

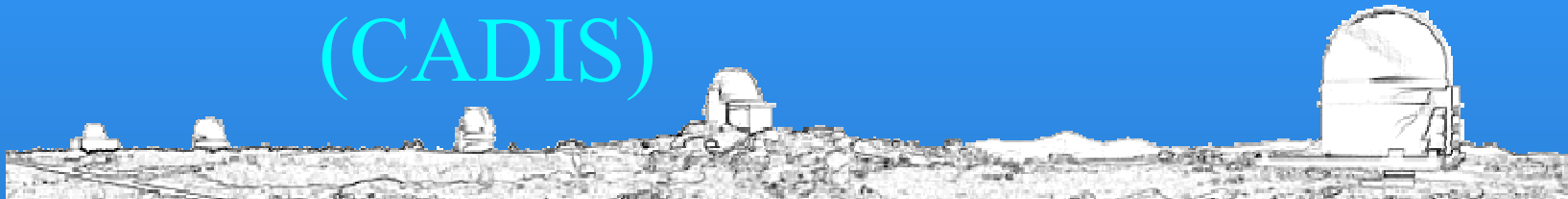
Constraints to the evolution of Lyman- α bright galaxies between $z\sim 3$ and $z\sim 6$

Christian Maier
MPIA Heidelberg

Outline

- Selection of Lyman- α galaxy candidates from the CADIS (**C**alar **A**lto **D**eep **I**maging **S**urvey) emission line sample
- Spectroscopic follow-up with the VLT
- The abundance of Lyman- α galaxies at $3 < z < 6$, and implications for the epoch of reionization

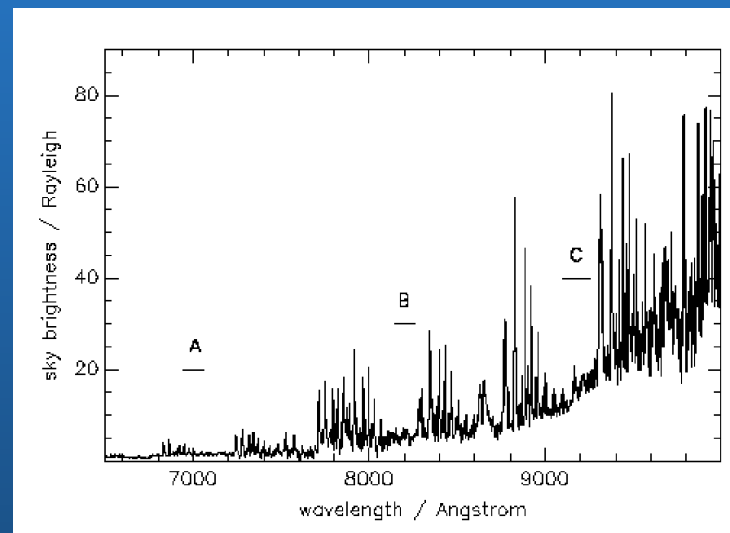
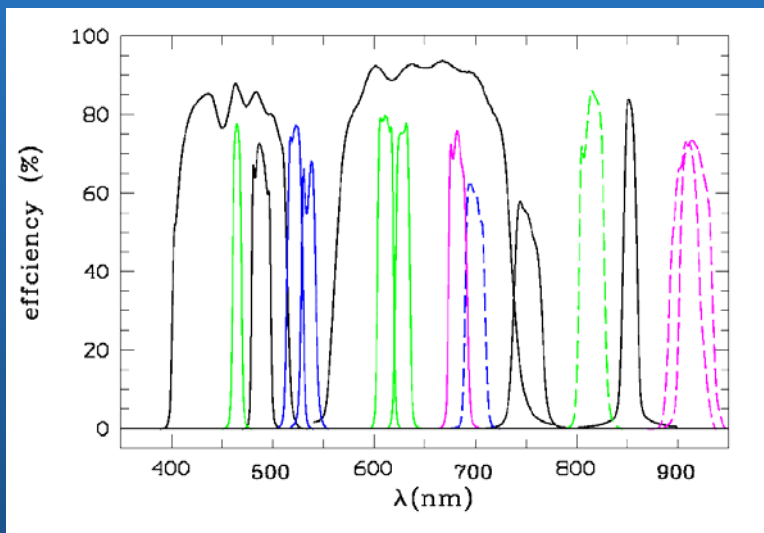
The Calar Alto Deep Imaging Survey (CADIS)



