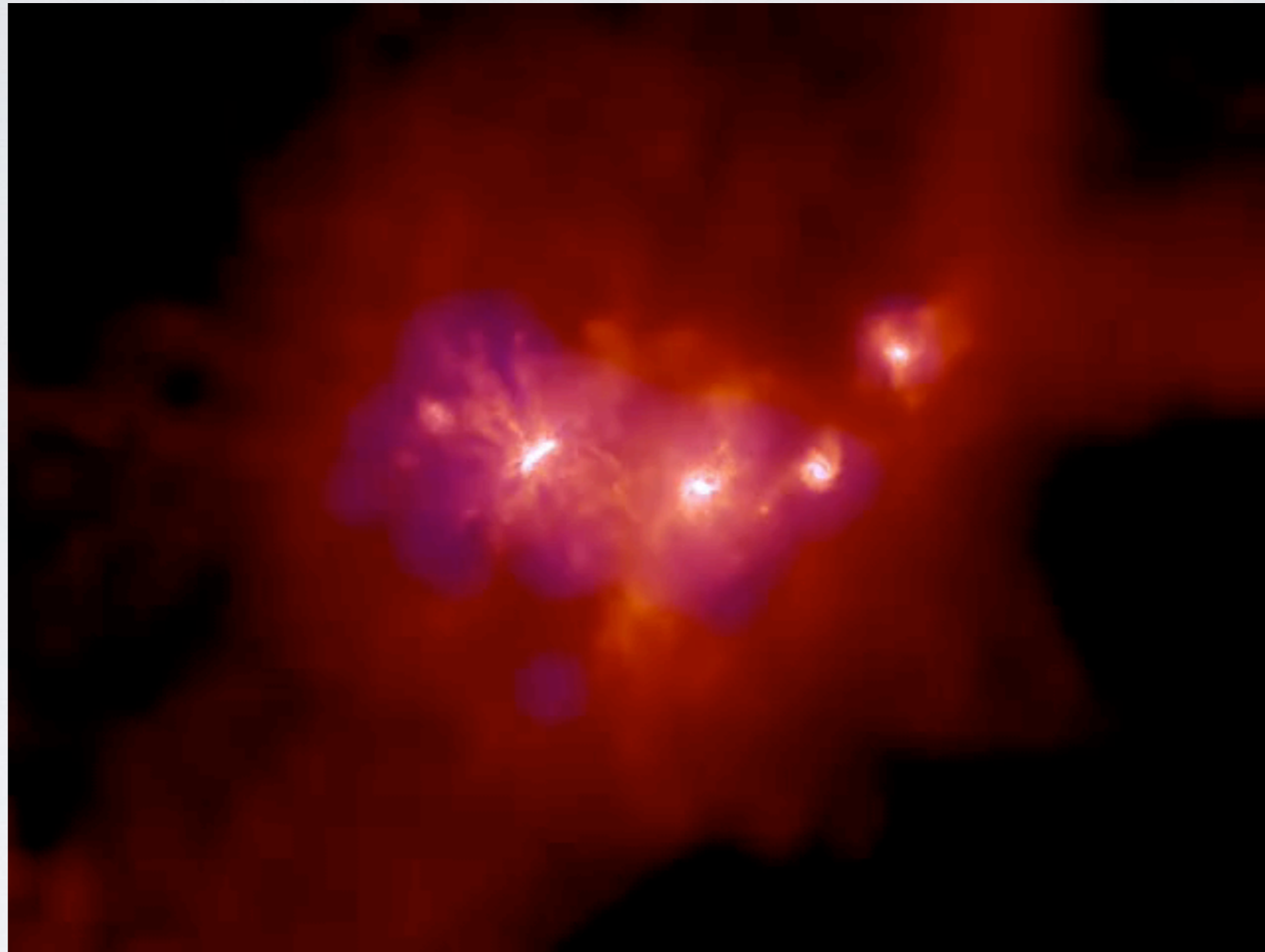



Major evolutionary drivers of the low- z circum-galactic medium



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& Paul Torrey (U Florida), Mark Vogelsberger (MIT)

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What shapes the CGM of MW-mass galaxies?

(in the local universe)

