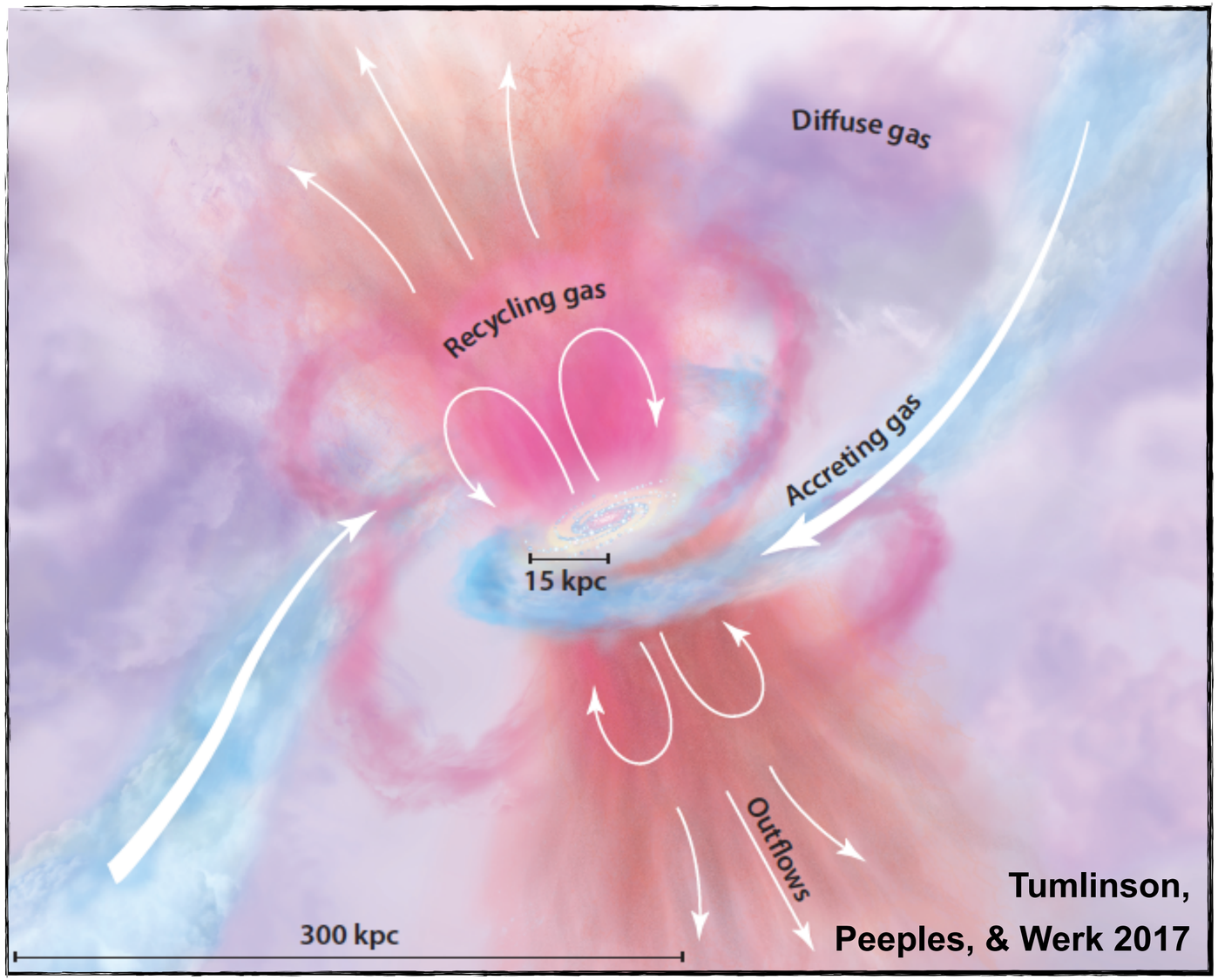
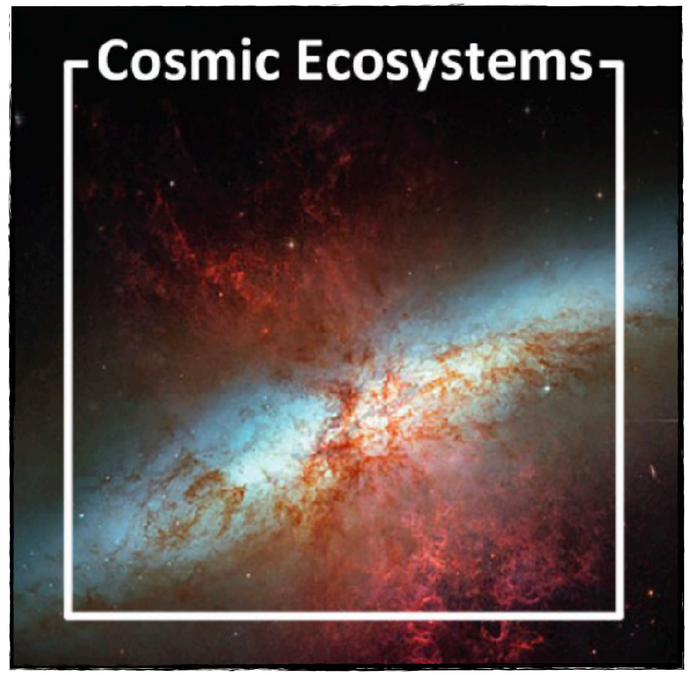
The multiphase CGM through UV-colored glasses





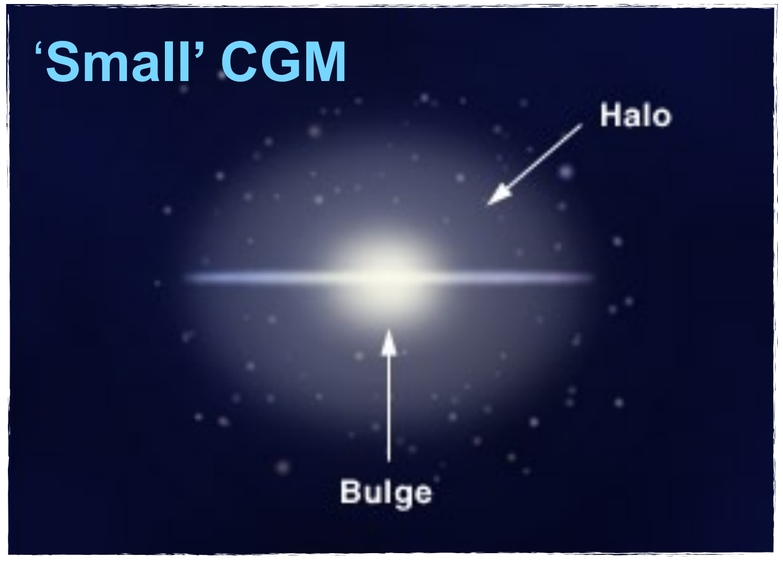
ON A POSSIBLE INTERSTELLAR GALACTIC CORONA*

LYMAN SPITZER, JR.
Princeton University Observatory
Received March 24, 1956

ABSTRACT

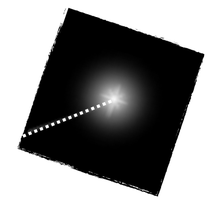
The physical conditions in a possible interstellar galactic corona are analyzed Pressure equilibrium between such a rarefied, high-temperature gas and normal interstellar clouds would account for the existence of such clouds far from the galactic plane and would facilitate the equilibrium of spiral arms in the presence of strong magnetic fields. Observations of radio noise also suggest such a corona.

