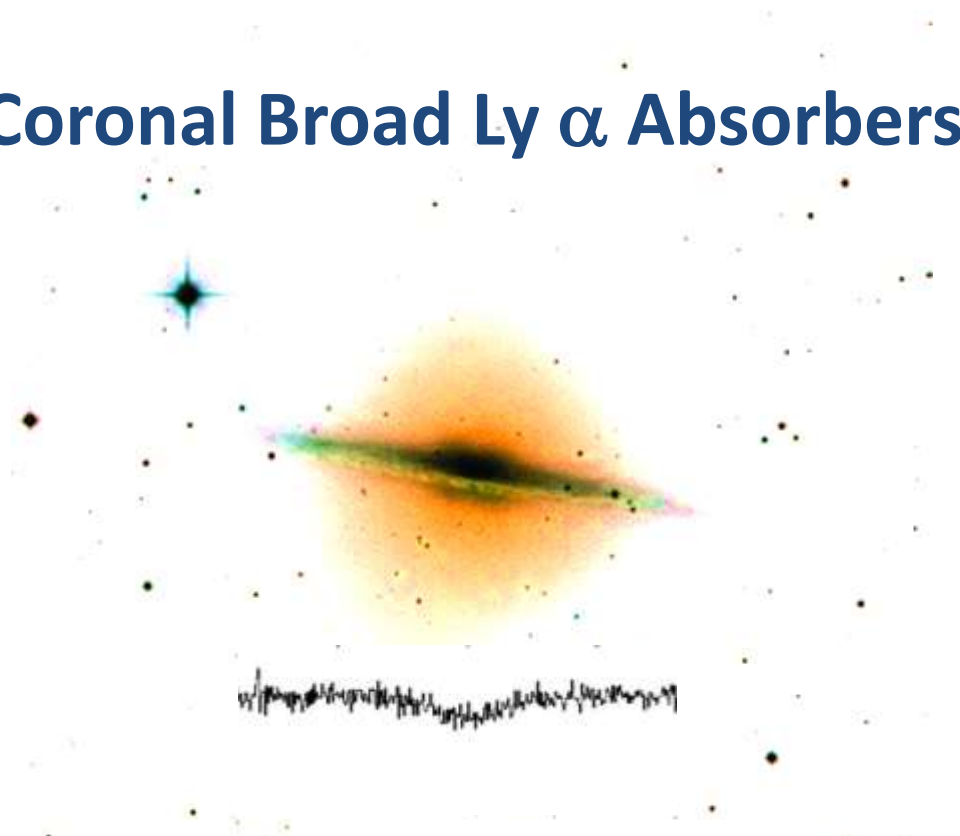
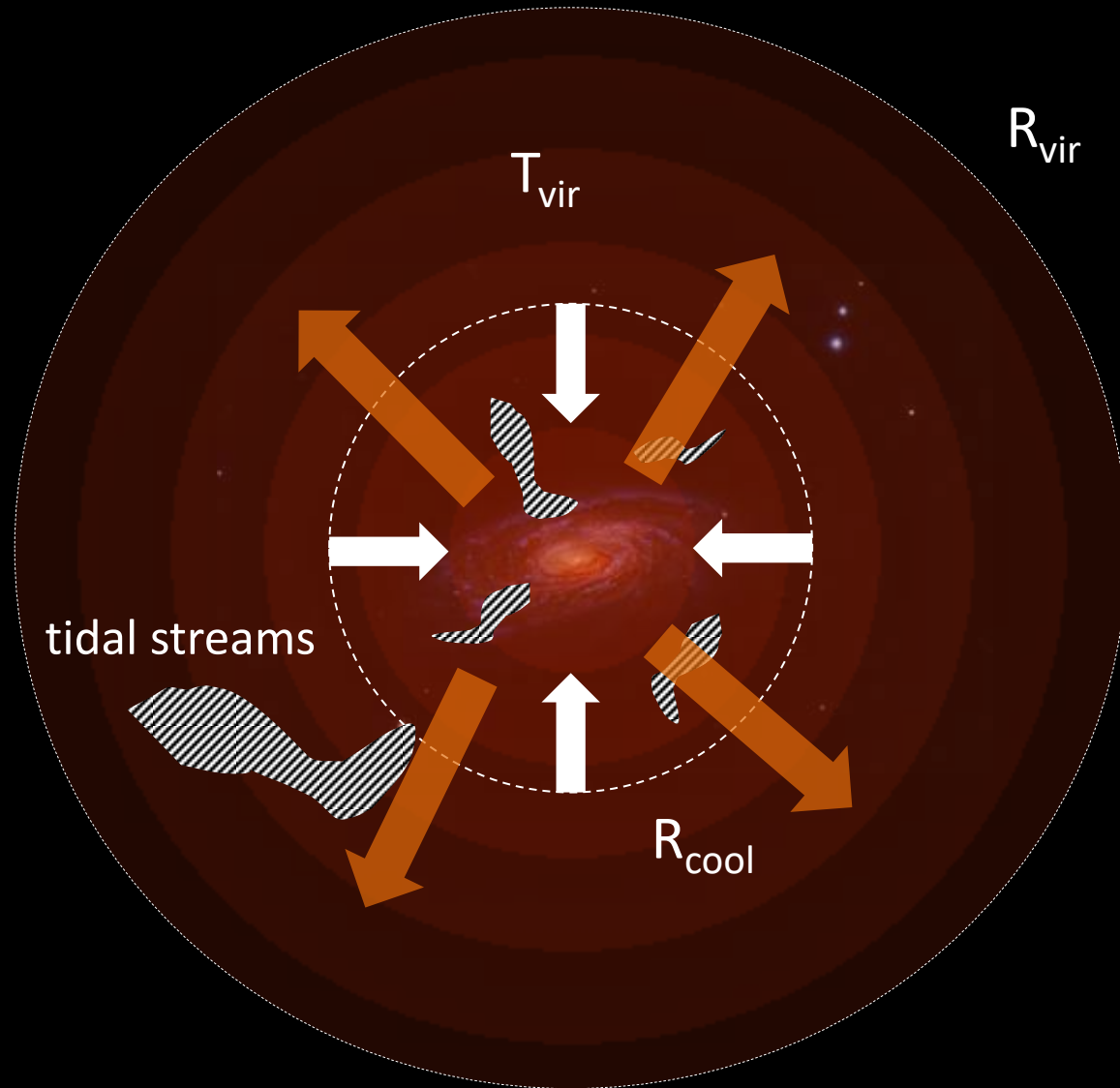


