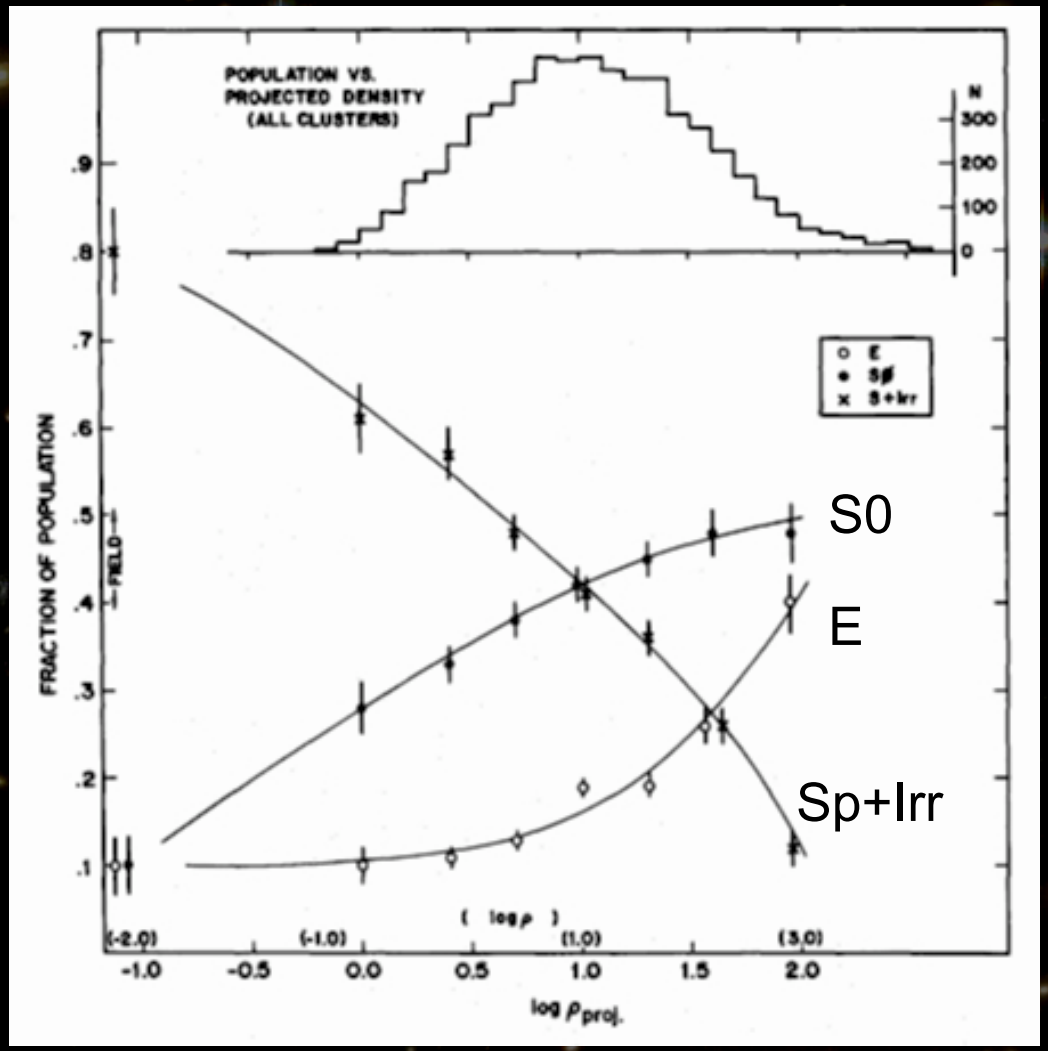
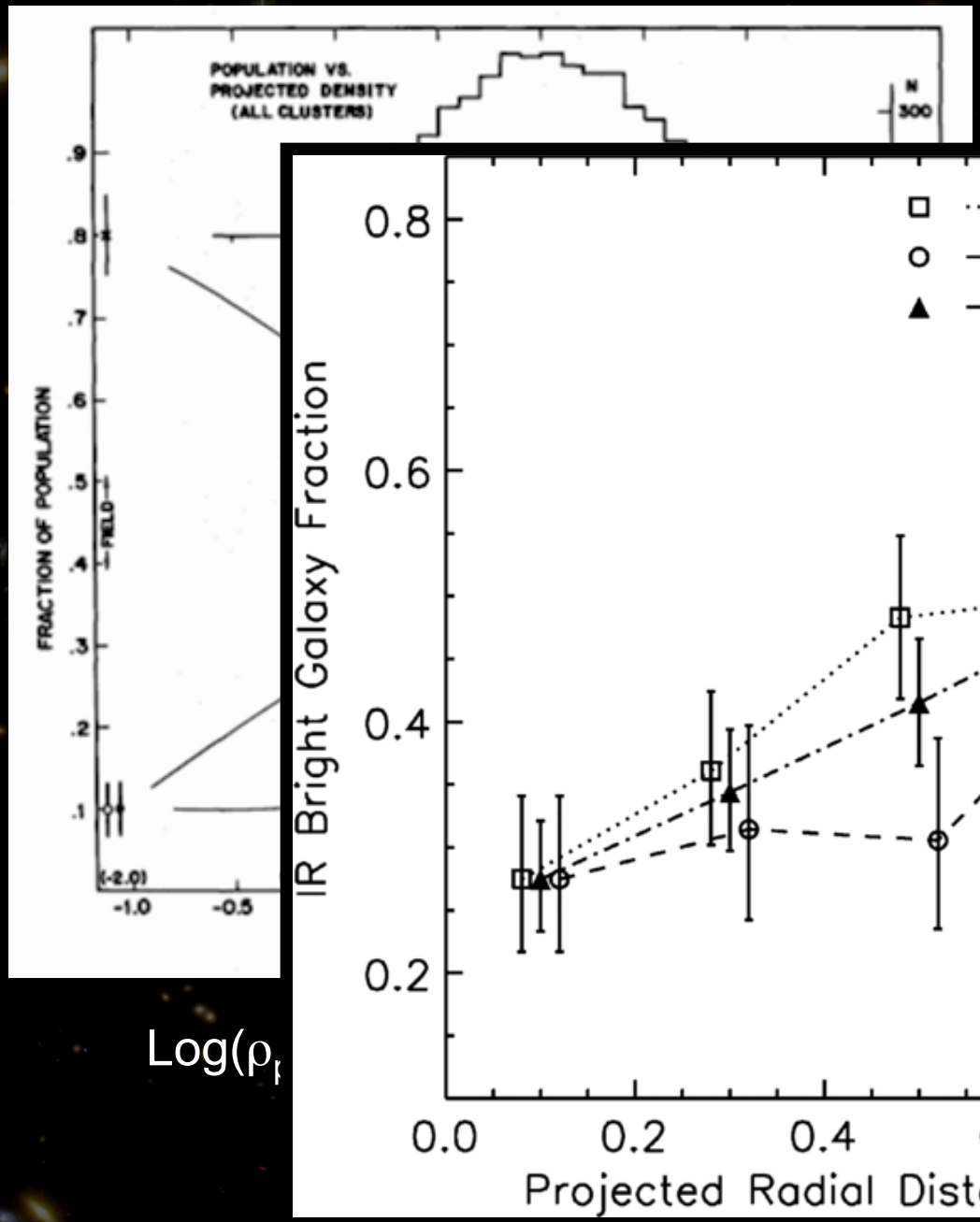