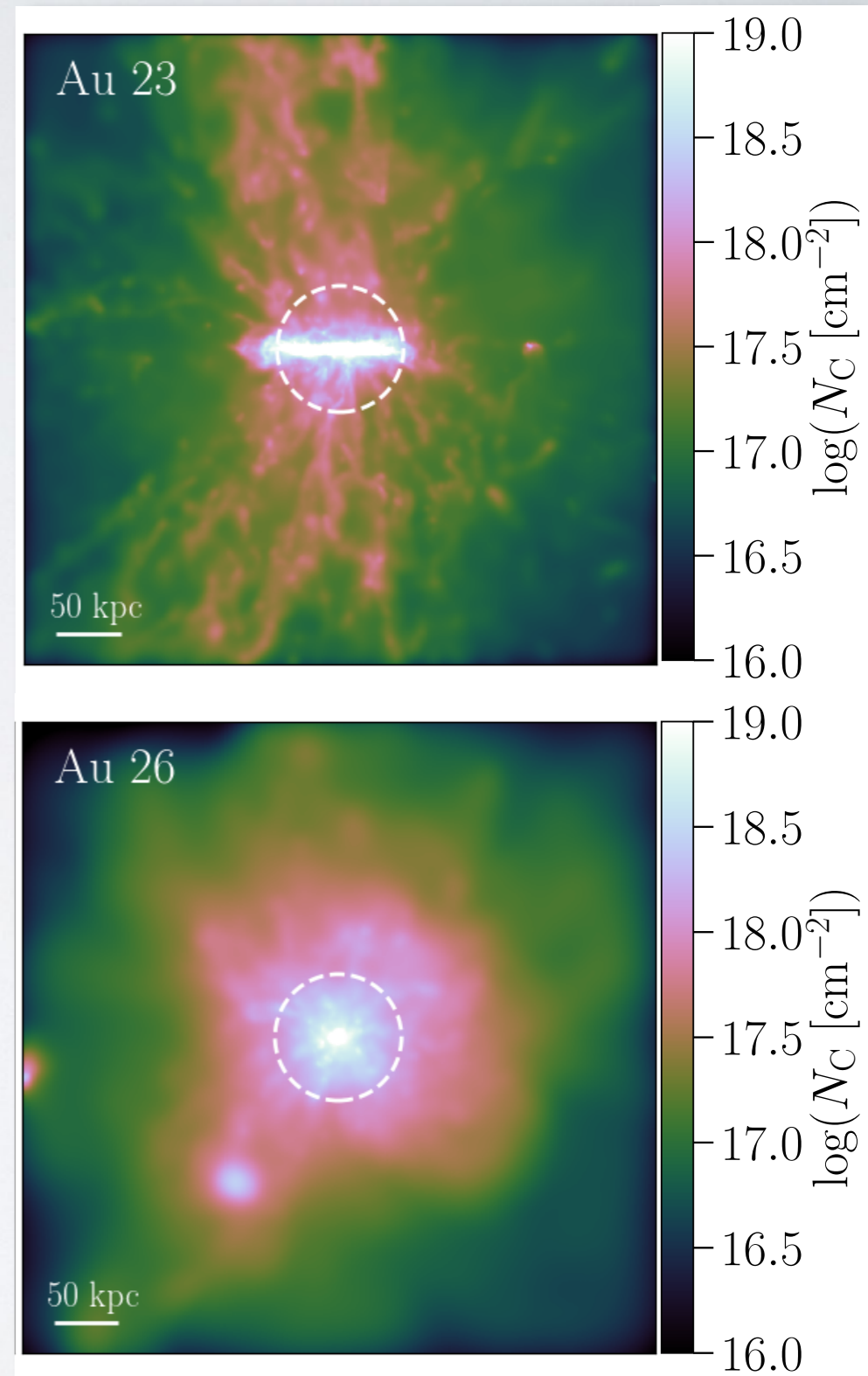
What shapes the CGM of MW-mass galaxies?

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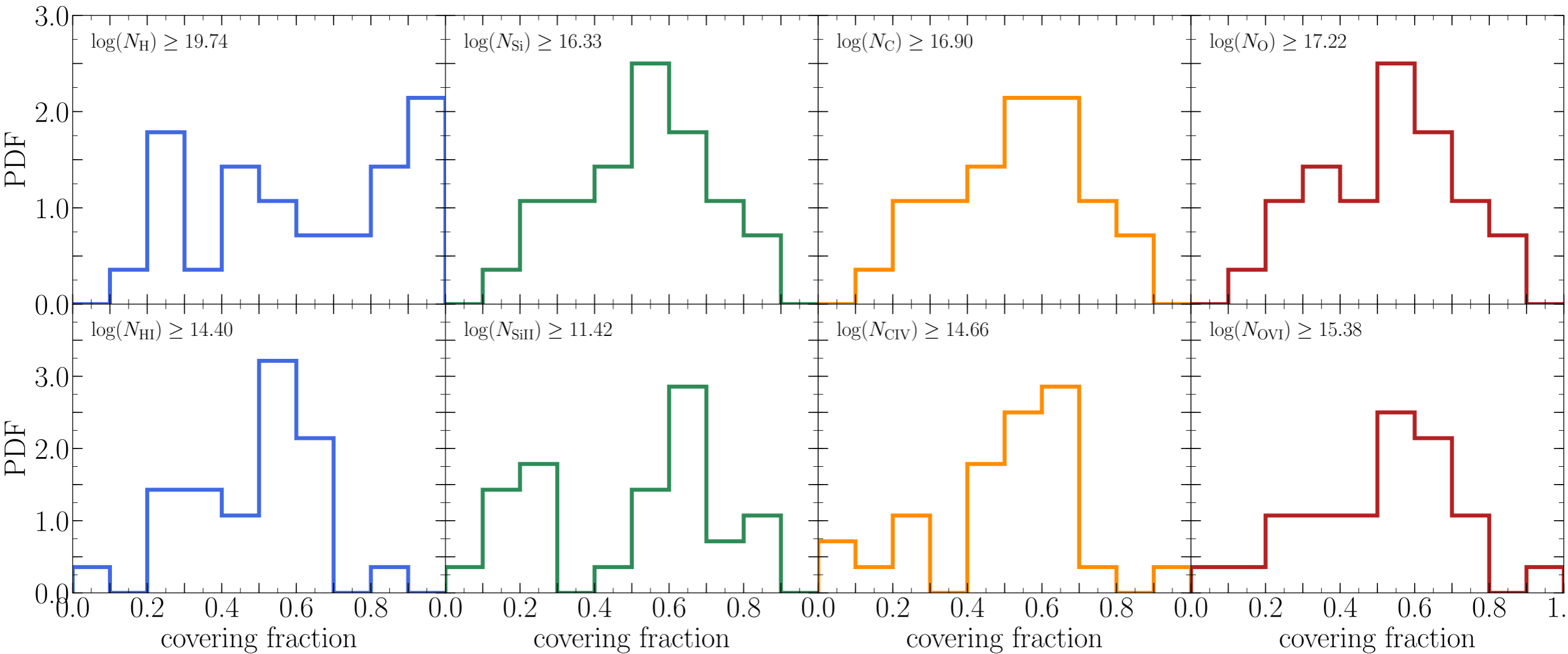
- (1) Are all L^* CGMs *similar*?
- (2) Is the difference (if any) random?

