Discussion on the

Local CGM

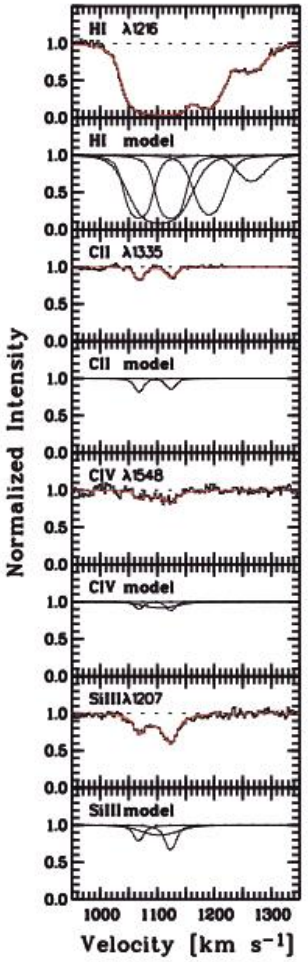
Philipp Richter

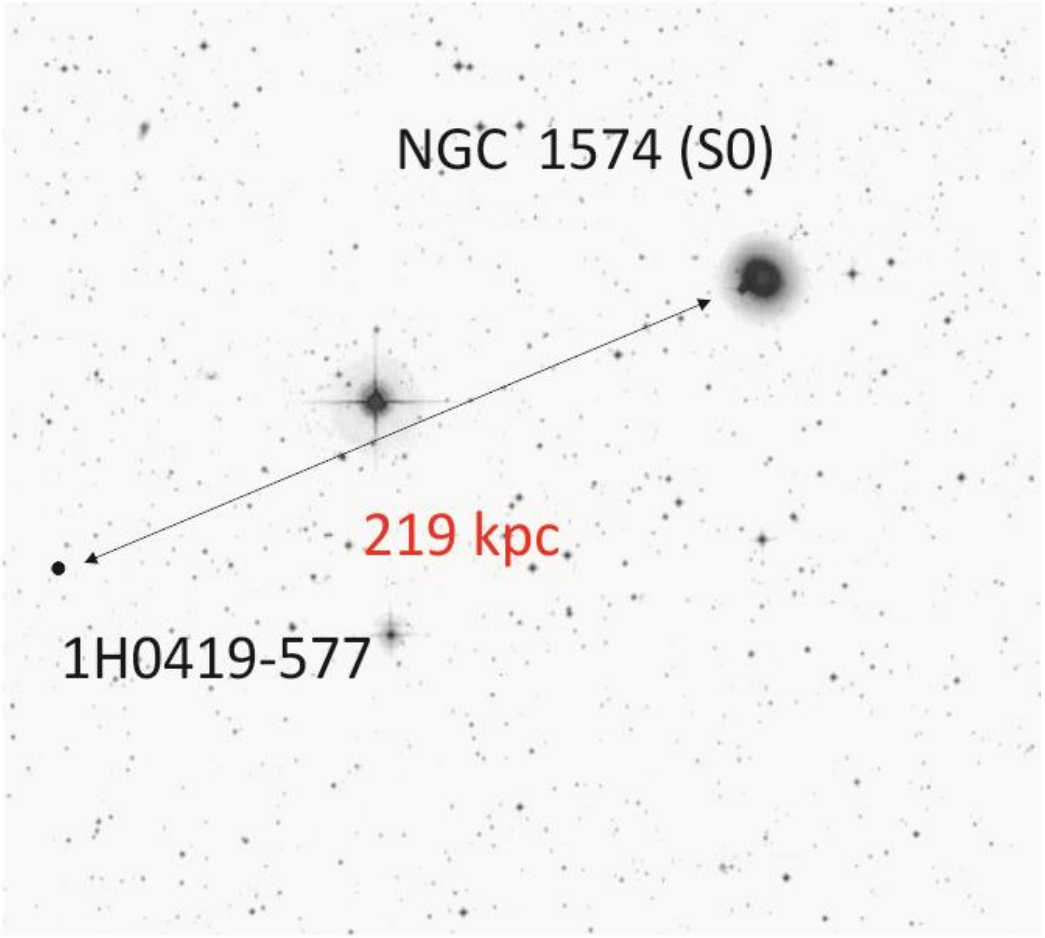
Some important questions on the local CGM

- What can we learn from the Milky Way / Local Group?
- How good can we resolve small-scale structure in the local CGM?
- How far (deep) can we push emission studies in 21cm and X-ray?
- How can we most efficiently connect observations and simulations?

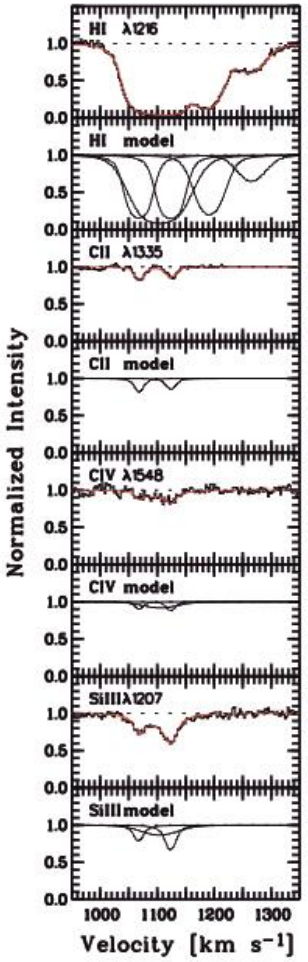
- How to characterize the role of galaxy mergers?
- … infall-/outflow rates, CGM dust, group environments ….?

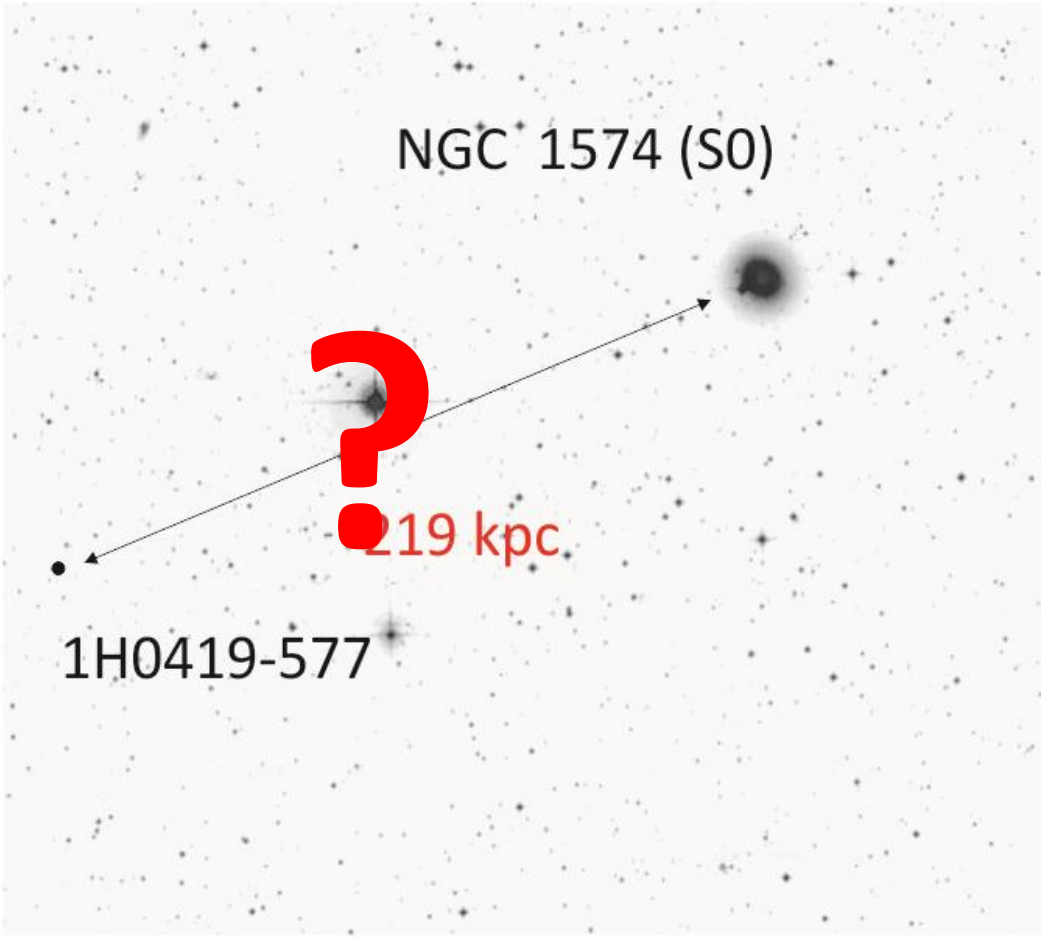
The „typical“ QSO absorption experiment to trace the CGM



