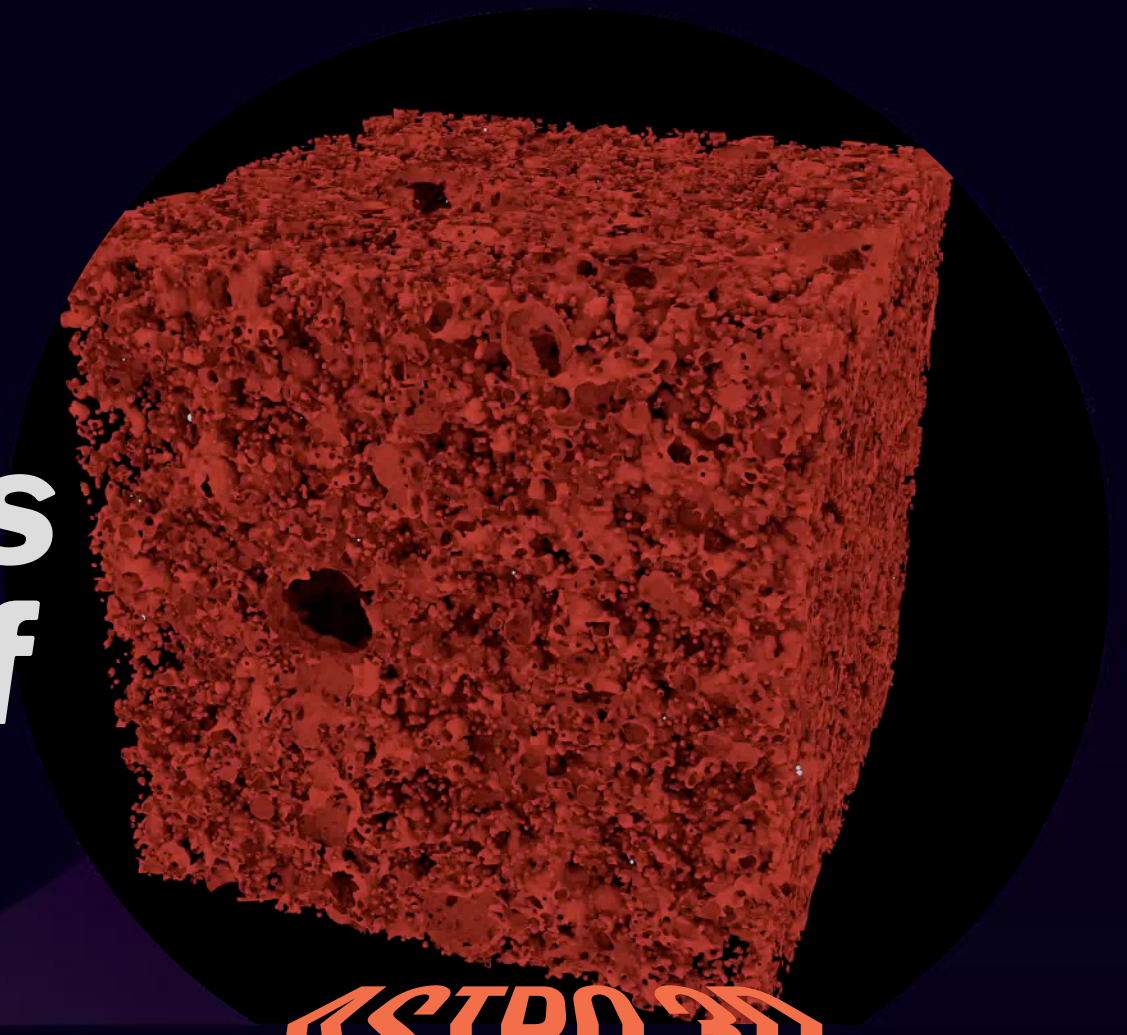
Connecting observations of the first galaxies and the Epoch of Reionisation



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Simon Mutch

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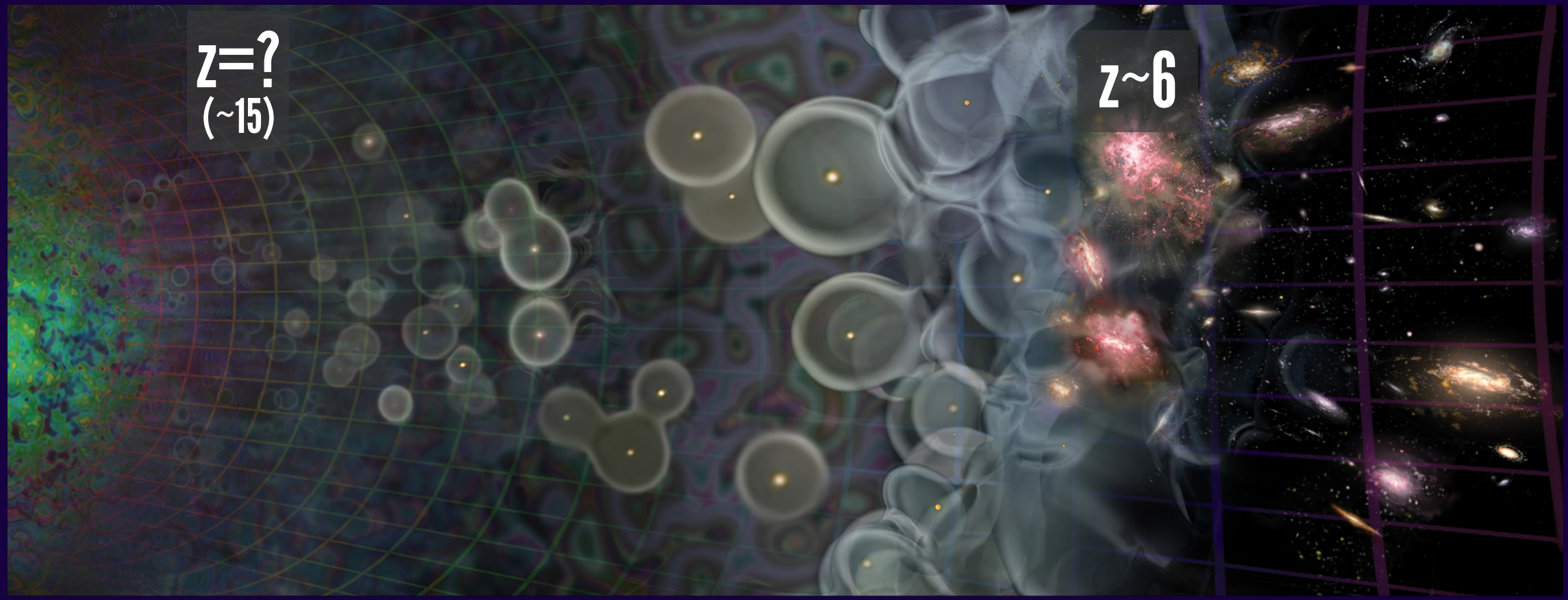
Dark Ages — Epoch of Reionization



Loeb A., 2006, SciAm, 295, 46

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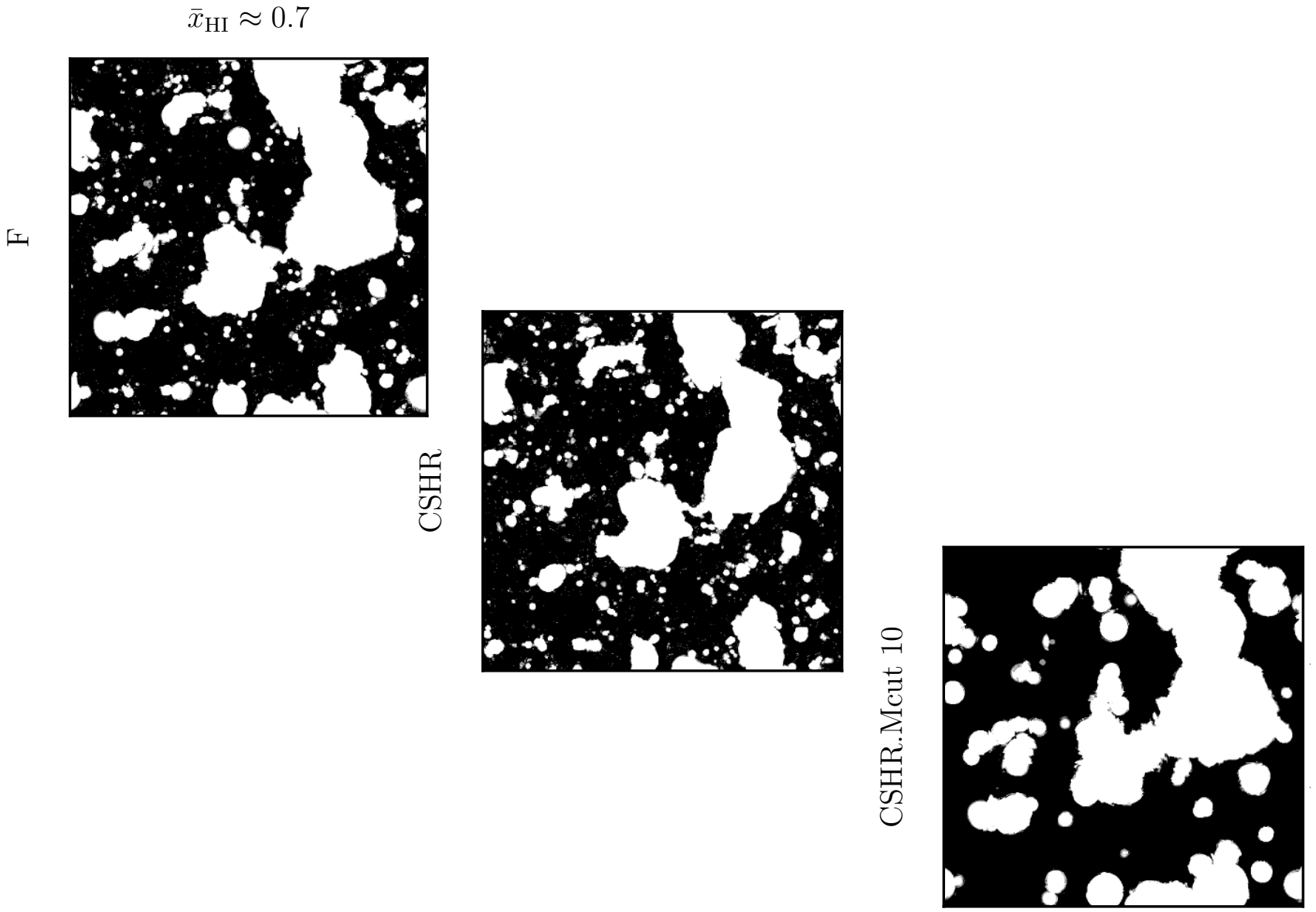
THE STRUCTURE OF REIONIZATION IS SENSITIVE TO GALAXY PHYSICS



