SEARCH FOR HIGH $f_{\rm esc}$ GALAXIES IN THE HEART OF REIONIZATION WITH JWST SPECTRA

Emma Giovinazzo

& Pascal Oesch, Anne Verhamme and the RUBIES team

RUBIES

UNIVERSITÉ DE GENÈVE
FACULTÉ DES SCIENCES
Département d'astronomie

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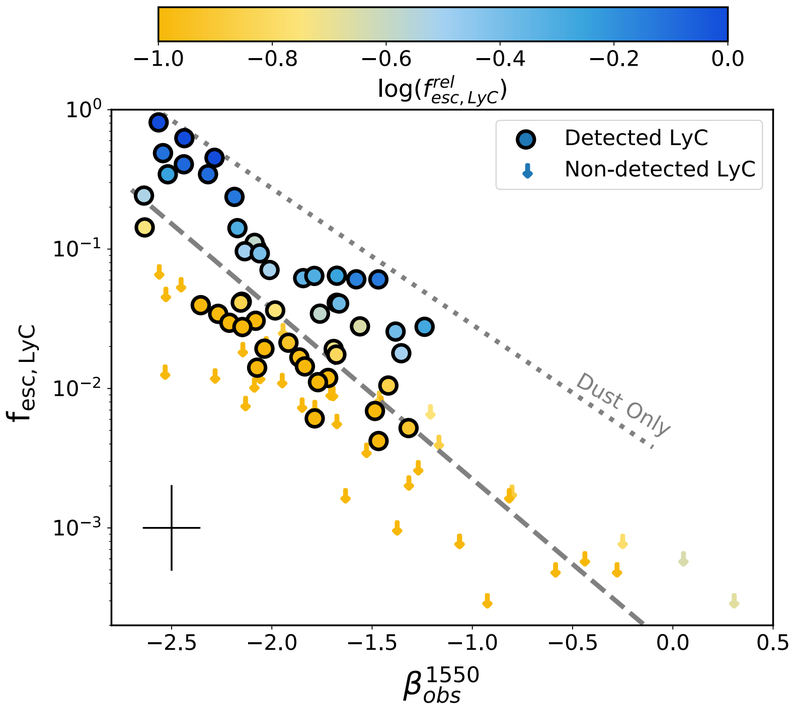
THE IGM IS OPAQUE TO IONISING PHOTONS AT $z > 4.5$