Fraction

Dressler 1980

Log(ρ_{proj})



Fraction

Log(ρ_r

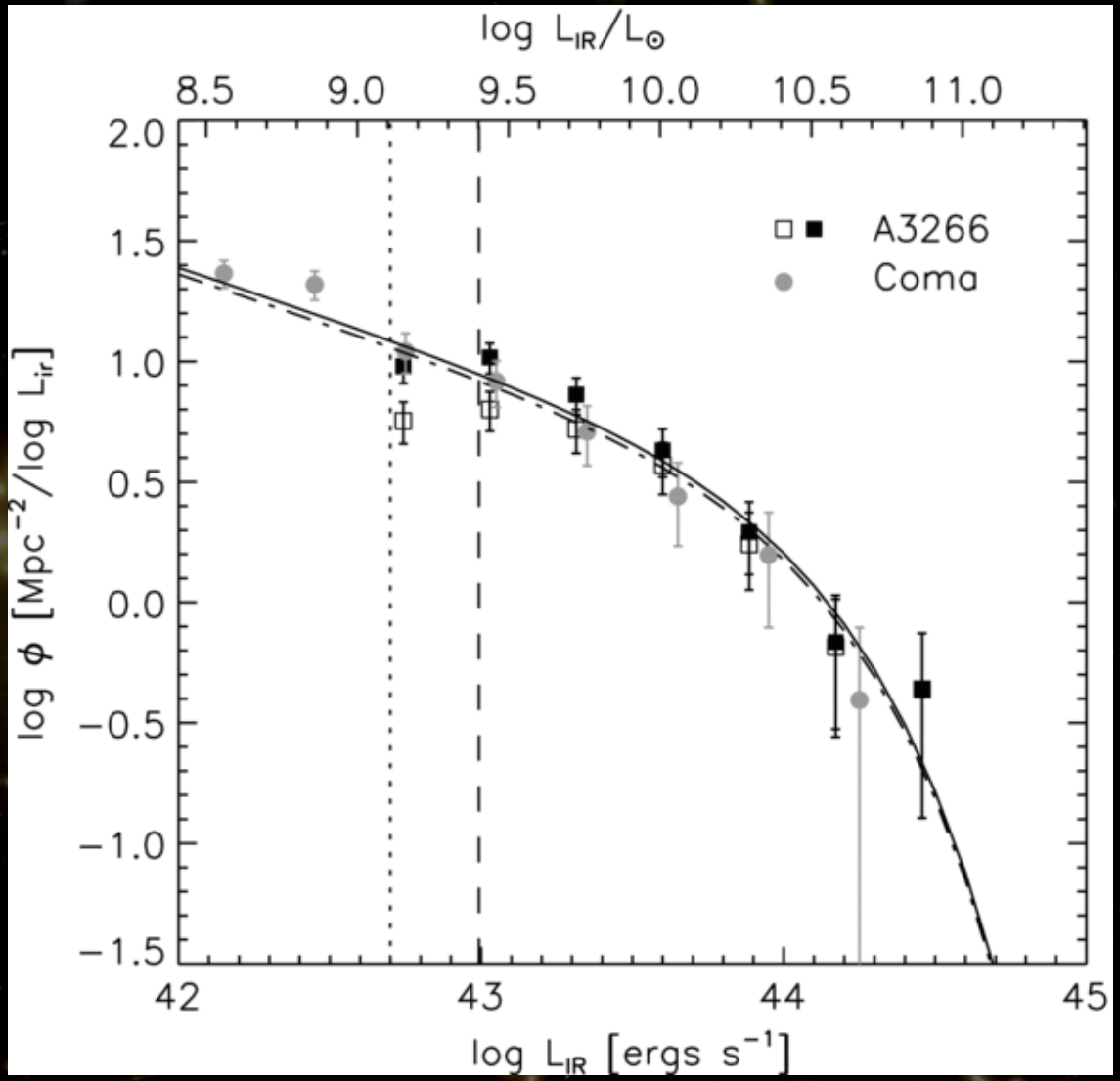
Bai et al. 2009

Coma, A3266
(Bai et al. 2009)
α = 1.41+/-0.08
Log($L^*/L_\odot$) = $10.49^{+0.13}_{-0.11}$