Geil, Mutch+ (2015)

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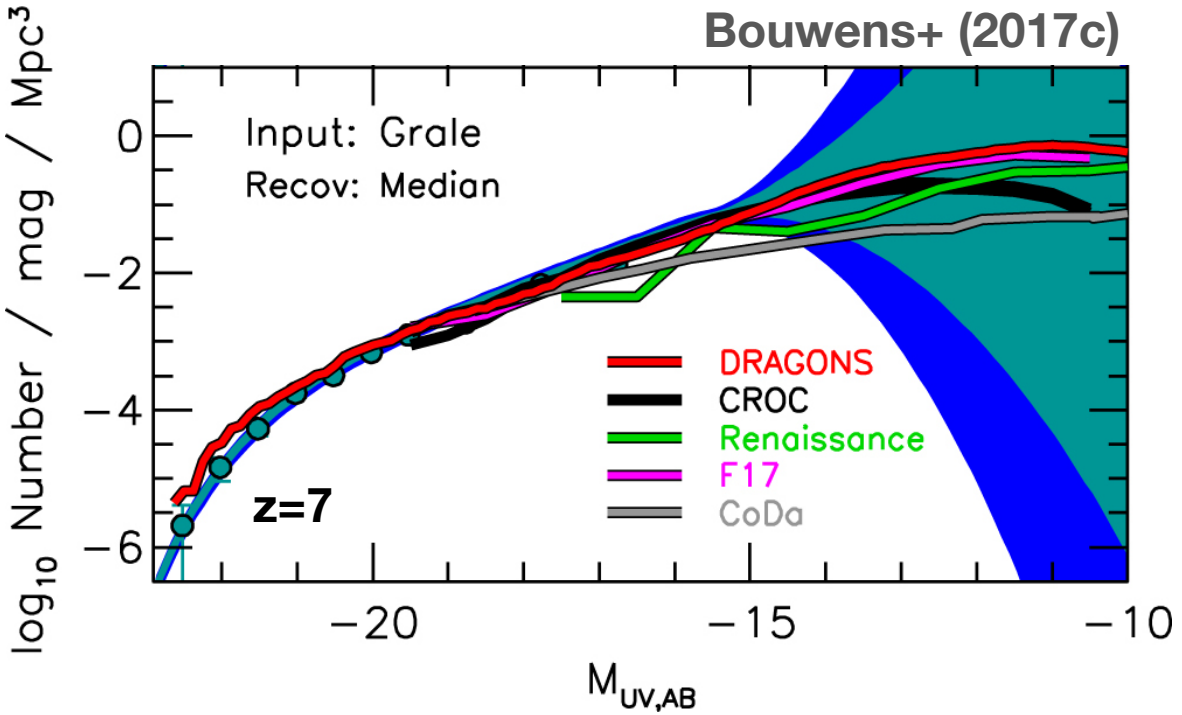
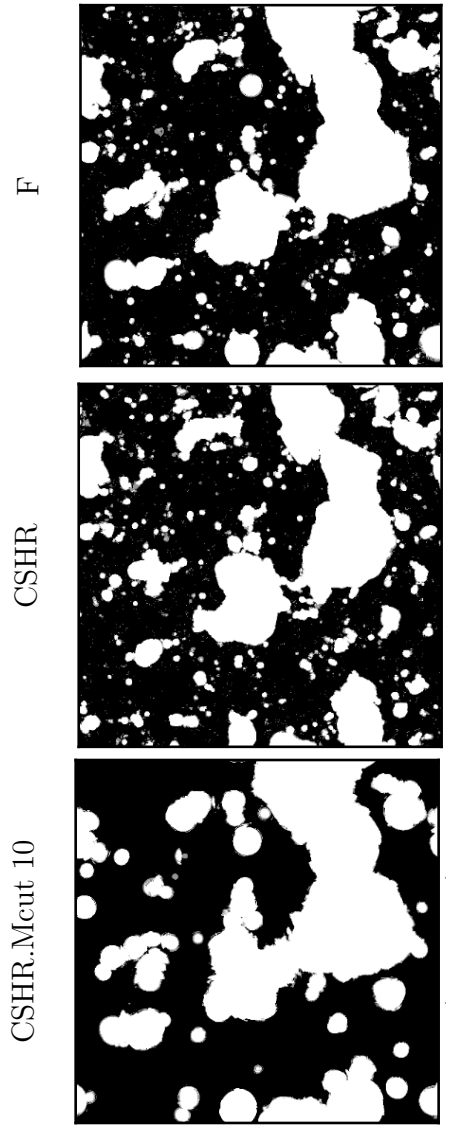
THE STRUCTURE OF REIONIZATION IS SENSITIVE TO GALAXY PHYSICS

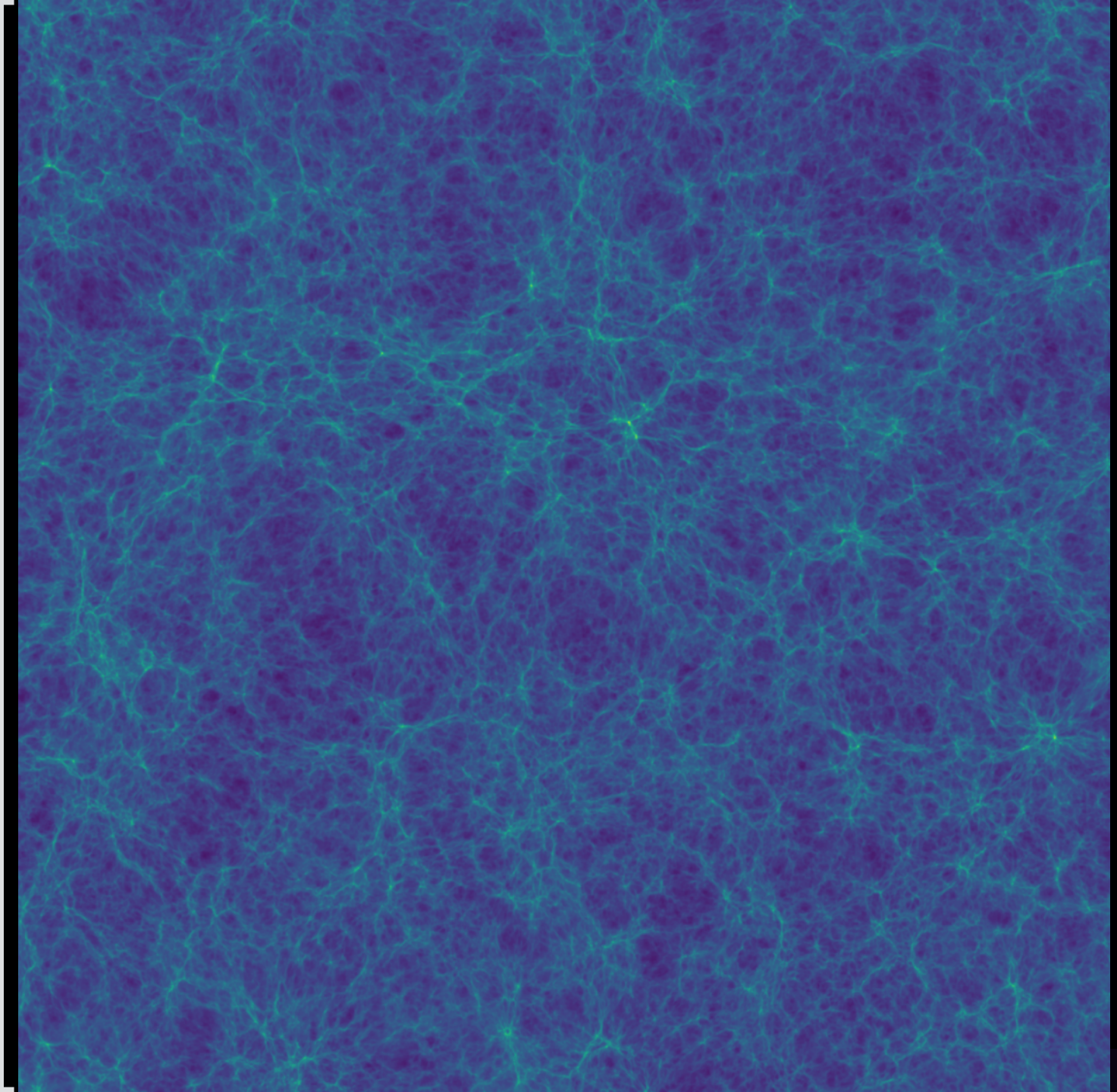
Geil, Mutch+ (2015)

THE STRUCTURE OF REIONIZATION IS SENSITIVE TO GALAXY PHYSICS



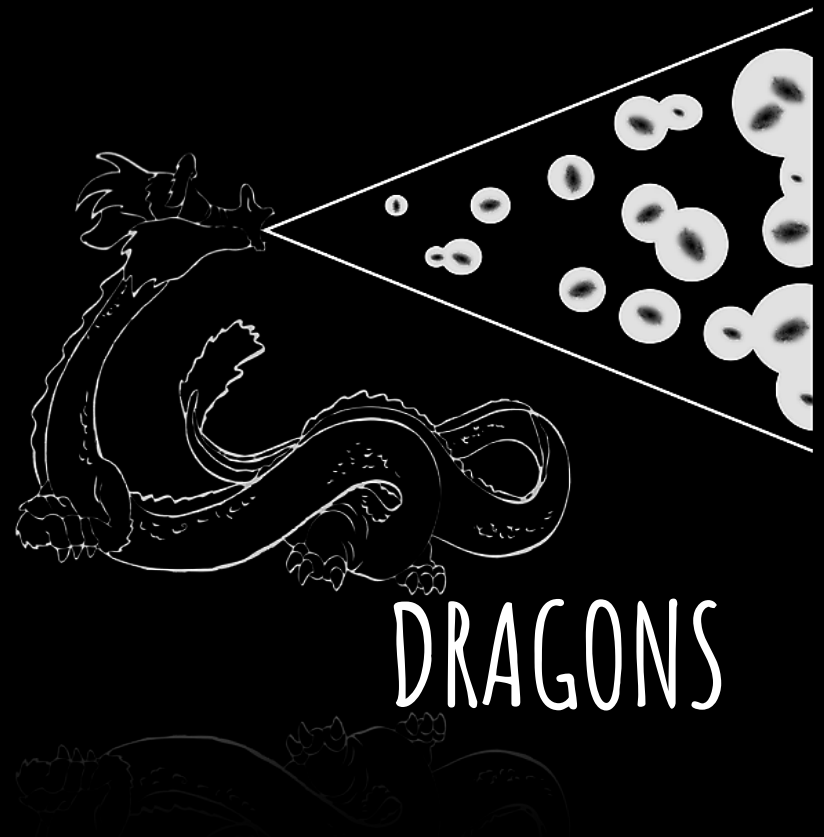


Geil, Mutch+ (2015)

