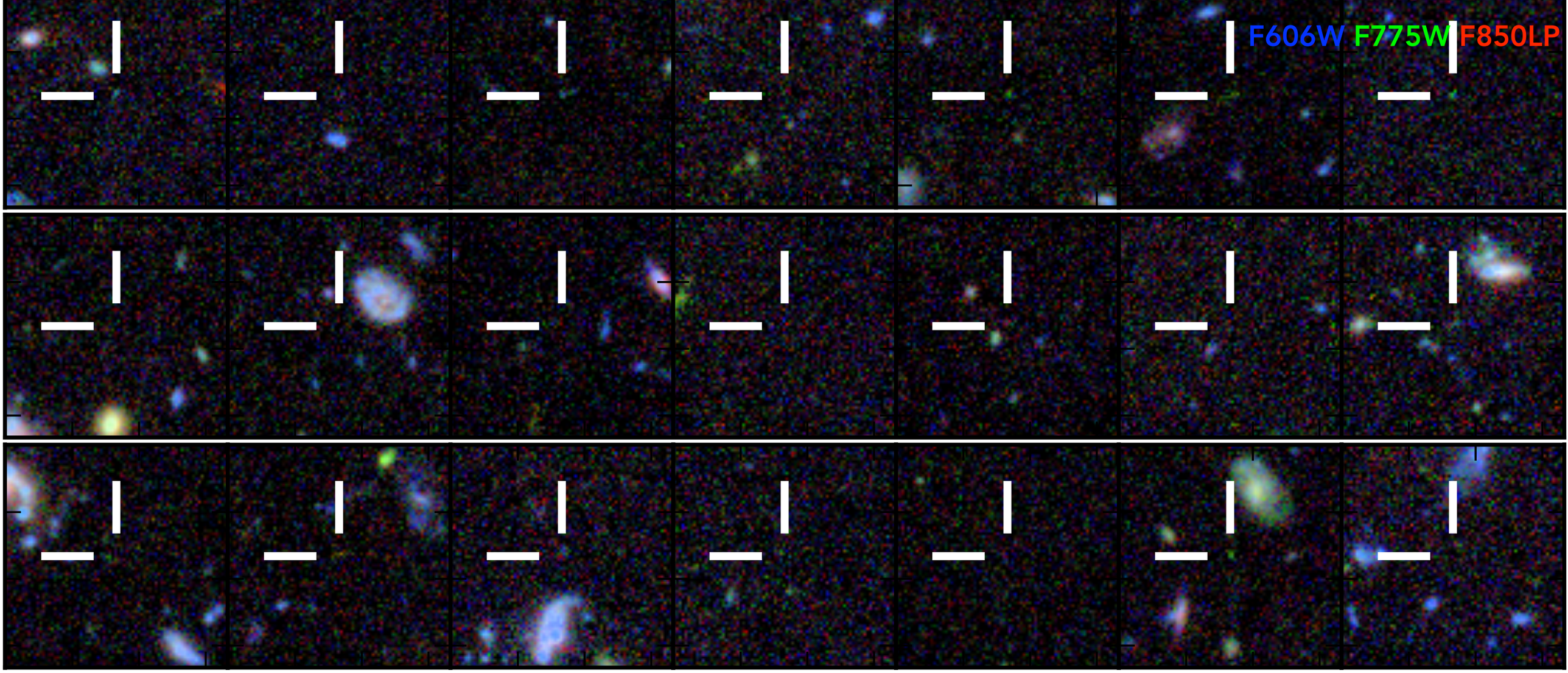
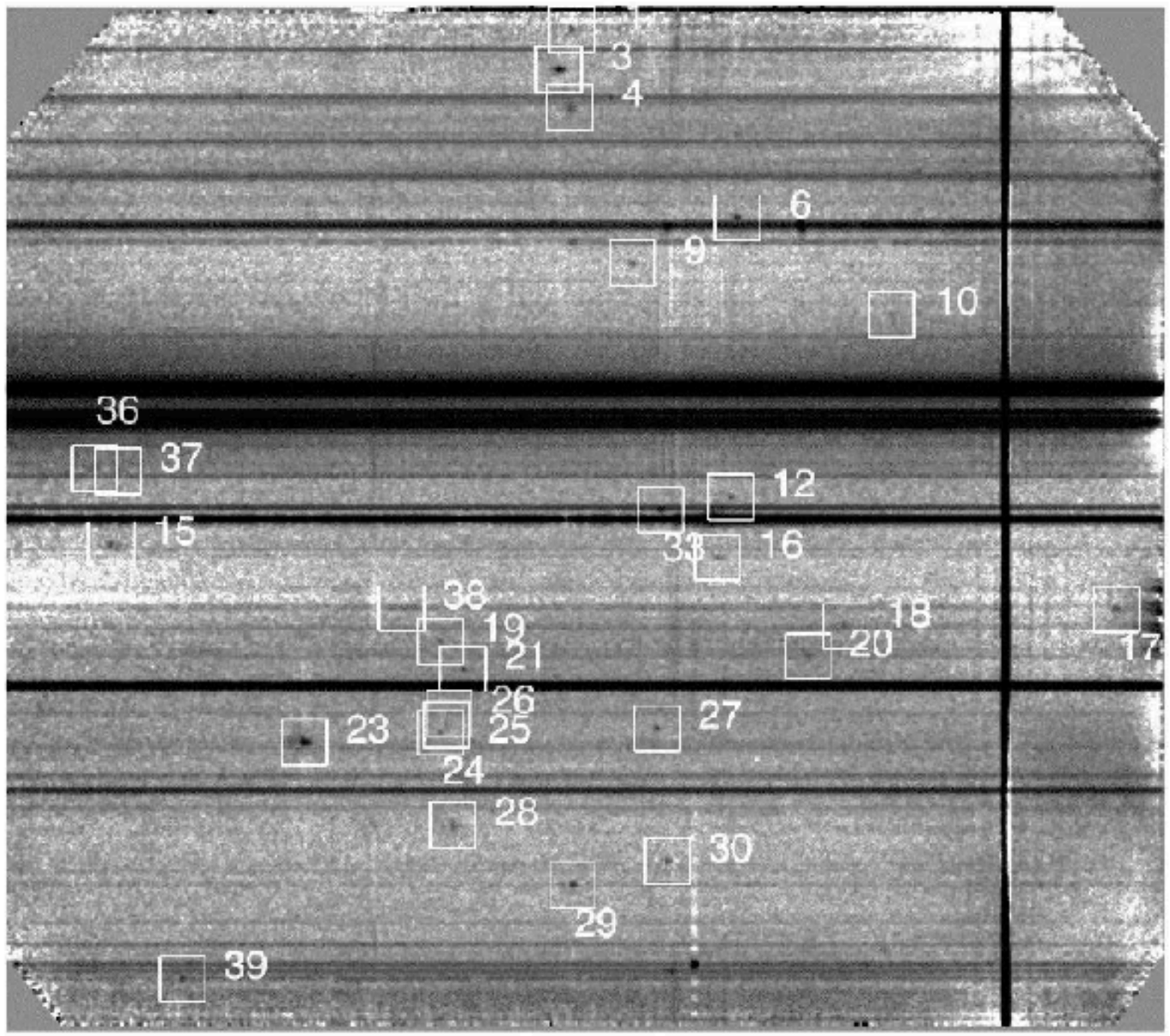



# Lyman-$\alpha$ Emitters with no HST Counterpart

*Michael Maseda (Leiden), Roland Bacon, Marijn Franx, and the MUSE GTO Team*

# HOW WE GOT HERE

- MUSE is fantastic, because before we had to do things like this:



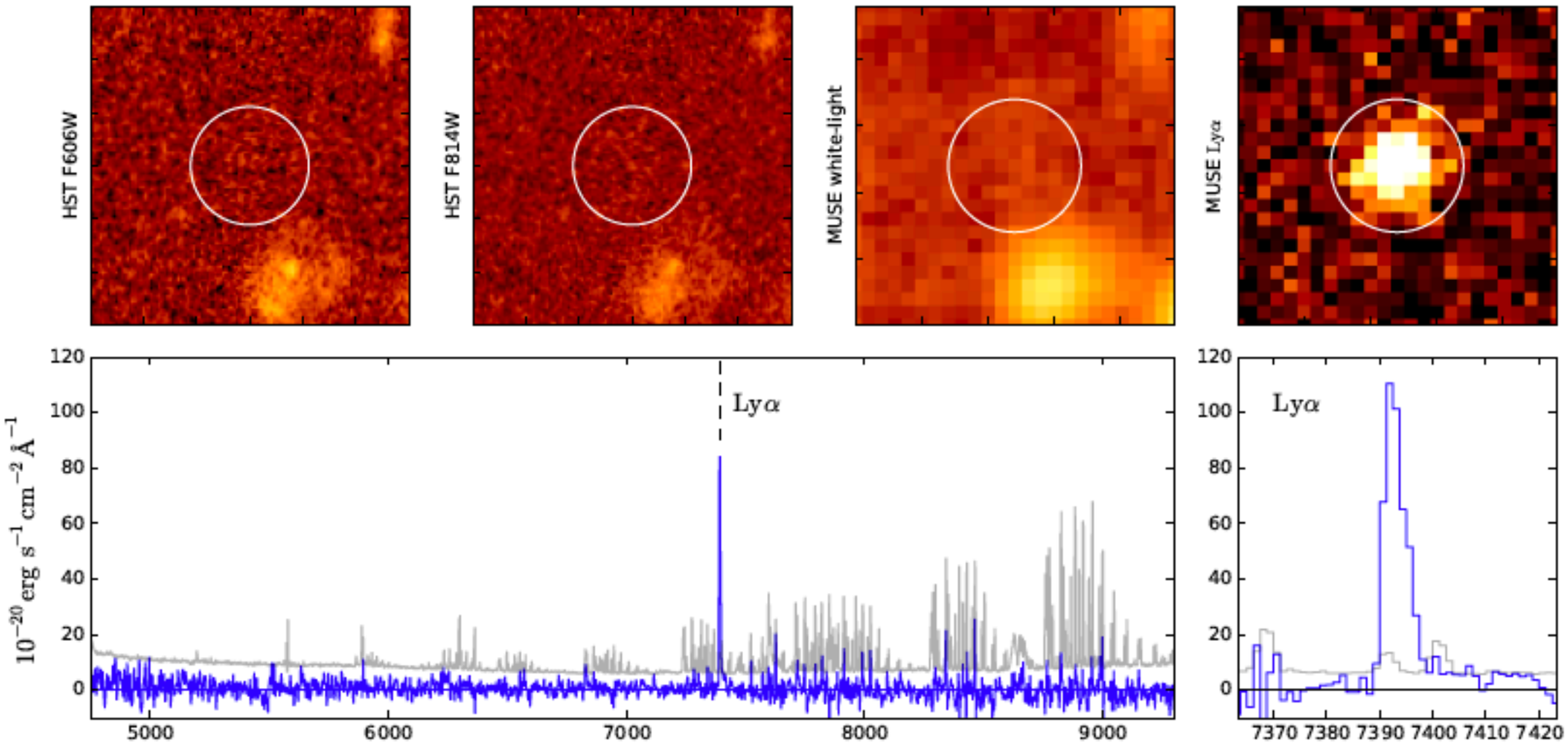

Rauch+08

(92h FORS2)