Auriga galaxy sample

- Cosmological magneto-hydrodynamical **zoom-in** simulation suite
- Simulated with Arepo (i.e., moving mesh)
- **Auriga physics model**
(Grand+16, Marrinacci+14, Vogelsberger+13)
- **28 isolated** MW-mass galaxies (Grand et al. 2017)
- Galaxies re-produce **observed properties**

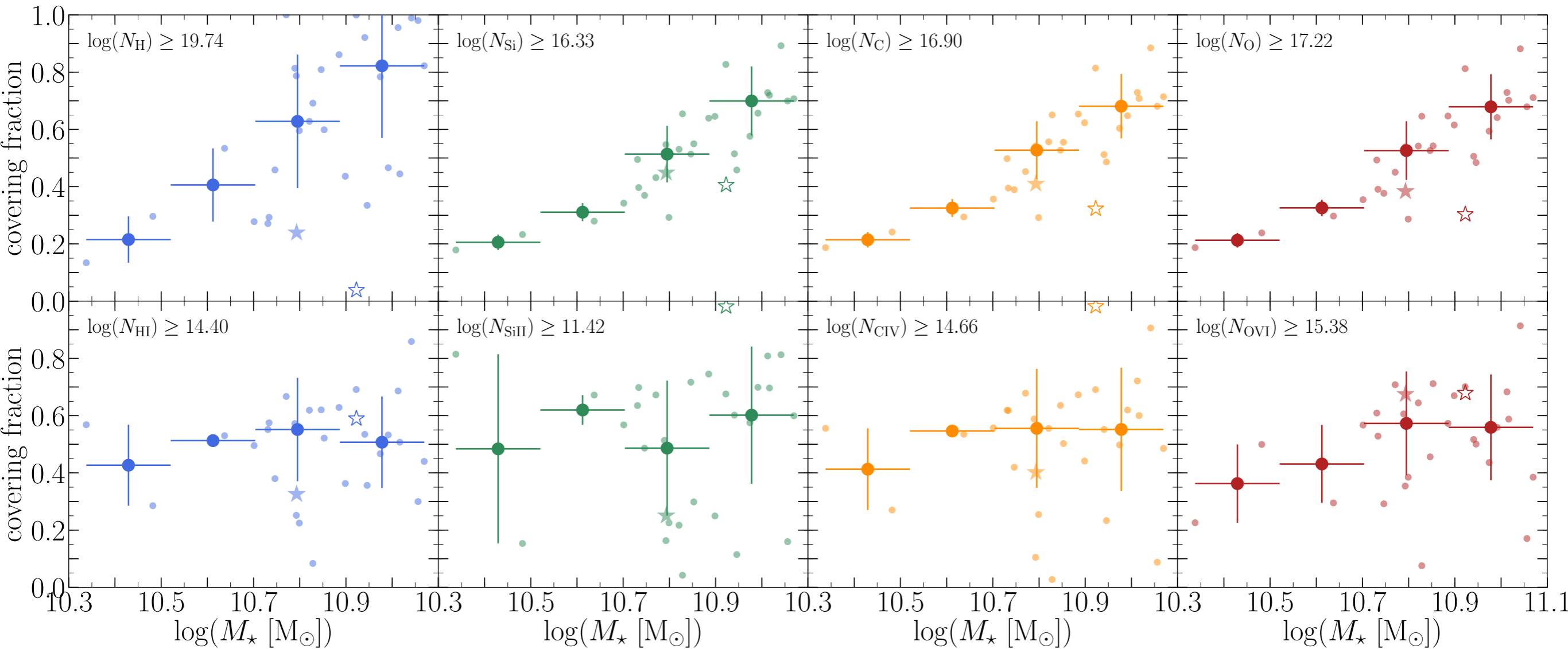


The diverse CGM



Hani et al. (2019)