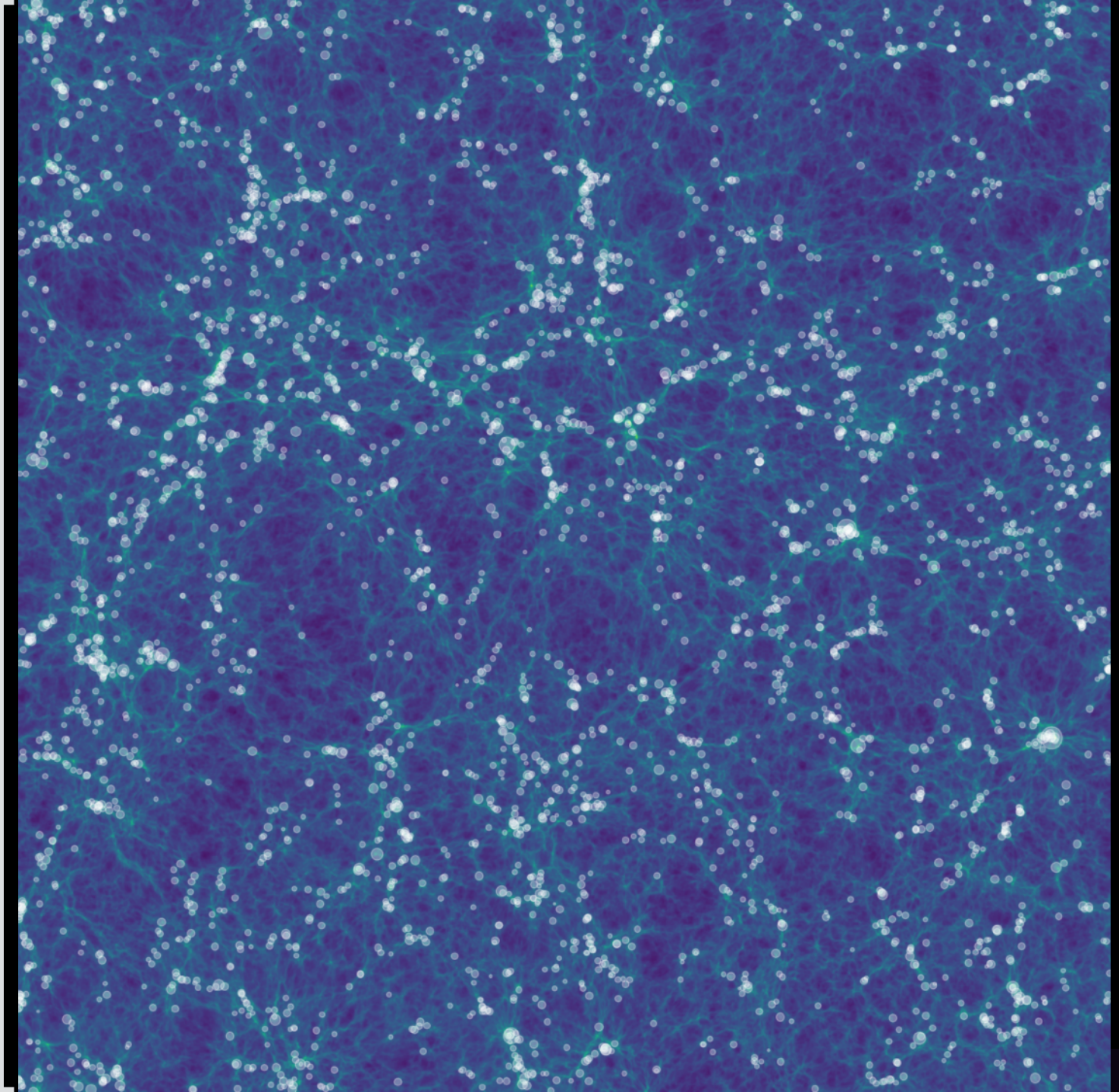


MERAXES

[məɹ’ɑksiz] mər-ahk-seez



DRAGONS



MERAXES

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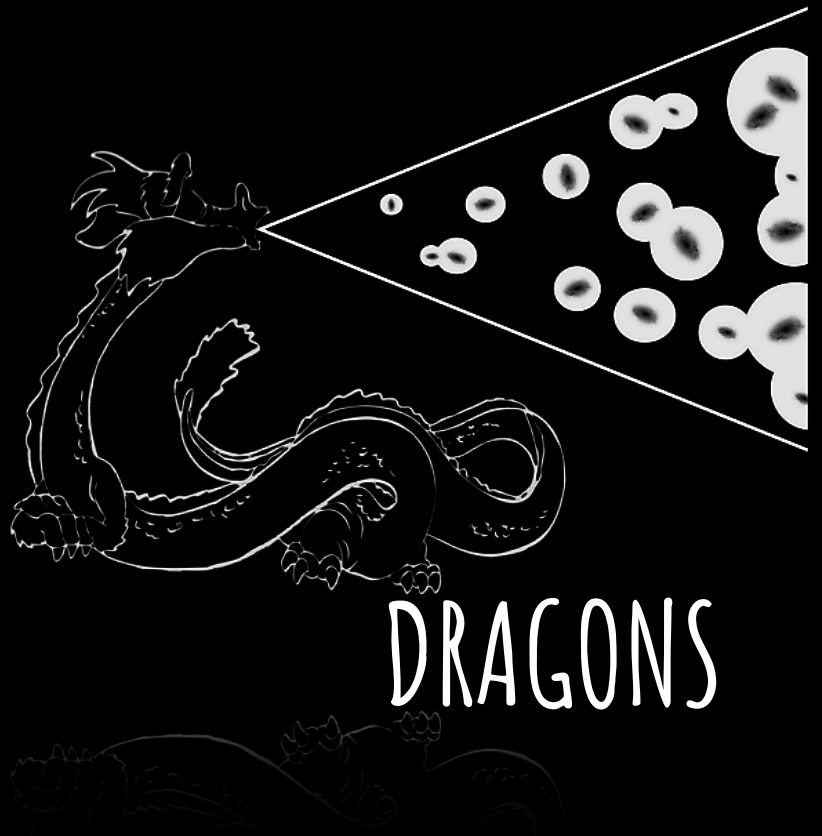
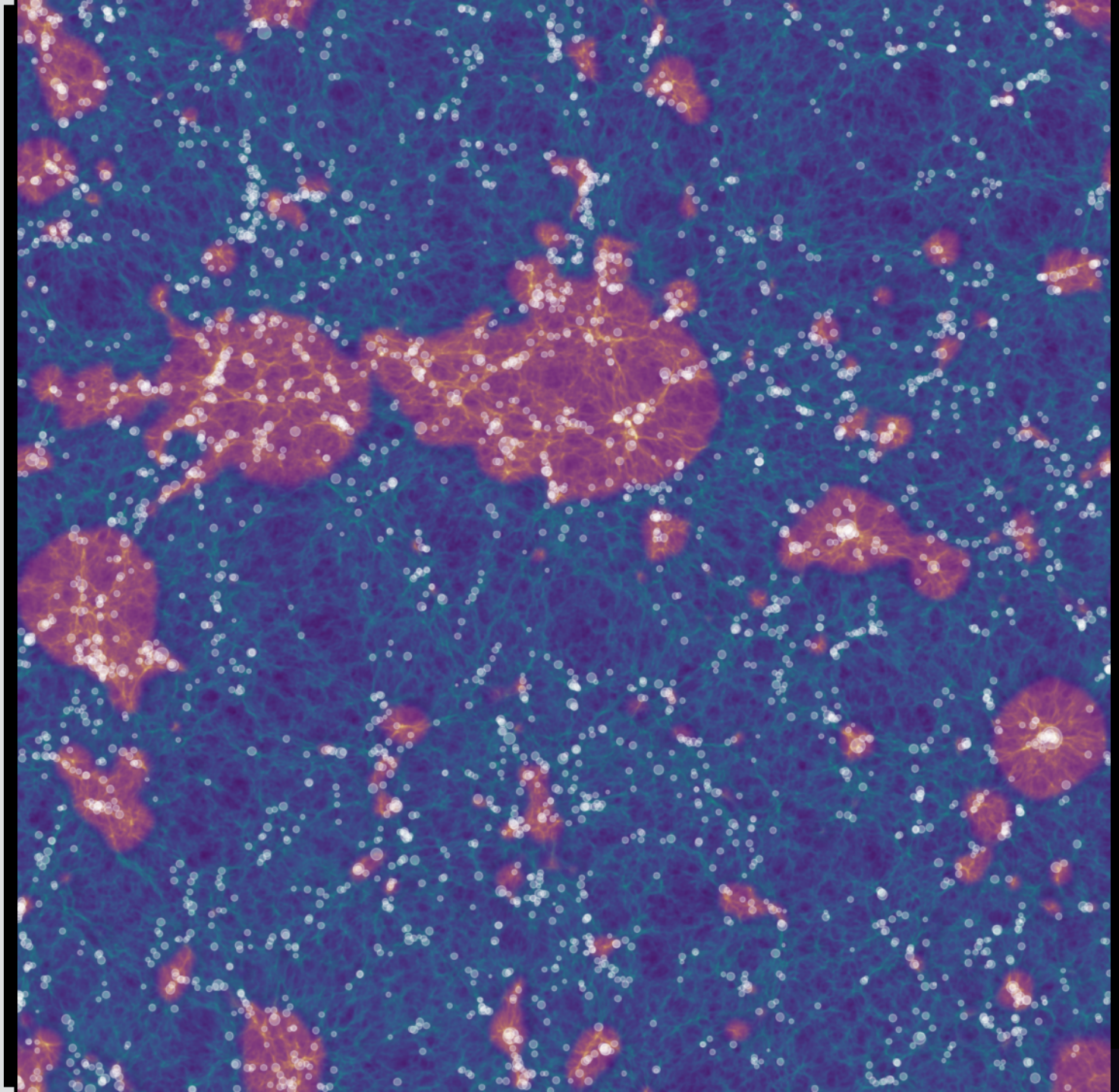
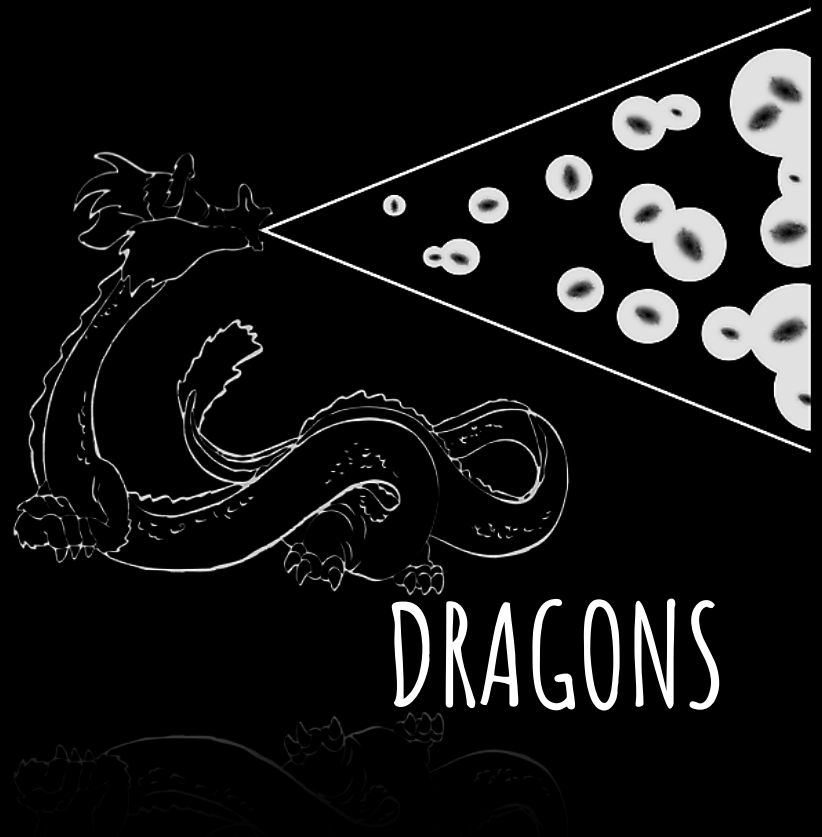