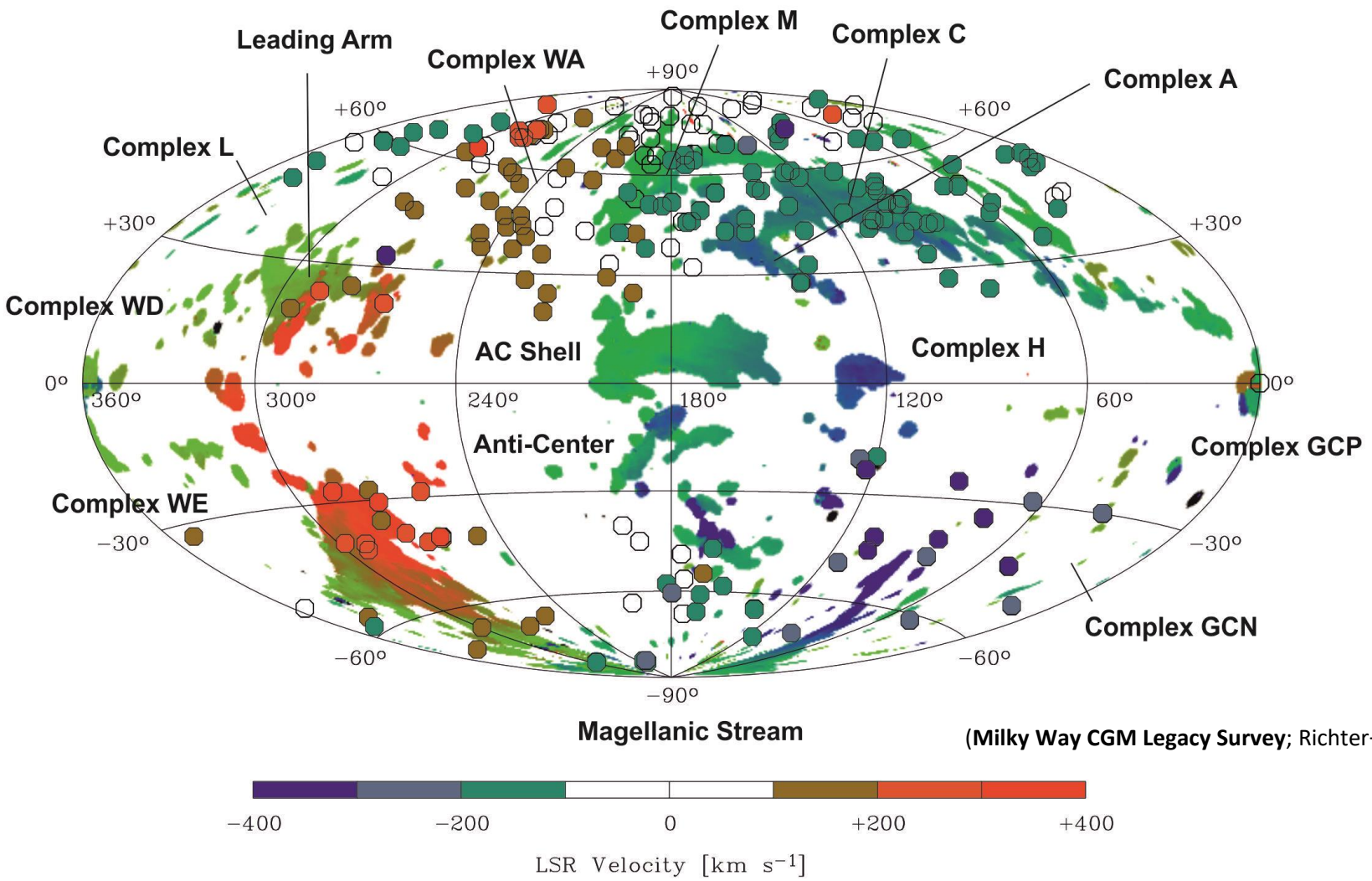


The „typical“ QSO absorption experiment to trace the CGM



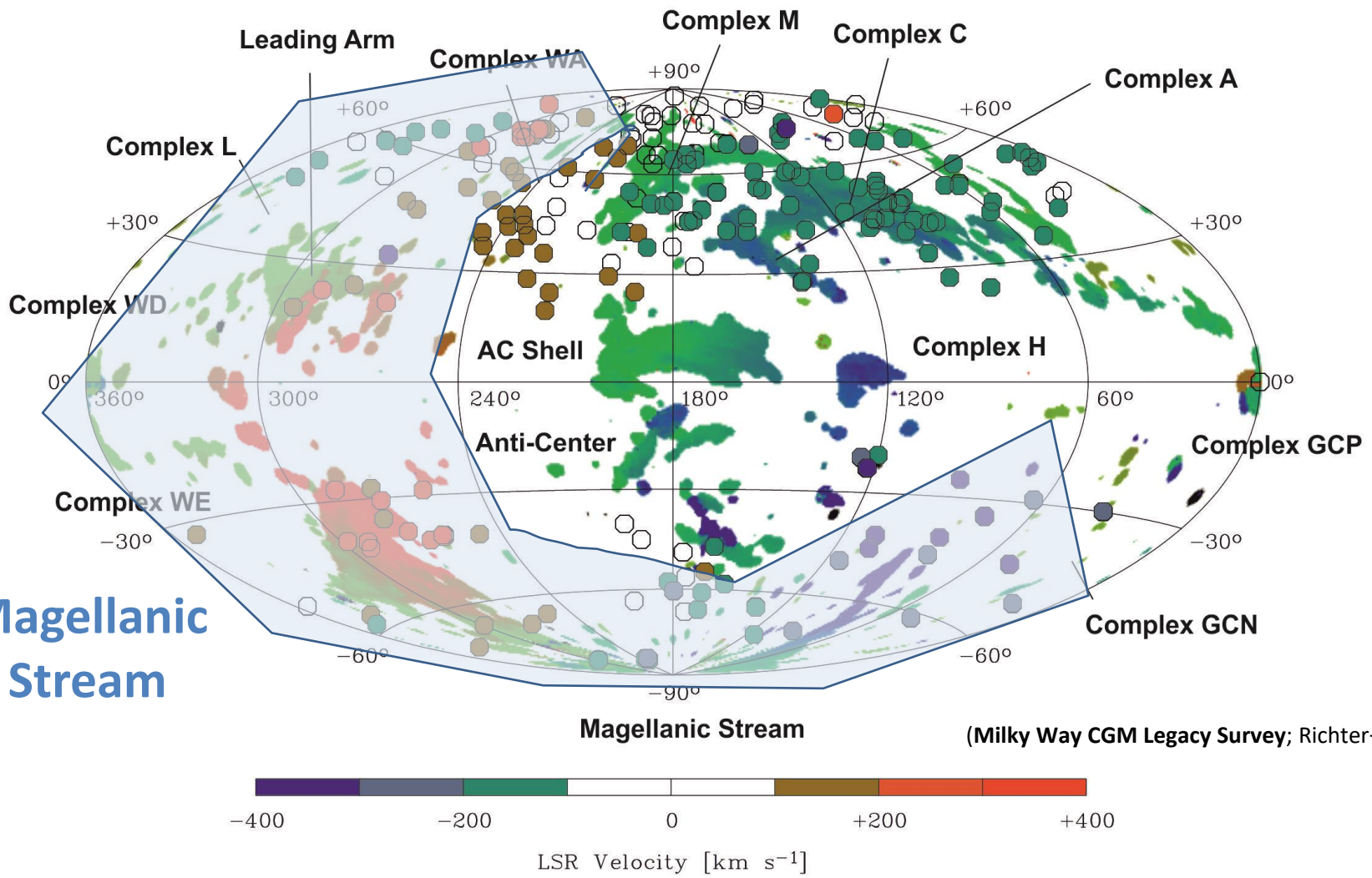


The Milky Way's CGM in absorption and emission



(**Milky Way CGM Legacy Survey**; Richter+17)

