



International
Centre for
Radio
Astronomy
Research

Cold Gas Stripping in Galaxy Groups

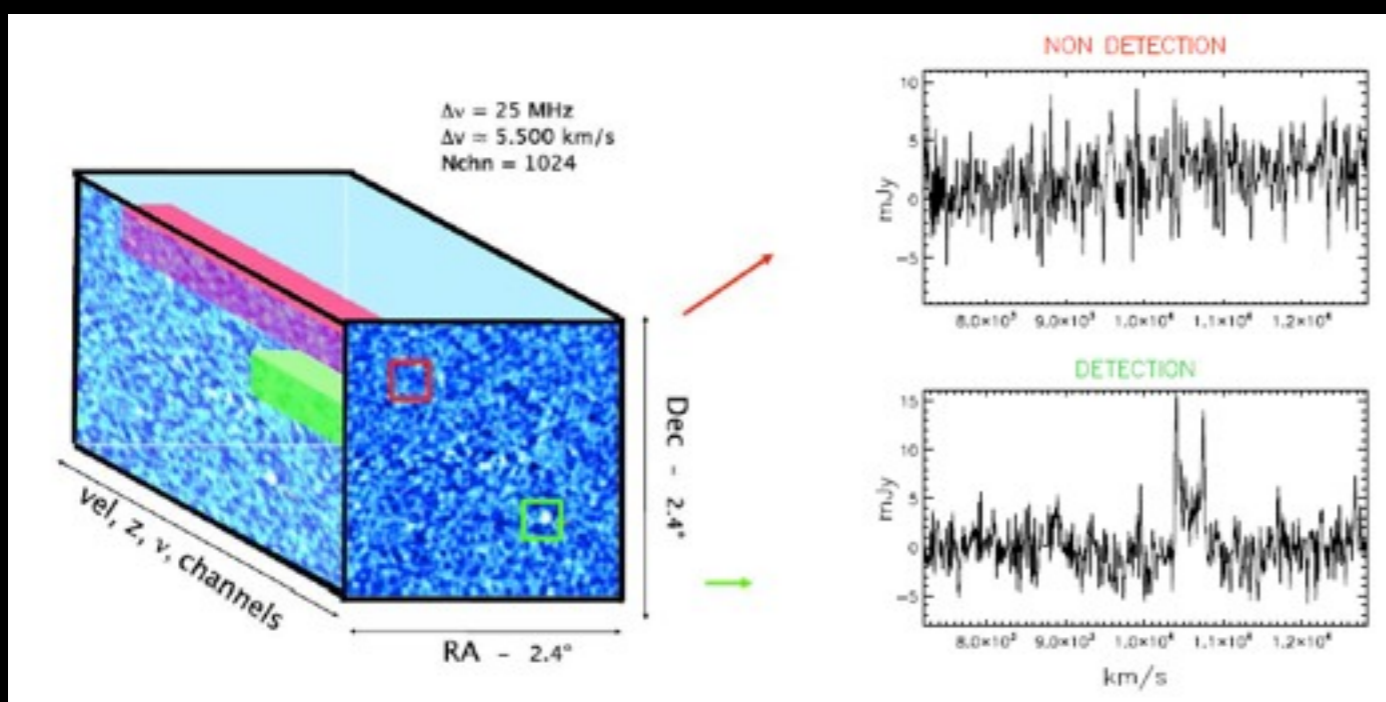
4 “simple” points in 4 minutes

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(based on PhD work by Toby Brown)

HI stacking

HI observations not deep enough to allow statistical analysis of HI properties of groups using only detected galaxies



Fabello+ 2011

- extract HI spectra at known coords, z
- align in velocity, co-add & measure
- Get average HI content of a population