DRAGONS



MERAXES

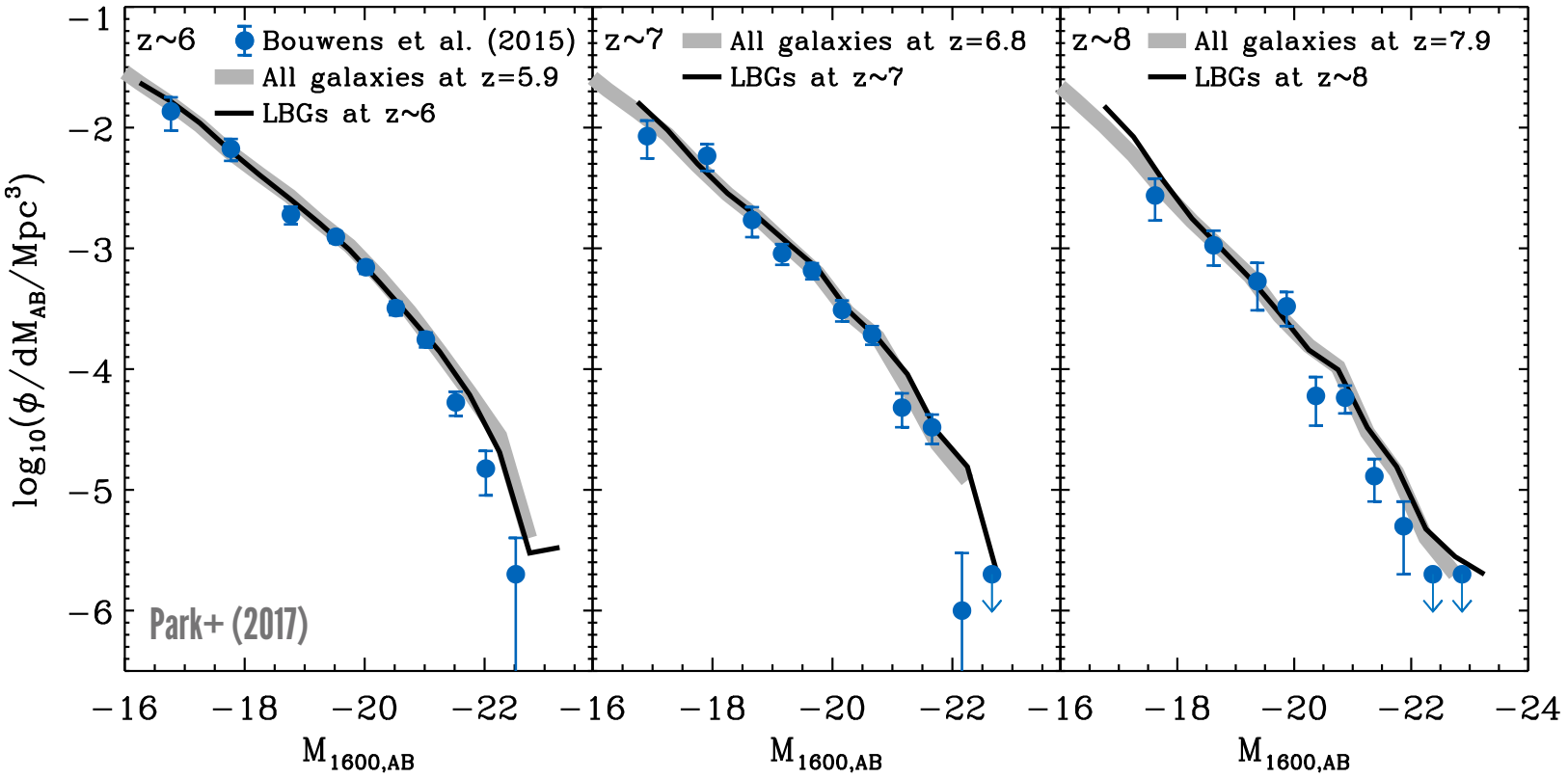
[məɹ’ɑksiz] mər-ahk-seez



DRAGONS

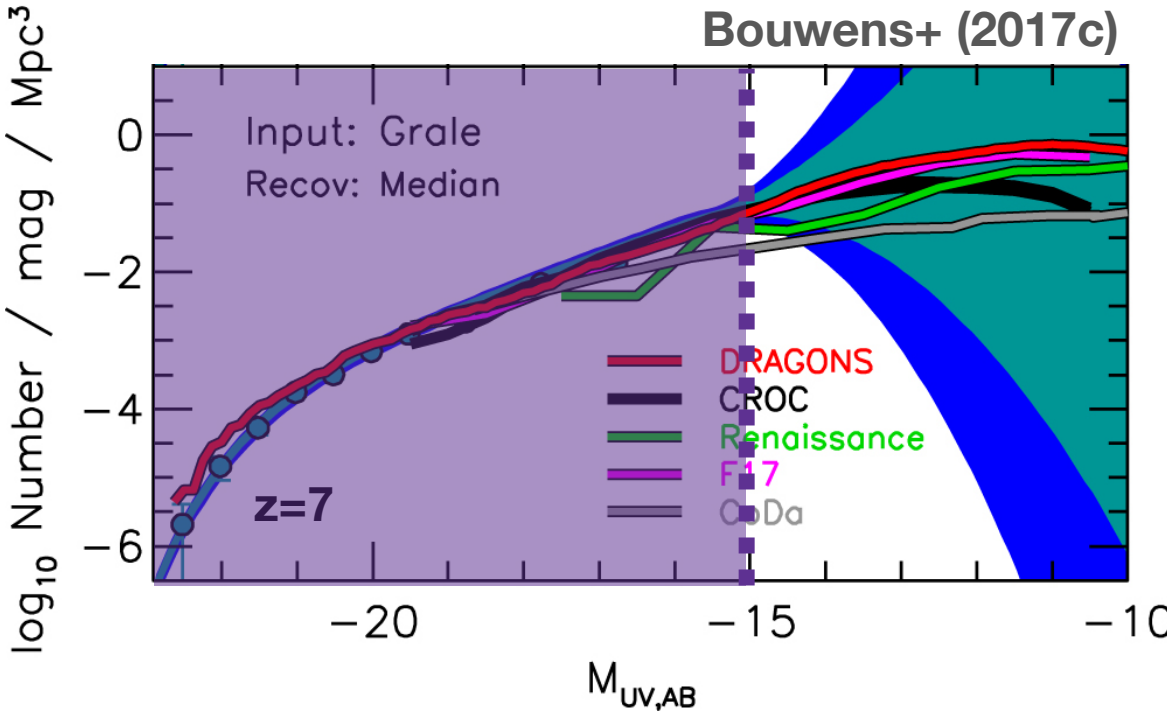
REPRODUCING KEY OBSERVABLES

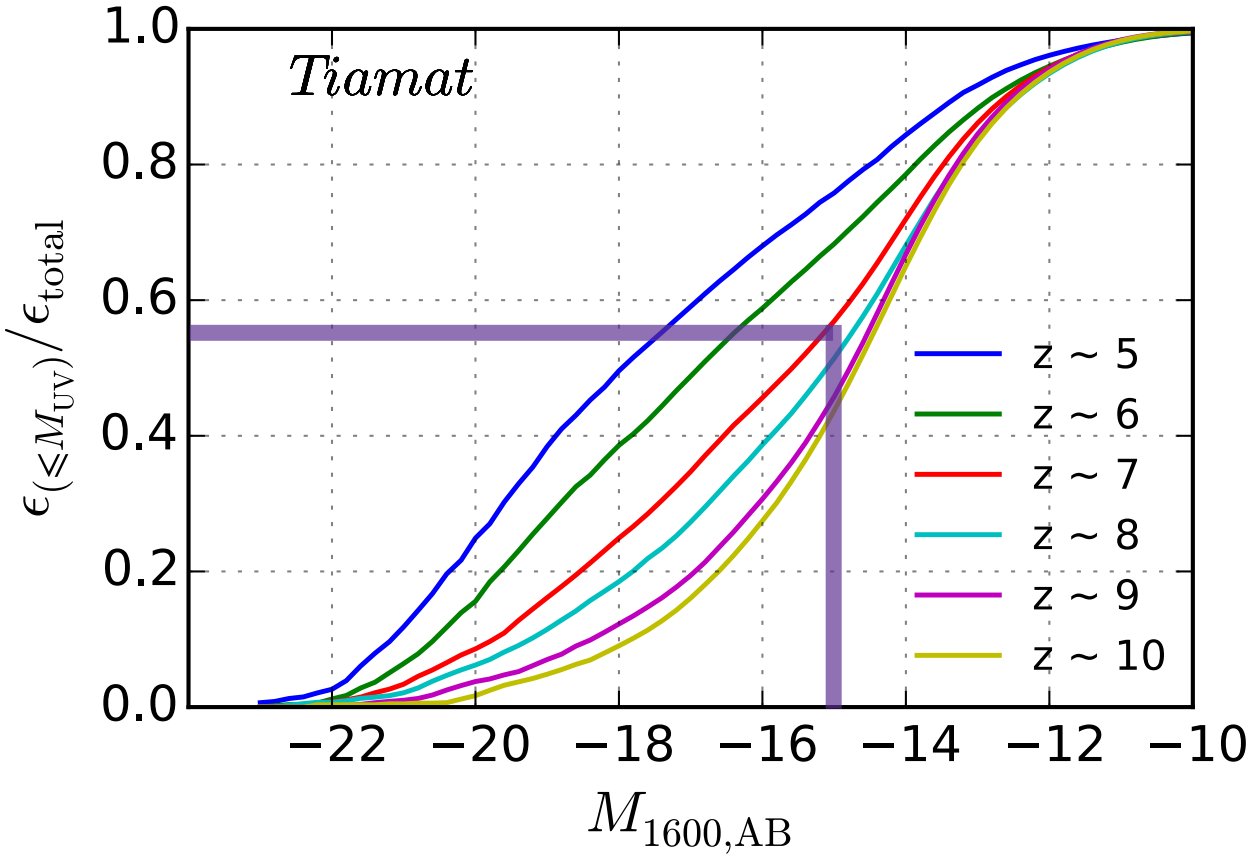
- SMF (z=0.6—8)
  [Mutch+ (2016), Qin+ (2017)]
- BH—M★ relation (z=0.6)
  [Qin+ (2017), Marshall+ (in prep)]
- QSO UV LFs (z>1)
  [Qin+ (2017)]
- Ionizing emissivity (z>2)
  [Mutch+ (2016), Davies+ (in prep)]
- Galaxy UV LF (z>5)
