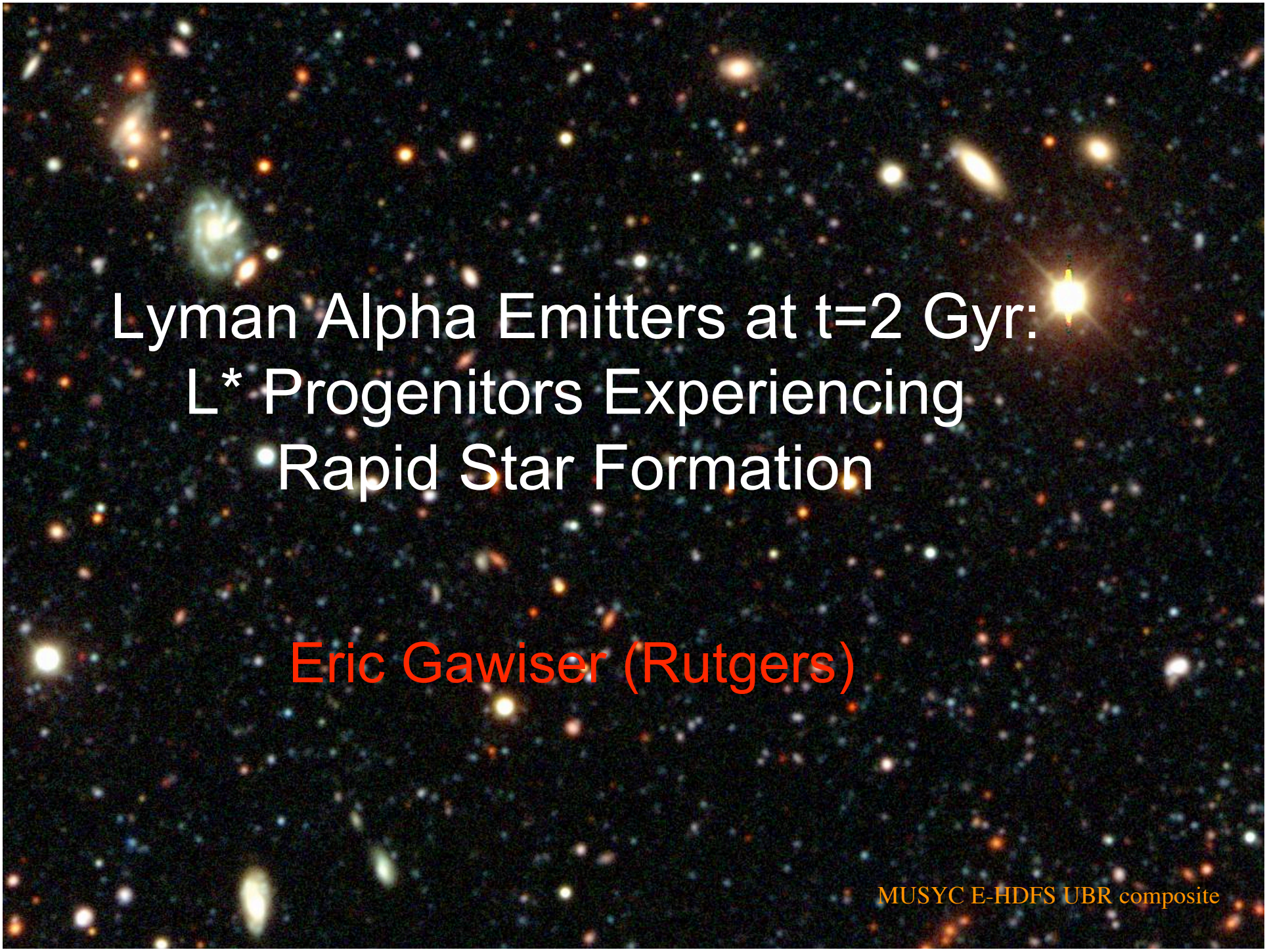

Lyman Alpha Emitters at t=2 Gyr:
L* Progenitors Experiencing
Rapid Star Formation
Eric Gawiser (Rutgers)
MUSYC E-HDFS UBR composite

MUSYC

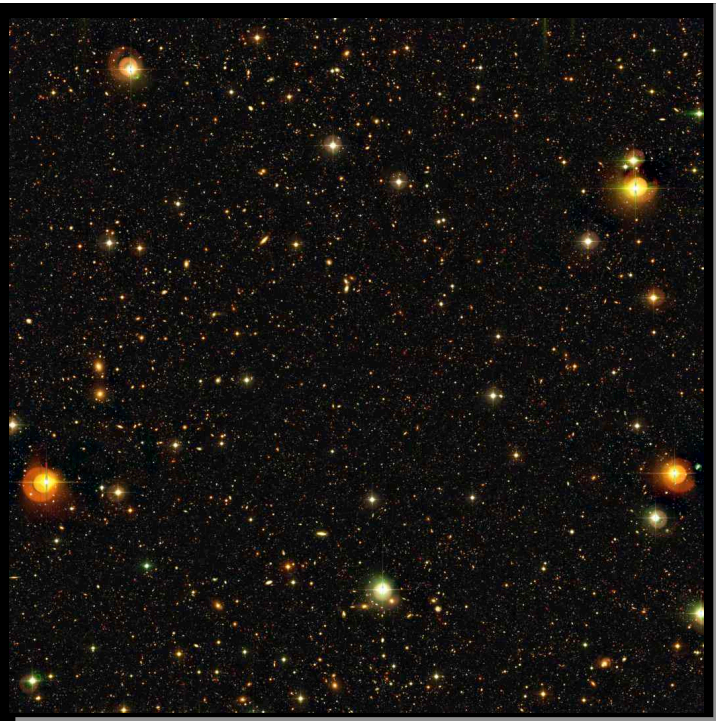
(Multiwavelength Survey by Yale-Chile)

