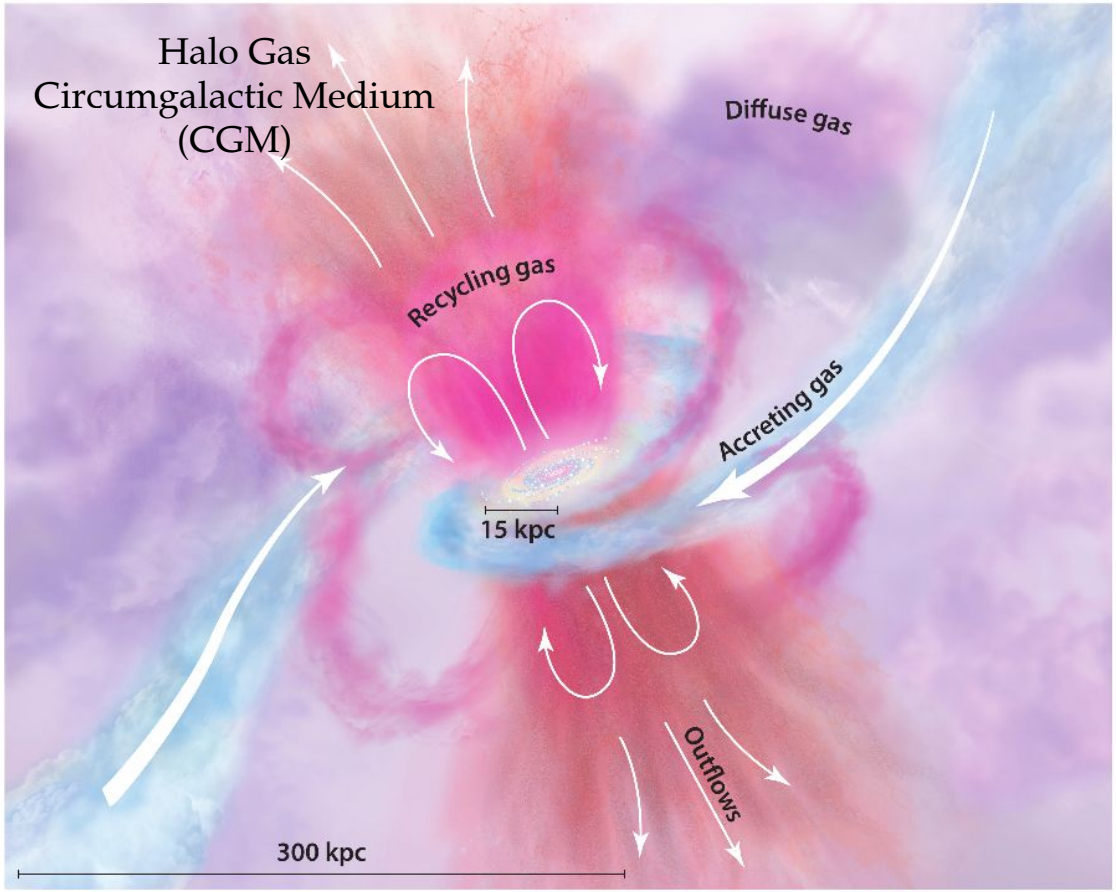
The Galaxy-Halo Gas Connection



Dali 2018

Three Main Messages

1. (Cool) Halo gas (kinematics) traces the galaxy stellar mass.

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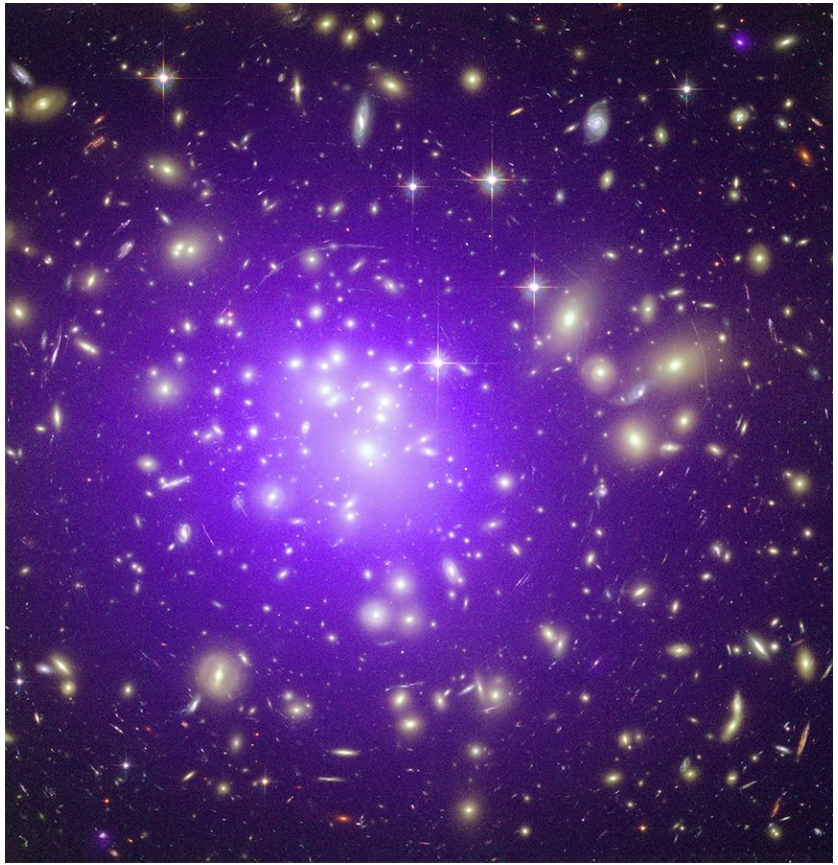
(4. Quasars show the extrema of Cool Halo gas)

<u>Caveats</u>

- z<1 (primarily)
- Hot gas is nearly unconstrained
- Sample sizes are modest [10's, not even 100's]

X-ray Emission: Too Diffuse/Soft for Galaxy Halos



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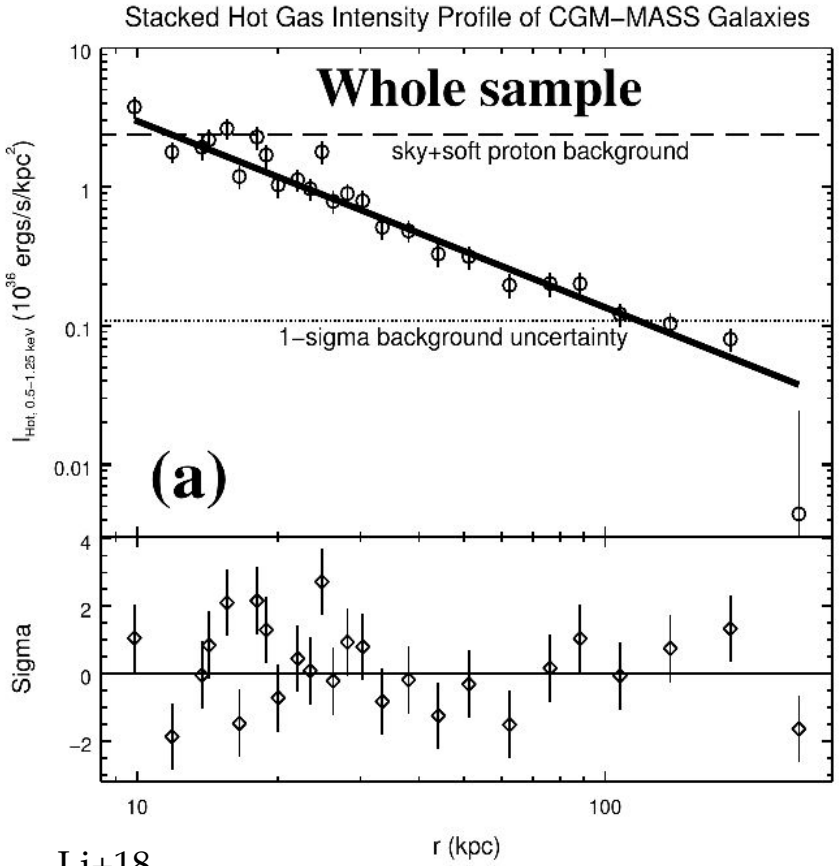
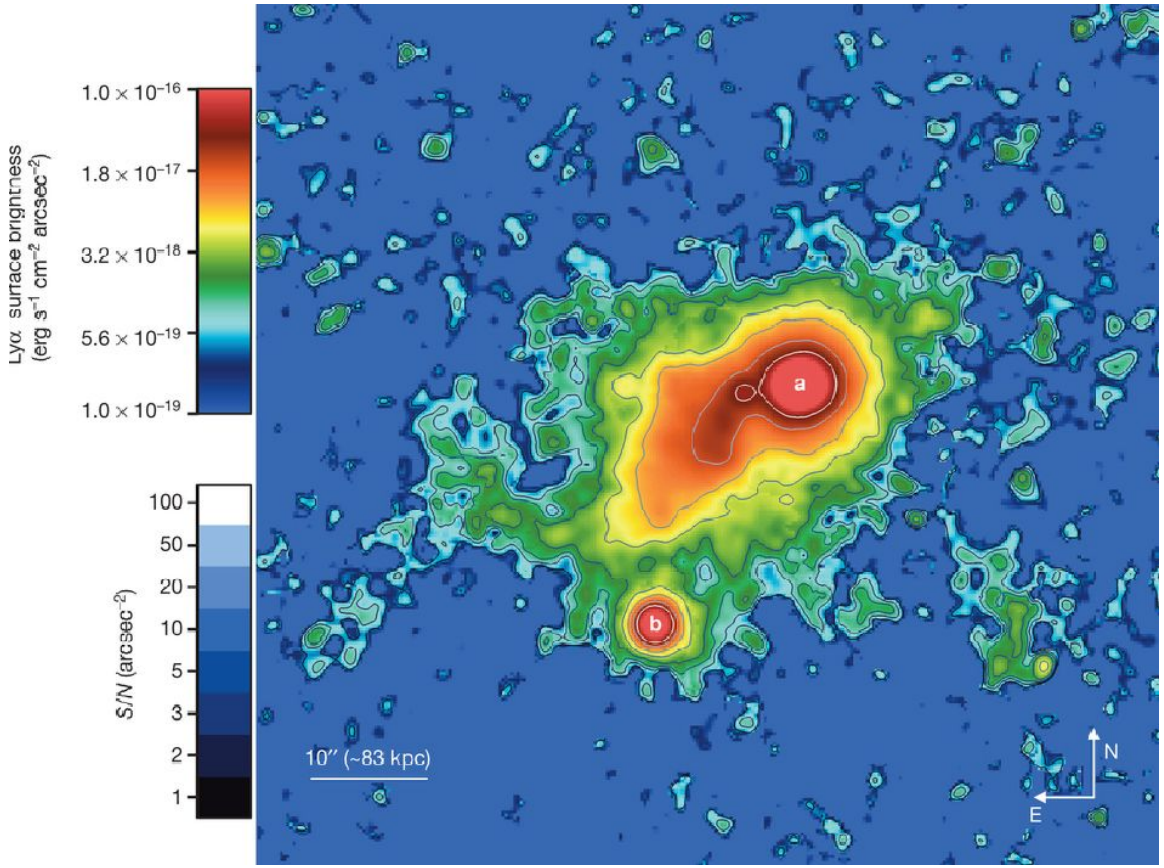
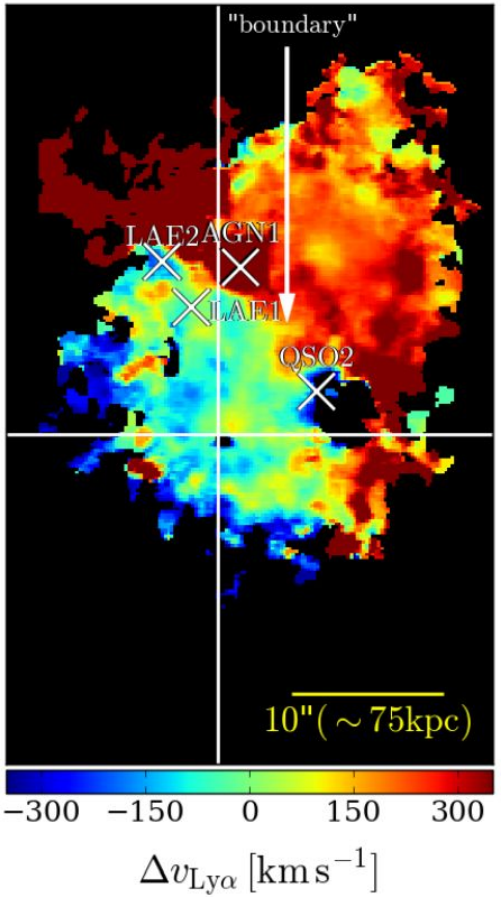


