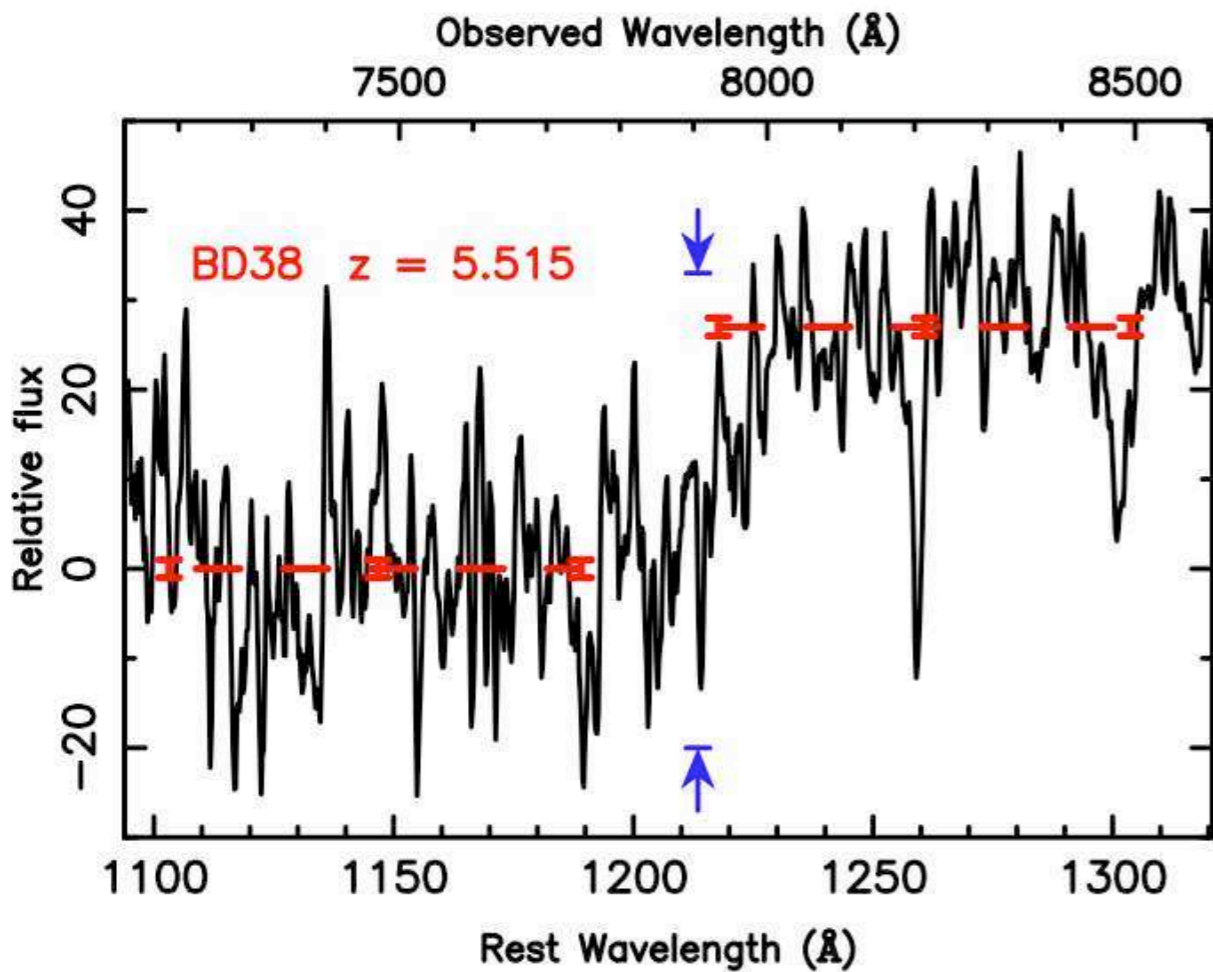


Spectroscopic Follow-up of $z \sim 6$ Galaxies

Bradford Holden
UCSC - UCO/Lick Observatory

Rychard Bouwens, Garth Illingworth,
Arjen van der Wel, Andrew Zirm

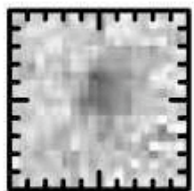
I-Dropouts



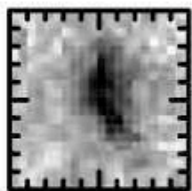
Not very photogenic.