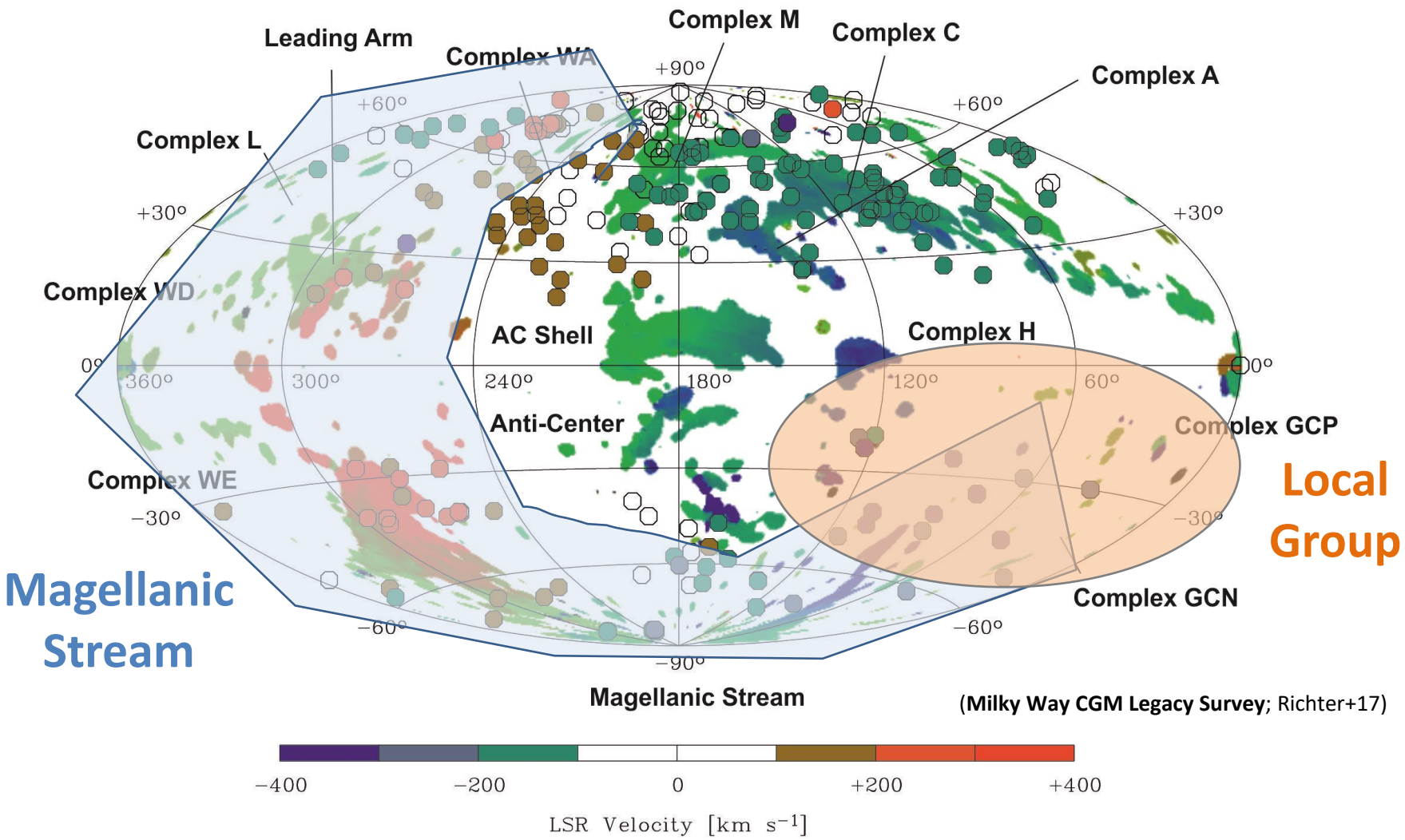
The Milky Way's CGM in absorption and emission



Magellanic Stream

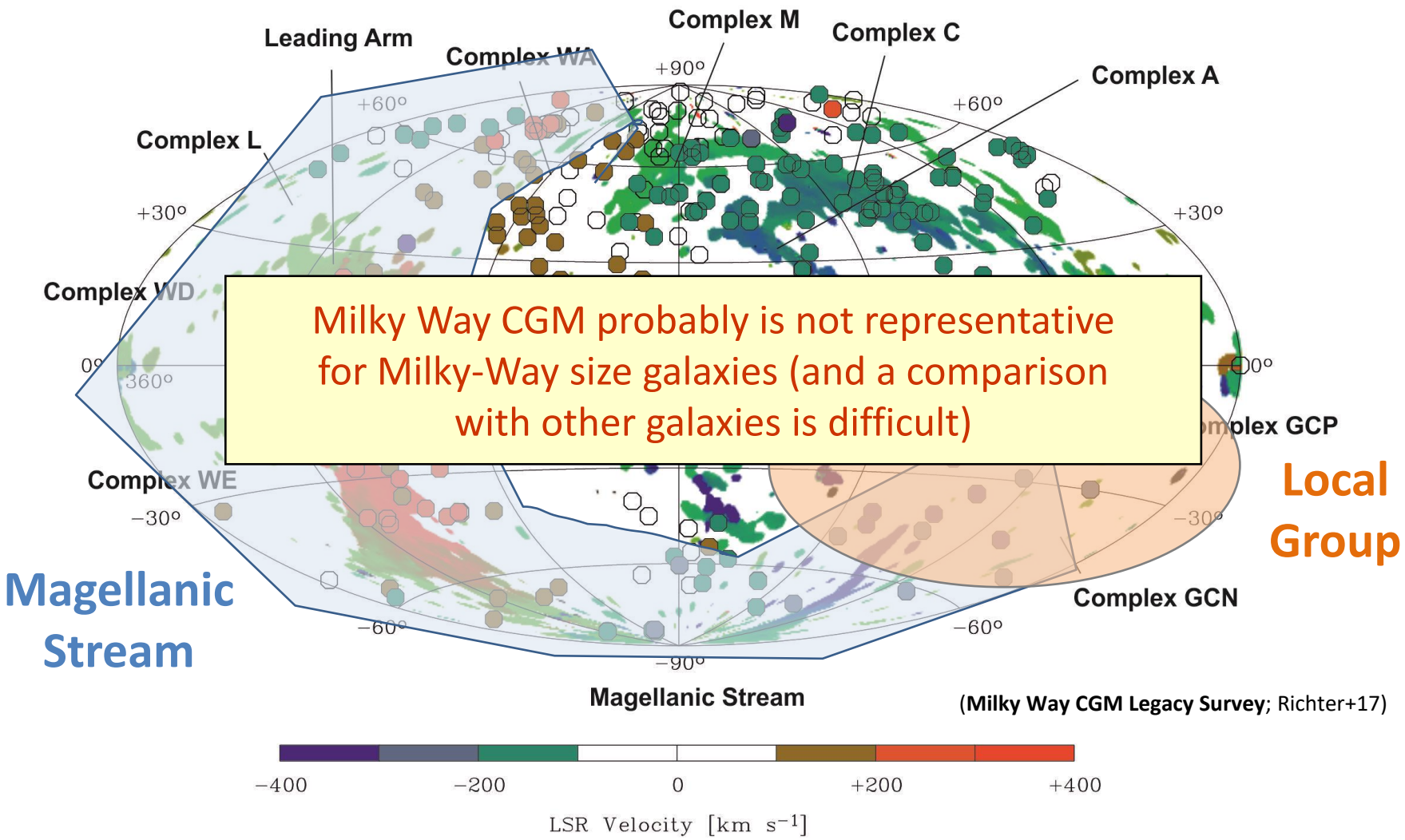
(**Milky Way CGM Legacy Survey**; Richter+17)

The Milky Way's CGM in absorption and emission



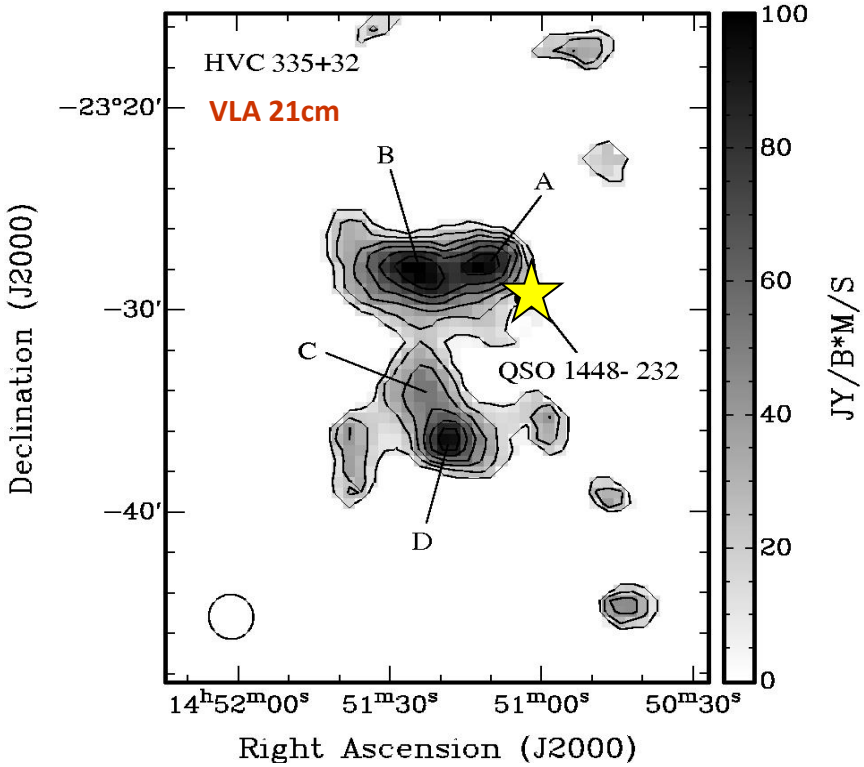
(**Milky Way CGM Legacy Survey**; Richter+17)