4 CADIS fields (field size $\sim 100\text{arcmin}^2$)

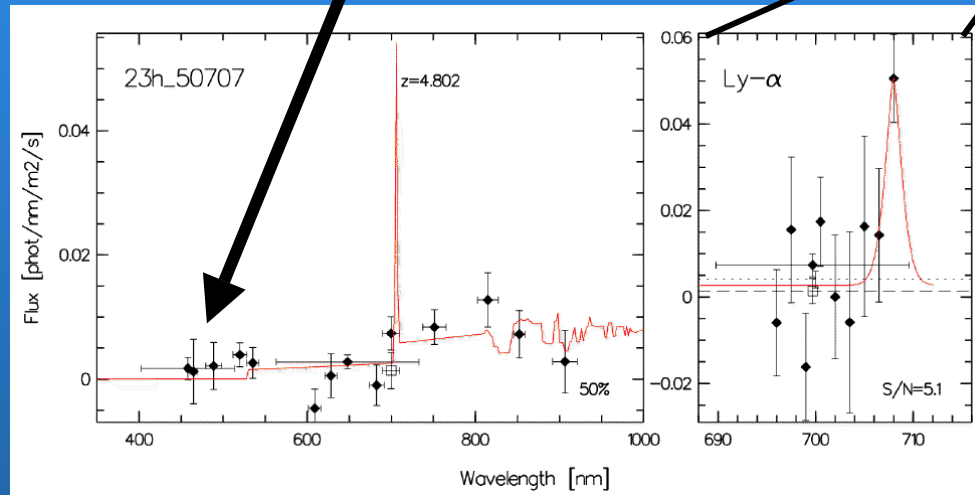
14 optical filter (+2 NIR)

3 Fabry-Perot Windows



Selection of Lyman- α candidates

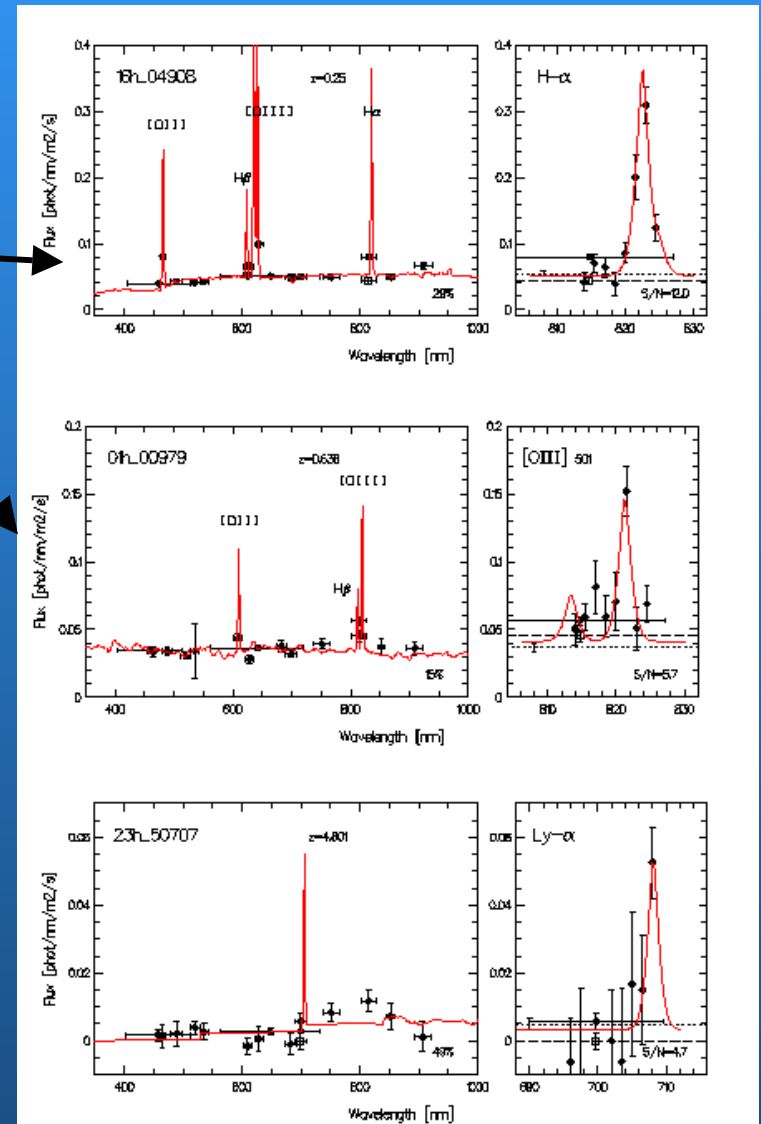
- 845 emission lines detected by the Fabry-Perot
- No flux in CADIS-B filter