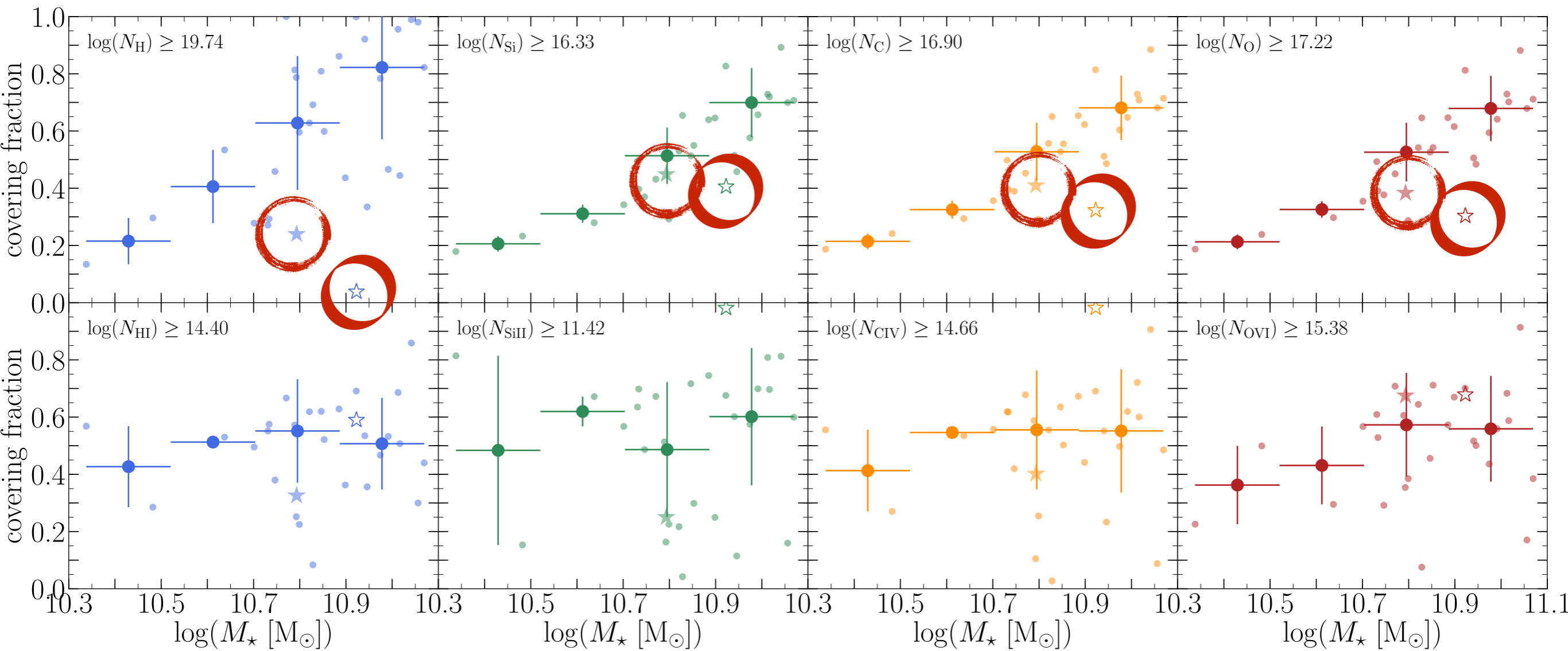
Effects of galaxy assembly



Hani et al. (2019)