Field (0.05 < z < 0.2)
(Rujopakarn et al. 2010)
α ~ 1.74

Cluster effects on low-mass galaxies (ram-pressure stripping, strangulation, etc.)

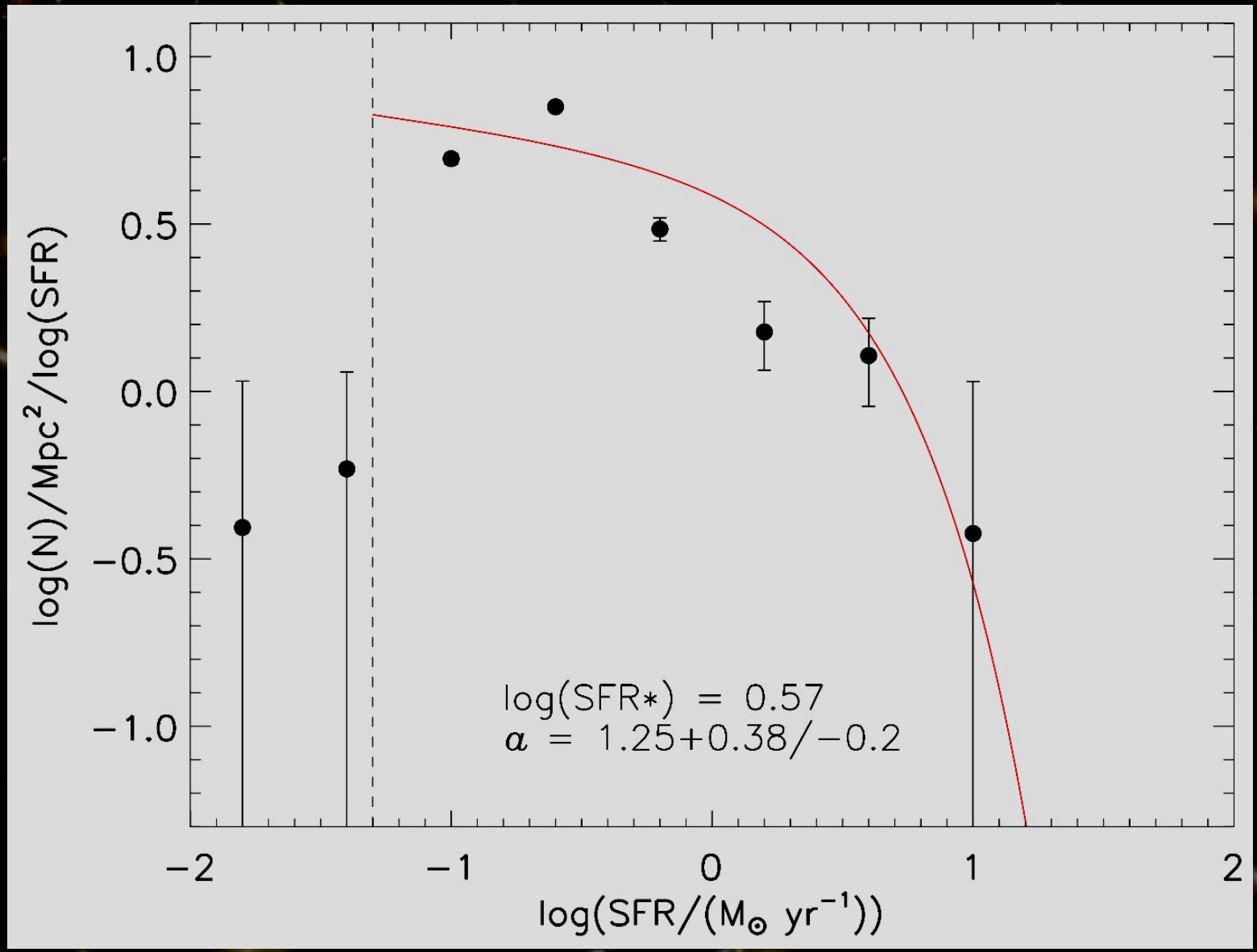
(e.g. Sivanandam et al. 2010)