Tracing the hot CGM with **Coronal Broad Ly α Absorbers**



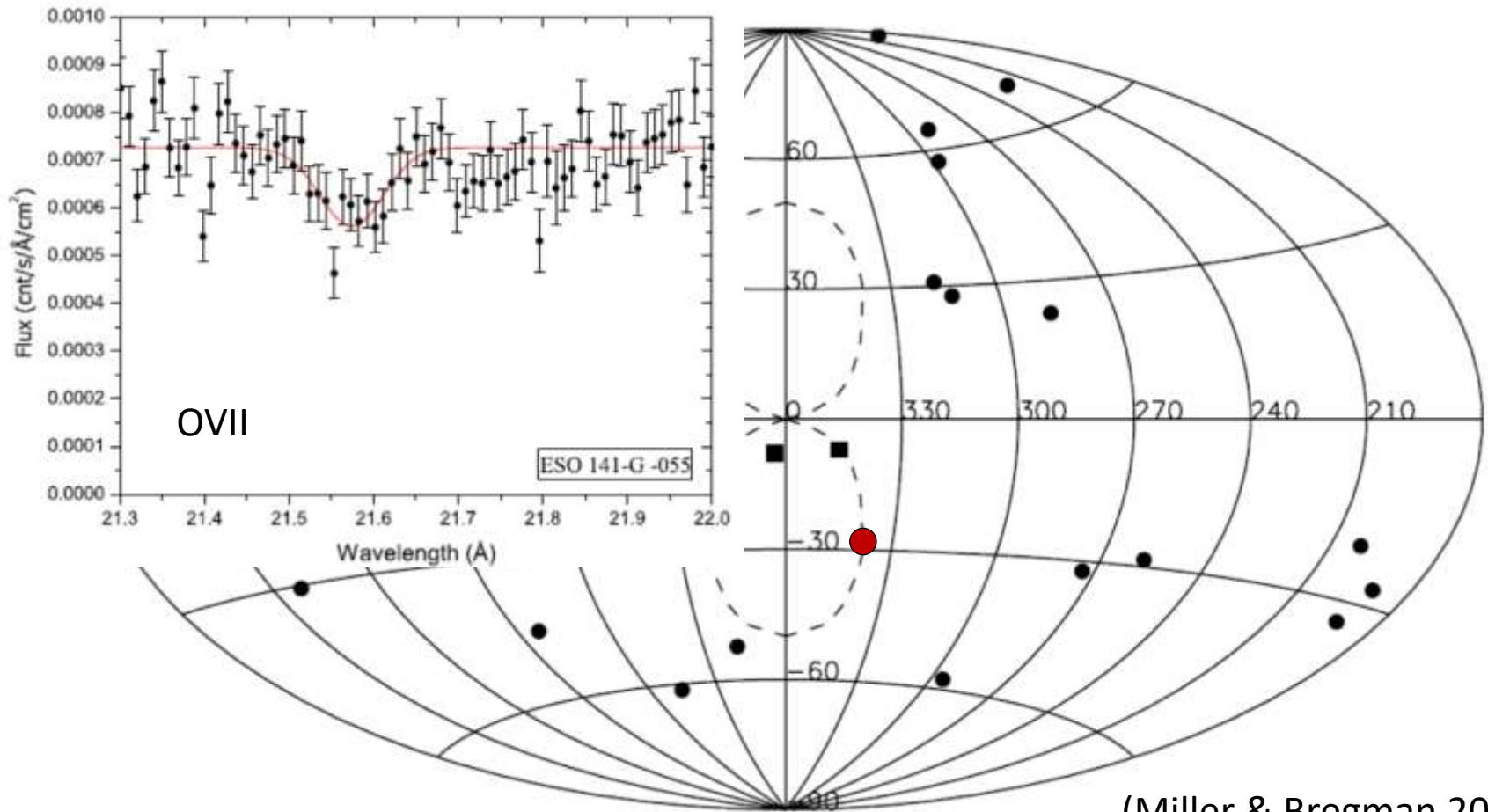
Philipp Richter
University of Potsdam

Hot Coronae of Galaxies



X-ray Observations of Coronal Gas

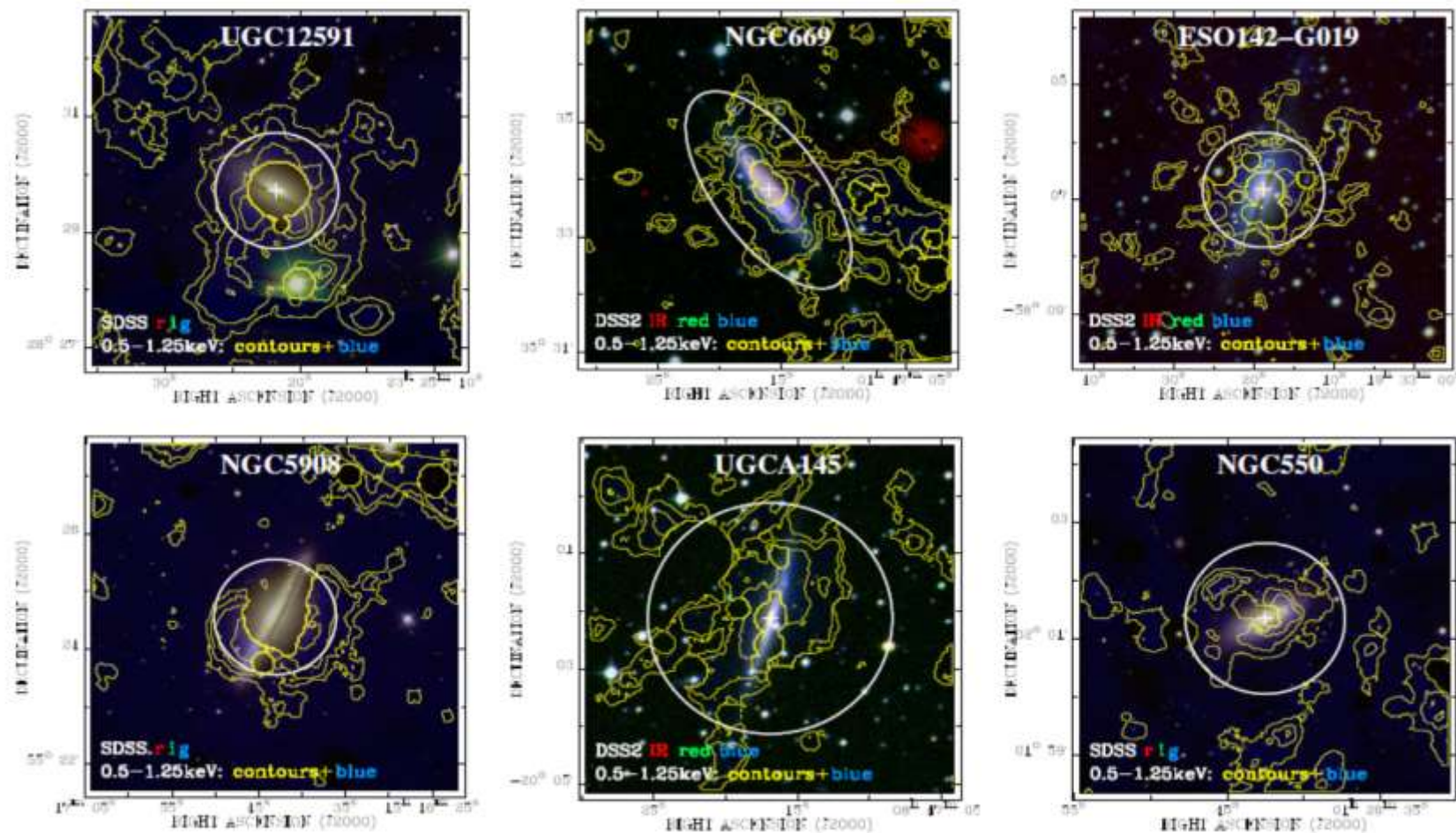
Milky Way Corona



(Miller & Bregman 2013)