As galaxies grow, they grow their CGM

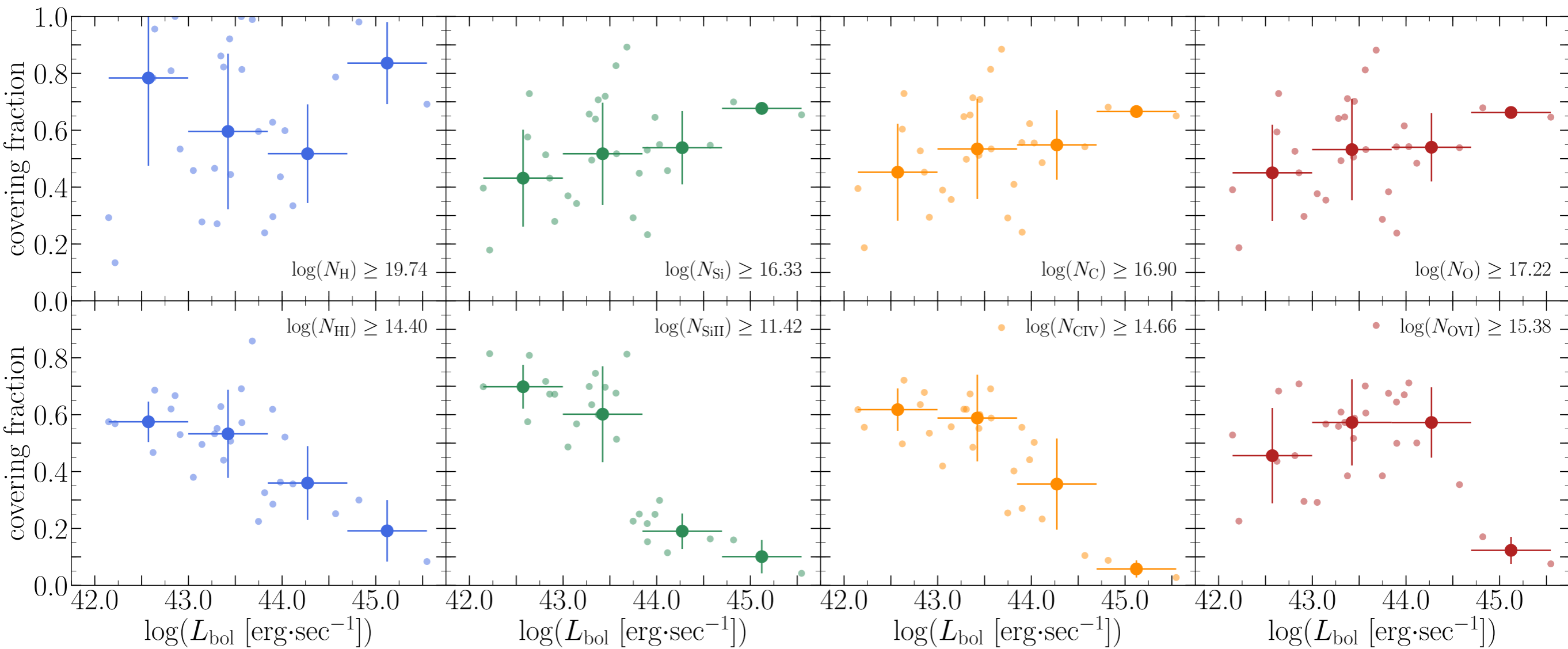
Effects of AGN feedback



Hani et al. (2019)

AGN driven winds contribute to the CGM metal content

Effects of AGN radiation

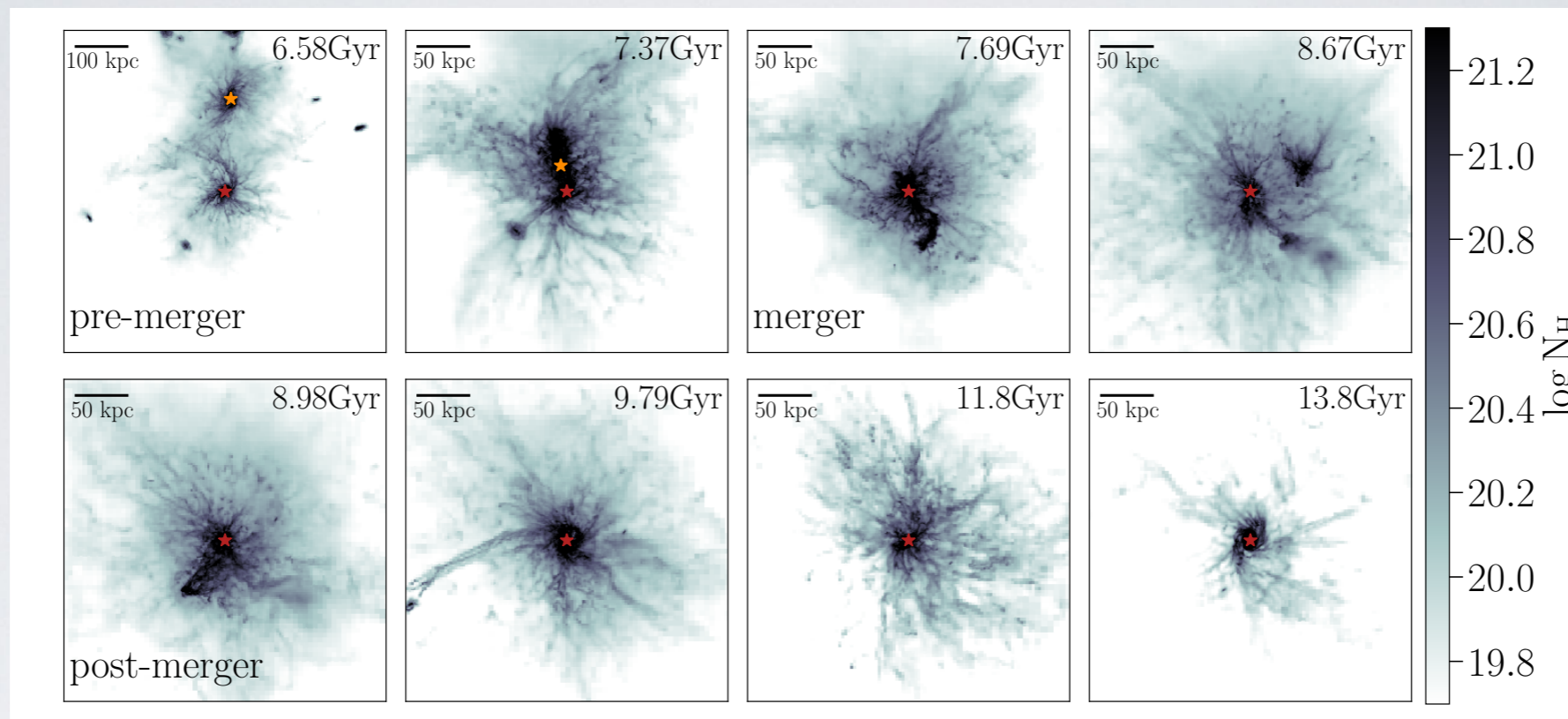


Hani et al. (2019)