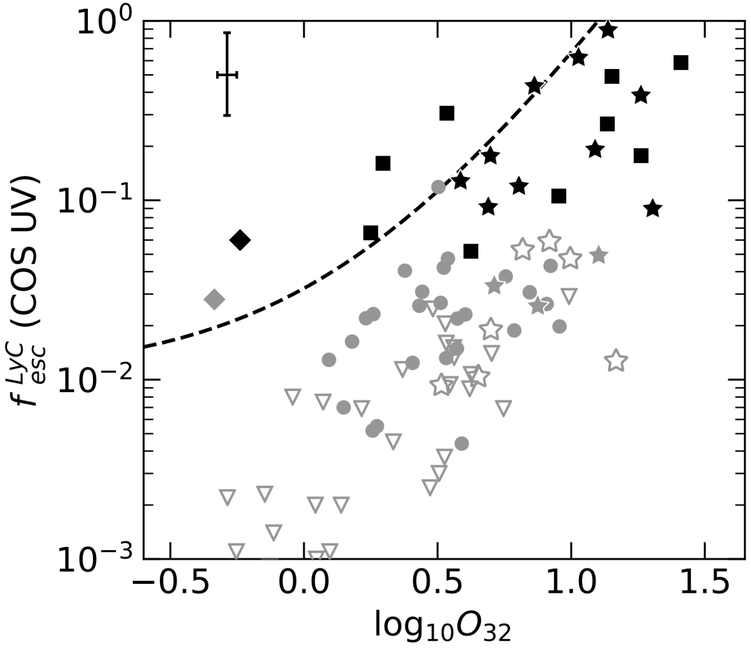
WE RELY ON TRACERS CALIBRATED AT LOW REDSHIFT

UV β slope



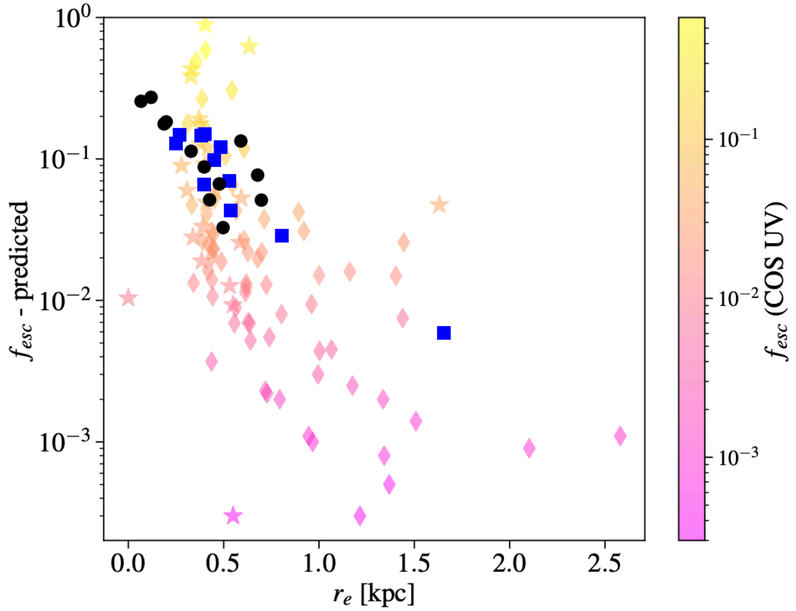
Chisholm+22

O32



Flury+22

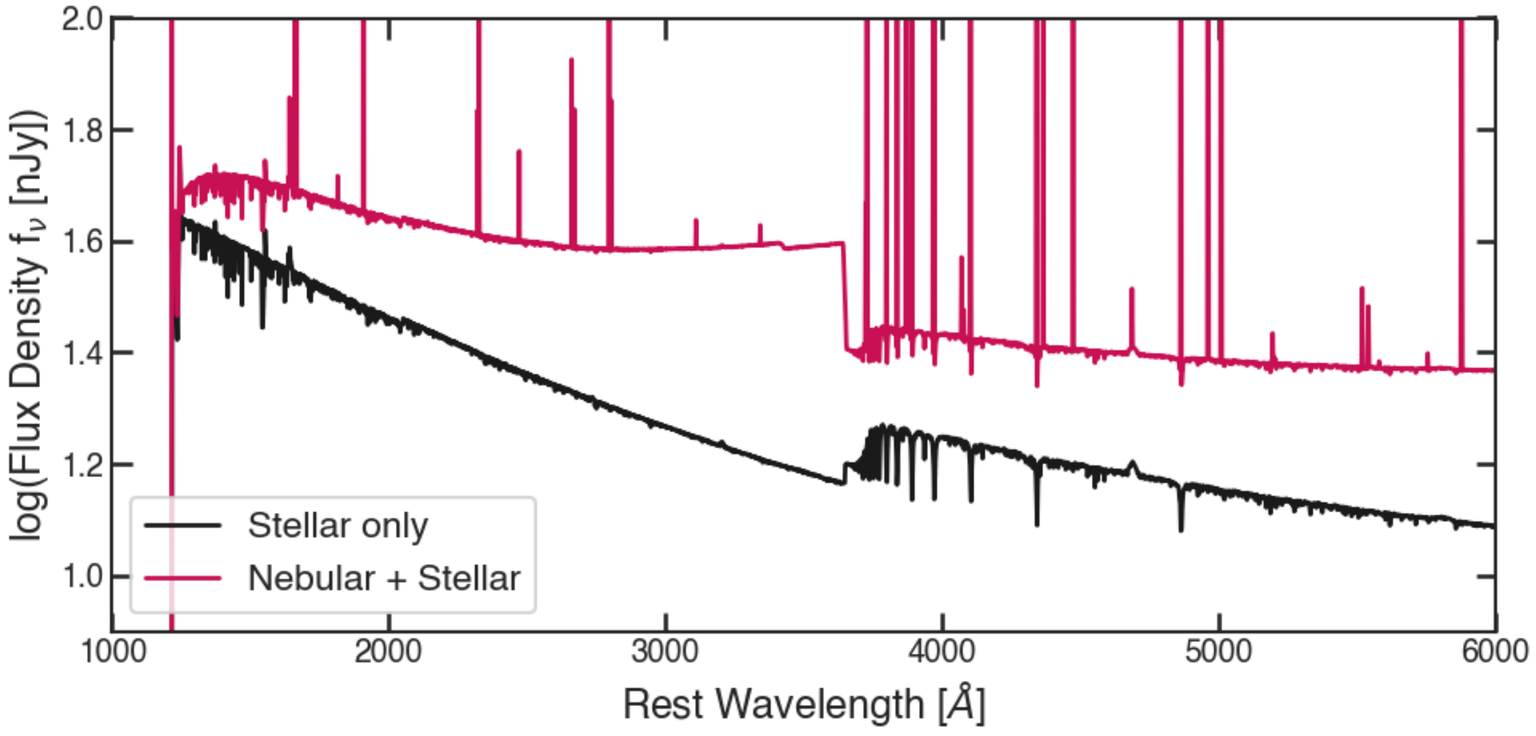
O32 + r_e + β

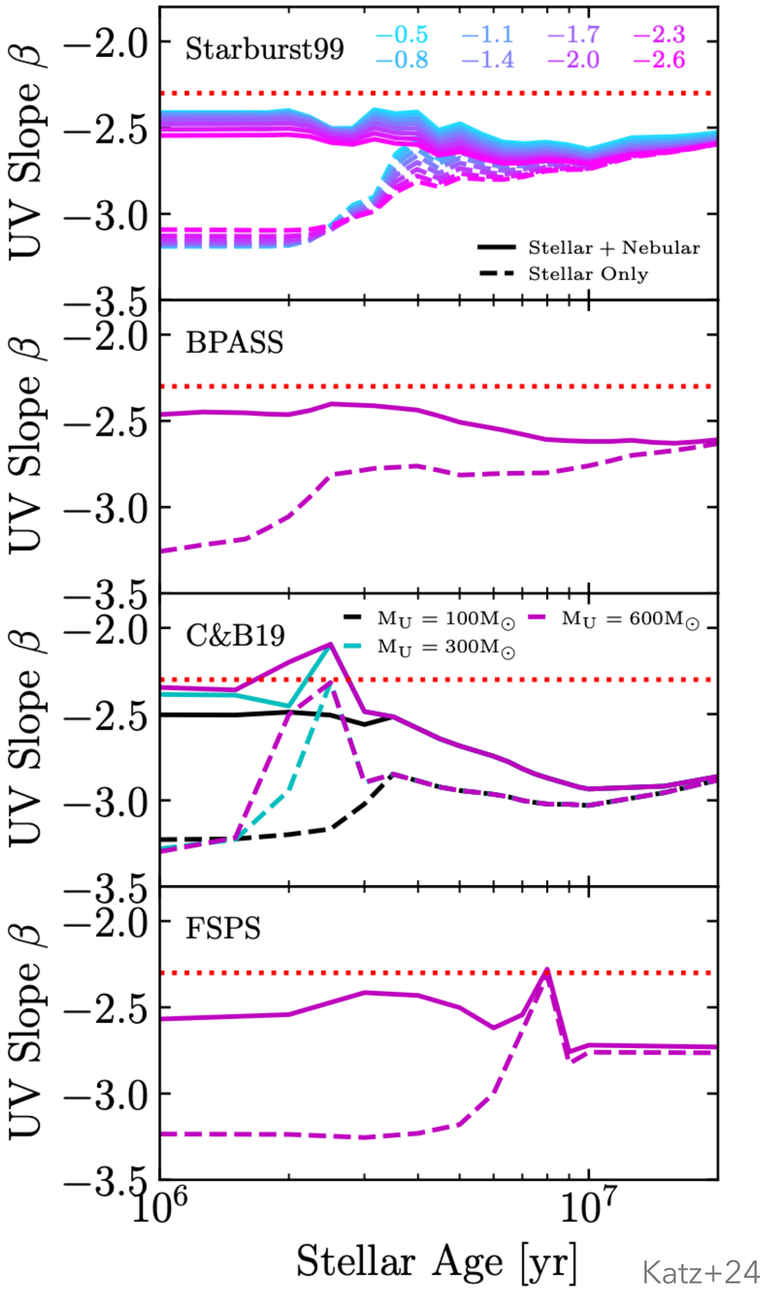


Mascia+23

HIGH f_{esc} MEANS REDUCED NEBULAR EMISSION

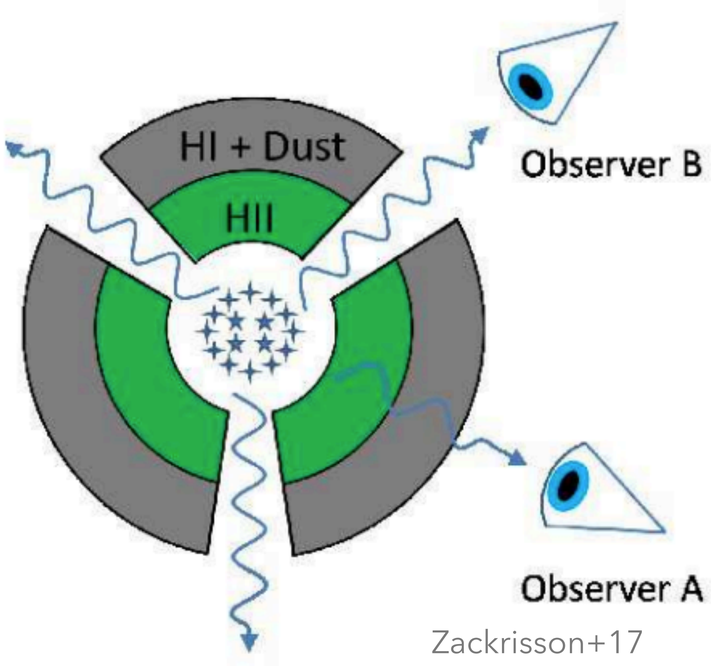
SO CAN WE ESTIMATE FESC DIRECTLY IN THE EOR?



