Sakura CLAW

Relating Si II ISM transitions to Lyman-alpha in low-redshift galaxies

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LARS Team

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MUSE Collaboration

Lyα as a probe of the CGM

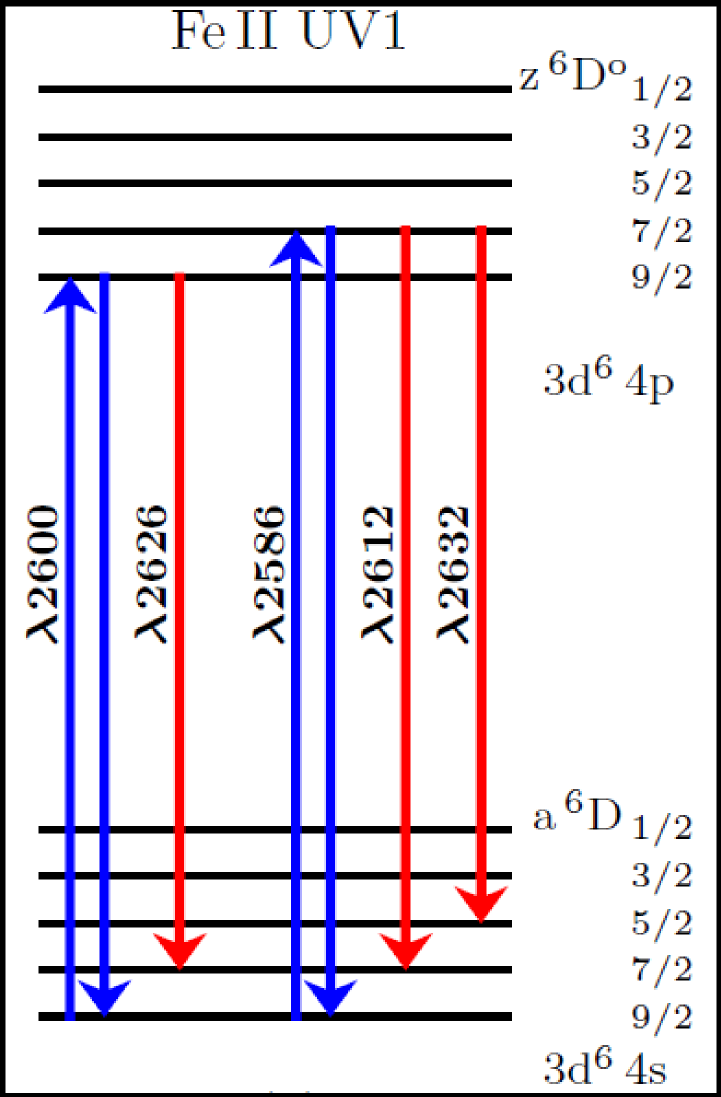
↔

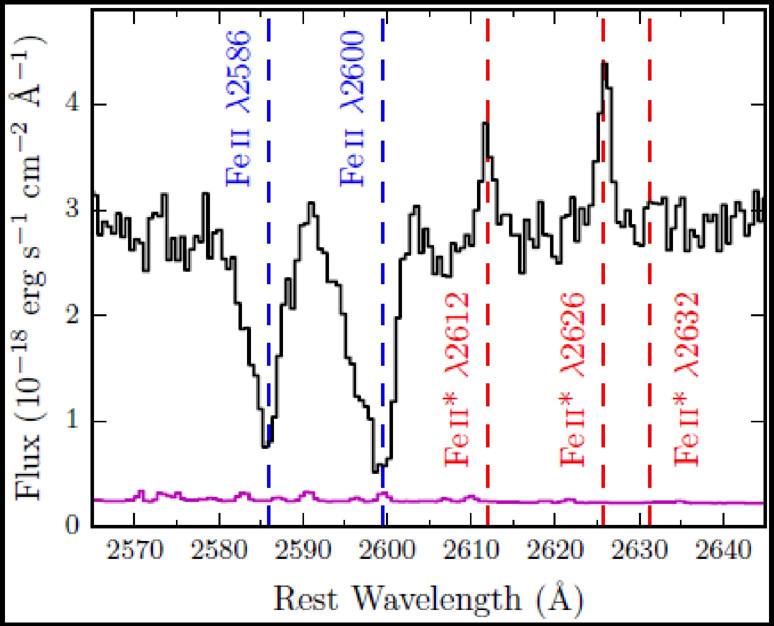
CGM as a probe of Lyα

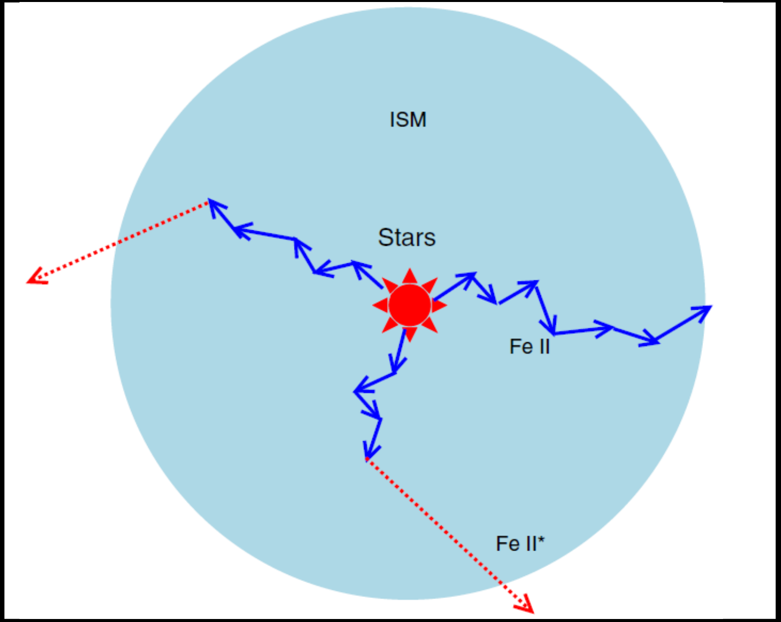
How do outflows contribute to Lyα escape ?