# HOW WE GOT HERE

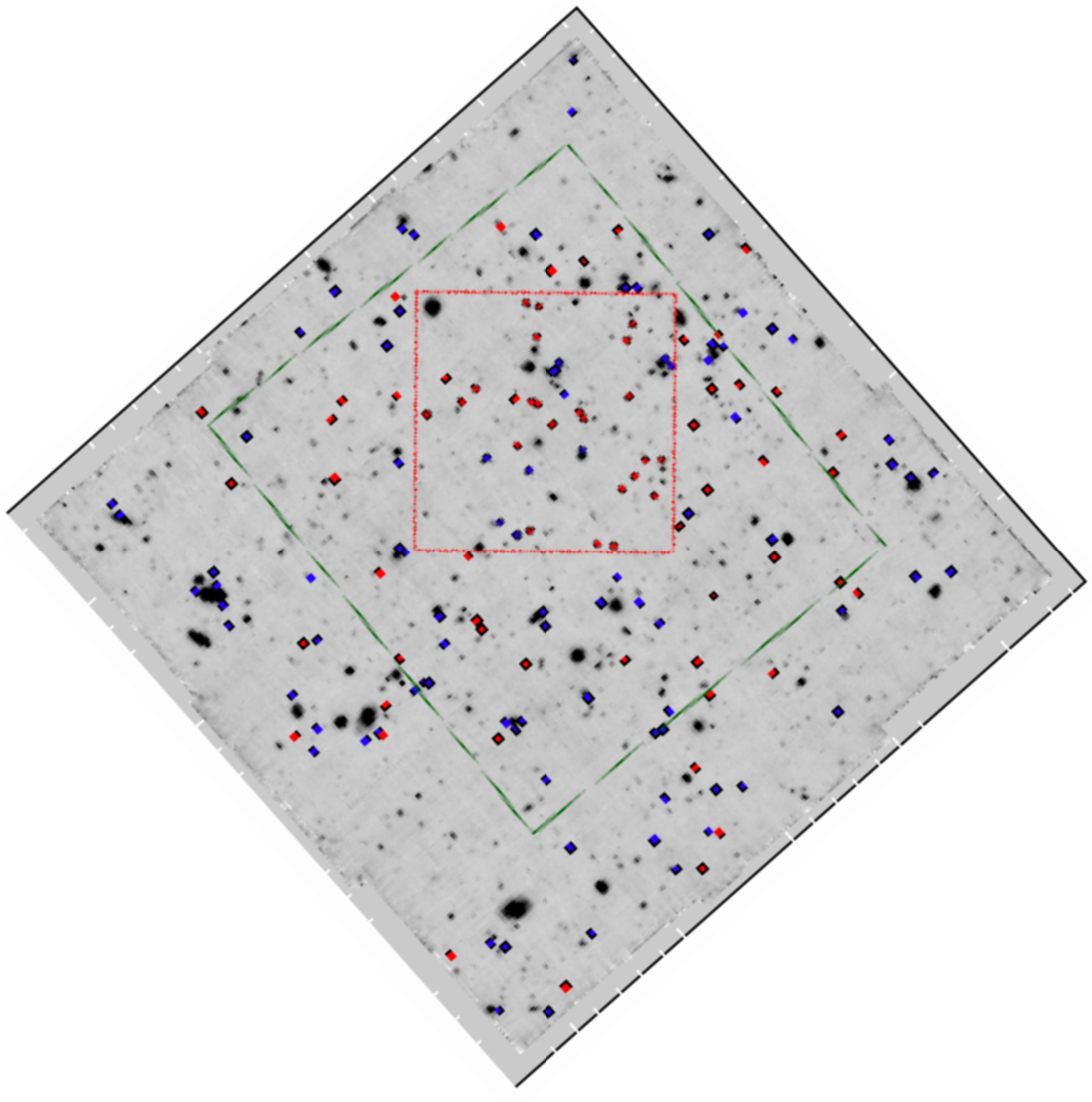
➤ Bacon+15:

Note that we have found several even fainter line emitters that have no HST counterpart. However, because of their low S/N, it is difficult to firmly identify the emission line and they have therefore been discarded from the final catalogue.



# HOW WE GOT HERE

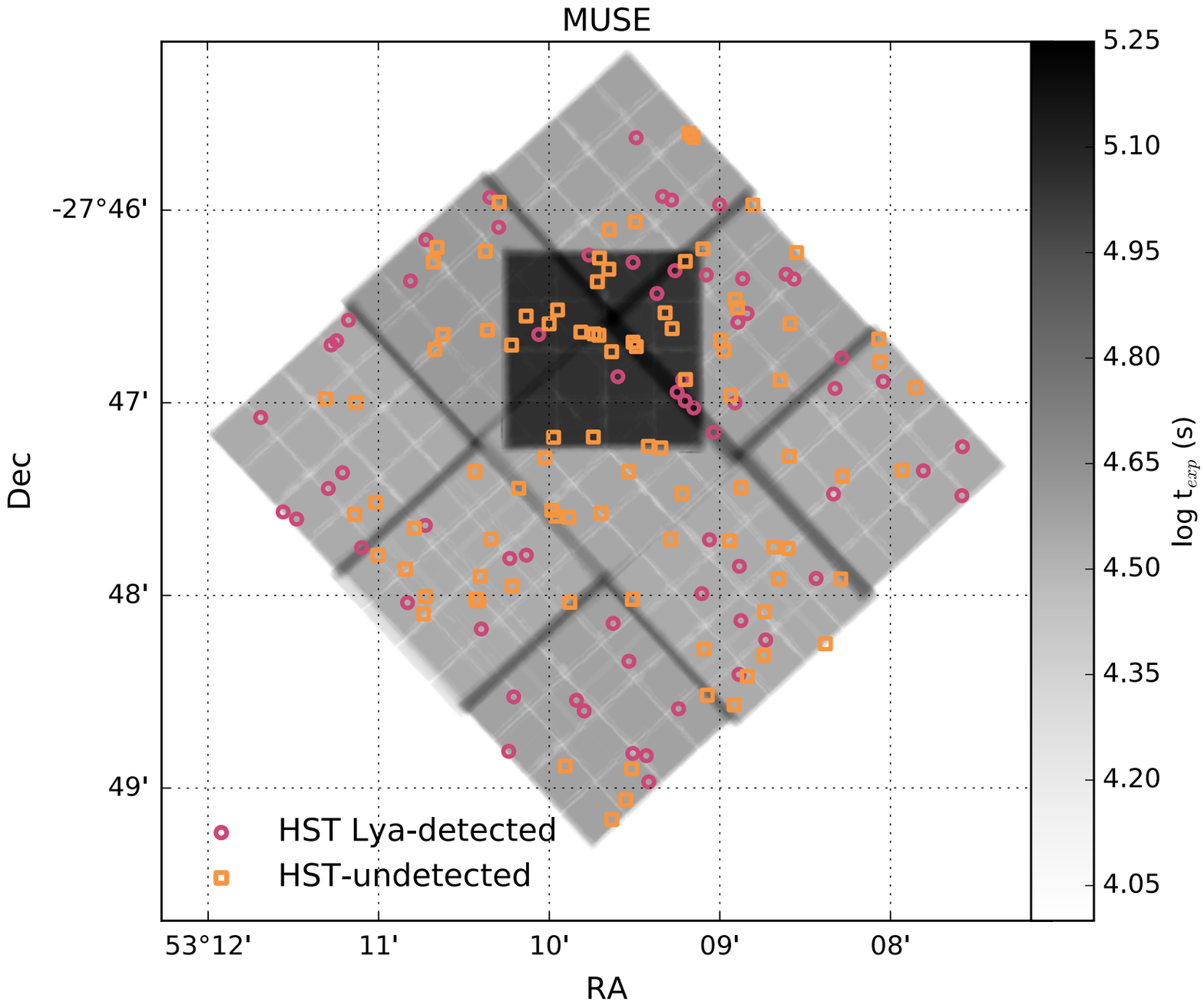
- Bacon+17: 72 “HST-undetected” LAEs in the UDF



| Filter | $\overline{\mathrm{AB}}$ | $\mathrm{AB}_{5\sigma}$ |
|---|---|---|
| F606W | 31.8 ± 1.1 | 29.6 |
| F775W | 31.3 ± 1.3 | 29.5 |
| F850LP | 31.0 ± 1.4 | 28.9 |
| F105W | 31.3 ± 0.9 | 30.1 |
| F125W | 31.1 ± 0.6 | 29.7 |