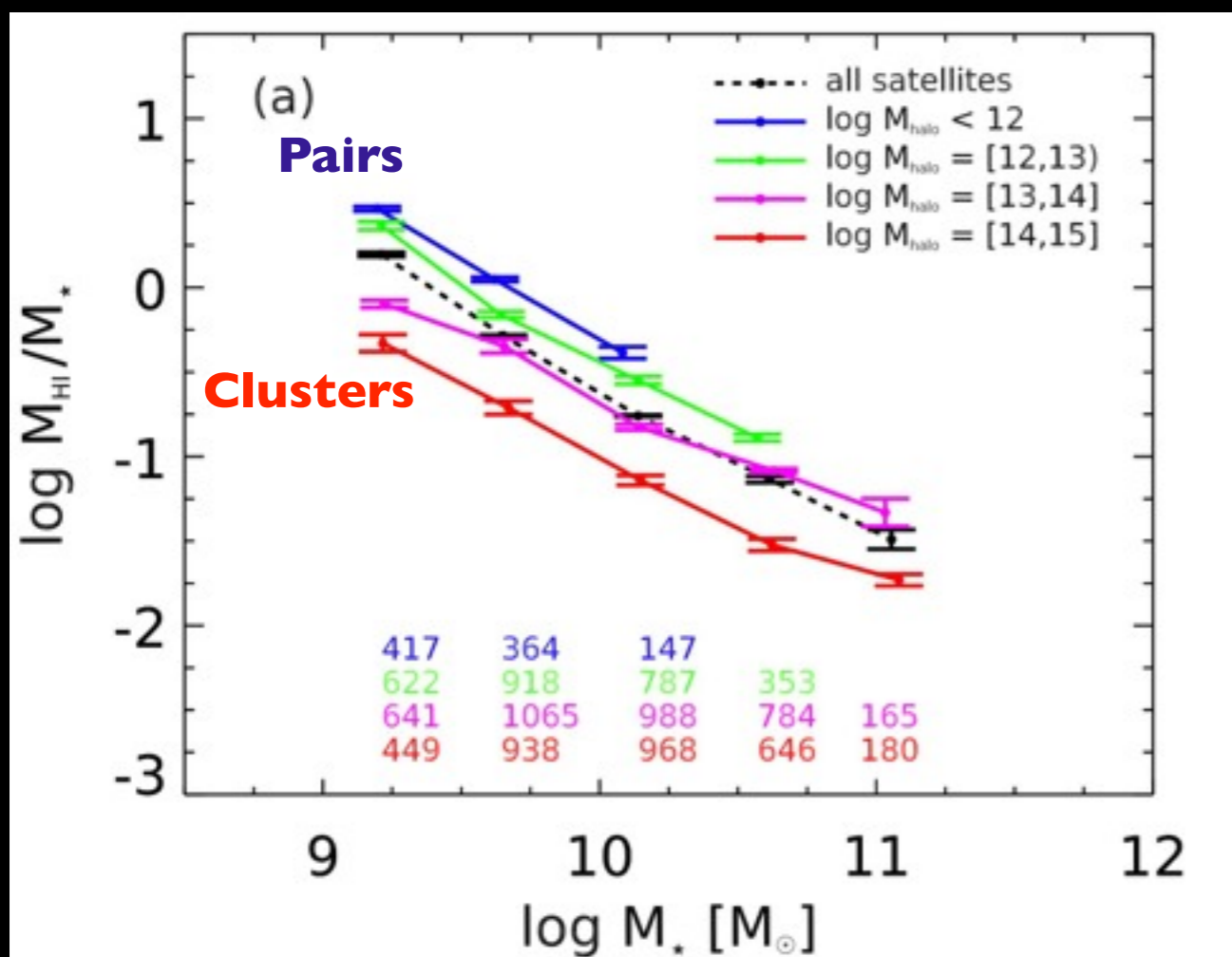
HI stacking (combined with an optical redshift survey) great tool to start digging into the group regime

Our sample

~10,500 satellite galaxies
ALFALFA footprint
 $0.02 < z < 0.05$ - Stellar mass $> 10^9 M_{\text{sun}}$