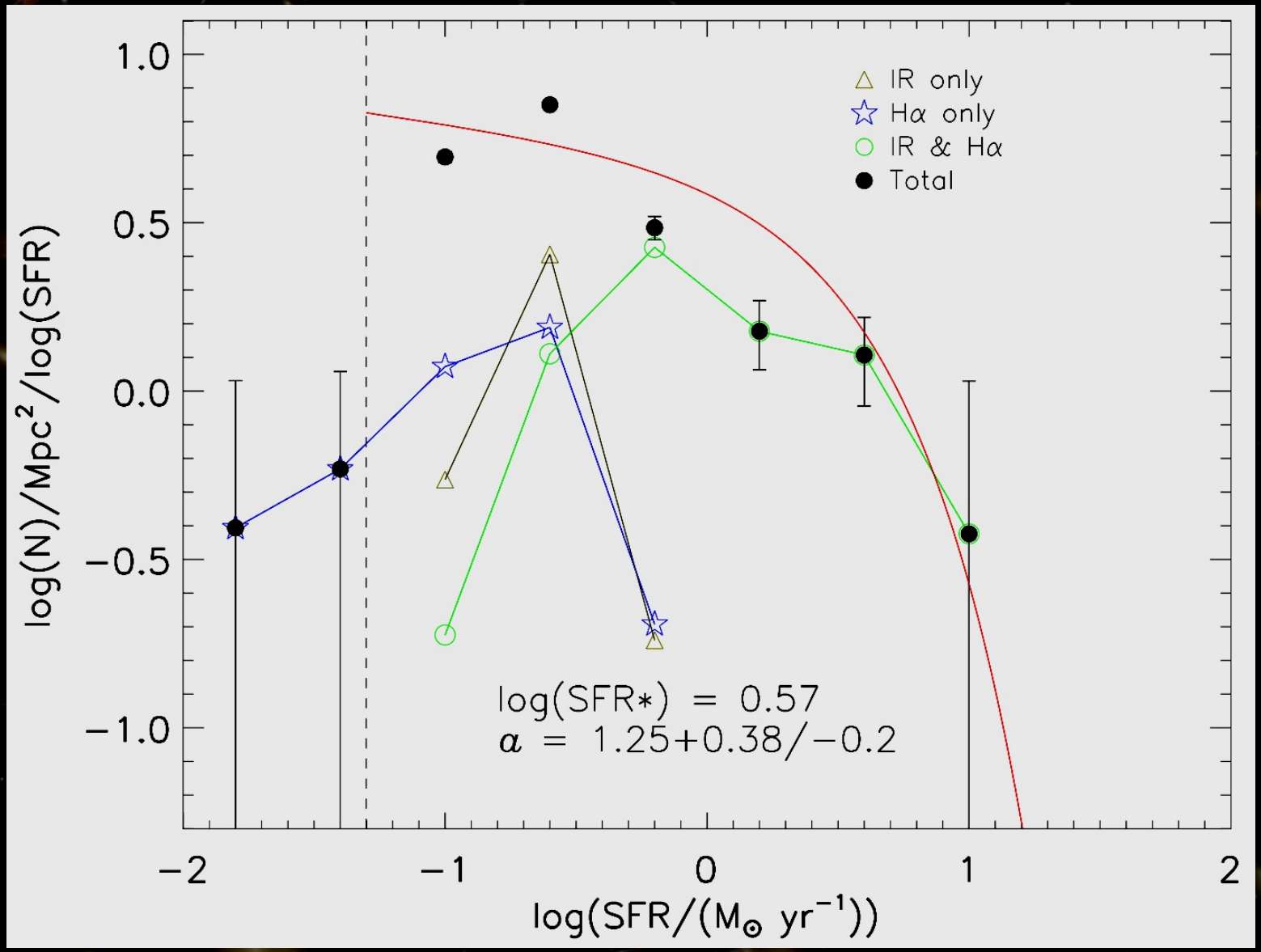
A2029

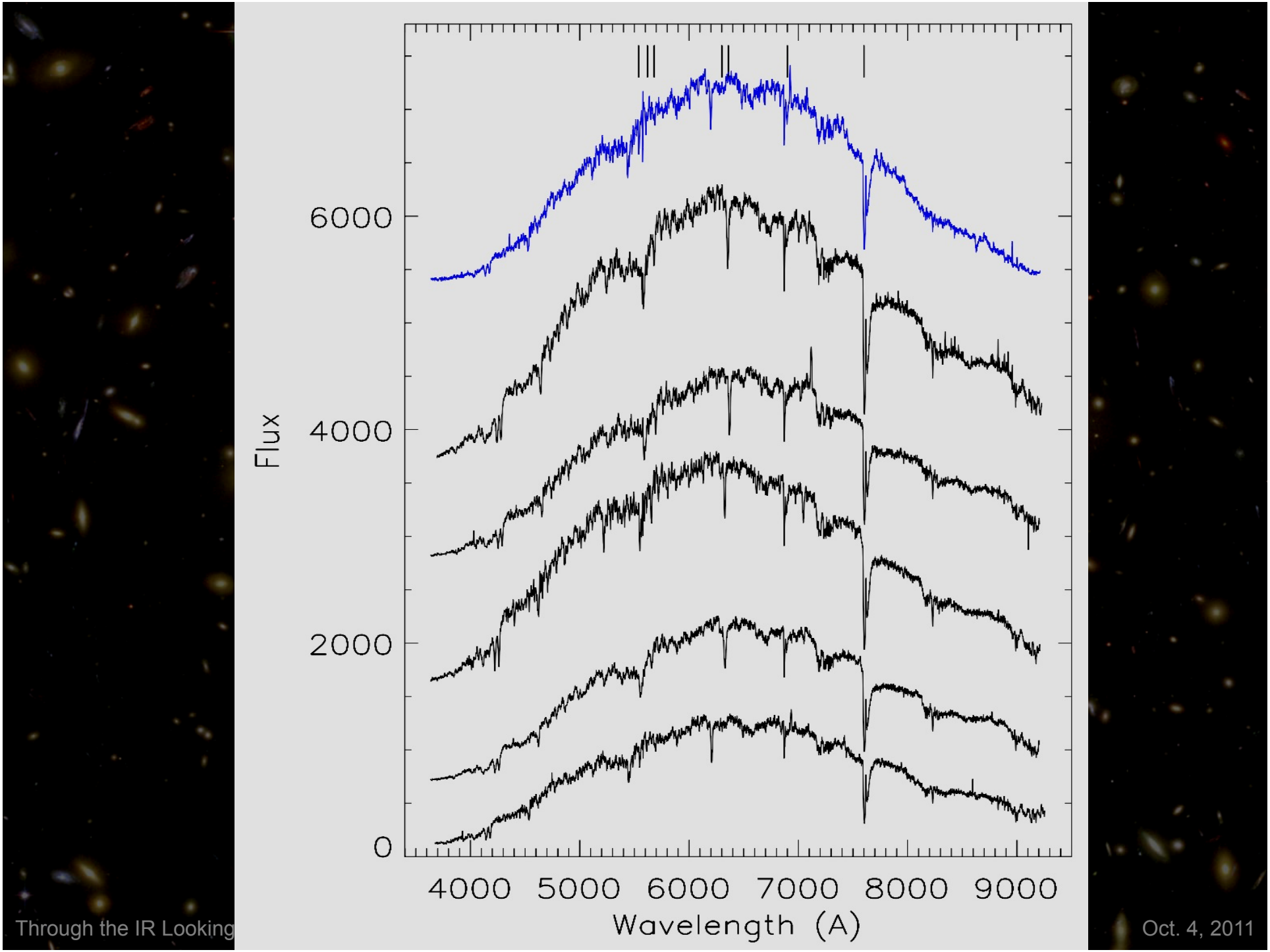
- Massive (~10^{15} $M_\odot$), z ~ 0.08, smooth X-ray profile, no obvious substructures, BCG
- 24um (Bai et al. 2007) - down to ~200 uJy (3σ)
  - SFR ~ 0.05 $M_\odot$/yr (Calzetti et al. 2010)
- Hectospec (MMT)
  - r ≤ 20
  - Redshifts (Cluster membership)
  - Hα luminosity, SFRs
  - AGN removed
- 257 cluster galaxies
  - 78 det. at 24um, Hα, or both
- SFR function: convert L* (Coma) to SFR*