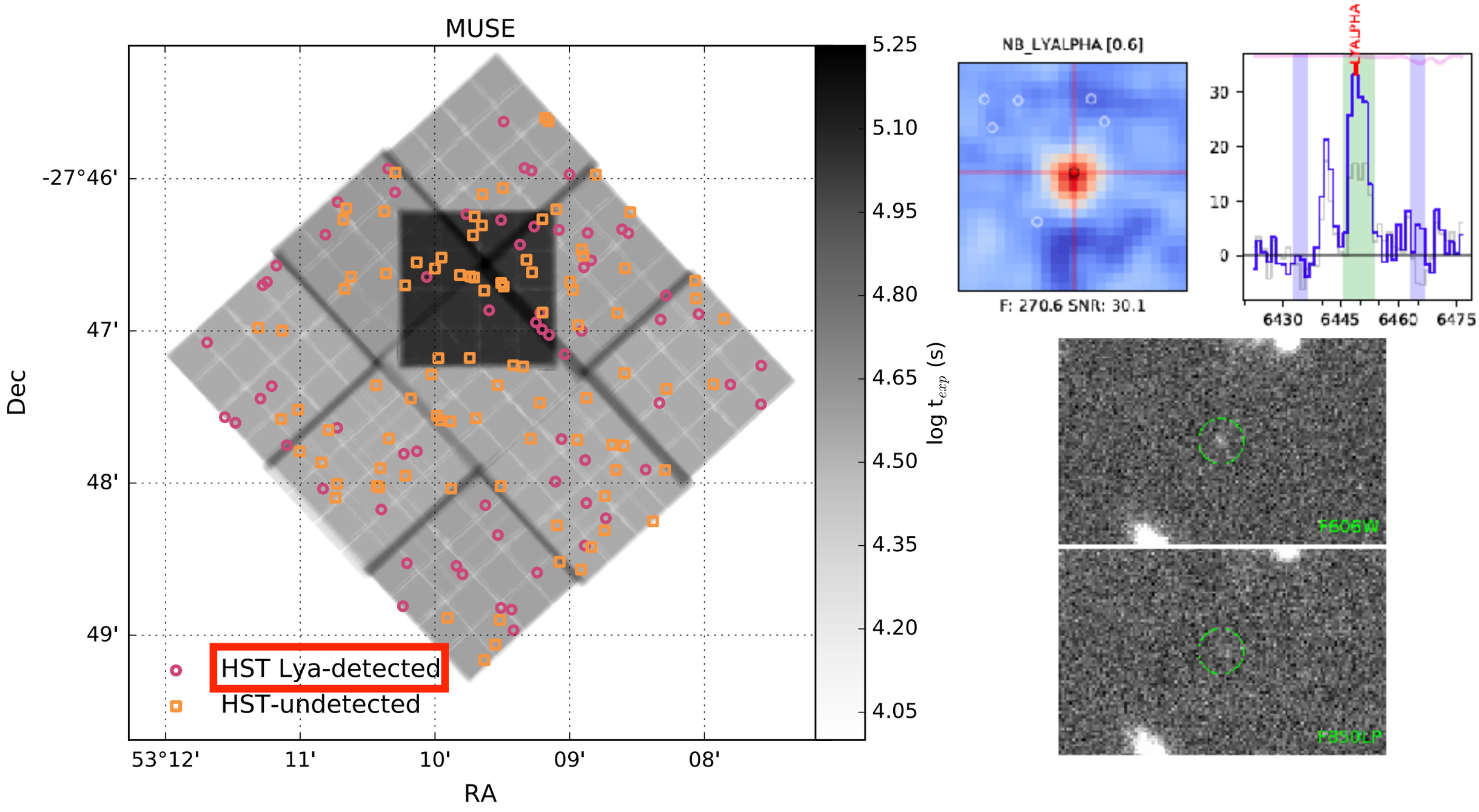
# HOW WE GOT HERE

- Maseda+18: 155 “high-EW” LAEs in the UDF



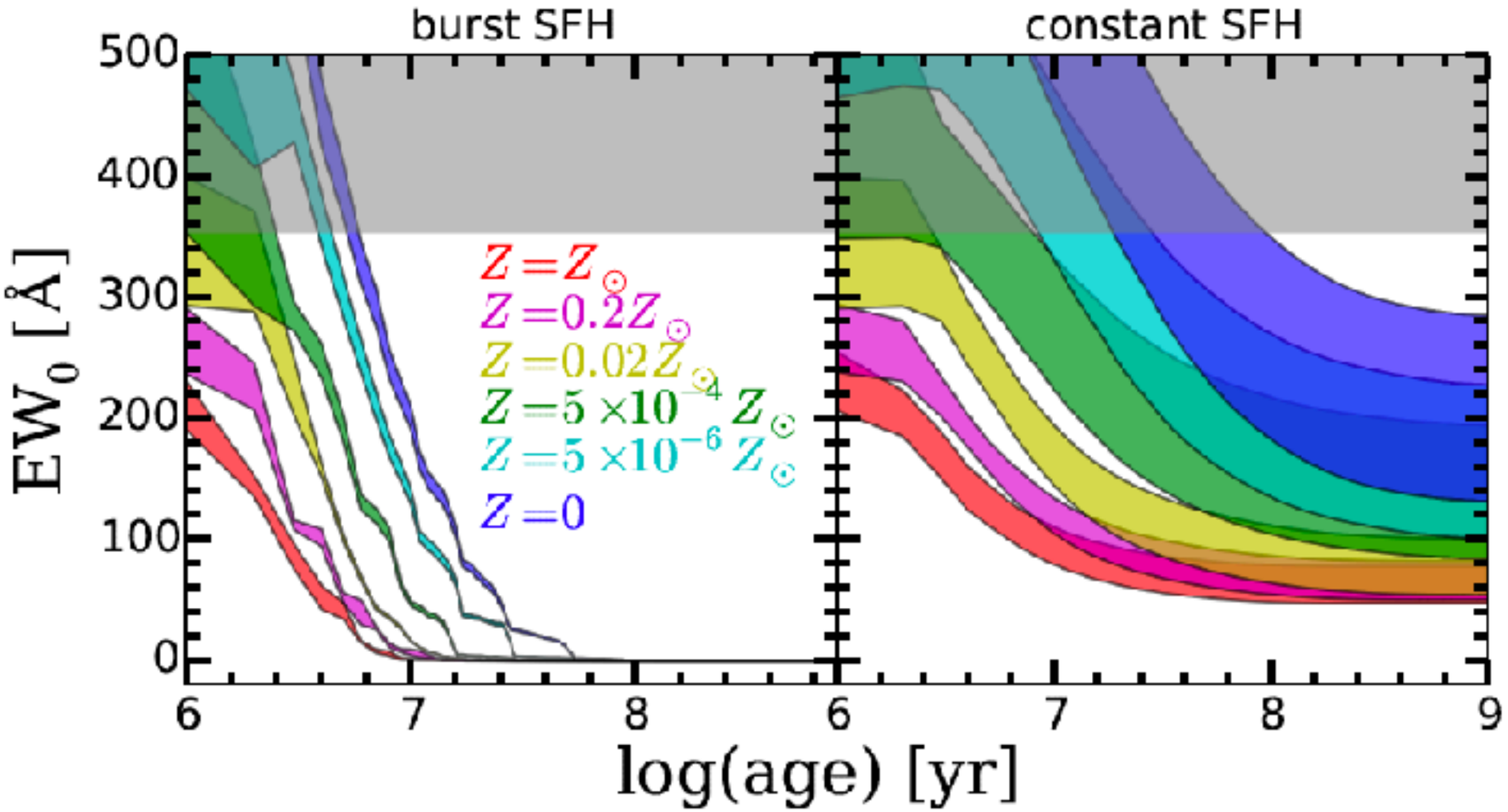
# HOW WE GOT HERE

- Maseda+18: 155 “high-EW” LAEs in the UDF



# WHY ARE THESE SOURCES POTENTIALLY INTERESTING?

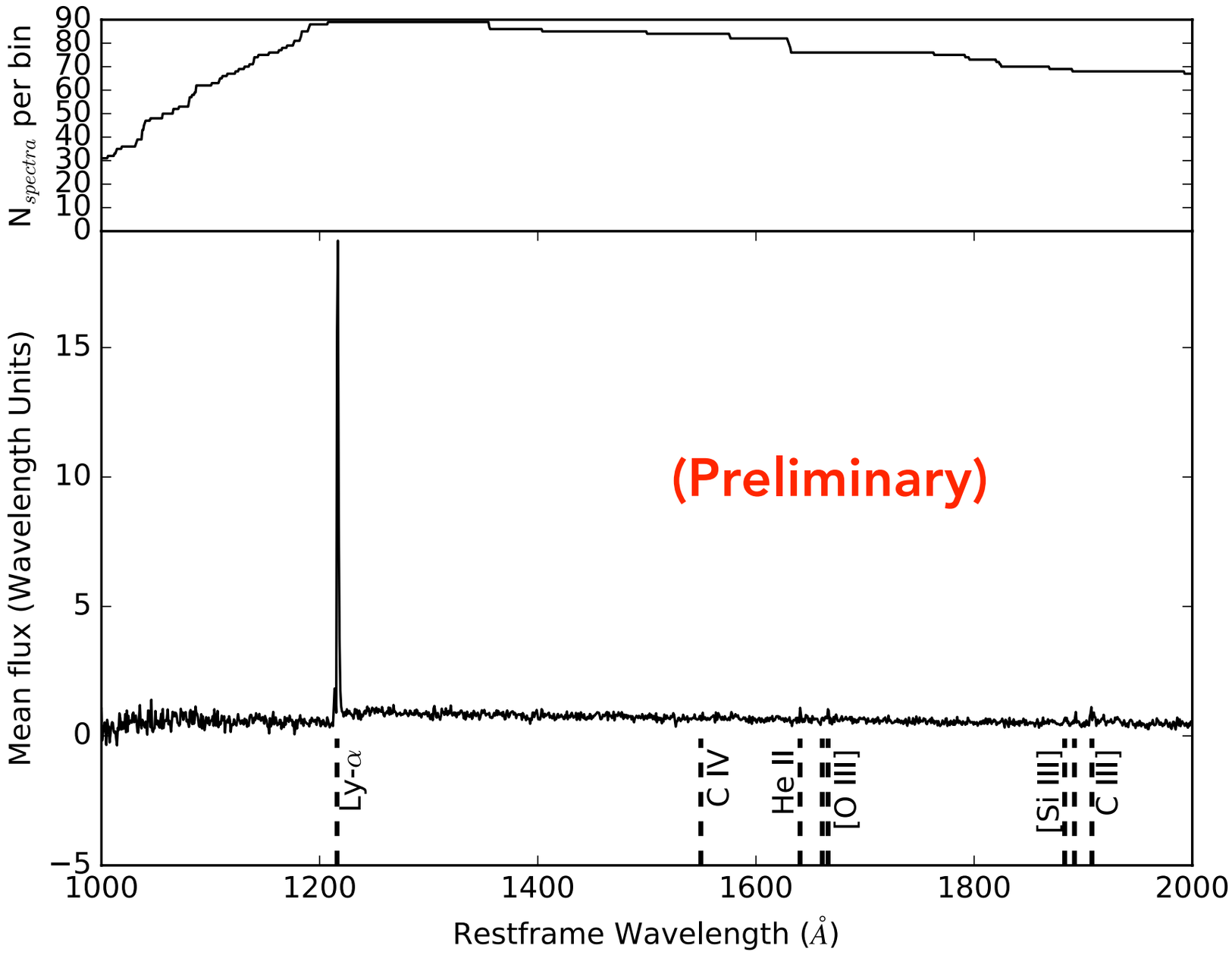
- Plausibly high-EW LAEs (> 200 Å)
  - Can only occur with young ages (< 10 Myr), very low metallicities, and/or top-heavy IMFs




