Inferring the bulk properties of reionizing galaxies from the kSZ and other observations

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21 cm Cosmology meeting Trieste

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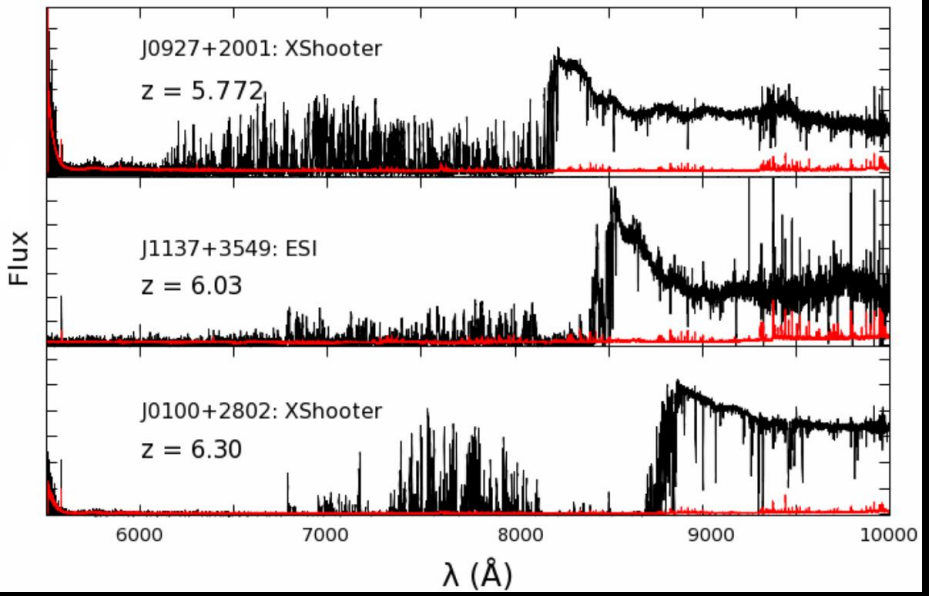
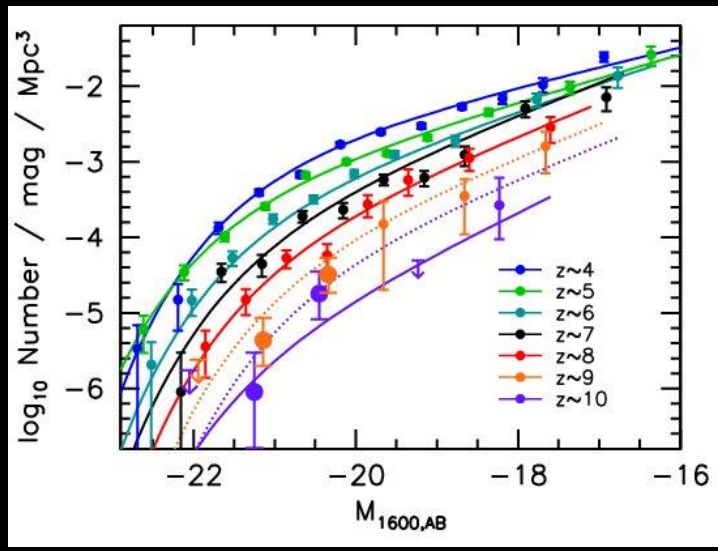
SCUOLA
NORMALE
SUPERIORE