Li+18

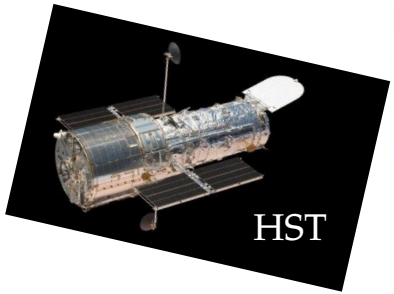
Lya Emission: Progress with Cool HI Gas

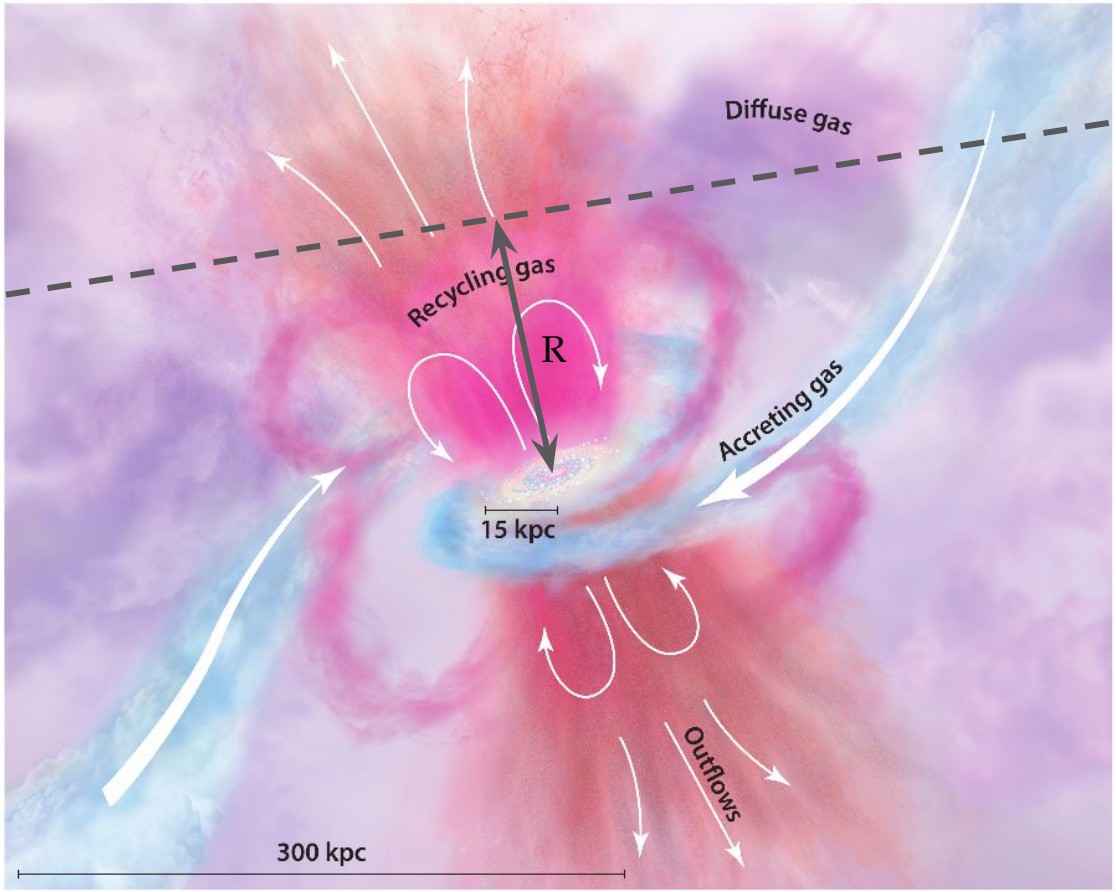


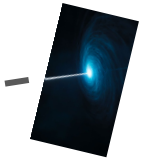


Dali 2018

Probing Halo Gas in Absorption





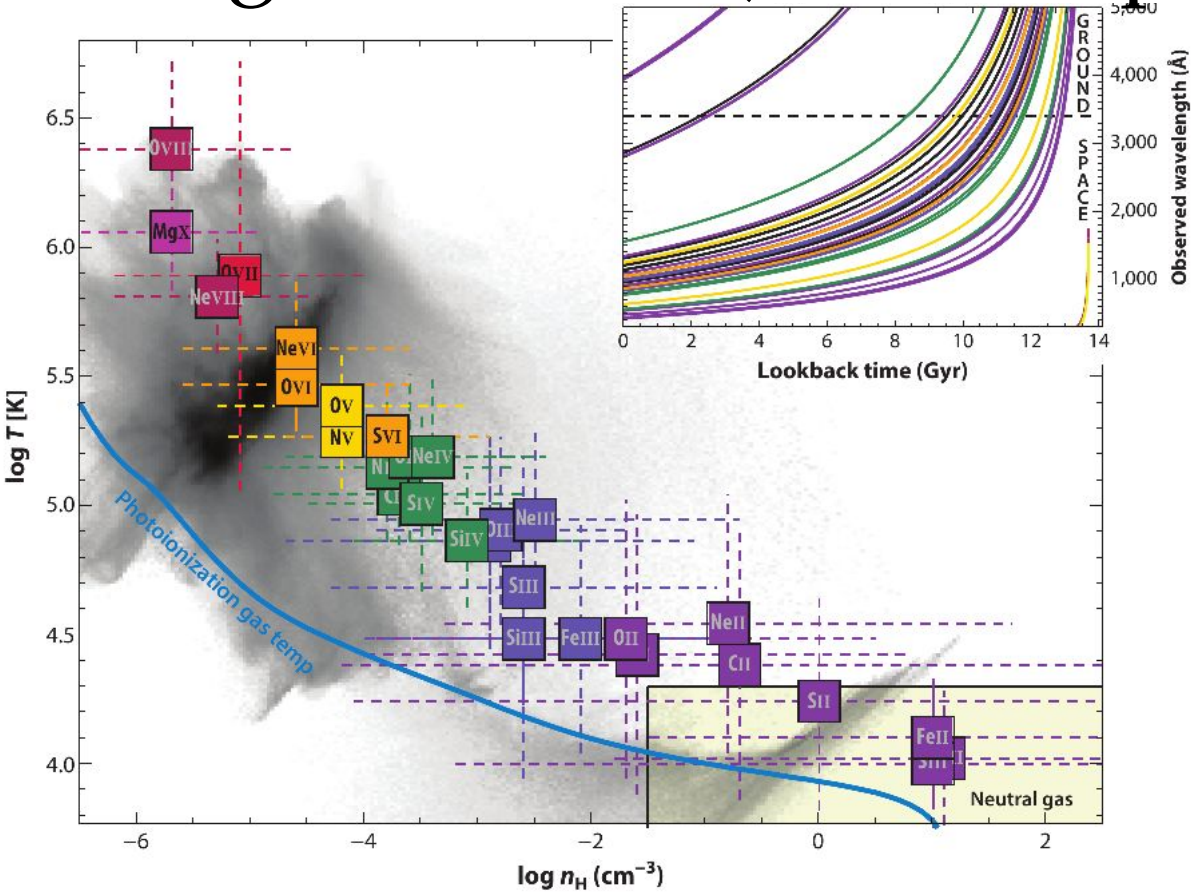


Quasar
(UV bright)

Tumlinson+17

Dali 2018

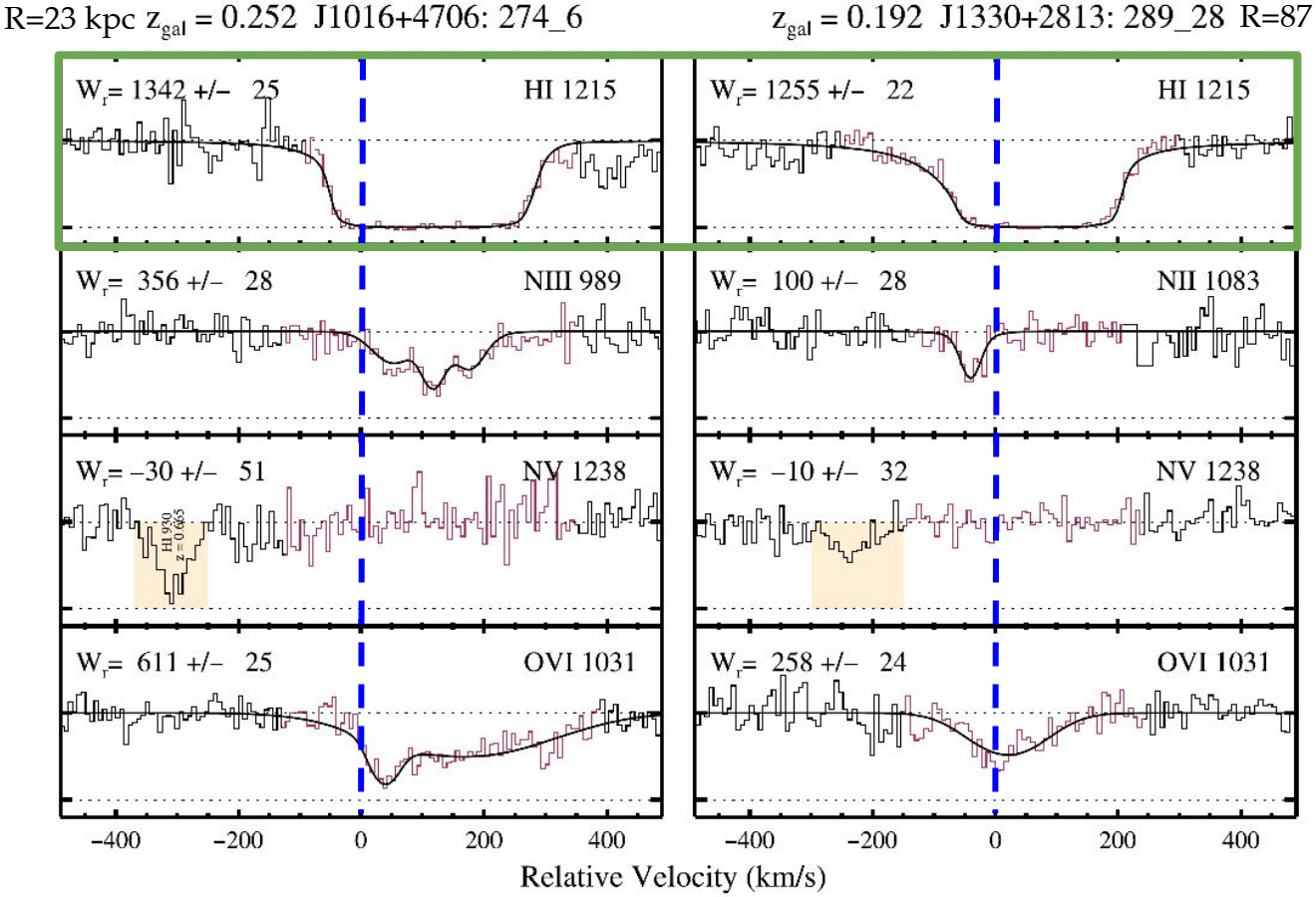
Diagnosing Halo Gas (in Absorption)