Eric Gawiser (Rutgers, P.I.)
Pieter van Dokkum (Yale, P.I.)
Paulina Lira (U. Chile)
Meg Urry (Yale)
Nicholas Bond (Rutgers)
Gabriel Brammer (Yale)
Carie Cardamone (Yale)
Marijn Franx (Leiden)
Harold Francke (U. Chile/Yale)
Lucia Guaita (P.U. Catolica)
Leopoldo Infante (P.U. Catolica)
Sheila Kannappan (UNC)
Sugata Kaviraj (Oxford)
Mariska Kriek (Princeton)
Ivo Labbe (OCIW)
Kyoung-Soo Lee (Yale)
Danilo Marchesini (Yale)
Nelson Padilla (P.U. Catolica)
Ryan Quadri (Leiden)
Kevin Schawinski (Oxford)
Ned Taylor (Leiden)
Ezequiel Treister (ESO)
Shanil Virani (Yale)

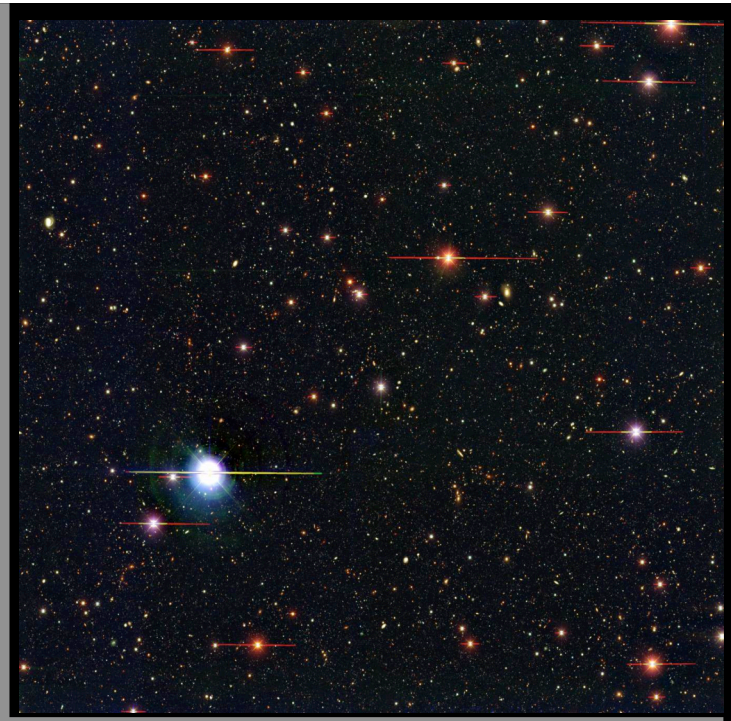
www.astro.yale.edu/MUSYC

Gawiser et al 2006a, ApJS 162, 1

U,B,R=26
(5σ)

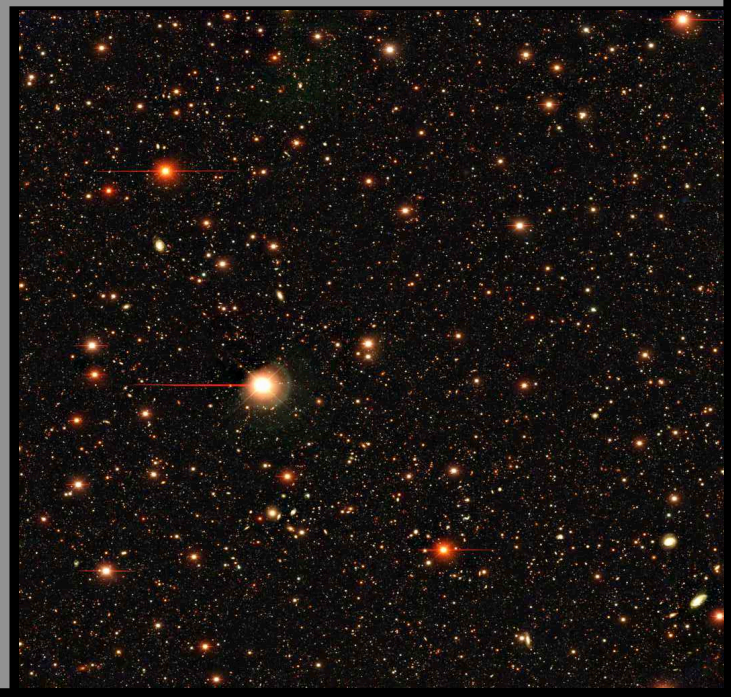


Chandra Deep Field South



SDSS 1030+05 z=6.3 QSO Field

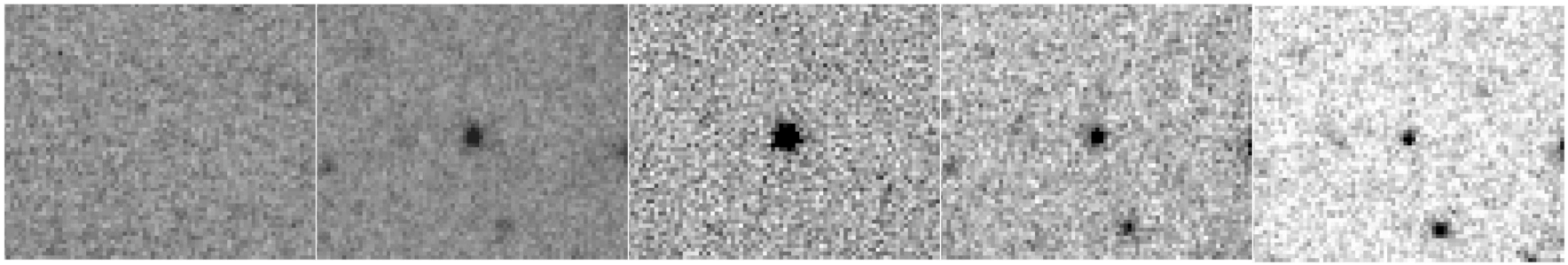
Castander's Window (1256+01)