Such a corona is apparently not observable optically except by absorption measures shortward of 2000 A.



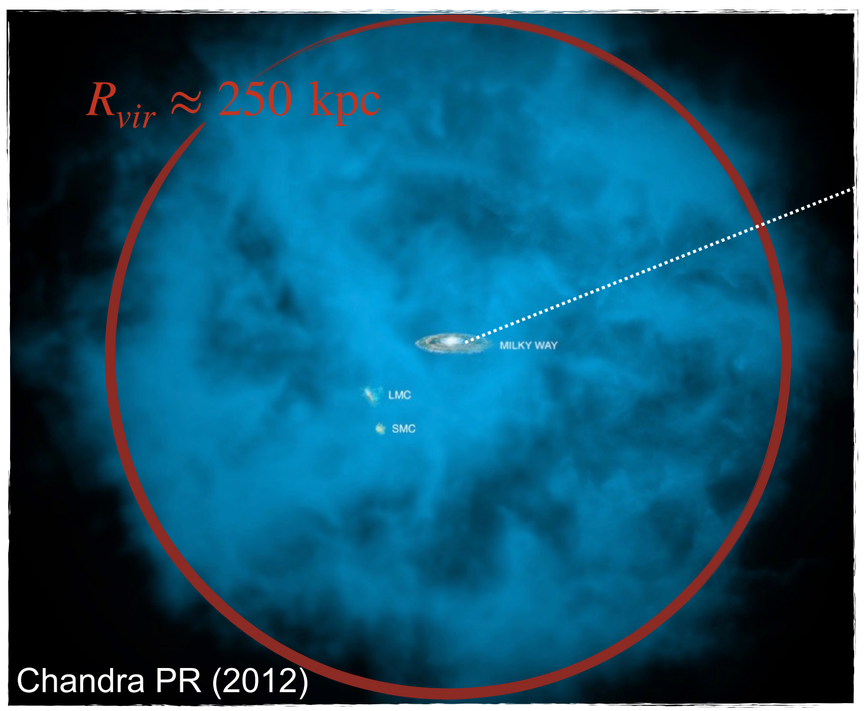
(Maller & Bullock 2004, Dekel & Birnboim 2006)

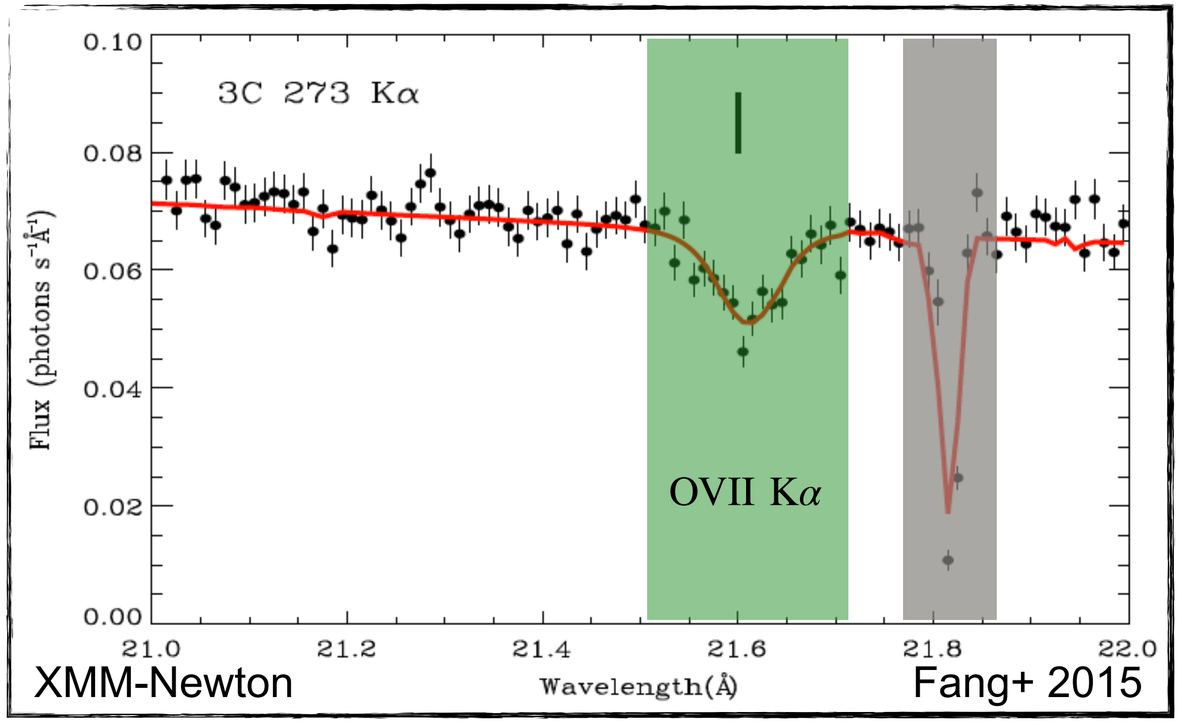
(Bregman & Lloyd-Davies 2007, Gupta+ 2012, Fang+ 2015)



X-ray is the way to go!

(Wait…)





(Tumlinson+ 2011, Werk+ 2012)

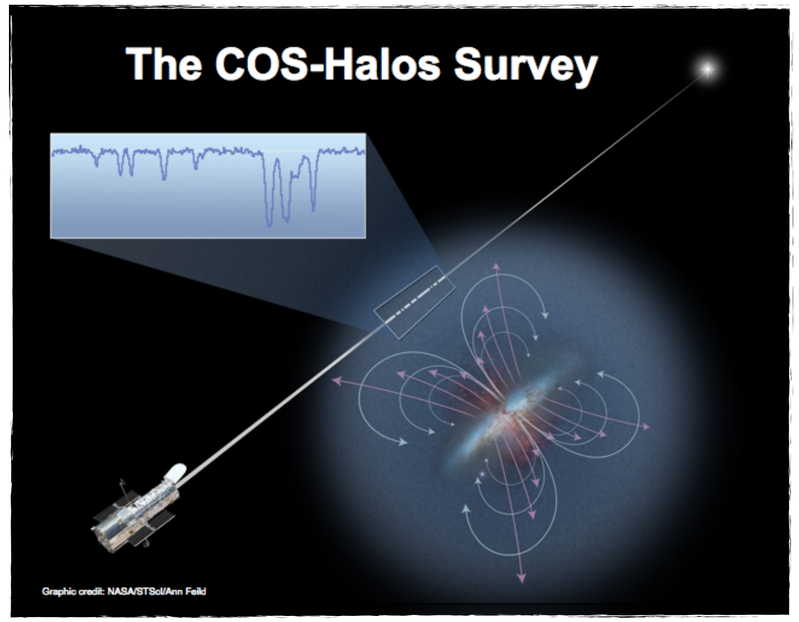
(Bordoloi+ 2014)