Hashimoto+17a

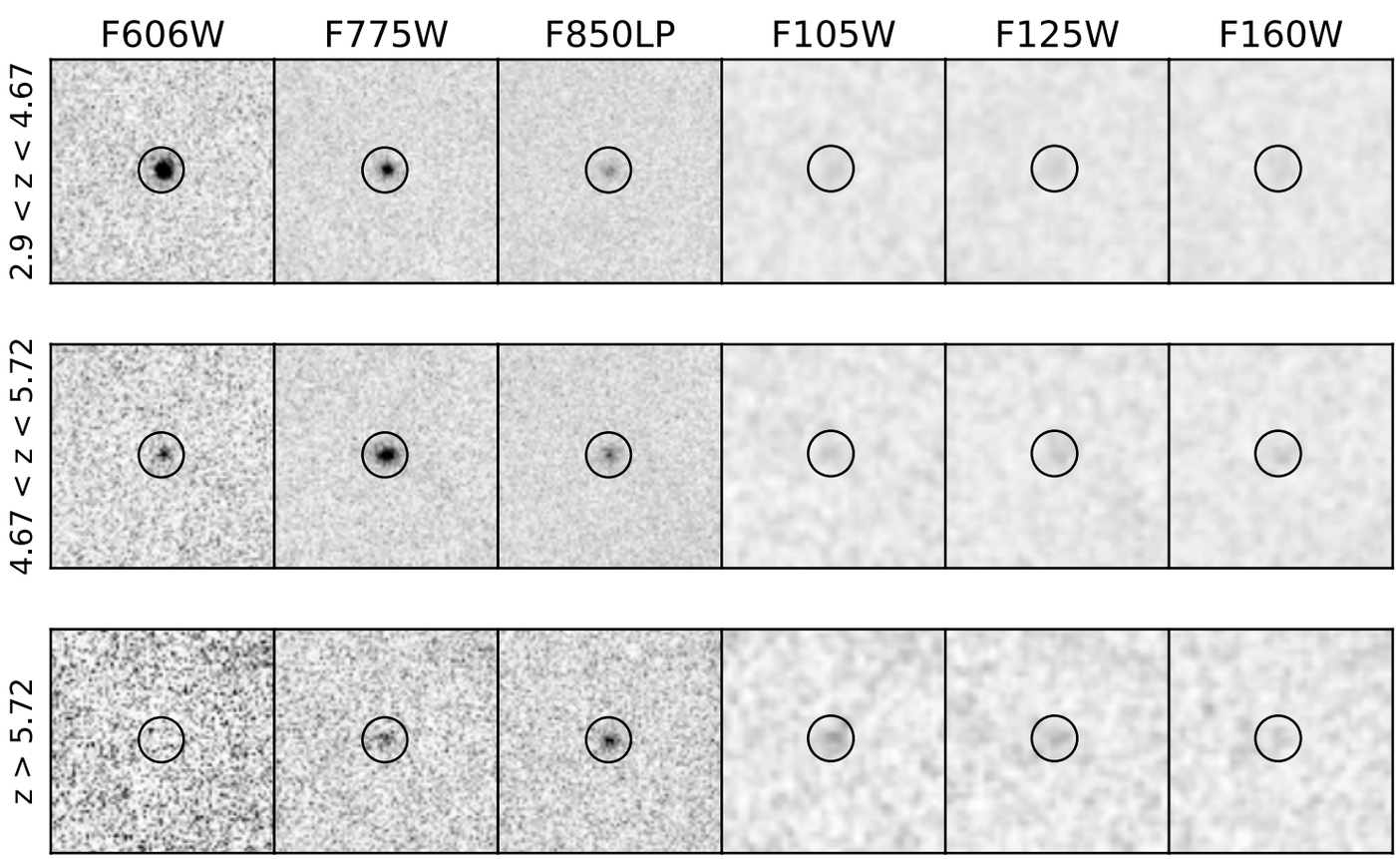
# SPECTRAL STACKS

- Using correction from $z_{Ly\alpha}$ to $z_{sys}$ using $FWHM_{Ly\alpha}$ (Verhamme+ submitted)