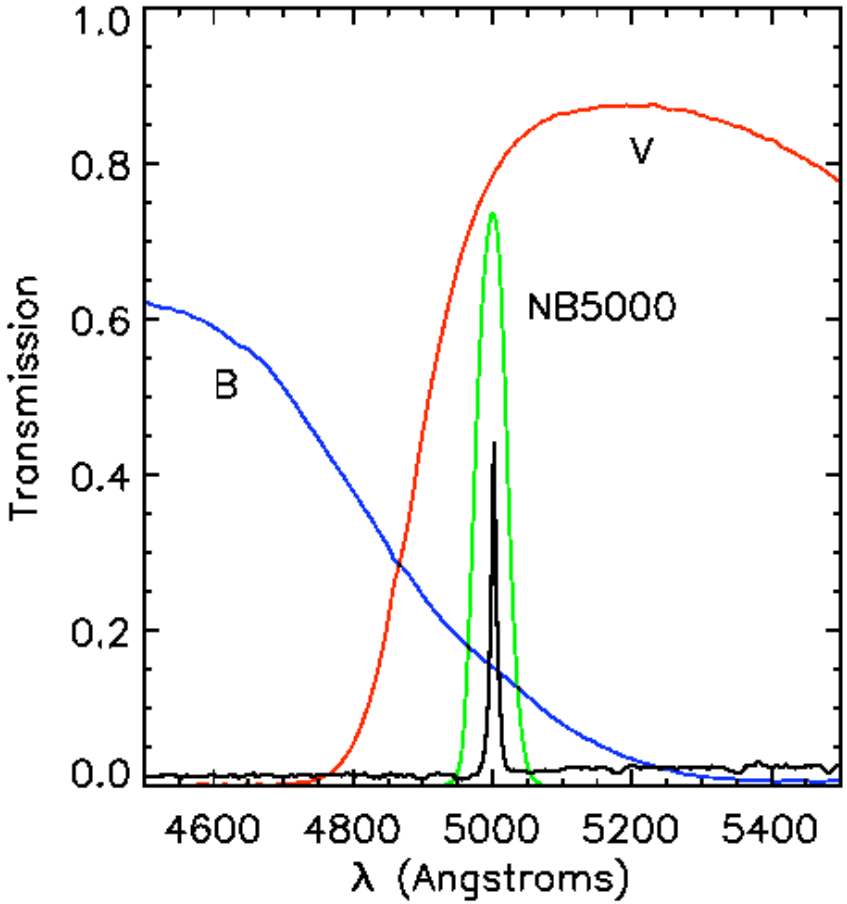


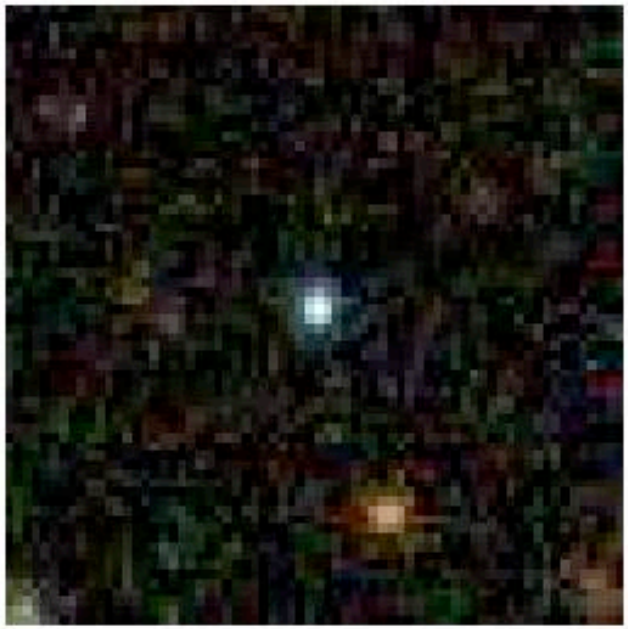
Hubble Deep Field South

Lyman α Emitter (LAE)