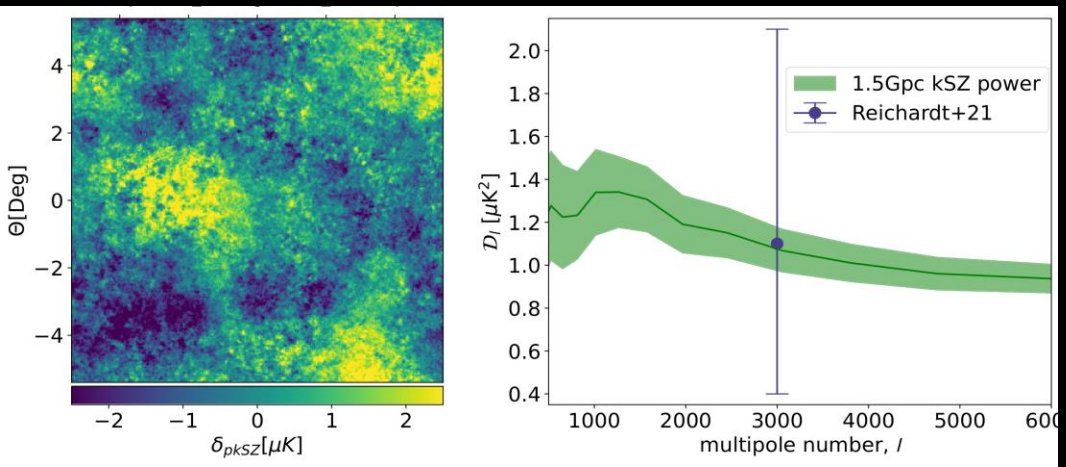
Bosman+18: Lyα forest

$$\tau_e = 0.0522 \pm 0.0080$$

Planck+18: TT+lowE τ_e



Bouwens+16: high-z UV LFs

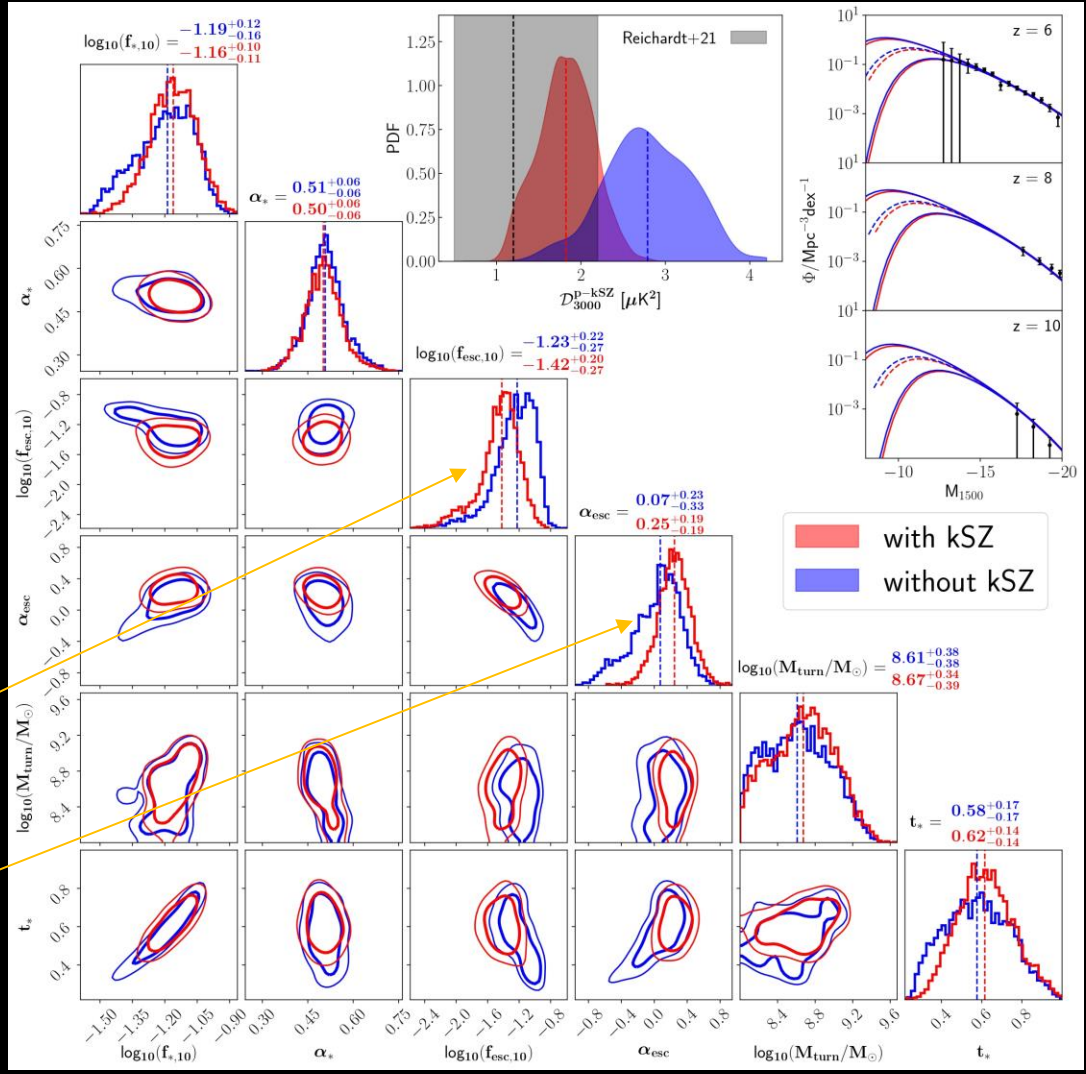


Reichardt+21 patchy kSZ signal

without kSZ – Qin+21 posterior including observational data:

- **Large-scale Lyα forest opacity PDFs**
- ***Dark fraction in the Lyα* and Lyβ forests**
- **UV LFs**
- **CMB optical depth**

with kSZ – the same as *without kSZ* but including the likelihood factor for the patchy kSZ measurement.