Imaging: Flux and Size

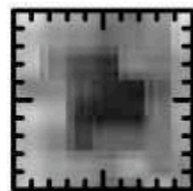
Spectra: Redshift, LyA emission



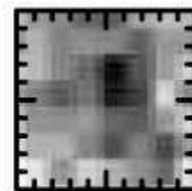
i_{775} 25.8



z_{850} 24.3



ISAAC J 24.1



ISAAC K 23.8

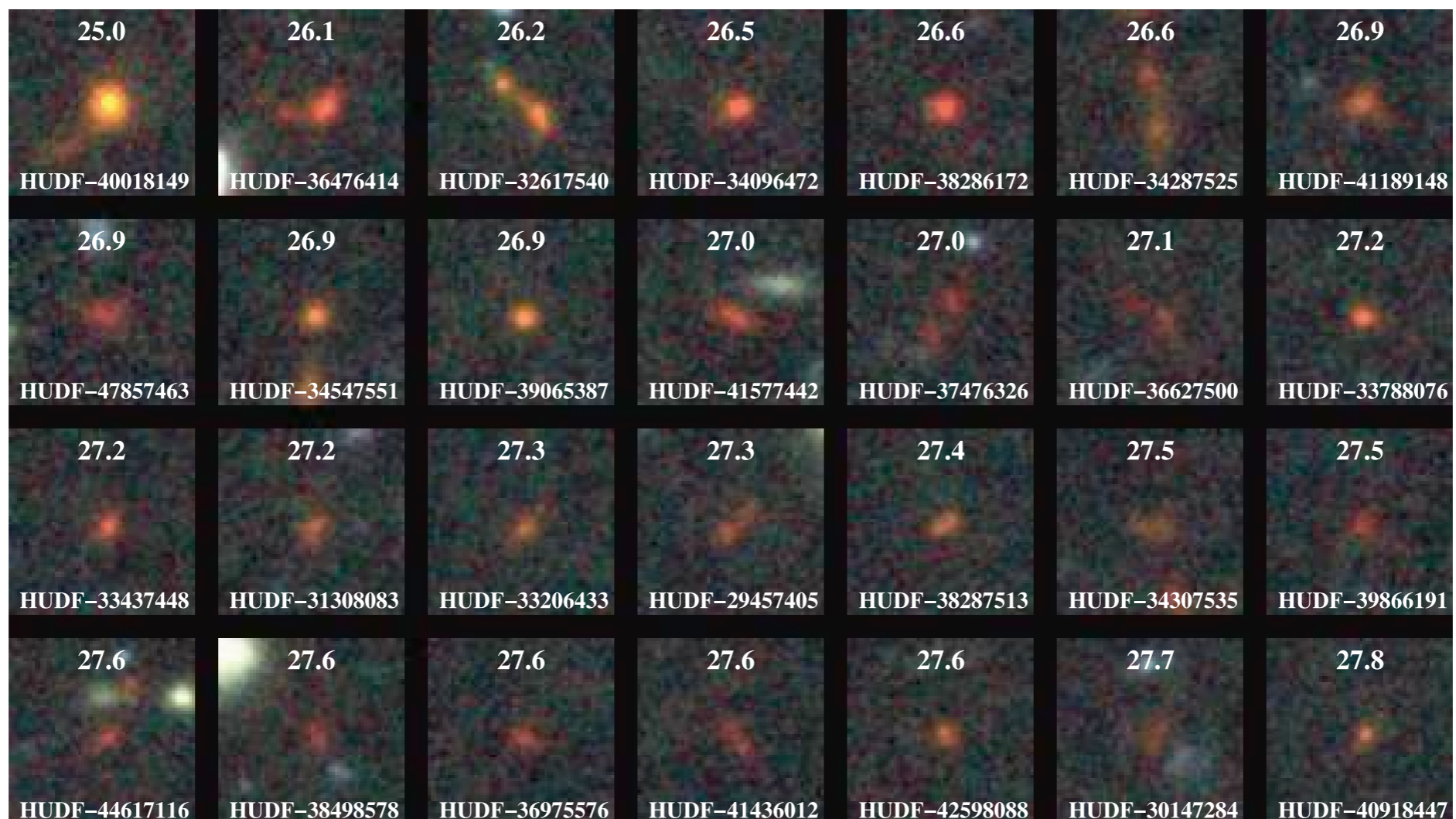
I-Dropout Spectra

What can we learn?