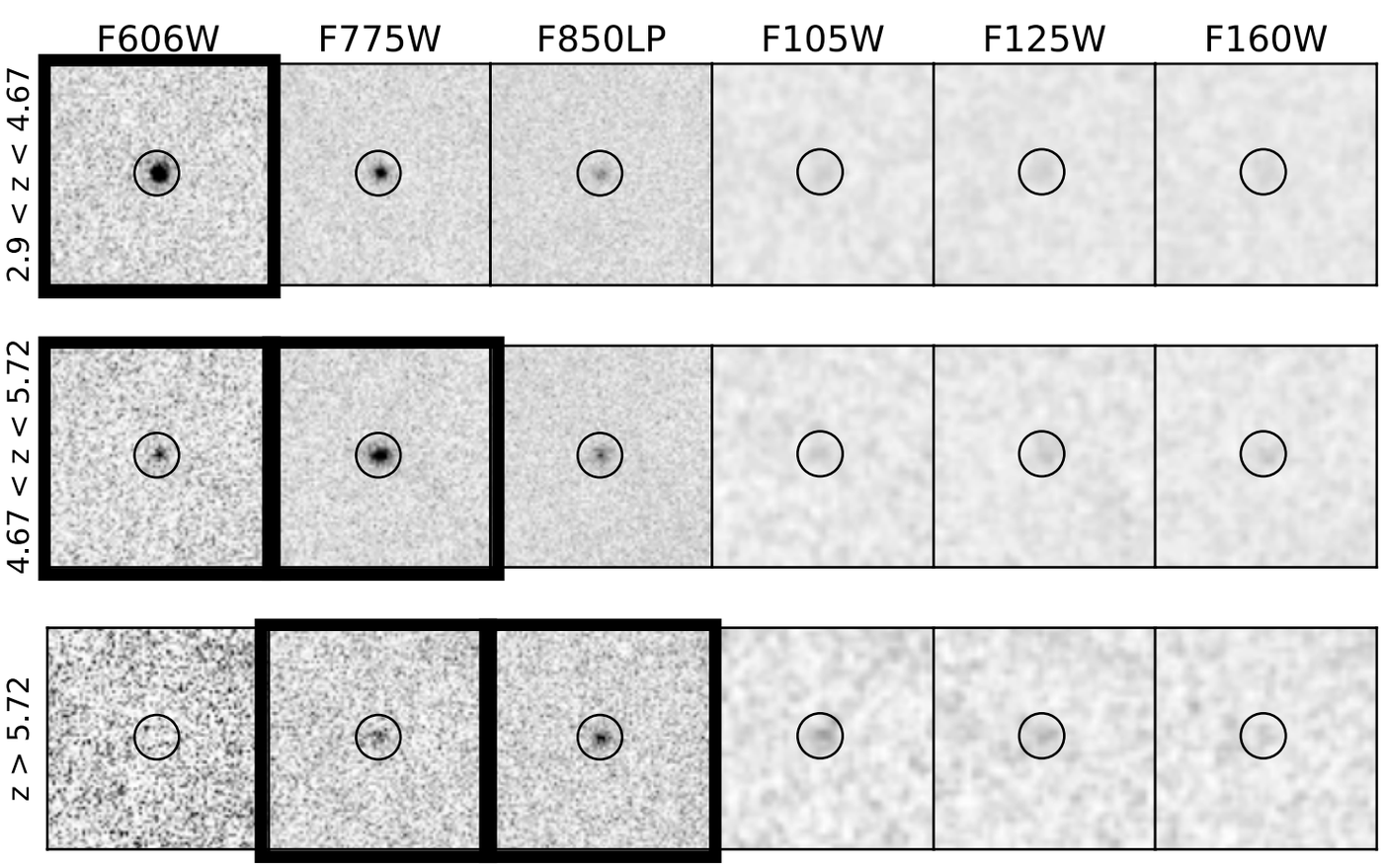
# PHOTOMETRIC STACKS

- Blue continuum slopes
- $M_{UV}$ ~ -15
- Effect of Ly-α visible



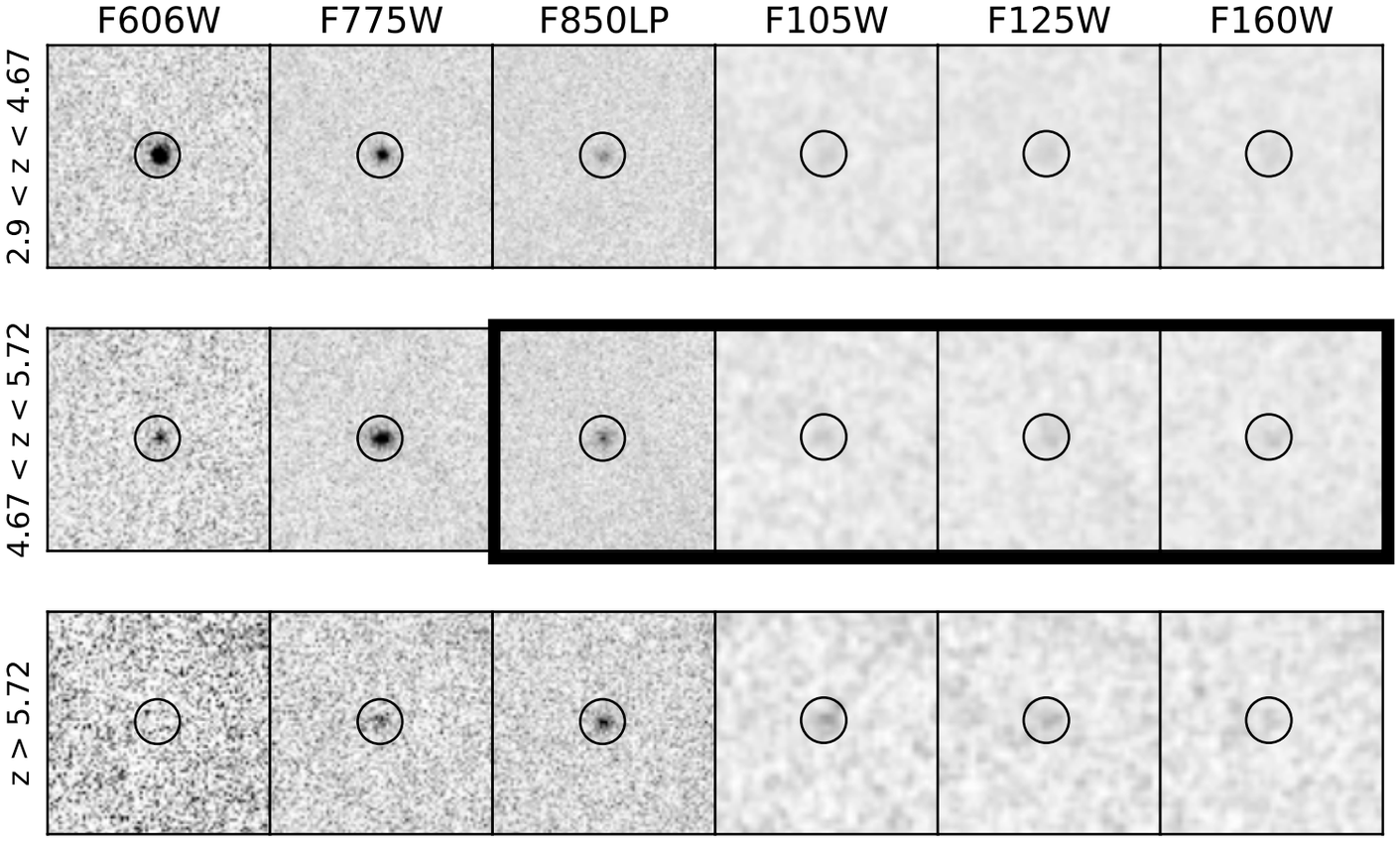
# PHOTOMETRIC STACKS

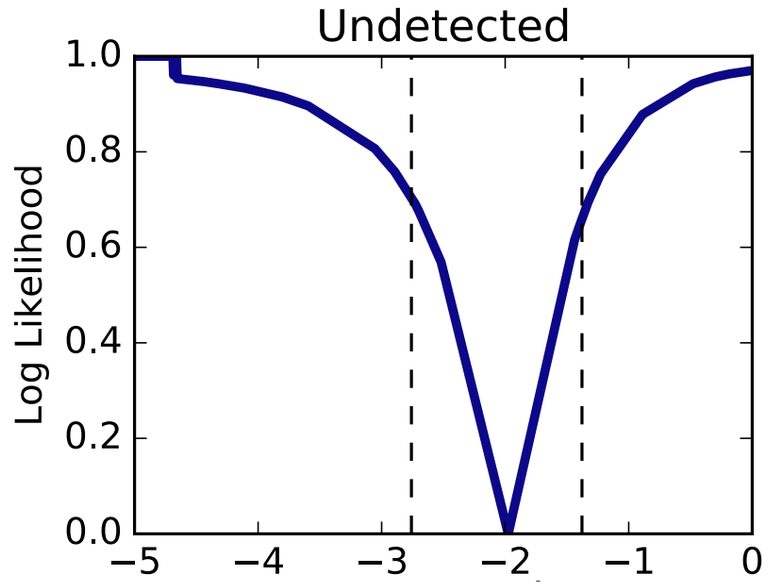
- Blue continuum slopes
- $M_{UV}$ ~ -15
- **Effect of Ly-α visible**

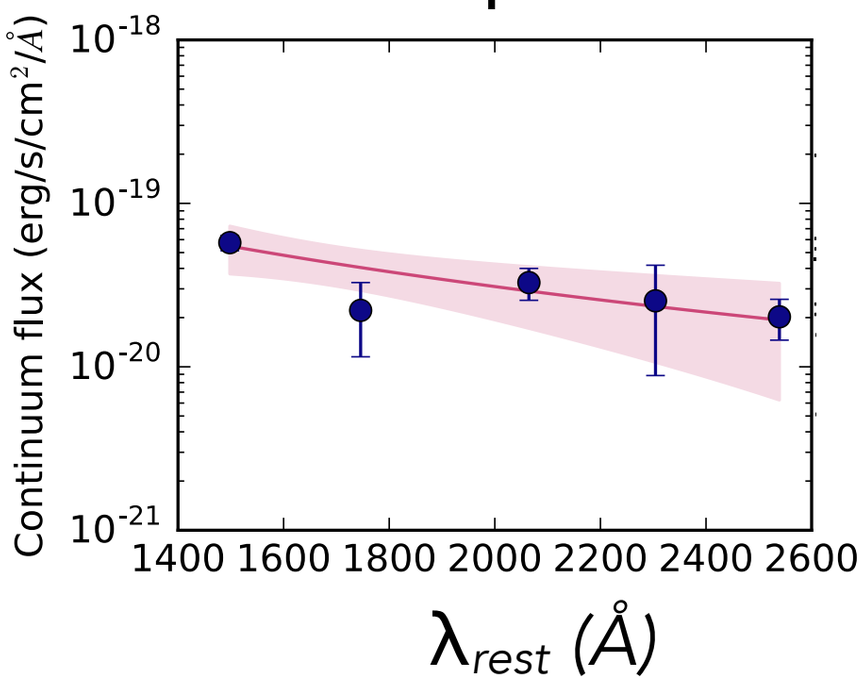


# PHOTOMETRIC STACKS

- Blue continuum slopes
- $M_{UV}$ ~ -15
- Effect of Ly-α visible

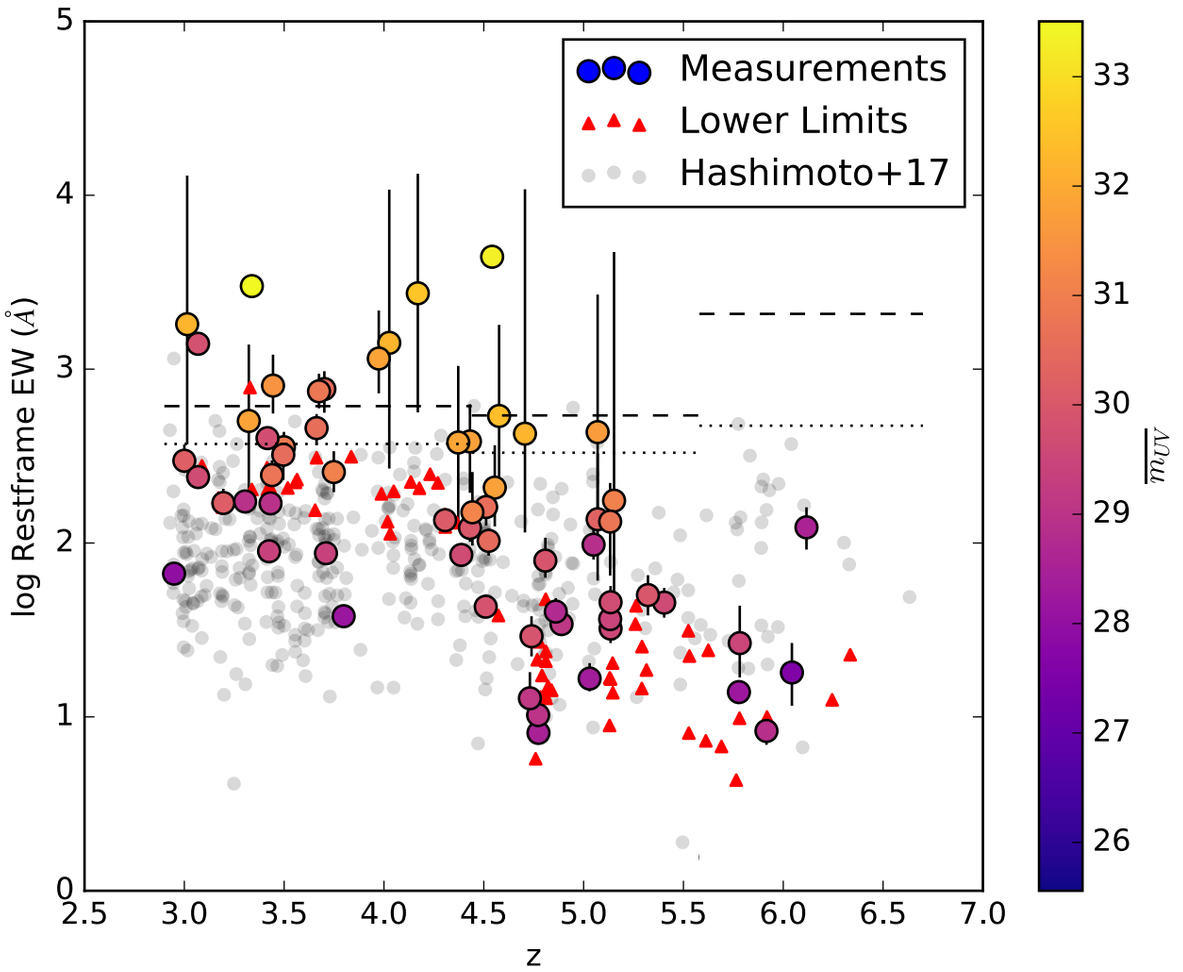


# DETERMINATION OF EW

- $m_{UV}$ from stacks for a given object (otherwise limit)
- $\beta$ from stacks in redshift bin

