Molecular Gas Content and Star-Formation In LSBGs

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Outline:

- ***Background***
- ***Sample selection and observation***
- ***Analysis & Discussion***

Background

- Low Surface Brightness galaxies(LSBGs):

Surface Brightness is at least one magnitude lower than the ambient night sky.

[$\mu_0(B)$ > 22.0~23.0 $mag\ arcsec^{-2}$]

- Features:

Optical dim ,

diffusion Stellar disk,

gas rich(HI) ,

low metallicity ,

low SFR…...

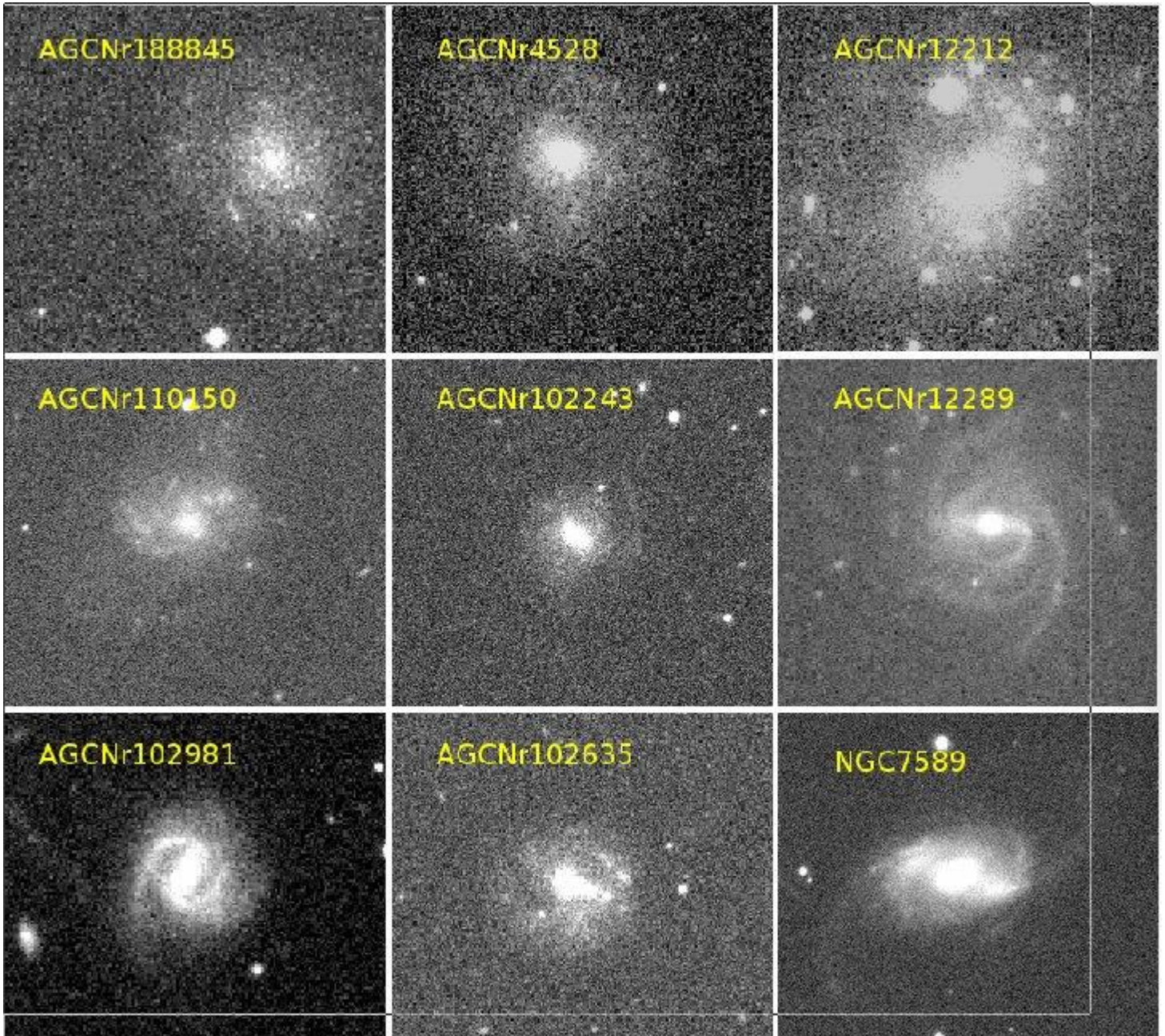
Puzzle:

- Gas-rich(HI) but low-SFR
- The star formation is directly related with molecular gas

Low SFR: SFR/M_{H_2} or M_{H_2}/M_{HI} ?