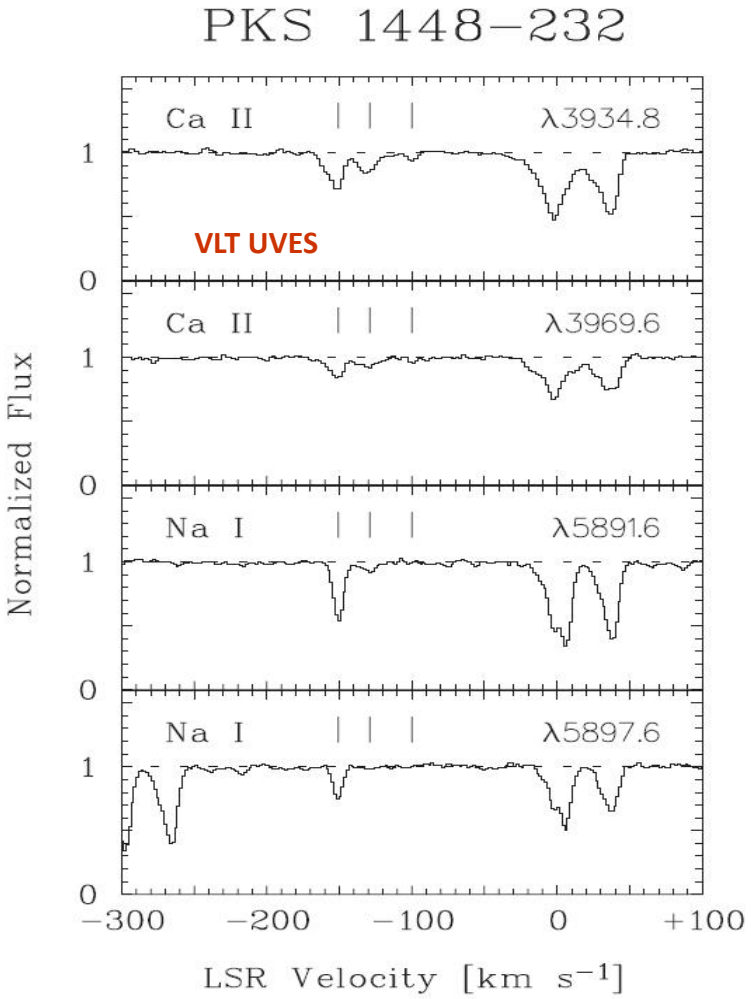
The Milky Way's CGM in absorption and emission



(**Milky Way CGM Legacy Survey**; Richter+17)

Extreme small-scale structure in the Milky Way's CGM

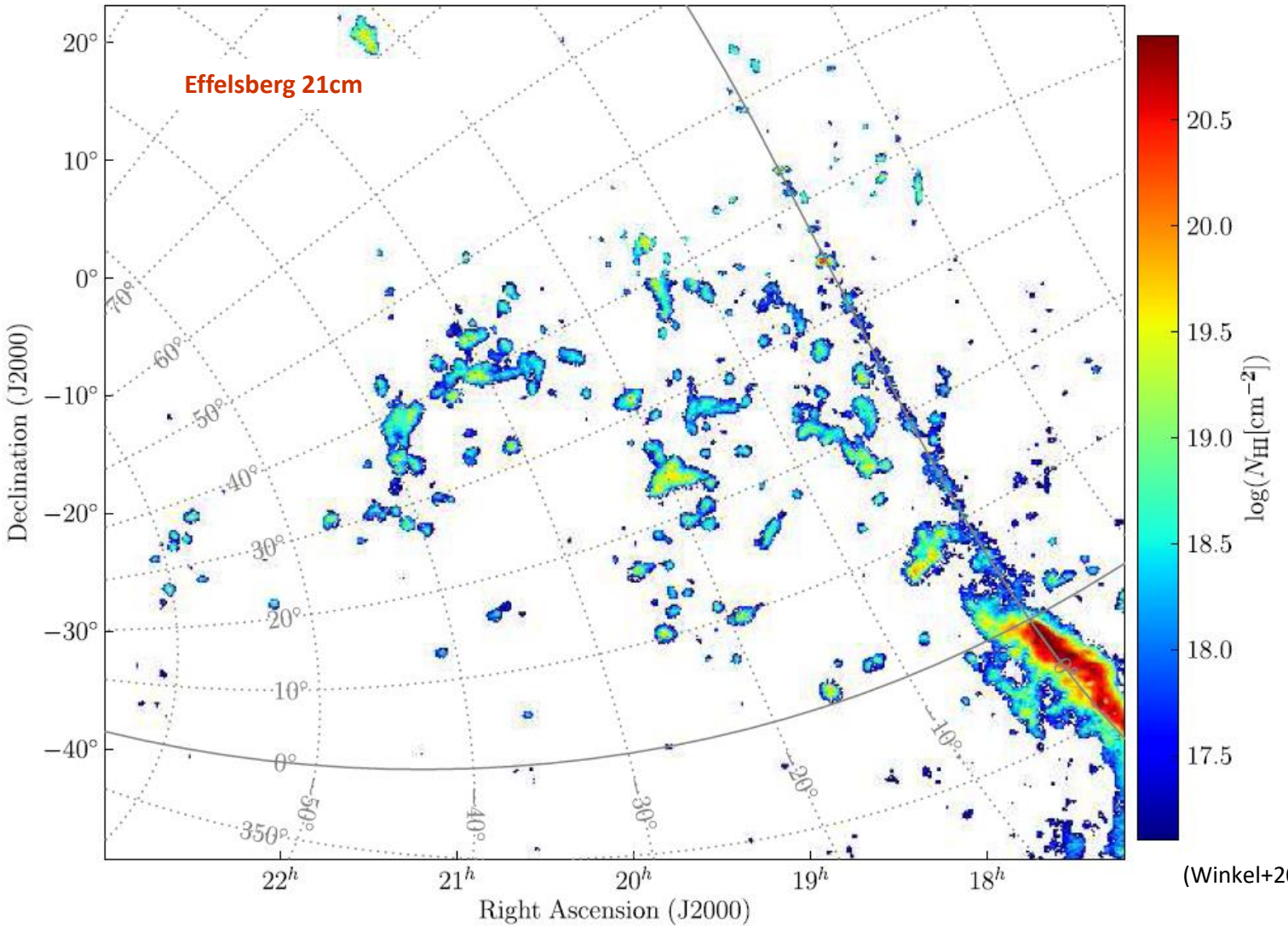




- N(HI) < 8 x 10^{18} cm^{-2}
- Cold (T<900 K), small (pc-scale)

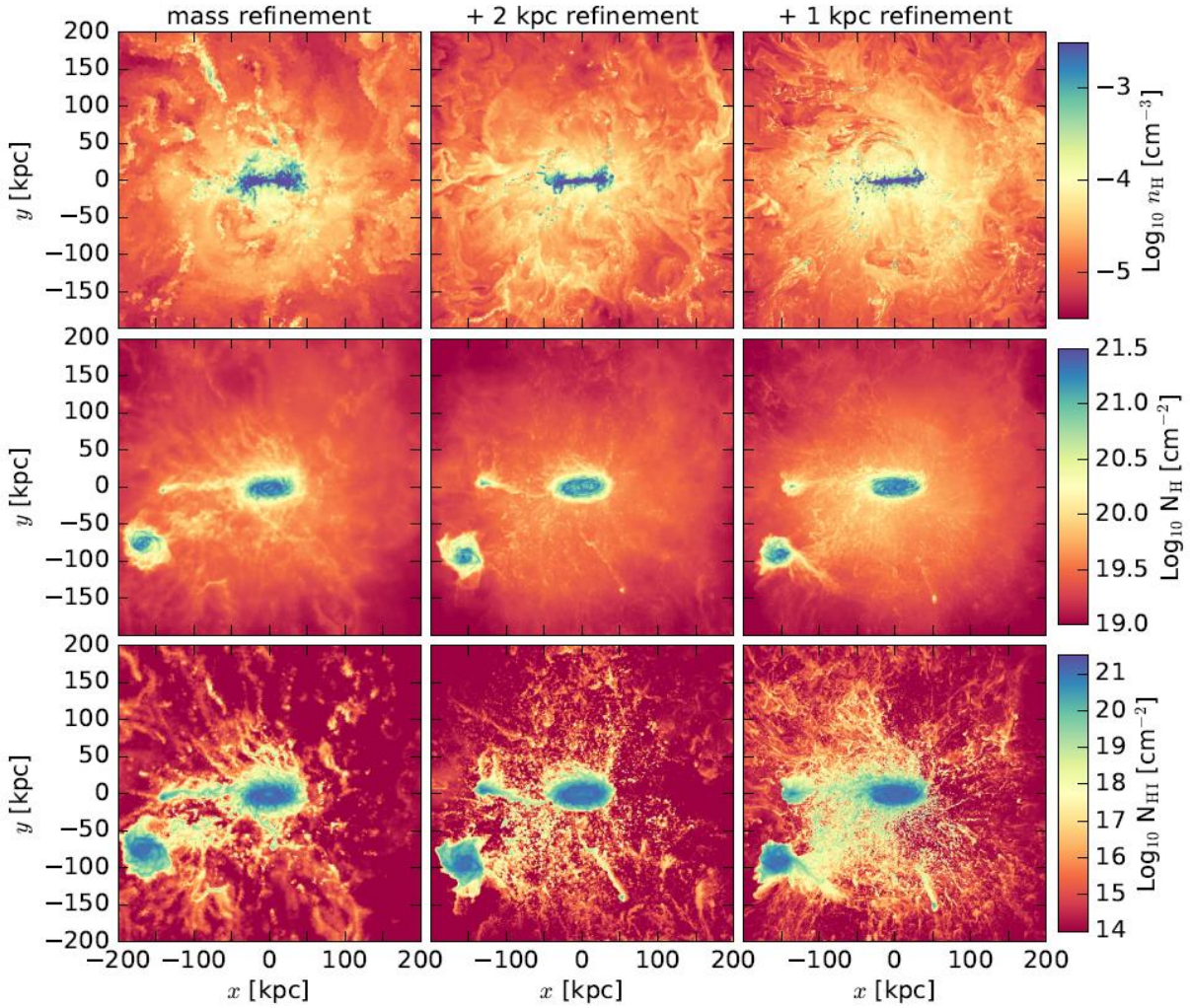
(Richter+2005; Ben Bekhti+2008; 2012)