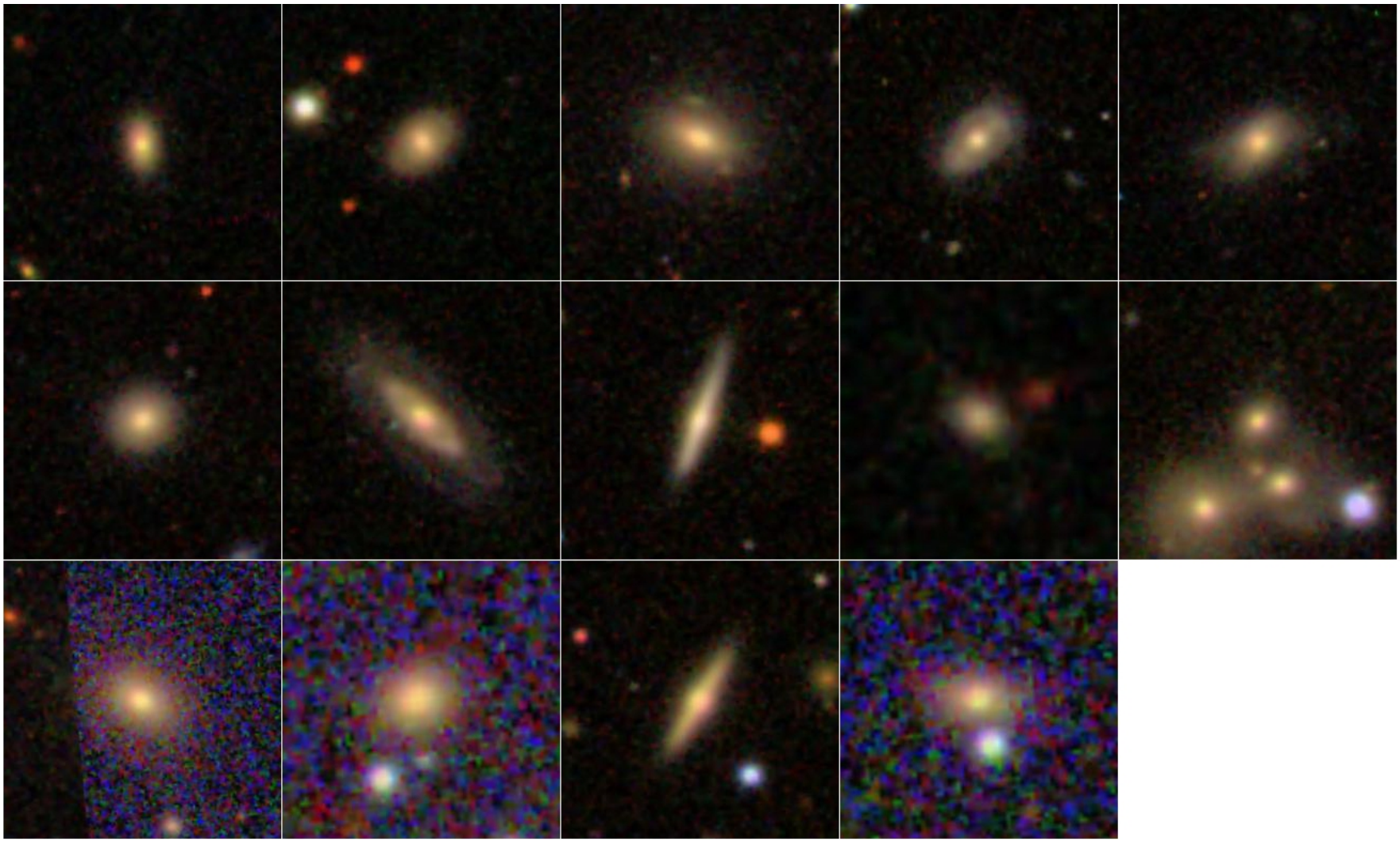
SFR Function

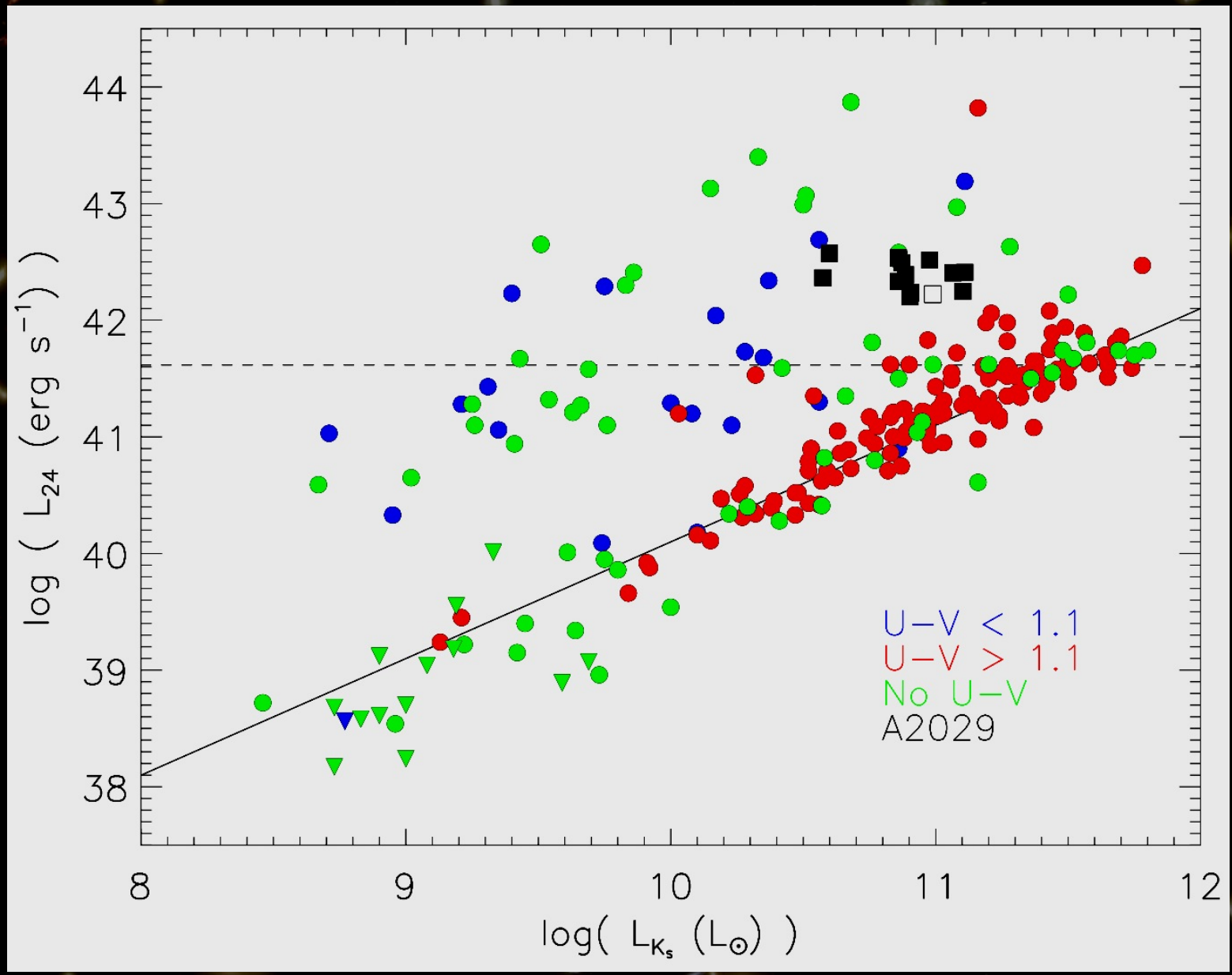


SFR Function