(Borthakur+ 2015)

(Heckman+ 2017)

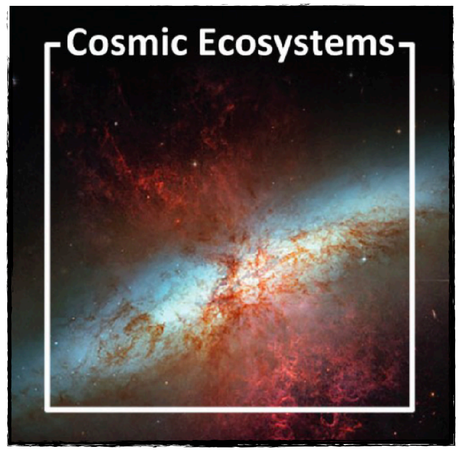
(Hsiao-Wen+ 2020)

(Berg+ 2022, in progress)

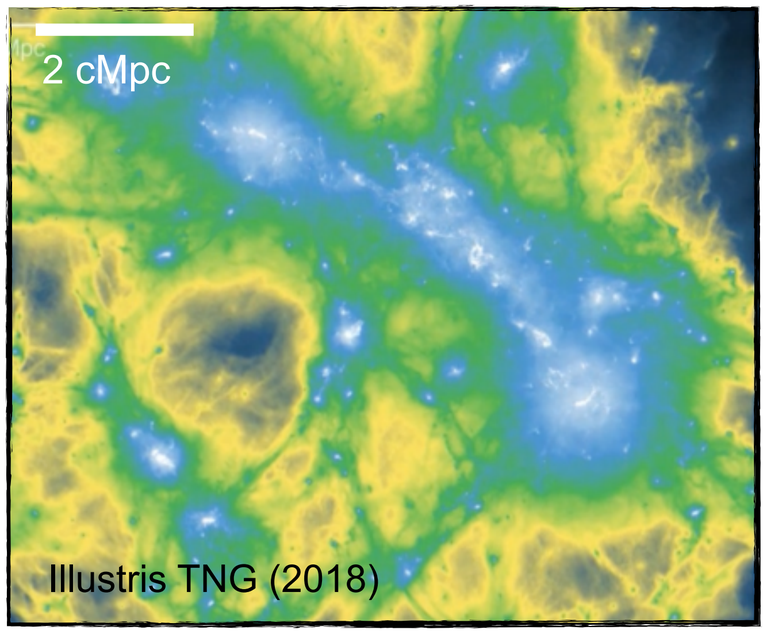


UV is crucial to observing and characterizing the CGM

Many open questions

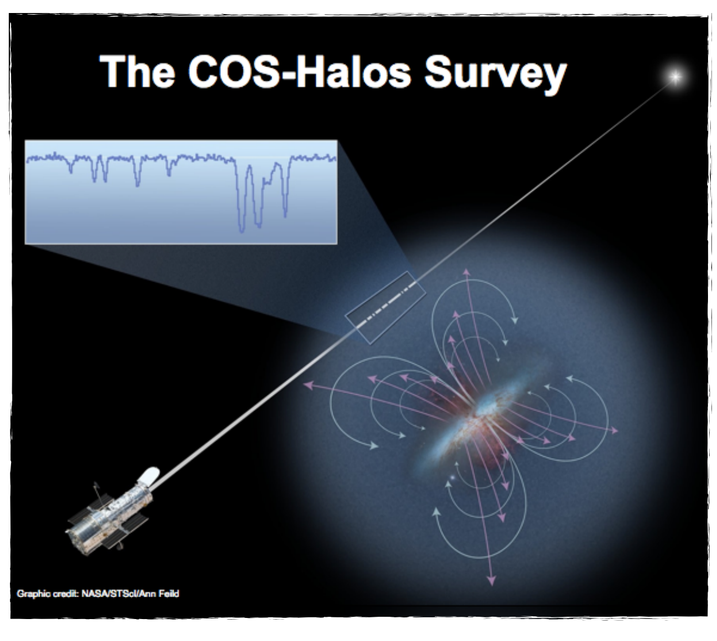


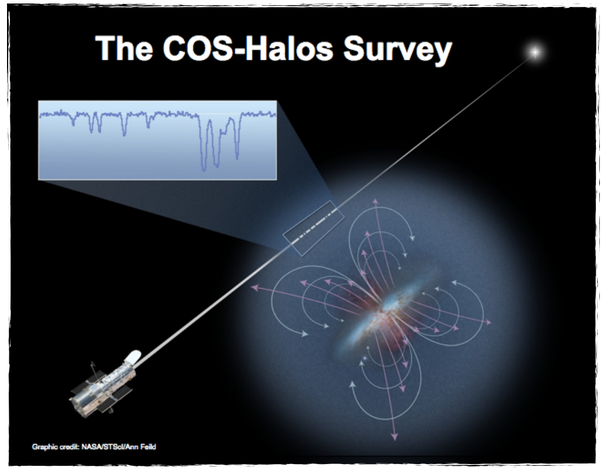
Simulations (cosmological / idealized)