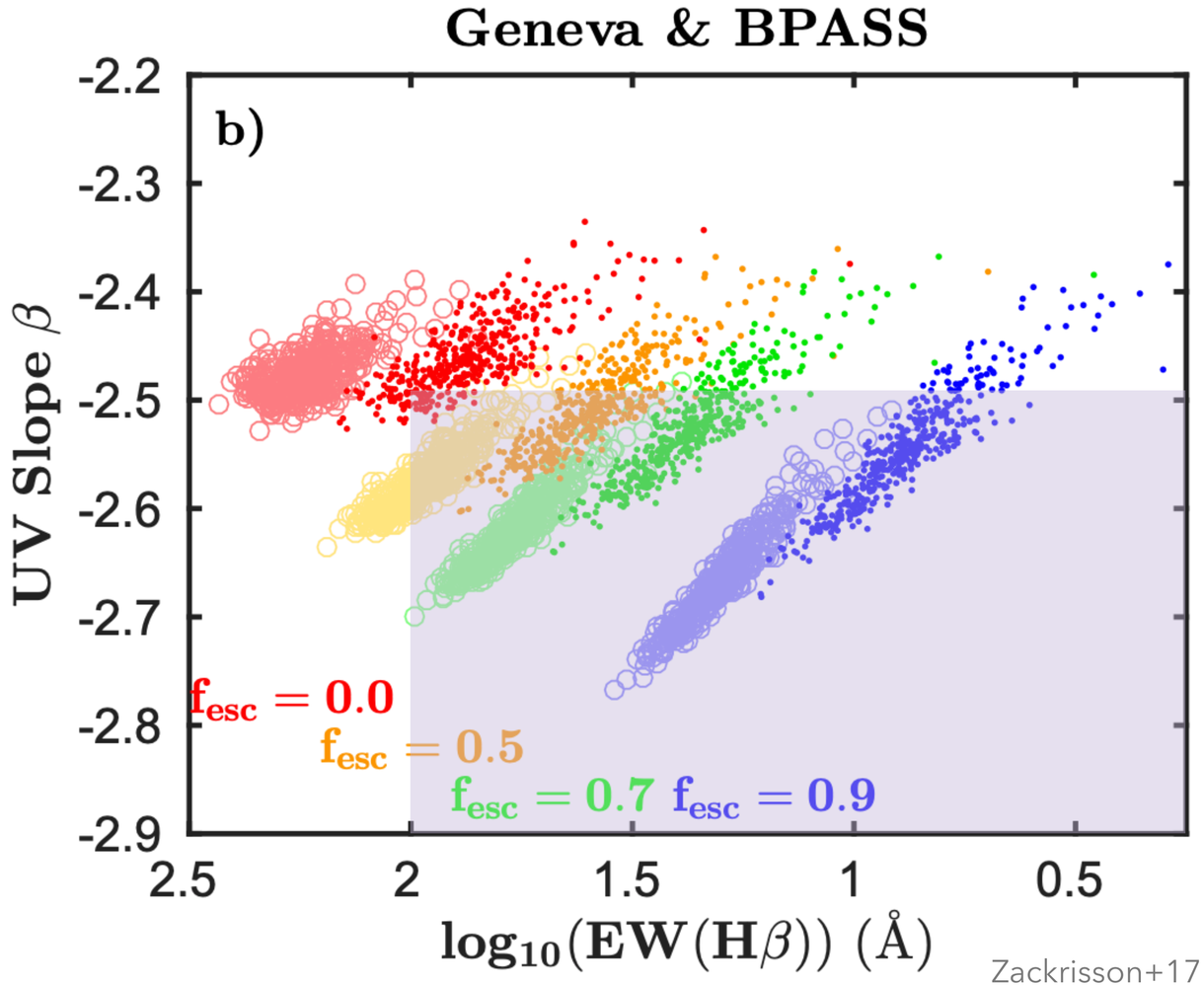


Katz+24

PICKET FENCE MODEL TO MODEL $f_{\rm esc}$

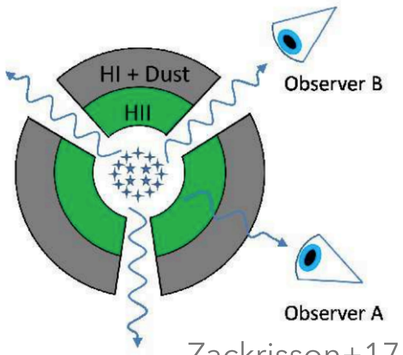


Zackrisson+17



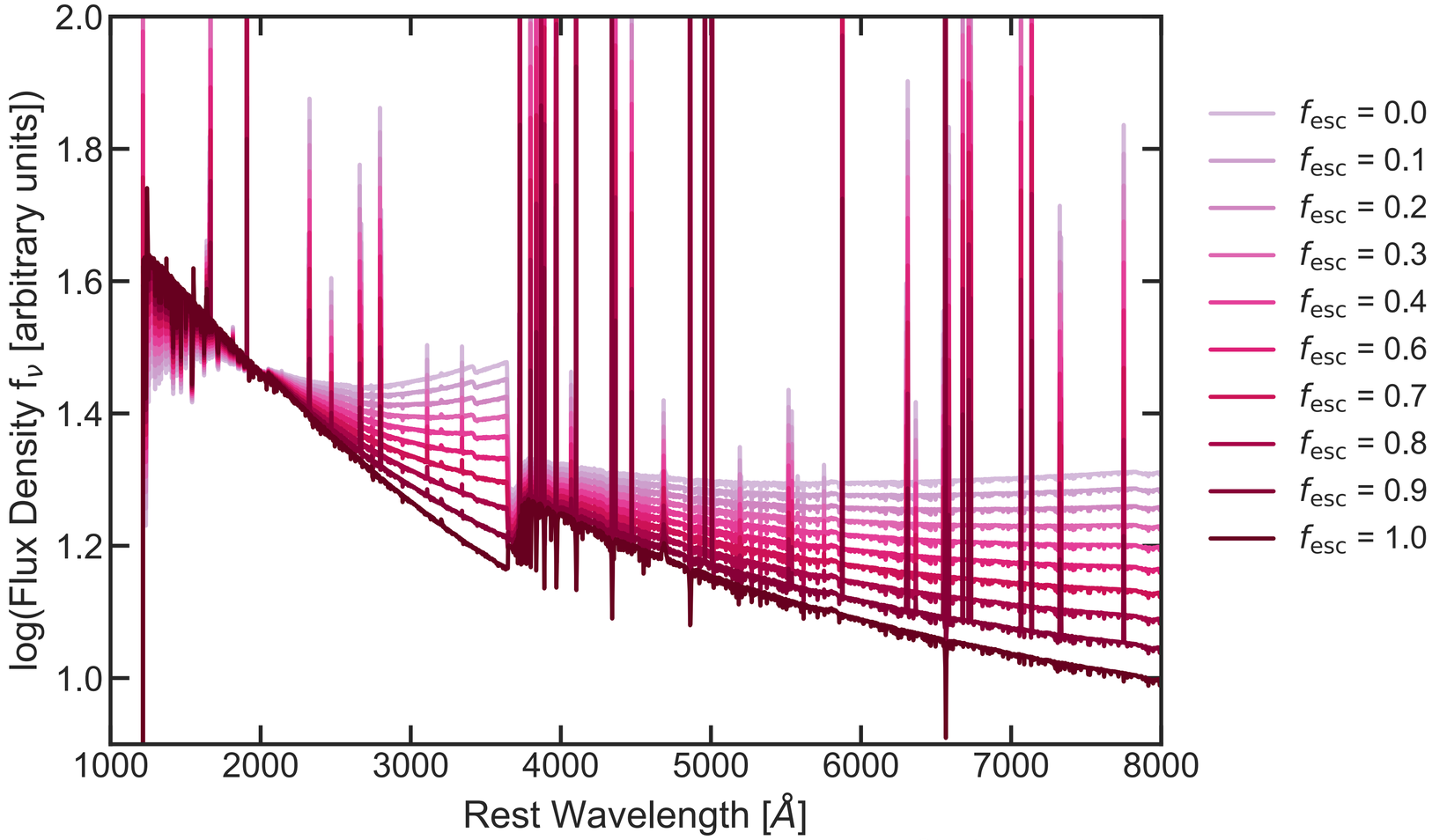
Zackrisson+17

PICKET FENCE MODEL IN BAGPIPES



Zackrisson+17

Carnall+18

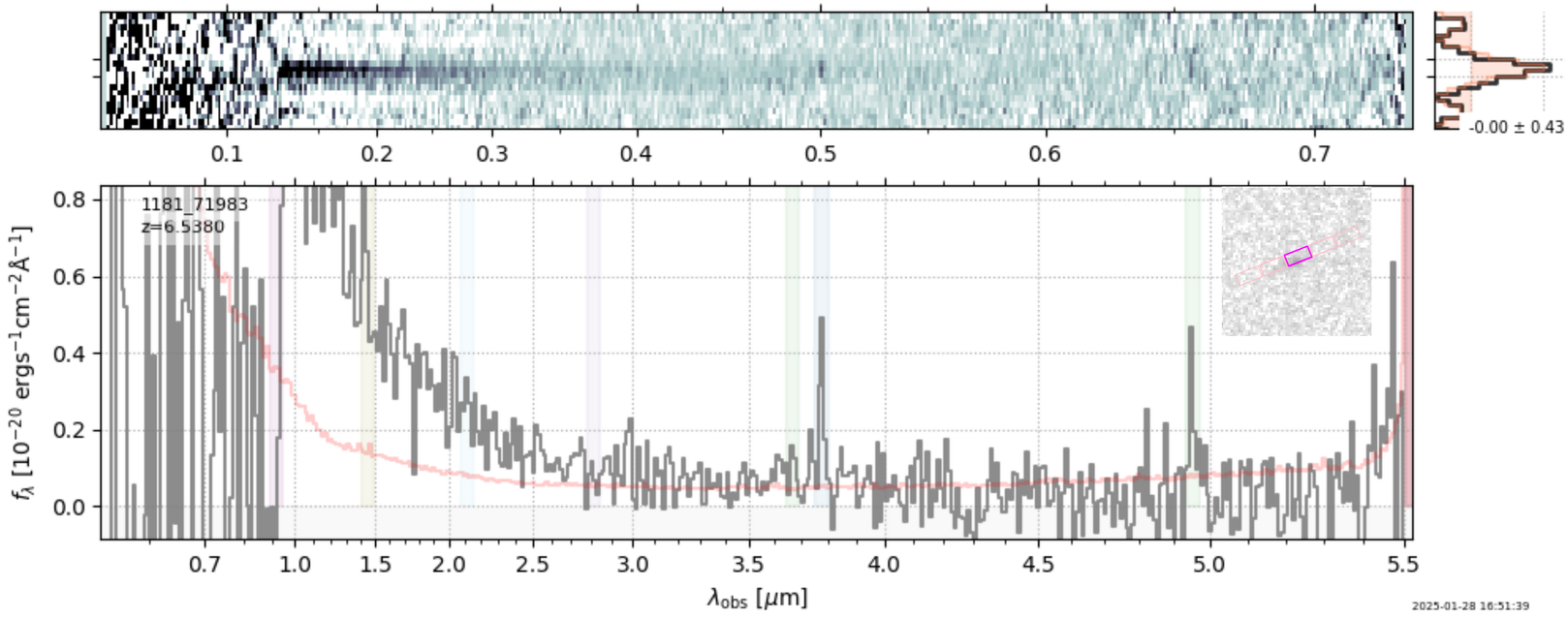


Giovinazzo+ in prep

SAMPLE OF 1671 PRISM SPECTRA AT $z > 5$

We select our sources from the *DAWN JWST Archive* (DJA), an archive of all public JWST data uniformly reduced with the criteria:

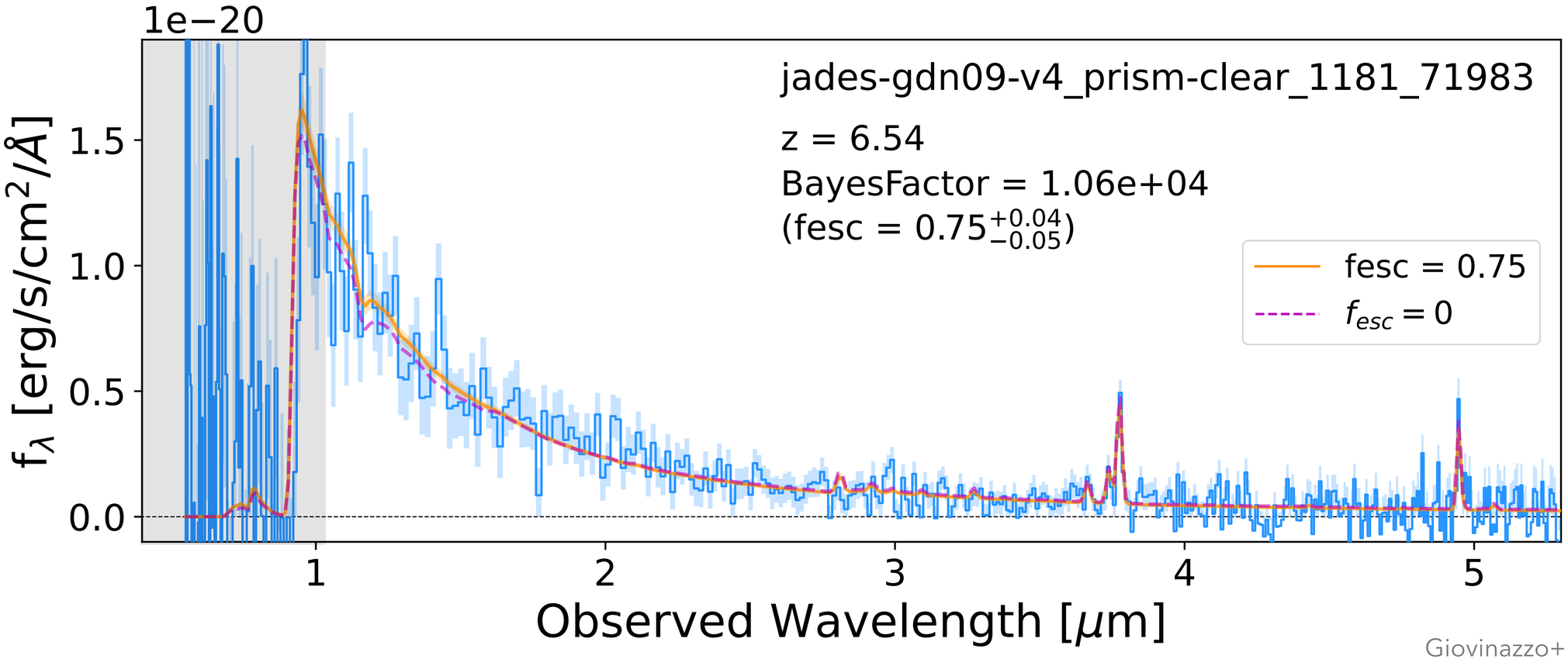
- Grade > 2.5 (i.e. secure redshift)
- Observed with PRISM
- z>5



See Heintz+25, also https://dawn-cph.github.io/dja/

HIGH CONFIDENCE SAMPLE SELECTION

We select 80 galaxies as ***high confidence leaker candidates*** as those with a Bayes factor (B_{12}) >100



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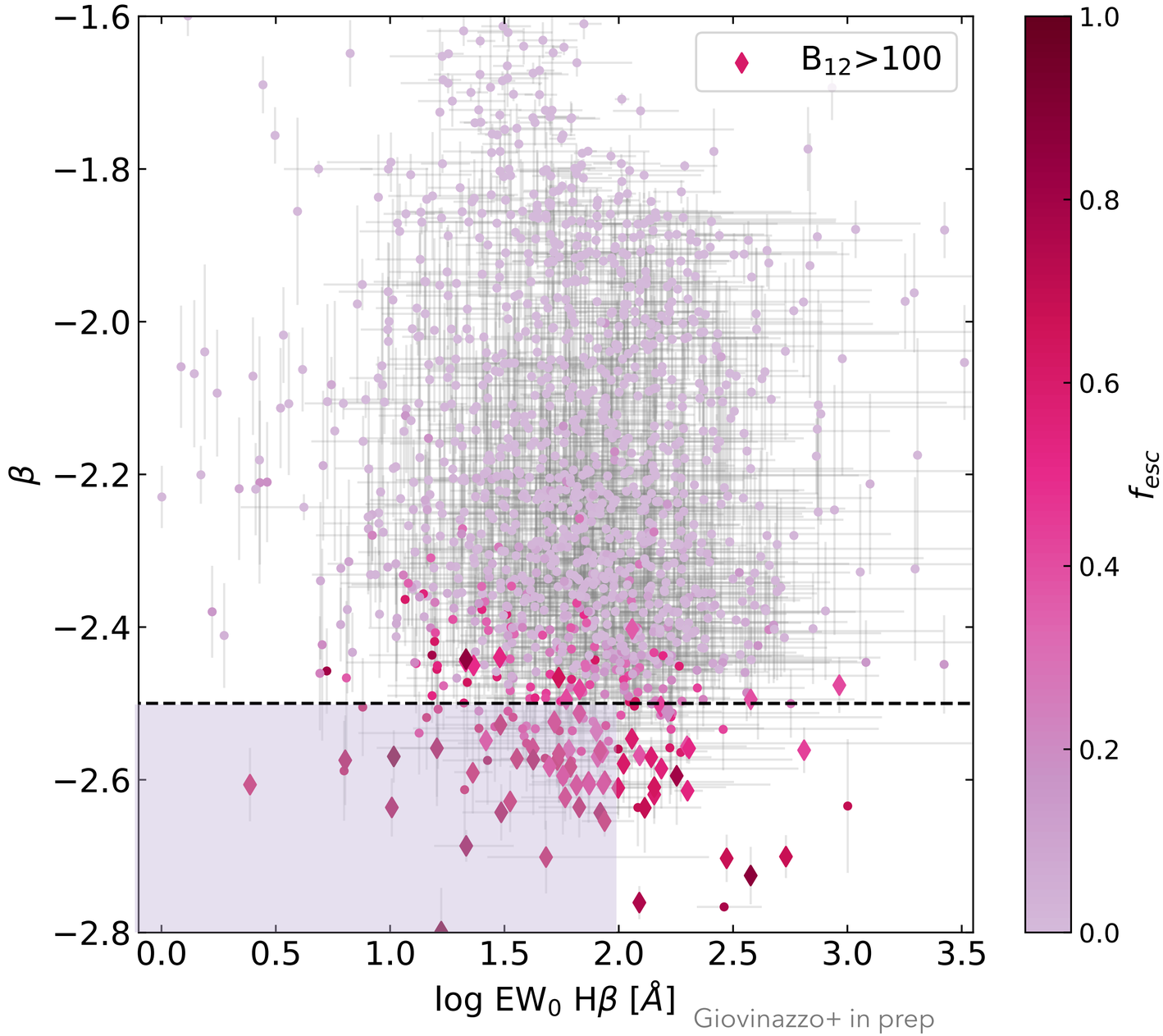
β SLOPE VS. EQUIVALENT WIDTH