Small-scale structure in the Milky Way's CGM



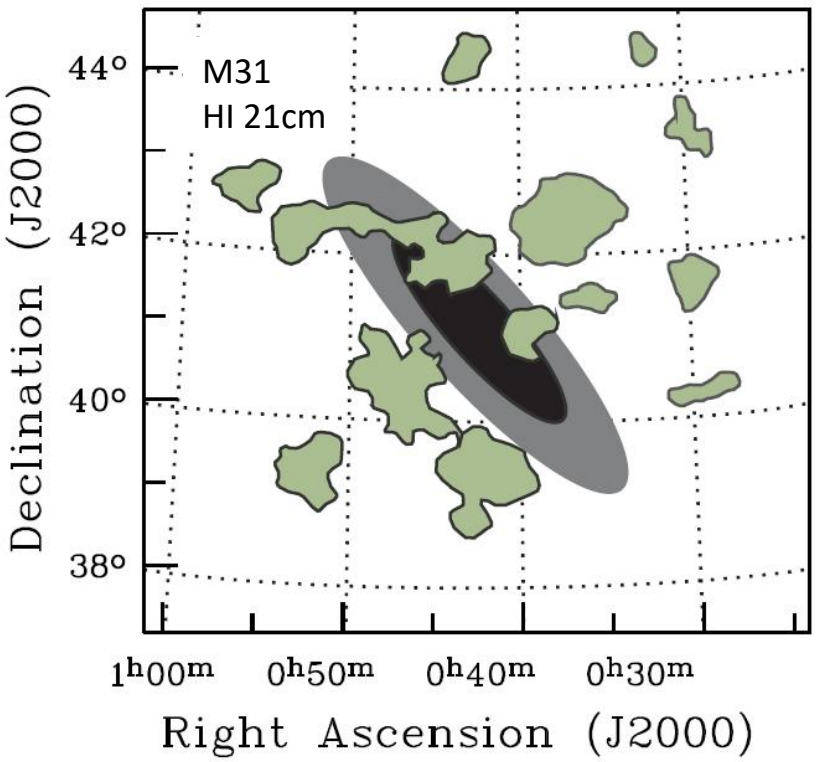
(Winkel+2011)

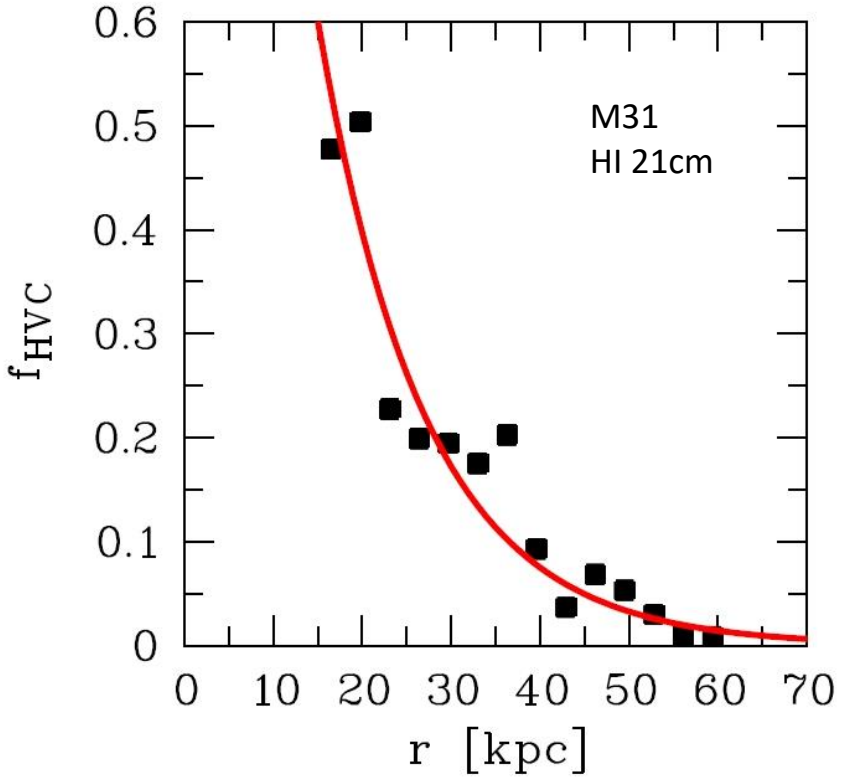
High-resolution simulations of the CGM



(van de Voort+2018; also Sparre+2018; McCourt+2018; Liang+2018 & many others)

The neutral gas halo of M31 seen in 21cm emission



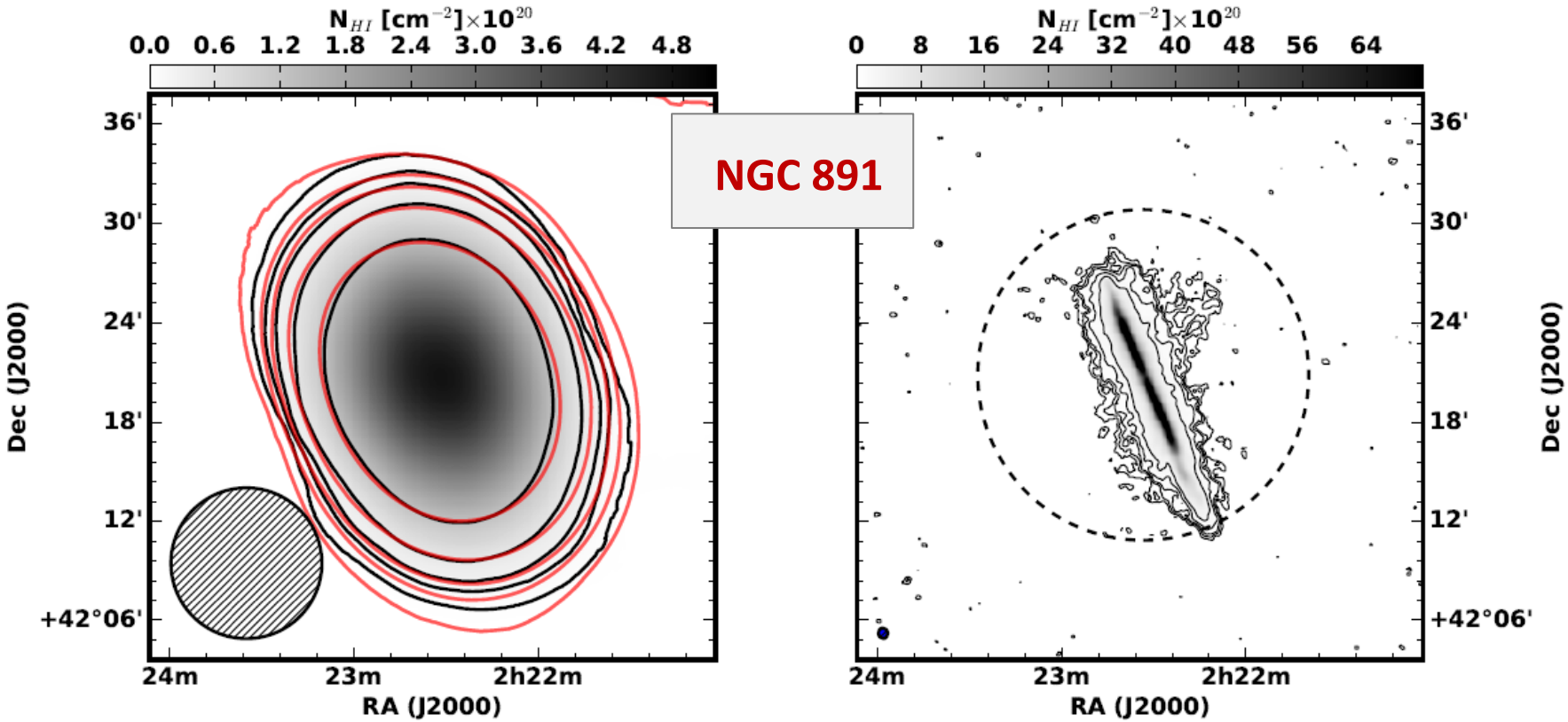


(Thilker+2004; Richter 2012)