Point 1: Satellites become gas poorer in bigger groups

Satellite galaxies binned by halo mass



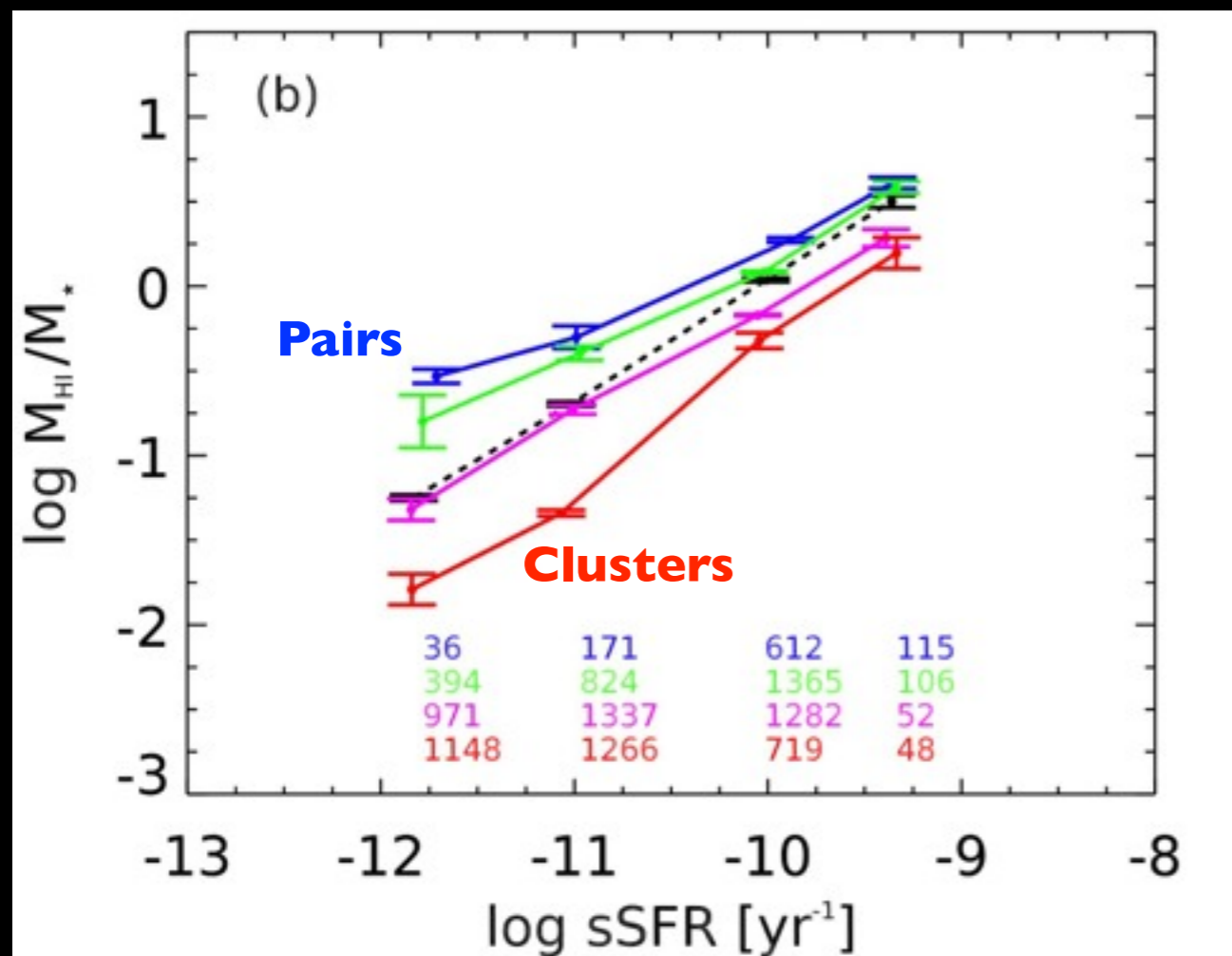
Brown, Catinella, LC+ 2017

Decrease of HI content significant also outside clusters!