  [Liu+ (2016), Park+ (2017)]
- Thompson scattering optical depth (z>6) *[Mutch+ (2016), Geil+ (2016)]*
- Galaxy size evolution (z>5)
  [Liu+ (2017), Marshall+ (in prep)]
- LBG correlation functions (z>4)
  [Park+ (2017), Qiu+ (2018)]



THE IONISING PHOTON BUDGET

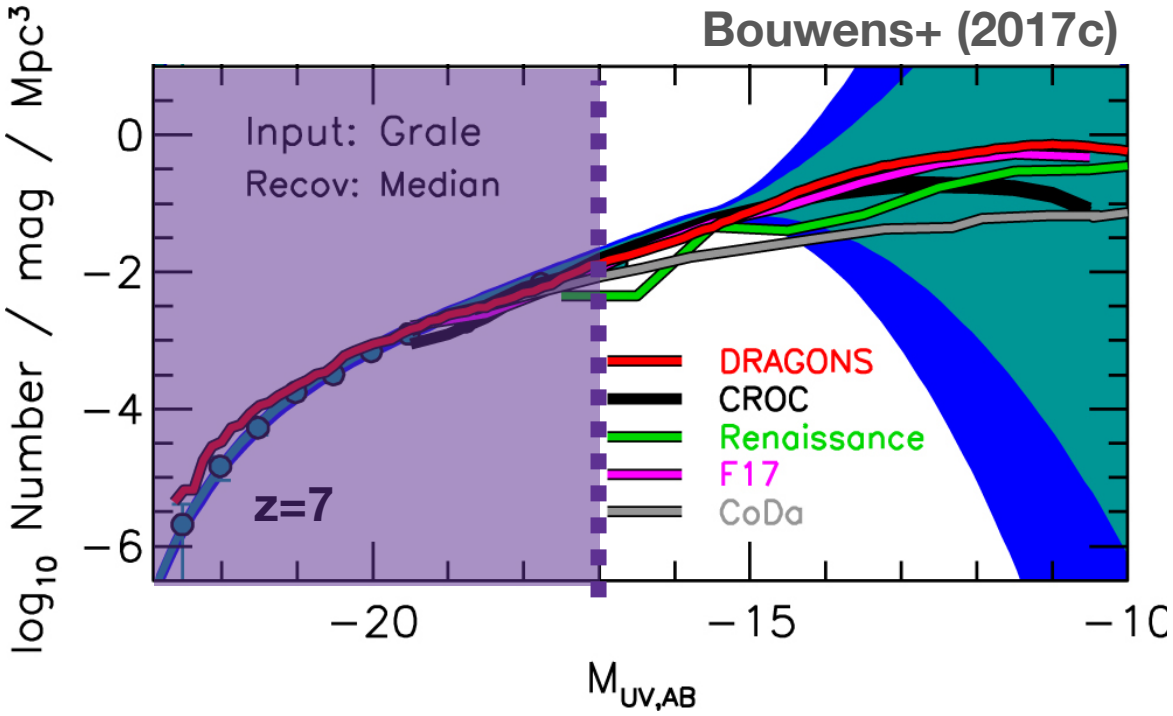
Liu, Mutch+ (2015a)

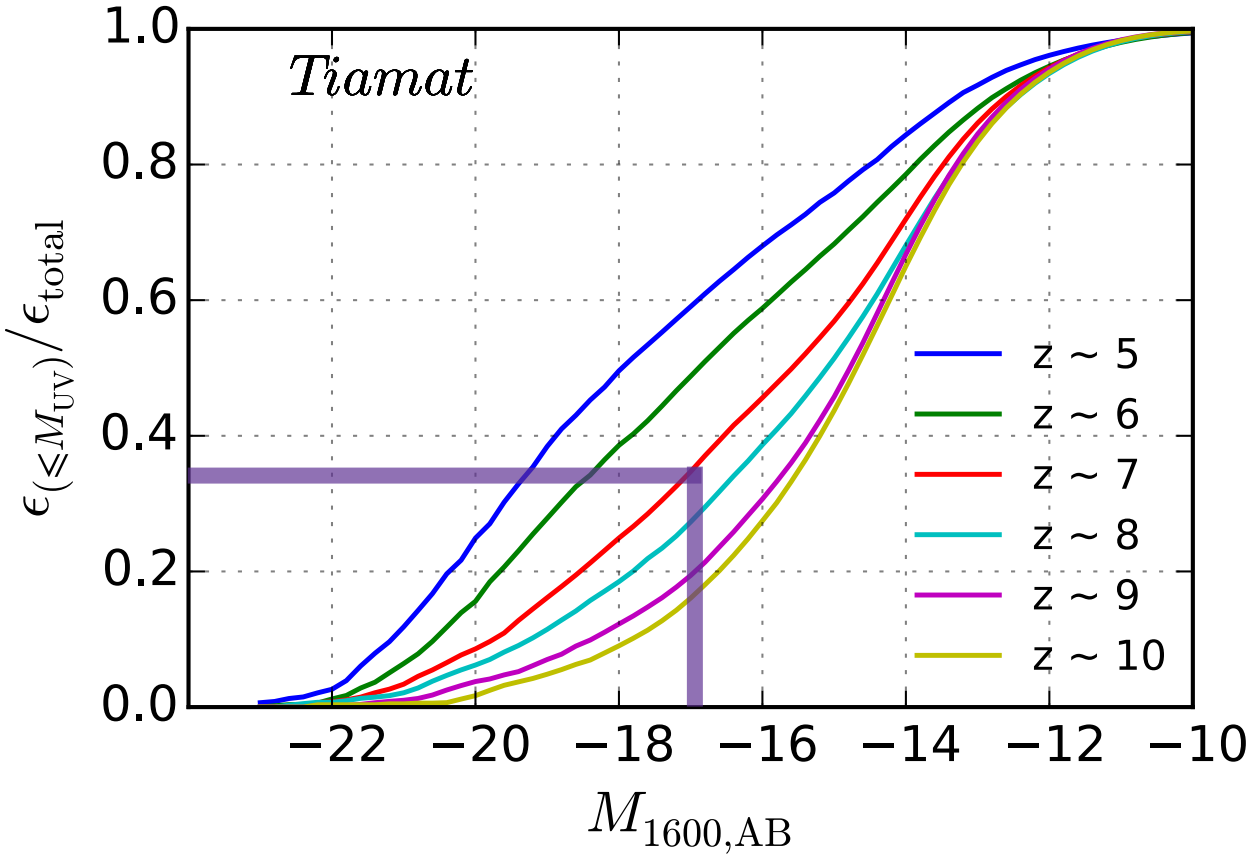




THE IONISING PHOTON BUDGET

Liu, Mutch+ (2015a)