Clear preference for high $f_{\rm esc}$ at steep β slopes but no clear relation with Hβ EW.

At β<-2.5 we find $\langle f_{\rm esc} \rangle$ = 59%



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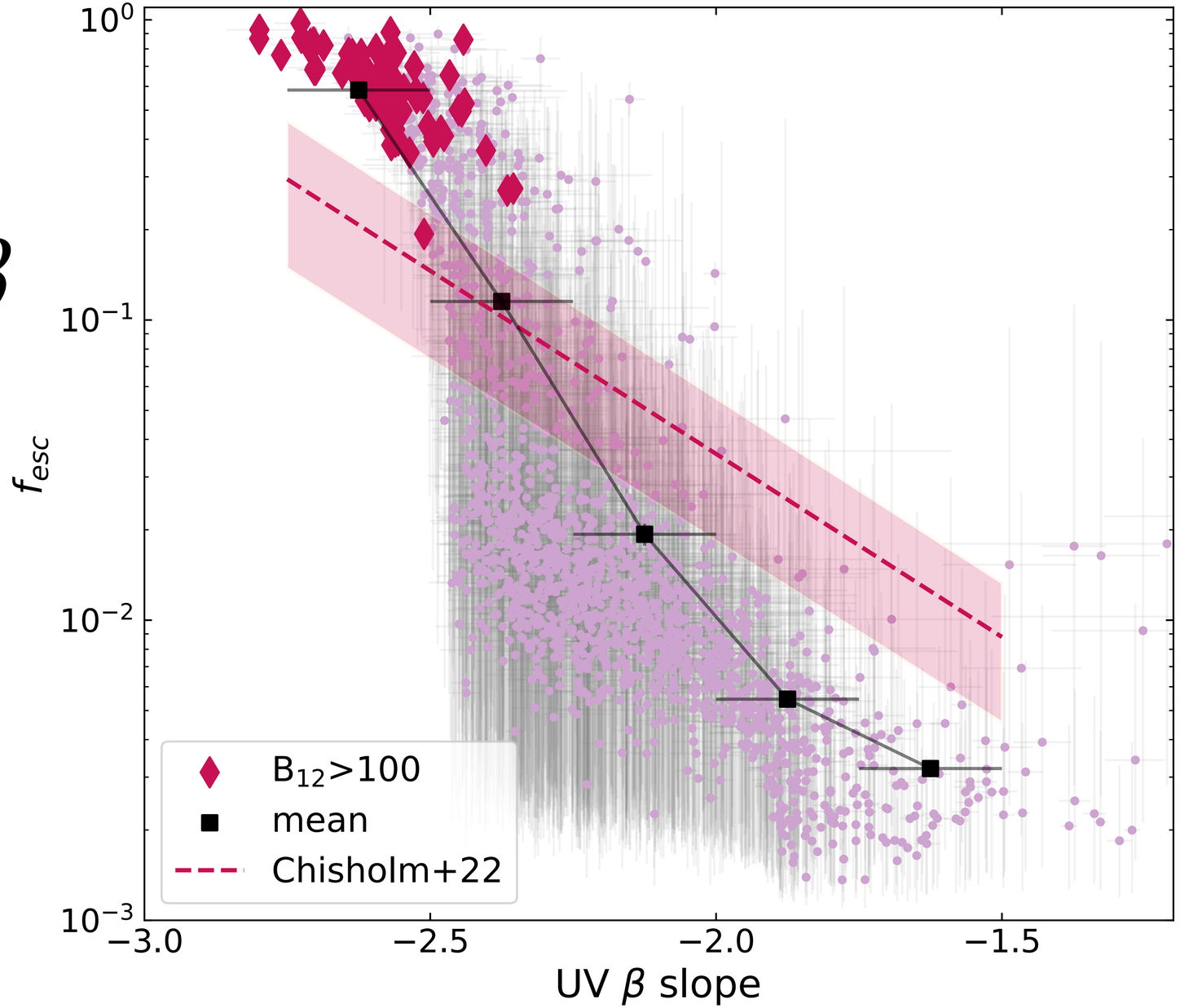
AVERAGE f_{esc} DECREASES WITH β SLOPE

Consistent with the results of Chisholm+22 but steeper.



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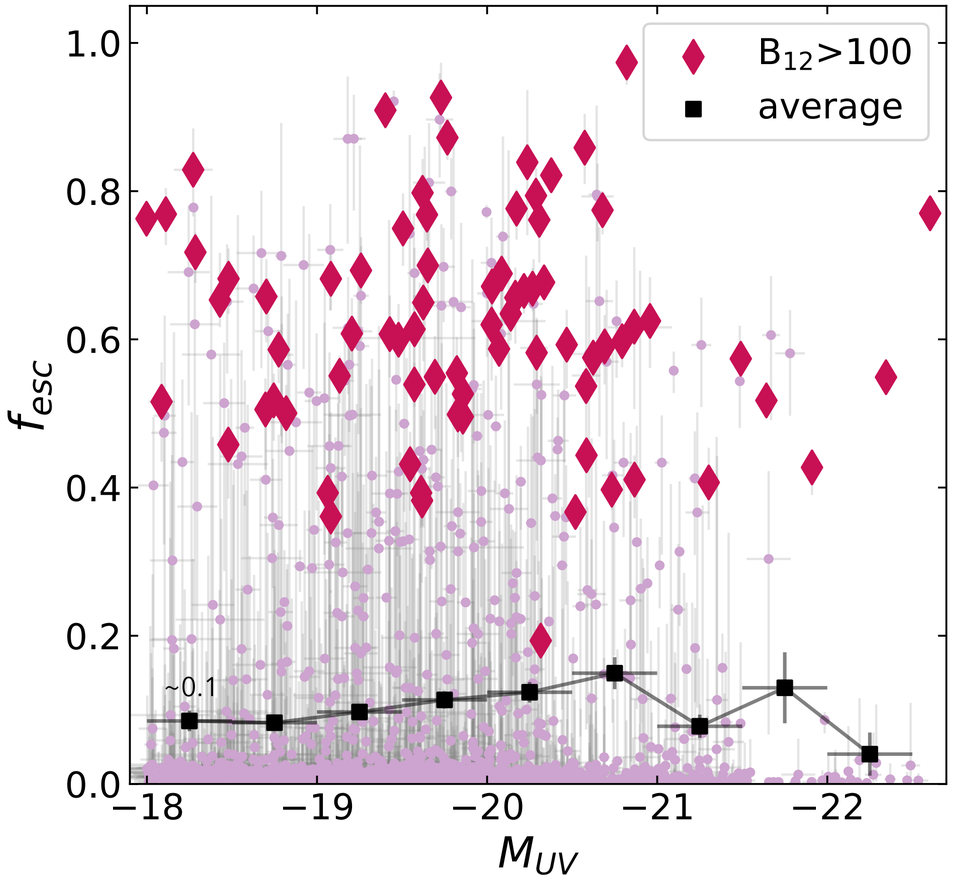
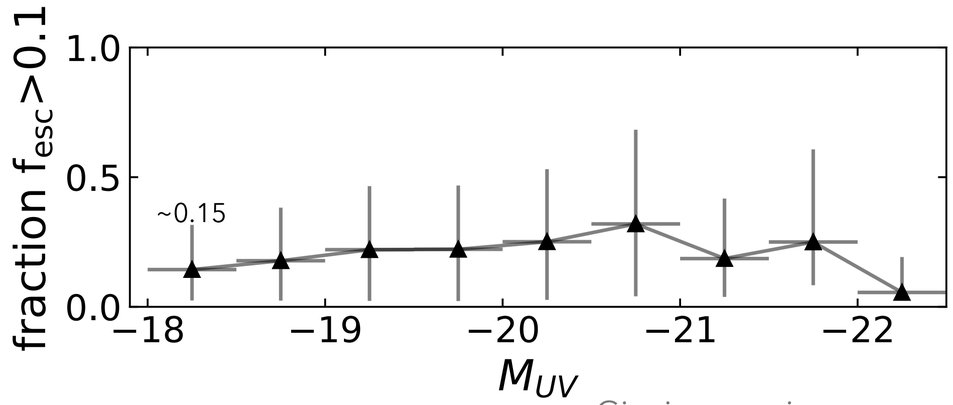
MEAN f_{esc} IS $\sim$ 10 % AT ALL MUV