Monotonic decrease of HI content as function of halo mass

Point 2: HI depletion in groups even at fixed SSFR

Satellite galaxies binned by halo mass (10,000 galaxies)



Brown, Catinella, LC+ 2017

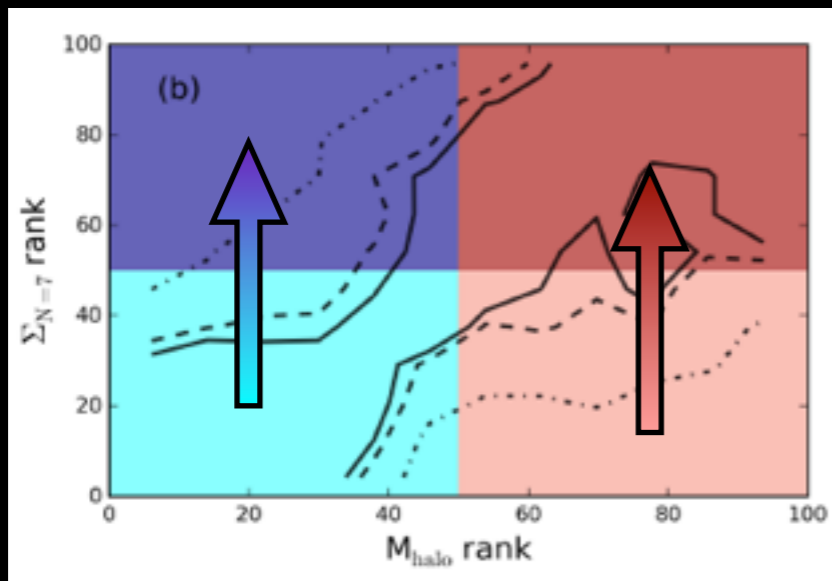
Decrease of HI content also at fixed SSFR
HI evolution detached from SF!

Stripping is faster than quenching

Star-forming galaxies become gas-poor while still forming stars.

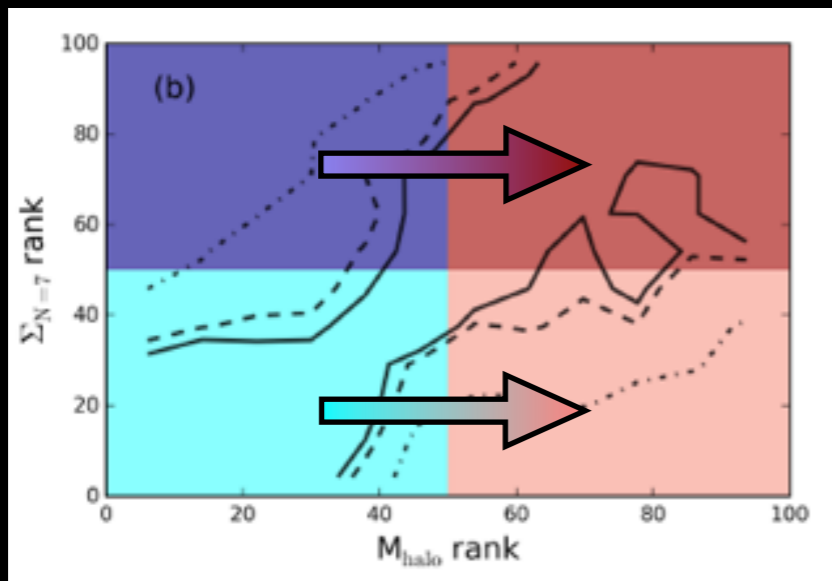
Point 3: Halo mass matters more than local density