$$f_{\rm esc} = \mathbf{f_{esc,10}} \left(\frac{M_{\rm h}}{10^{10} M_\odot} \right)^{\boldsymbol{\alpha_{\rm esc}}}$$

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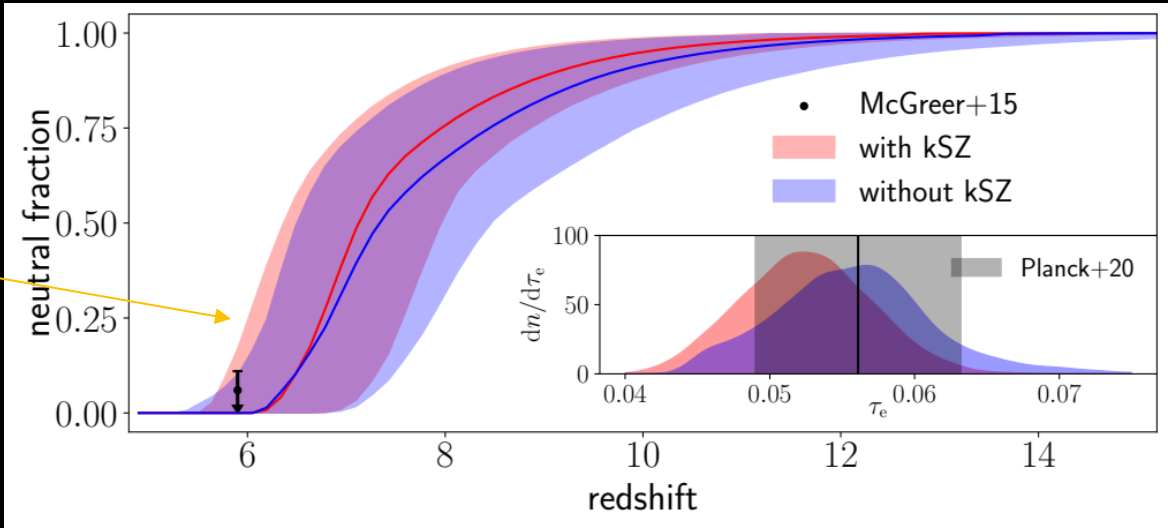
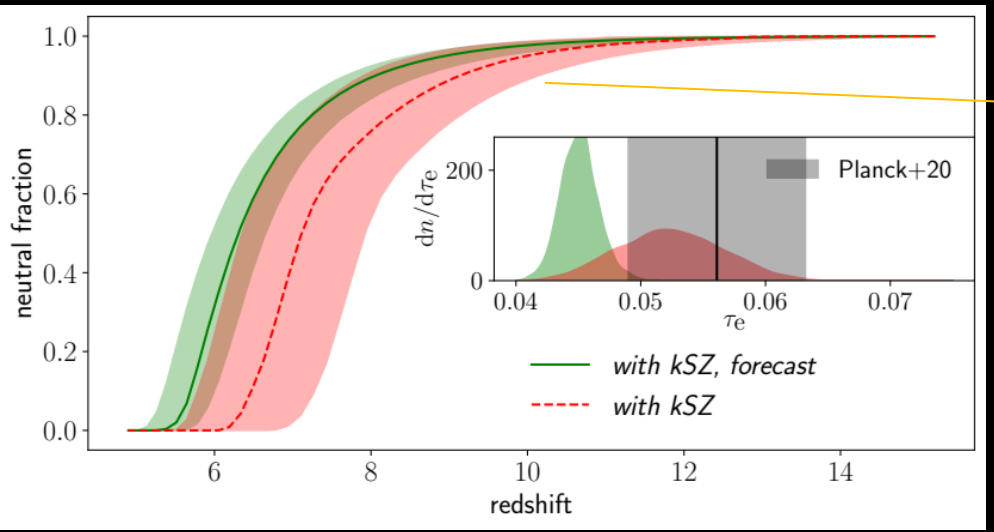
Power-law index close to 0 points to a late and rapid end of EoR.





CMB probes will continue to give better and better constraints on EoR in synergy with upcoming 21cm experiments.