So it is necessary to observe the molecular gas content in LSBGs

Sample selection and observation

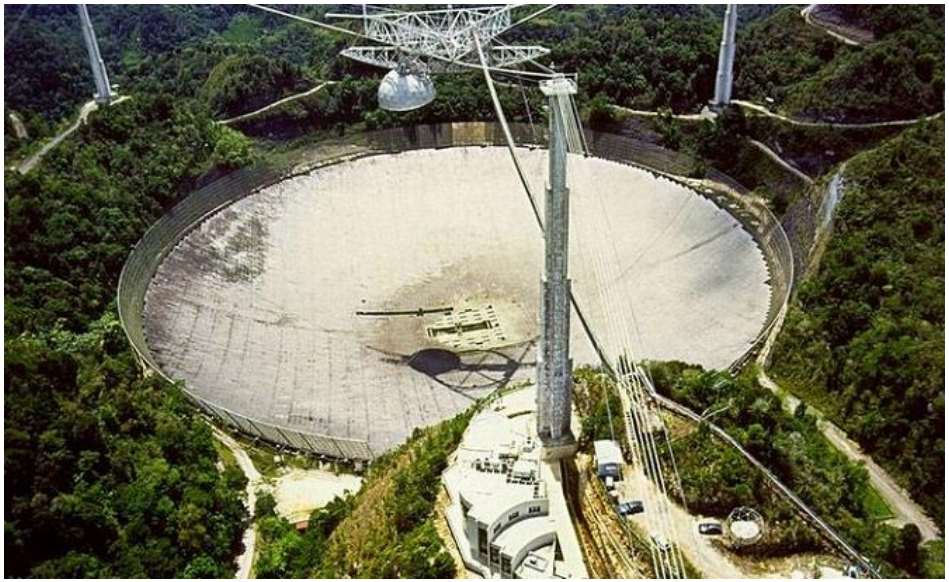


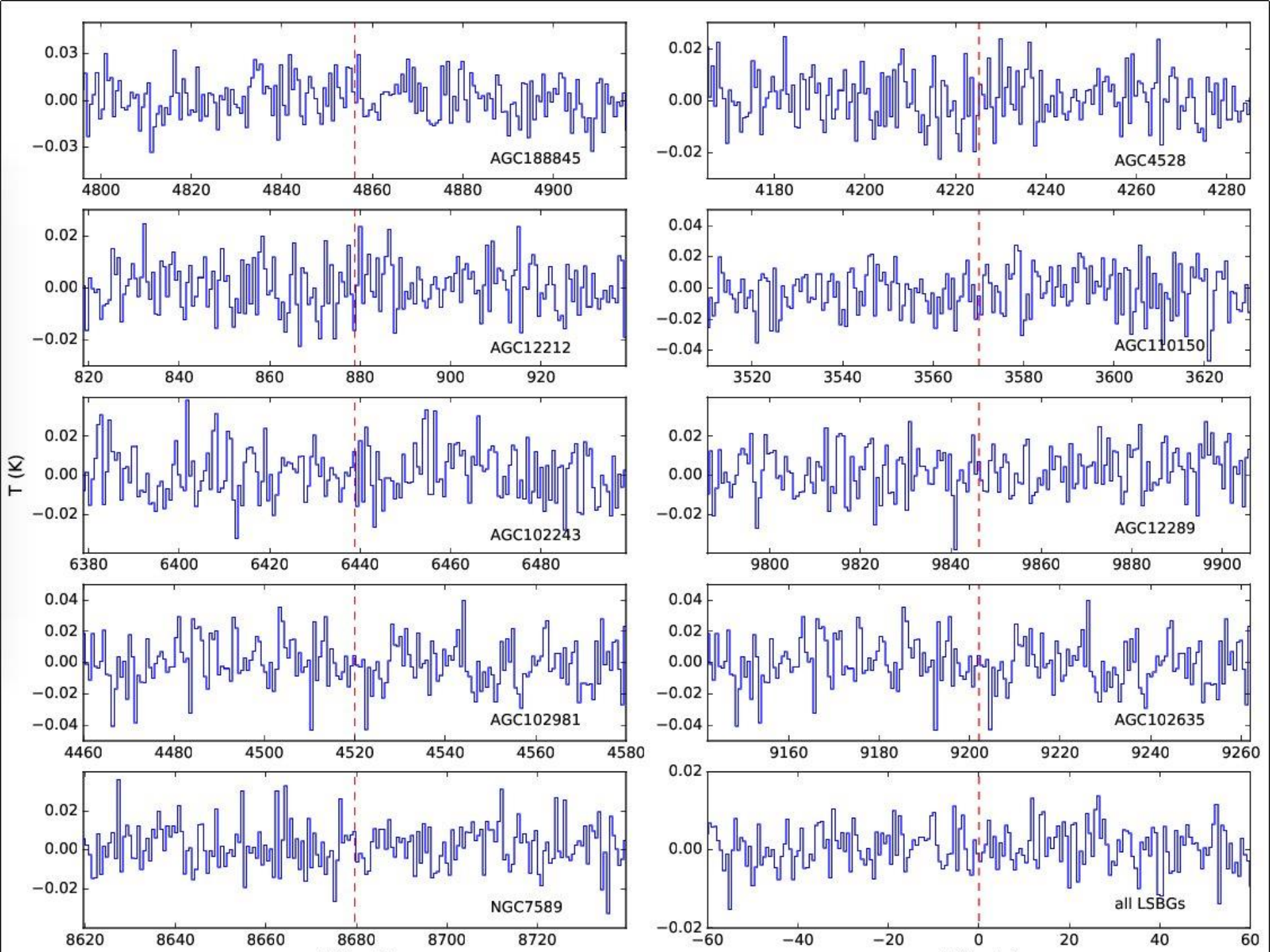