U B NB5000 V R



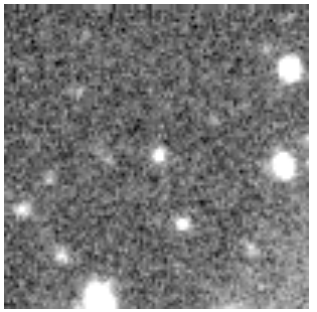


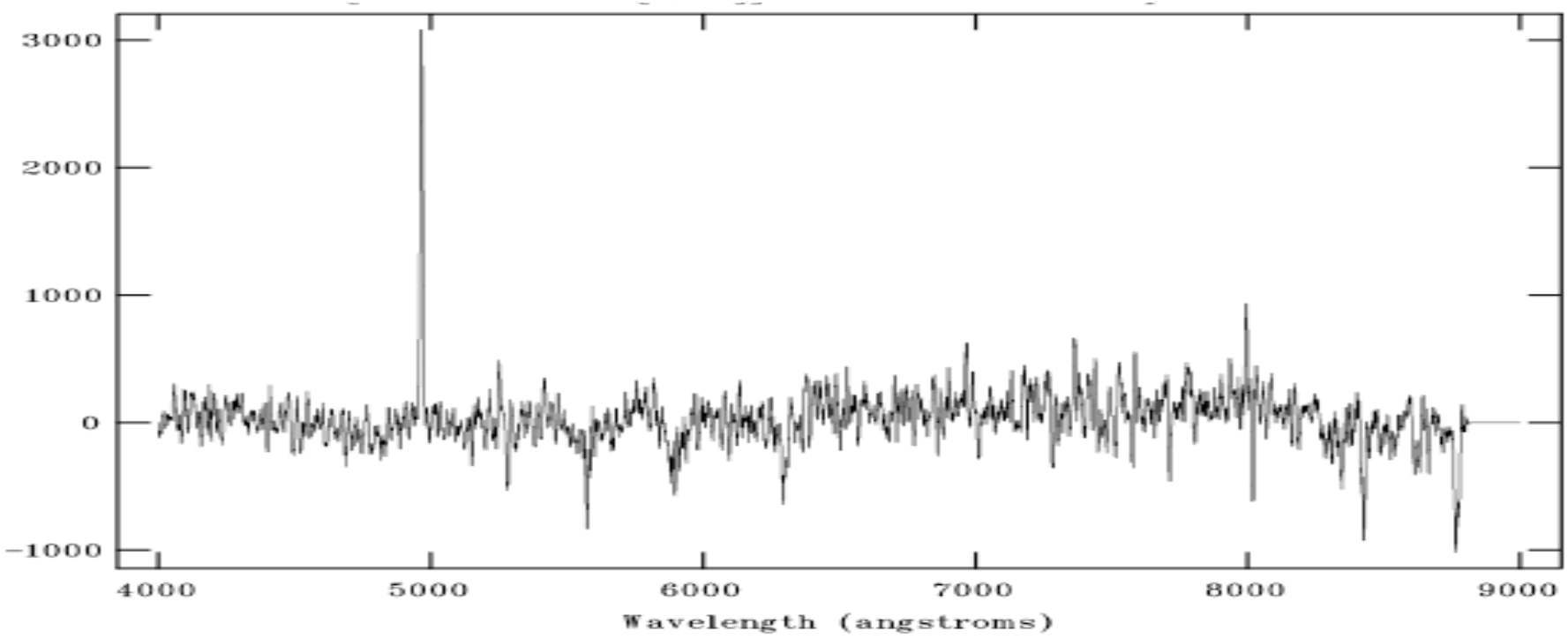


LAE in E-CDFS, R=25.7, z=3.085

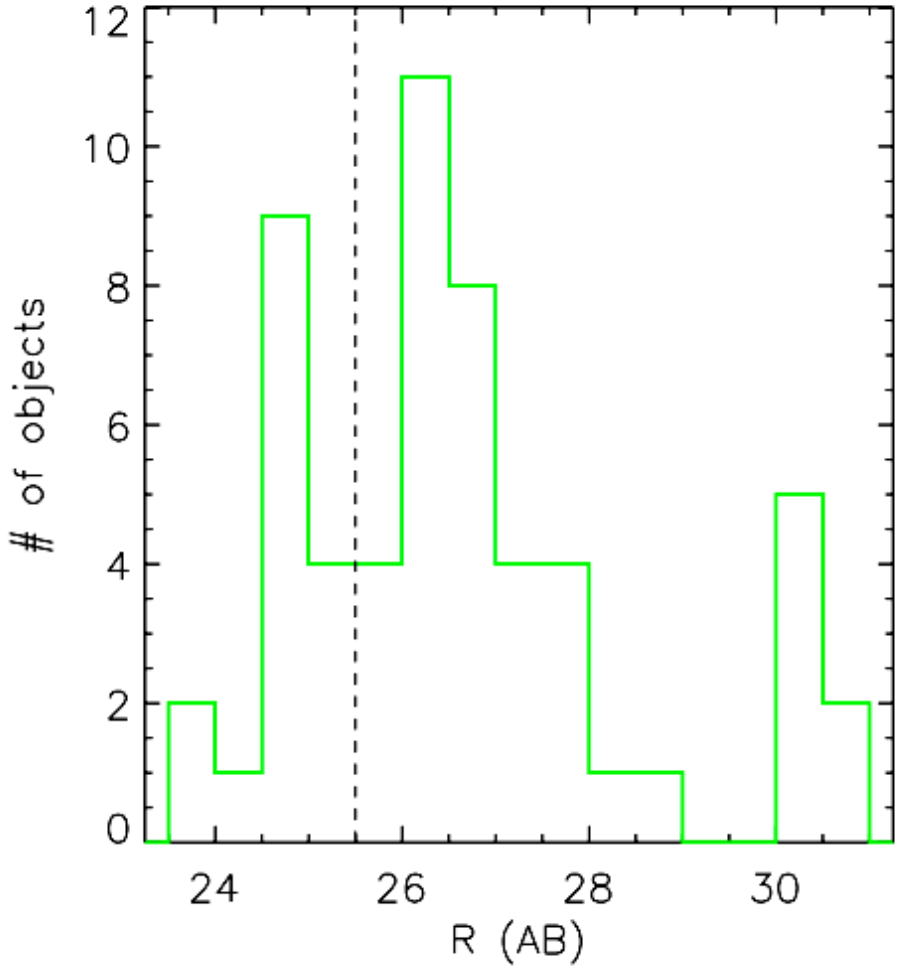
Lyα EW_{obs}=200Å, SFR≥30 $M_{\odot}$/yr

(6 hr exposure with Magellan+IMACS)