- HI column density
- Dust
- Geometry

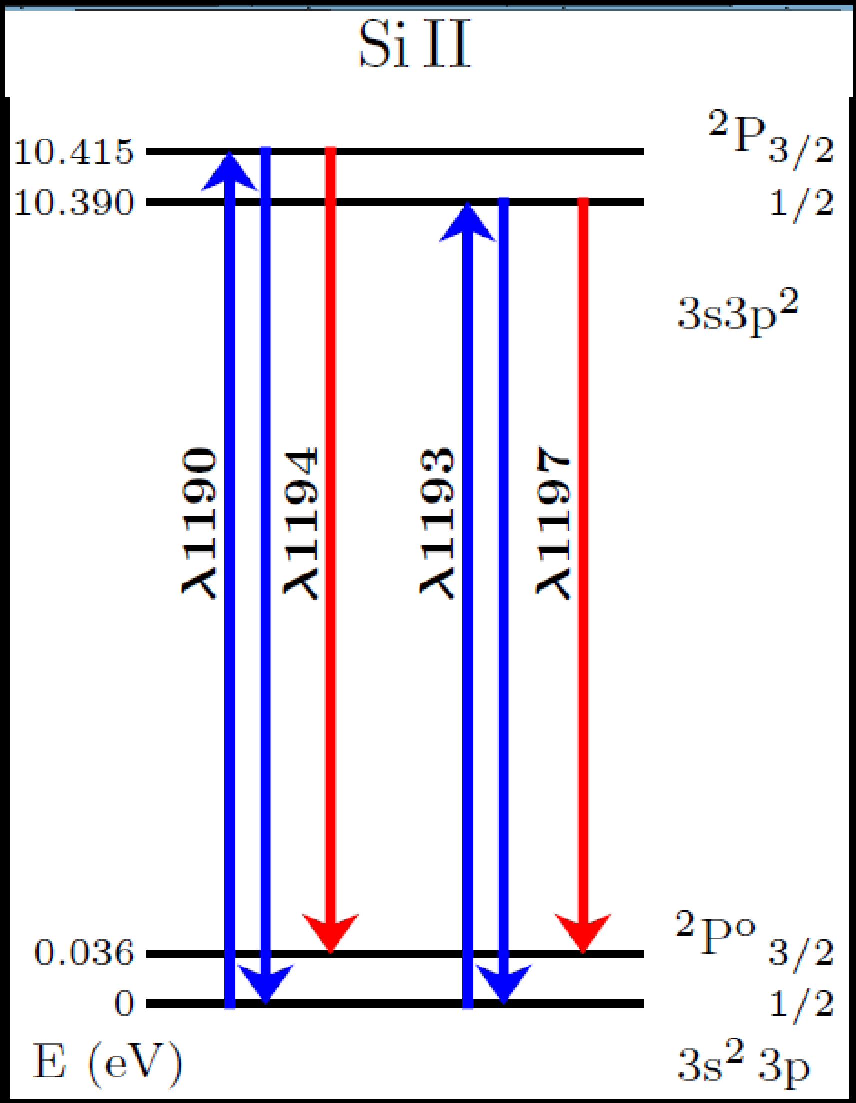
FeII* emission

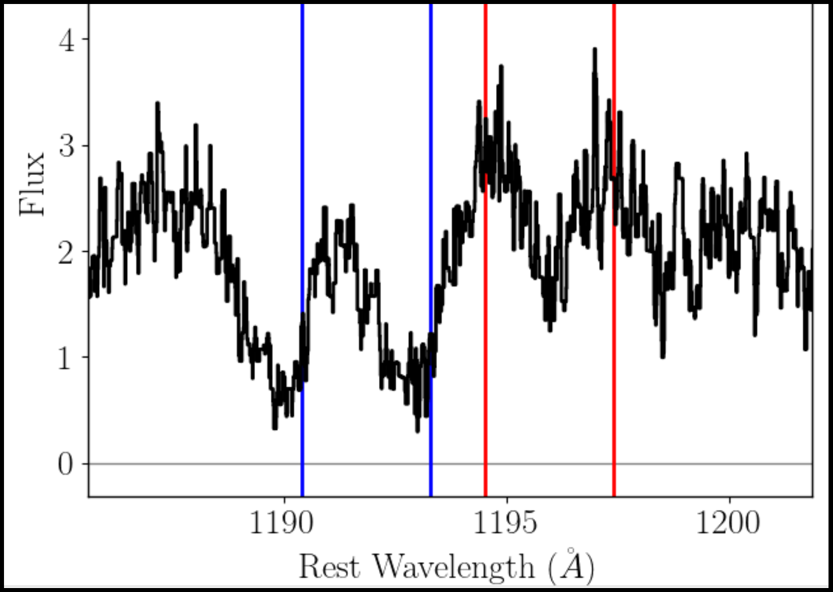


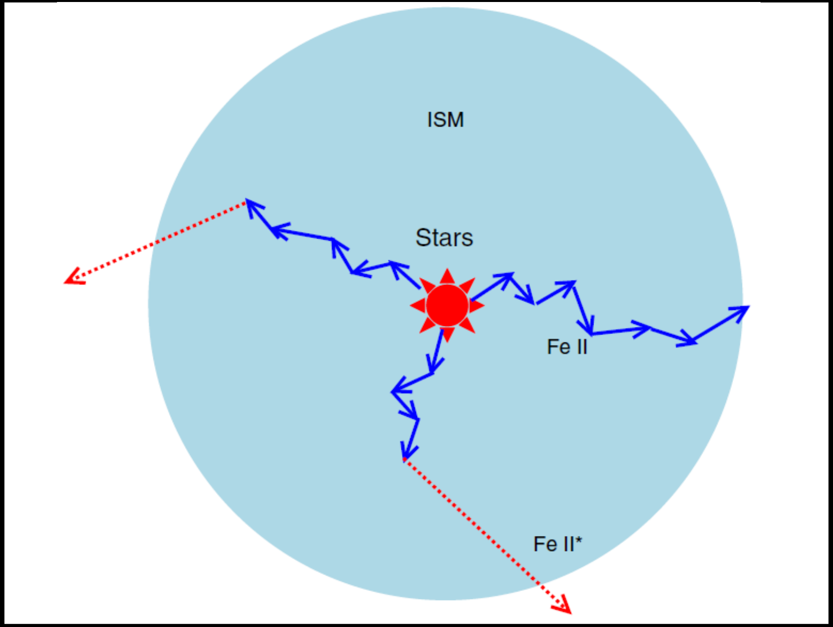




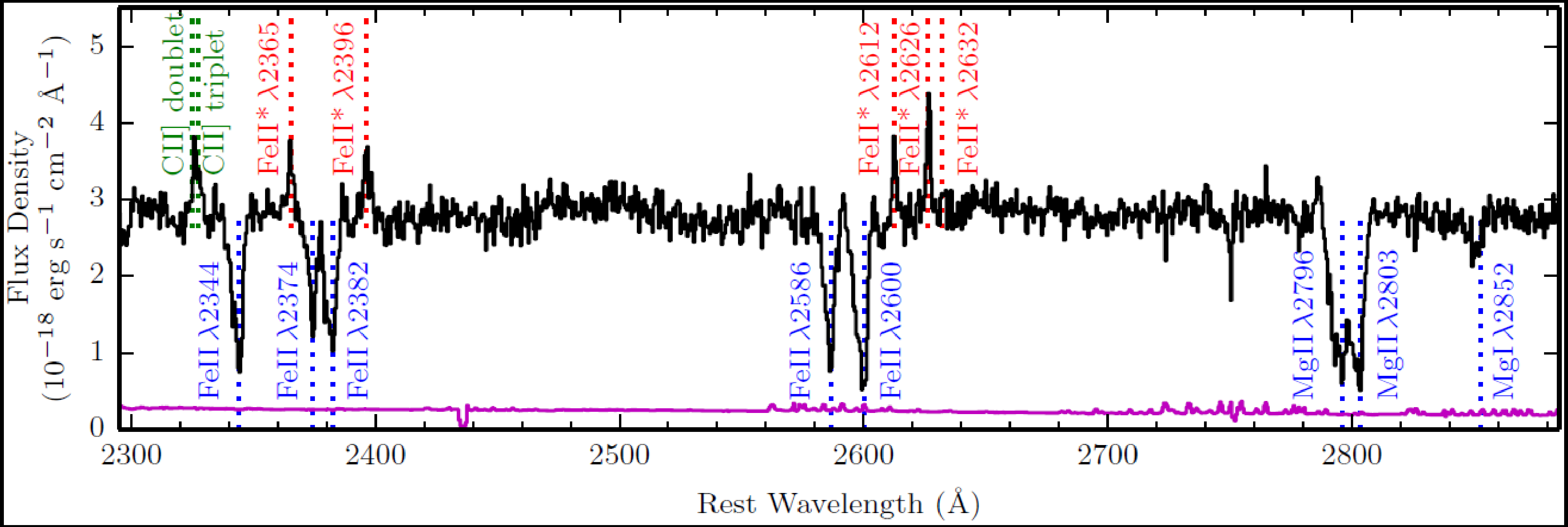
SiII* emission

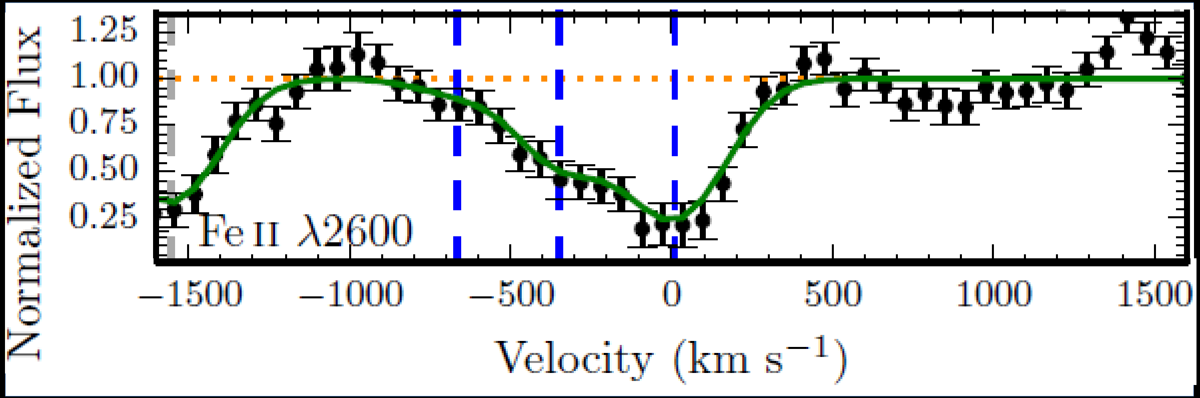