Mean f_{esc} consistent with reionization models.

Slight increase of mean f_{esc} at brighter magnitudes.





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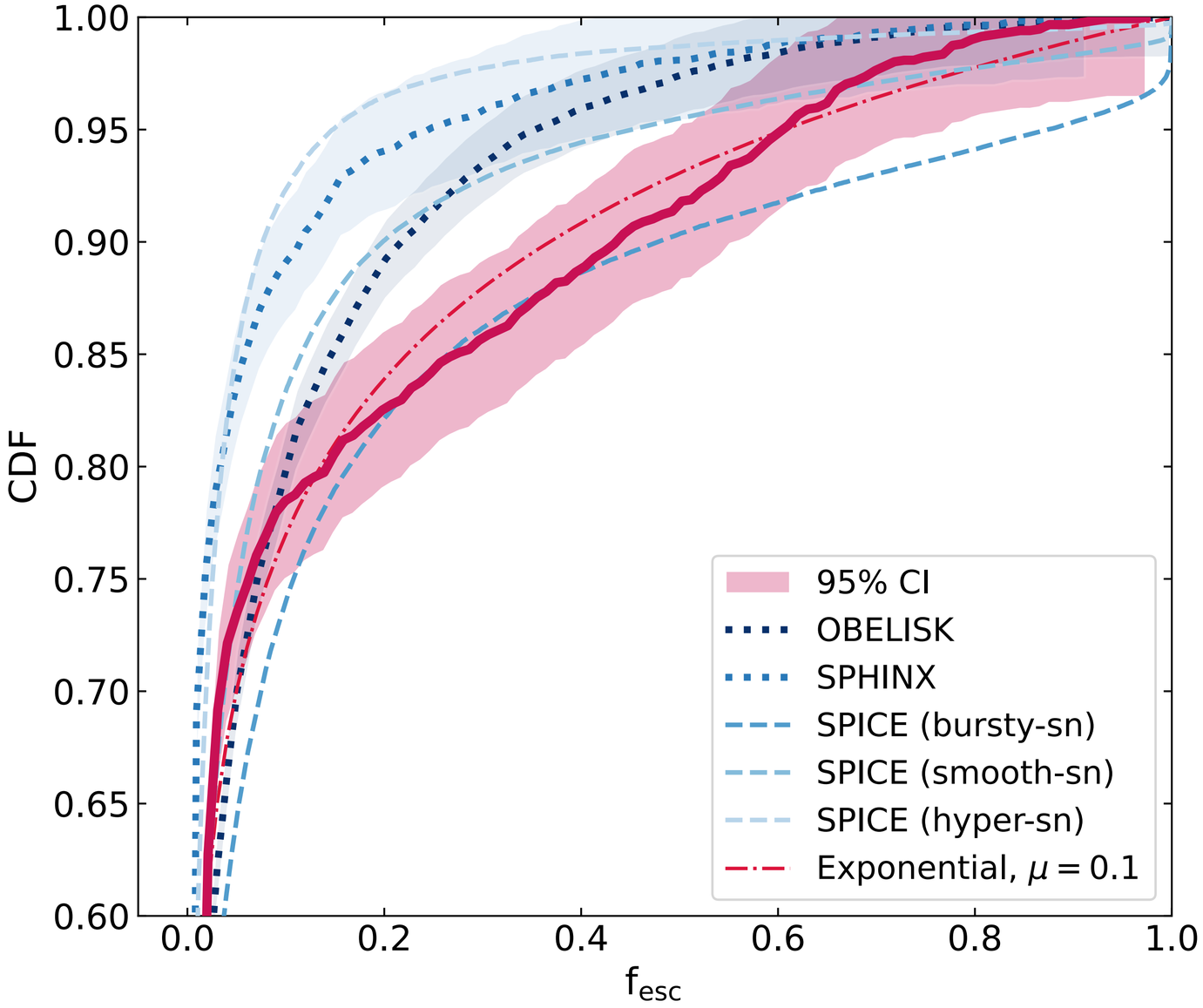
CUMULATIVE DISTRIBUTION FUNCTION

Consistent with SPICE and with an exponential with μ=0.1

Lower than SPHINX and OBELISK.



See also Katz+23, Kreilgaard+24, Bahgwat+in prep

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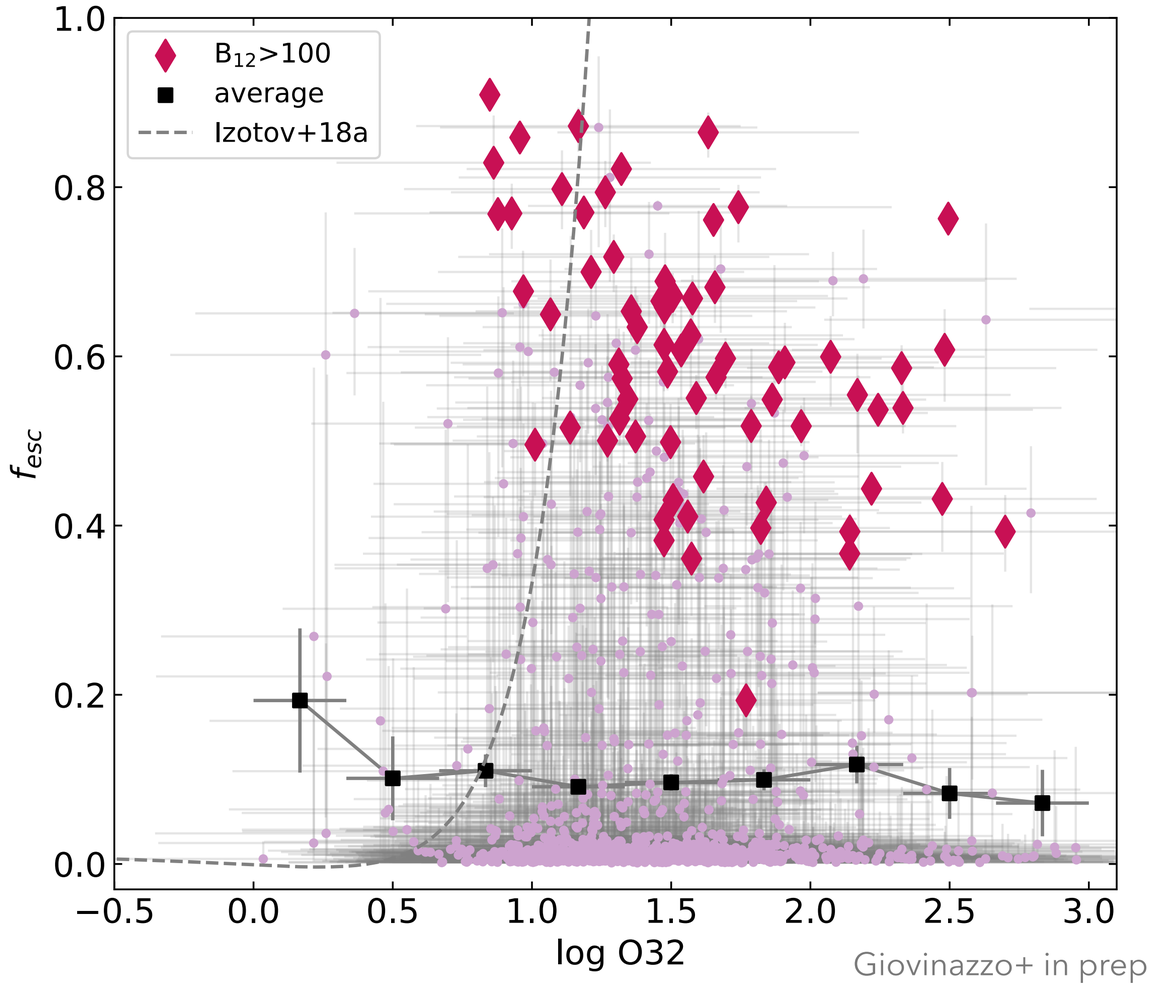
NO RELATION WITH O32 BUT INCREASE WITH Σ_{SFR}