Tumlinson+17

Dali 2018

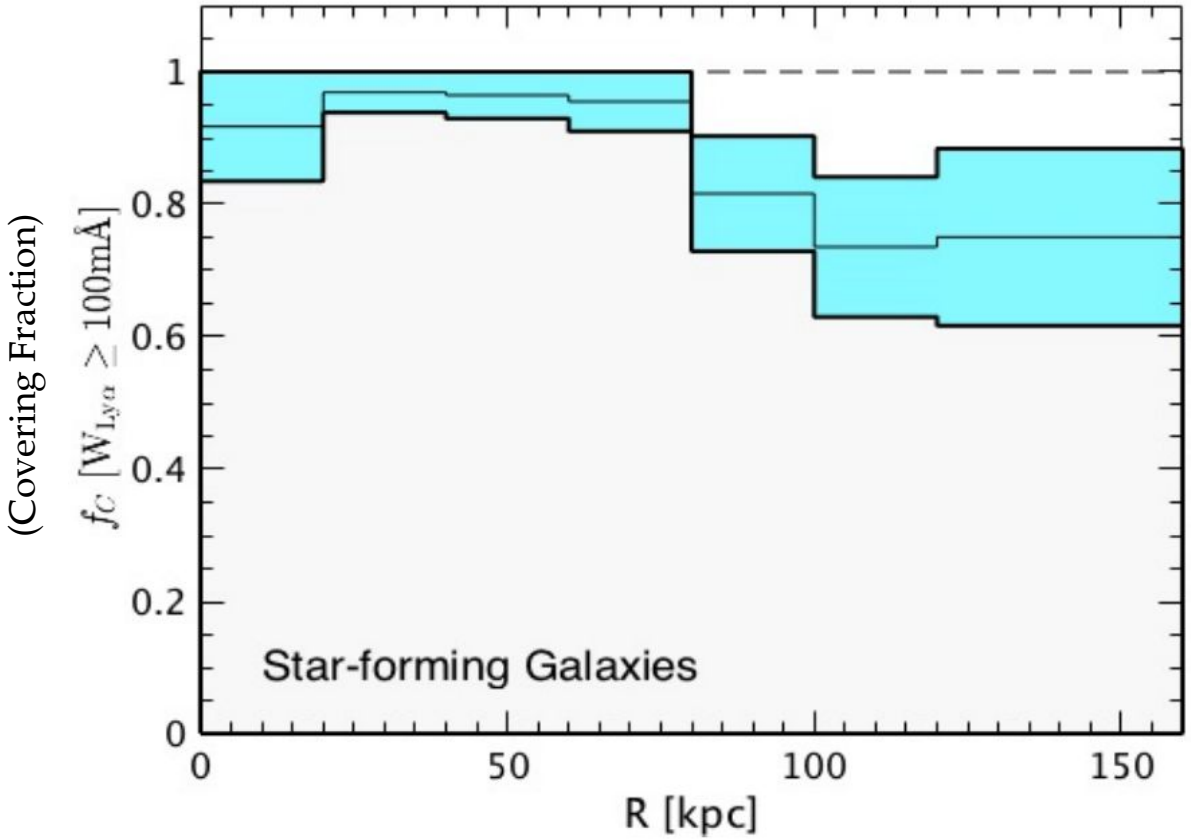
Halo Gas Detected



Werk+16

Dali 2018

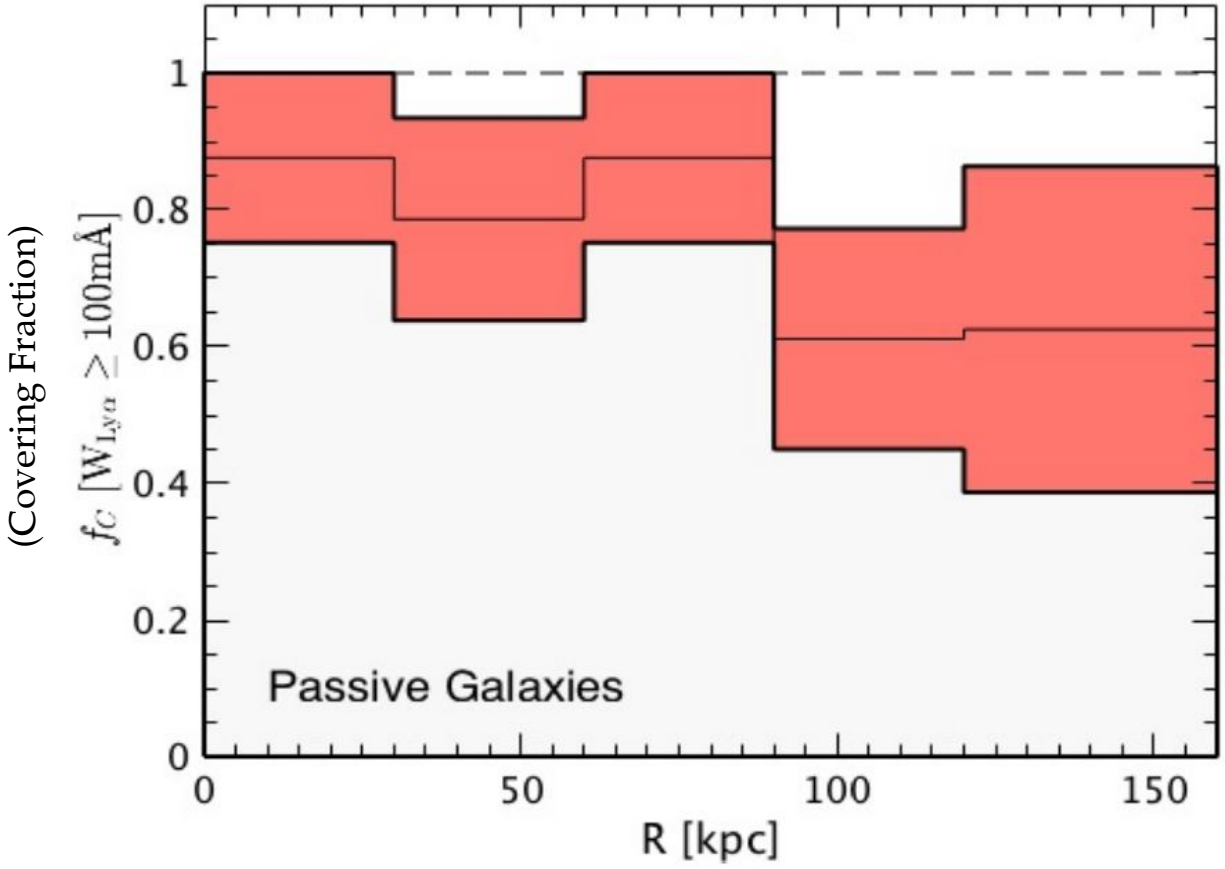
Cool Halo Gas is nearly Ubiquitous



X+11
Tumlinson+13
Bordoloi+16,18

Dali 2018

Cool Halo Gas is nearly Ubiquitous



Bordoloi+18

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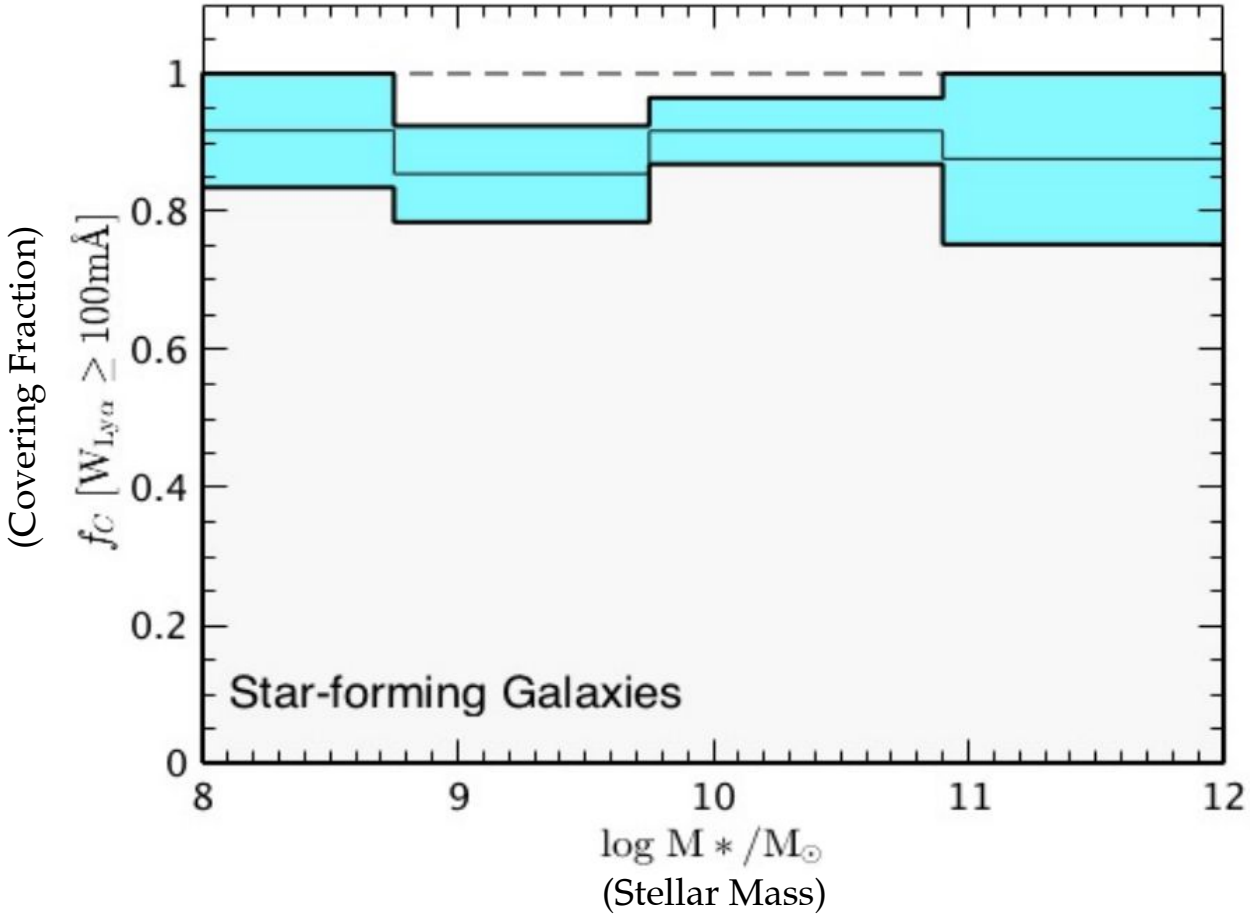

Bordoloi+18

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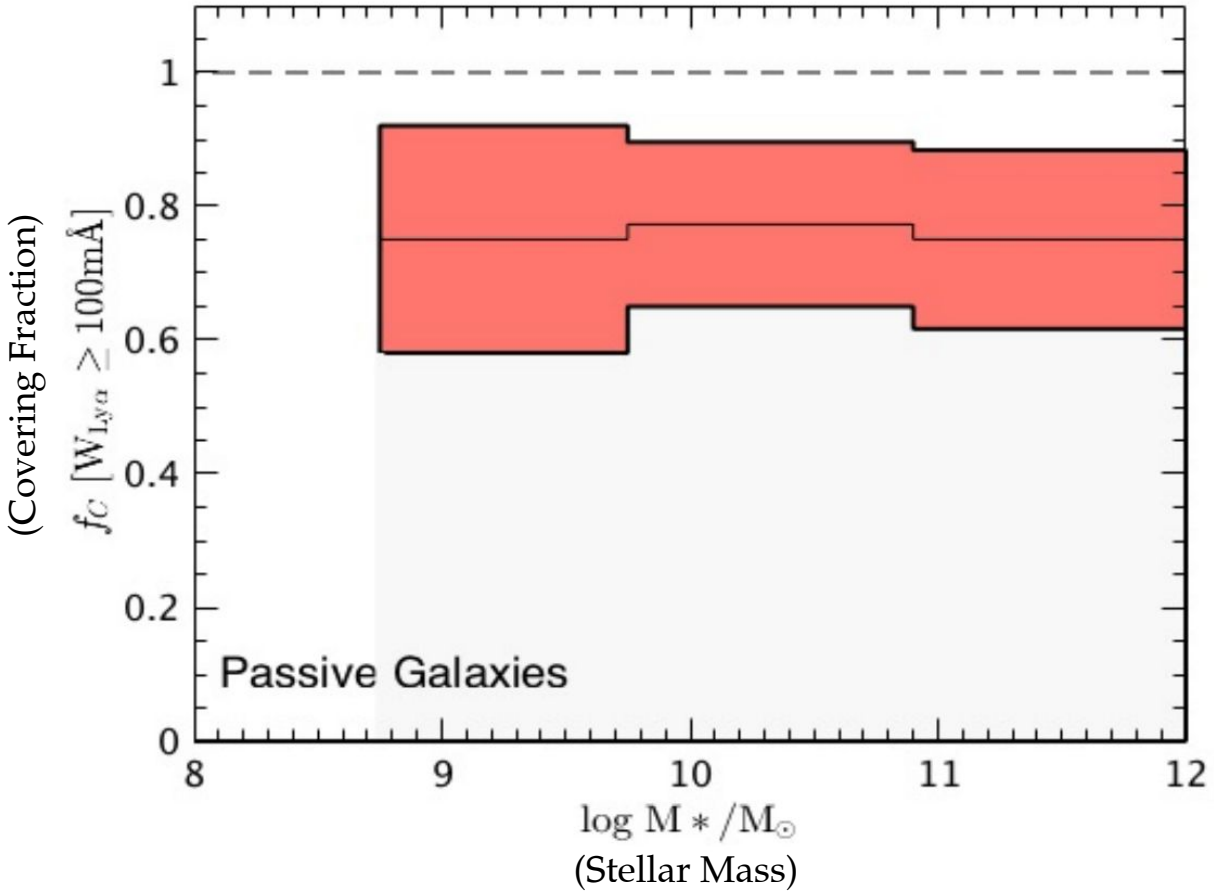
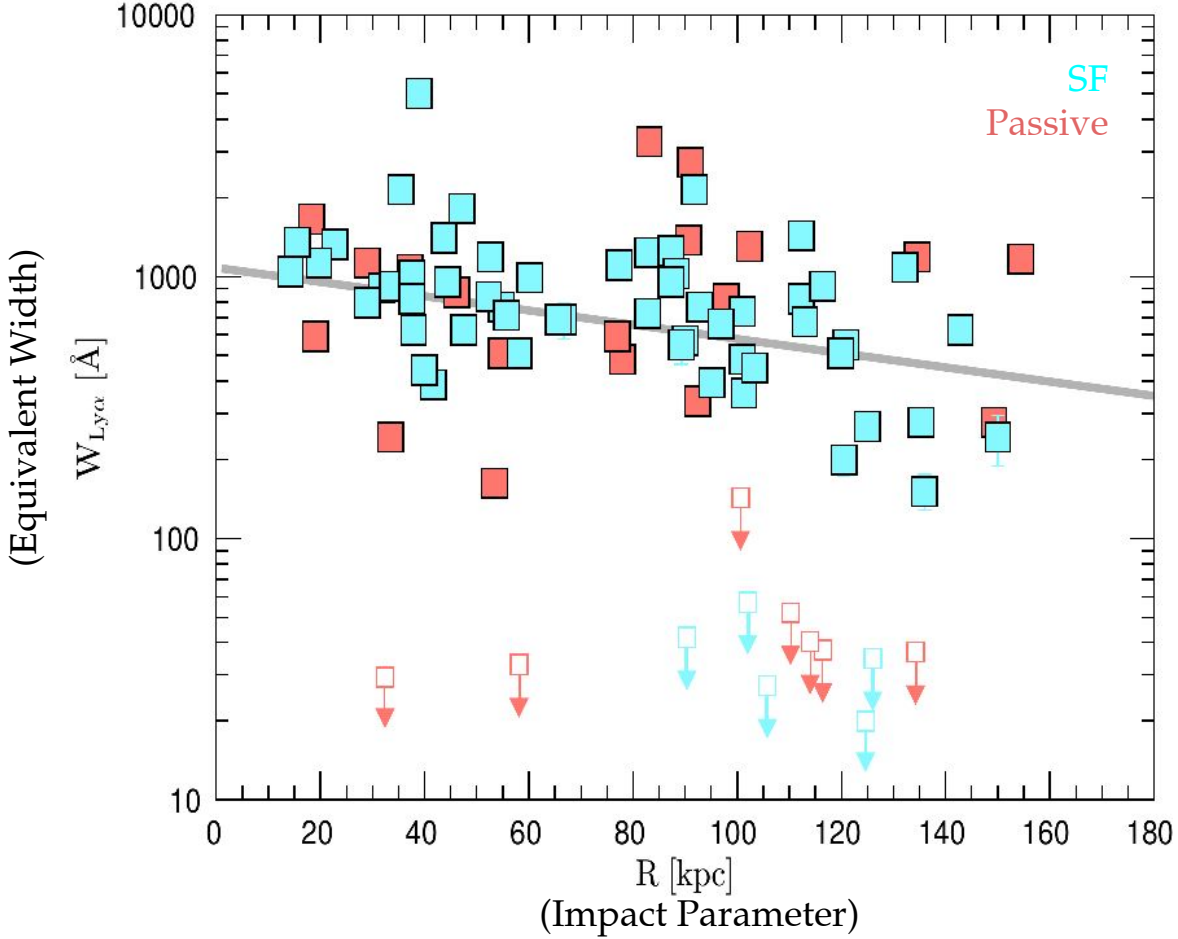