Galactic outflows in emission

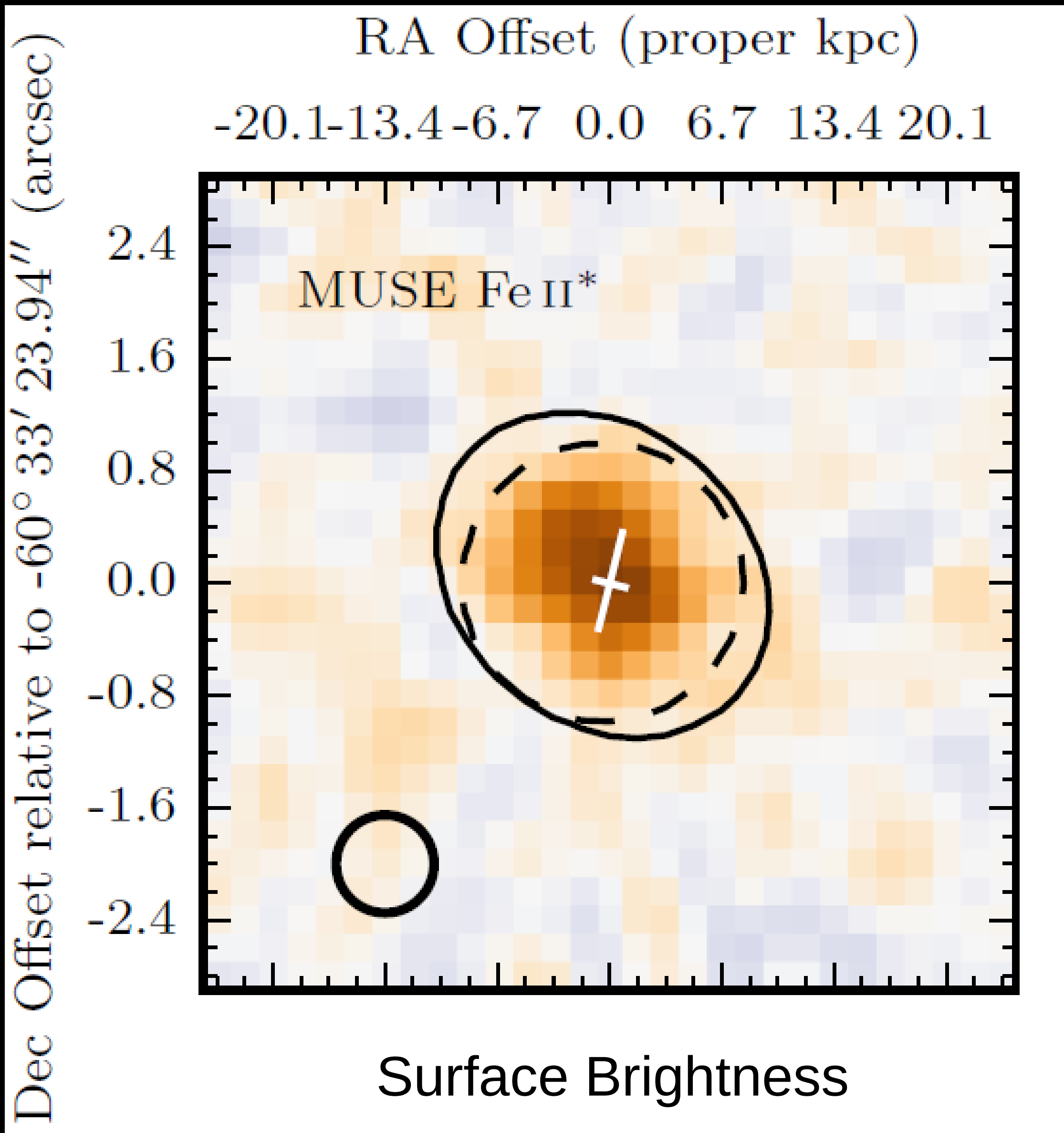




MUSE [OII] emitter
z ~ 1.29

Finley et al. 2017a

FeII* emission is extended



$R_{1/2}$ is 70 % larger than for the stellar continuum, [OII] emission

$$R_{1/2,\,\mathrm{Fe\,II*}} = 4.1 \pm 0.4\ \mathrm{kpc}$$