- No bright objects closer than 3 arcseconds
- No signal in veto-filters

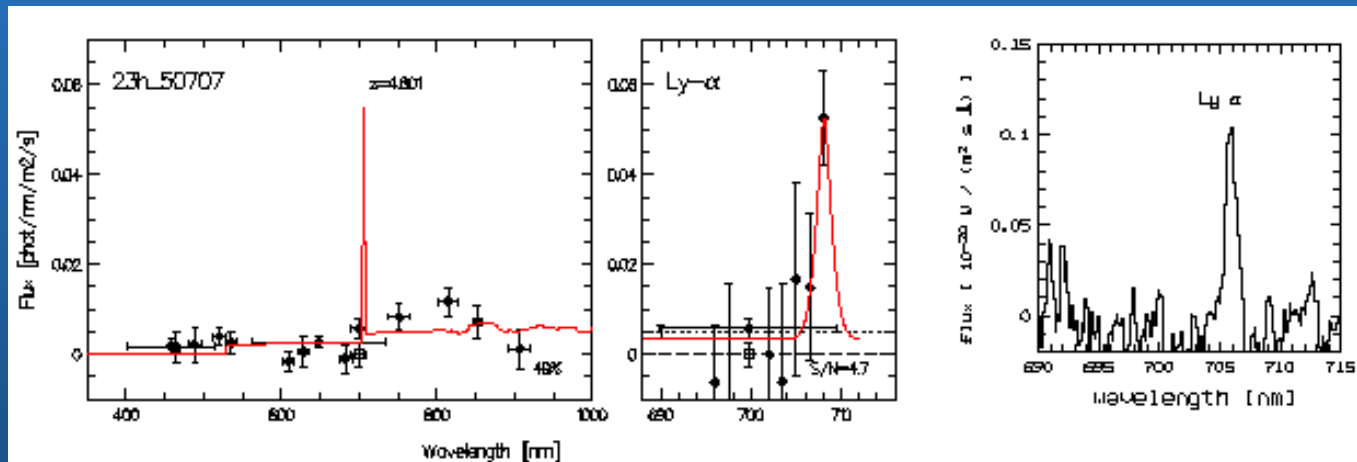
Selection of Lyman- α candidates

- Signal in veto-filters \rightarrow Low redshift galaxies
- Continuum step across the emission line or no continuum detected
- 16 likely [OII] λ 3727 lines
- 21 Lyman- α candidates
~3% of the ELGs