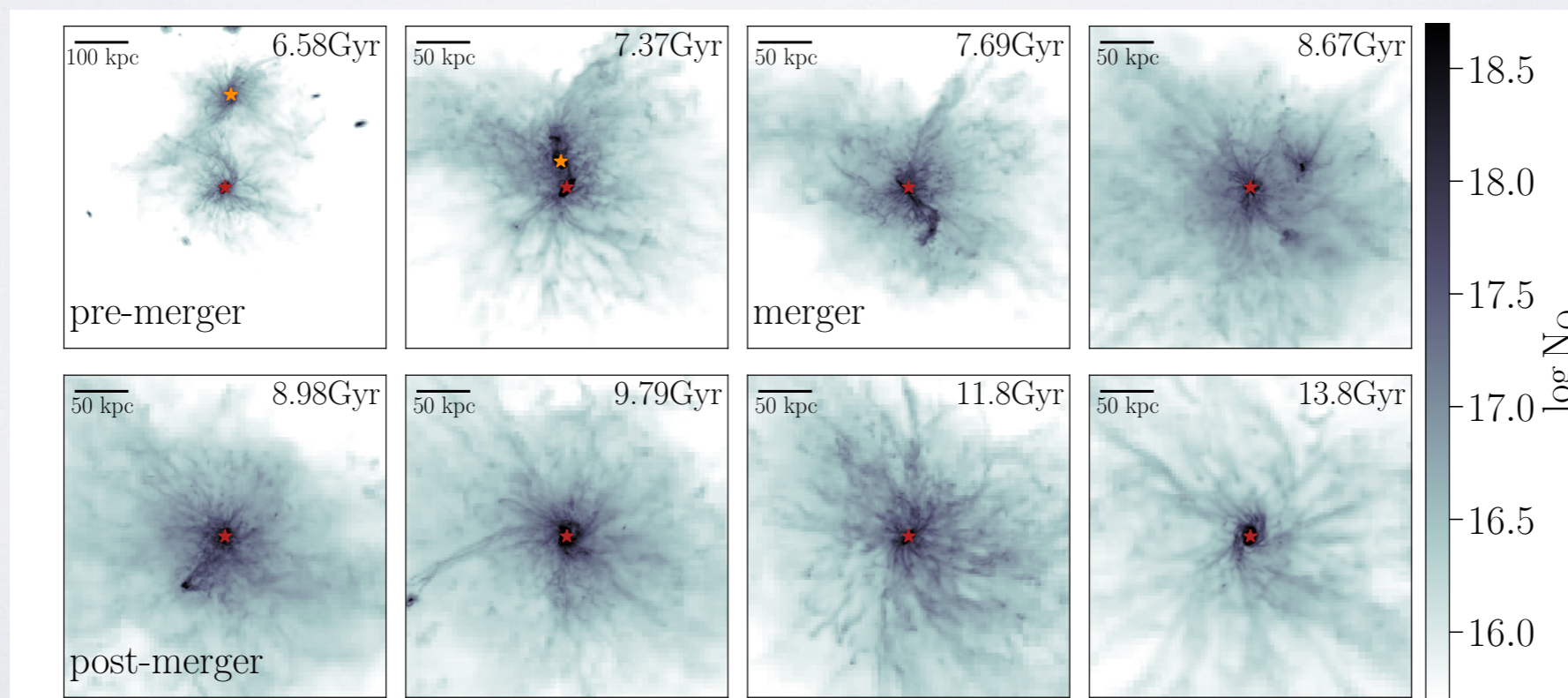
The AGN radiation field is a major source of ionization

What is the effect of mergers on the
CGM?