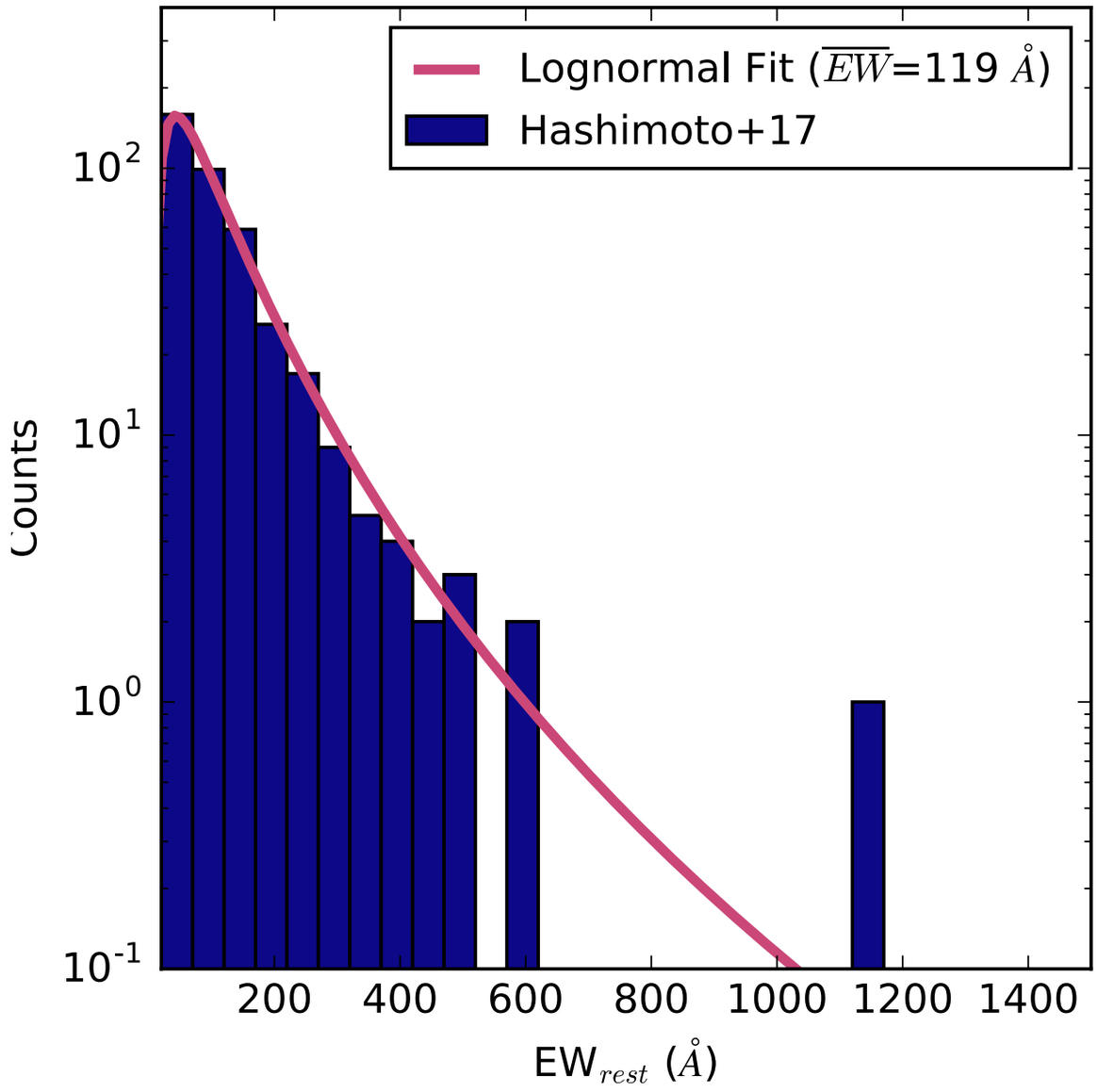


# IS THIS EXPECTED?

- Based on an EW distribution (Hashimoto+17b) and a UV luminosity function (Bouwens+15), can predict fraction of LAEs that are below a detection limit

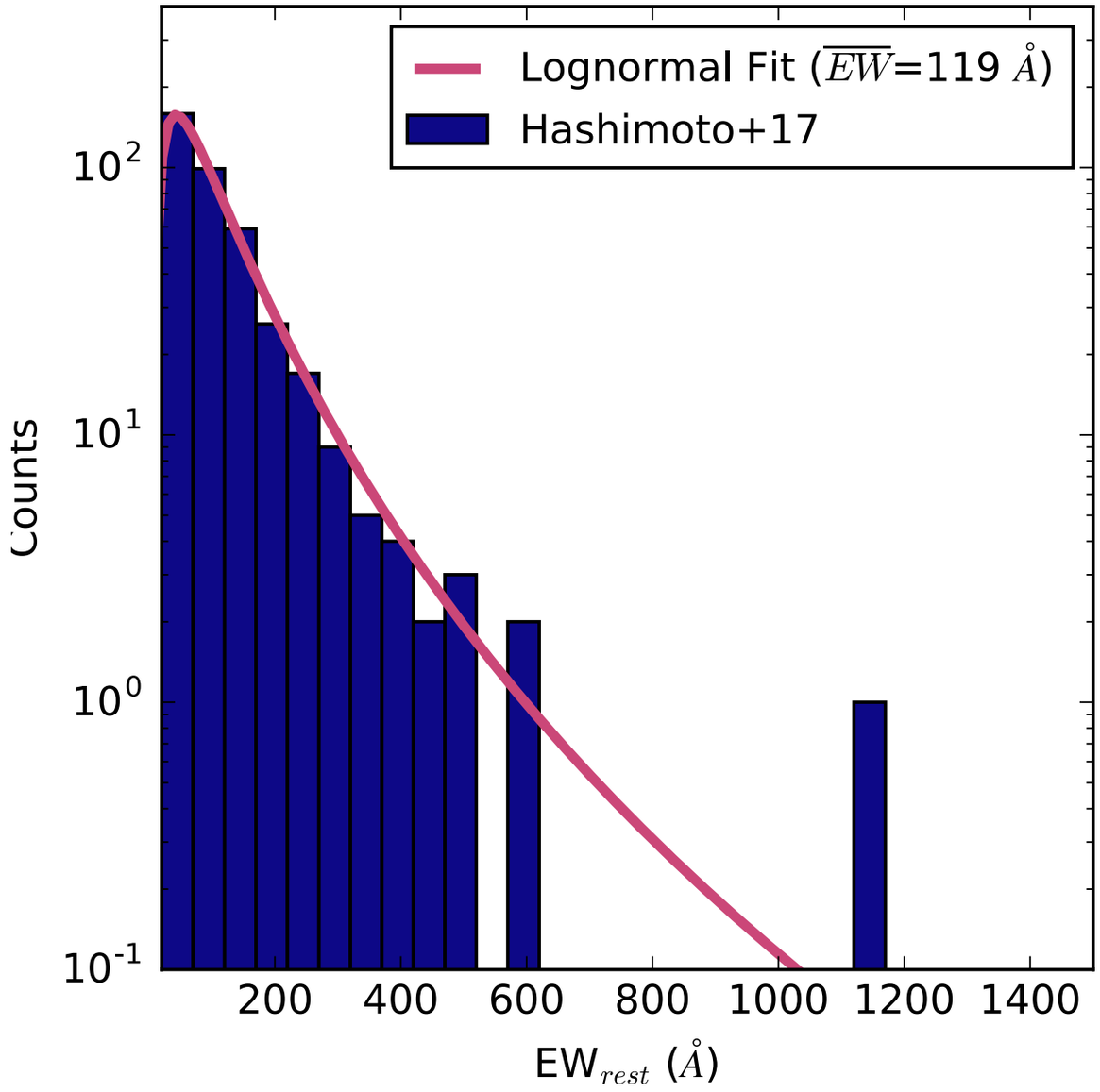
# IS THIS EXPECTED?

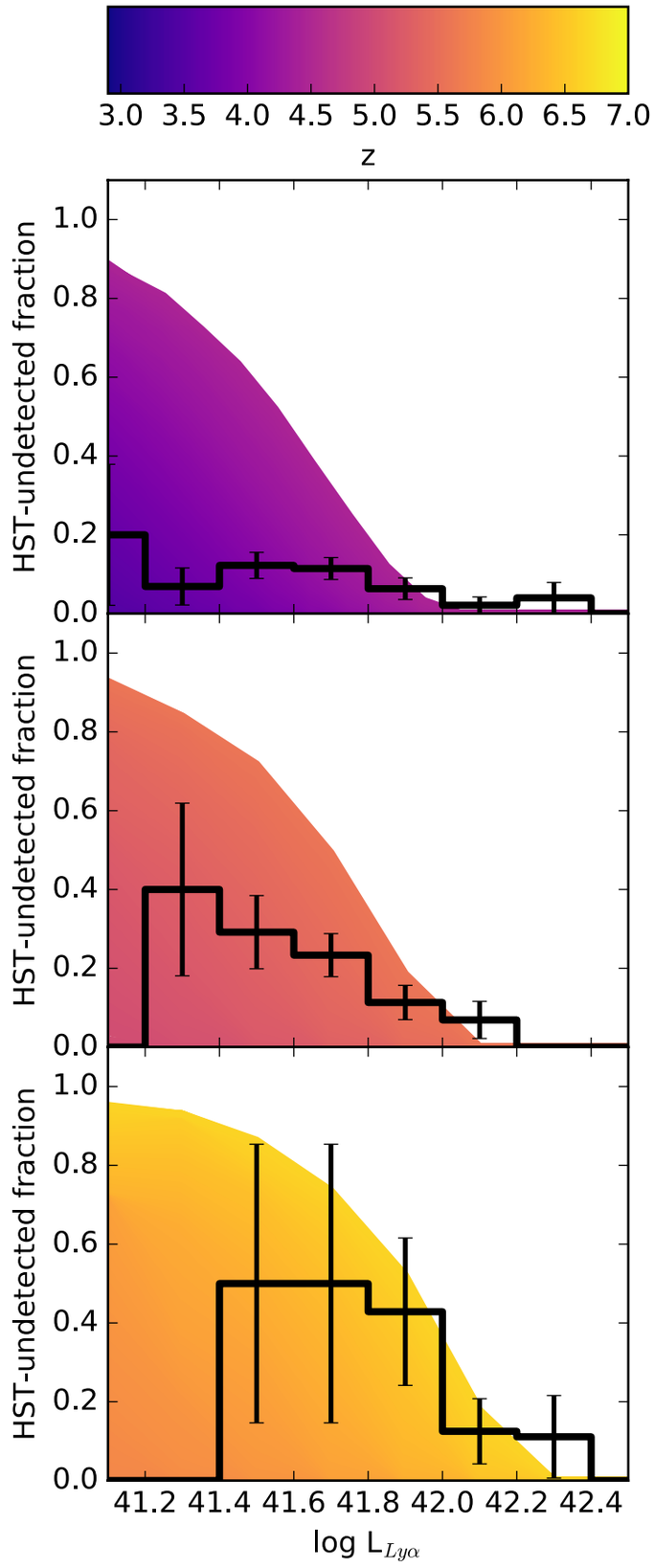
- Based on an **EW distribution** (Hashimoto+17b) and a UV luminosity function (Bouwens+15), can predict fraction of LAEs that are below a detection limit