Spectroscopic follow-up

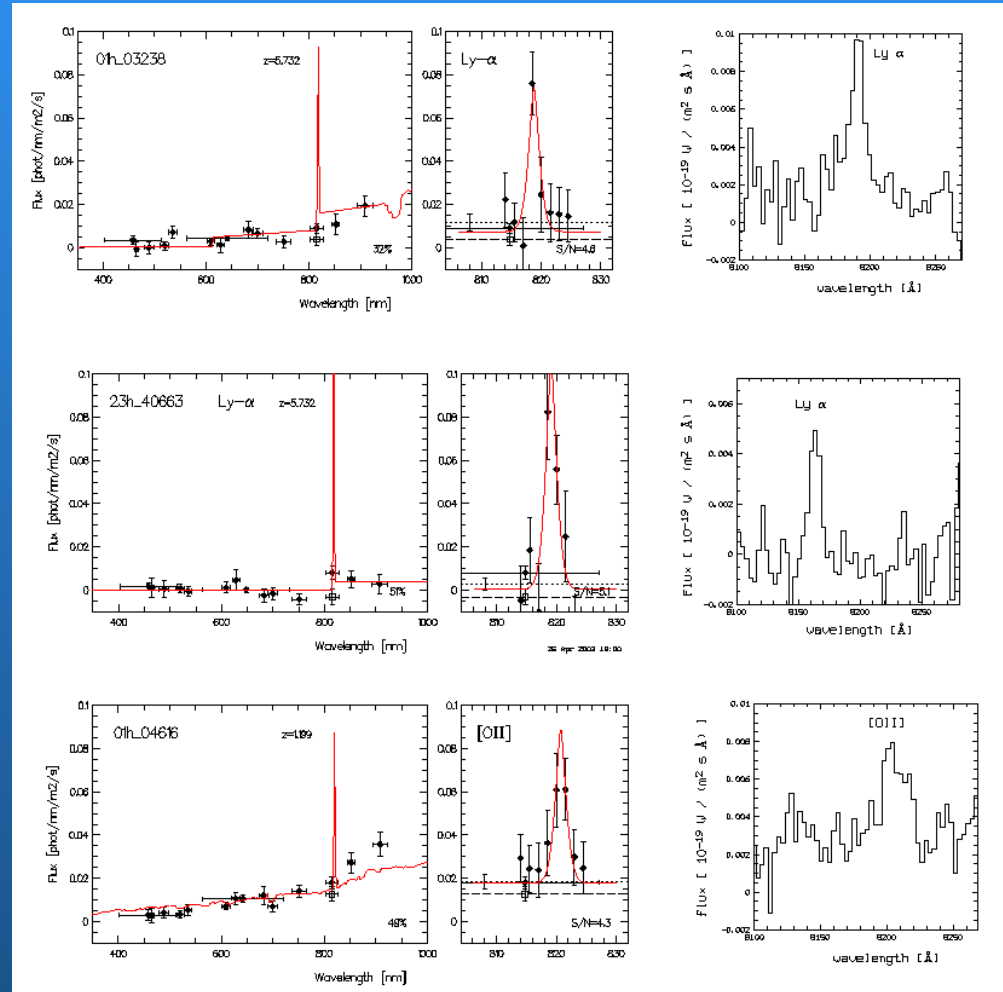
- spectroscopic follow-up of 8 Lyman- α candidates with the VLT
- 4 verified emission lines
- 1 likely Lyman- α galaxy at $z \sim 4.8$