$$M_{200} = 3 - 10 \times 10^{10} M_{\text{sun}}$$

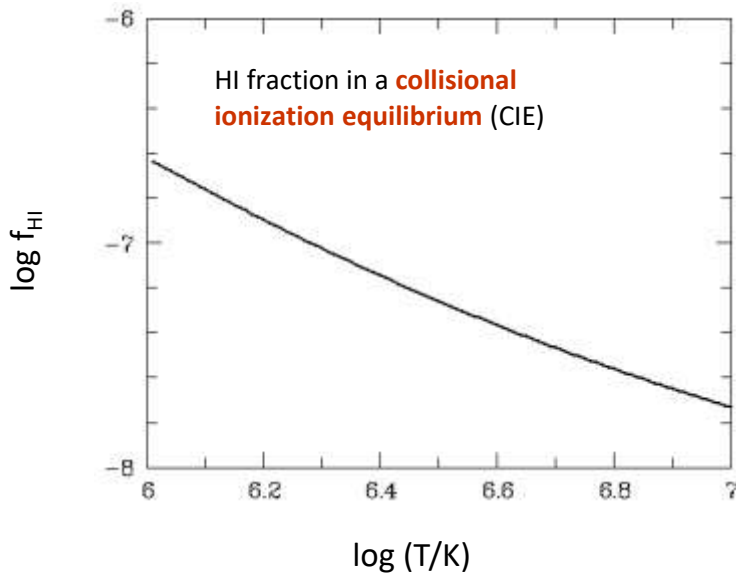
X-ray Observations of Coronal Gas (?)



(Li et al. 2018)

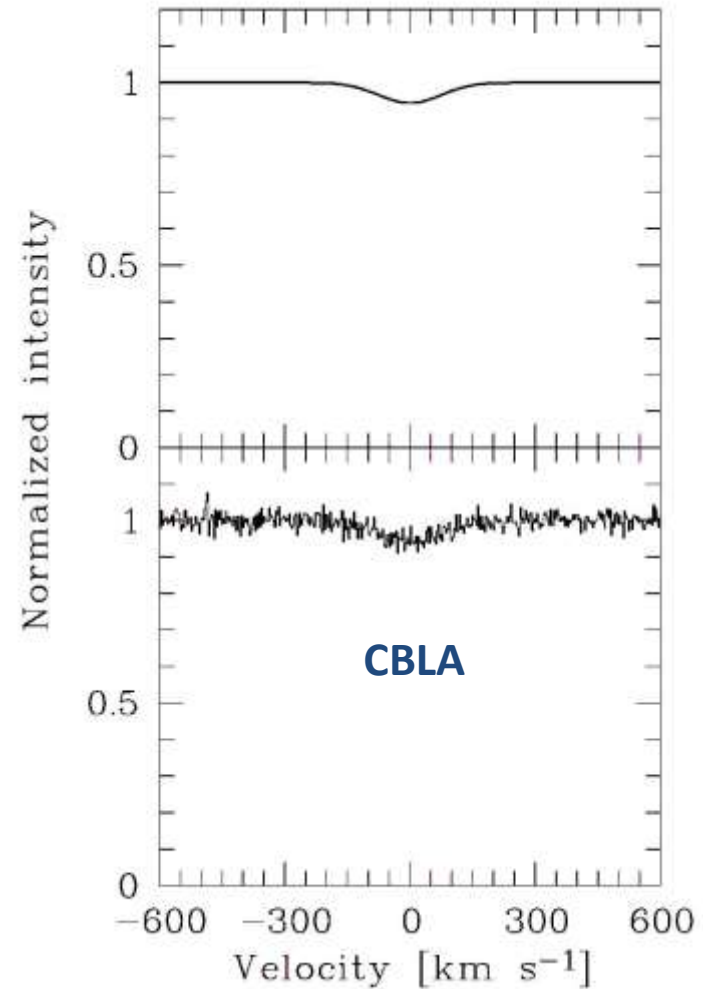
L_{xray} scales with SFR \Rightarrow Xrays predominantly trace SN feedback and outflows

Coronal Broad Ly α Absorbers (CBLAs)

