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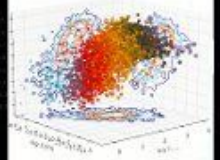
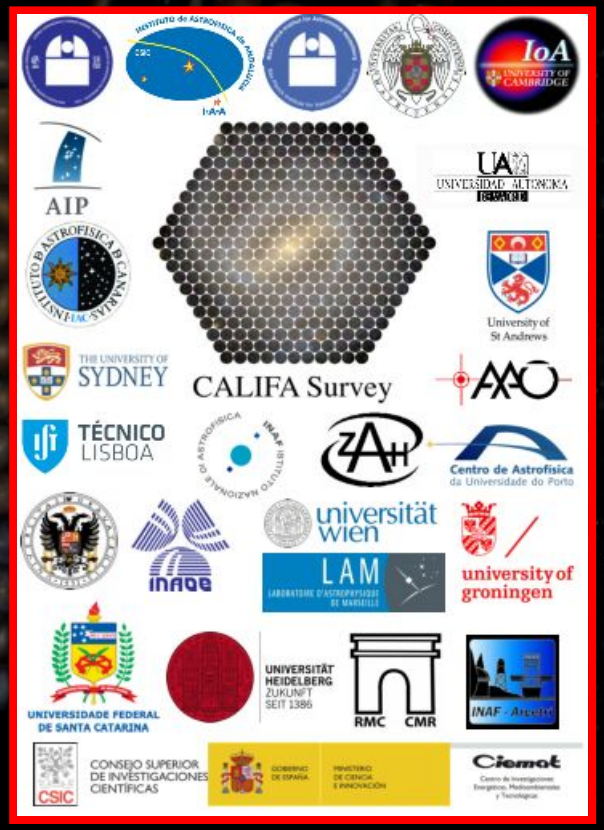


The CALIFA Survey:
Spatial resolved ionized gas

Sebastián F. Sánchez –IA/UNAM



- The interplay between local and global processes in galaxies -
Cozumel, April, 2016

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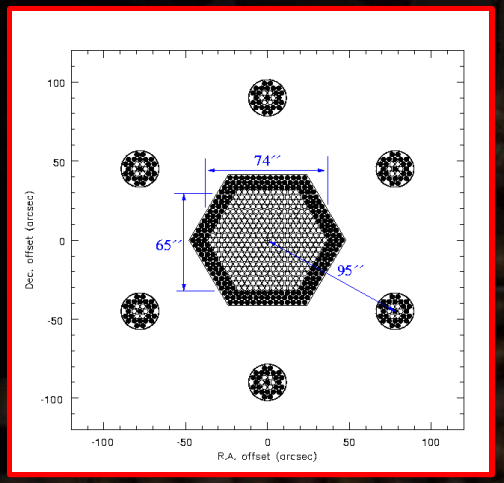
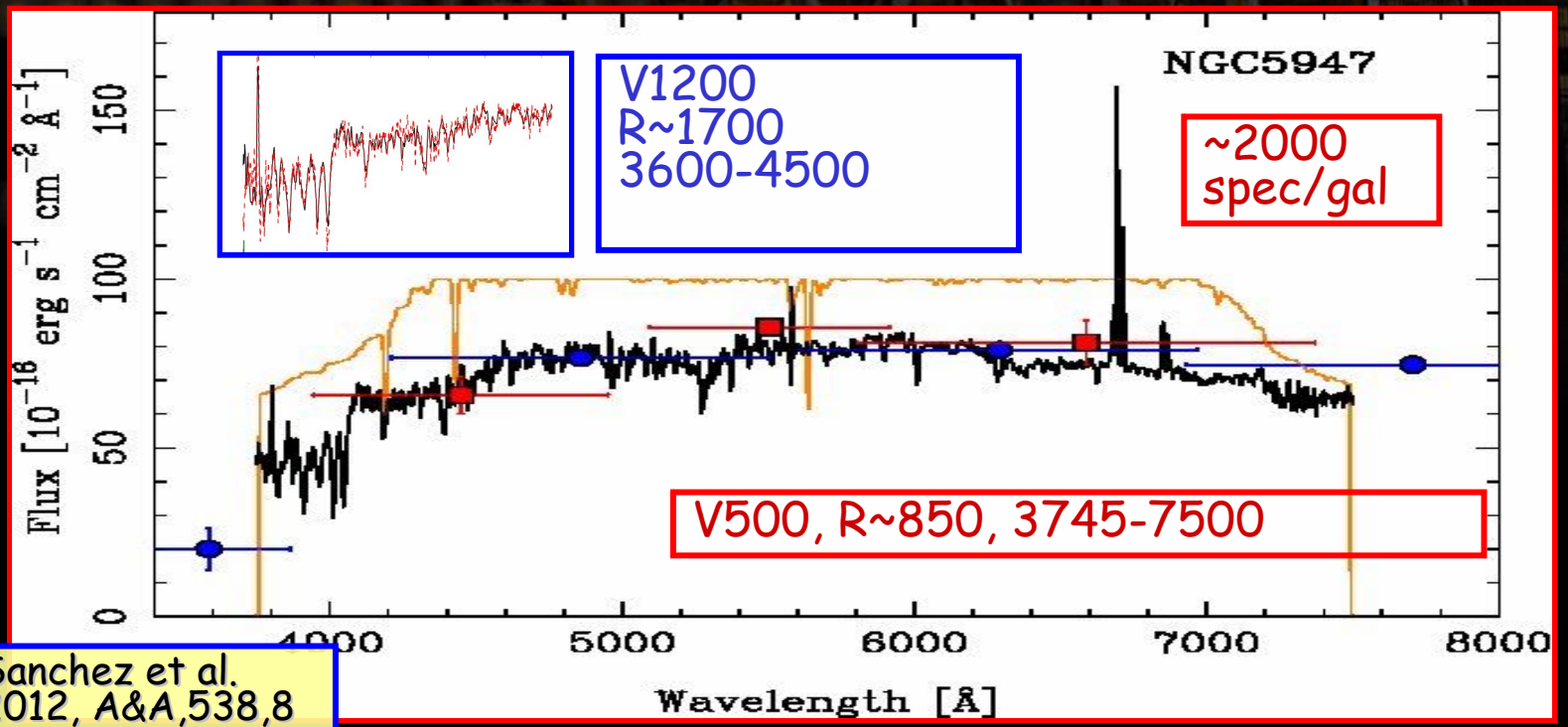
CALIFA: Brief Summary