local density \rightarrow

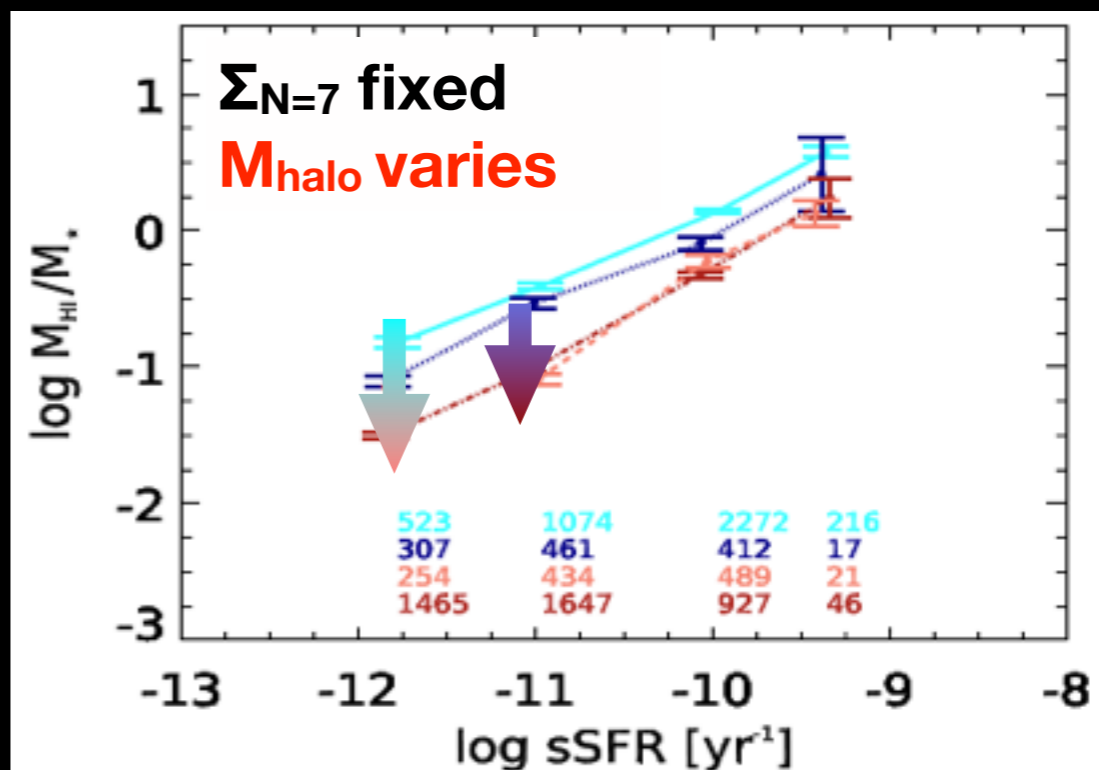
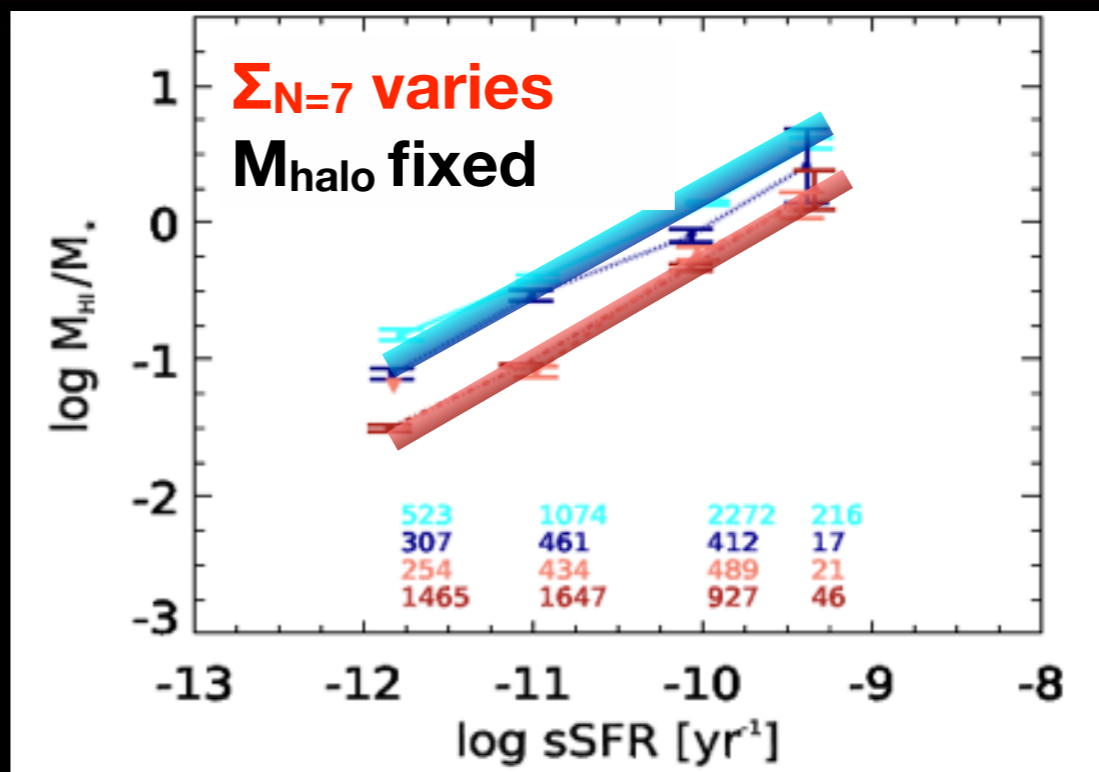