# IS THIS EXPECTED?

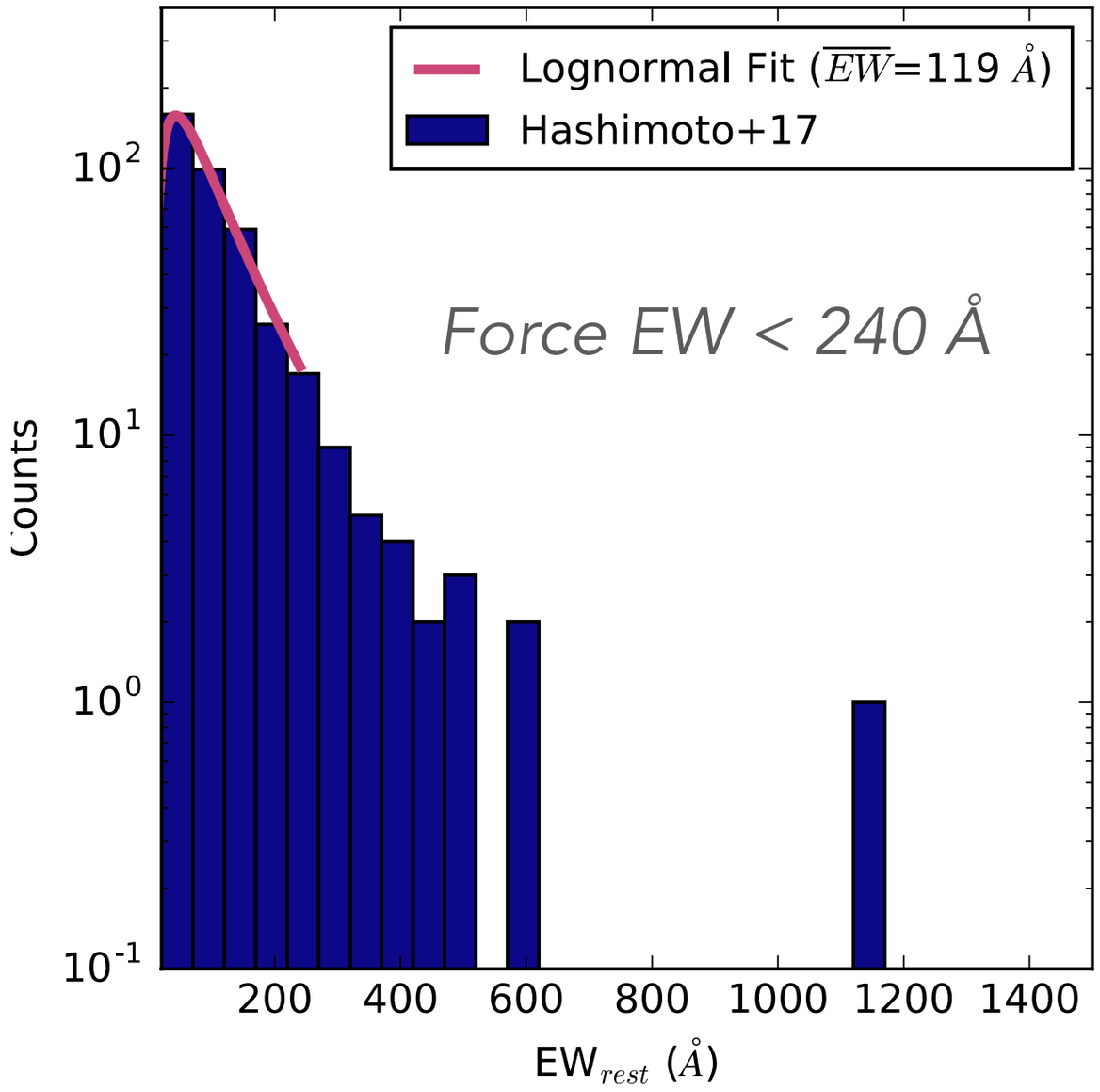
- Based on an EW distribution (Hashimoto+17b) and a UV luminosity function (Bouwens+15), can predict fraction of LAEs that are below a detection limit

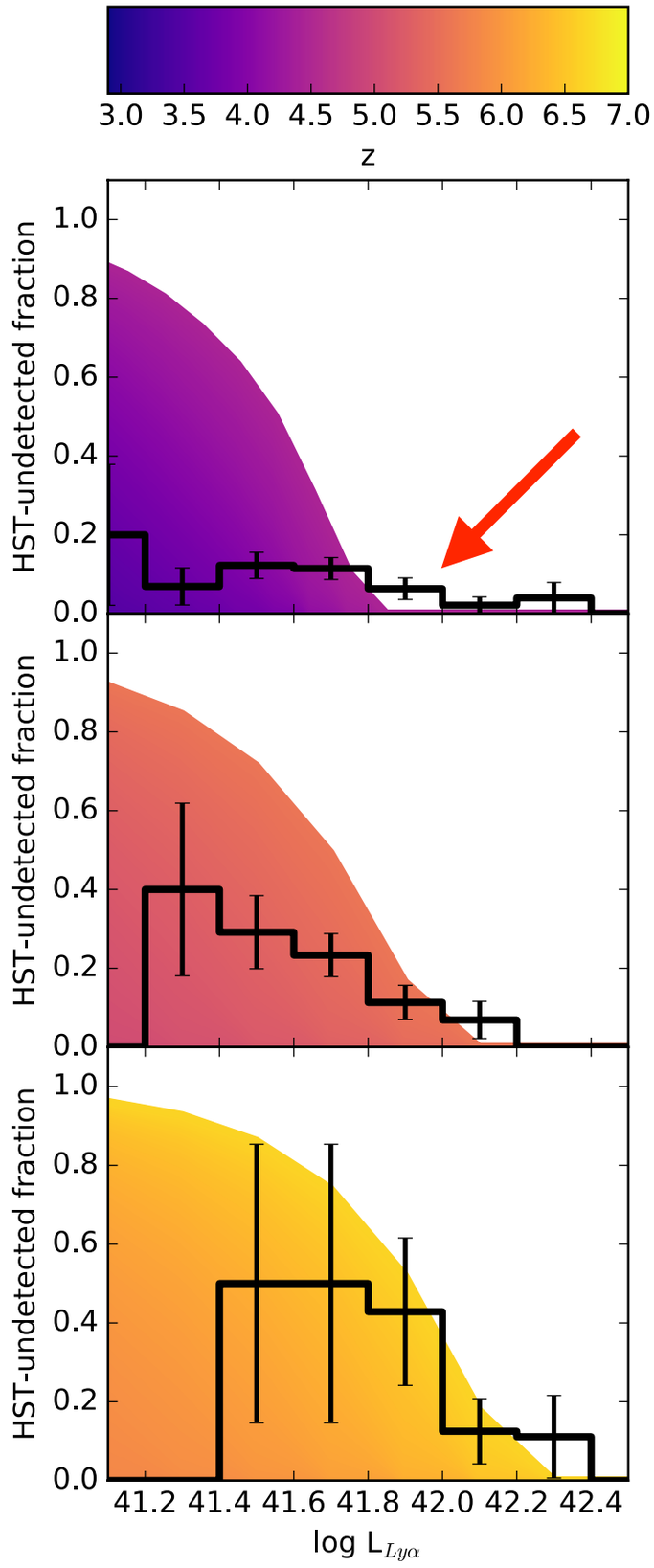


# IS THIS EXPECTED?

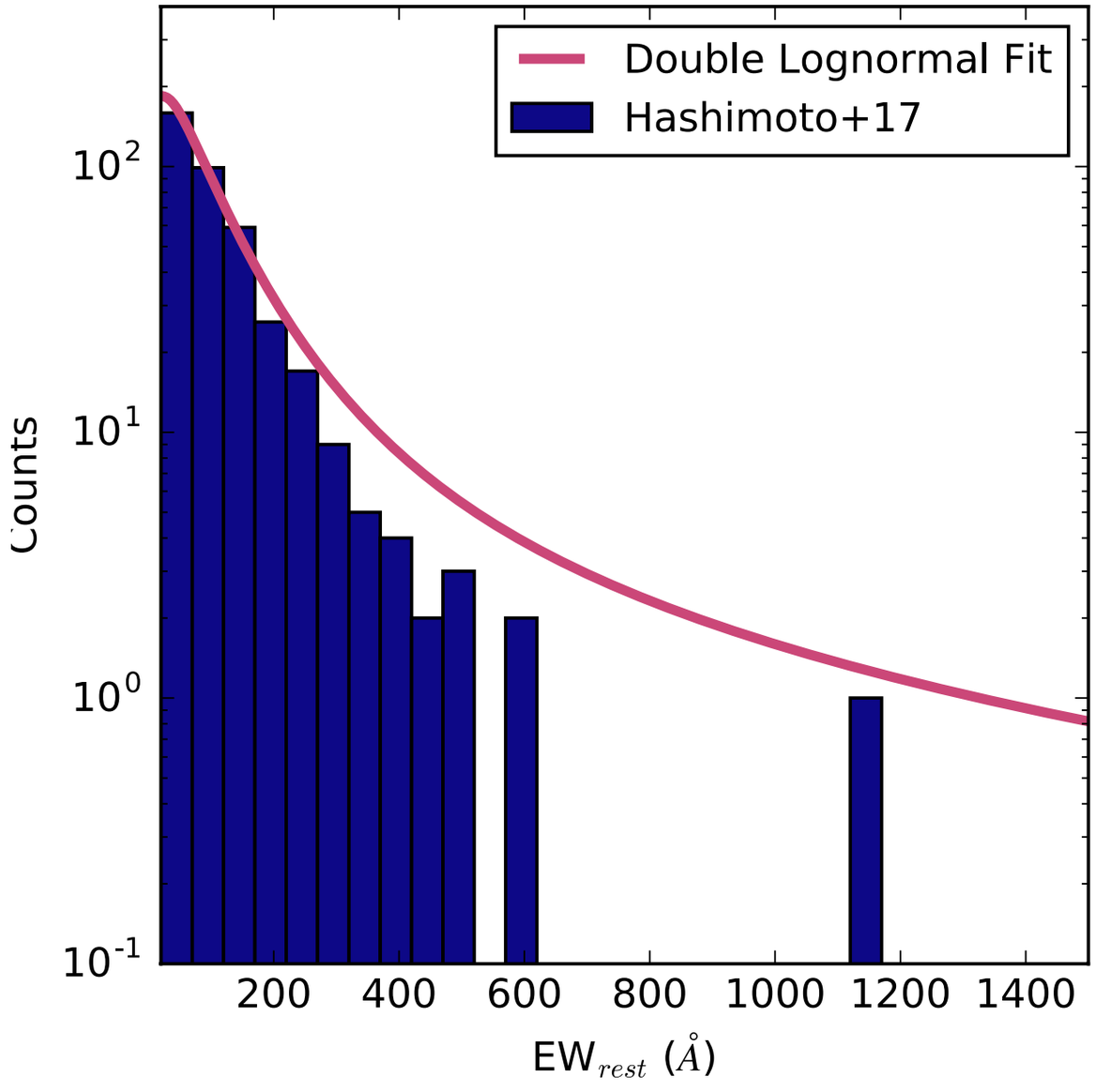
- Based on an EW distribution (Hashimoto+17b) and a UV luminosity function (Bouwens+15), can predict fraction of LAEs that are below a detection limit