Bordoloi+18

Dali 2018

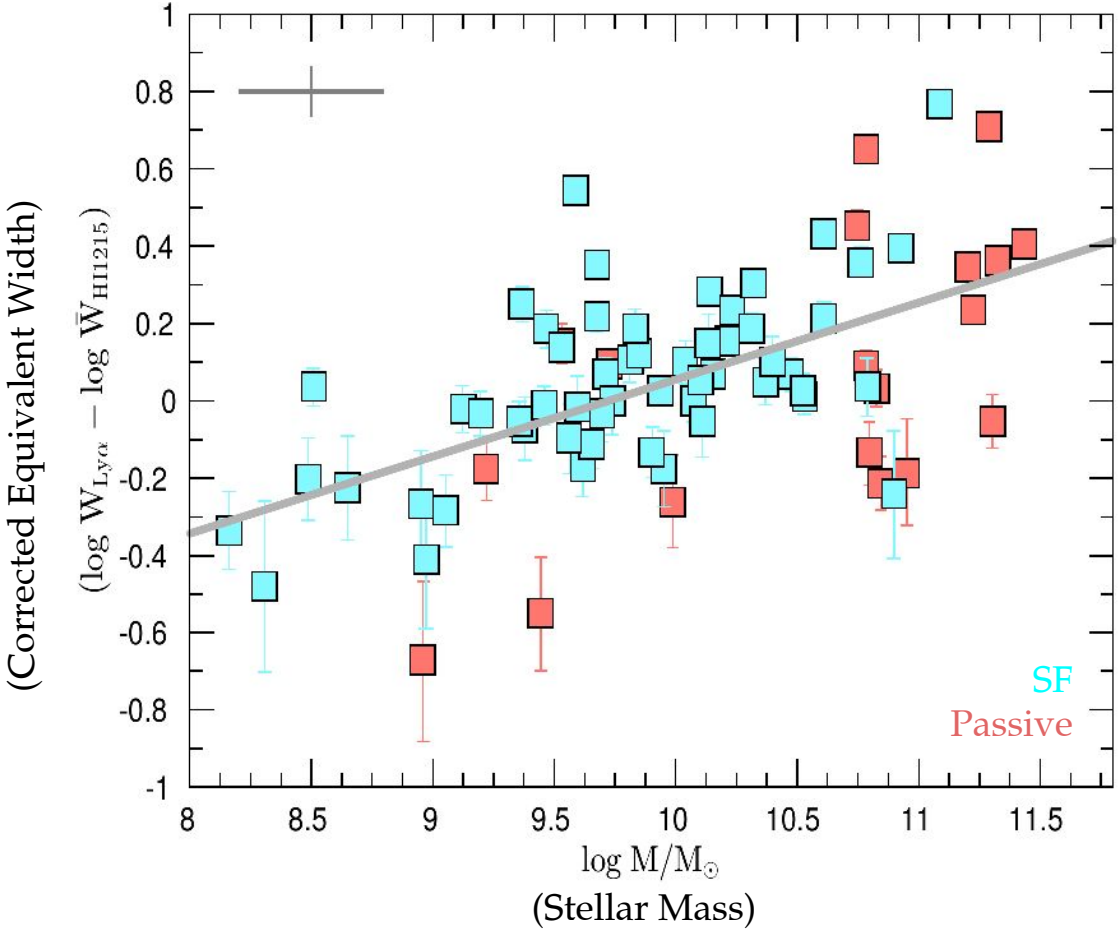
Cool Halo Gas scales with R



Bordoloi+18

Dali 2018

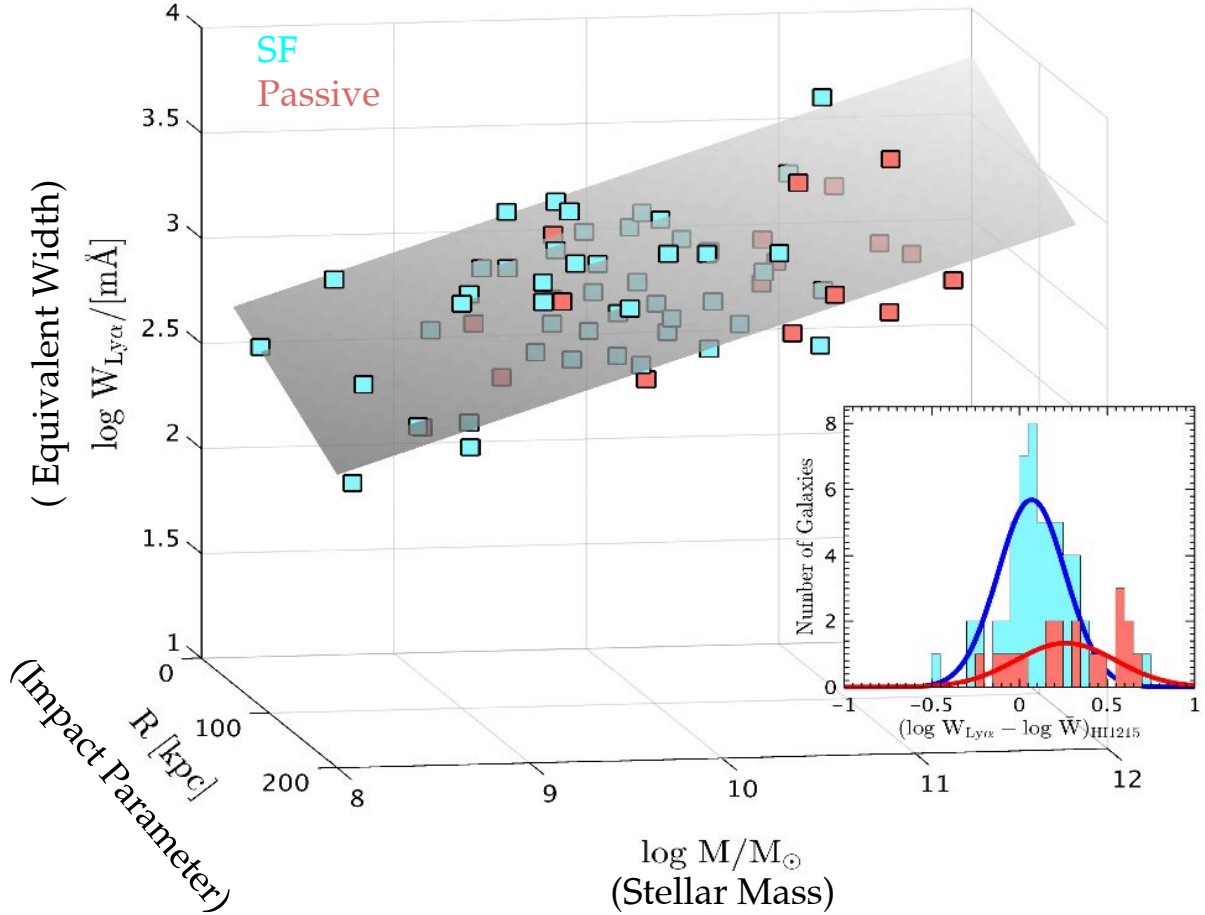
Cool Halo Gas scales with M*



Bordoloi+18

Dali 2018

Cool Halo Gas: Fundamental Plane

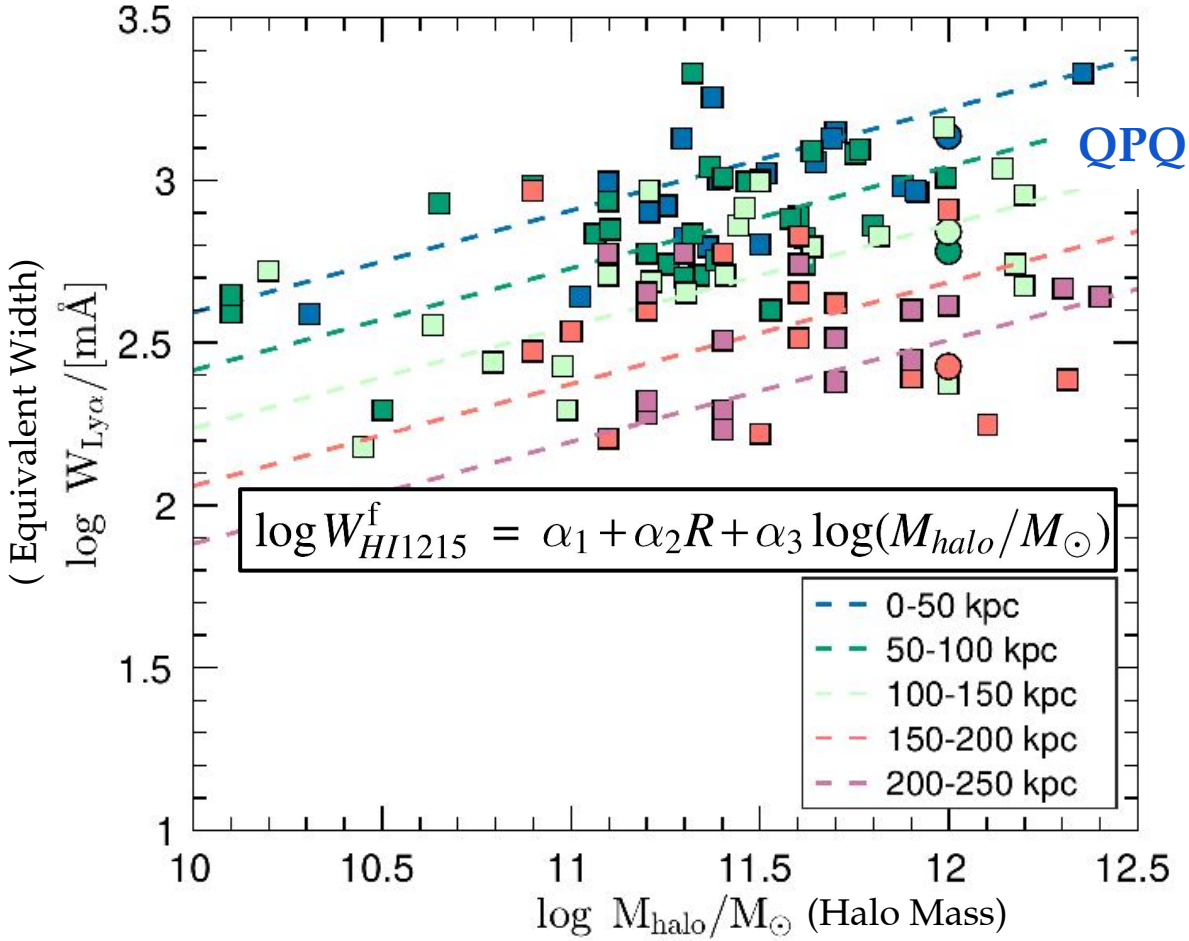


Bordoloi+18

Dali 2018

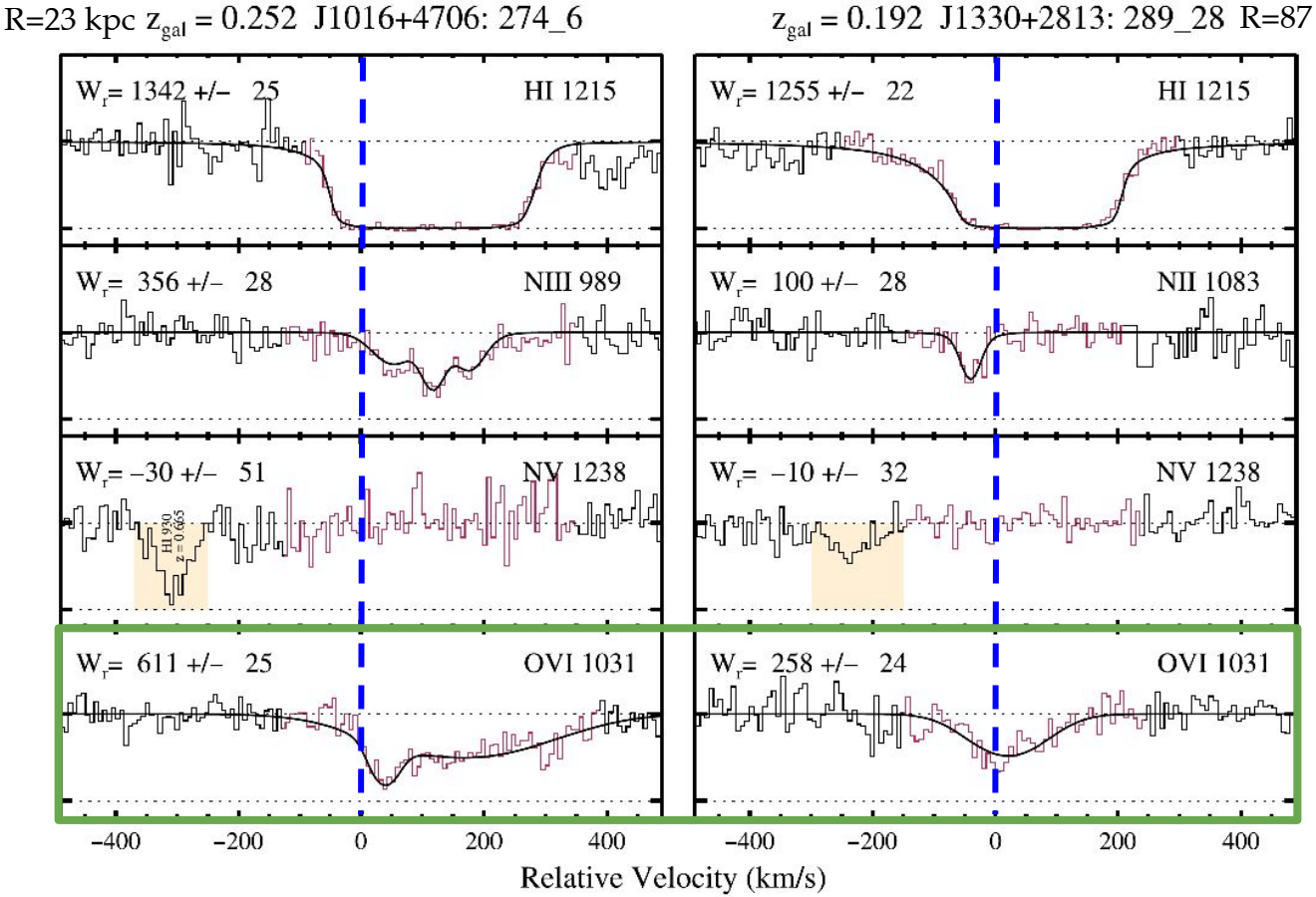
Cool Halo Gas Traces the Halo Mass

Bordoloi+18



Dali 2018

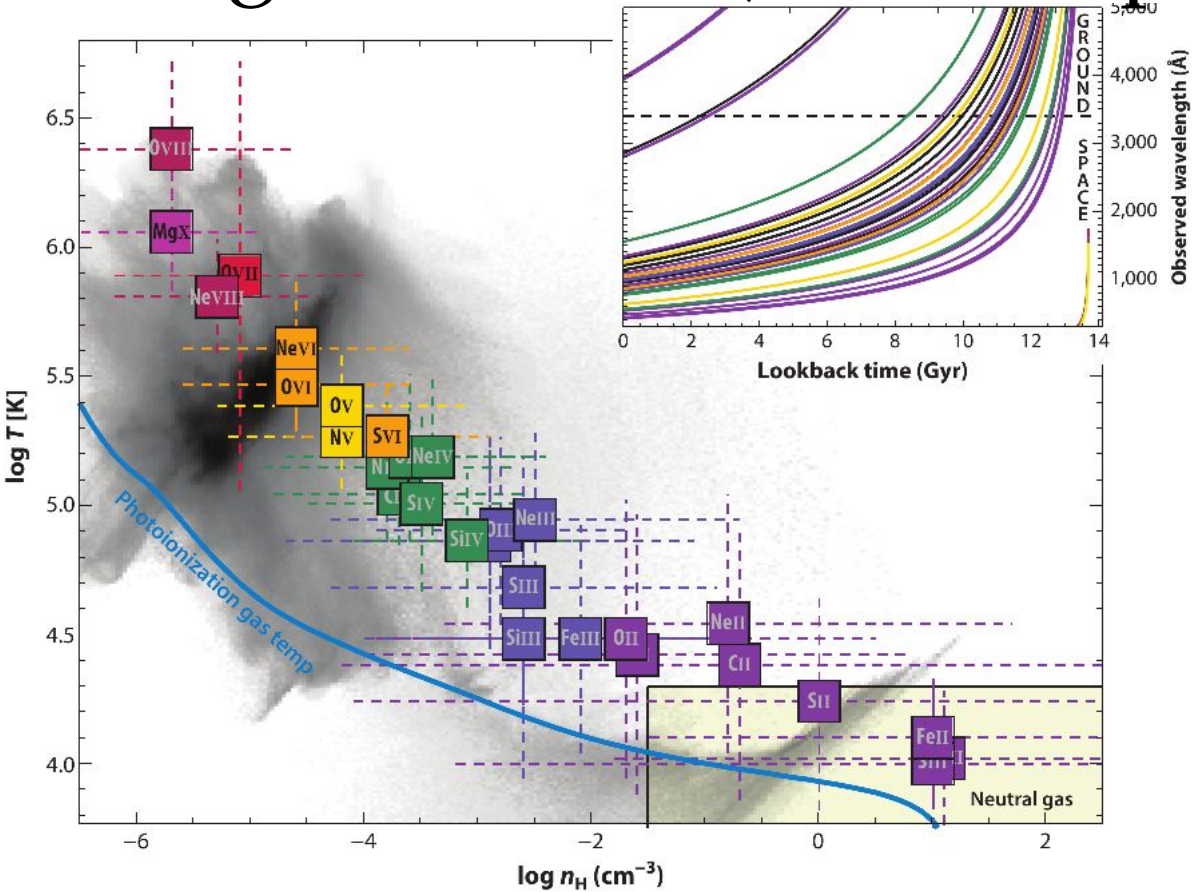
Halo Gas Detected



Werk+16

Dali 2018

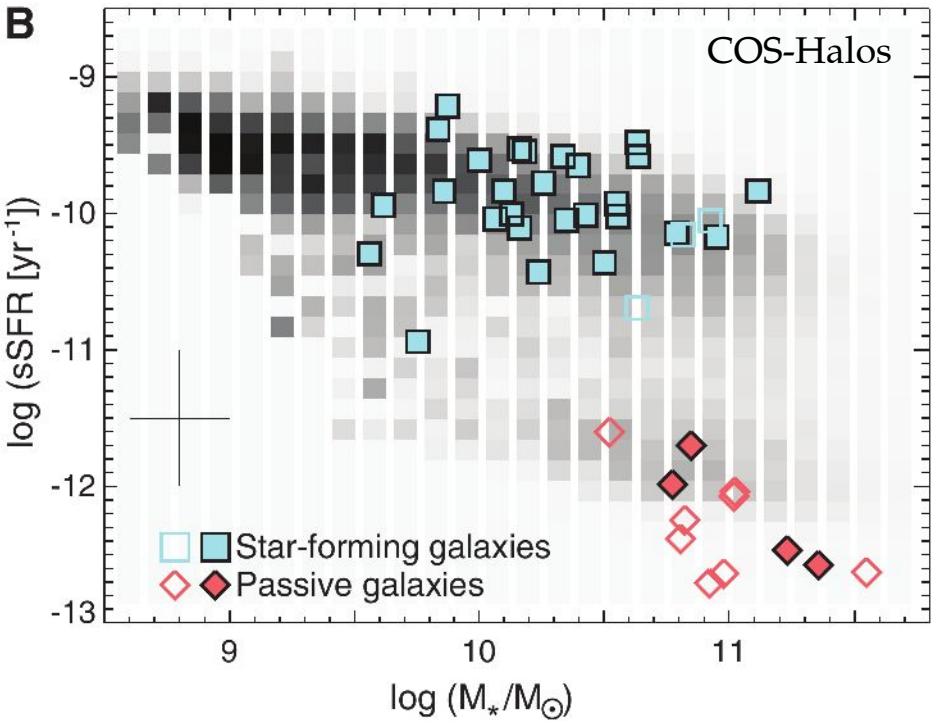
Diagnosing Halo Gas (in Absorption)