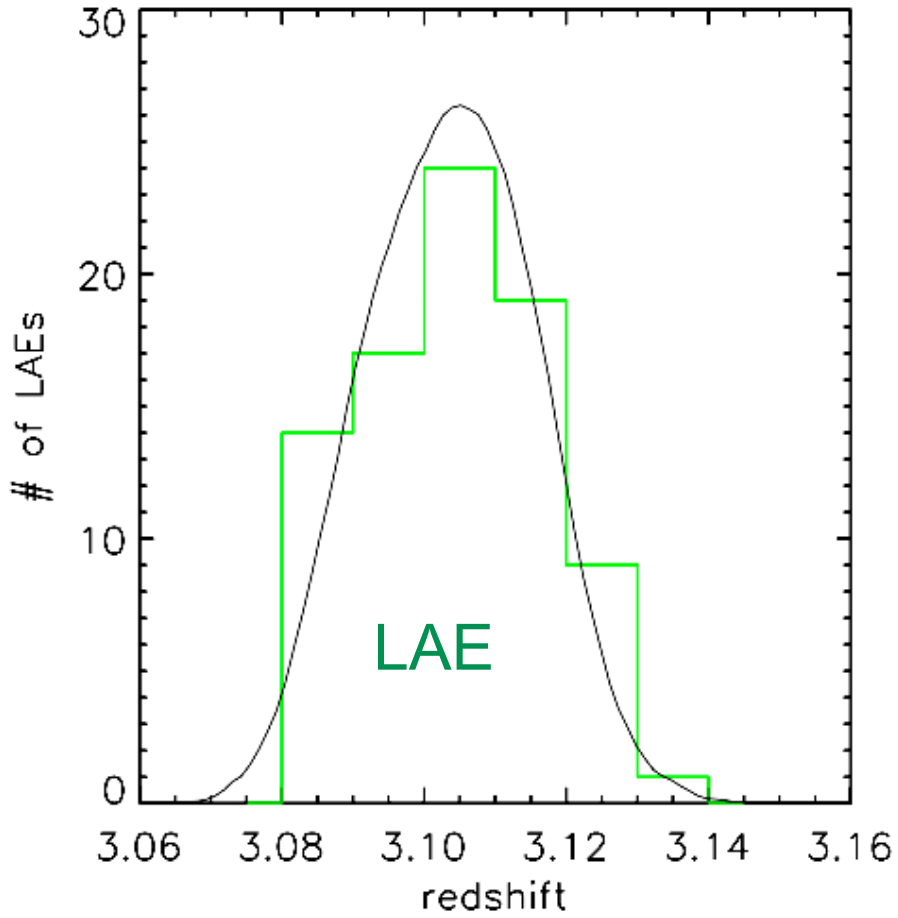
Lyman Alpha Emitters probe the z=3 luminosity function much deeper than Lyman break galaxies (R<25.5)



60 spectroscopically confirmed LAEs in MUSYC-ECDFS

Redshift distribution

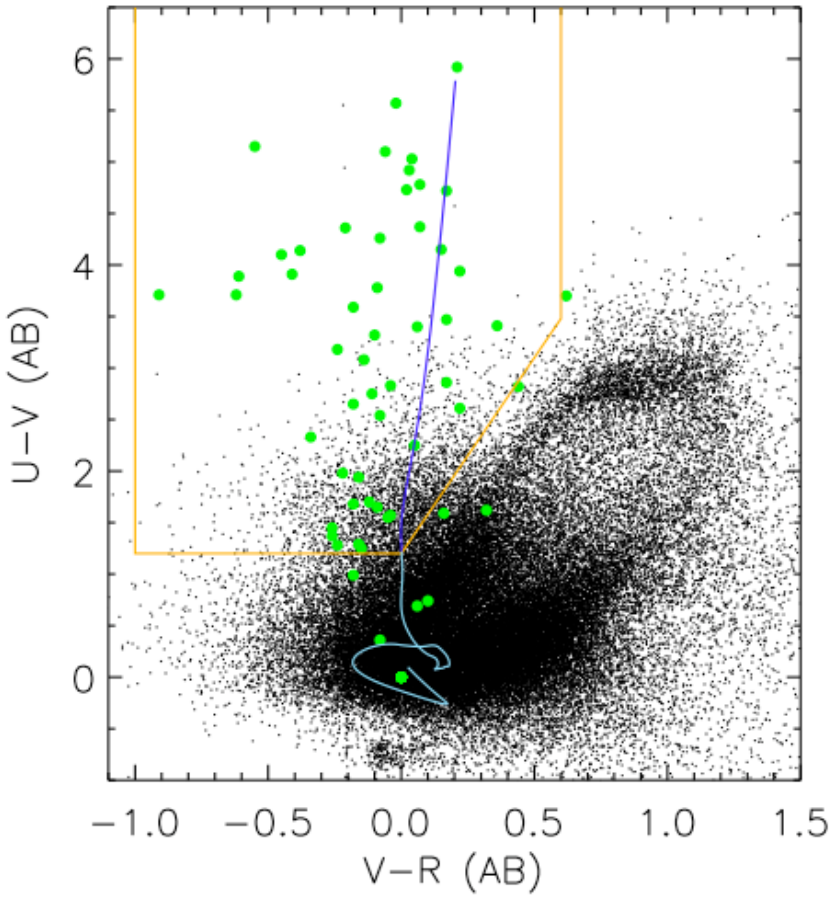
(84 spectroscopically confirmed LAEs in 3 MUSYC fields)



Dark curve shows selection function:
narrow-band filter response
convolved with EW distribution

UVR colors of spectroscopically confirmed LAEs

Gawiser et al 2006b, ApJ 642, L13



Confirmed LAE are blue! Disagrees with claims of red LAEs by Stiavelli et al 2001, Campos et al 1999

Further analyses led by:

Kamson Lai (CfA) - Careful IRAC photometry

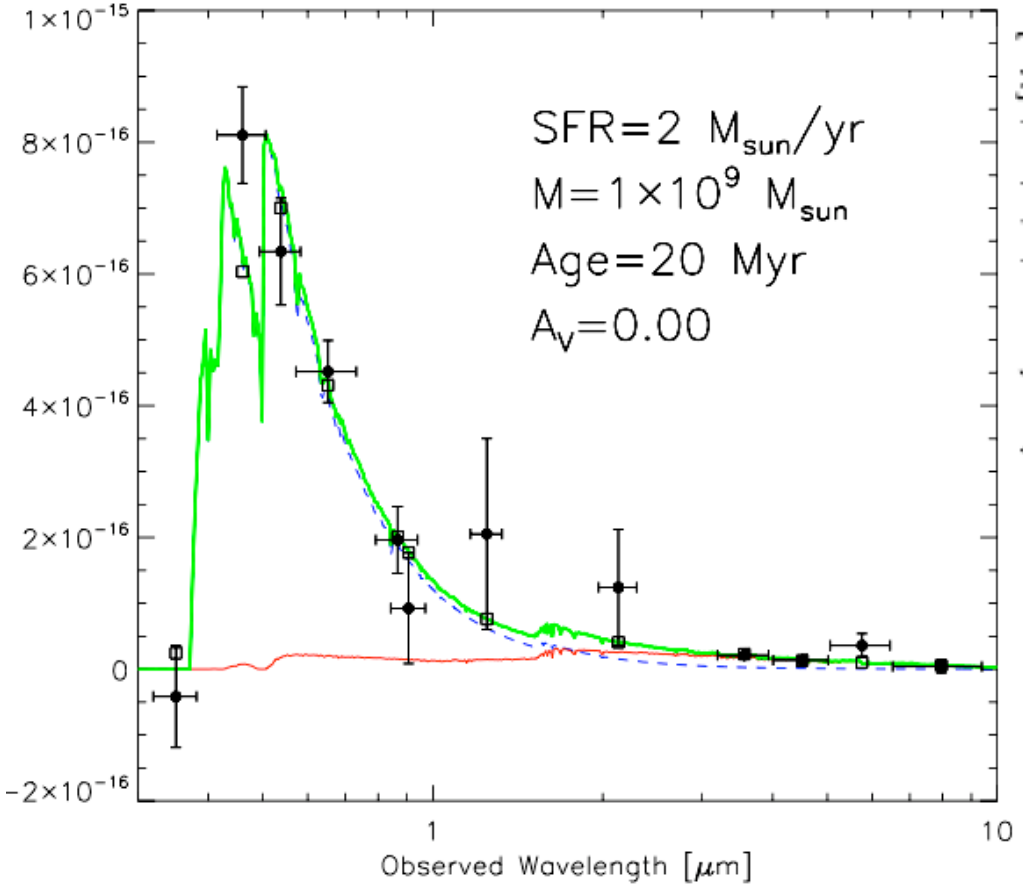
Kevin Schawinski (Oxford) - Dual-population SED fitting

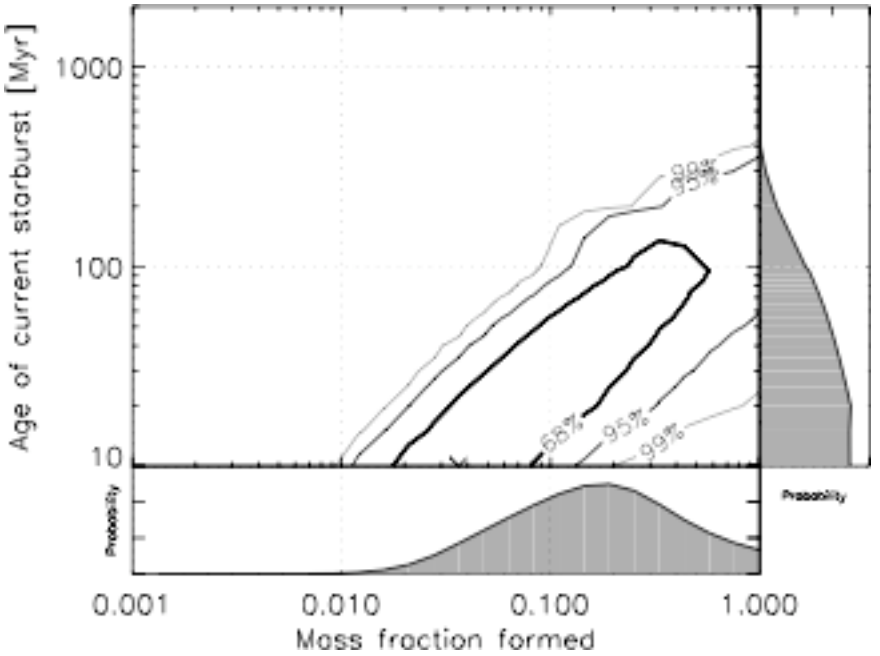
Harold Francke (U. Chile/Yale) - Clustering analysis