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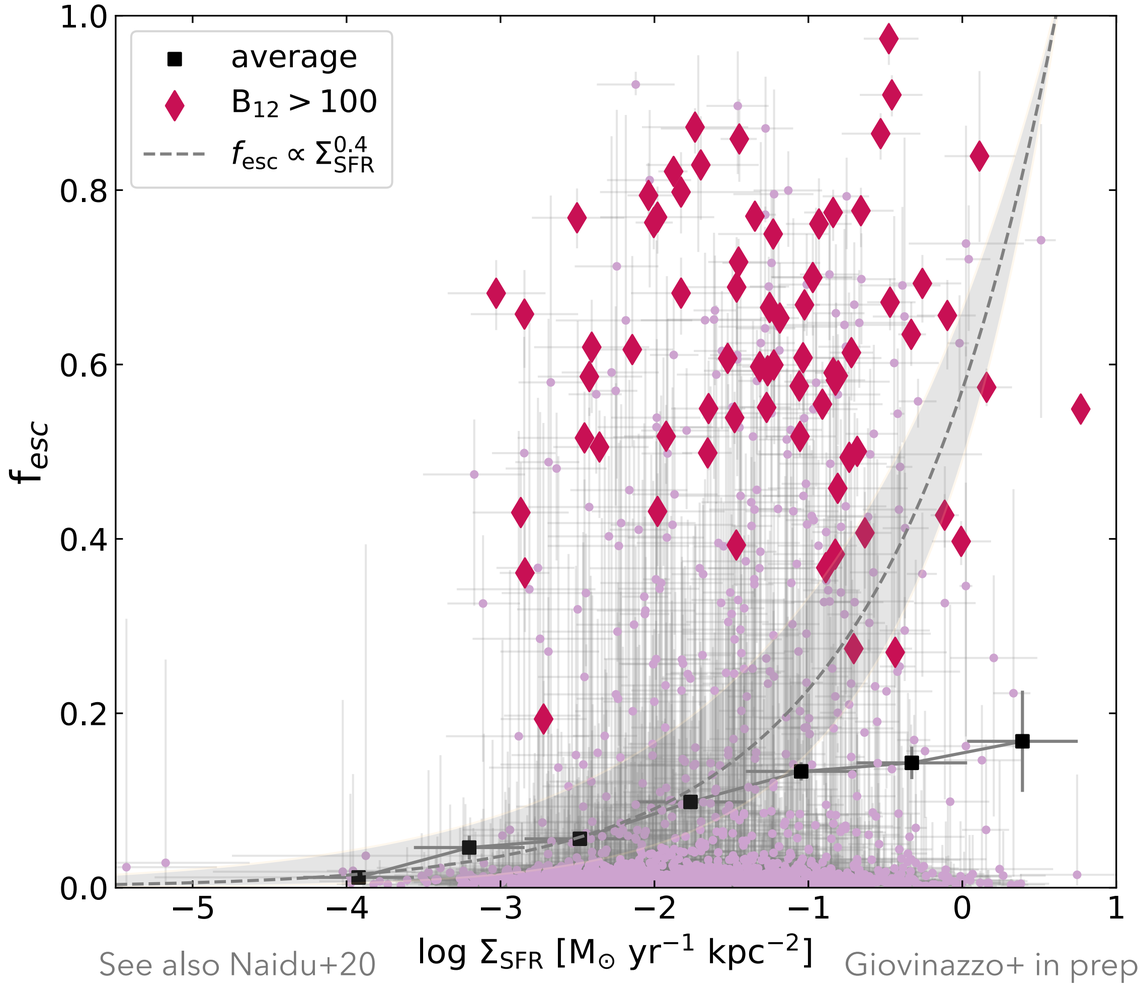

See also Naidu+20

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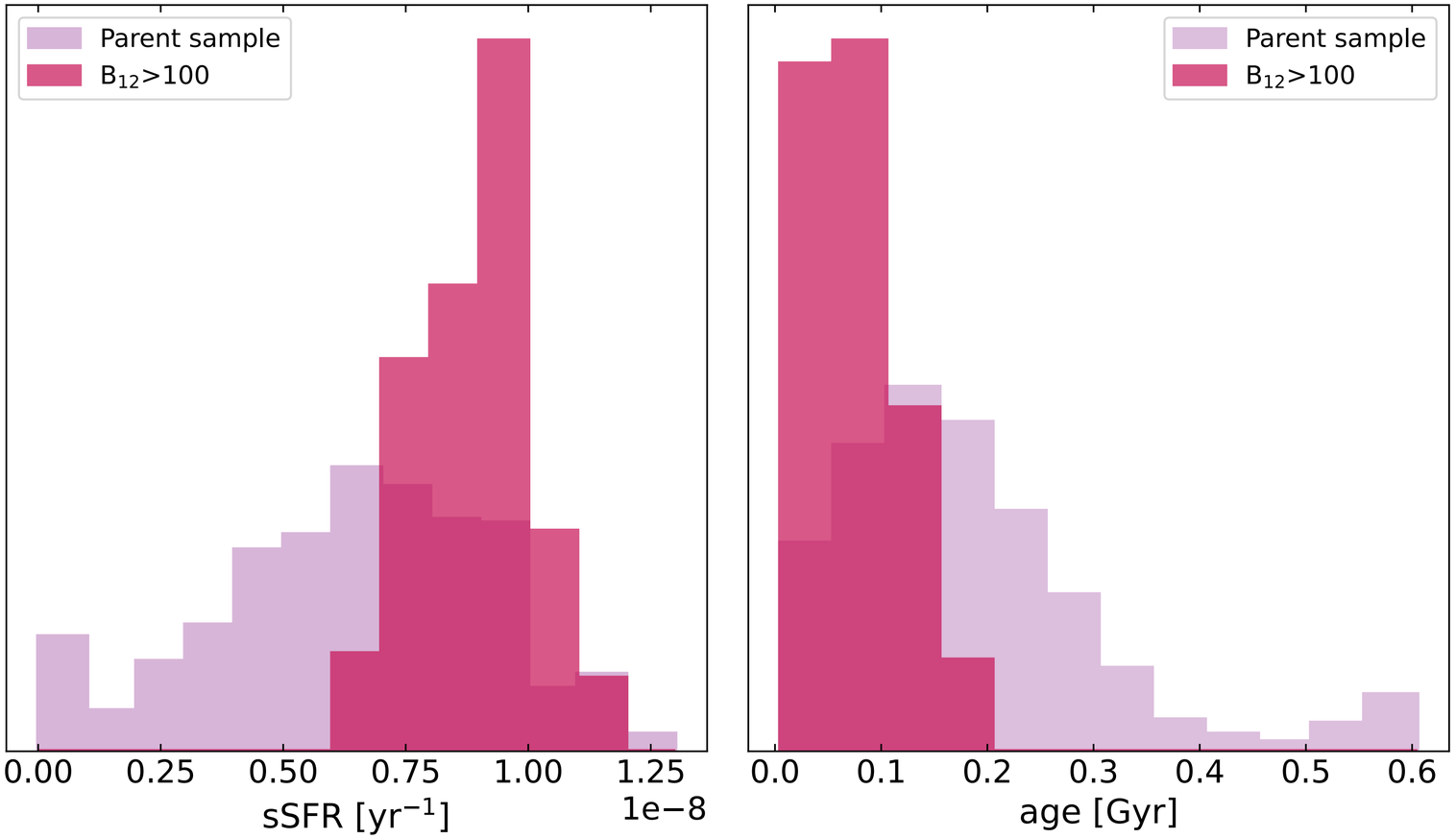
THE HIGH CONFIDENCE SAMPLE IS YOUNG AND STAR FORMING