Tumlinson+17

Dali 2018

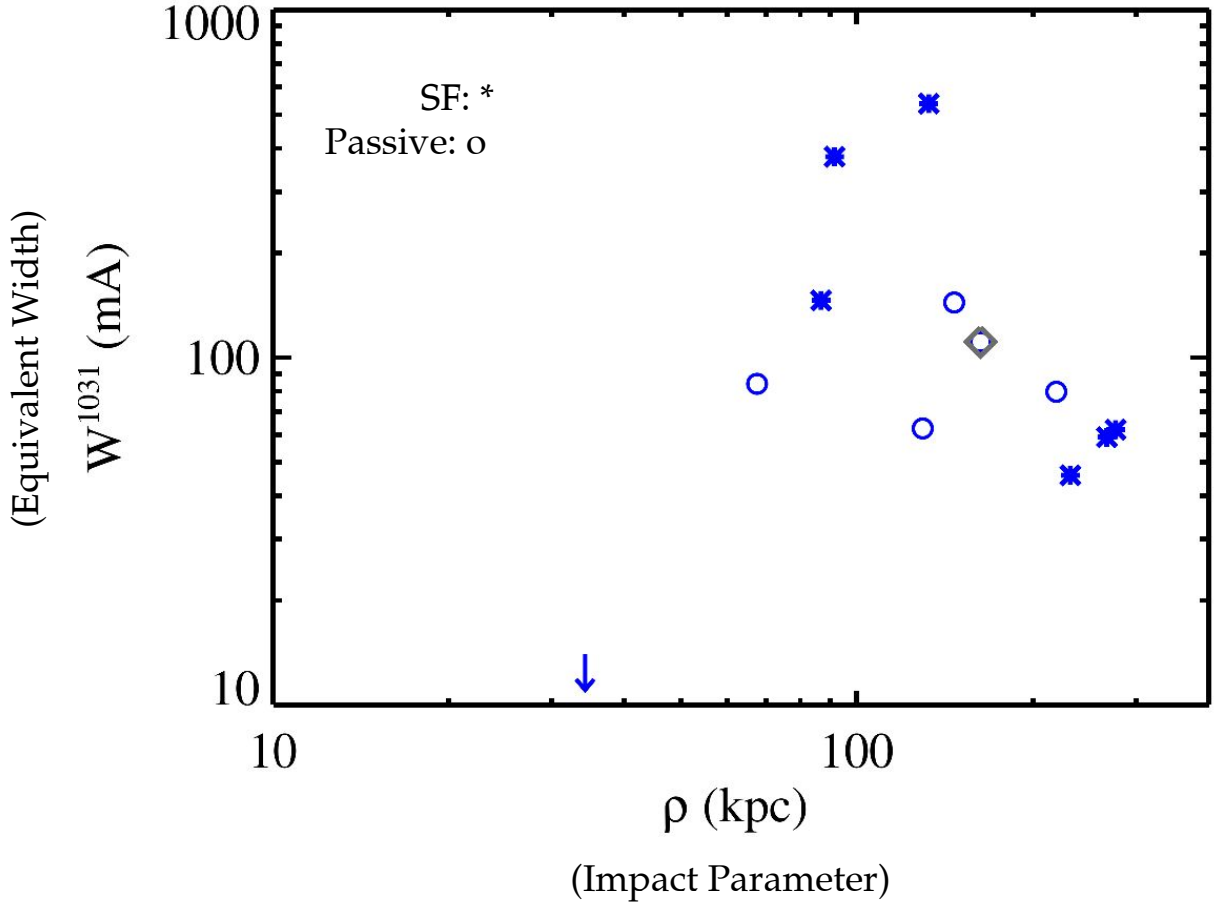
OVI Gas traces Star-Formation in L* Galaxies



Tumlinson+11

Dali 2018

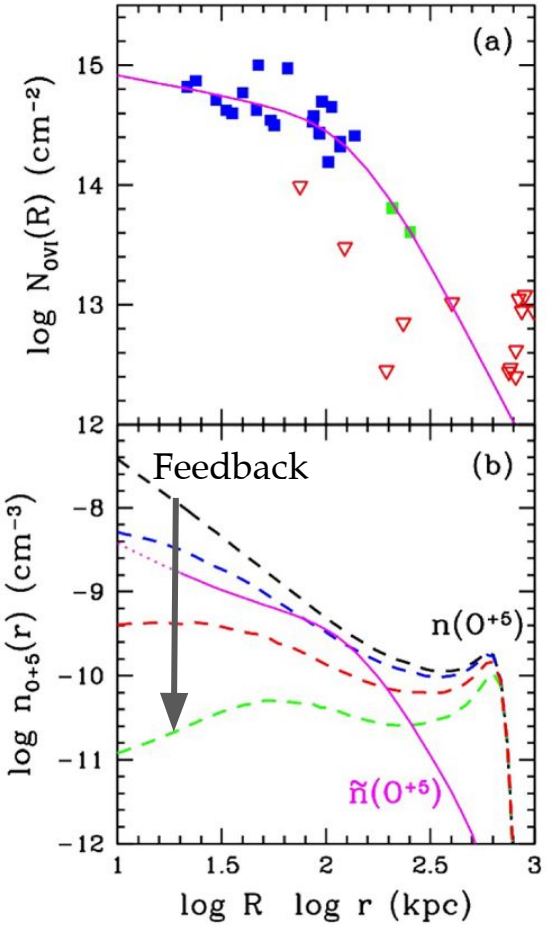
OVI Gas traces all sub-L* Galaxies

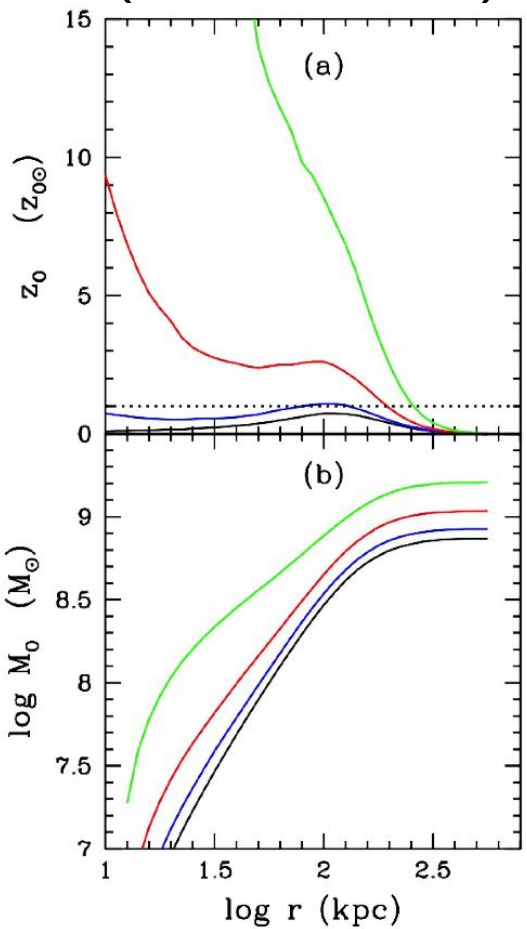


X+11

(Note: OVI avoids Dwarf Galaxies)

OVI traces Warm/Hot (T~10^6 K) Halo gas?



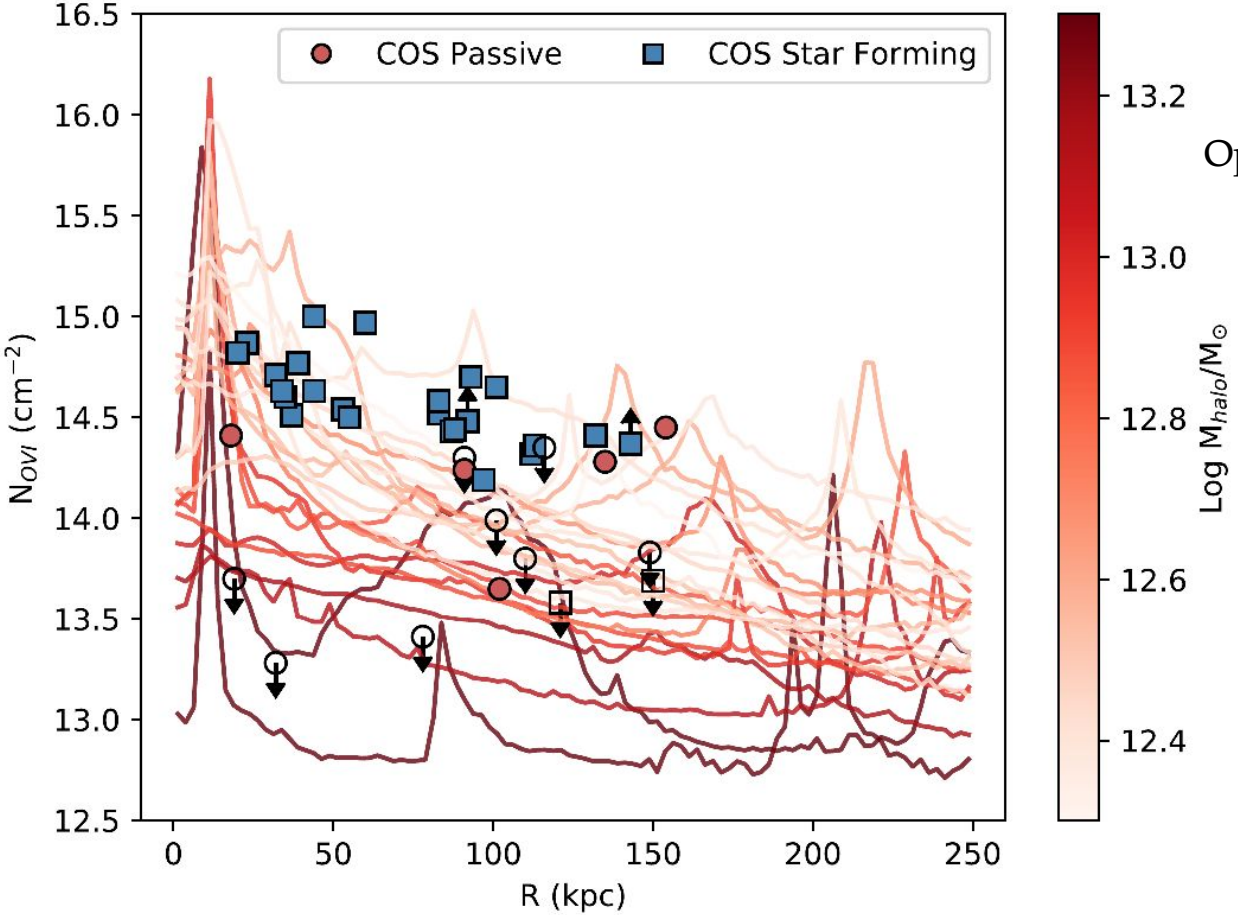


Mathews & X (2017)

(see also Faerman+17)

Dali 2018

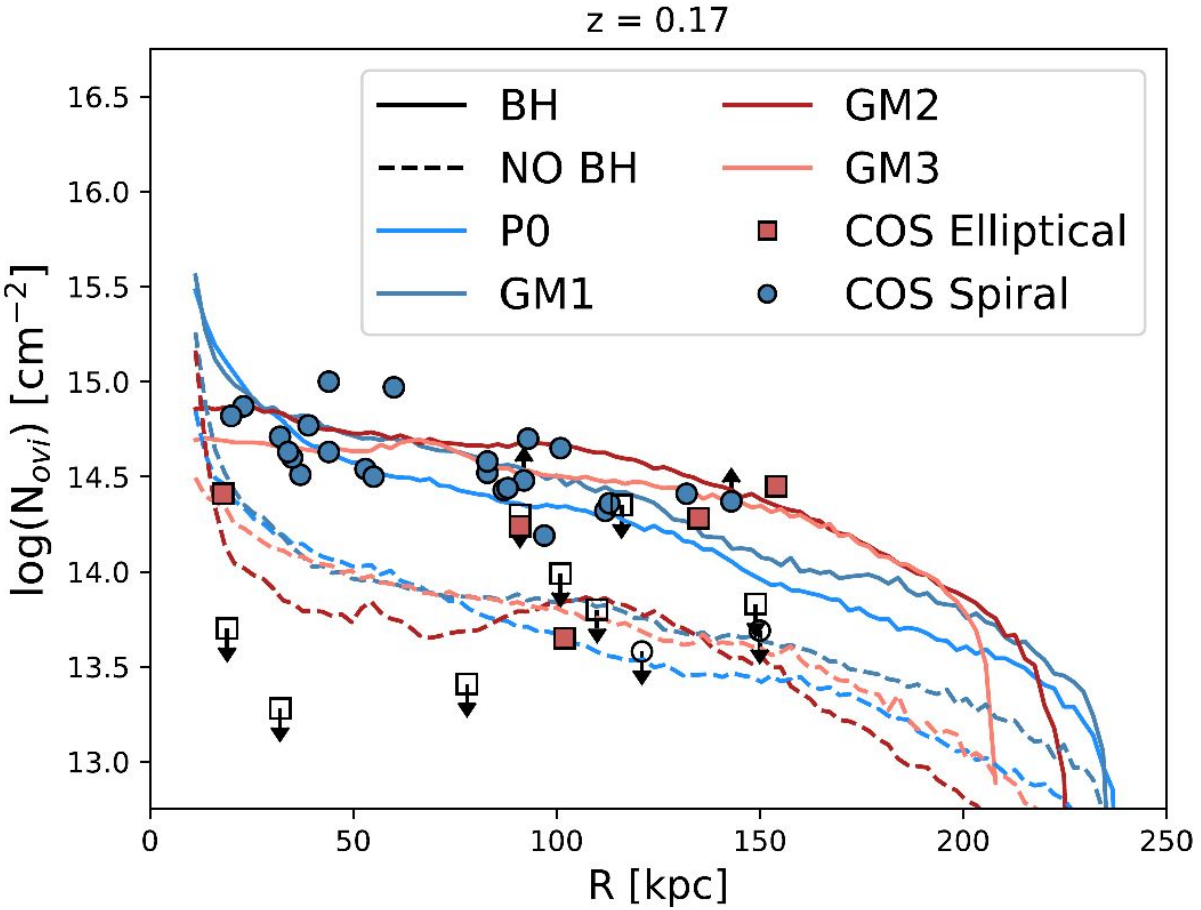
OVI Gas traces Halo Mass?