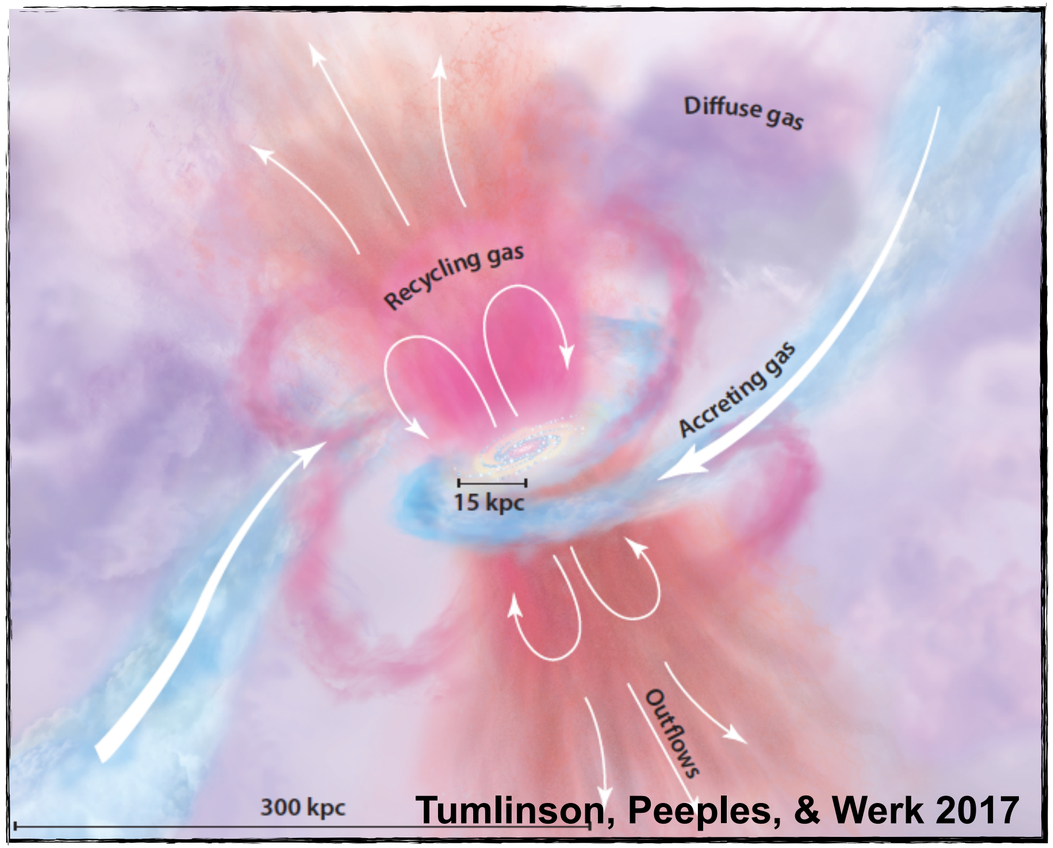


Modeling (analytic / semi-analytic)