Alvaro Orsi (P.U. Catolica) - Millenium halo catalogs

Two-population fit to stacked SED of IRAC-undetected LAEs

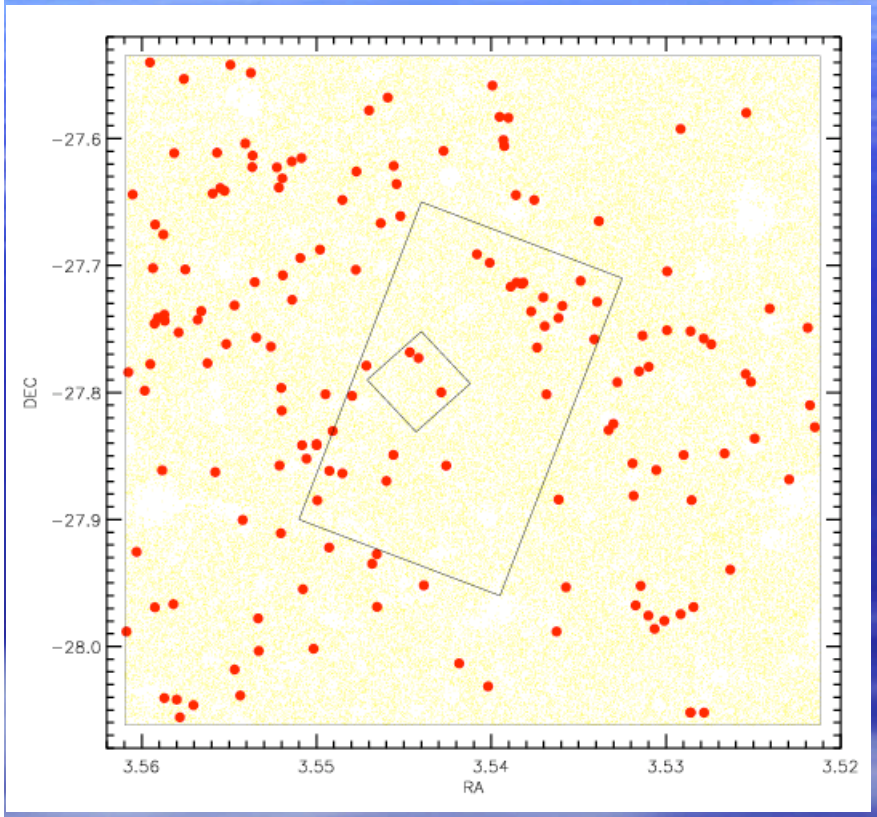
(Gawiser et al 2007, ApJ 671, 278)

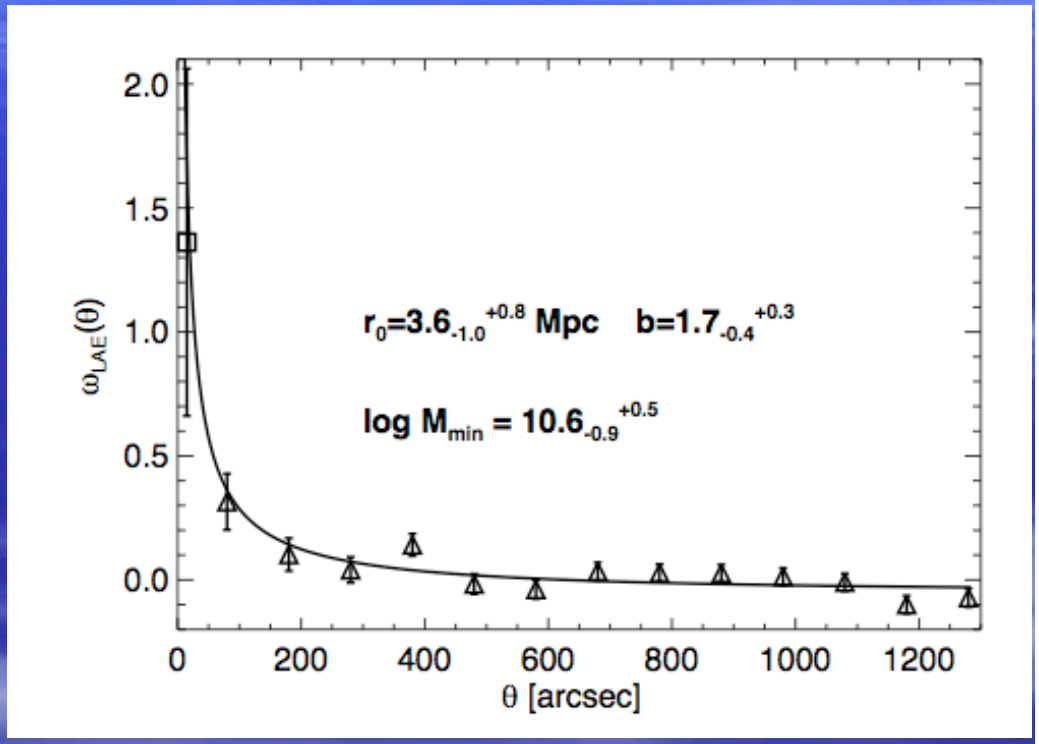




LAE clustering in MUSYC-ECDFS

(Gawiser et al 2007, ApJ 671, 278)