THE IONISING PHOTON BUDGET

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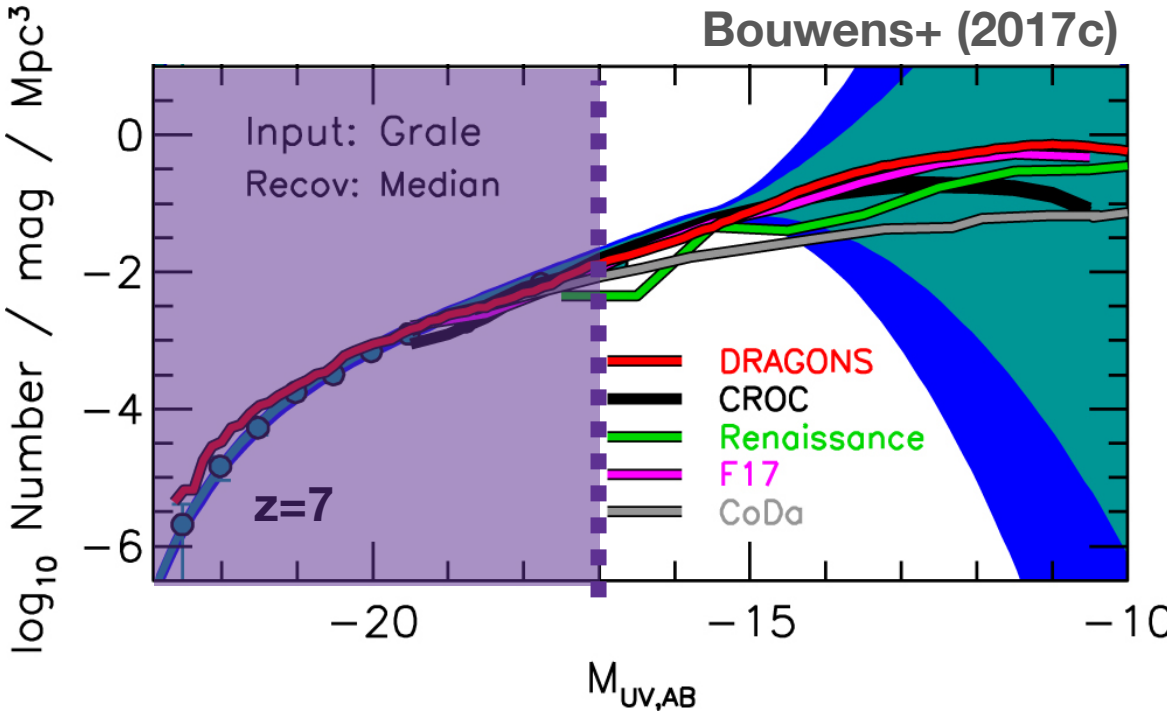
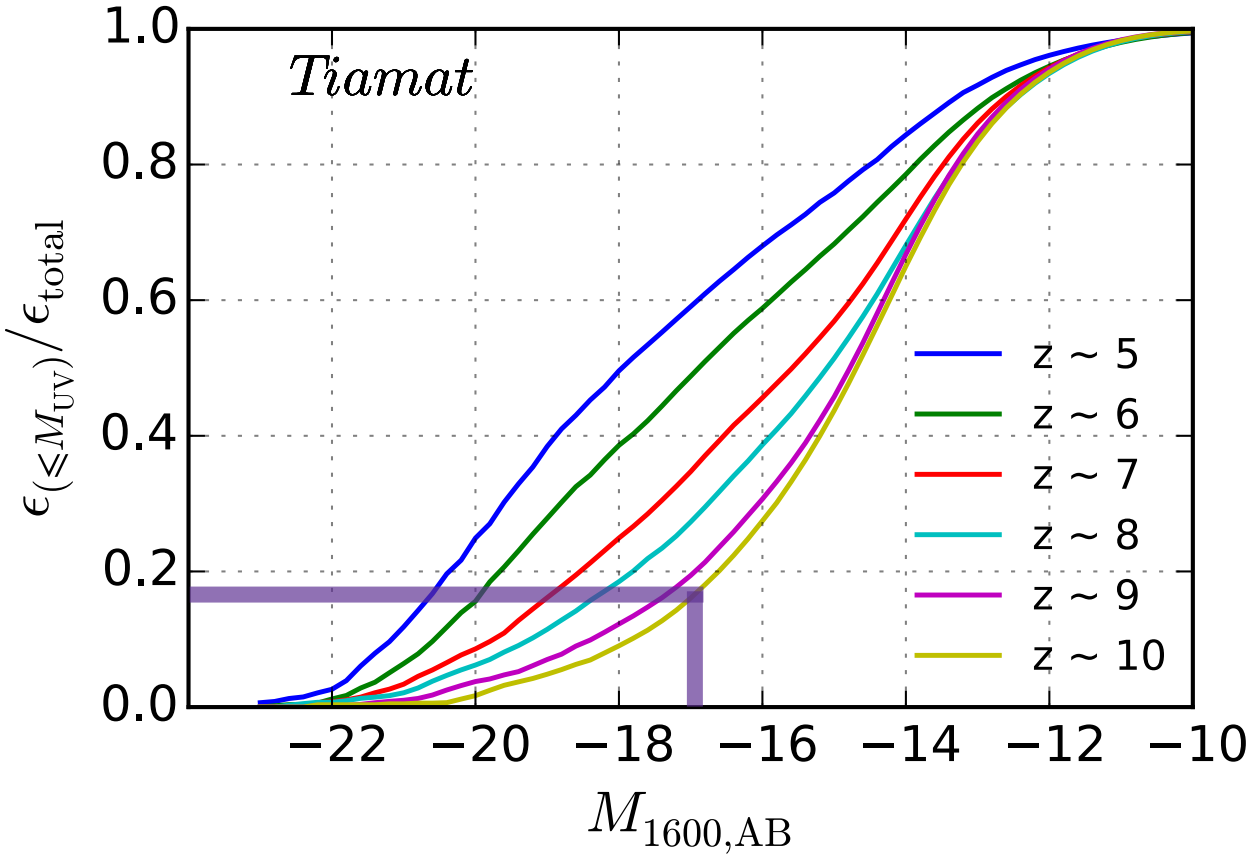
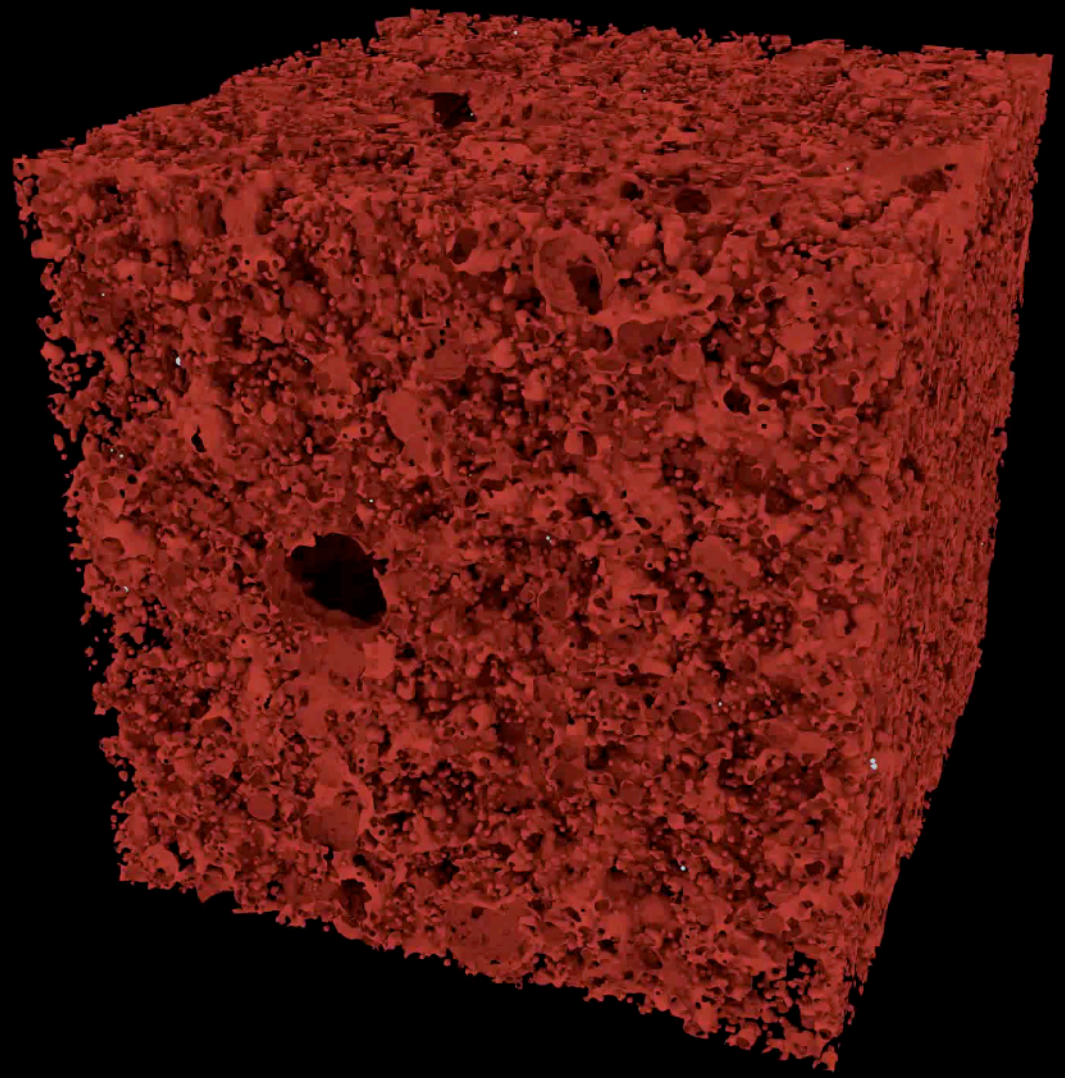
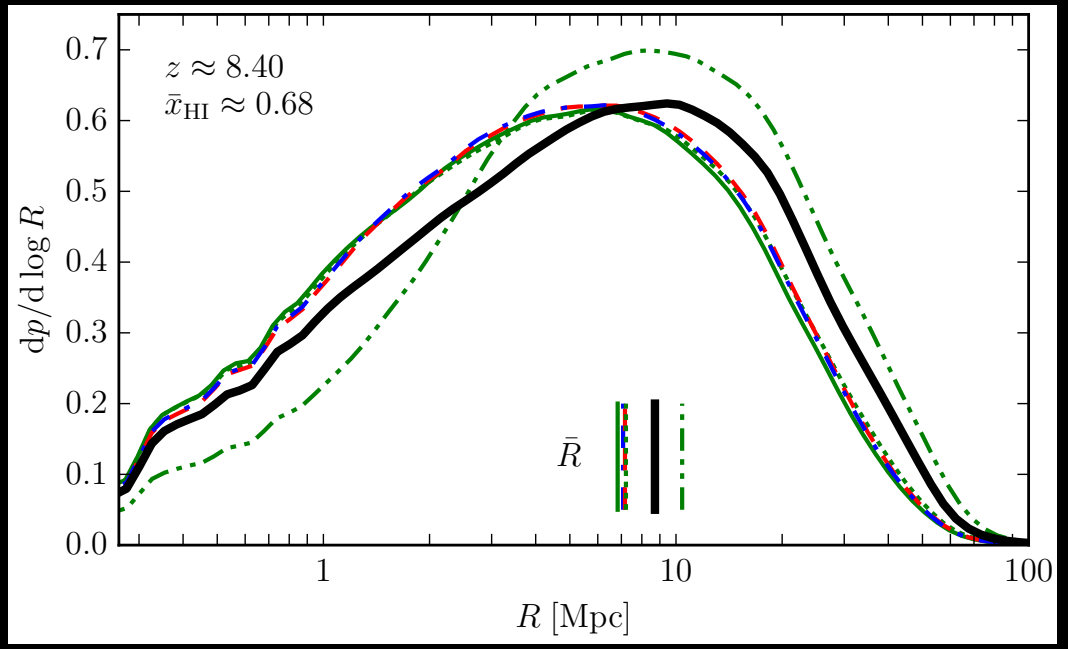




The imprint of galaxy physics on reionisation

Geil+ (2016)





Meraxes allows us to investigate how the properties of galaxies drives the **number**, **size distribution**, and **redshift evolution** of ionised **bubbles**.