halo mass \rightarrow

local density \rightarrow



halo mass \rightarrow



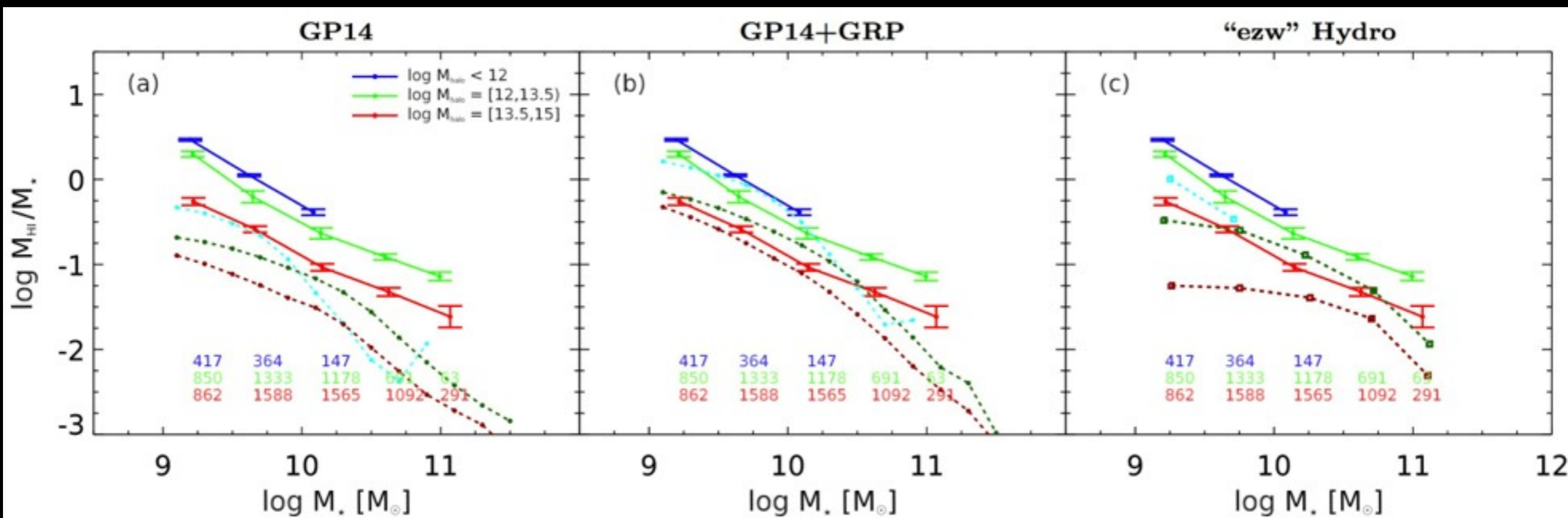
Global environment (halo mass) is more important than local one for gas stripping

Point 4: Satellite in current models are too gas-poor

Instantaneous stripping
warm gas only

Gradual stripping
warm gas only

Gradual stripping
warm+cold gas only



Any stripping currently implemented in cosmological models does not completely reproduce data

Simulated galaxies too gas poor... even when cold gas is not directly affected!