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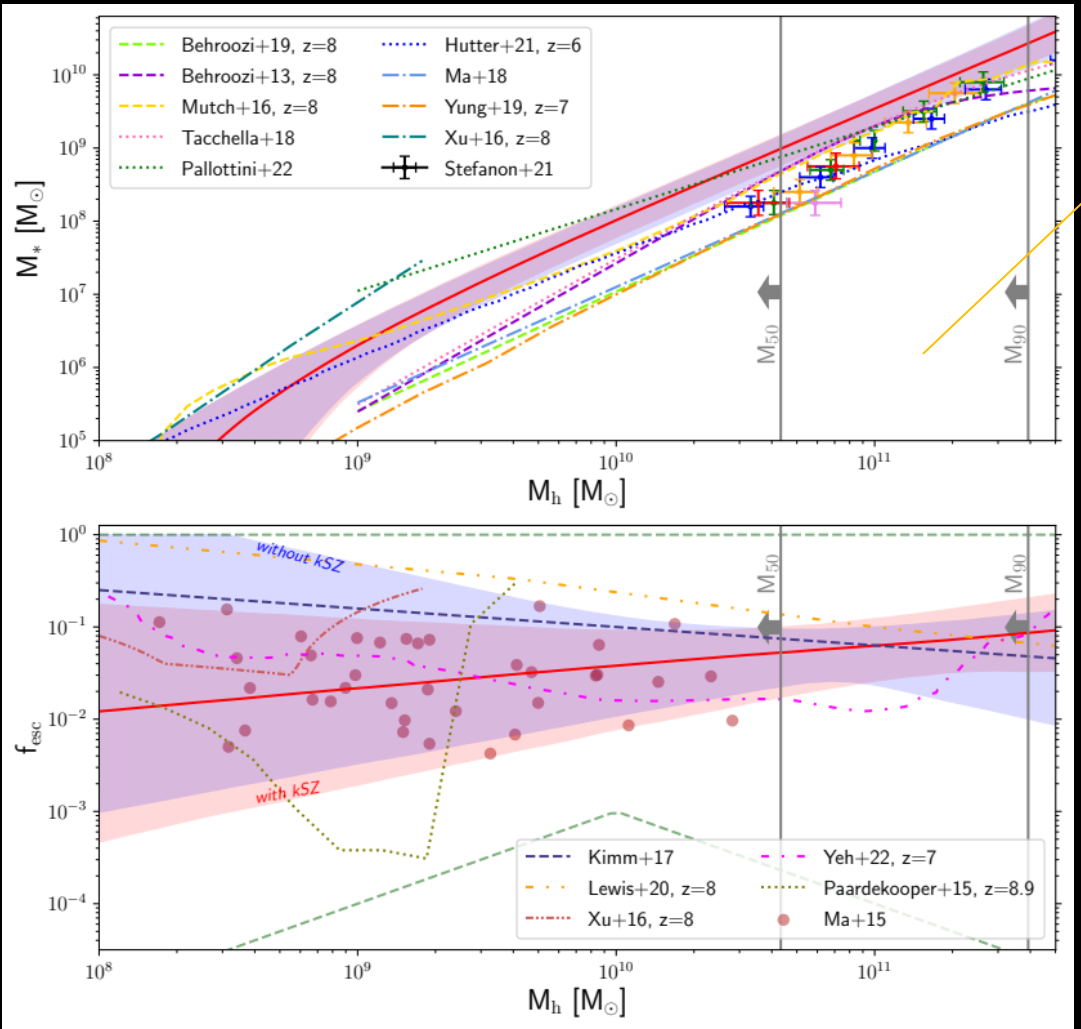

Using Bayesian inference we can infer scaling relations that are impossible to observe directly.

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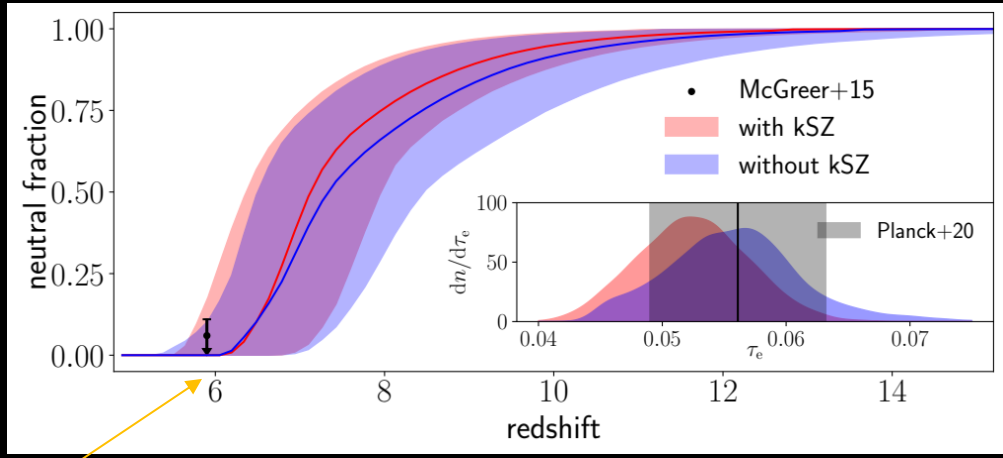
Take away messages:

-> Bayesian inference is the way to go, and using other EoR probes together with 21cm signal is helpful for constraining astrophysical parameters.

-> Many probes point to a late and rapid end of reionization



For more info check out arXiv:2307.01265
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