Simulation The DRAGONS team Visualisation Paul Geil & Simon Mutch

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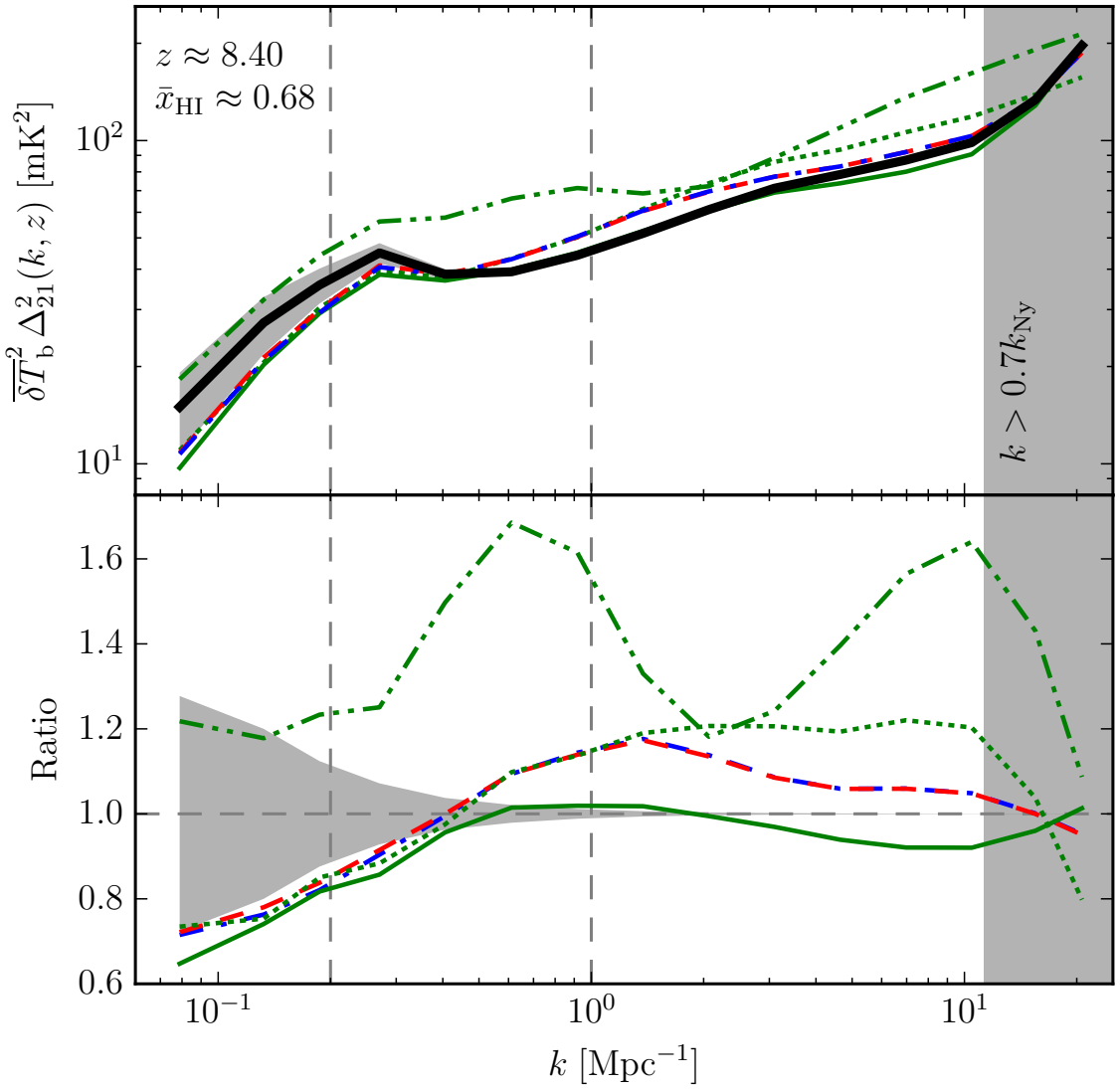
THE IMPRINT OF GALAXY PHYSICS ON REIONISATION

Geil+ (2016)



Fiducial

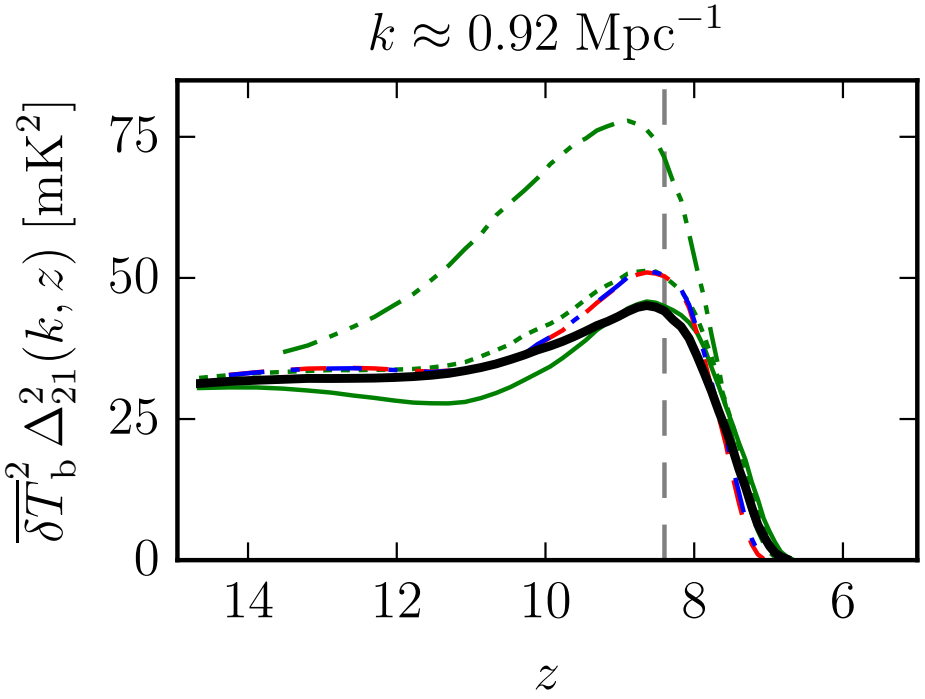
No SN feedback

Also no reion feedback

Constant $M_\star - M_{\rm vir}$

With $M_{\rm vir} < 10^9\ M_\odot$

With $M_{\rm vir} < 10^{10}\ M_\odot$



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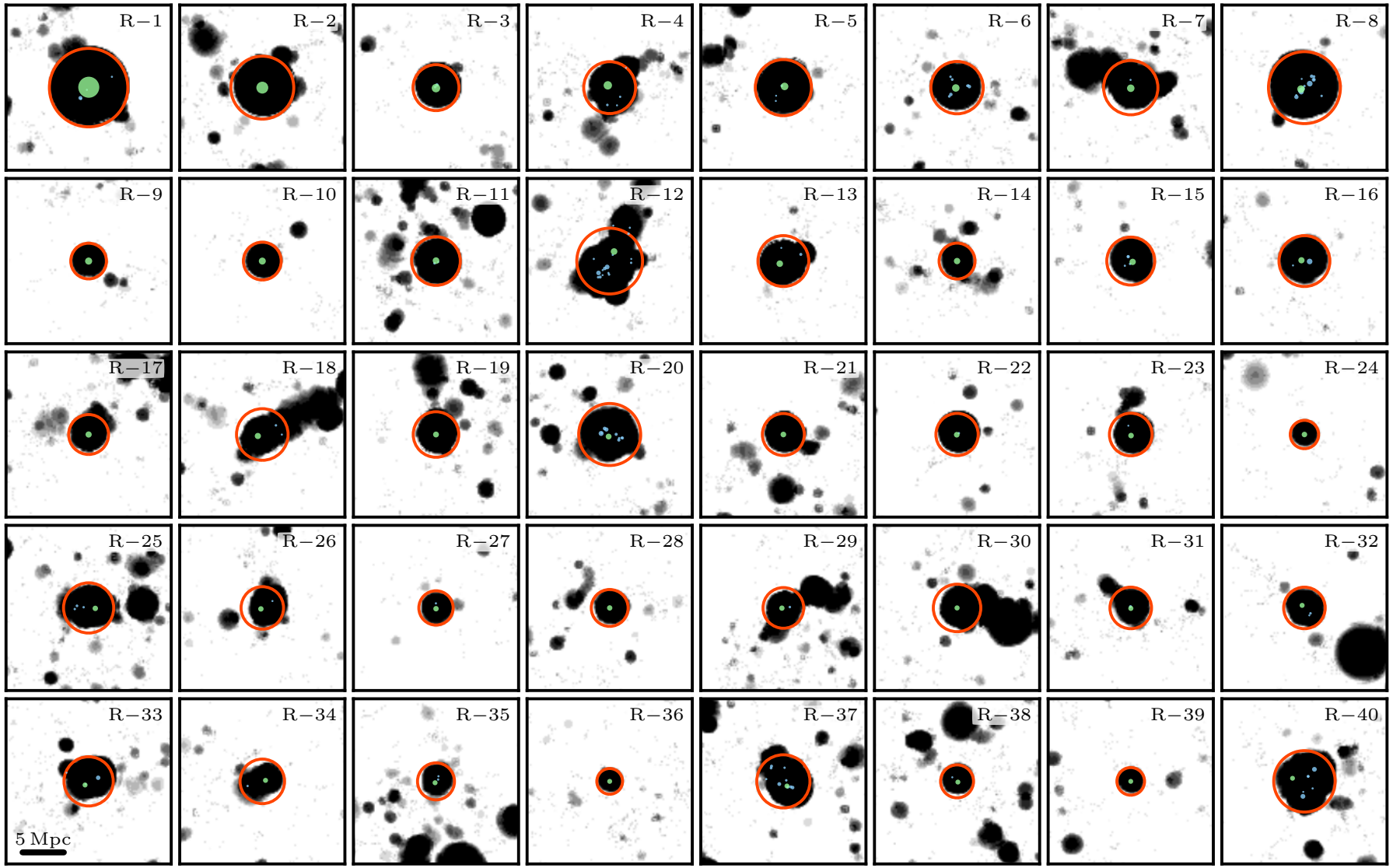
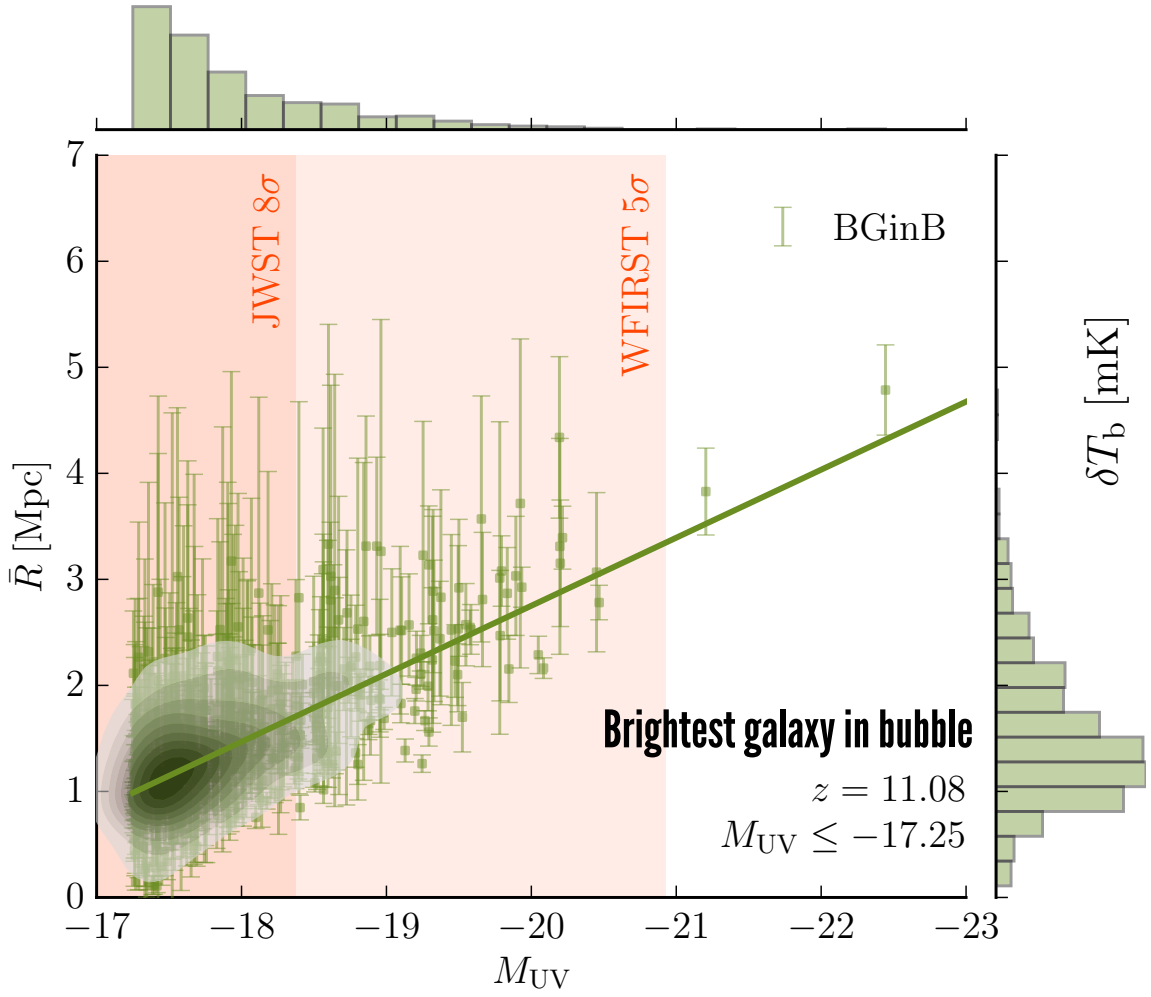
DETECTING REIONIZATION