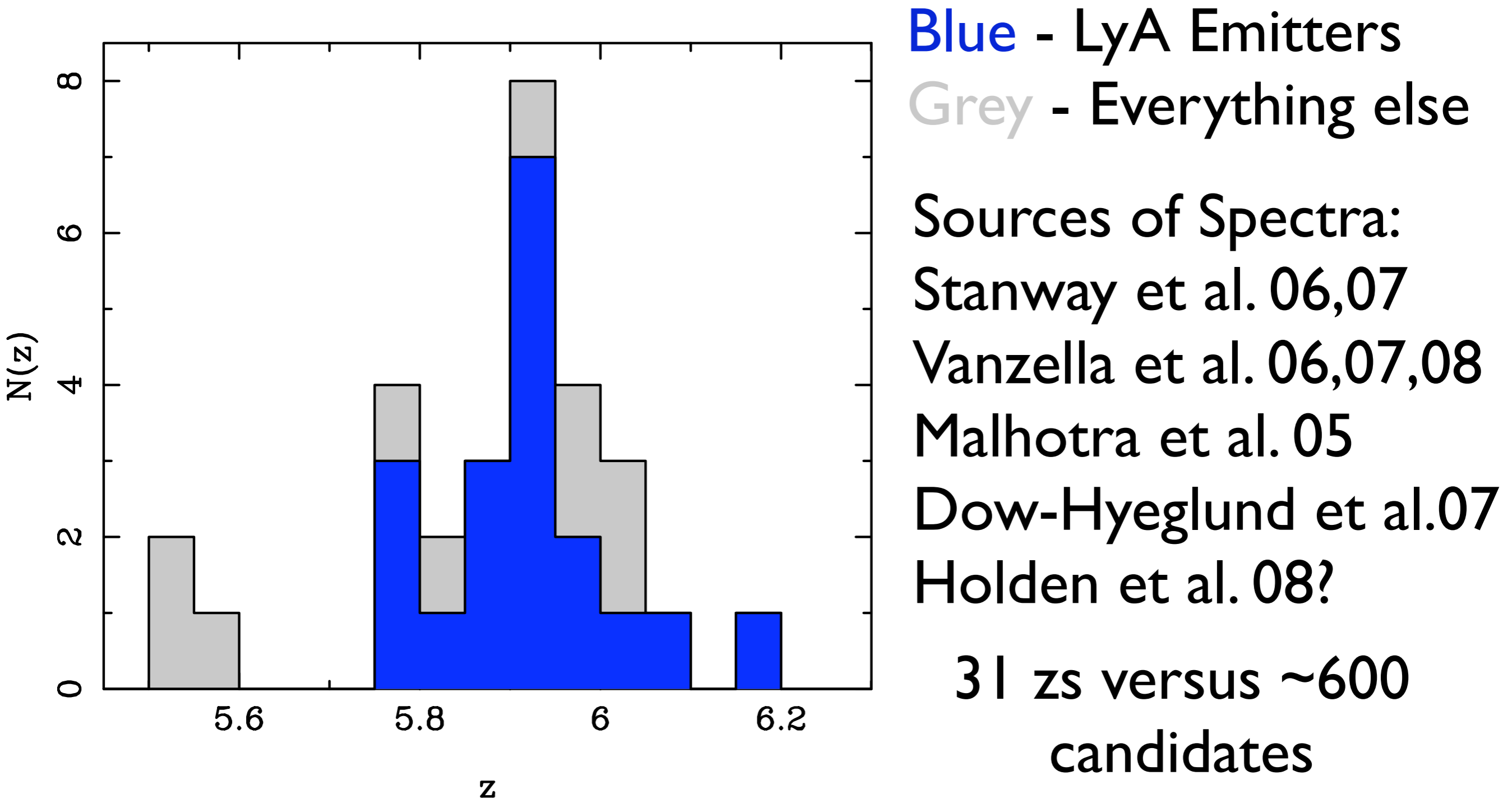
- Redshift Distribution
- Fraction of the Star-forming Population with Lyman alpha emission (LAEs)
- Is there a physical difference between