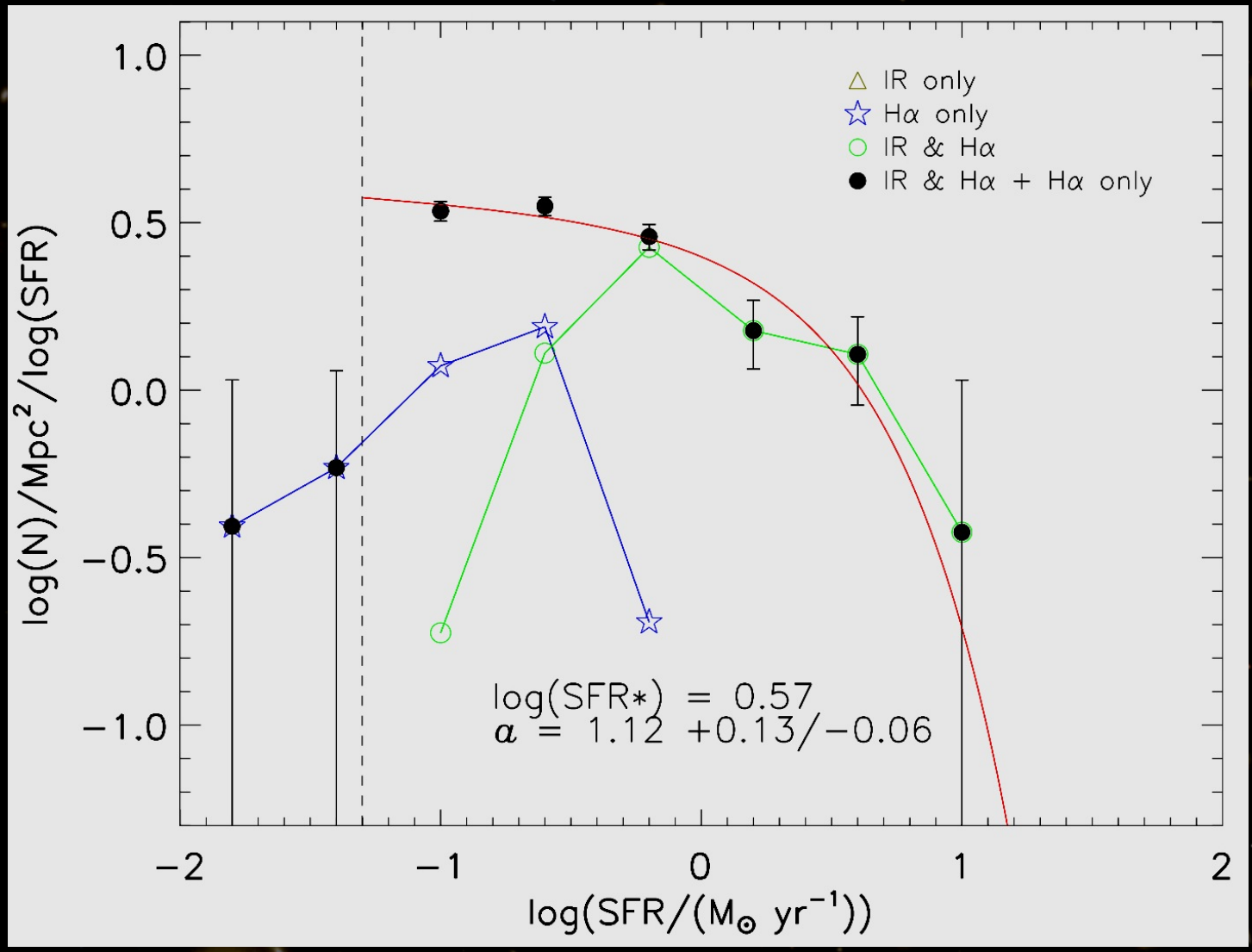



Flux
6000
4000
2000
0
4000 5000 6000 7000 8000 9000
Wavelength (A)