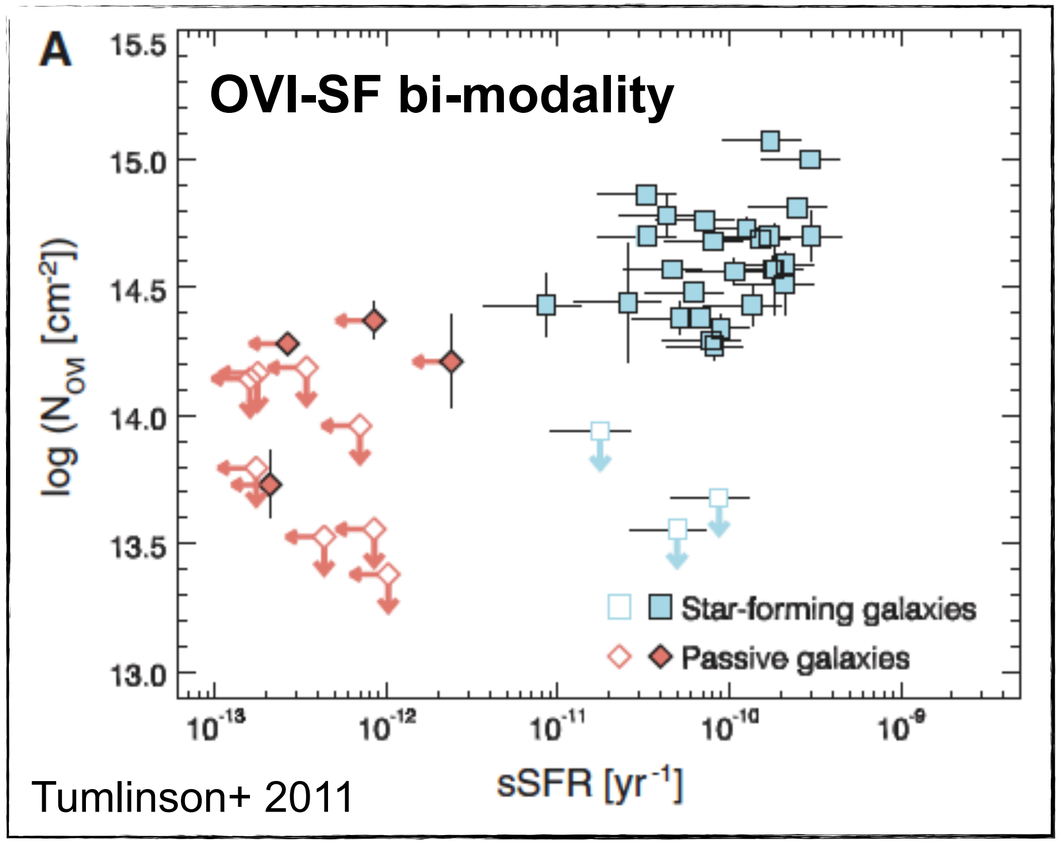
Observations and instrumentation



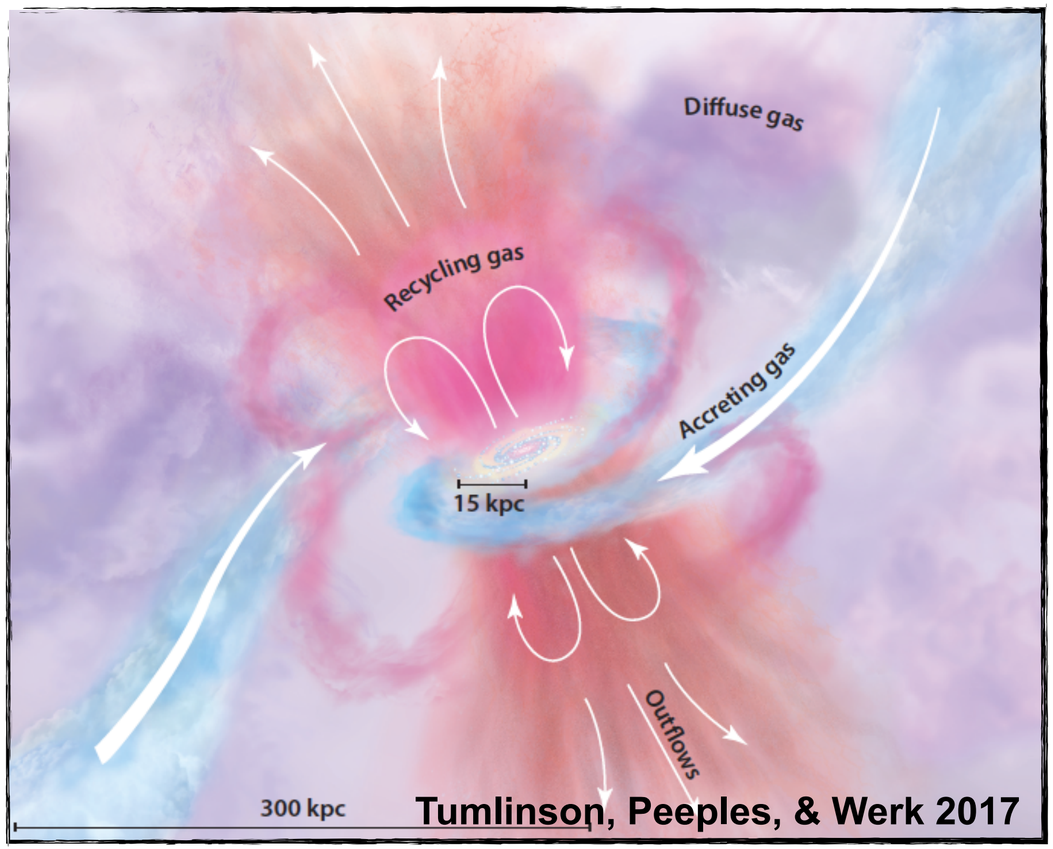




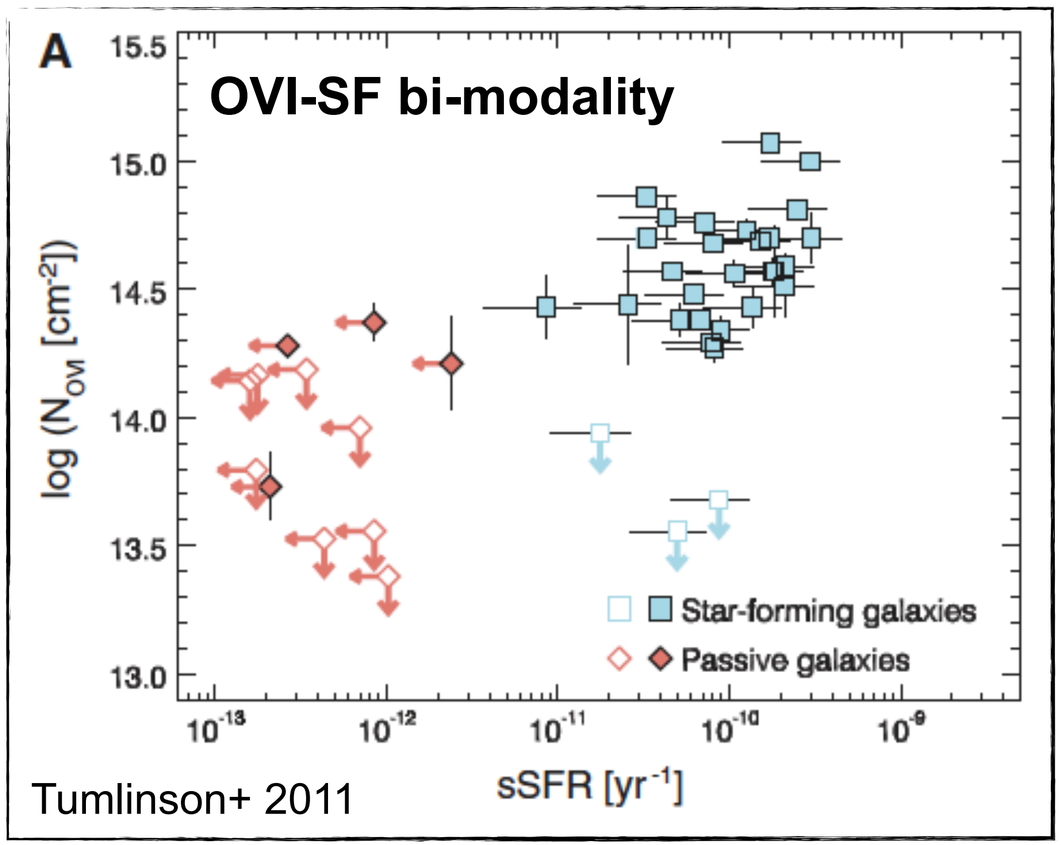
Tumlinson, Peeples, & Werk 2017



Tumlinson+ 2011



Tumlinson, Peeples, & Werk 2017

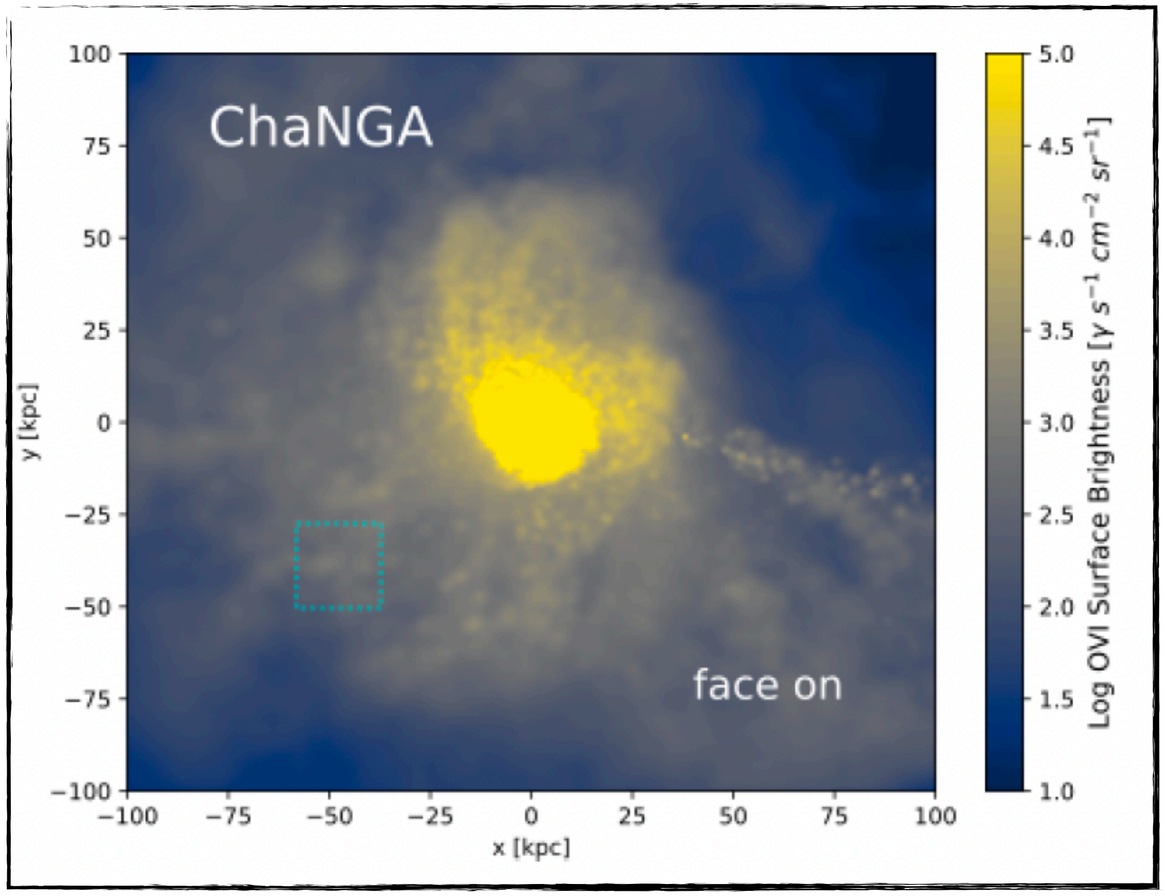


Tumlinson+ 2011

(Piacitelli+ 2022 - absorption-based emission predictions)

(CIViL - PI: Trystin Berg, with Sam Garza, Jess Werk+)

(Meiring+ 2013, Qu & Bregman 2016, Burchett+ 2019)