star-forming galaxies with different spectral properties?

I-Dropouts

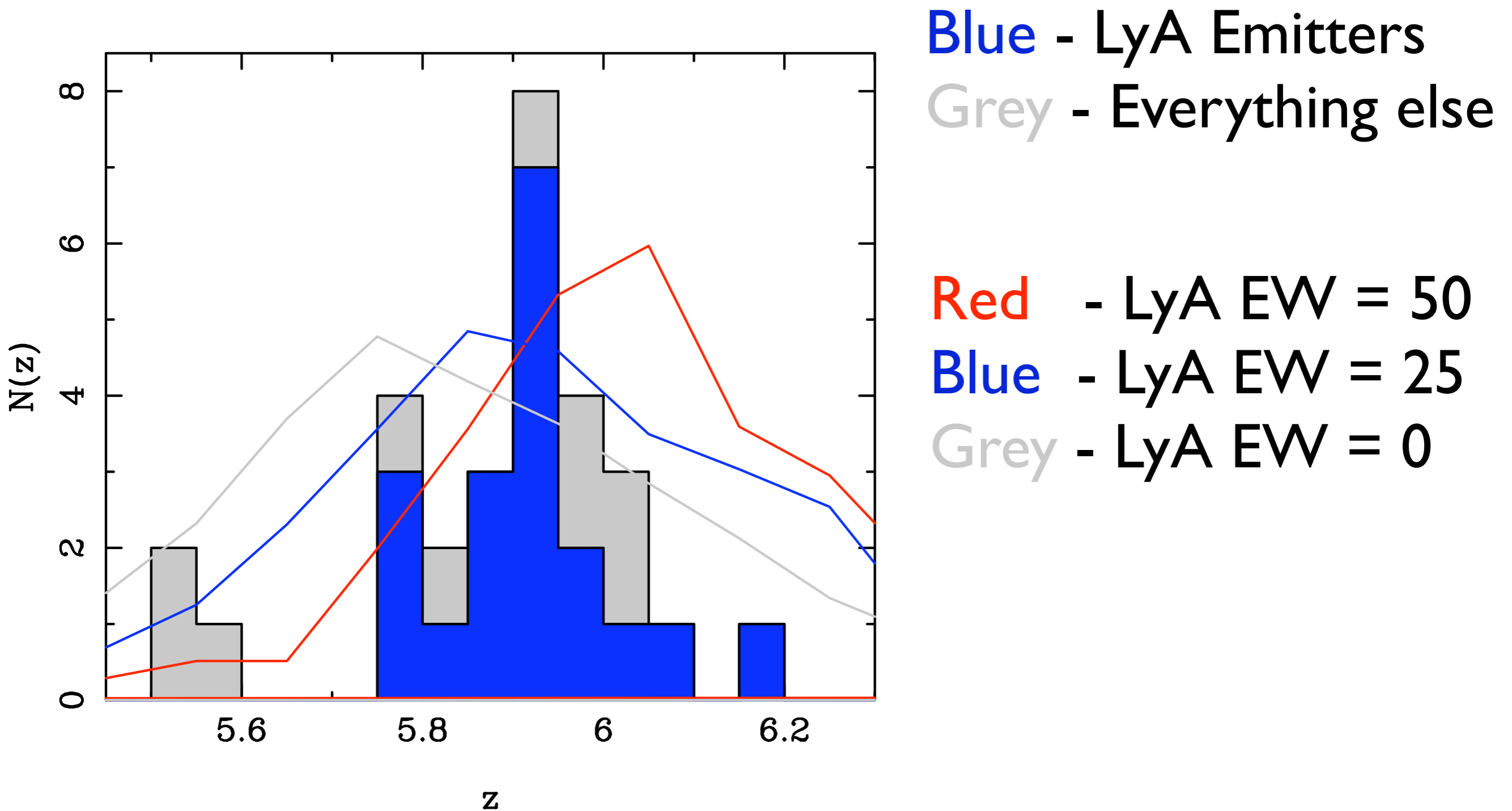
Parent Sample: Bouwens et al. 03, 07
CDFs and CLI 252-2927