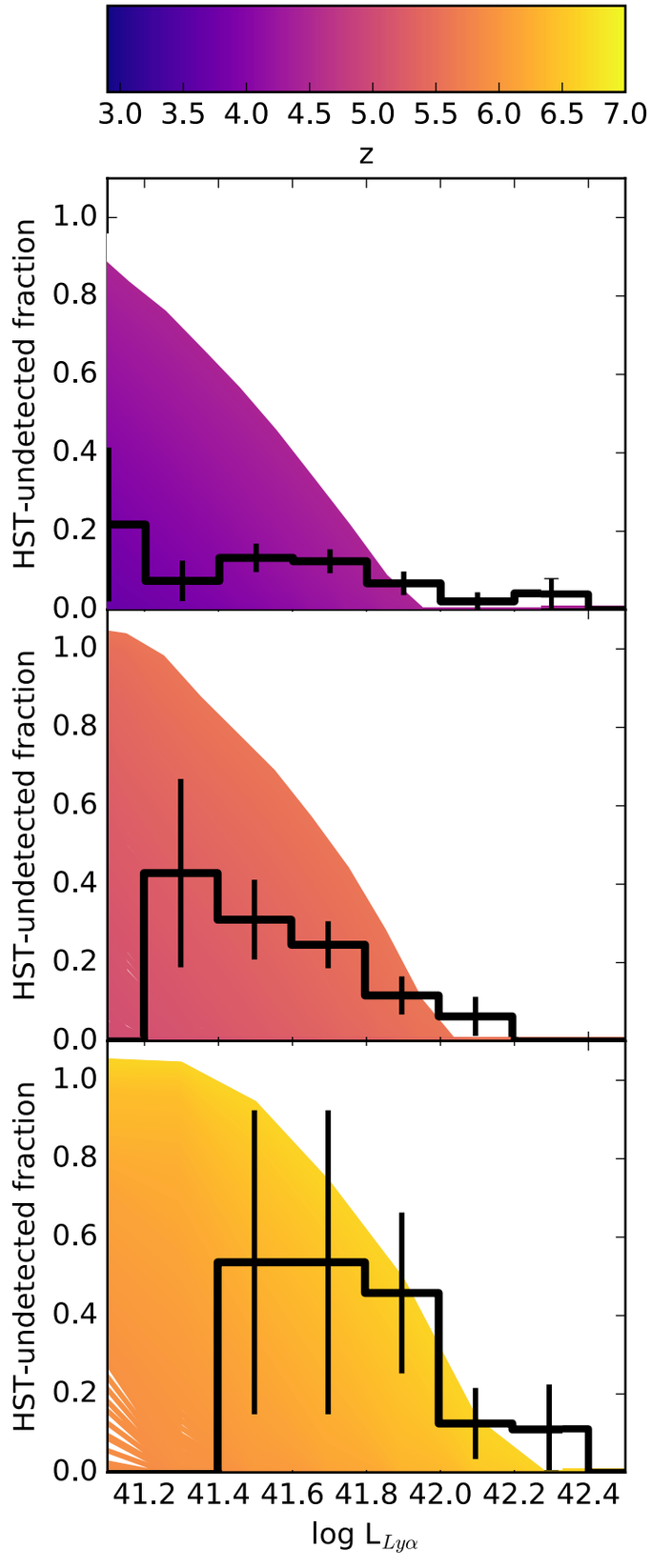


# IS THIS EXPECTED?

- Based on an EW distribution (Hashimoto+17b) and a UV luminosity function (Bouwens+15), can predict fraction of LAEs that are below a detection limit

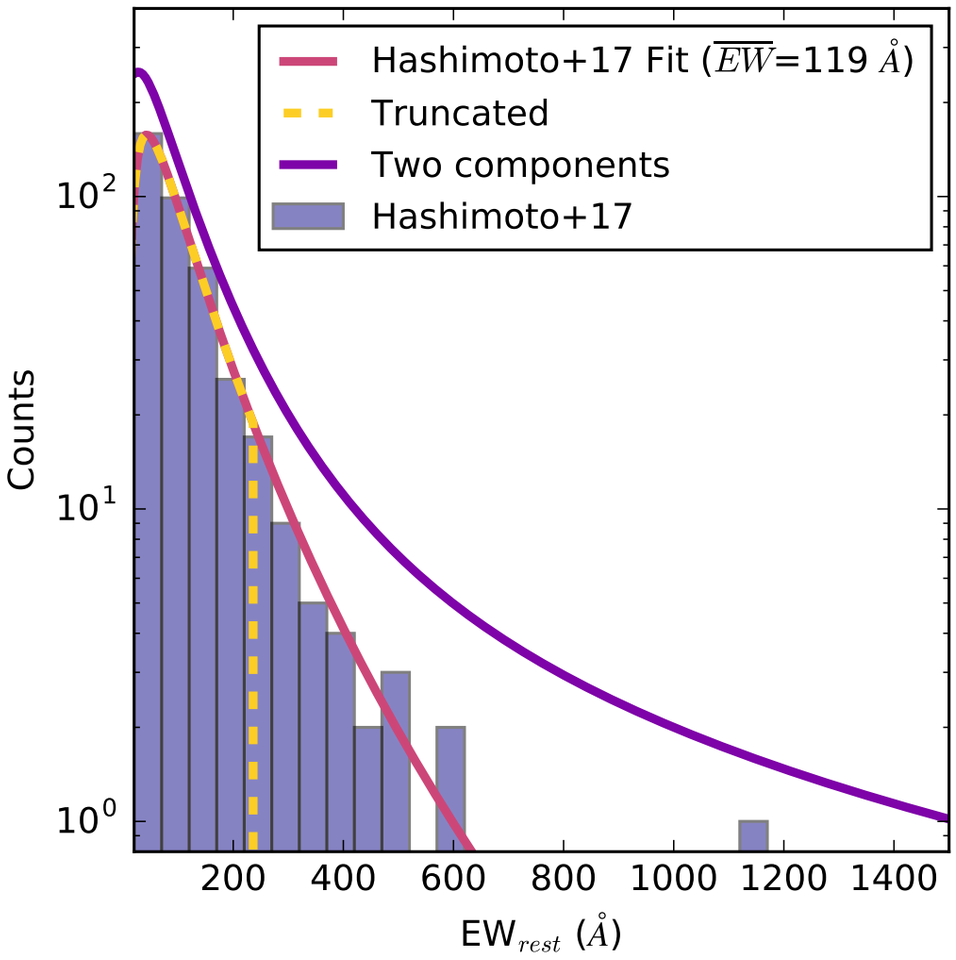


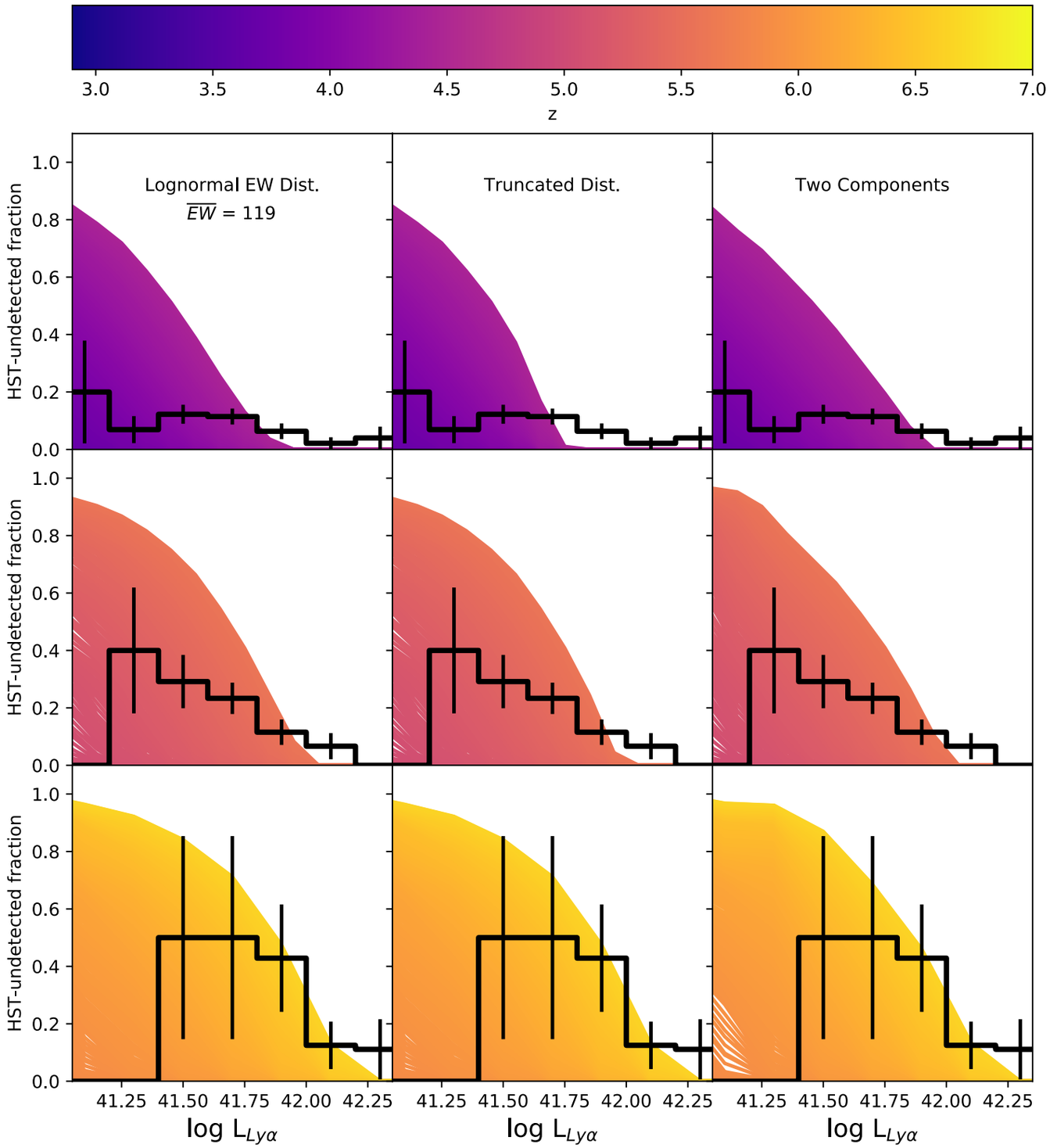



# IS THIS EXPECTED?

**It's hard to distinguish between these models,**

**but undetected sources are expected**



# CONCLUSION AND OUTLOOK

- More than 150 high-EW LAEs in the UDF
- $M_{UV}$ as faint as -15
- Blue ($\beta \sim -2$) UV continuum slopes
- They appear to be an extension of the known LAE population
- More work (JWST?) will be required to fully characterize them

🌸ありがとうございました🌸