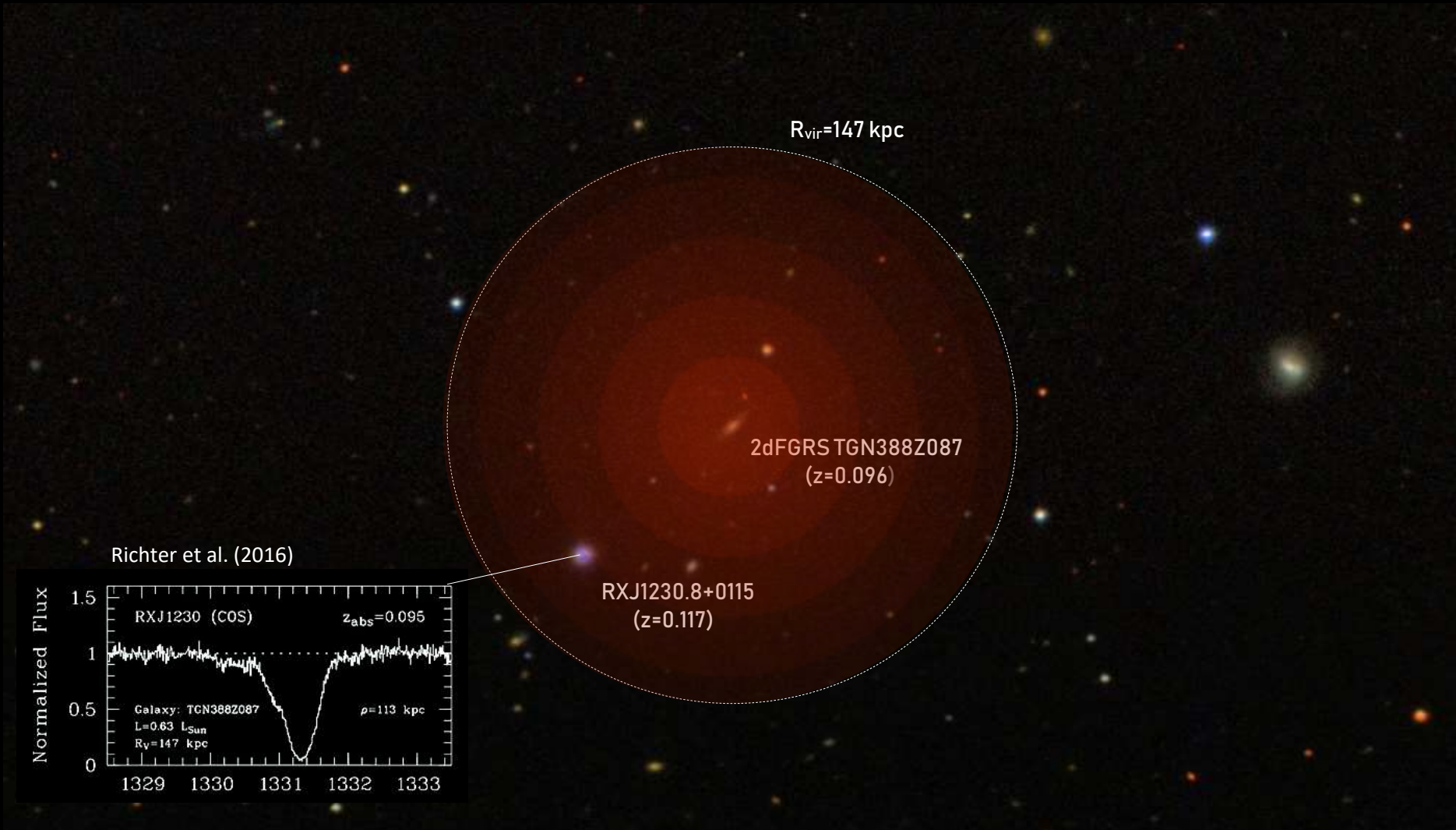


Central LOS for Milky-Way type galaxy
with $D_{\text{vir}} \sim 450$ kpc and $T_{\text{vir}} \sim 2 \times 10^6$ K

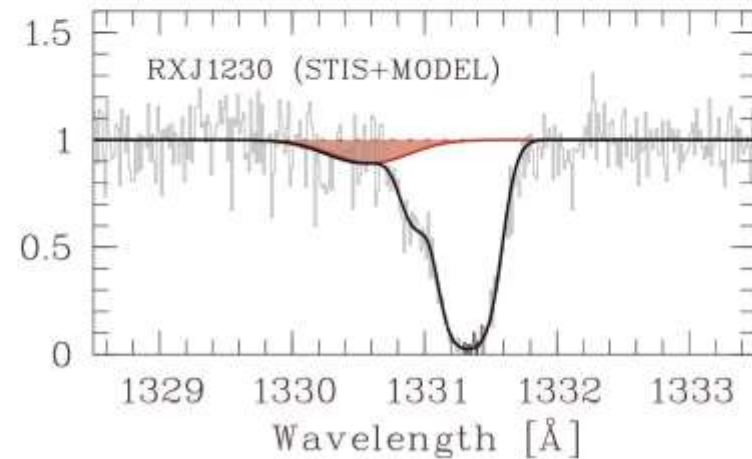
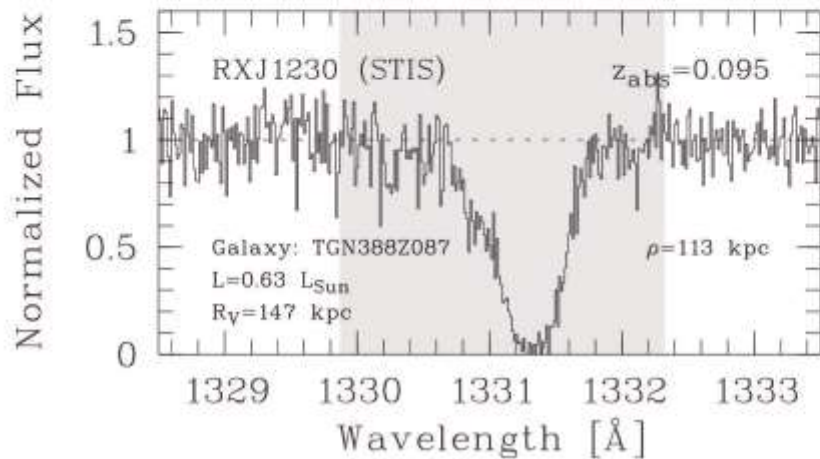
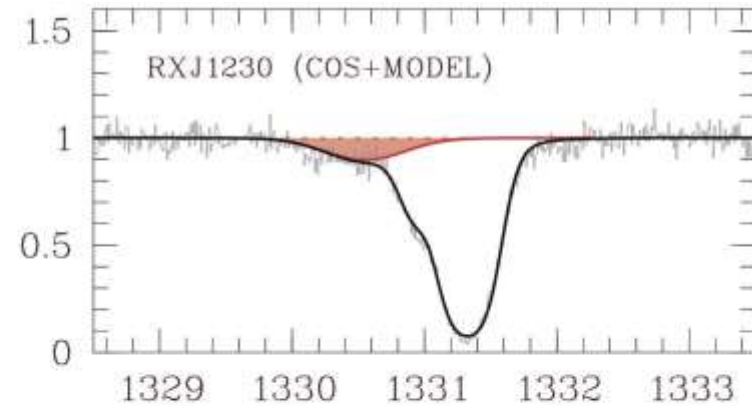
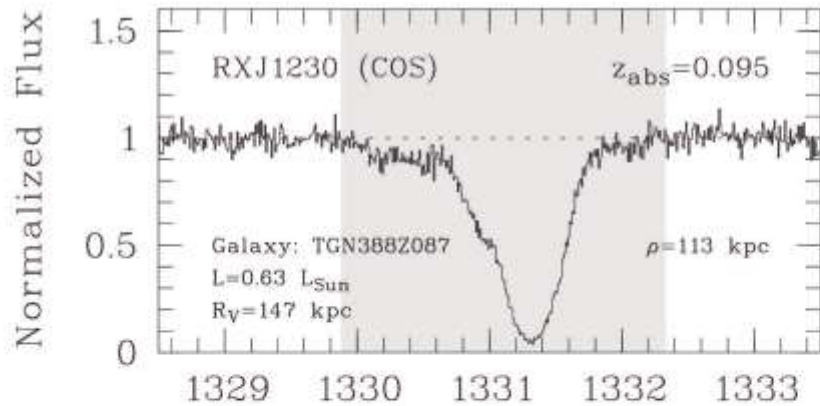
- $\log N(\text{H}) \sim 20.0$
- $\log N(\text{HI}) \sim 13.0$
- $b \sim 130 \text{ km s}^{-1}$



Coronal Broad Ly α Absorbers (CBLAs)