Nine face-on LSBGs(α 40)

HI (Arecibo)

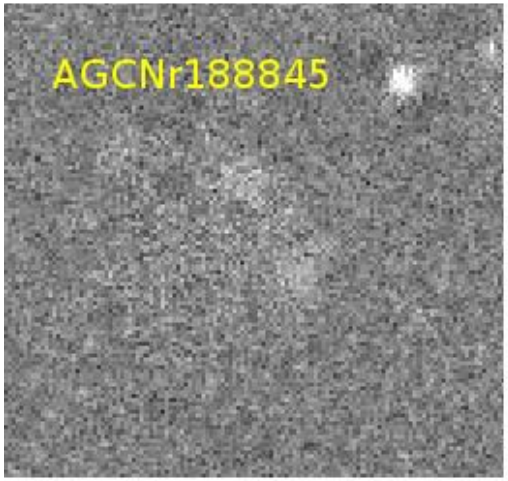
H_α (2.16meter)

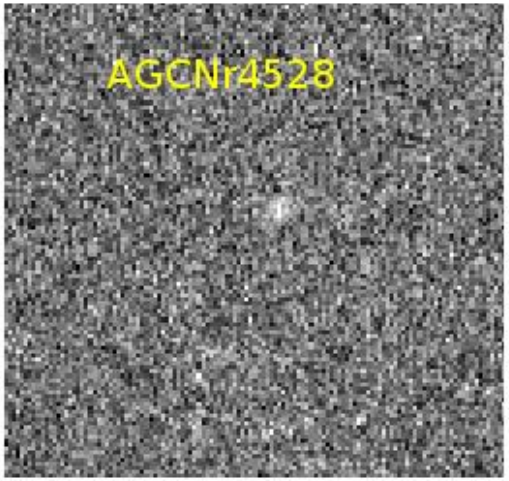
CO(2-1) (JCMT)