44
43
42
41
40
39
38
log (L_{24} (erg s^{-1}))
8
9
10
11
12
log(L_{K_s} ($L_\odot$))
U−V < 1.1
U−V > 1.1
No U−V
A2029

SFR Function

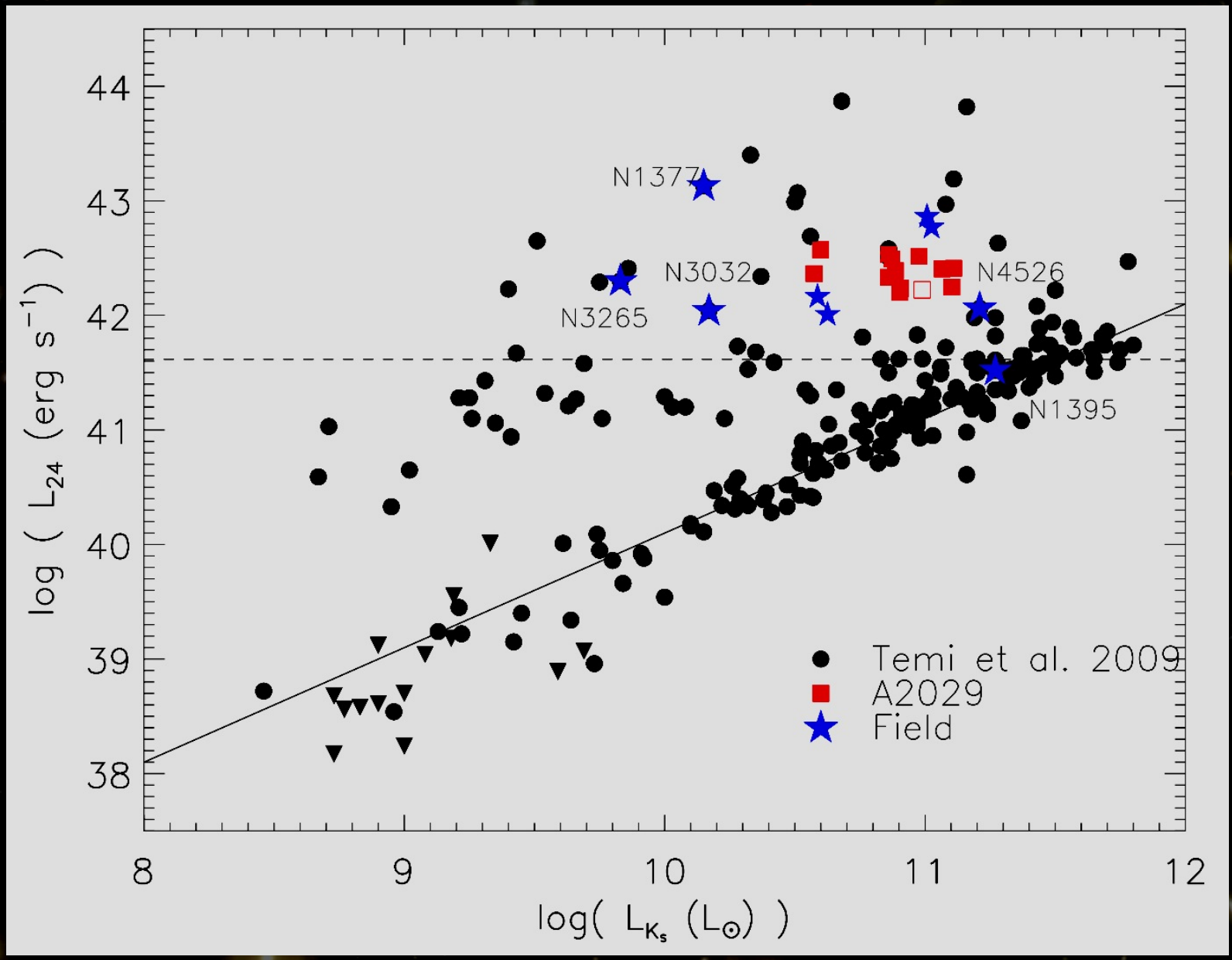


Are these IR-active, non-star forming galaxies unique to clusters?

- Find similar galaxies in Temi sample (field)

  Low SFR, Hα/24um

- Non-A2029 galaxies out to z = 0.2


44
43
42
41
40
39
38
8
9
10
11
12
log (L_{24} (erg s^{-1}))
log(L_{K_s} ($L_\odot$))
N1377
N3032
N3265
N4526
N1395
Temi et al. 2009
A2029
Field

Conclusions/Future Work

- Cluster IR SFR function shows effects of environment on low-mass galaxies
- Population of 24um-emitting, non-SF, mostly early-type galaxies pumping up the faint end of the cluster LF
  - Not unique to clusters, just more of them (morphology-density relation)
  - Must be removed from IR SFR estimates
- Additional work needed
  - What are these non-SF 24um-emitters?
  - Are they as common in other clusters? (Coma?)
  - Further narrow down the role of cluster dynamics in galaxy evolution (what mechanisms dominate?)