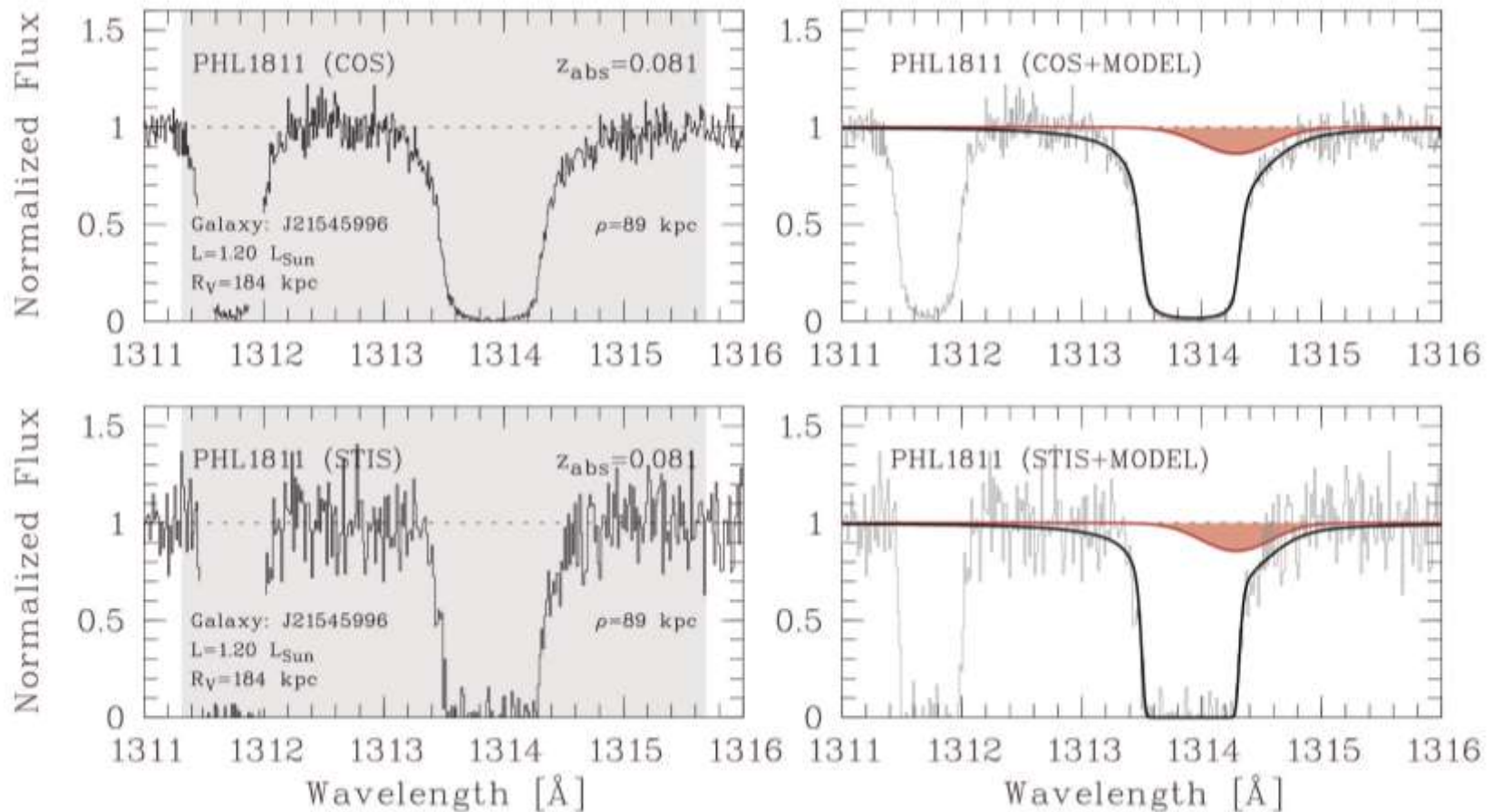


CBLAs in HST/COS and HST/STIS Spectra



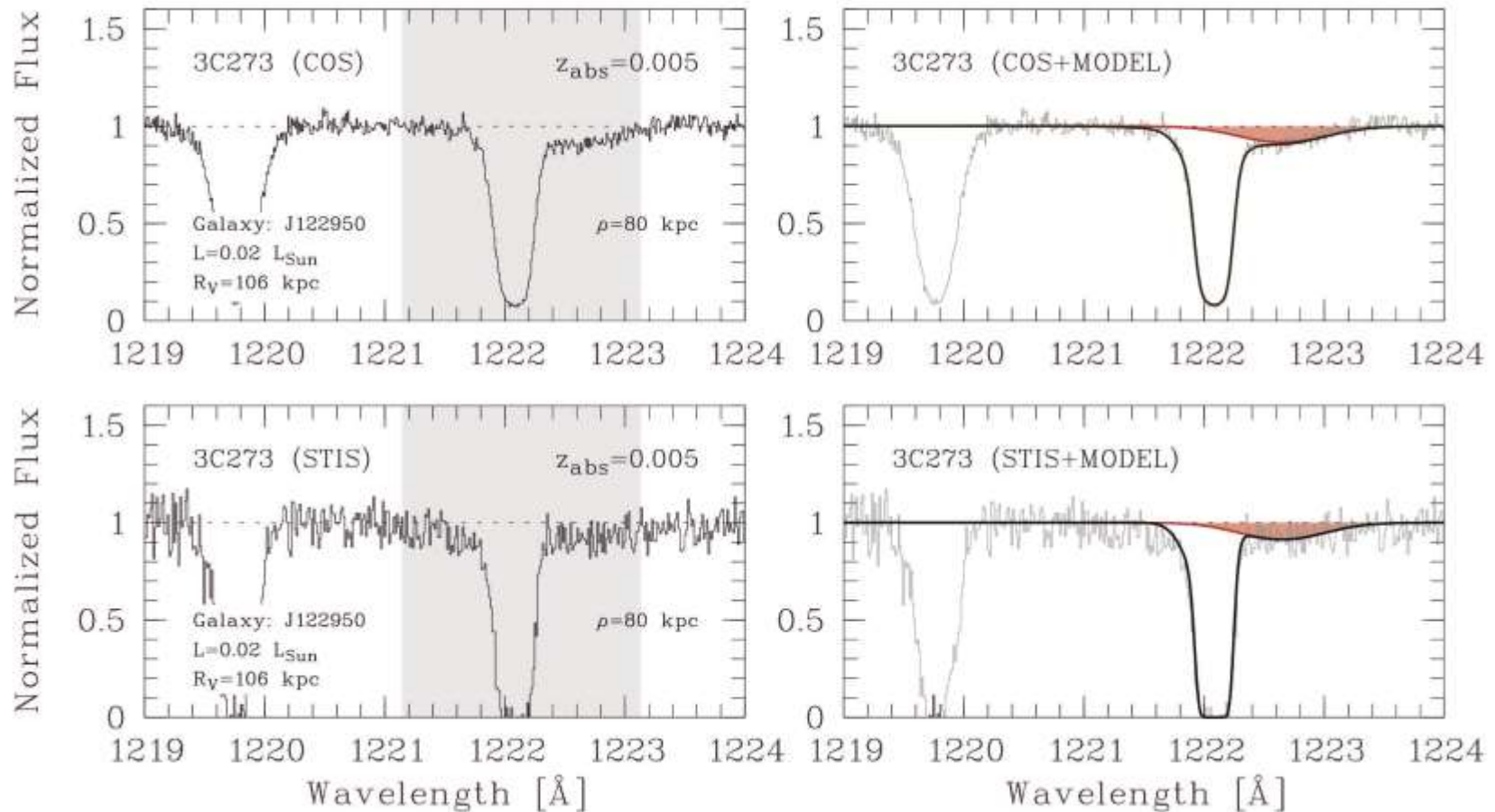
$\log N(\text{HI})=13.14, b(\text{HI})=90 \text{ km s}^{-1}$