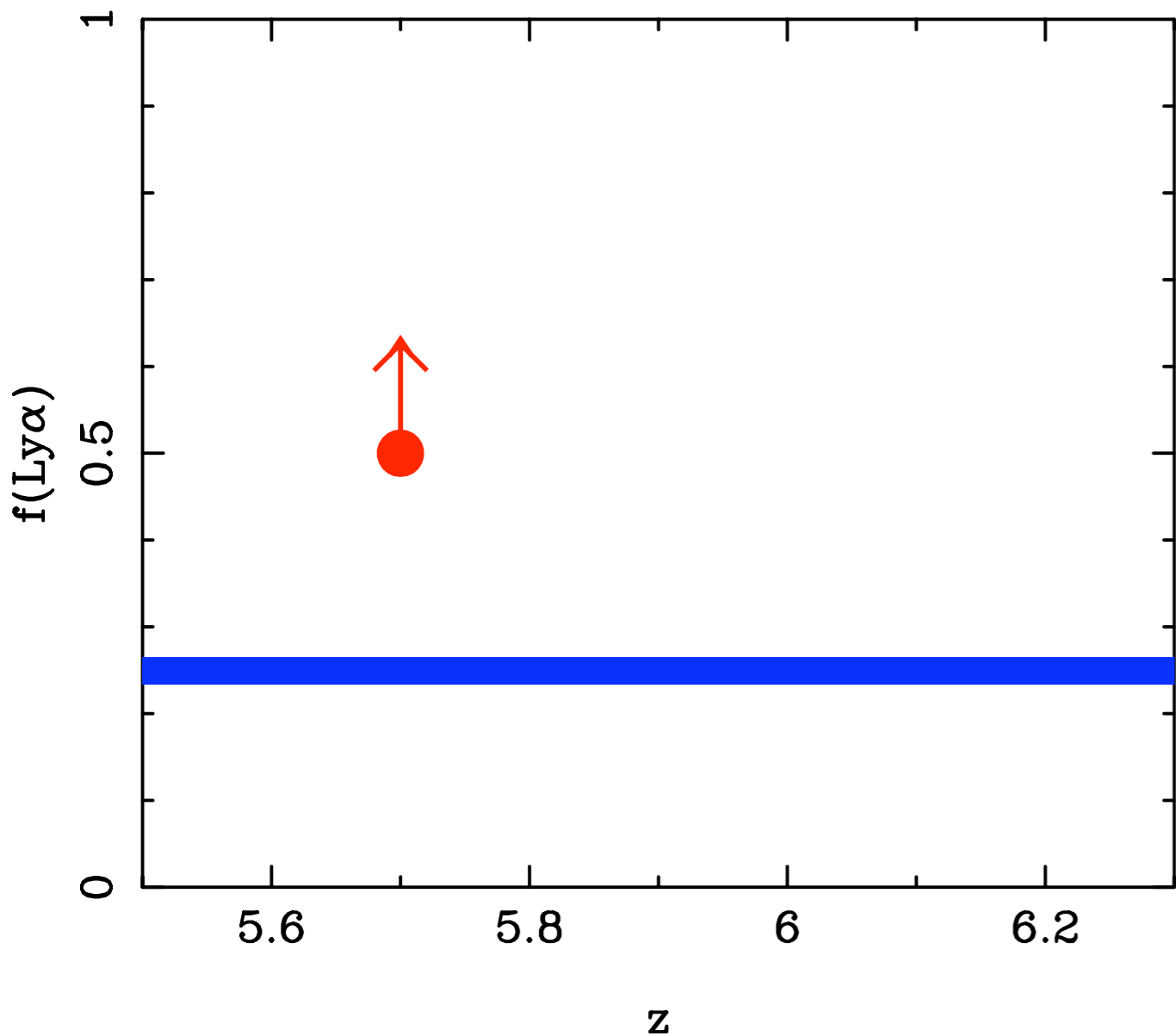
I-Drop Redshift Distribution



I-Drop Redshift Distribution



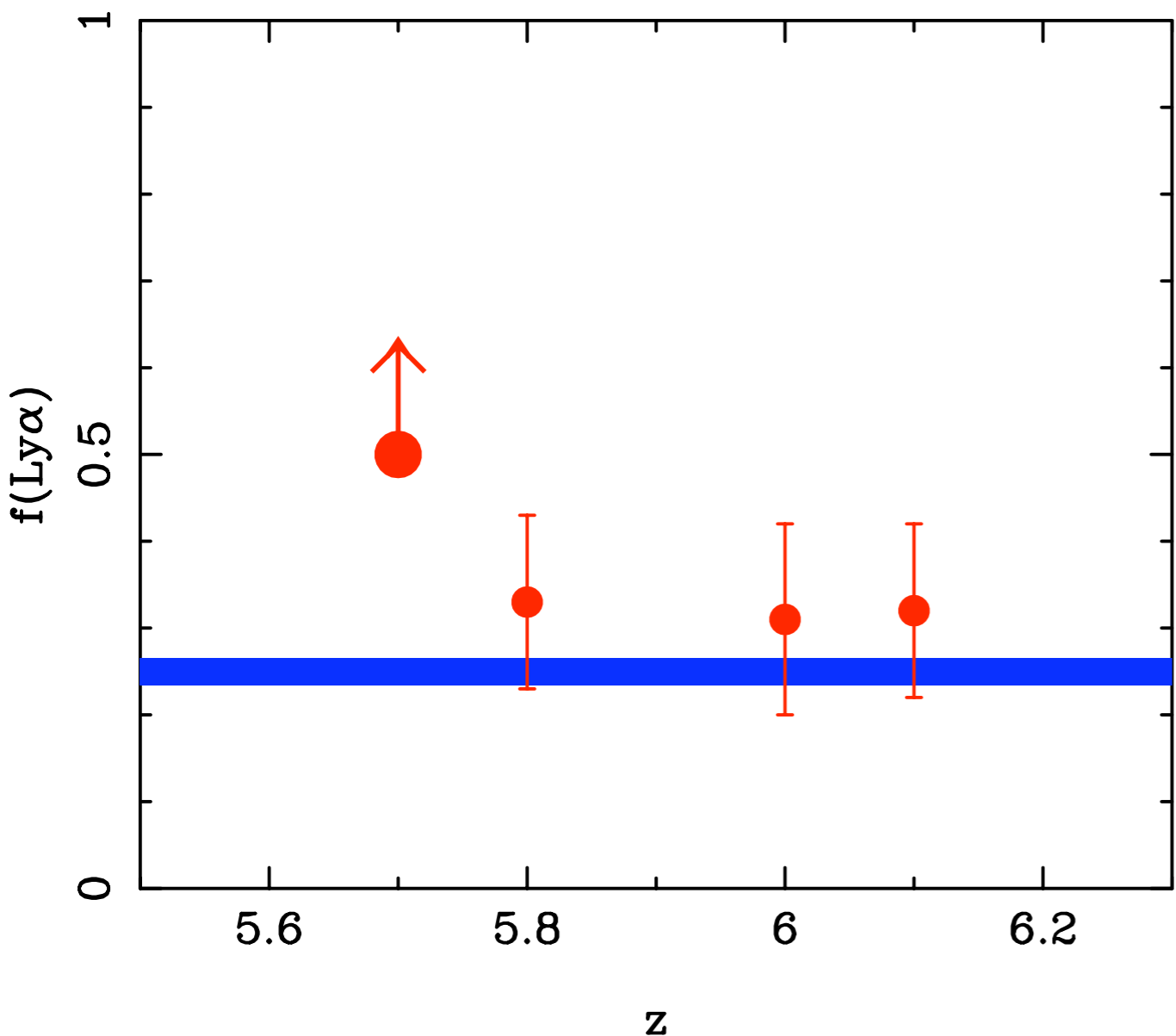
Fraction of LAEs in the I-Drop Population