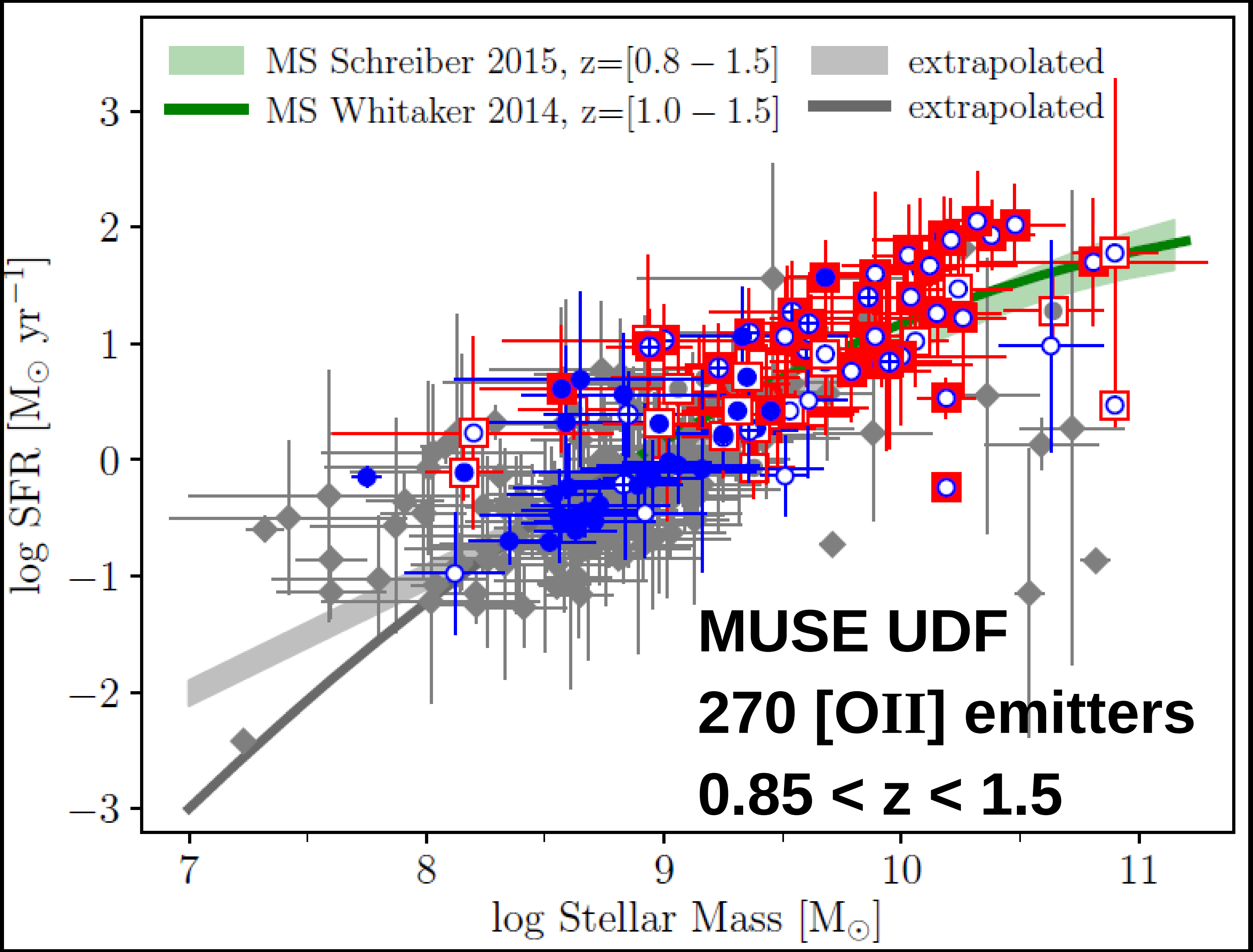
$$R_{1/2,\star} \simeq 2.34 \pm 0.17$$

$$R_{1/2,[\mathrm{O\,II}]} = 2.76 \pm 0.17\ \mathrm{kpc}$$

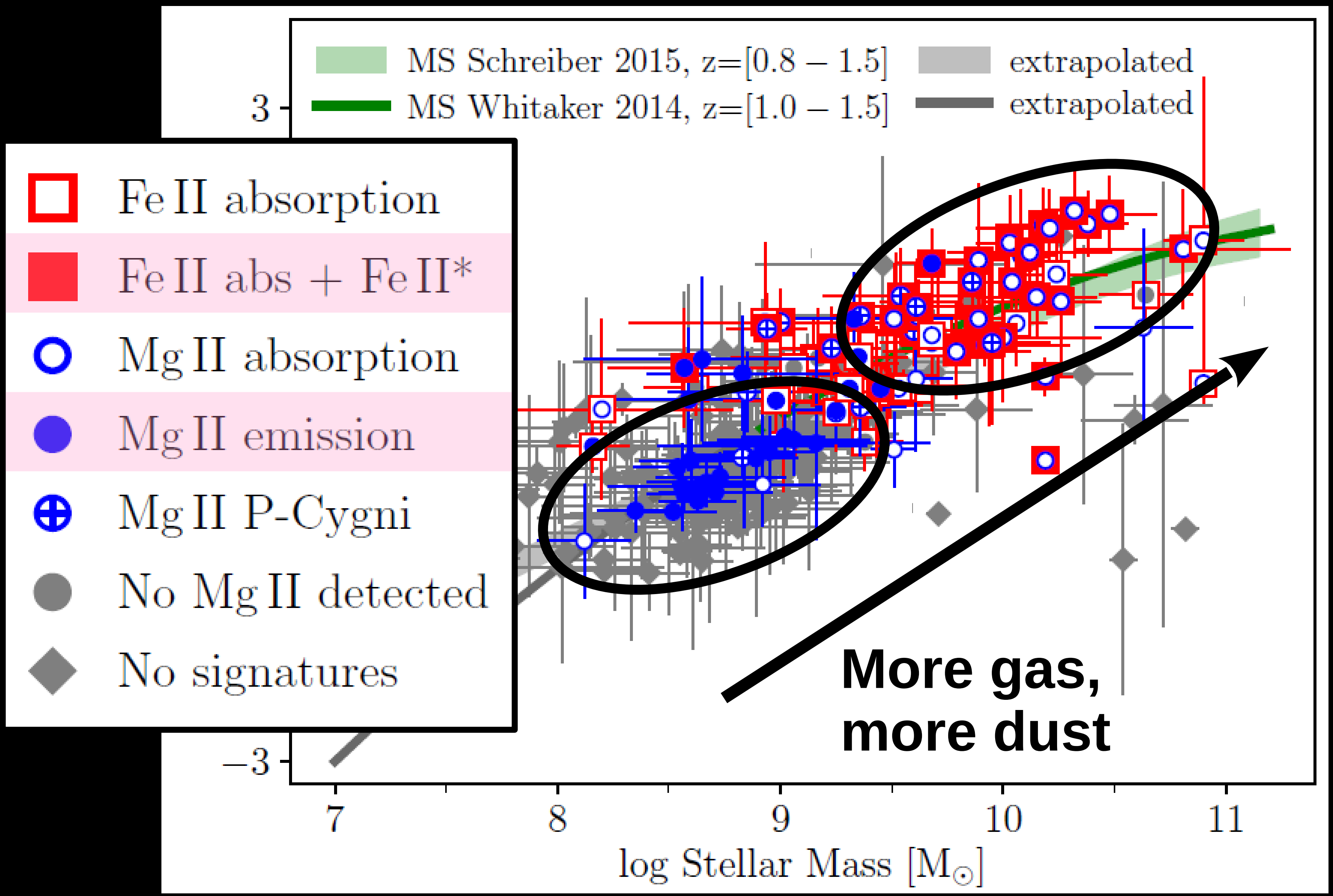
$$\Sigma_{\mathrm{SFR}} = 1.6\ \mathrm{M}_\odot\ \mathrm{kpc}^{-2}$$