CBLAs in HST/COS and HST/STIS Spectra



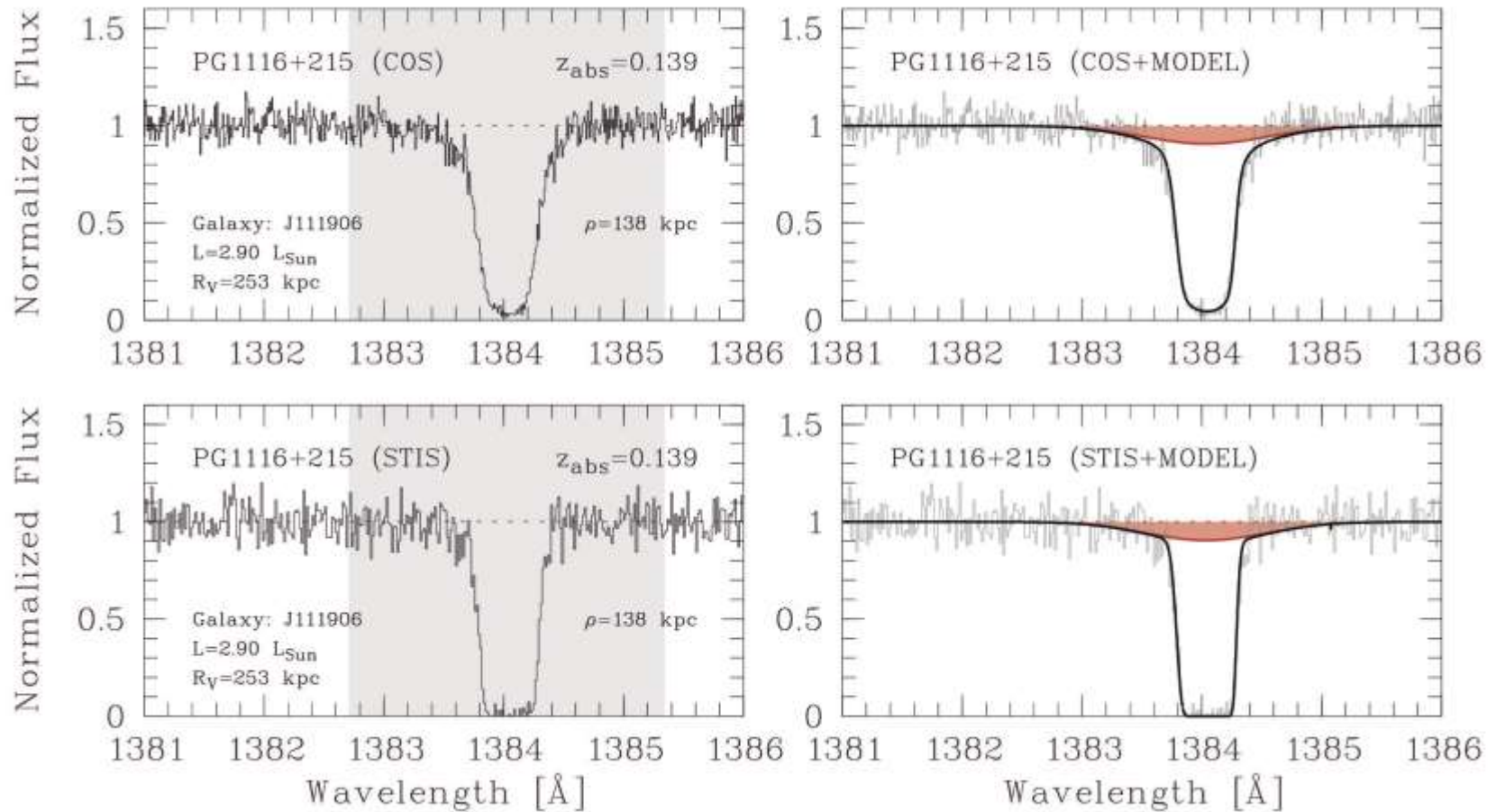
$\log N(\text{HI})=13.27$, $b(\text{HI})=95 \text{ km s}^{-1}$