Red Arrow -
fraction of emitters
from LyA surveys
Ouchi et al. 08

Blue - Shapley 03,
 $z=3$ LAE fraction
of LBG population

Fraction of LAEs in the I-Drop Population



Red Arrow -

Ouchi et al. 08

Blue - Shapley 03

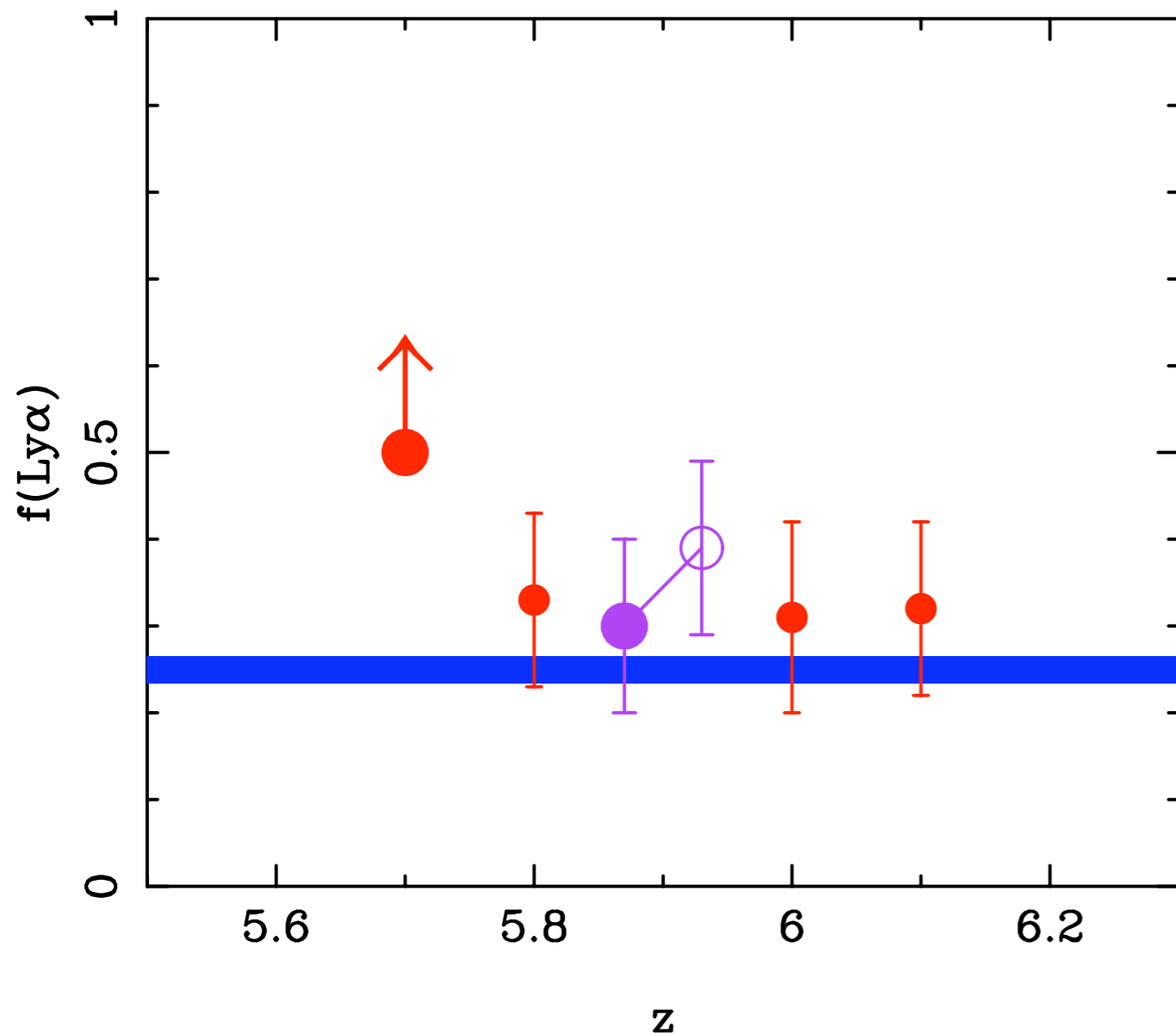
Red Points -

Stanway et al. 06, 07

Vanzella et al. 06