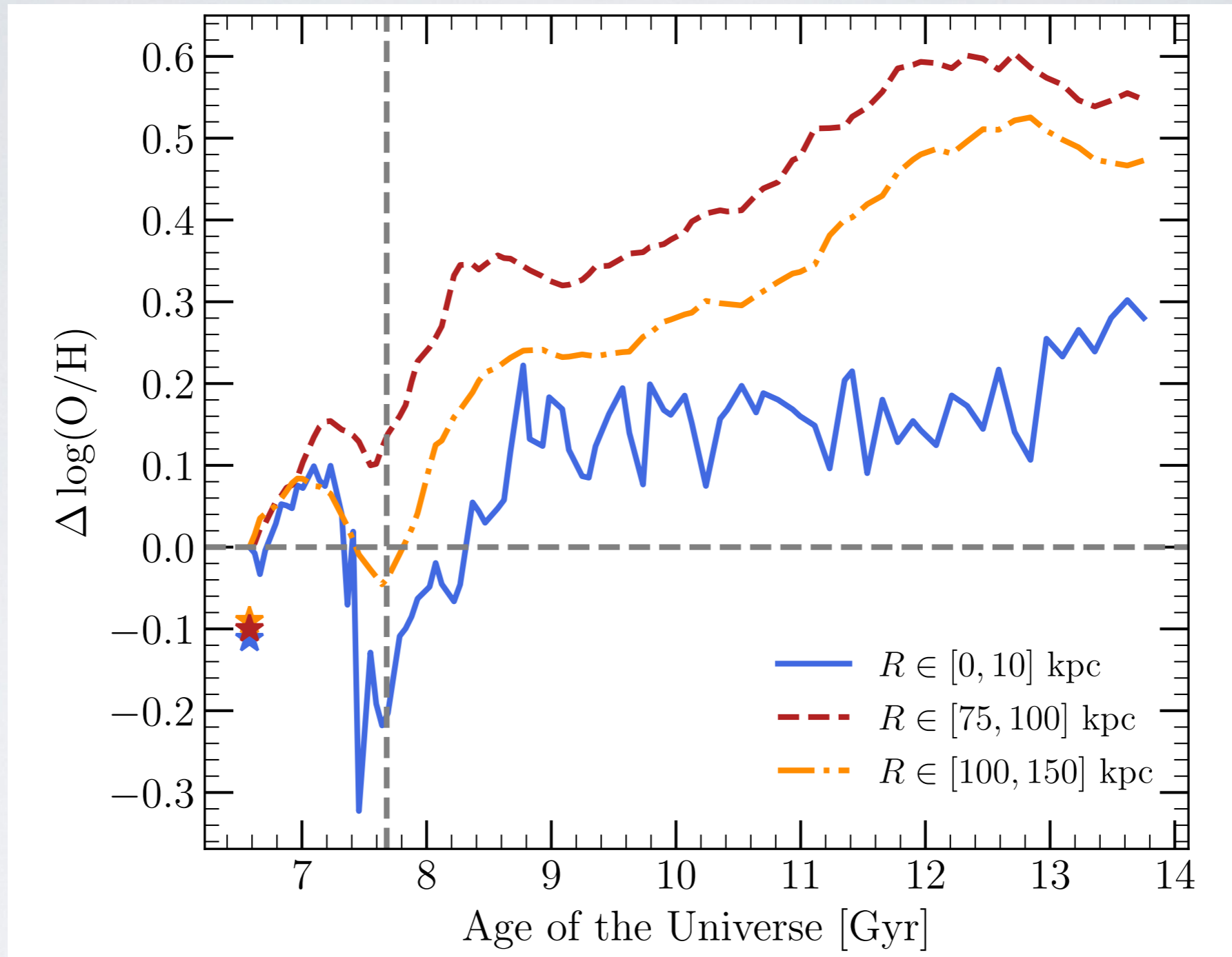
Effects of major mergers



Hani et al. (2018)



Effects of major mergers



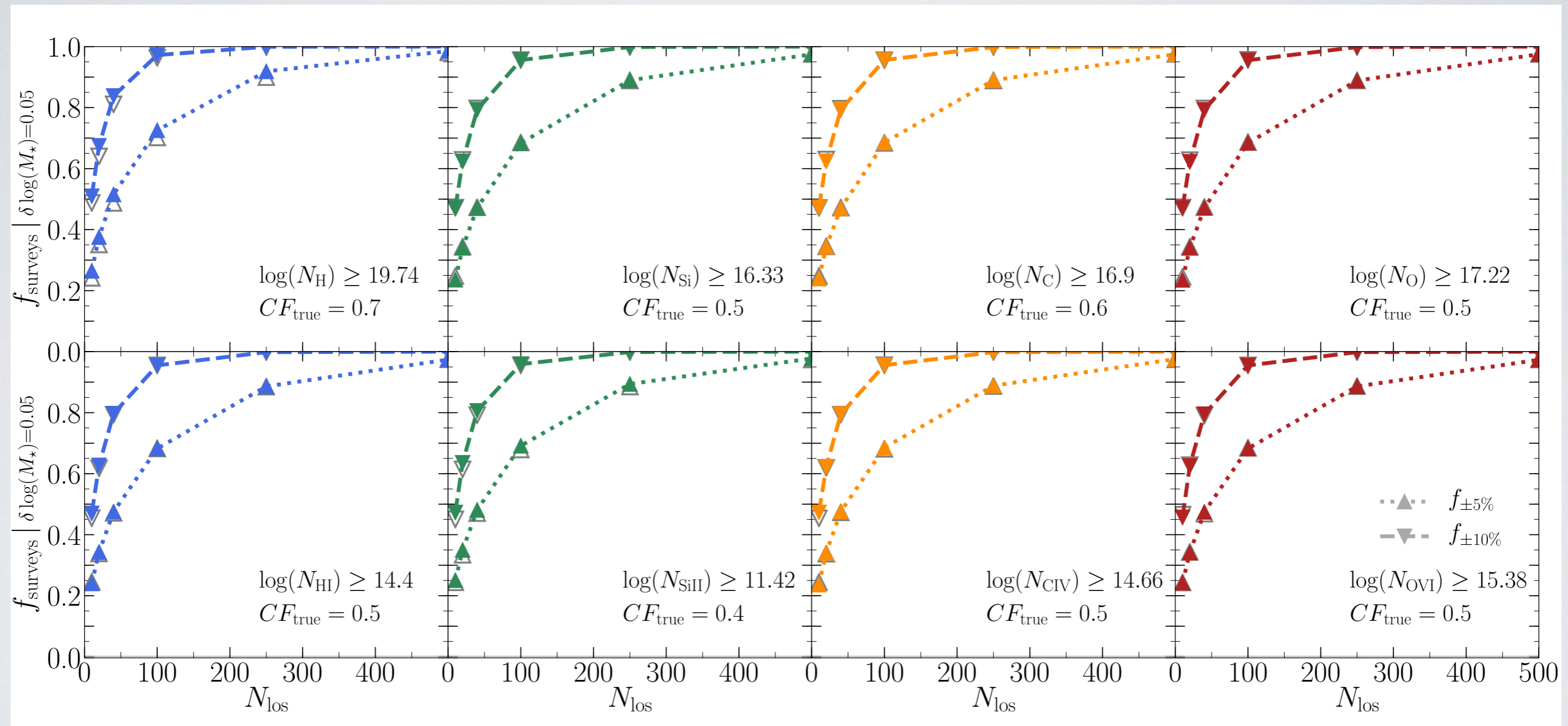
Hani et al. (2018)