Finley et al. 2017a

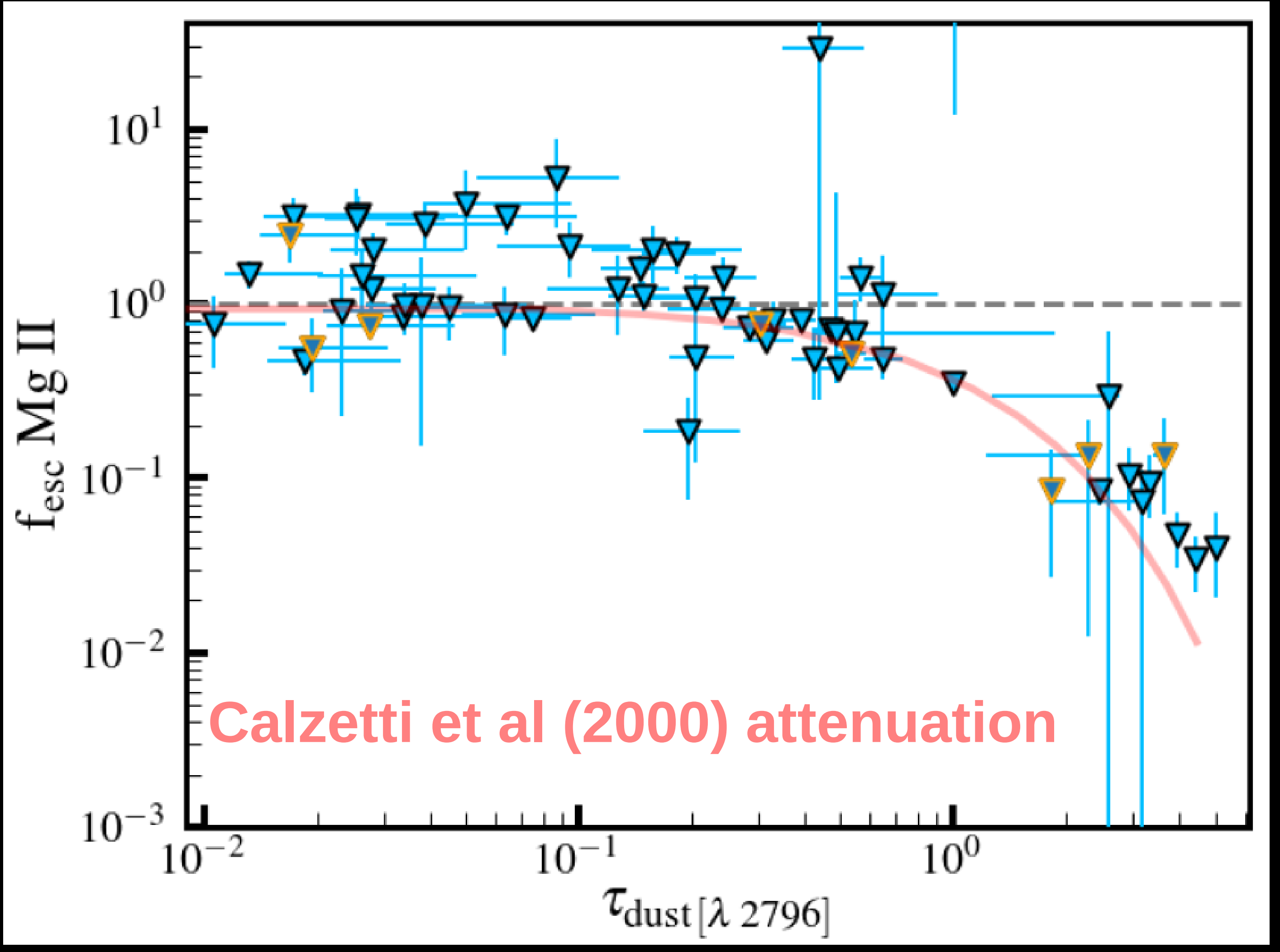
Emission signatures vary along MS



Emission signatures vary along MS



MgII escape fraction



MgII escape follows dust attenuation

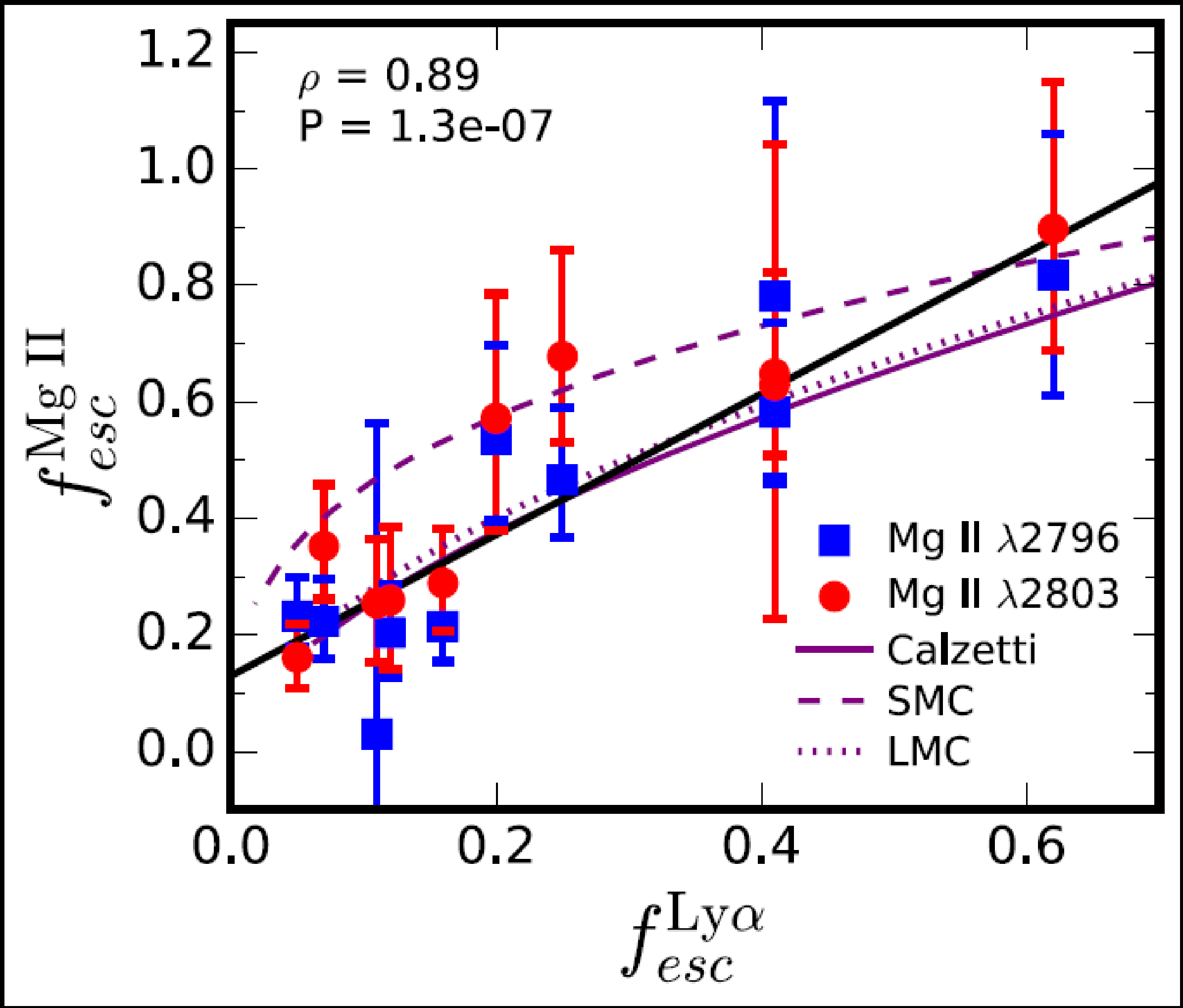
➔ Not much resonant scattering

Highest optical depth ➔ lowest MgII fesc, like Lyα

Feltre et al. 2018, in prep.

MgII escape + Lyα escape

Henry et al. 2018



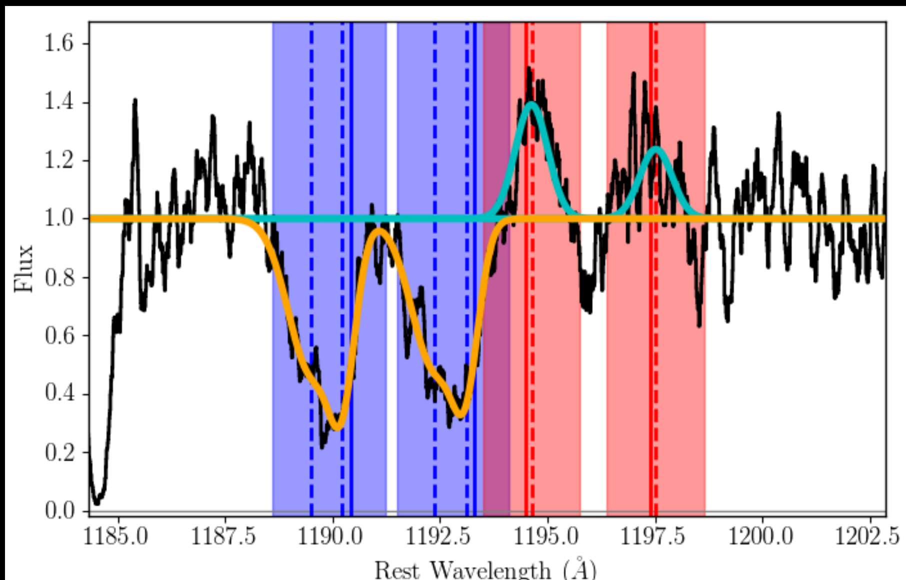
10 Green Peas
z ~ 0.2 – 0.3
HST COS

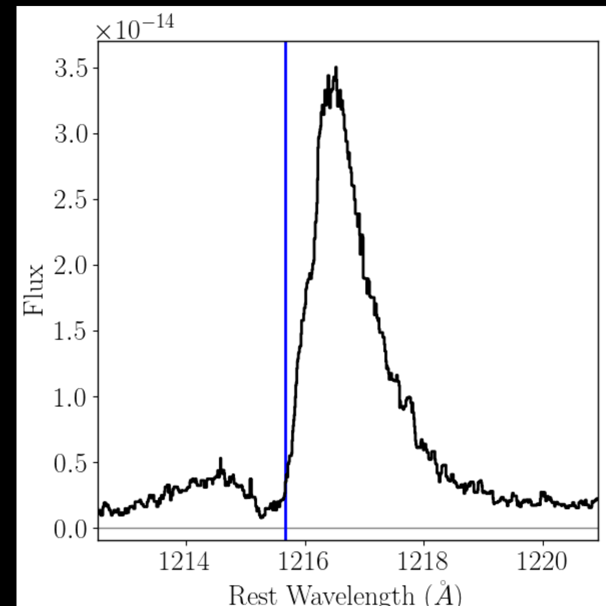
Lyα and MgII are both resonant lines

➔ similar impact from scattering

Does non-resonant emission (SiII*, FeII*) trace Lyα escape ?