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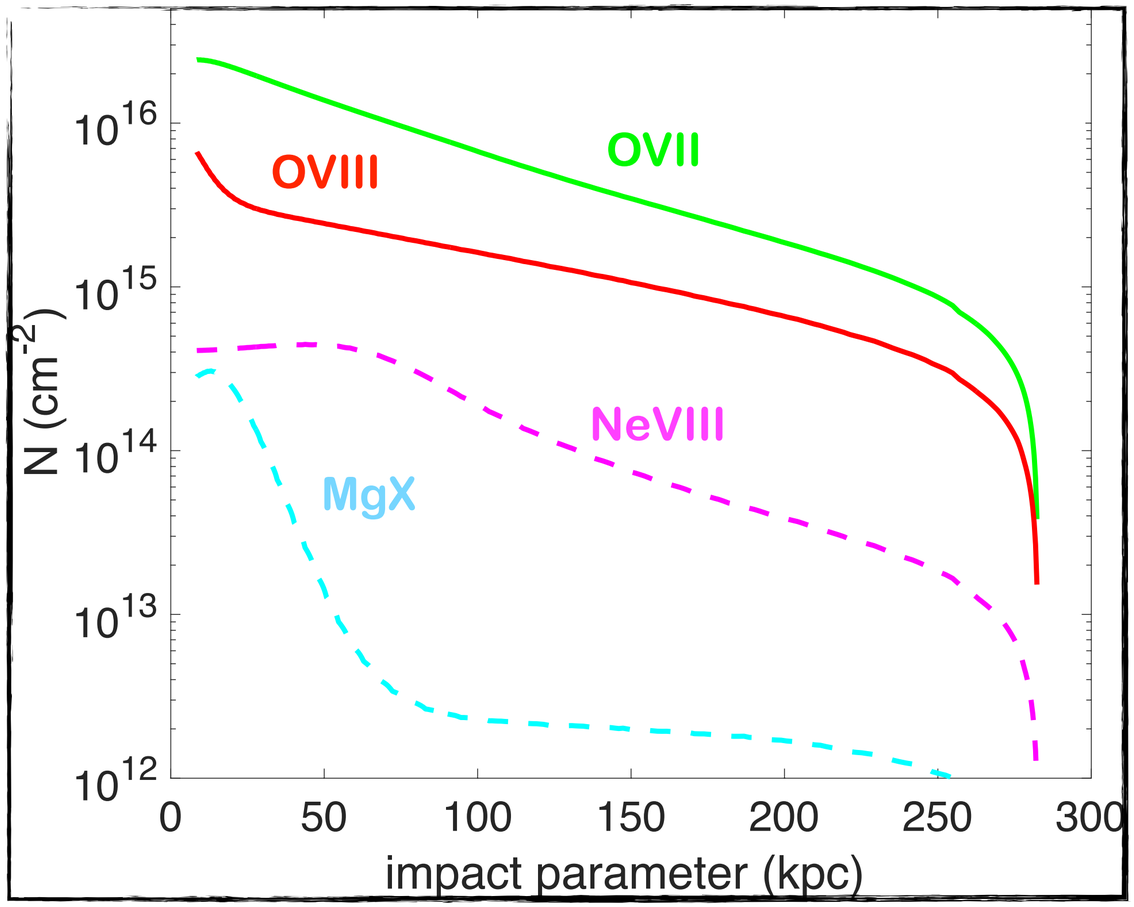

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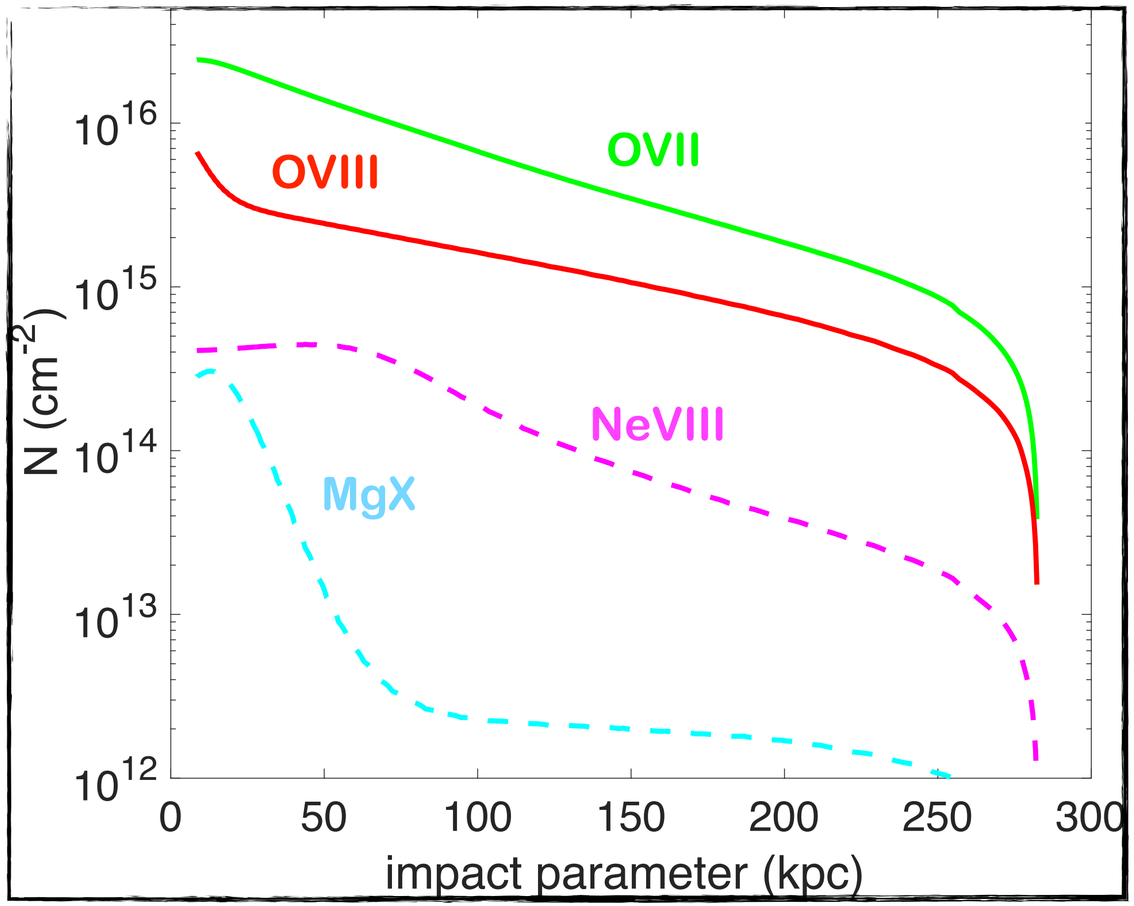
What else do we need?