Oppenheimer+16
Sanchez+18

Dali 2018

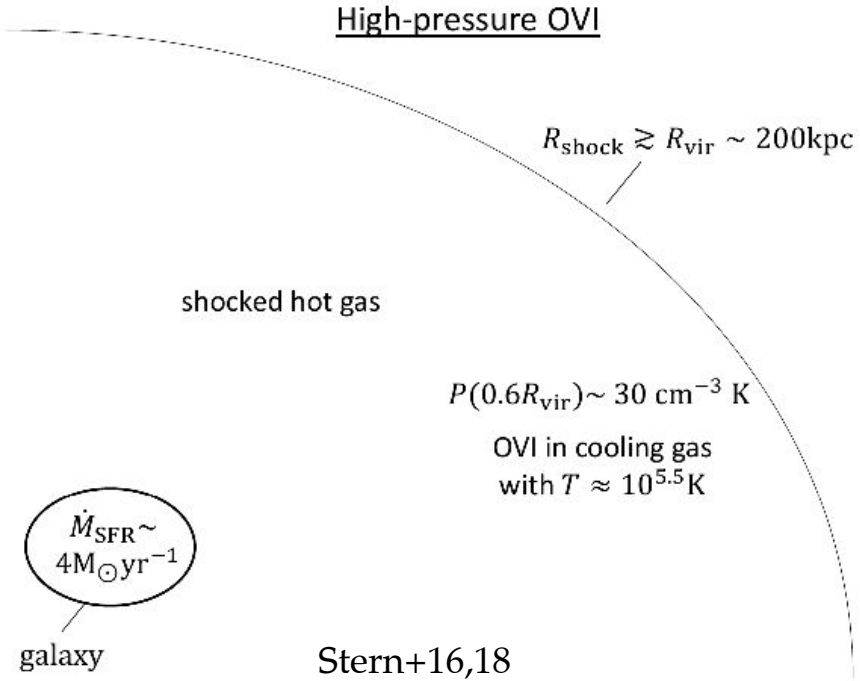
OVI Gas Needs SMBH Enrichment?



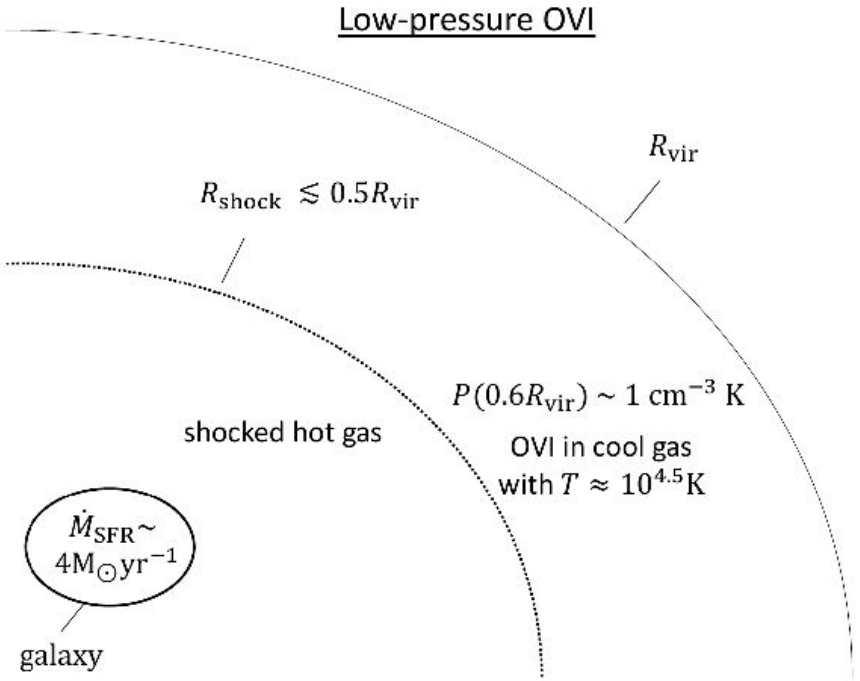
Sanchez+18

Dali 2018

OVI Gas Traces Non-Virialized Gas?



Stern+16,18



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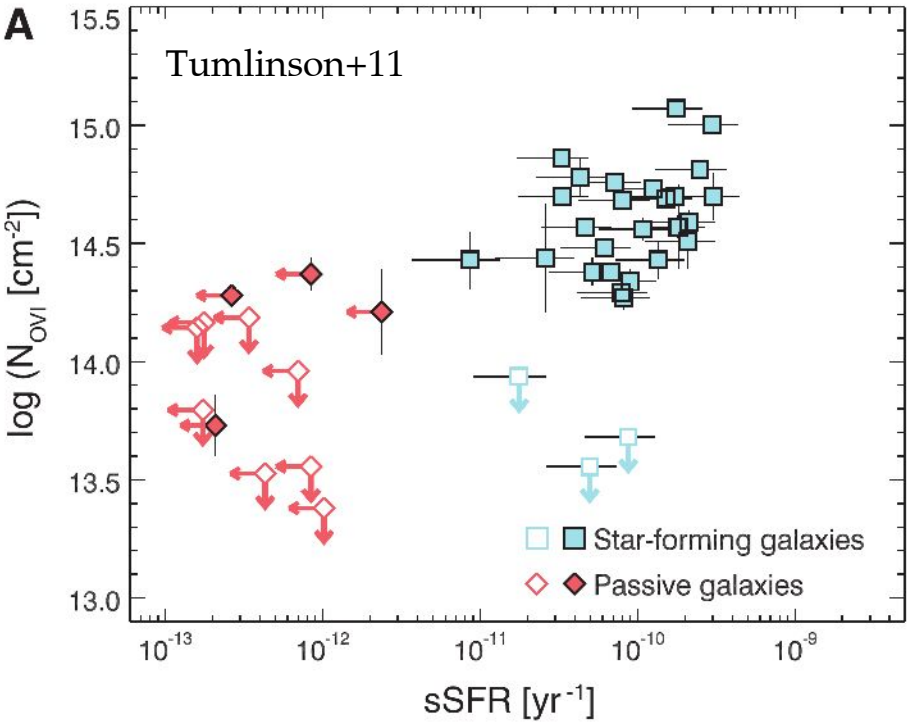
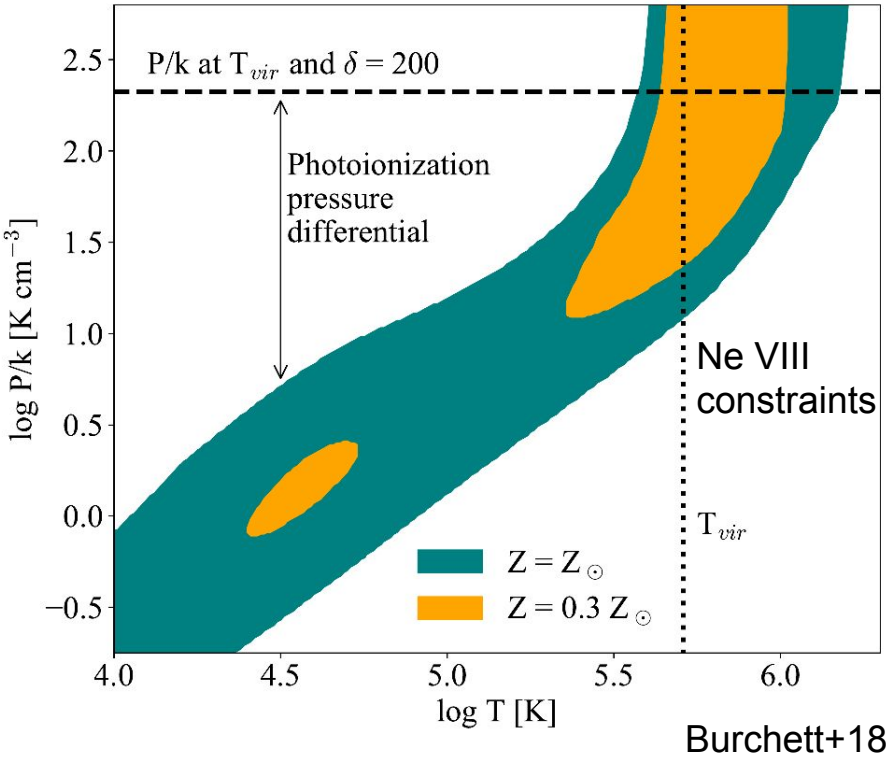
OVI Halo Knows about its Central Galaxy

But we aren't sure why...

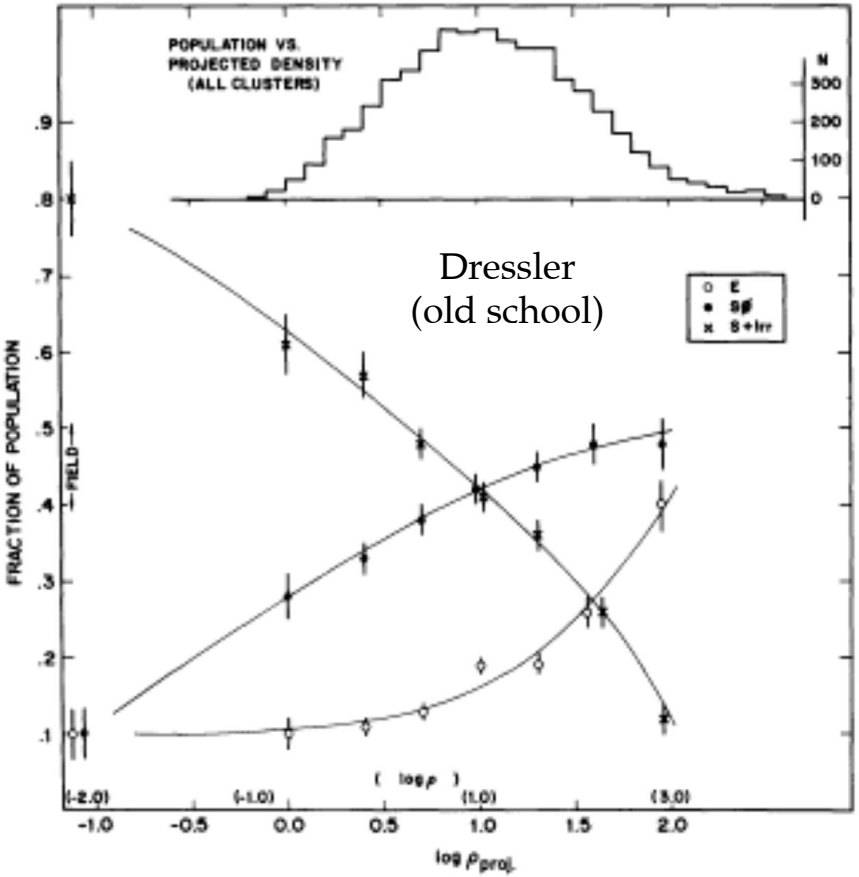


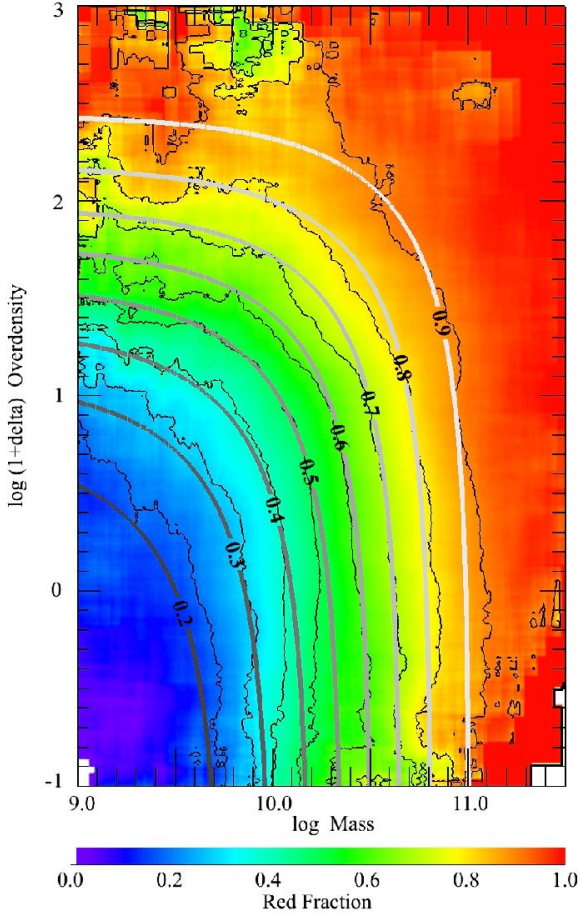


Burchett+18

Dali 2018

Environment Matters (for Galaxy Halos too)





Peng
(SDSS)