CBLAs in HST/COS and HST/STIS Spectra



$\log N(\text{HI})=13.16$, $b(\text{HI})=120 \text{ km s}^{-1}$

CBLAs in HST/COS and HST/STIS Spectra



$\log N(\text{HI})=13.30, b(\text{HI})=150 \text{ km s}^{-1}$

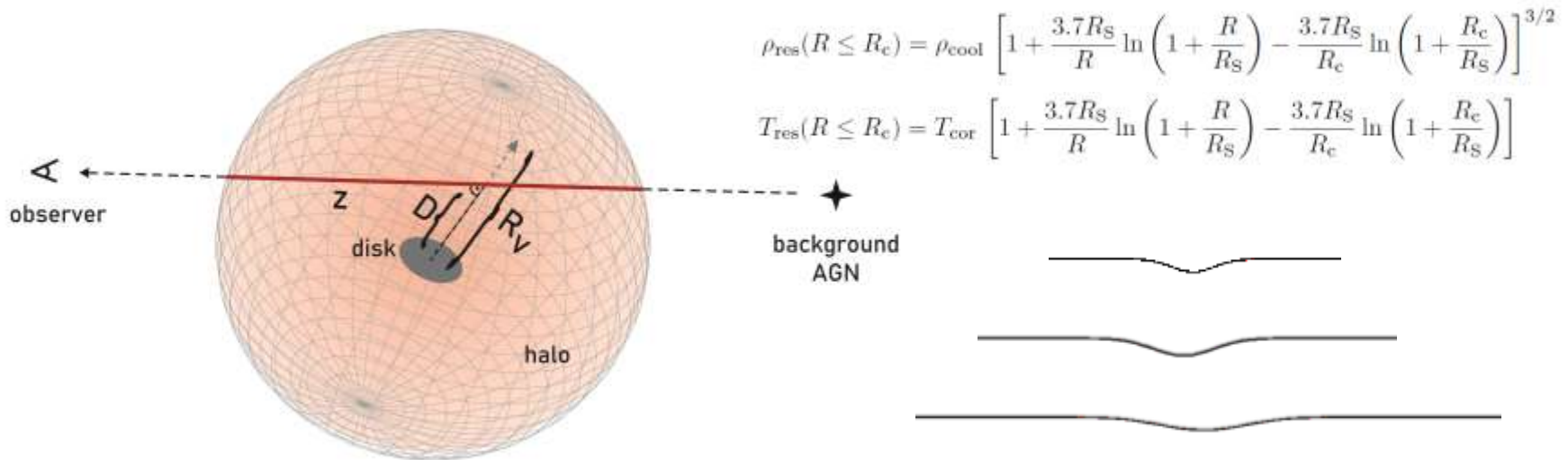
Semi-analytical Modeling of CBLAs

HOT GAS IN GALAXY HALOS TRACED BY CORONAL BROAD LYMAN α ABSORBERS

PHILIPP RICHTER^{1,2}

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²Visiting Erskine Fellow at the University of Canterbury, Department of Physics and Astronomy, Christchurch 8020, New Zealand



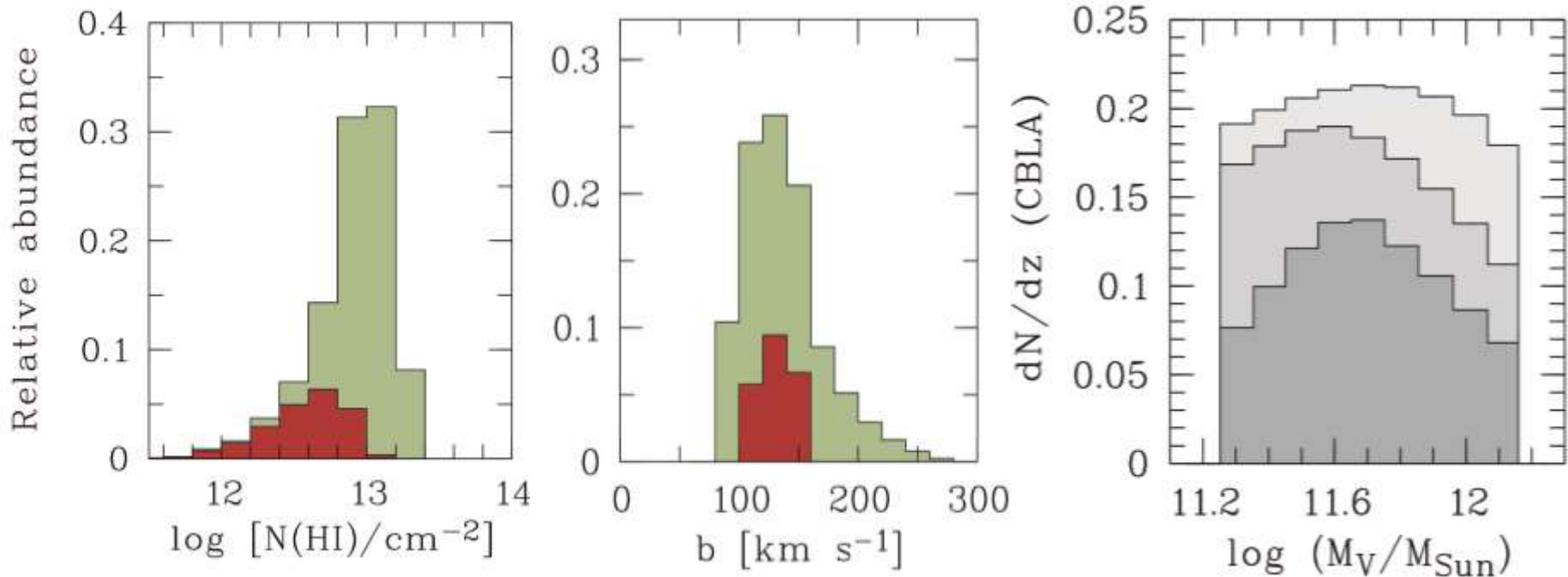
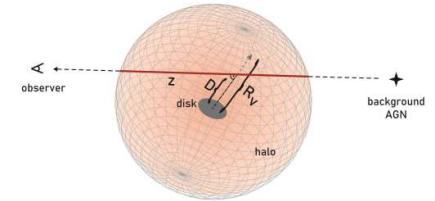
➔ calculate $N(\text{HI})$ and $b(\text{HI})$ as function of M_{halo} and ρ_{impact} for the local galaxy population using the **halopath** CGM model code.

(Maller & Bullock 2004; Richter 2012)

Semi-analytical Modeling of CBLAs

CBLA model predictions:

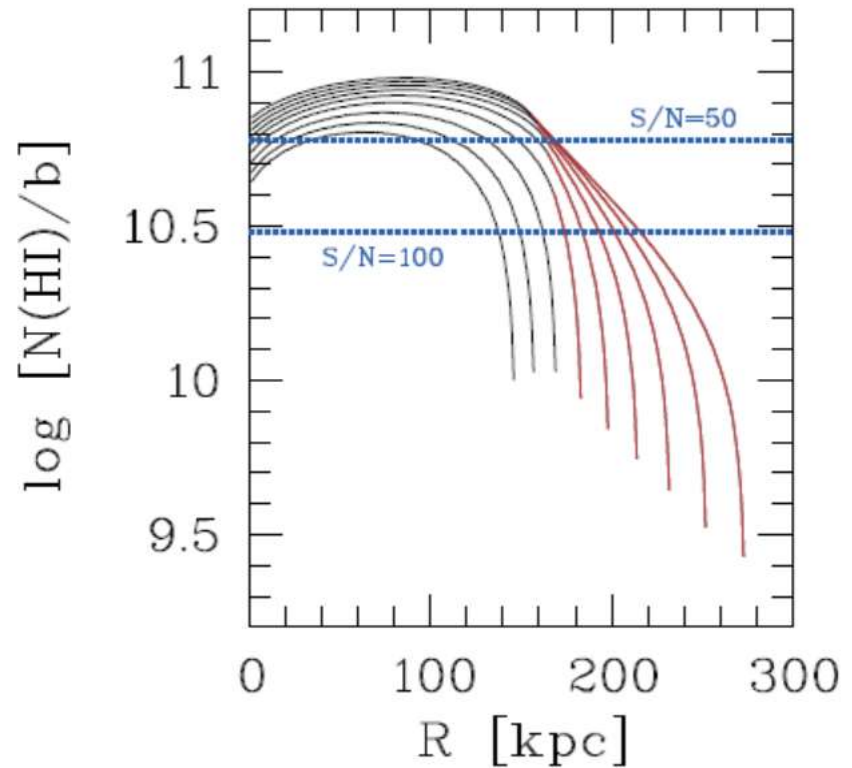
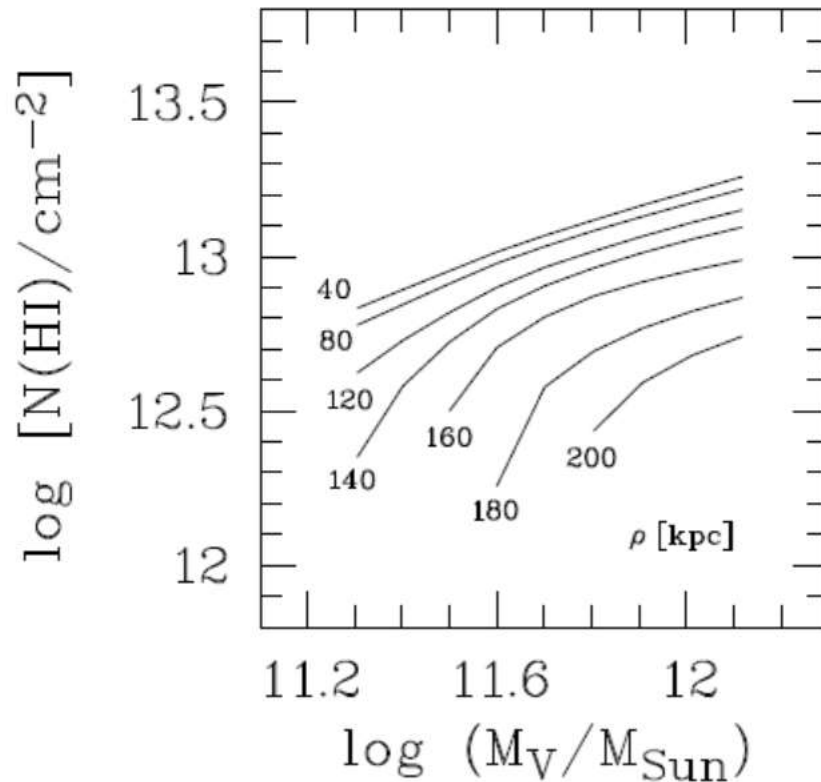
HI column densities, b values, and cross section



Semi-analytical Modeling of CBLAs

CBLA model predictions:

predictions for *individual* galaxy/absorber pairs



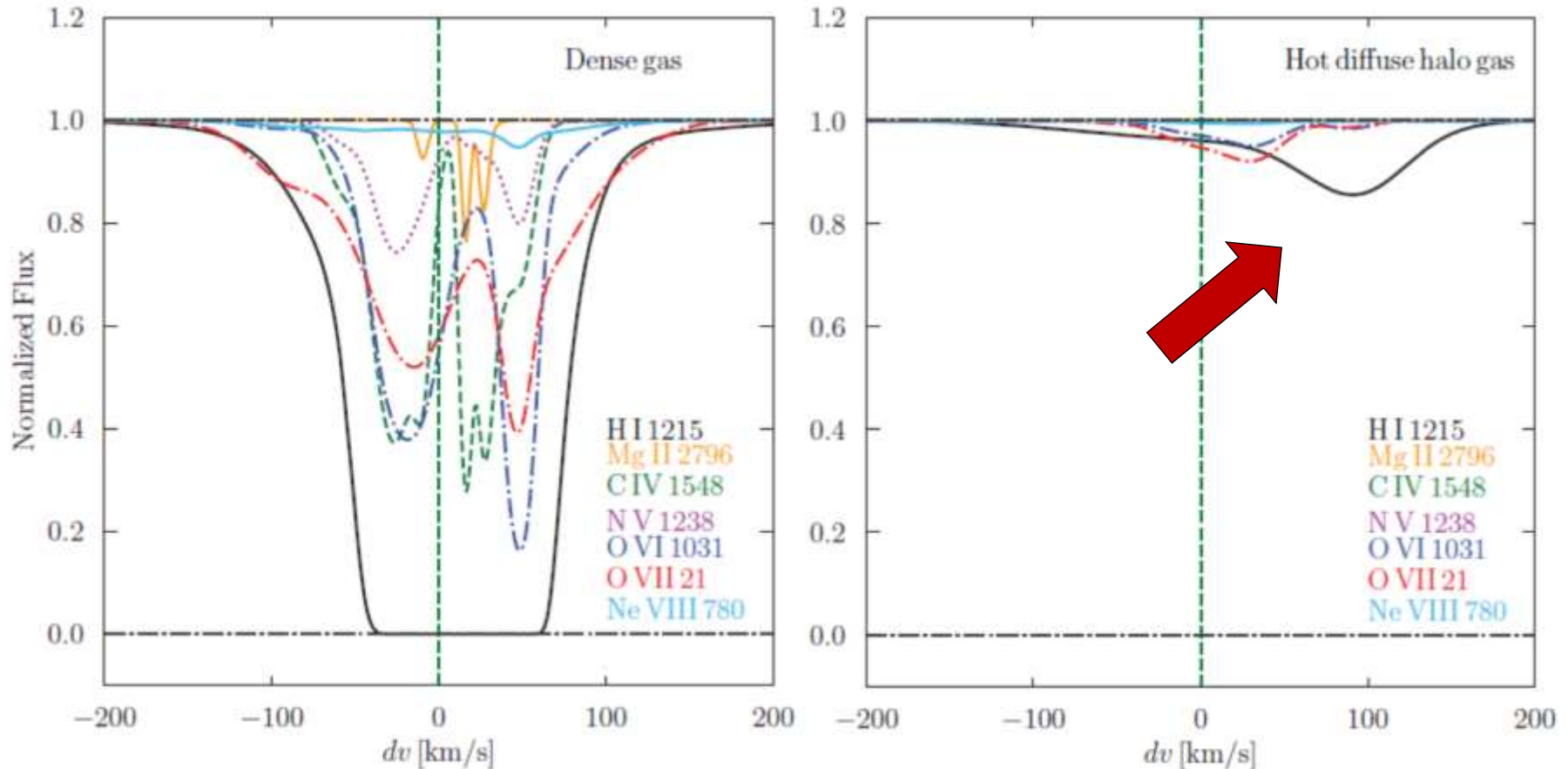
Conclusions:

- Broad, shallow HI absorption features are evident in many COS/STIS spectra of CGM absorbers
- Our semi-analytic model of coronal gas *predicts* that CBLAs should be detectable in high-S/N UV spectra
- **CBLAs represent an interesting absorber population that may be used to study the coronal gas around massive galaxies**

Next steps:

- A survey of CBLAs in COS/STIS spectra and a careful re-analysis of previously published CGM absorbers
- A systematic investigation of CBLAs in high-resolution CGM simulations

CBLAs in CGM Simulations



(Liang, Kravtsov & Agertz 2018)