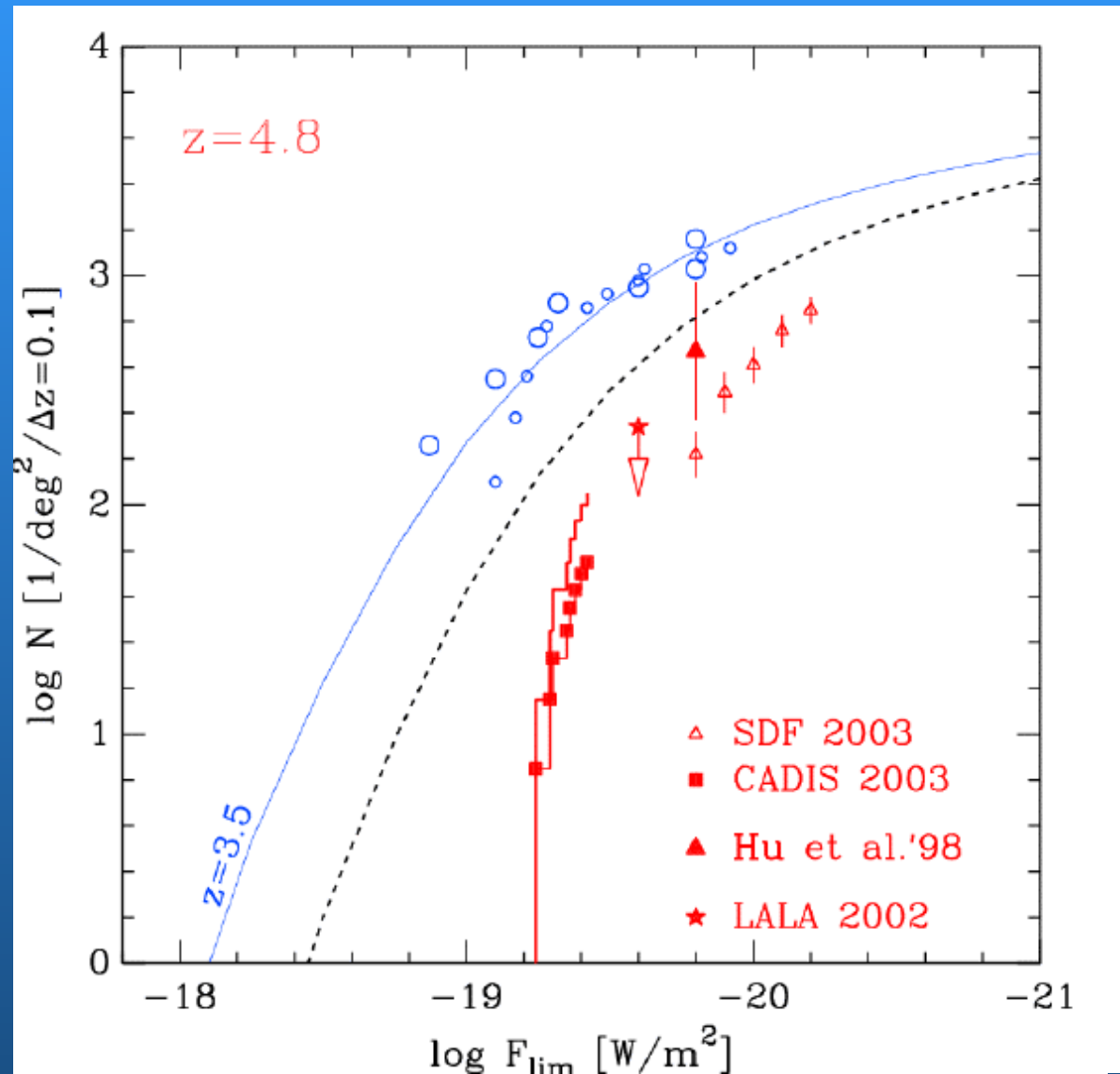
Spectroscopic follow-up

● 2 likely Lyman- α emitting galaxies at $z \sim 5.7$

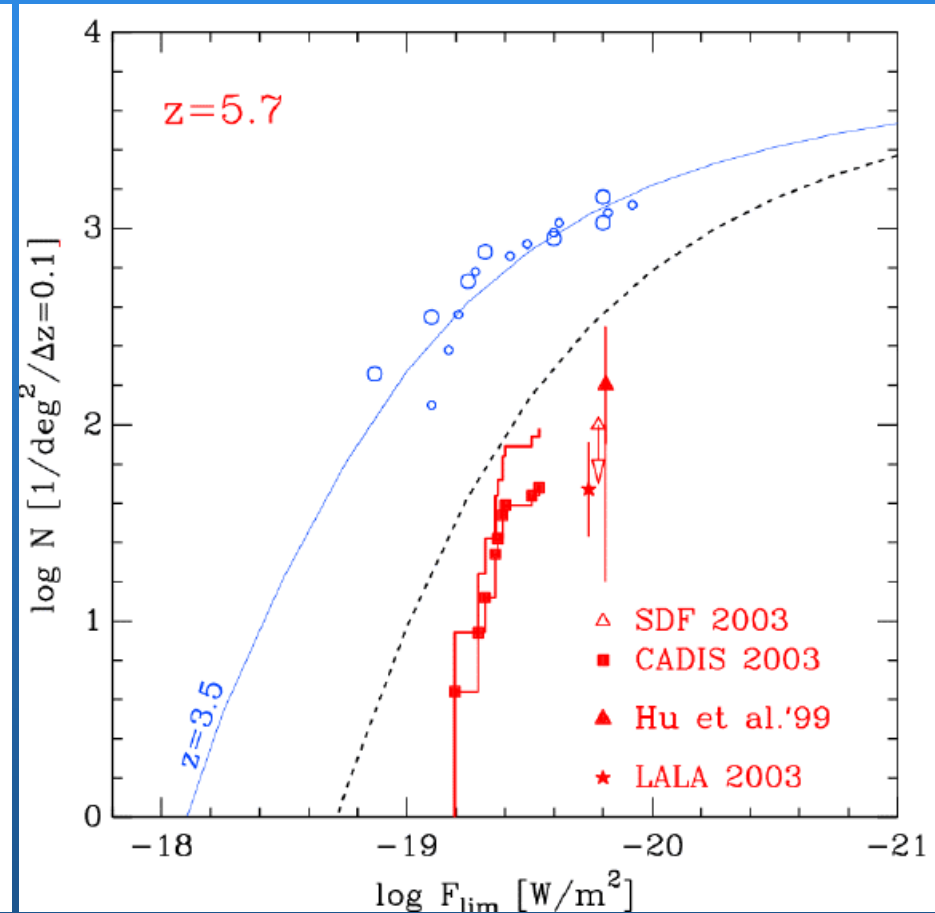
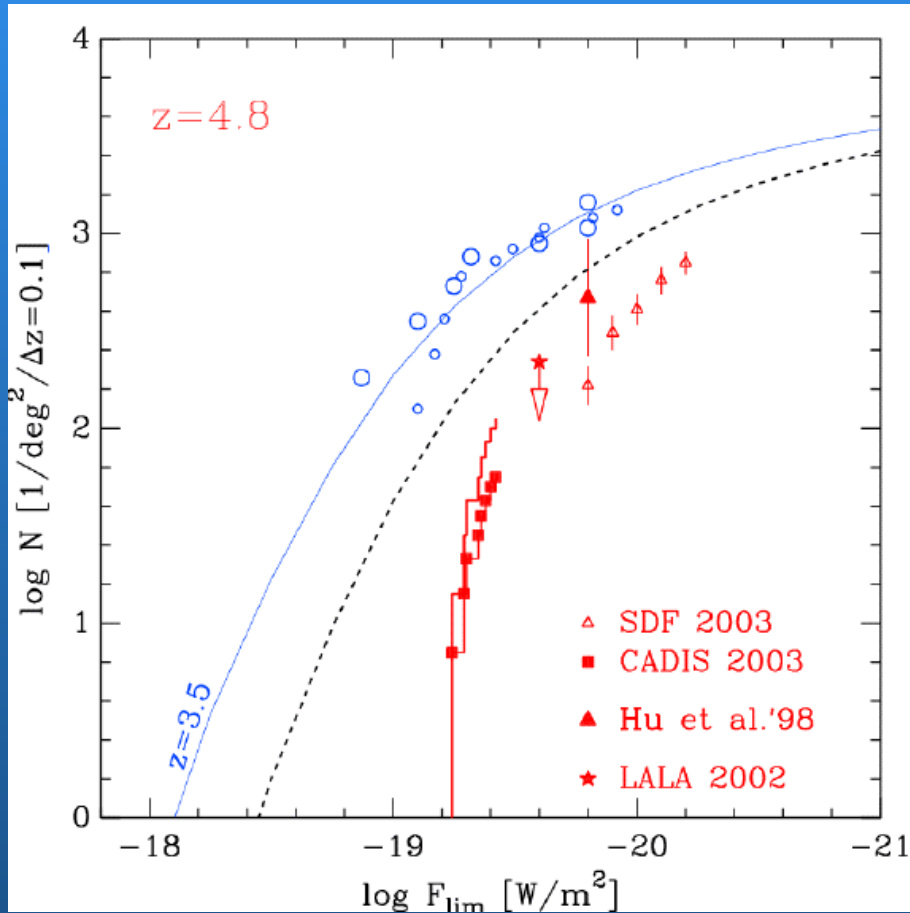
● 1 probable [OII] emission line at $z \sim 1.2$



Abundance of Lyman- α galaxies



Abundance of Lyman- α Galaxies



Conclusions

- Bright Lyman- α galaxies are significantly rarer at $z > 5$ than at $z \sim 3.5$
- Decrease in density for galaxies with $\text{SFR} \sim 11 M_{\text{sun}}/\text{yr}$ between $z \sim 3$ and $z \sim 6$
- Peak of the Lyman- α bright phase (i.e., the peak of the first formation of massive stars) is reached after $z \sim 6$
- Consistent with reionization of the universe does not occur long before $z \sim 6$