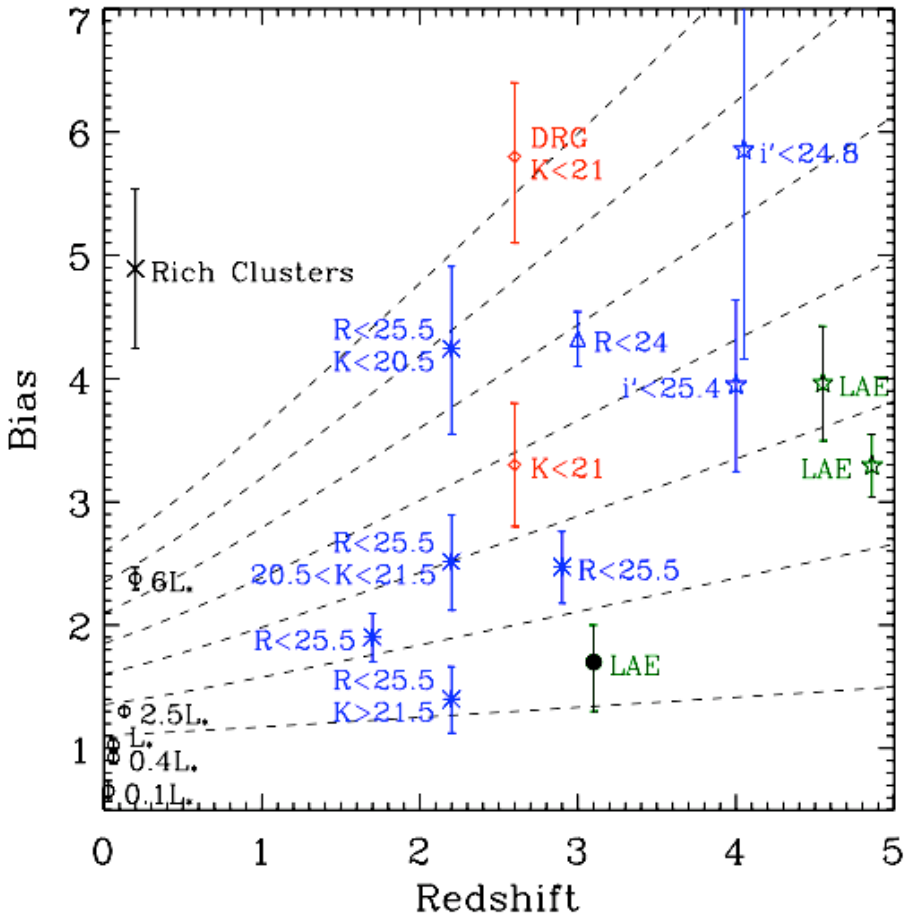


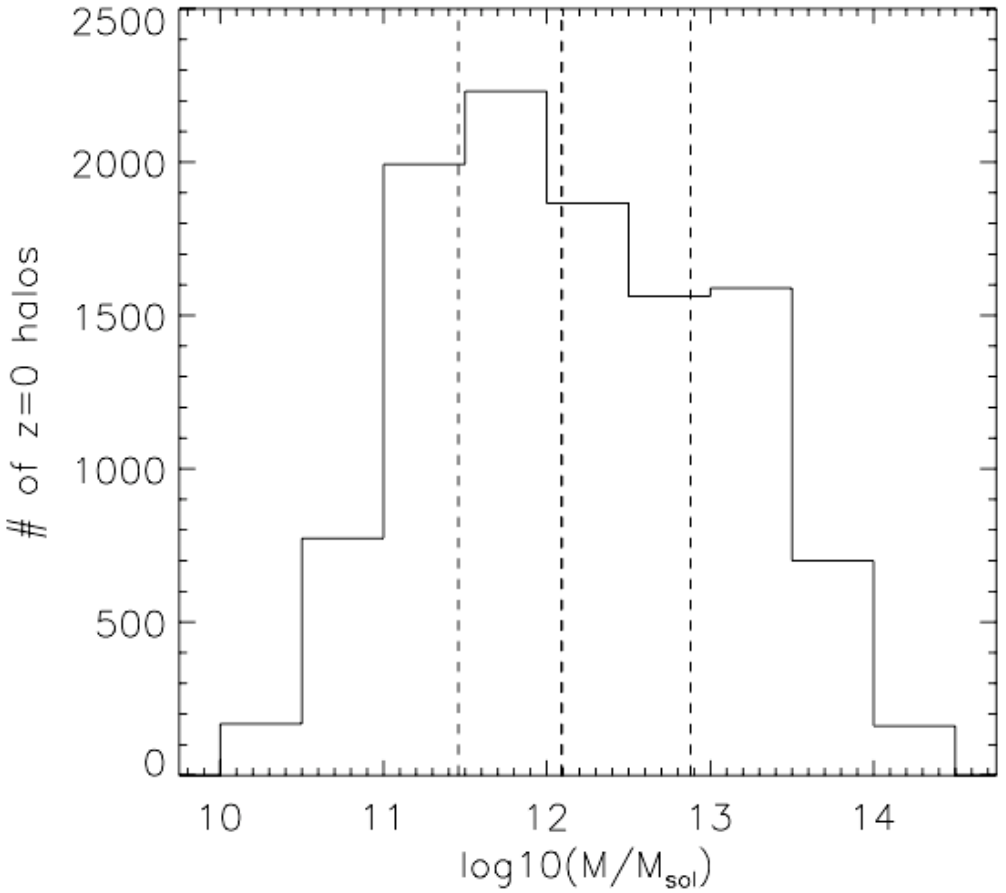
162 LAE candidates

Clustering analysis by Harold Francke

LAEs at z=3.1 evolve into ~L* galaxies at z=0

(Gawiser et al. 2007, ApJ 671, 278)





Related recent results:

Lyman Alpha Emitter Luminosity Function:

Gronwall et al. 2007, ApJ 667, 79

SED Analysis of IRAC-Detected and IRAC-Undetected LAEs:

Lai et al. 2008, ApJ in press, arXiv:0710.3384

Clustering analysis of z=3 X-ray selected AGN and LBGs in MUSYC:

Francke et al. 2007, ApJL 673, L13

Conclusions

- Only 20% of LAEs meet the traditional LBG color+magnitude criteria. LAEs are dimmer and slightly bluer in the rest-frame optical.
- With low stellar masses ($M<10^9 M_\odot$), LAEs have the highest *specific* SFR of any galaxy population. This is consistent with the starburst age of 20 Myr inferred for the dominant population not detected by IRAC.
- Only 1% of LAEs at z=3.1 host AGN revealed through X-rays, high ionization emission lines, or IRAC colors.
- LAEs have dark matter halo masses of $\sim 10^{11} M_\odot$. They appear to evolve into ~L* galaxies today.

- MUSYC publications, July 2007 public data release: www.astro.yale.edu/MUSYC