T (K)
AGC188845
AGC4528
AGC12212
AGC110150
AGC102243
AGC12289
AGC102981
AGC102635
NGC7589
all LSBGs

Ha:


AGCNr188845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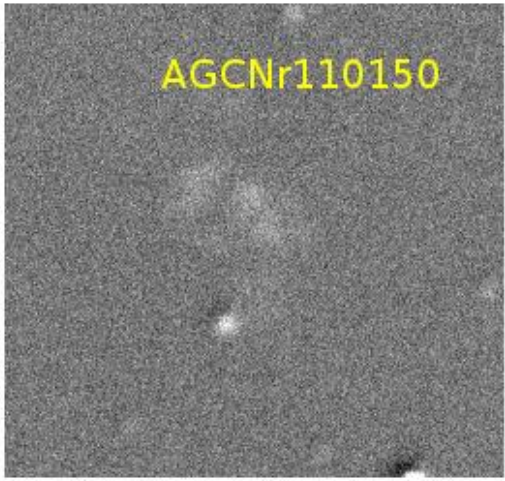
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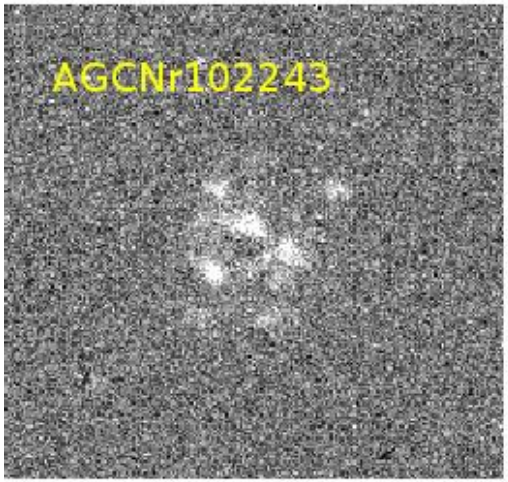