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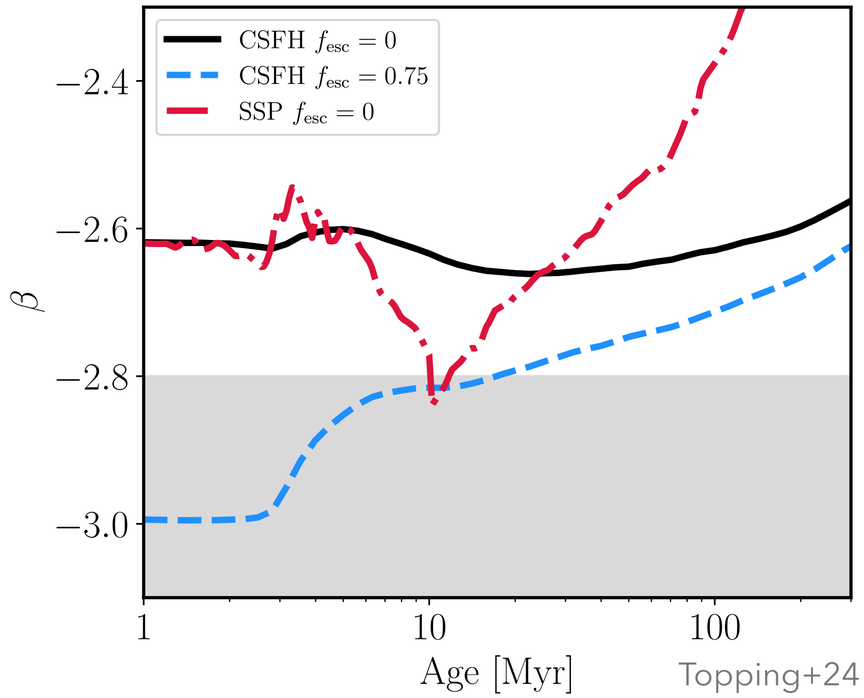
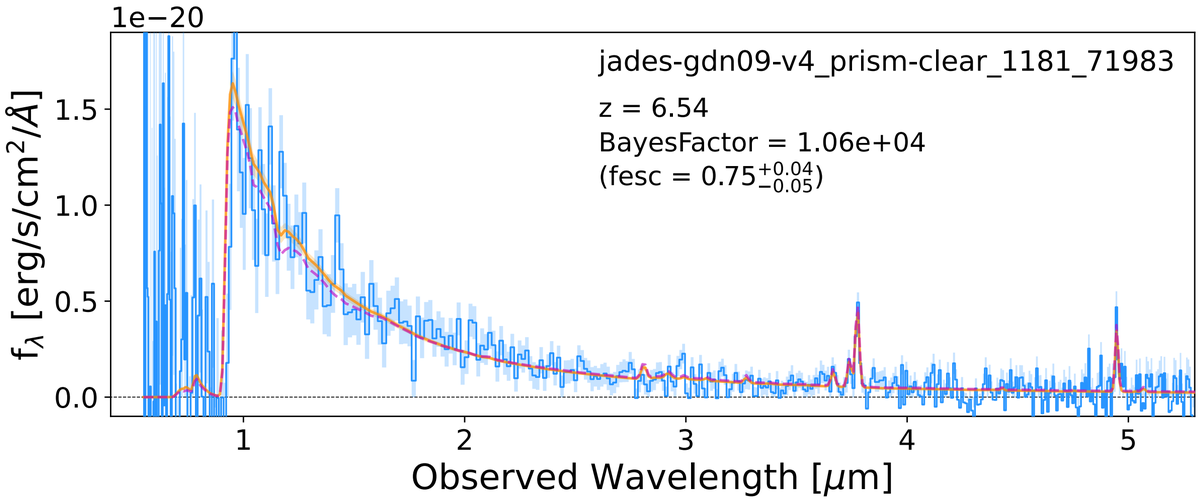
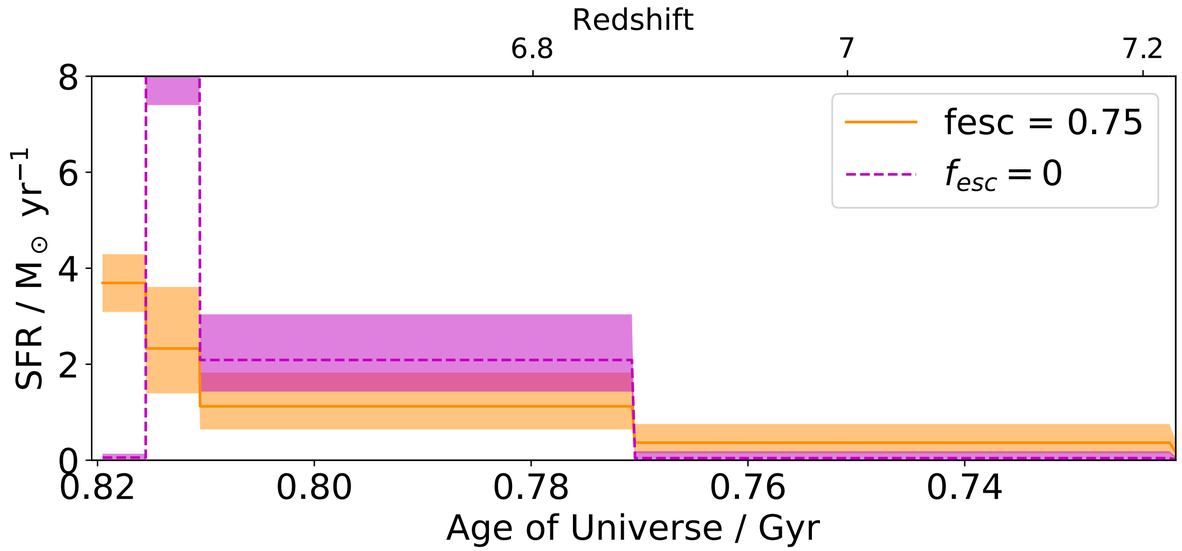
DEGENERACY WITH STAR FORMATION HISTORY

A recently quenched galaxy could also produce a steep β slope with weak lines



Topping+24





TO SUM UP

- We add a picket-fence model to Bagpipes to estimate f_{esc} from PRISM spectra of galaxies in the EoR
- Mean f_{esc} of ~5-15% at all M_{UV}
- CDF of f_{esc} consistent with an exponential distribution with $\mu = 0.1$
- Average properties overall consistent with reionization models

BACKUP

BAGPIPES PRIORS

Parameter	Range	Prior
$log_{10}(M/M_{\odot})$	[5, 12]	Linear
$\mathrm{Metallicity(Z/Z_{\odot})}$	[0.01, 0.5]	log
f_{esc}	[0.001, 1]	log
logU	[-3.5, -1.5]	Linear
A_{V}	[0,0.5]	Linear
$\Delta\mathrm{SFR}$	[-3, 3]	Student-t

RECOVERY SIMULATIONS