Long-lasting & significant enhancement in CGM metallicity

How well can observations reproduce
the *truth*?

(with limited sampling)

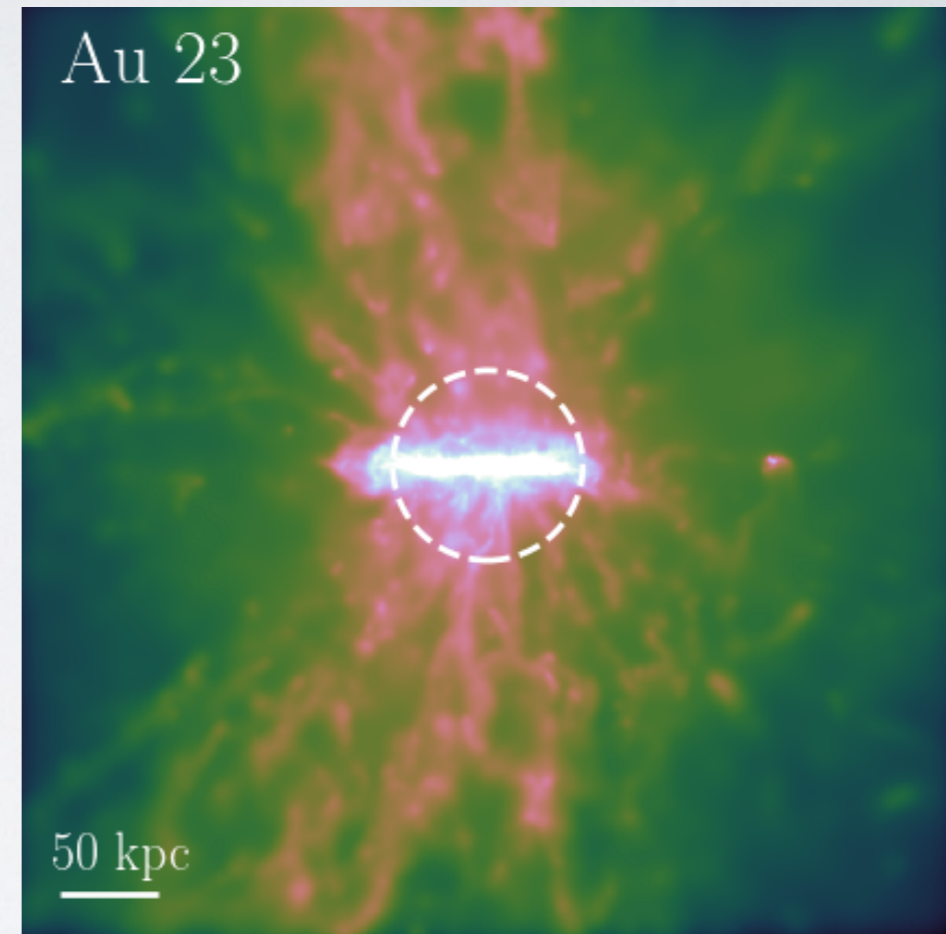
How well can we do observationally?



Hani et al. (2019)

Conclusions

- The **CGM** of MW—mass galaxies in the local universe is **diverse**
- Galaxy assembly leaves a remarkable imprint on the CGM
 - The CGM **metal content scales with M_{\star}**
 - The CGM **ionization scales with morphology**
- **AGN** radiation is a **significant ionization source**
- **AGN feedback** is a significant source of **metals** in the CGM
- **Galaxy mergers** have a significant impact on the **CGM's** size, metallicity, ionization, and observed column densities



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