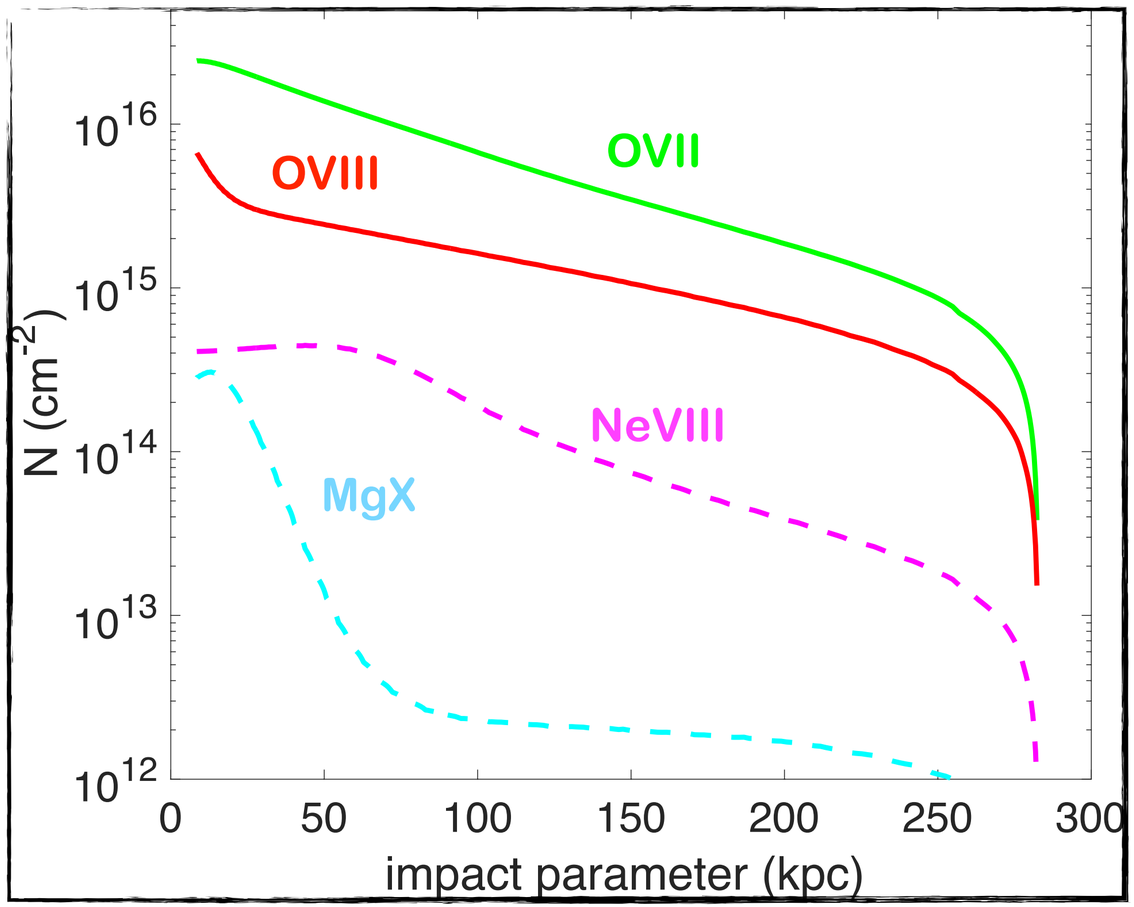


(HUBS, LEM, Arcus, Lynx, Athena)

(Johnson+2022, Nielsen+ 2023, Reichardt Chu+ 2024)

(Singh+ 2018, Lim+ 2020, Amodeo+ 2021, Bregman+ 2022)

(McQuinn 2014, Prochaska & Zheng 2019, Prochaska+ 2019)



Combinations are only available at low redshifts

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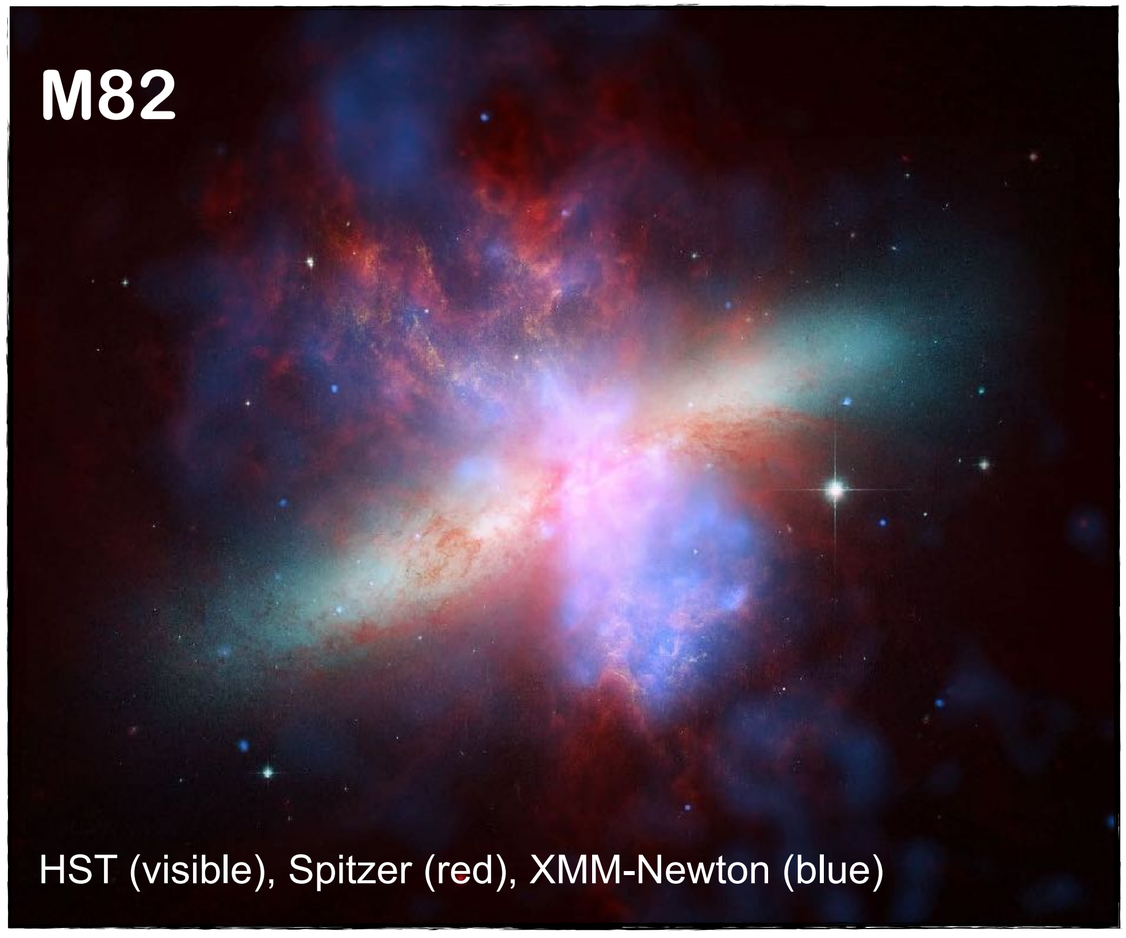