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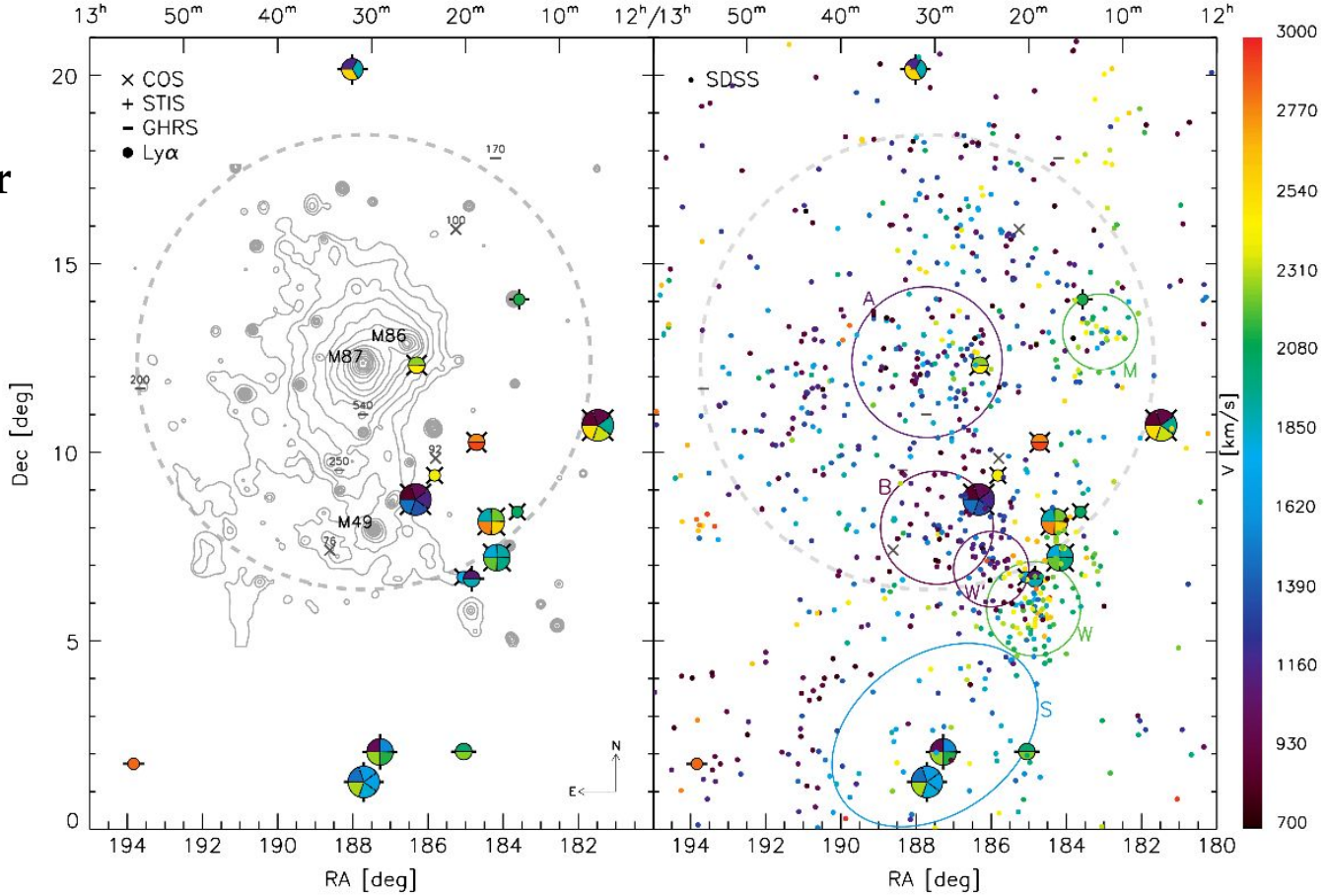
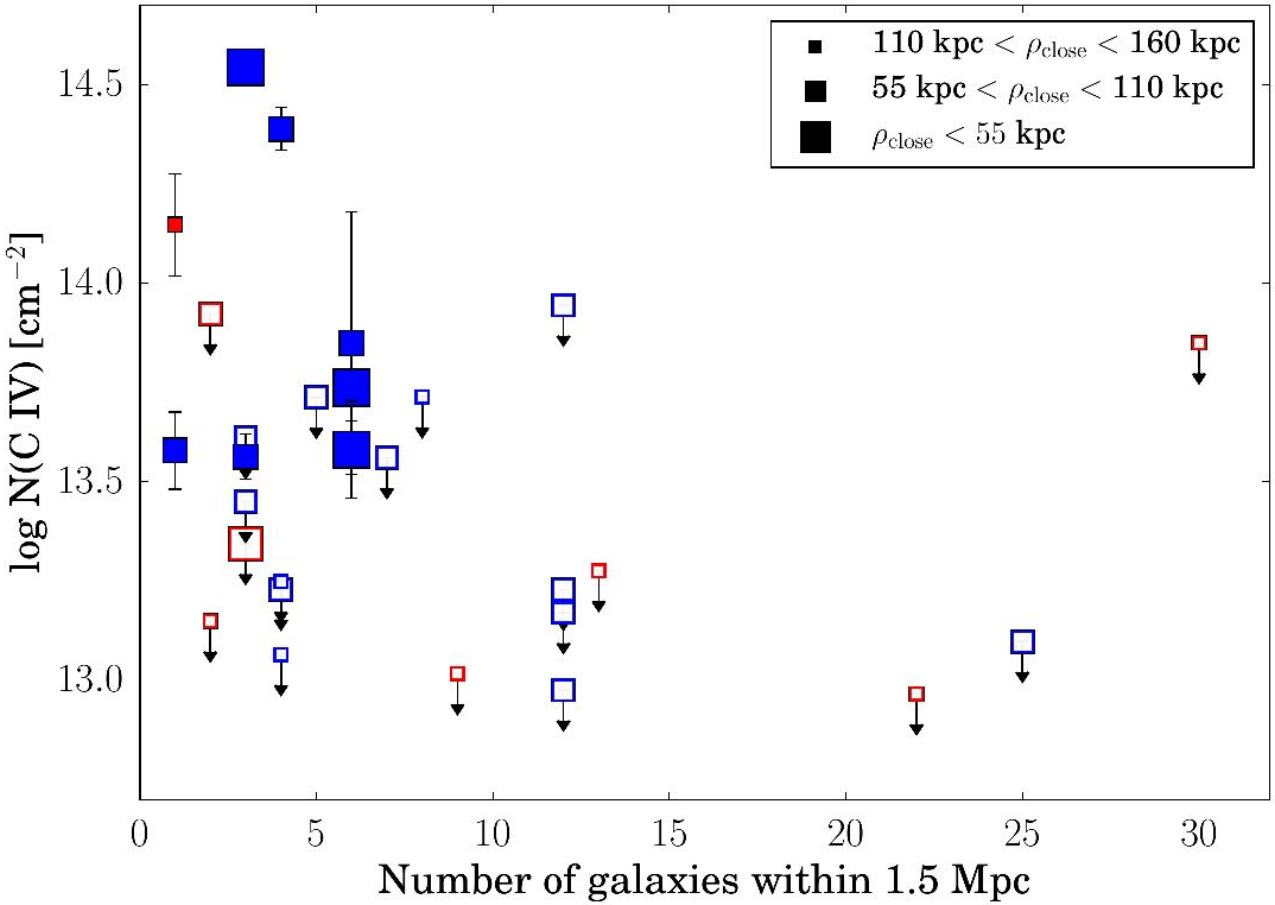
Environment Matters (Suppressed HI)

Coma Cluster



Yoon+12

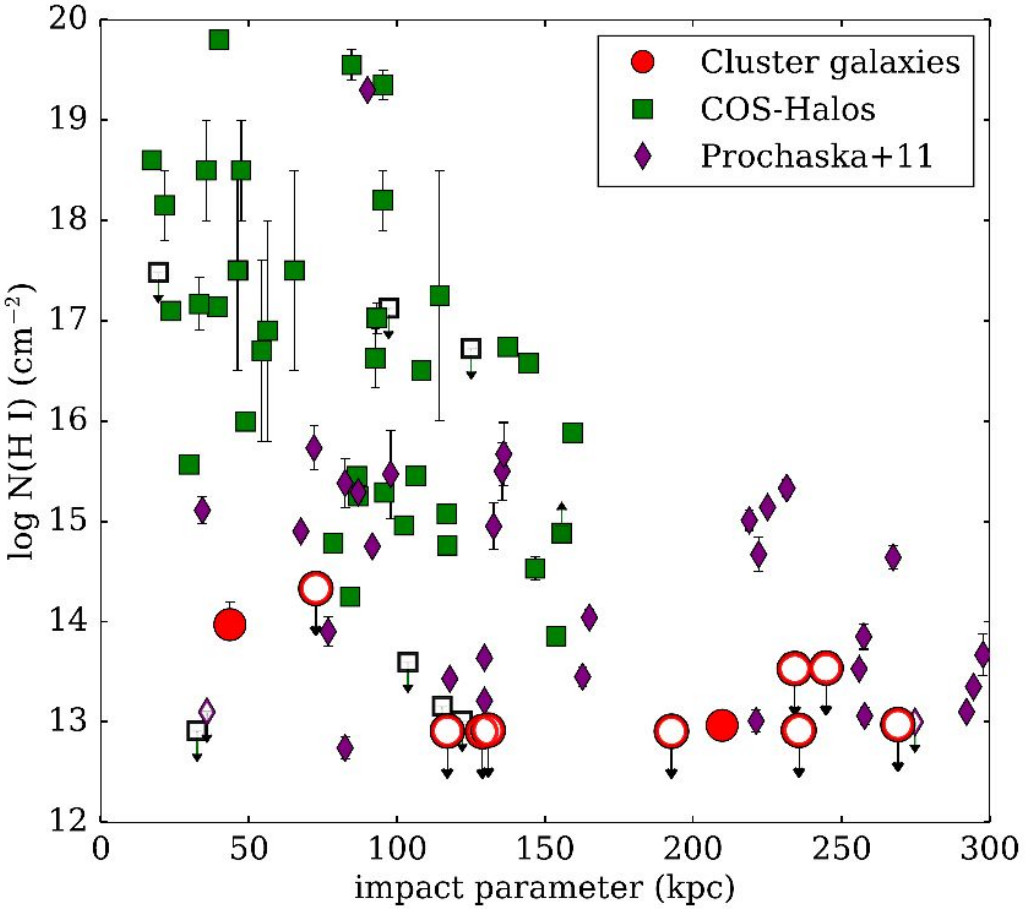
Environment Matters (Suppressed CIV)



Burchett+15

Dali 2018

Environment Matters (Suppressed HI)



Burchett+18
Tejos+19

Is the key to galaxy quenching the complete removal of a galaxy's halo gas?

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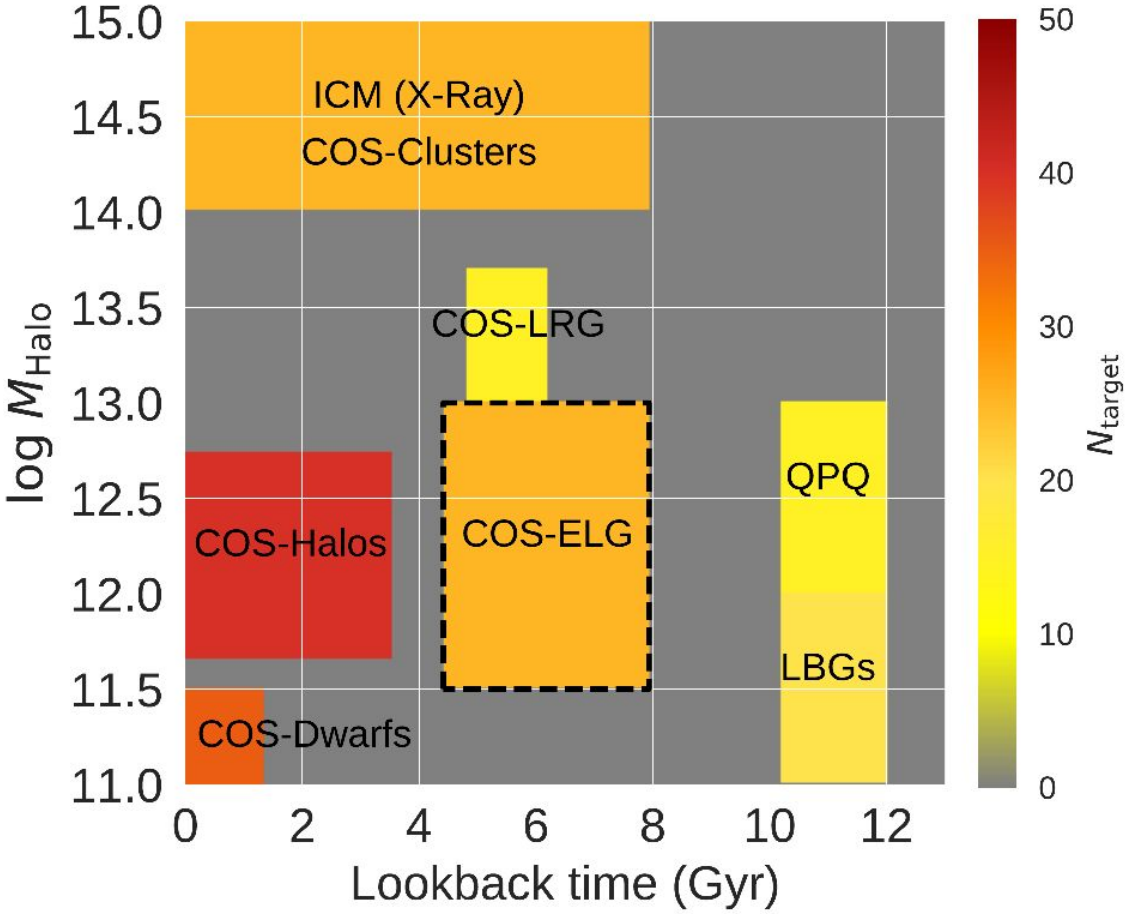
Future: CGM of ELGs



HST Cycle 25
(PI: X)

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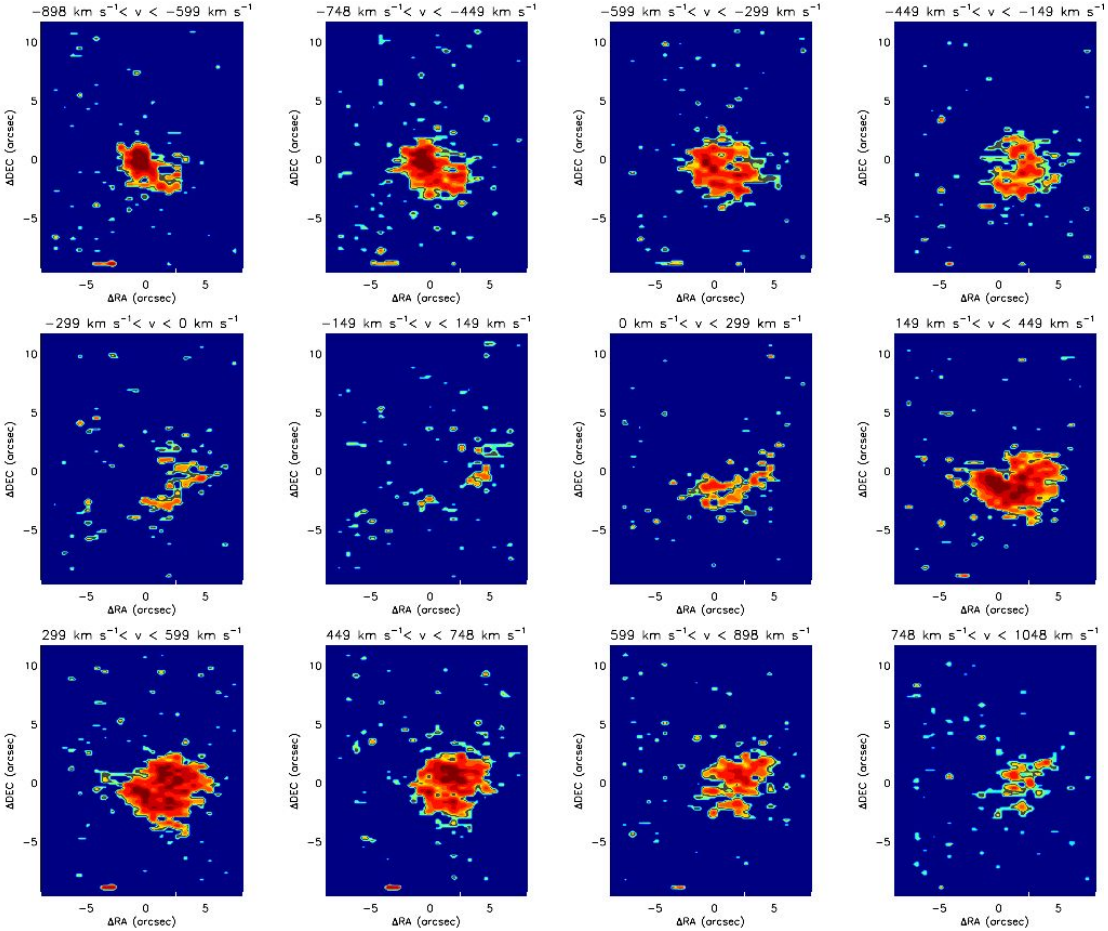
Future: CGM in Emission