Dow-Hygelund 07

Fraction of LAEs in the I-Drop Population



Purple - Our New Data and Analysis

Red Arrow - Ouchi et al. 08

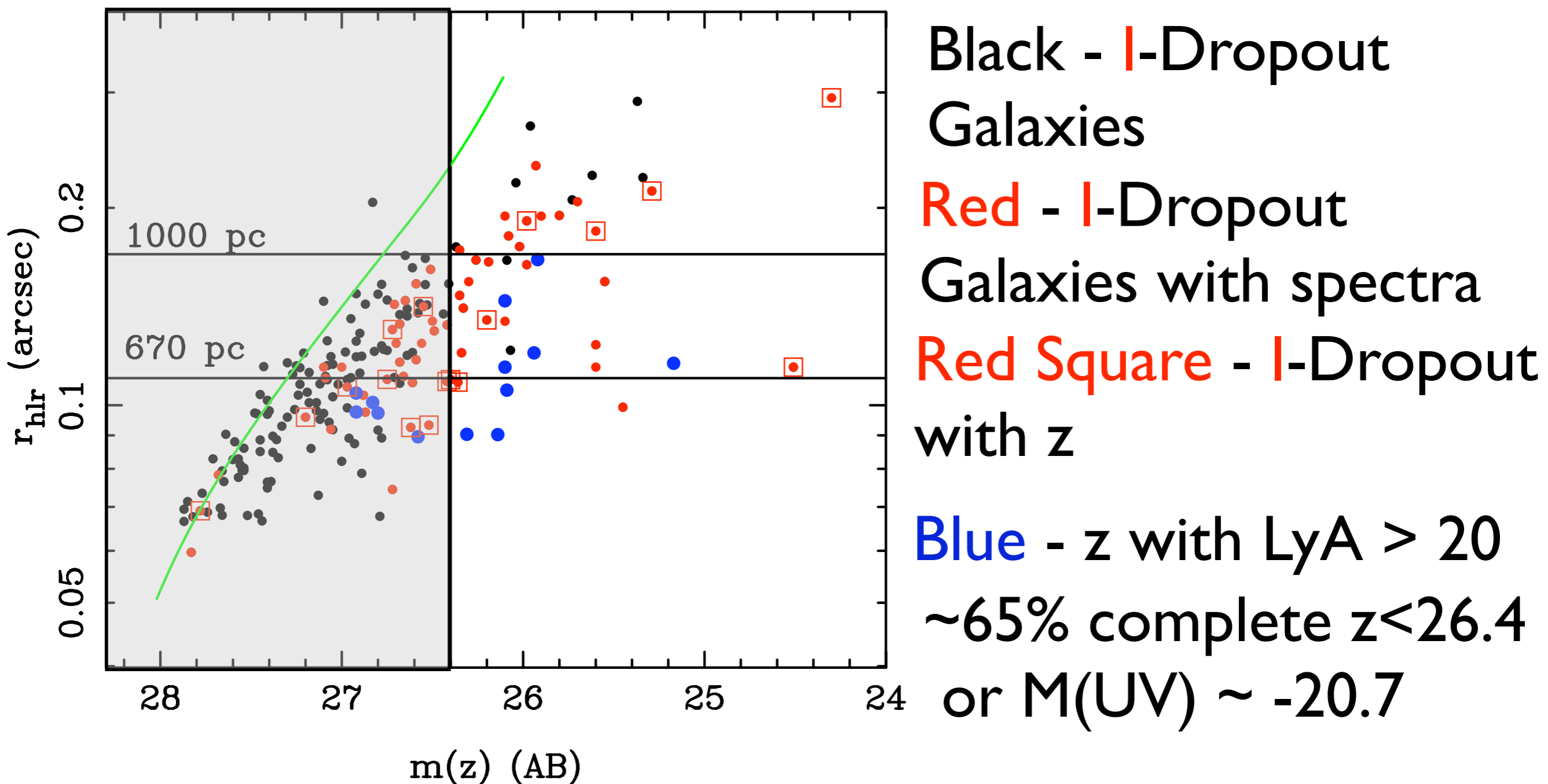
Blue - Shapley 03

Red Points - Stanway et al. 06, 07
Vanzella et al. 06
Dow-Hygelund 07

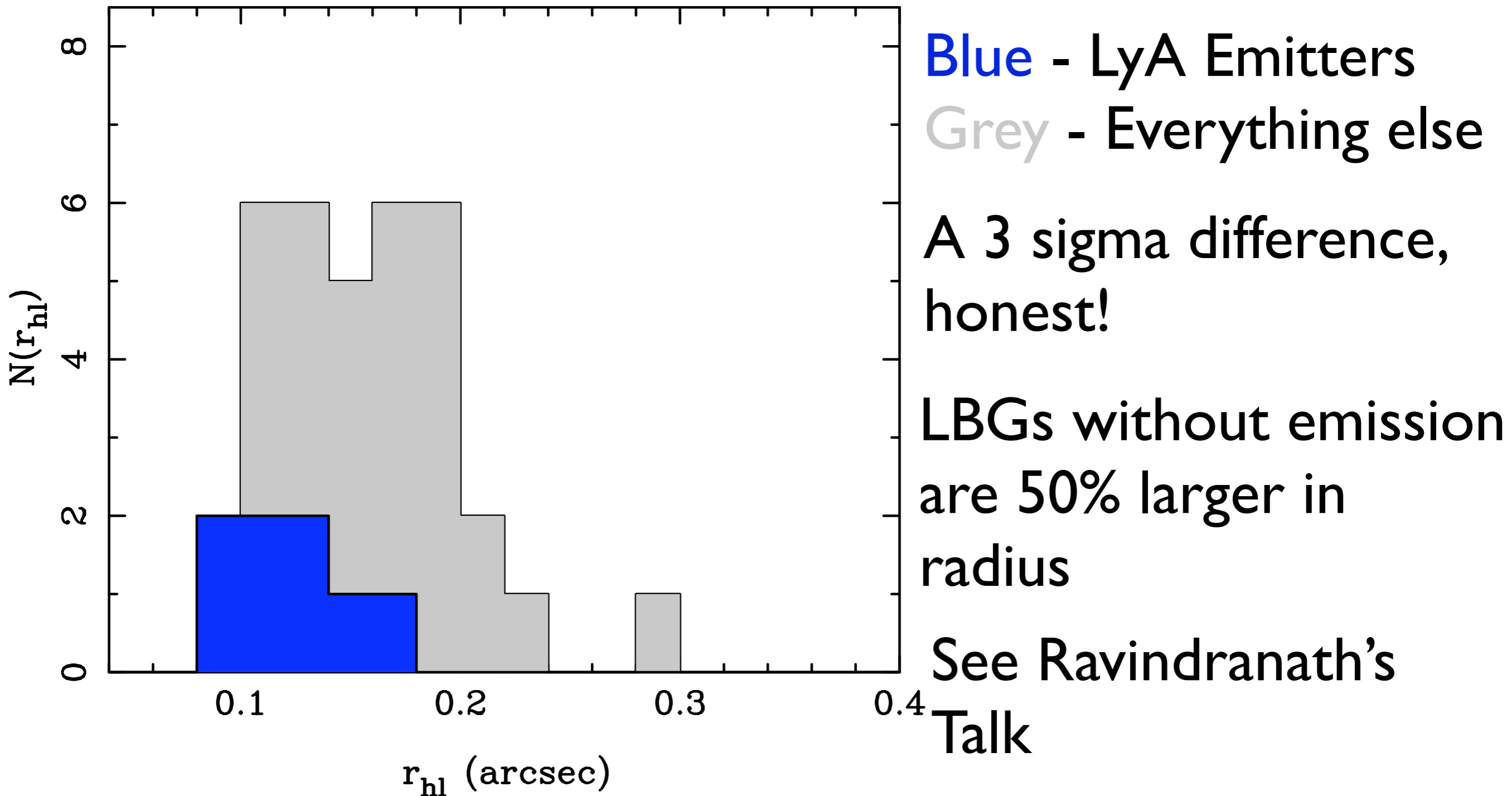
Can we reconcile these results?