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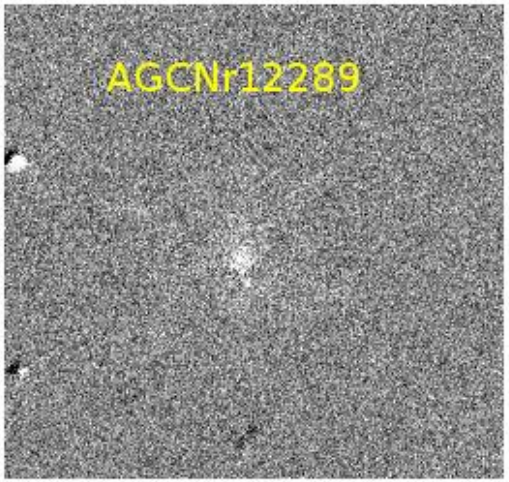
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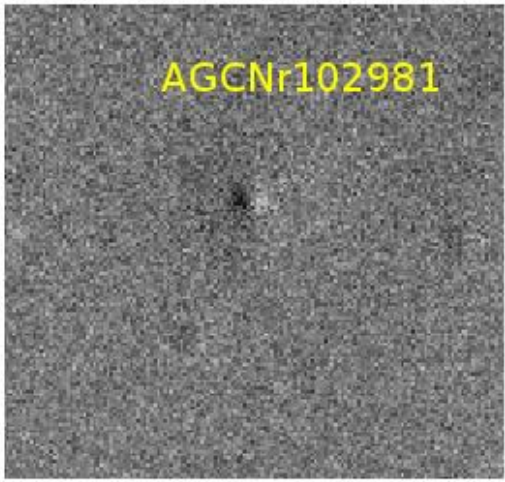
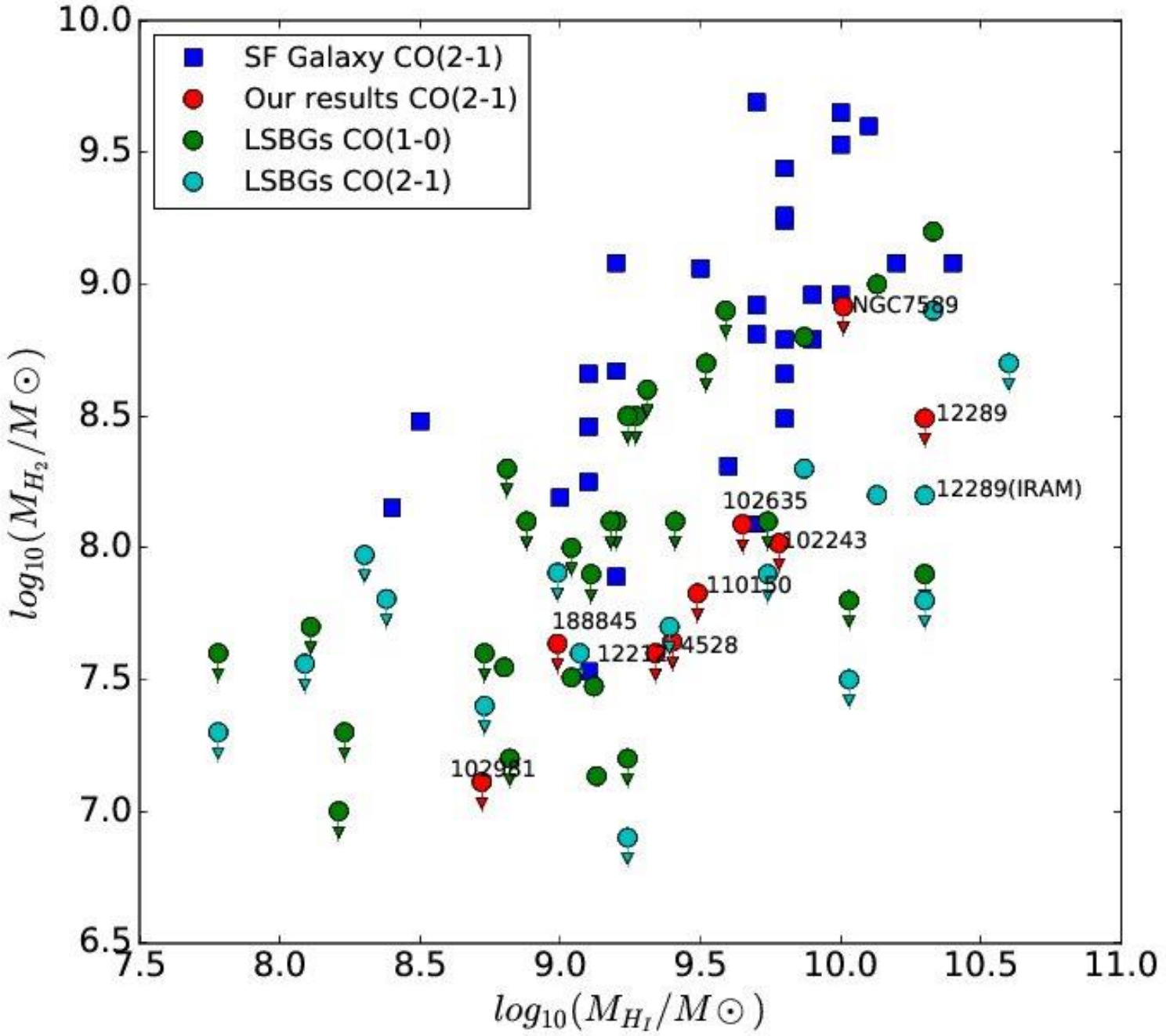