Searching for halo HI / cold gas accretion in 21cm emission

GBT low-res

WSRT high-res

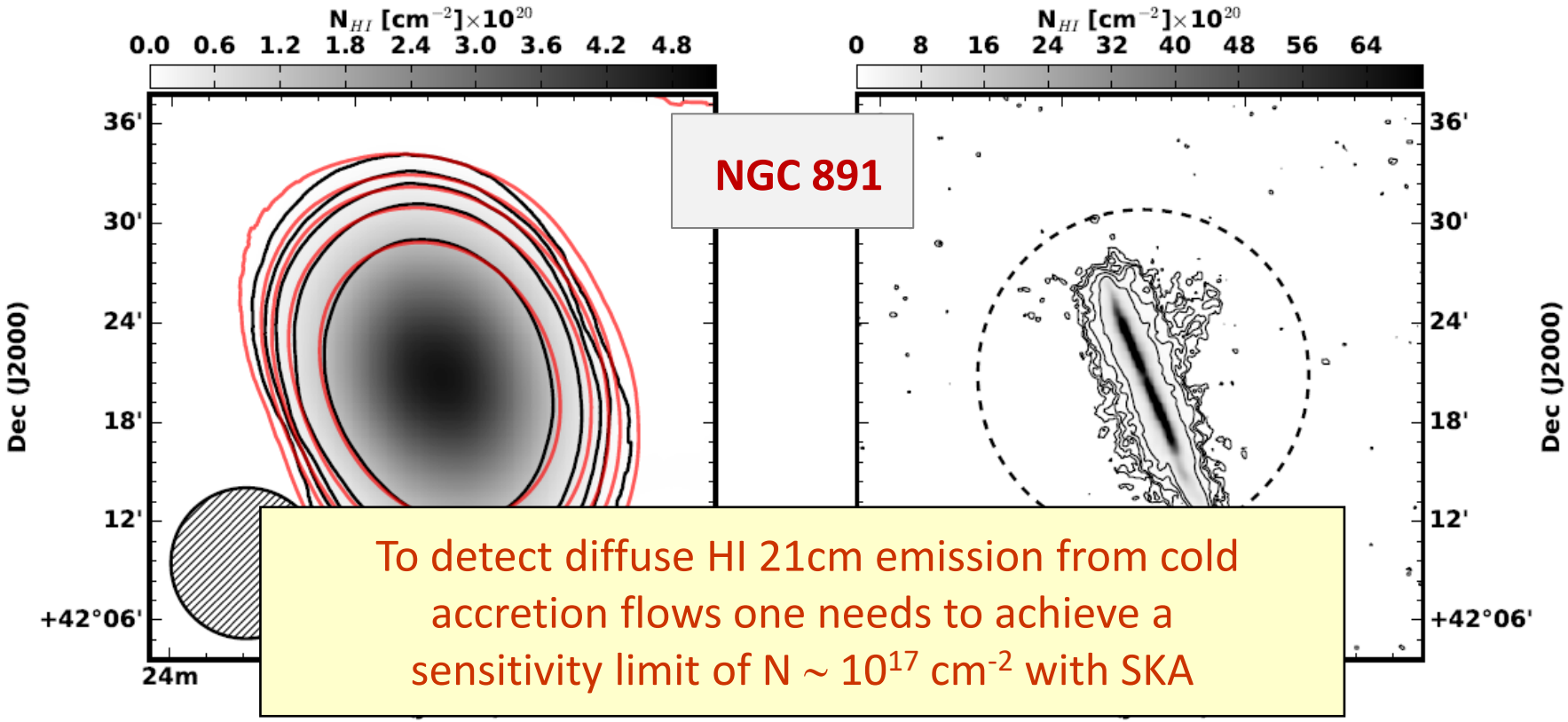


(Pingel+18)

Searching for halo HI / cold gas accretion in 21cm emission

GBT low-res

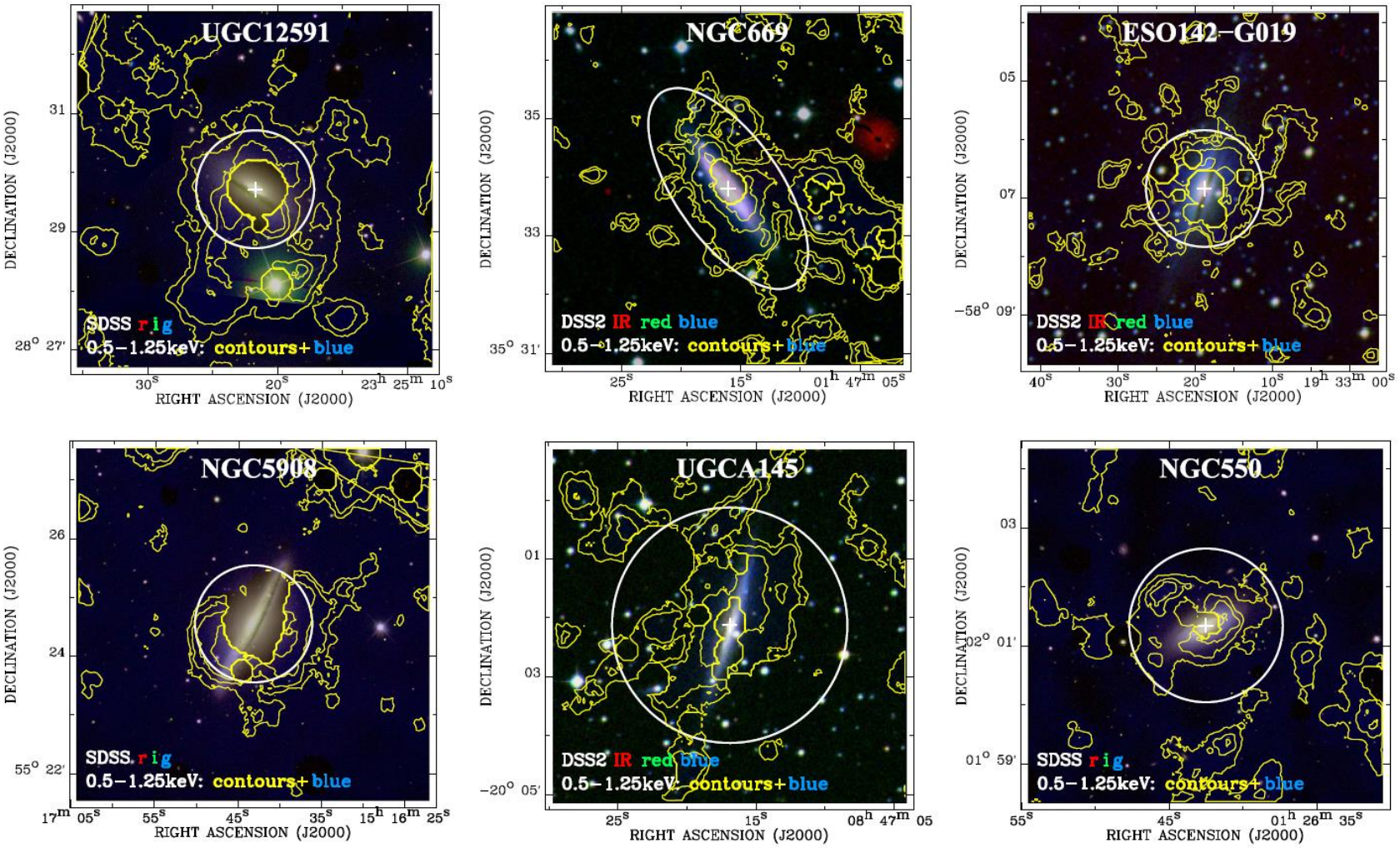
WSRT high-res



To detect diffuse HI 21cm emission from cold accretion flows one needs to achieve a sensitivity limit of N ~ 10^{17} cm^{-2} with SKA

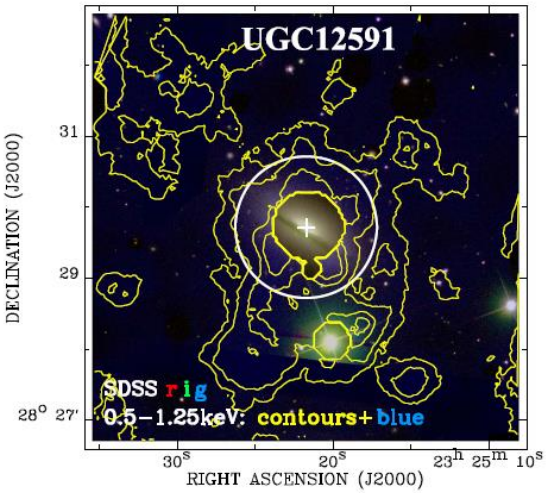
(Pingel+18)

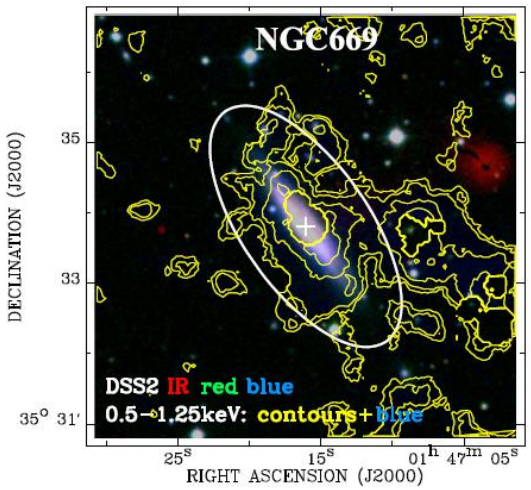
Mapping the hot coronal gas in X-ray emission