Fitting SiII & SiII*





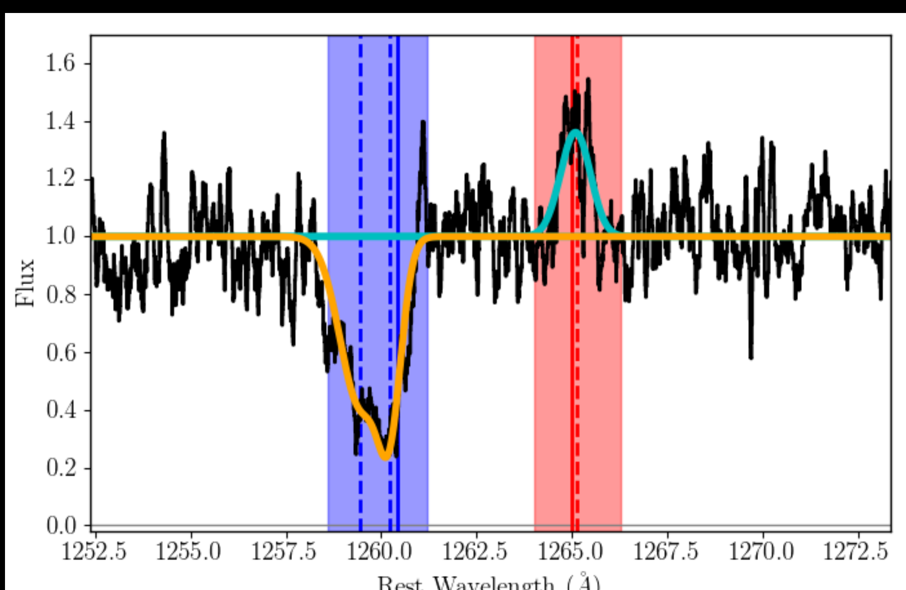
LARS

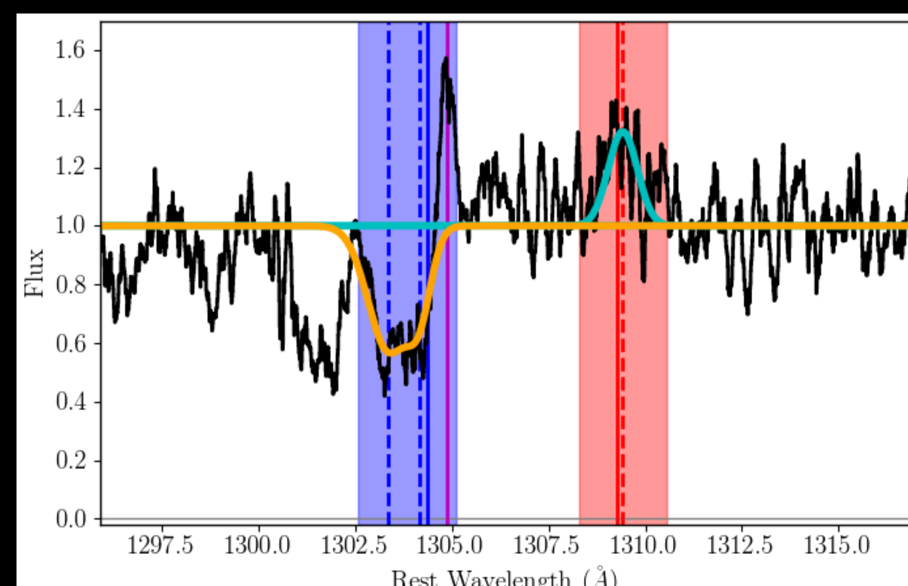
+

GPs

+

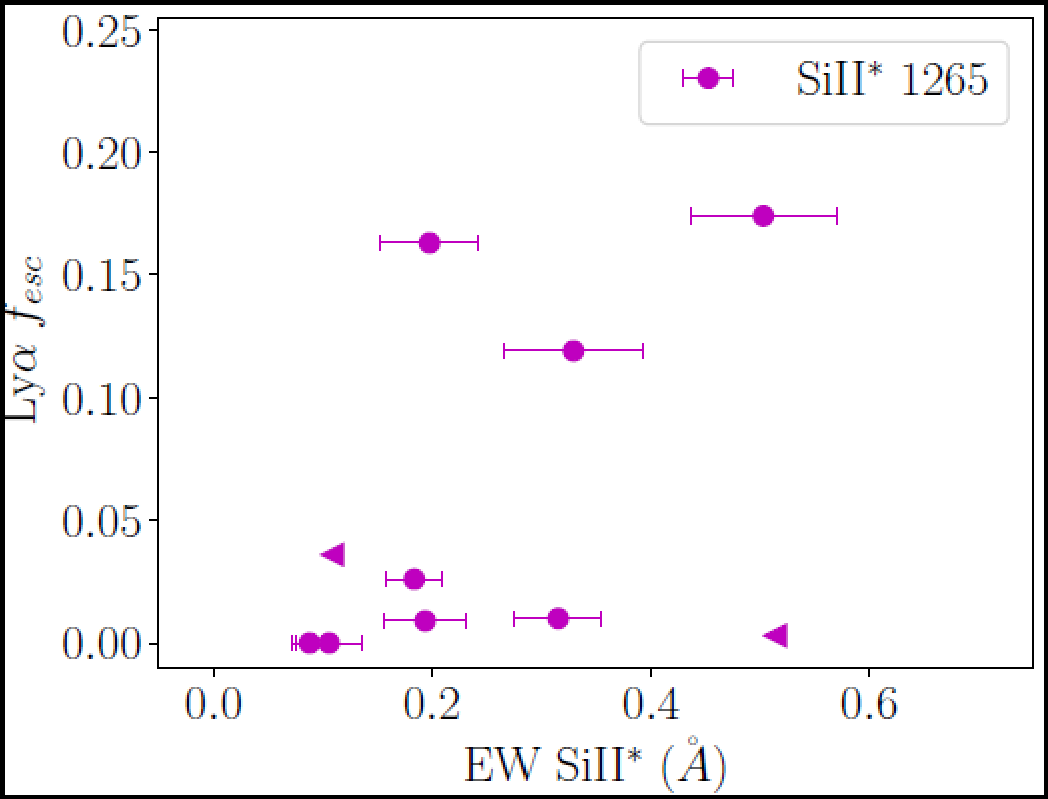
LAEs

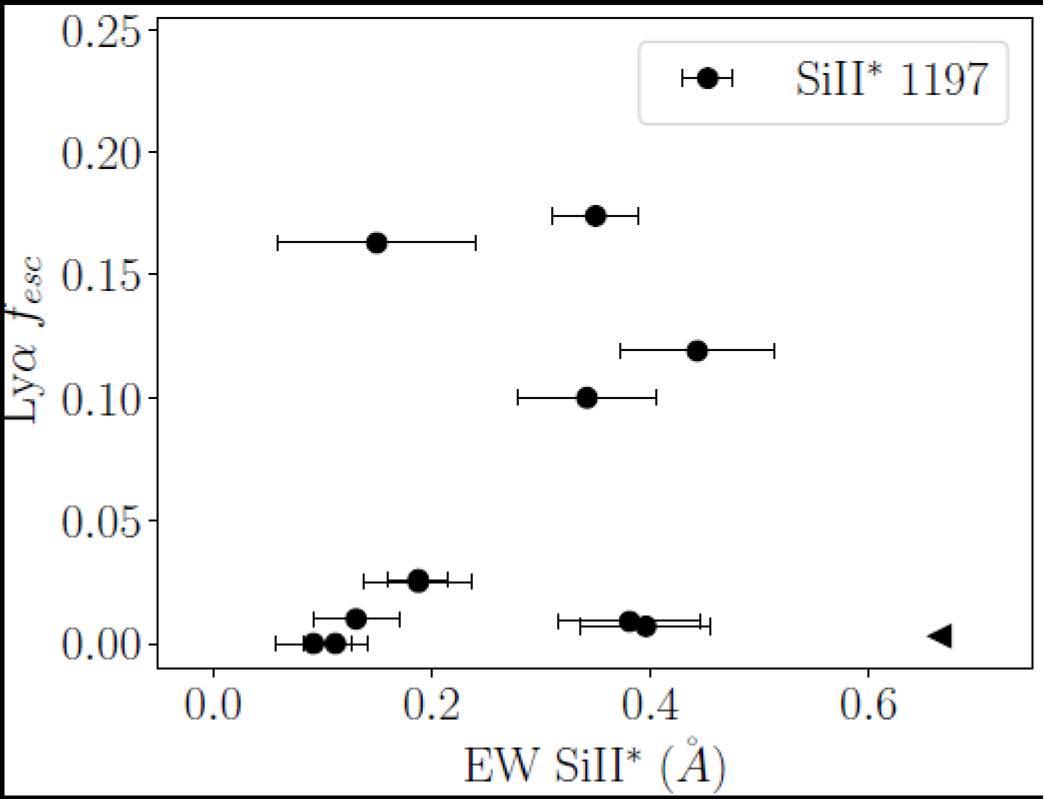




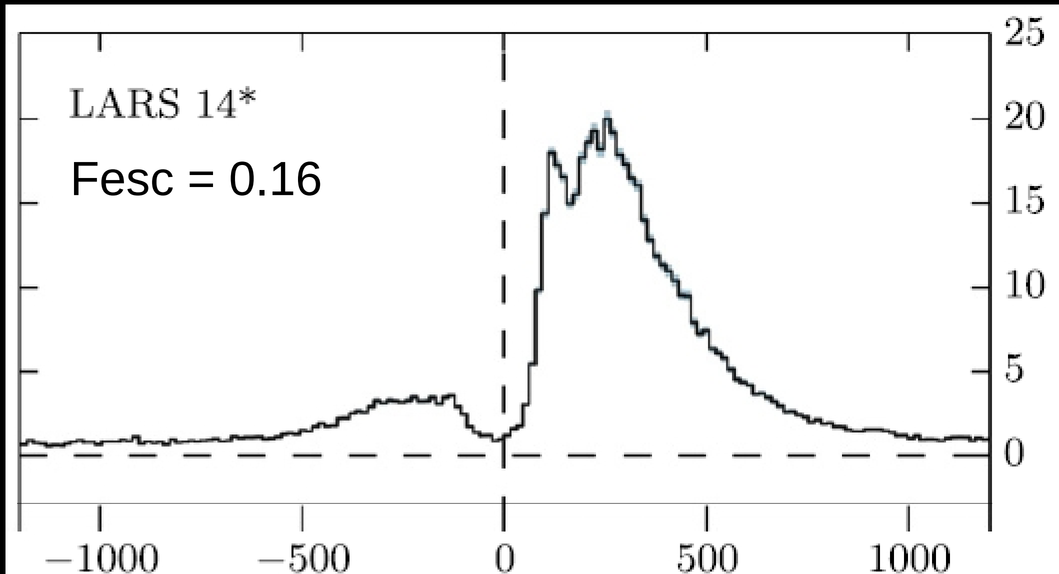
SiII* emission + Lyα escape

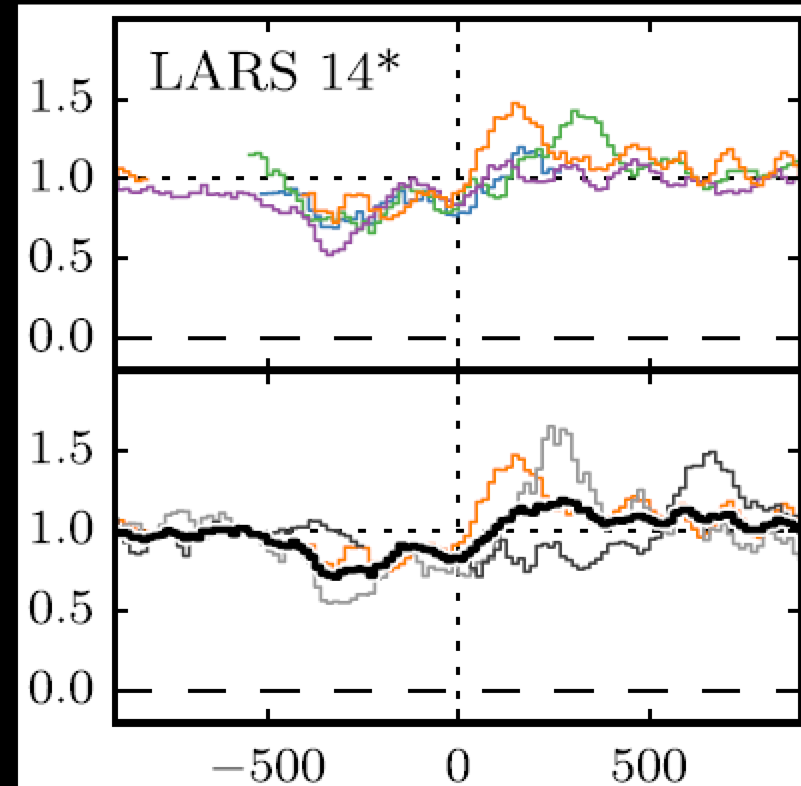
LARS 1 – 14

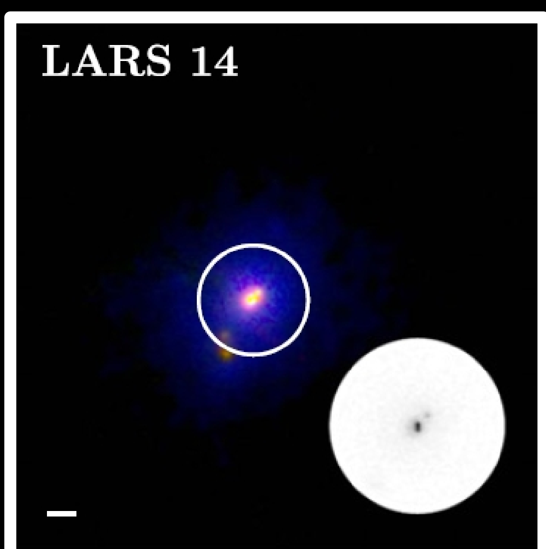


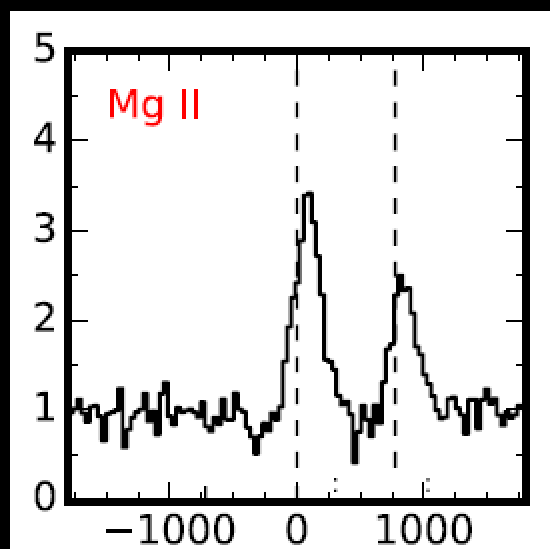