- Large error bars
- Cosmic Variance - **But** two different fields 130 degrees apart have the same fraction
- Clumpiness in the IGM or ISM (cf. Brenda's talk or Simona's talk)

Beyond A Flux and a Z....



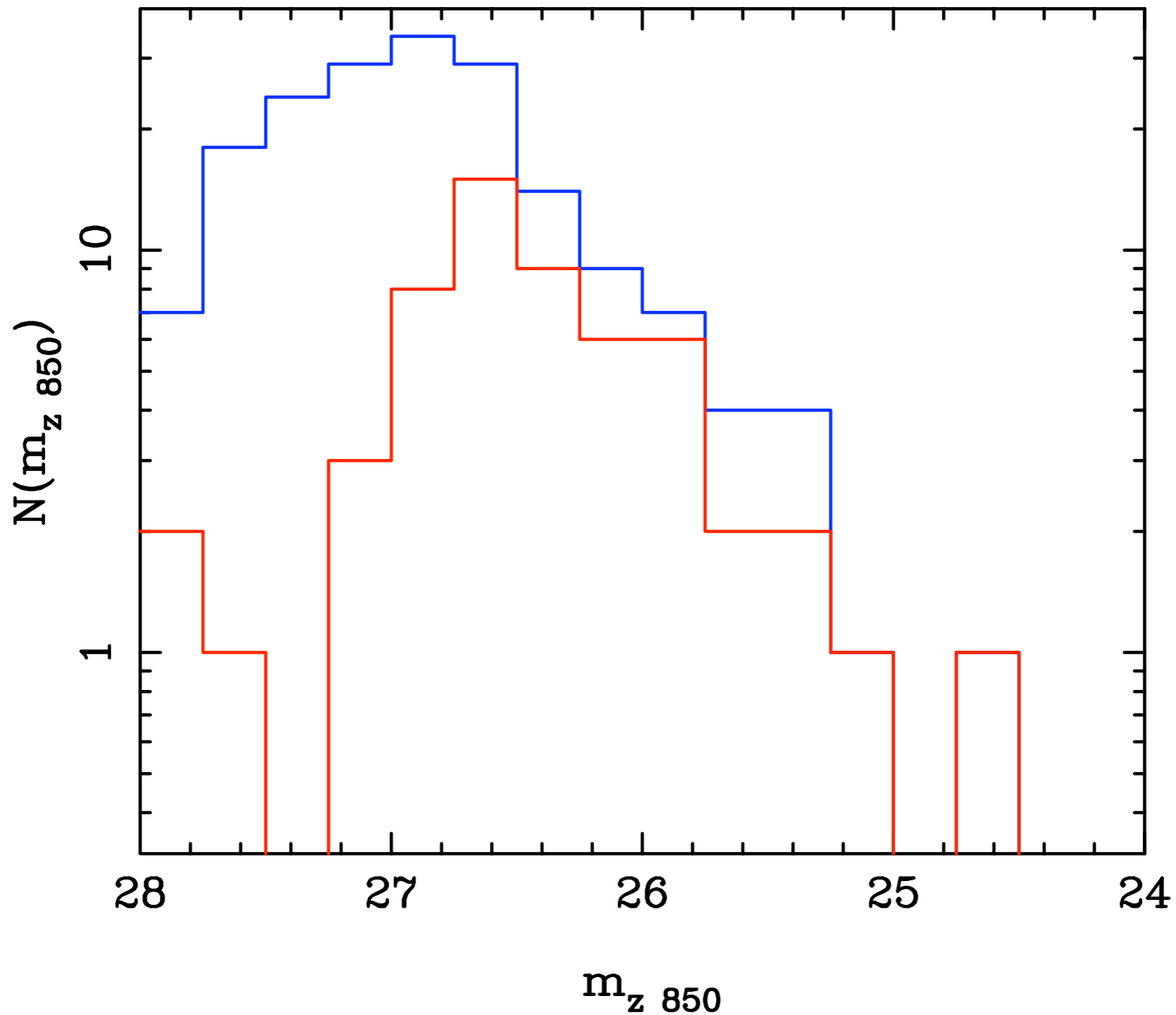
A Physical Difference?



Summary

- I-Dropout galaxies are $z \sim 6$ star forming systems
- The fraction of strong LAEs does not seem to change strongly in the LBG population, 5-15 +/- 10% increase between $z \sim 3$ and $z \sim 6$
- The LAE population of LBGs appears physically smaller, - see possibly reflecting lower masses or compact star-forming regions

Completeness of Sample



Fraction of Emitters: The Issues

- Apples to apples comparison (not grapes to pairs) - Must compare objects with same UV luminosity
- Must compare same EW
- Must include the same redshift range