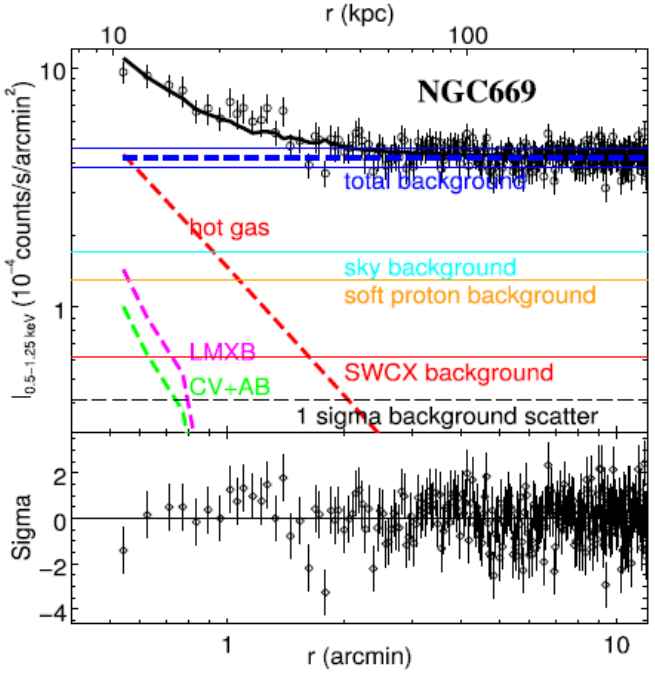


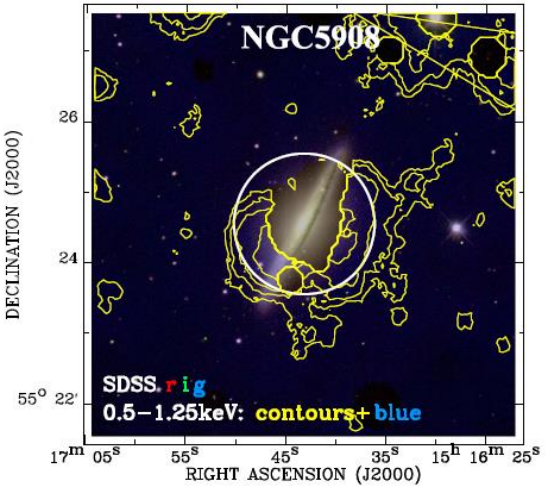
(Li, Bregman+2017)

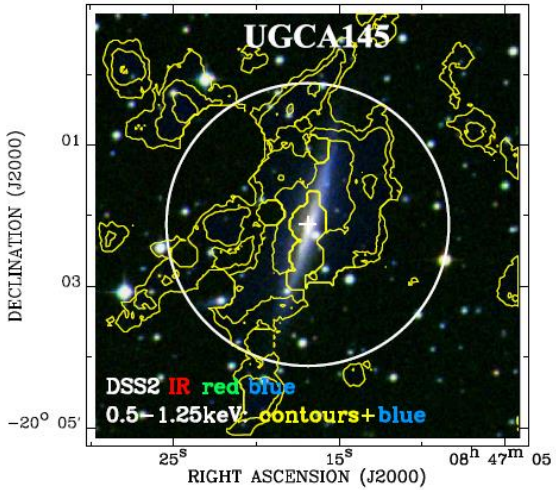
Mapping the hot coronal gas in X-rav emission

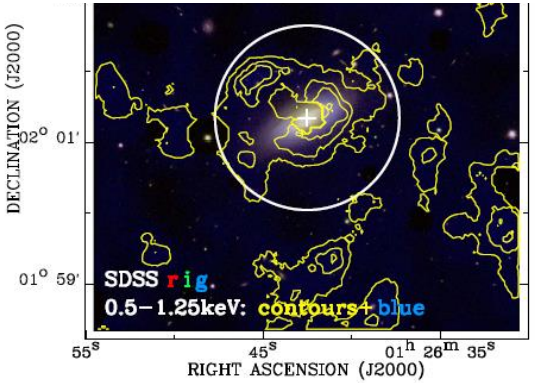






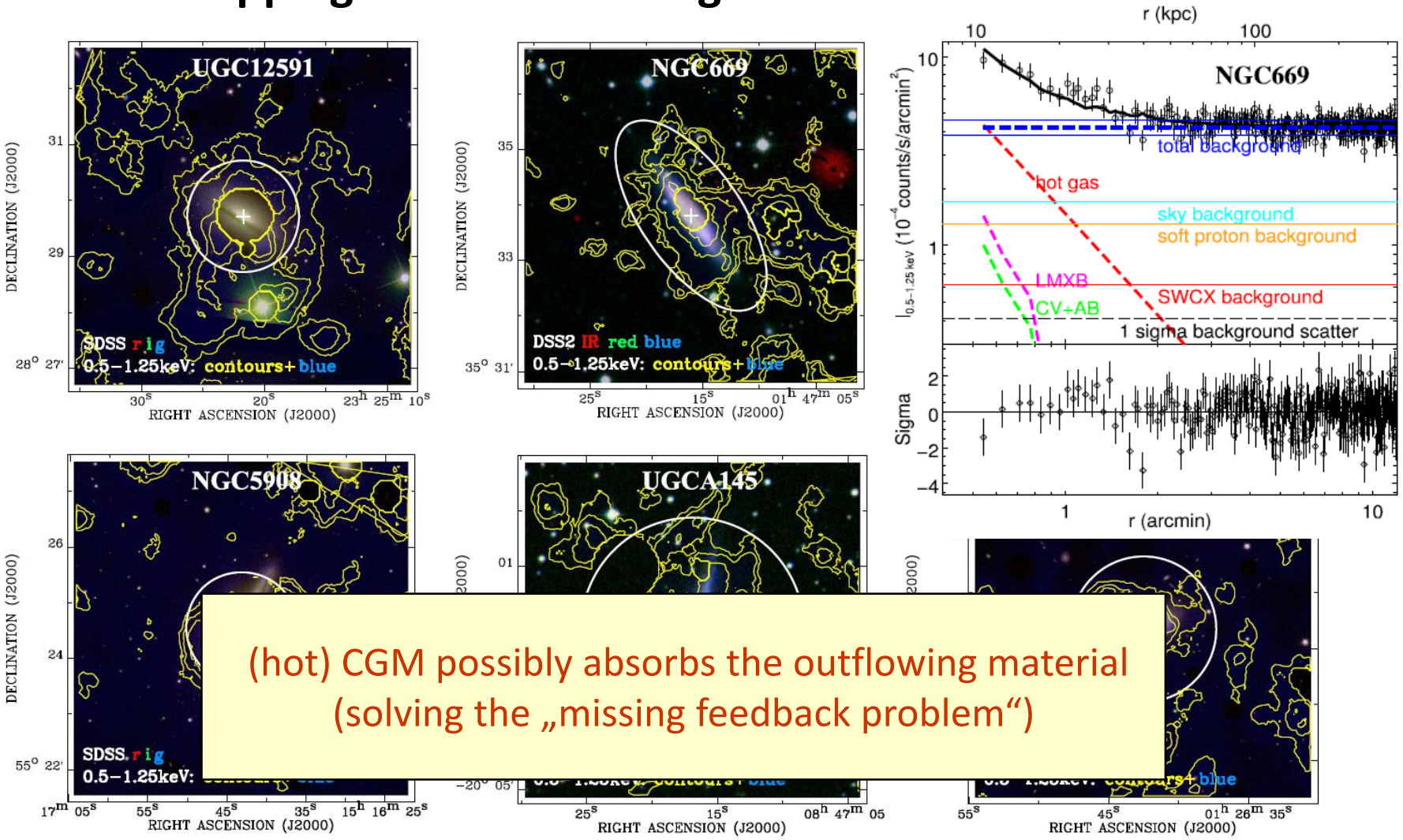






(Li, Bregman+2017)