SiII* vs SiII in LARS 14







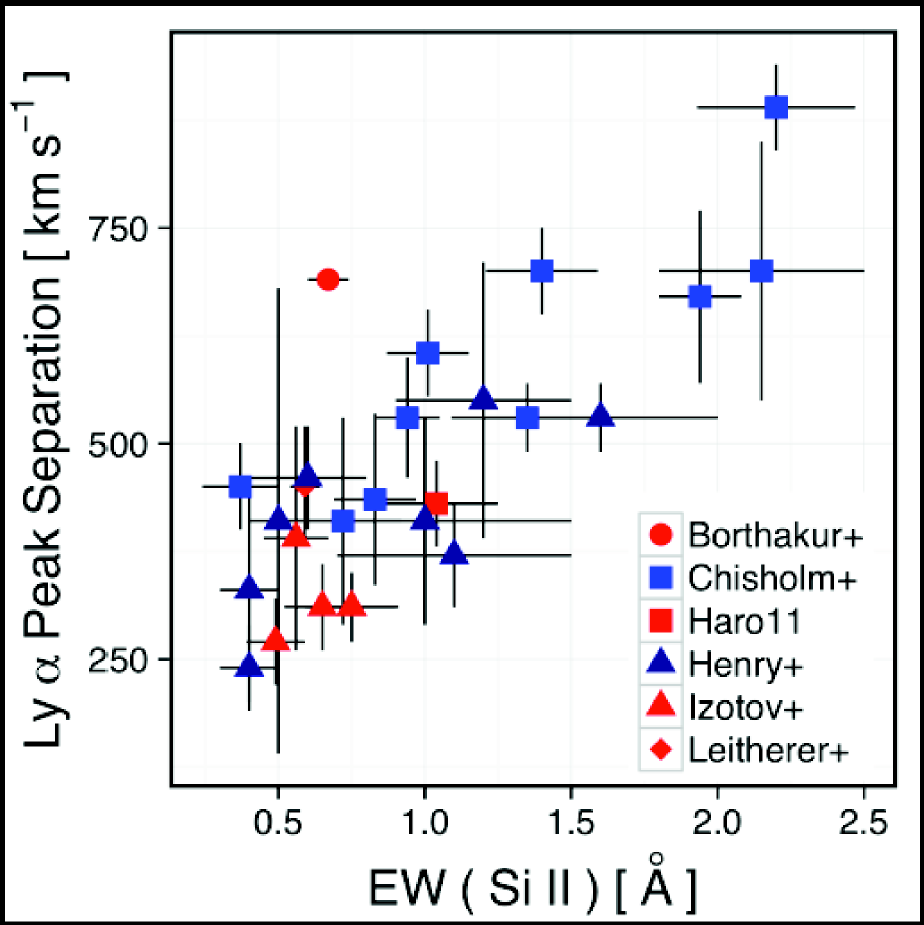


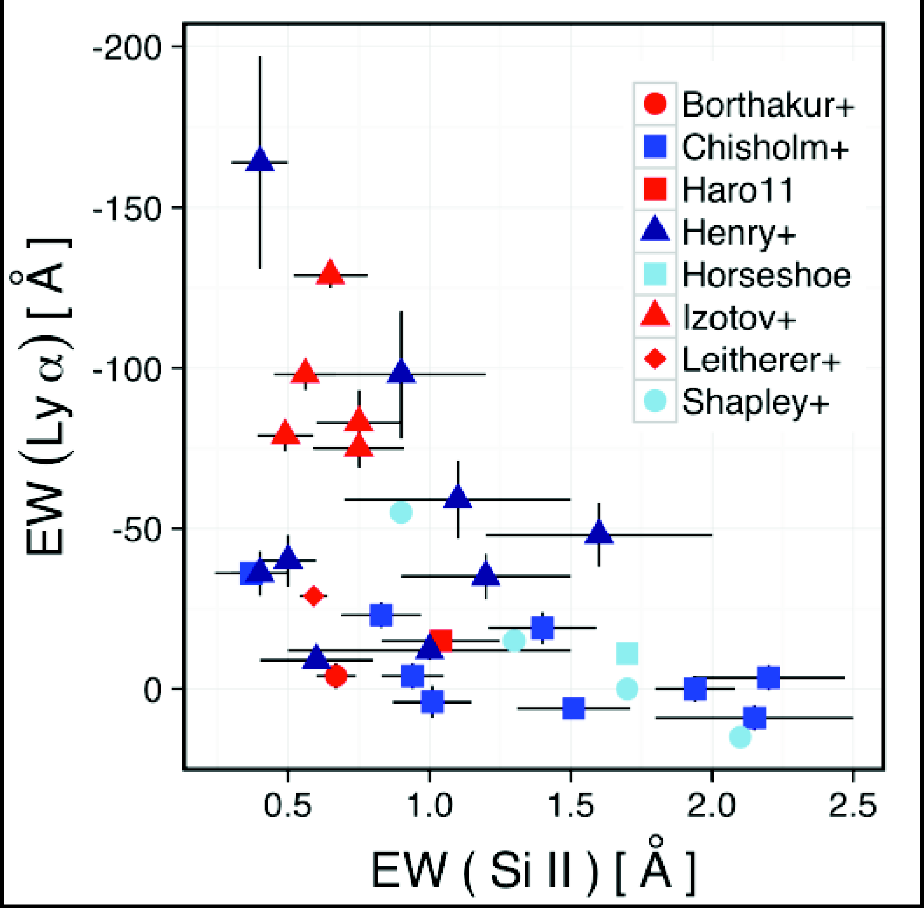
Rivera-Thorsen et al. 2015

Henry et al. 2018

Sill emission + Lyα properties

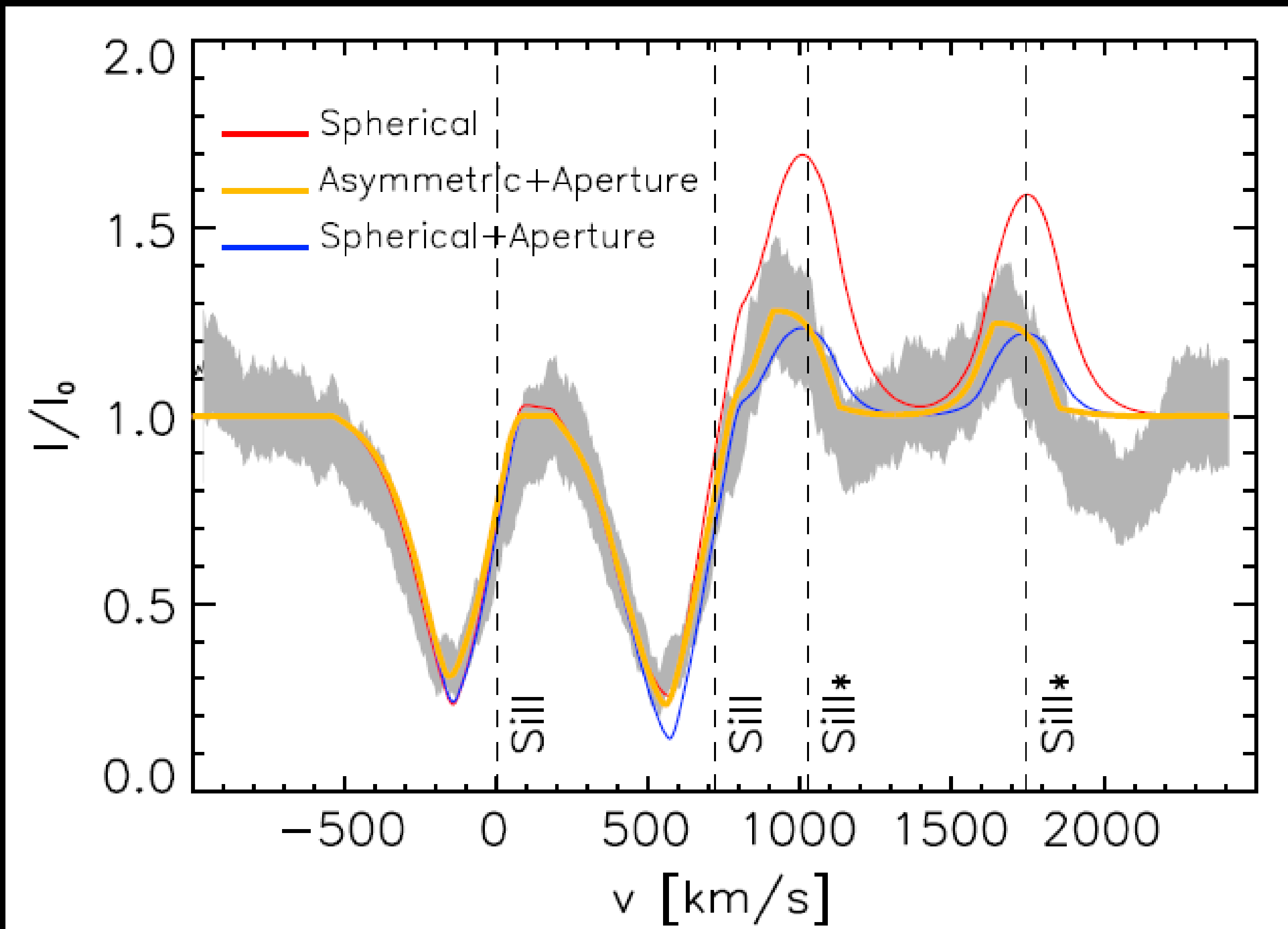
Chisholm et al. 2017





Outflow Models

Scarlata & Panagia 2015



RASCAS outflow models

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J. Blaizot
L. Michel-Dansac
A. Verhamme

Impact of
– geometry
– dust
– velocity & density profiles on resonant absorption + non-resonant emission

Conclusions and Future Prospects

- Trace galactic outflows from FeII*, SiII*, CII*
  - Reach z ~ 3 with MUSE
- Combine observations and models to constrain geometry, dust content, N(HI)
- Do the physical conditions that favor detecting non-resonant emission also favor Ly**α escape ?**

Thank you !