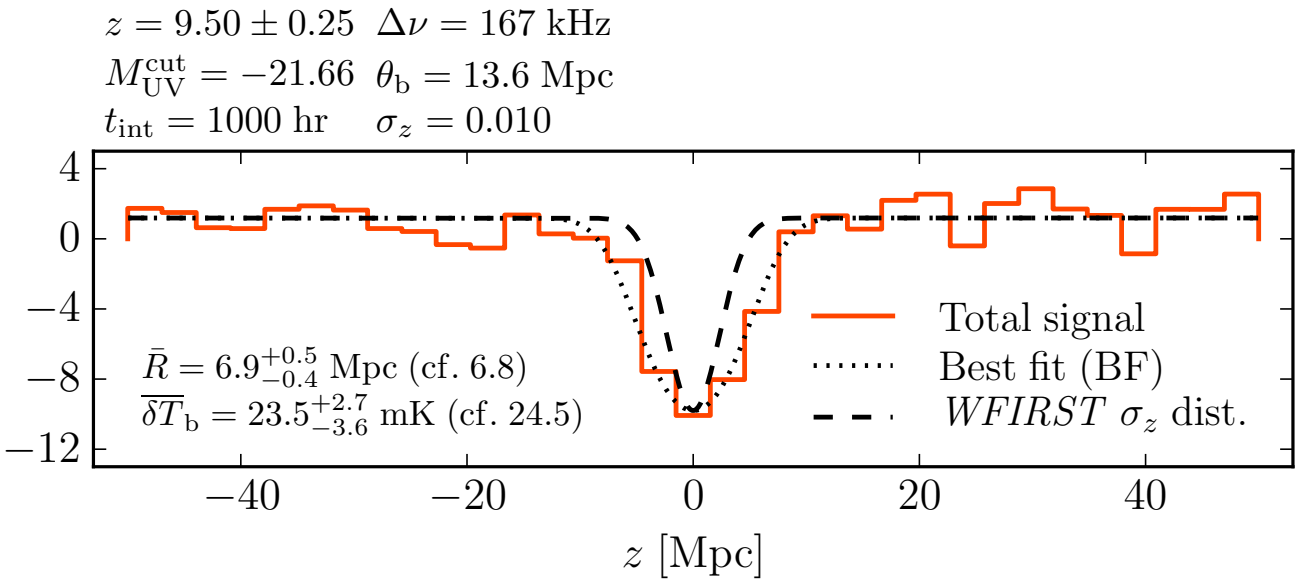
Geil, Mutch+ (2017)



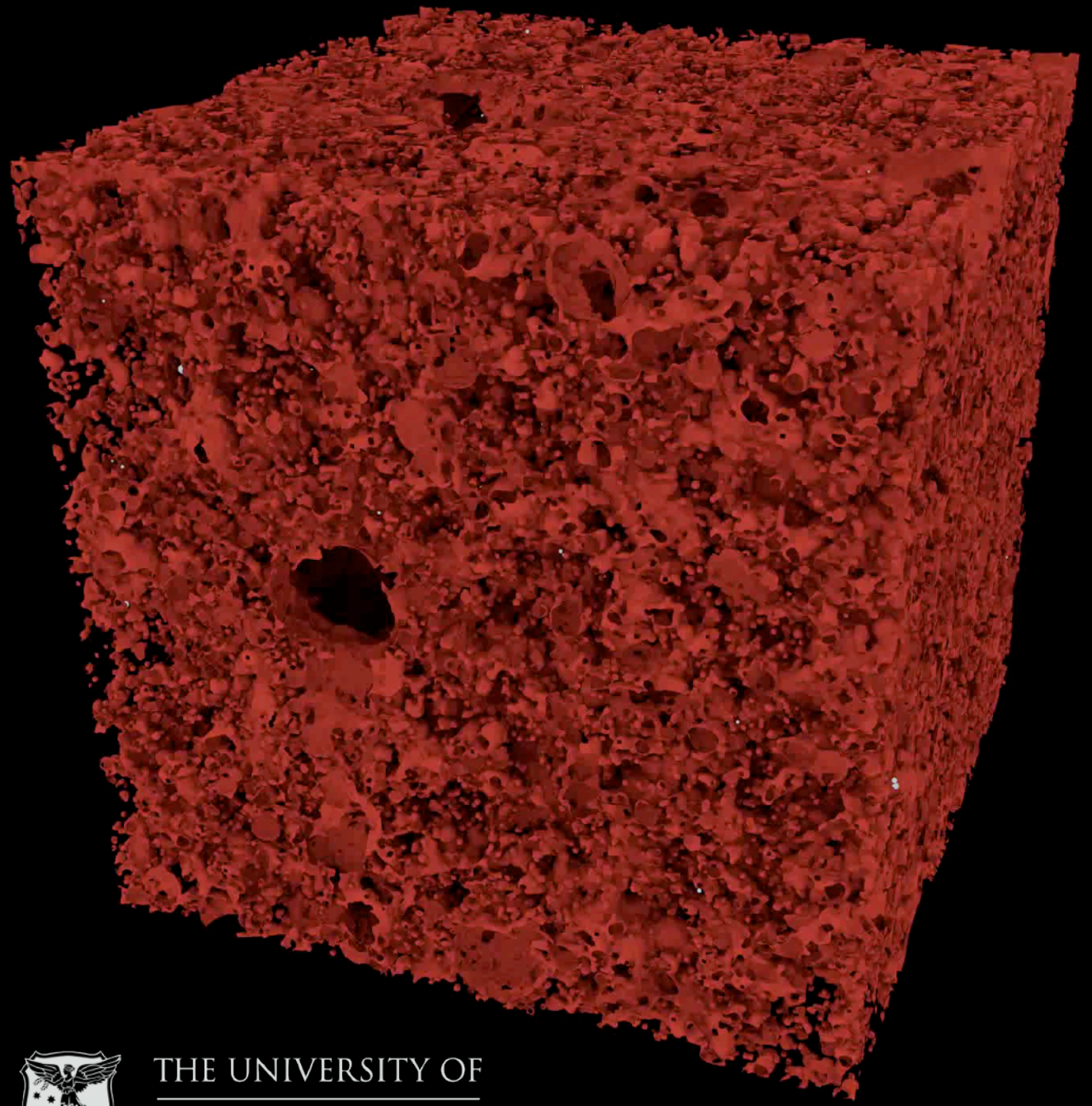
DETECTING REIONIZATION

Geil, Mutch+ (2017)





By stacking SKA spectra along LoS to bright galaxies we should be able to directly detect reionization.



The EoR is an important phase in the evolution of the Universe.

We need to be able to self-consistently model galaxy growth & the EoR if we want to learn the most we can from future observations.

MERAXES

[məɹ'ɑksiz] mər-ahk-seez

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Simulation The DRAGONS team

Visualisation Paul Geil & Simon Mutch

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