Borisova+17
Cai+18

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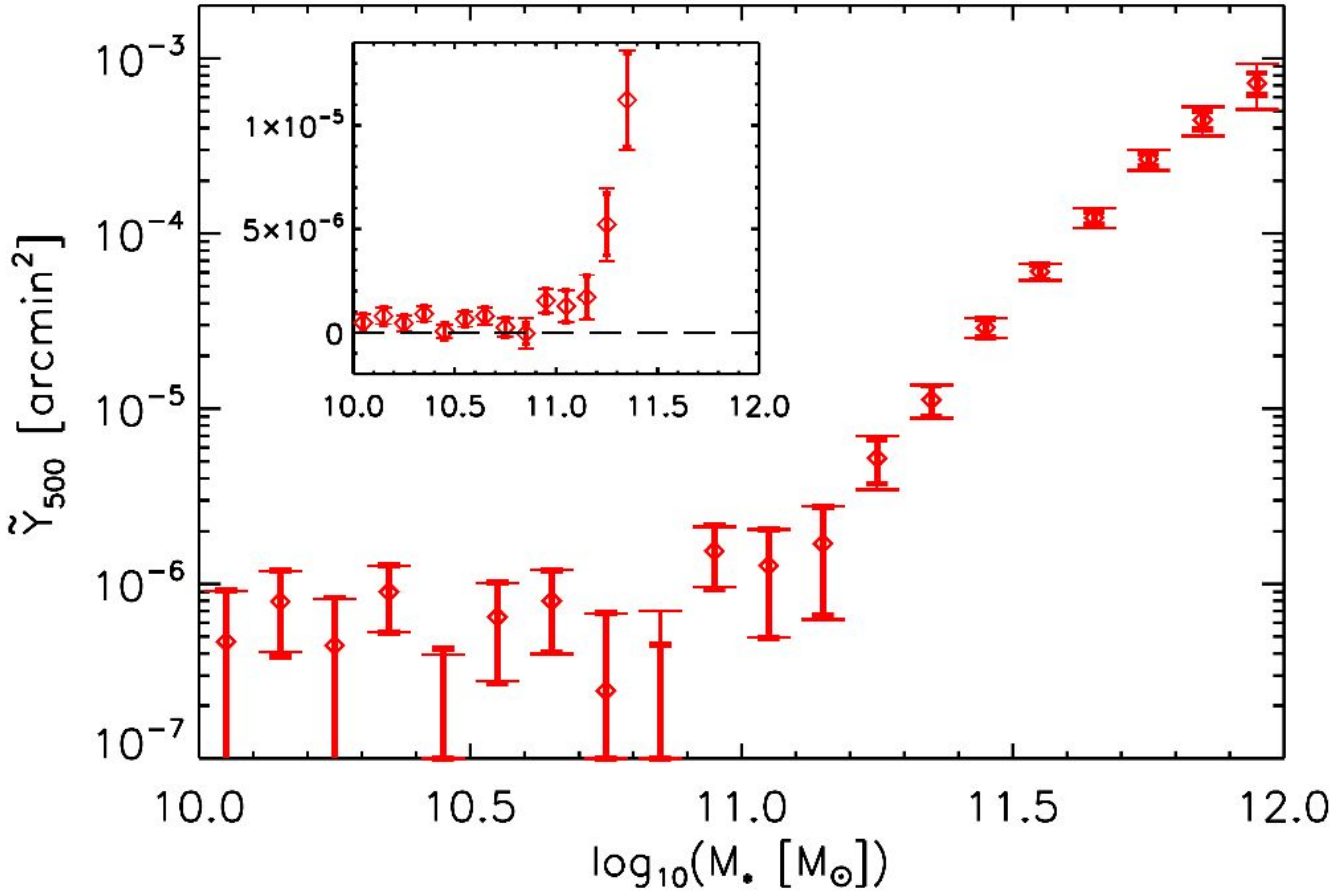
Future: SZ



Planck

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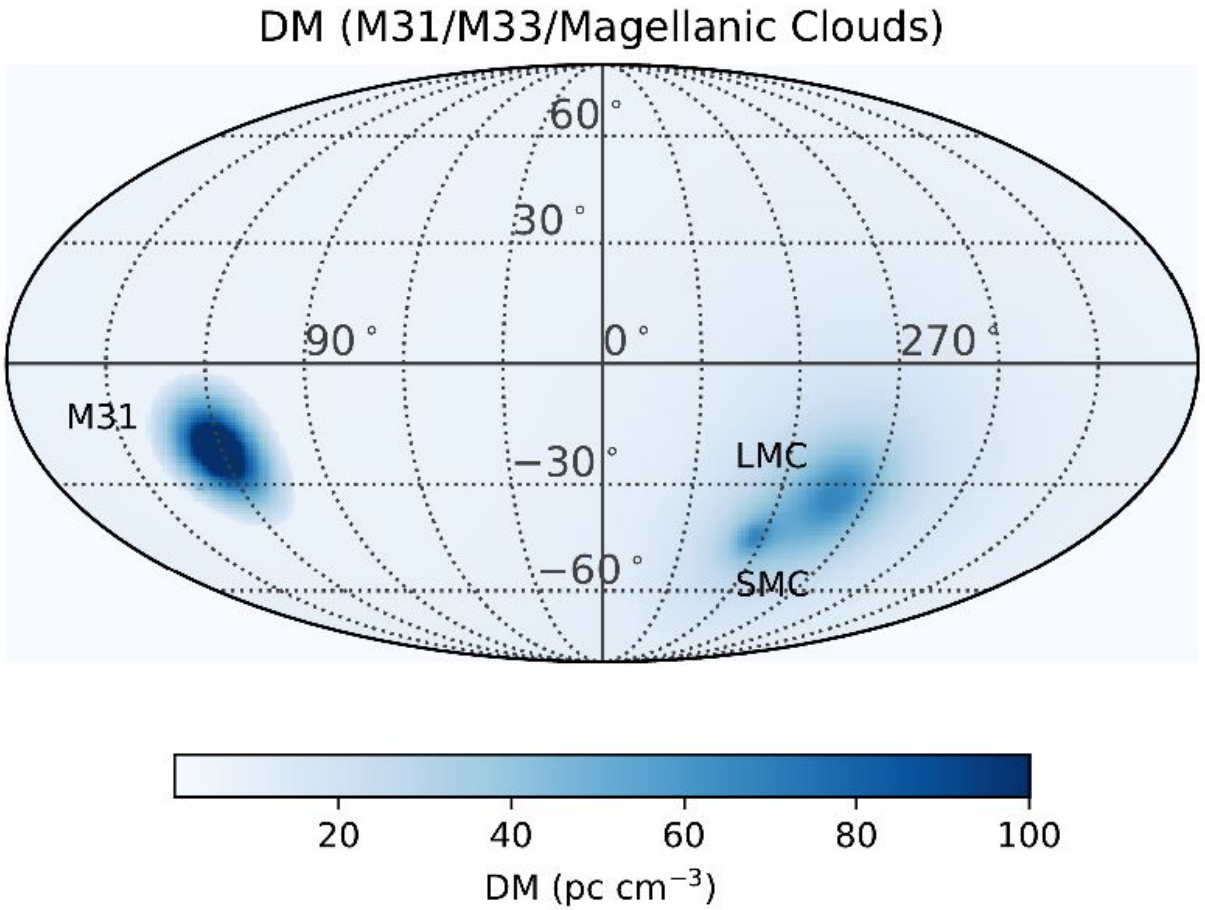
Future: FRBs



XYZ

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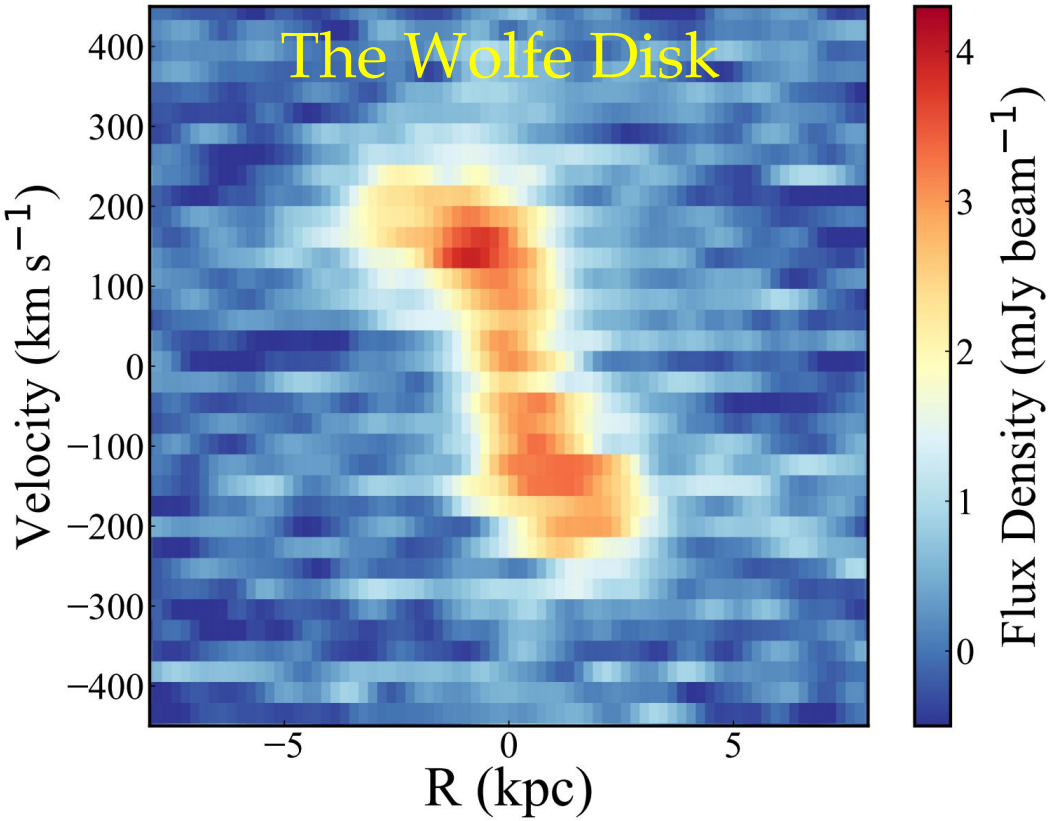
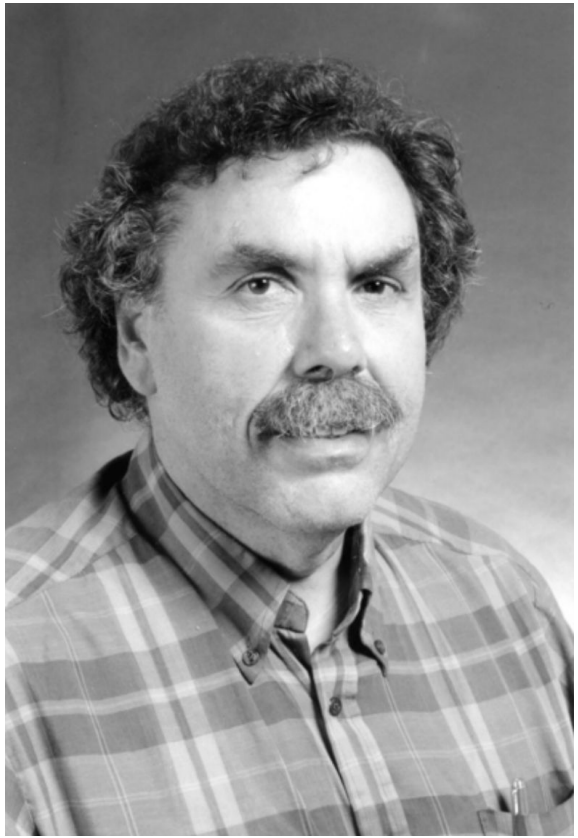
Three Brief Advertisements

A Cold, Large, Massive, Rotating Disk at z~4





Neeleman+19, to be submitted to *Science*

Dali 2018

ALMA Exgal Workshop: Nov 2019

Dali 2018

Kavli* Summer School 2019 @ UCSC

Machine Learning in the Era of Large Astronomical Datasets

*Co-sponsored by AAII

Dali 2018

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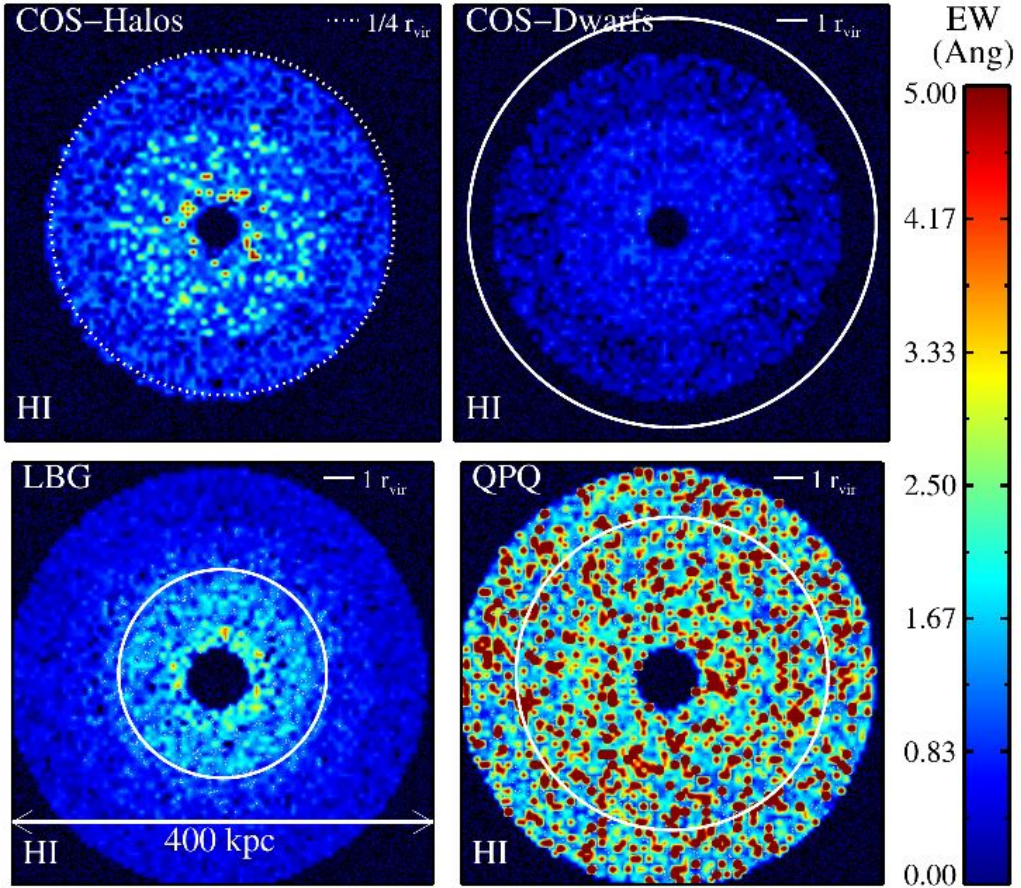
Cool Halo Gas Surrounding Quasars



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