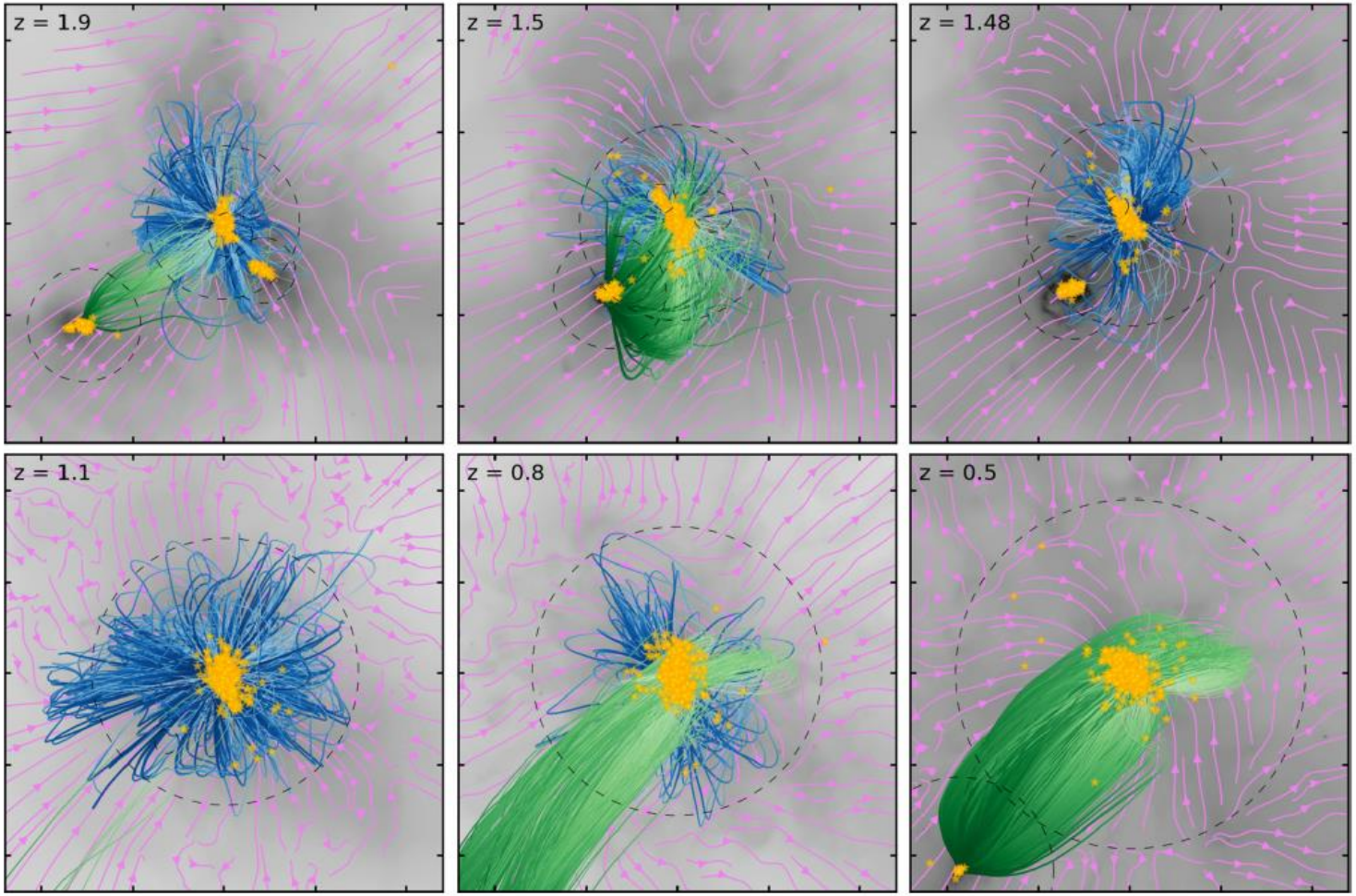
Mapping the hot coronal gas in X-rav emission



(hot) CGM possibly absorbs the outflowing material
(solving the „missing feedback problem“)

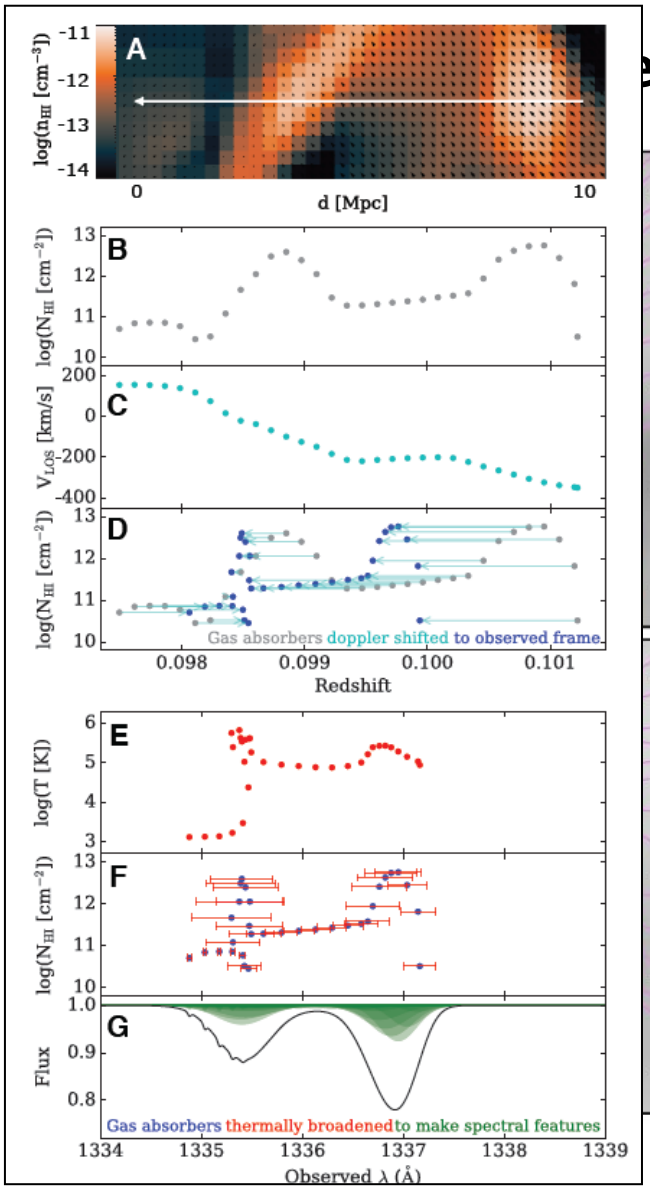
(Li, Bregman+2017)

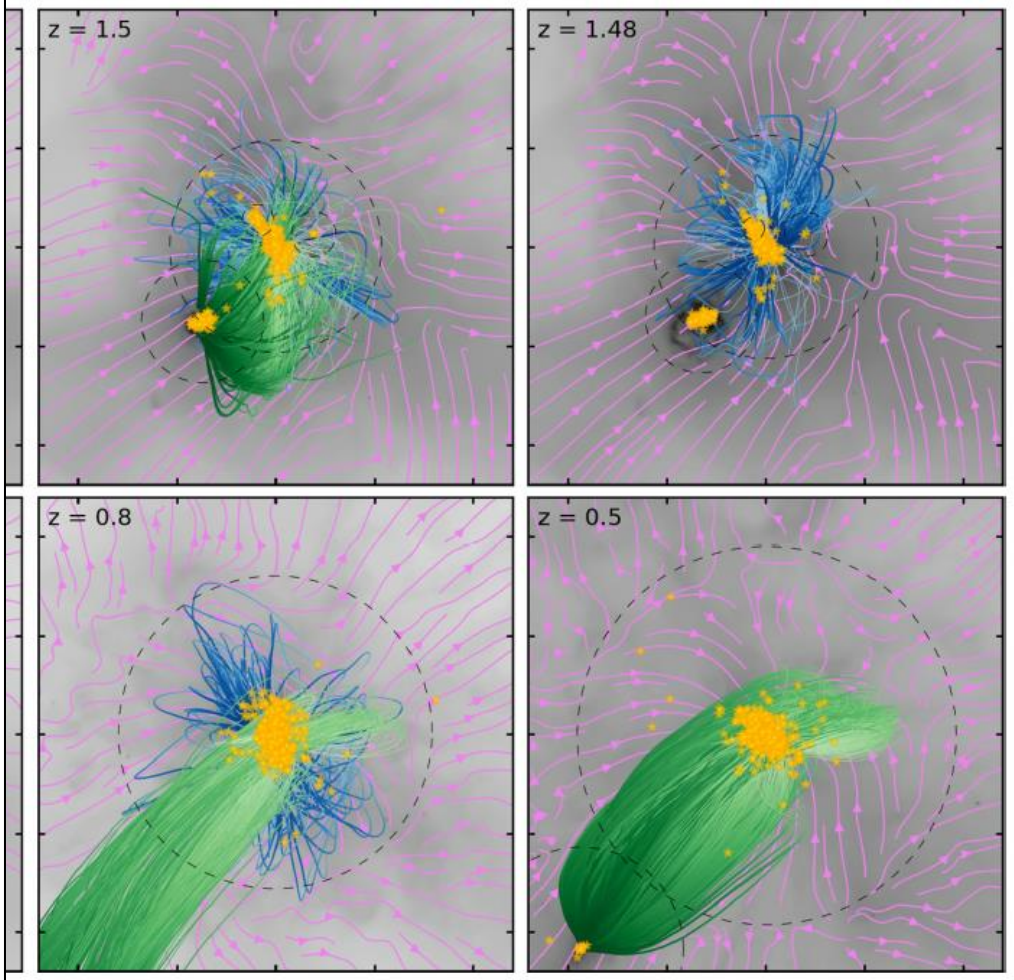
How to connect simulations and observations



(Anglés-Alcázar+2017)

ect simulations and observations





(Hummels+2017 and others)

(Anglés-Alcázar+2017)