OBSERVATIONAL CONSTRAINTS ON KEY-PARAMETERS OF REIONISATION

Adélie Gorce

Imperial College London

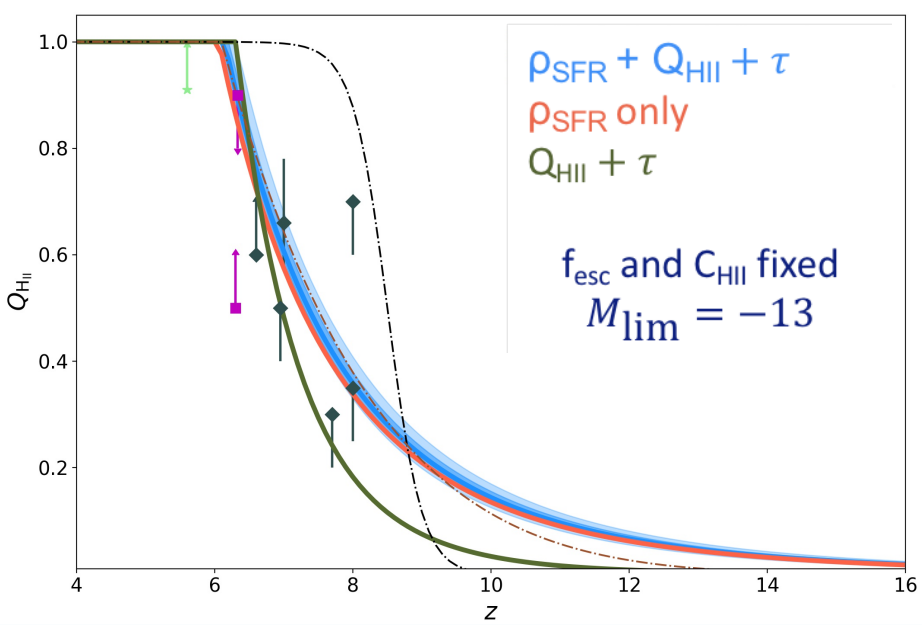
IAS Orsay

Université Paris Sud

université PARIS-SACLAY

SFR HISTORY PARAMETRISATION

$$\rho_{SFR}(z) = a\frac{(1+z)^b}{1+\left(\frac{1+z}{c}\right)^d}$$



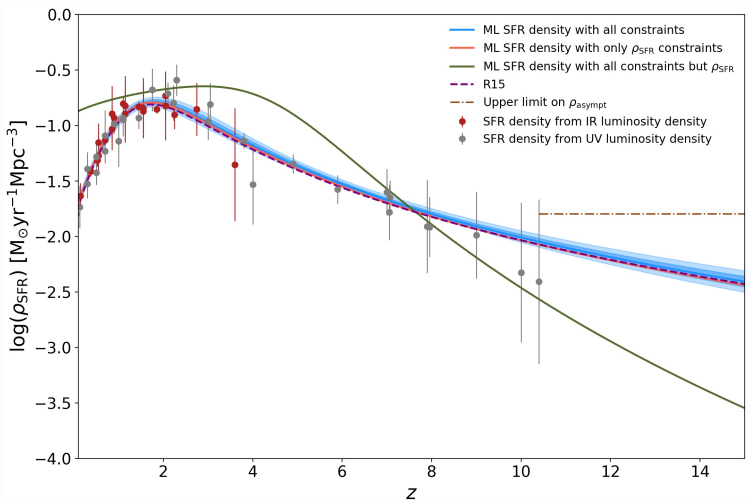
Evolution of IGM ionised fraction for different sets of constraints.

OBSERVABLES

- Star formation history ρ_{SFR}
- IGM ionised fraction Q_{HII}
- Thomson optical depth τ

$$\tau = 0.058 \pm 0.012$$

(Planck+2016)



Star formation history for different sets of constraints.

A&A 2018 (arXiv 1710.04152)

Collaborators: M. Douspis, N. Aghanim, M. Langer

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KEY PARAMETERS

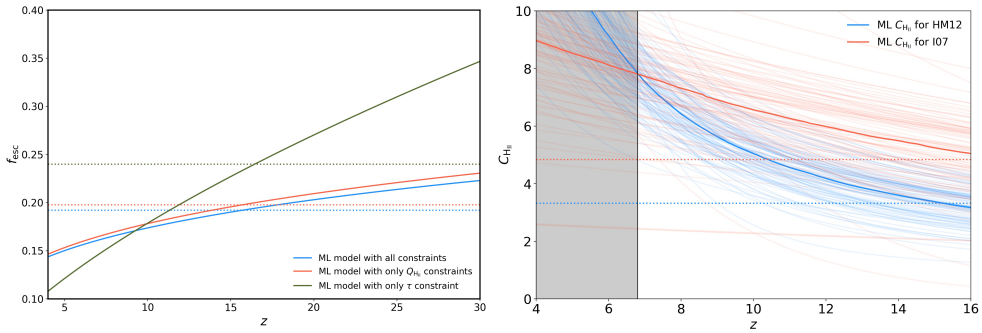
Escape fraction of ionising photons from host galaxy into the IGM

Clumping factor of ionised hydrogen in the IGM

Constant, free to vary

$f_{\rm esc} = 0.19 \pm 0.04$ $\quad C_{\rm HII} = 4.56 \pm 1.85$

Evolution with redshift

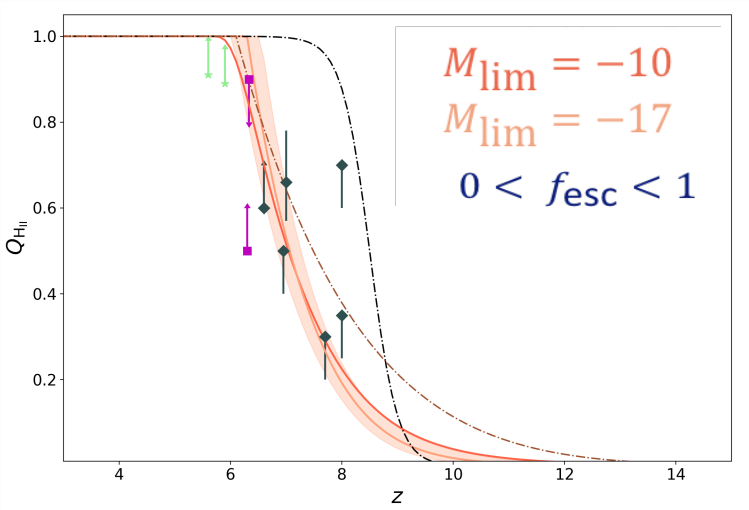


If a redshift evolution is allowed, it is weak.

No strong dependence of reionisation histories on the precise parameter value.

MAGNITUDE LIMIT

$$\dot{n}_{\rm ion} = f_{\rm esc}\,\xi_{\rm ion} \int_{M_{\rm lim}}^{\infty} \phi(M_{\rm UV})\,{\rm d}M_{\rm UV}$$
$$= f_{\rm esc}\,\xi_{\rm ion}\,\rho_{\rm SFR}$$



$M_{\rm lim} = -17$: no enough ionising sources
→ Requires $f_{\rm esc} = 70\%$ or $z_{\rm start} = 17$.
Smaller τ values (current trend)
→ Less ionising sources at high z required.

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