AGCNr102981

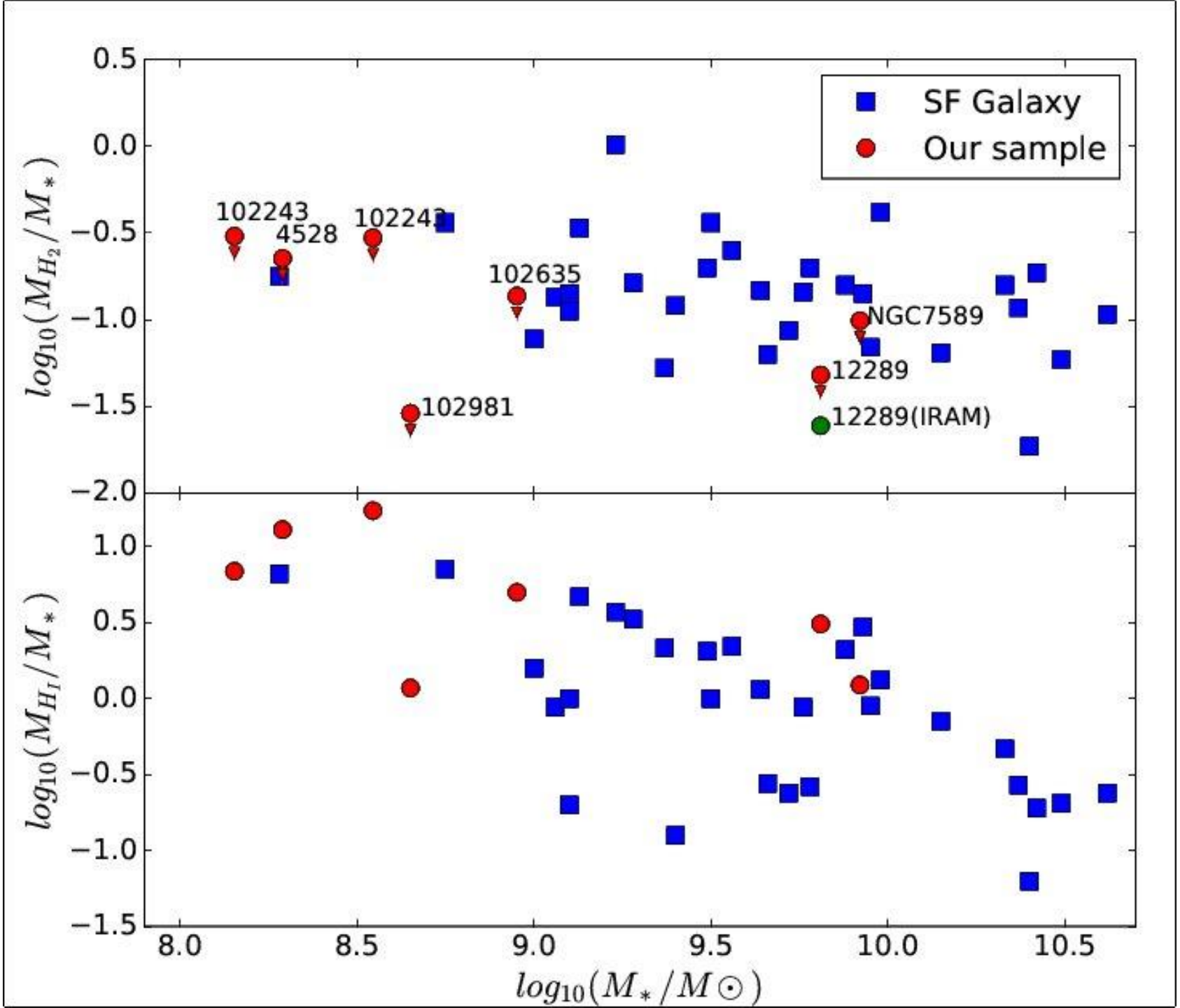
AGCNr102635

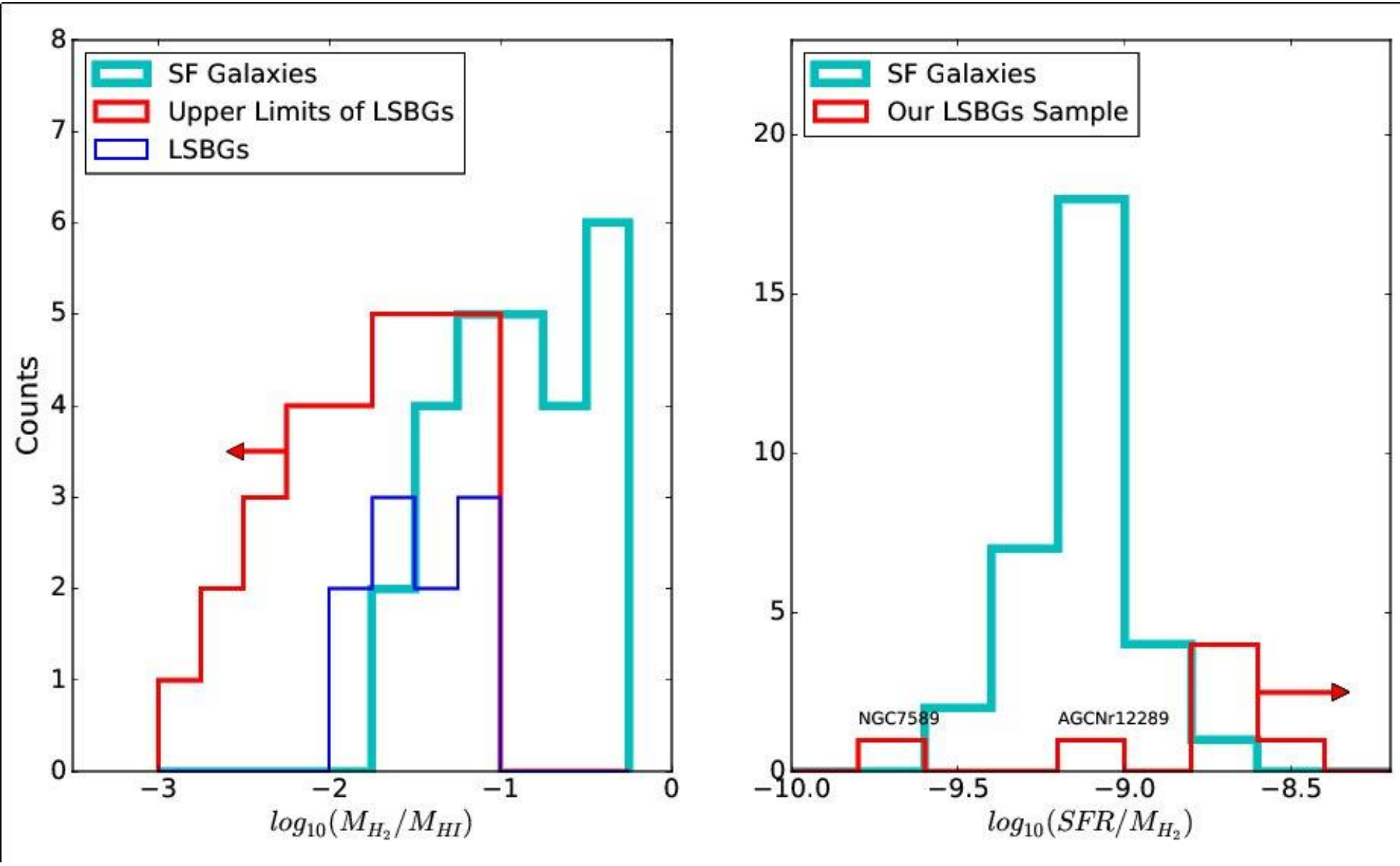
Analysis & Discussion

- 3σ Upper limits of the H_2 masses
- Ha Luminosity calculate SFR

The Star-Forming galaxies are from SMT sample (Jiang at el.2015)




SF Galaxy
Our sample
102243
4528
102635
NGC7589
12289
102981
12289(IRAM)
$log_{10}(M_{H_2}/M_*)$
$log_{10}(M_{H_I}/M_*)$
$log_{10}(M_*/M\odot)$
0.5
0.0
−0.5
−1.0
−1.5
−2.0
1.0
0.5
0.0
−0.5
−1.0
−1.5
8.0
8.5
9.0
9.5
10.0
10.5


SF Galaxies
Upper Limits of LSBGs
LSBGs
Counts
$log_{10}(M_{H_2}/M_{HI})$
SF Galaxies
Our LSBGs Sample
NGC7589
AGCNr12289
$log_{10}(SFR/M_{H_2})$

Conclusion:

There may be a short of molecular gas content in LSBGs;

The low SFR in LSBGs may relate with the low efficient of atom forming molecular (M_{H_2}/M_{HI}).

Thanks