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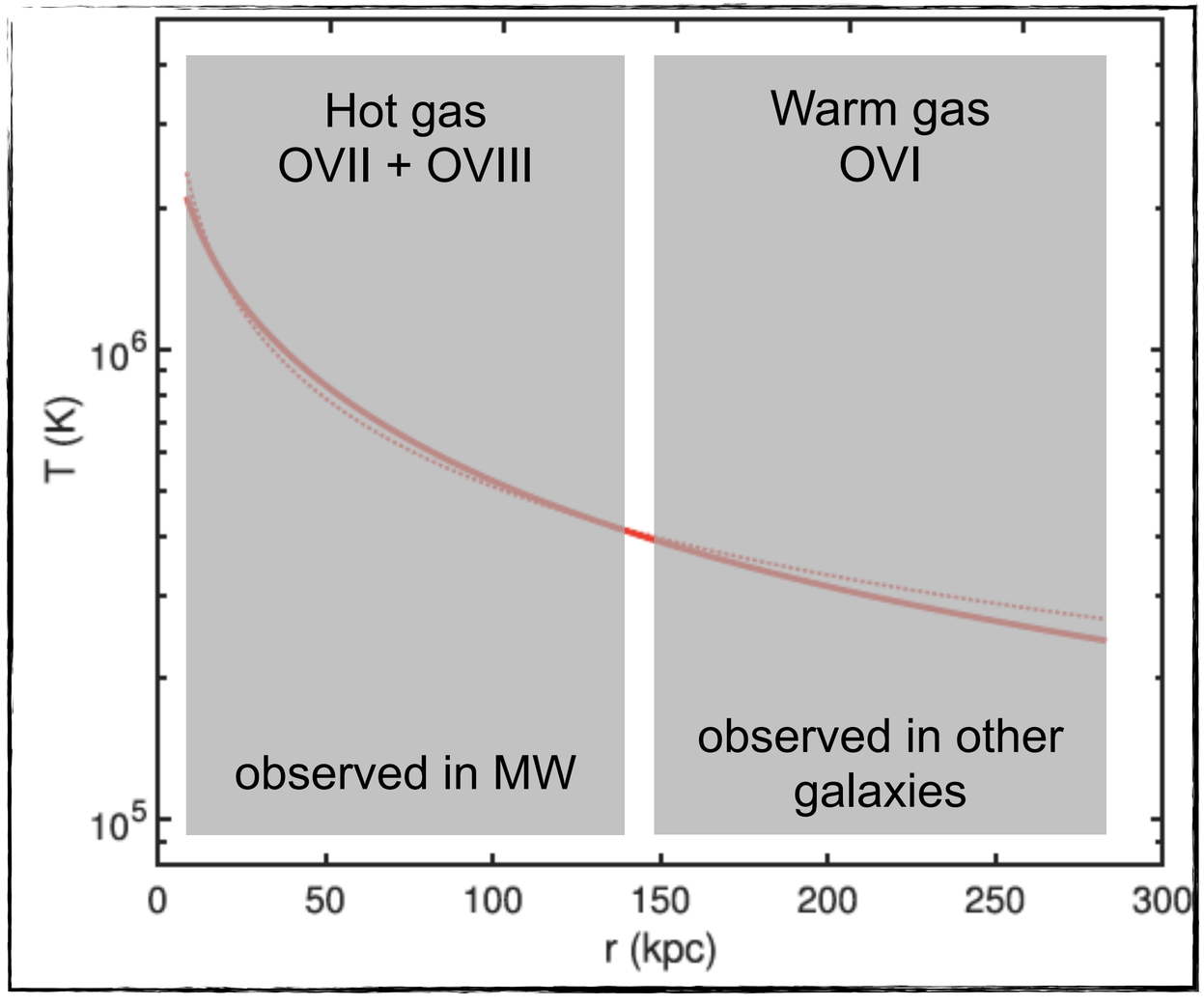

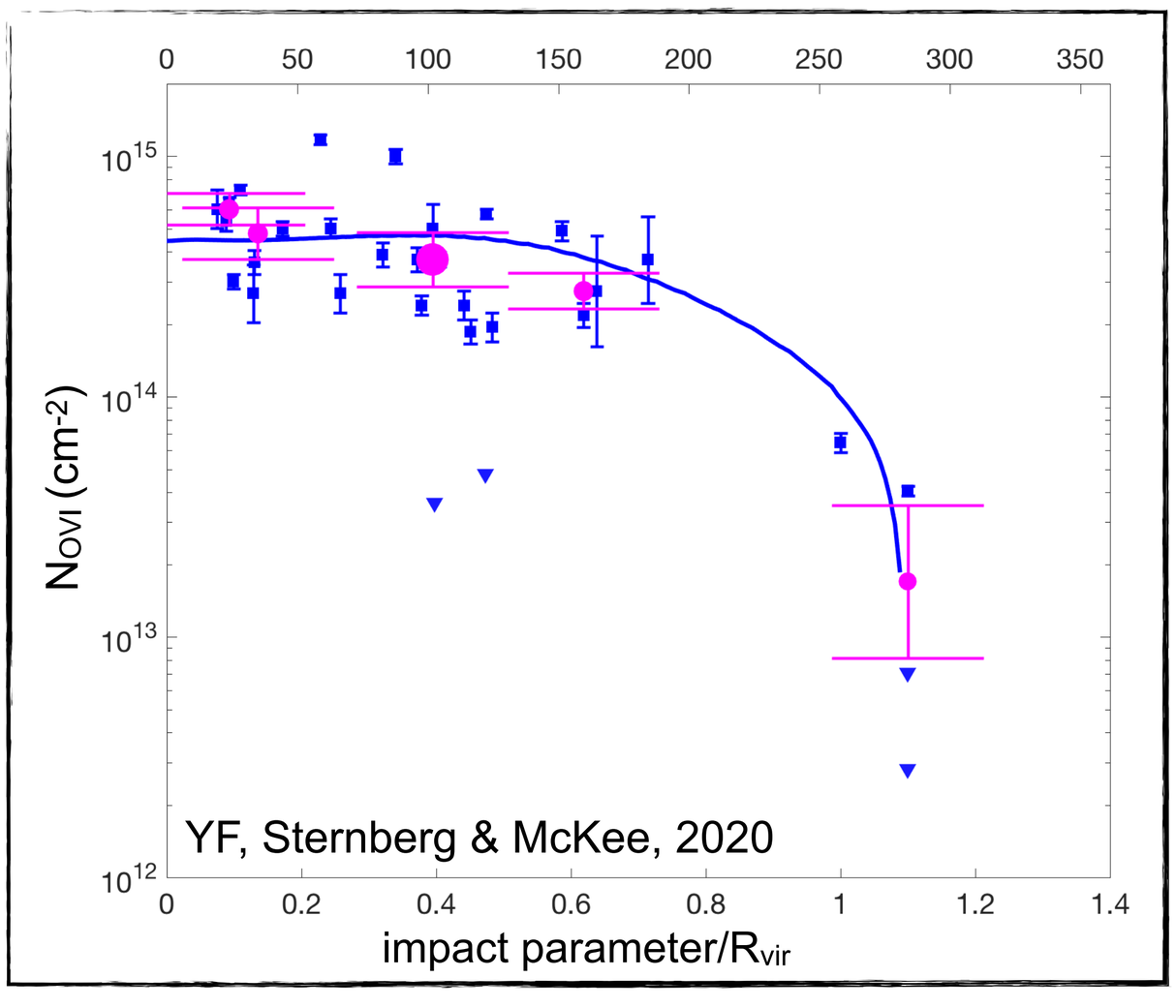

Can we have these for the same galaxies?

galaxy evolution (feedback, SF quenching) and gas physics

for larger samples, constraints on gas morphology and kinematics

multi-wavelength data (radio to X-ray) challenges and motivates theory

The (F)UV is crucial for understanding
the physics of the CGM and its role in galaxy evolution