Summary

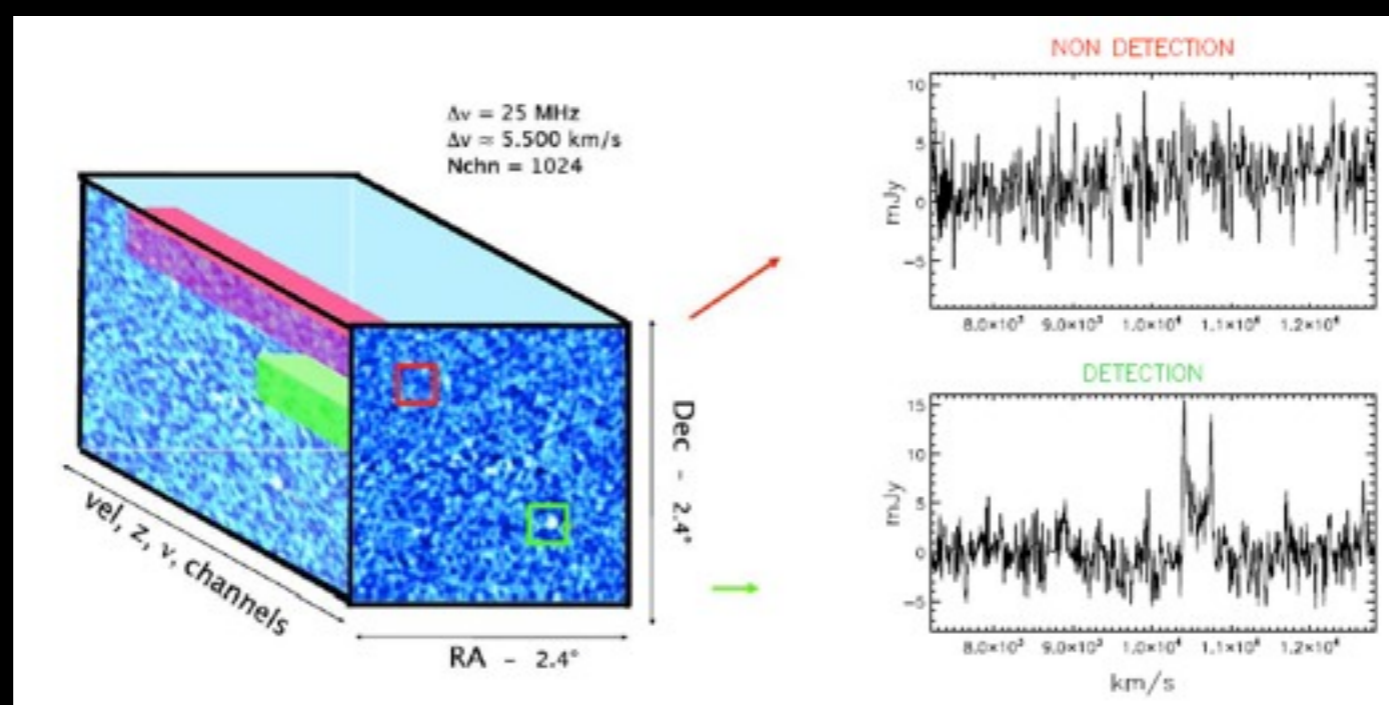
HI stacking allows us to quantify stripping as a function of group properties

Satellites gradually lose gas in bigger groups at fixed mass and SFR

Gas depletion faster than star formation quenching

Stripping associated more to group halo mass than local density

Cosmological models have too many gas-poor satellites





HI stripping in groups