Sanchez et al.
2012, A&A,538,8

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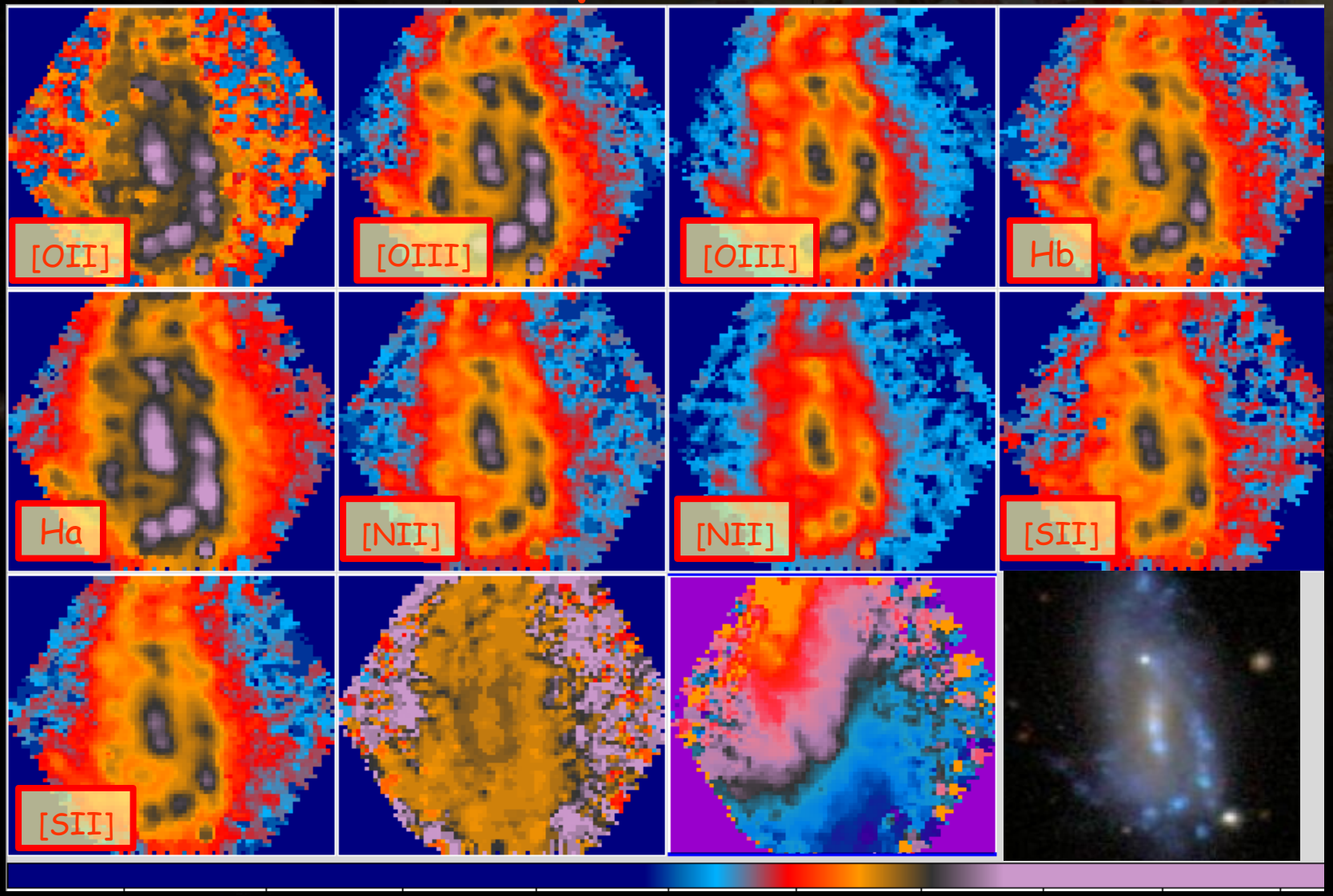
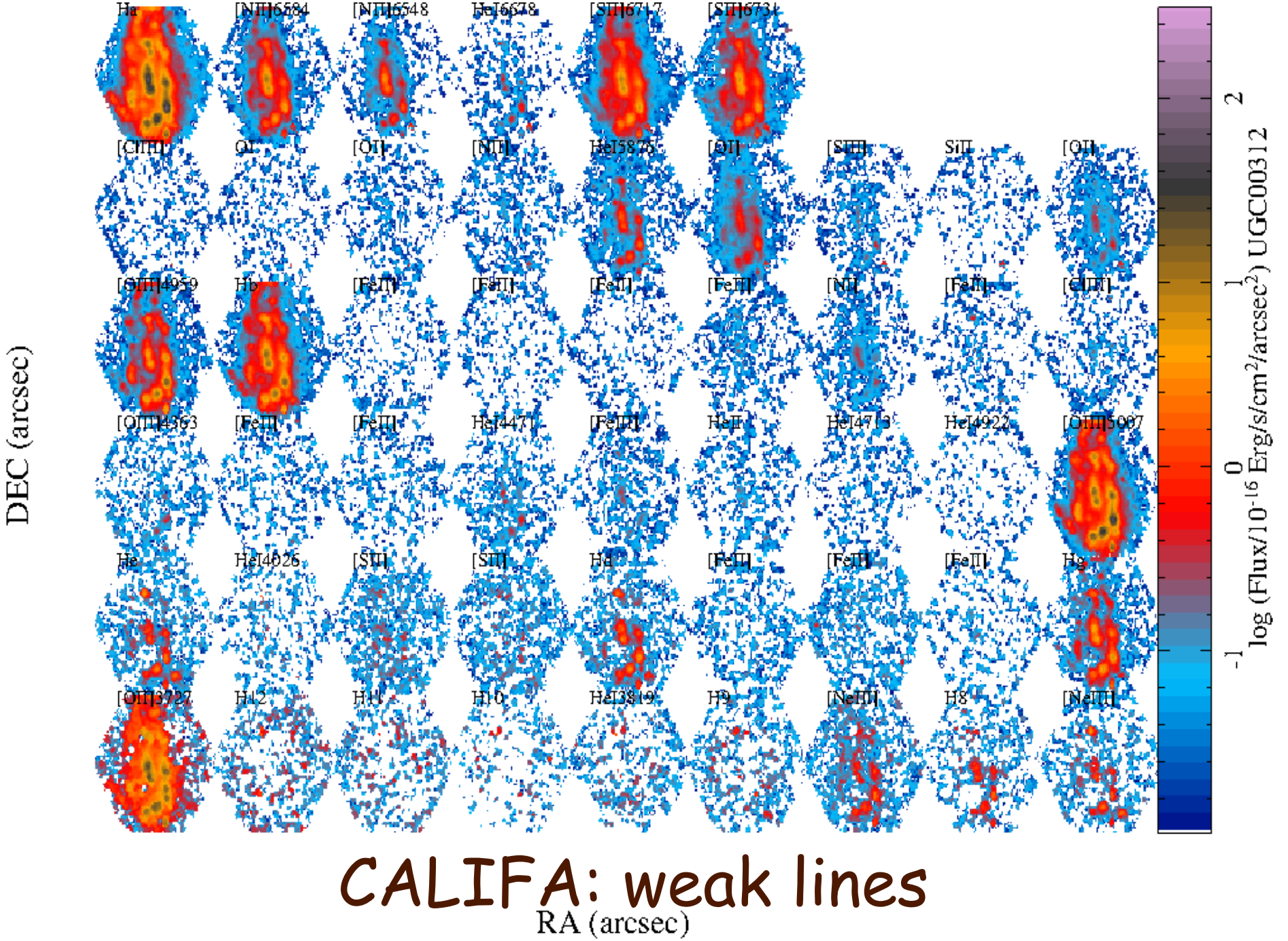
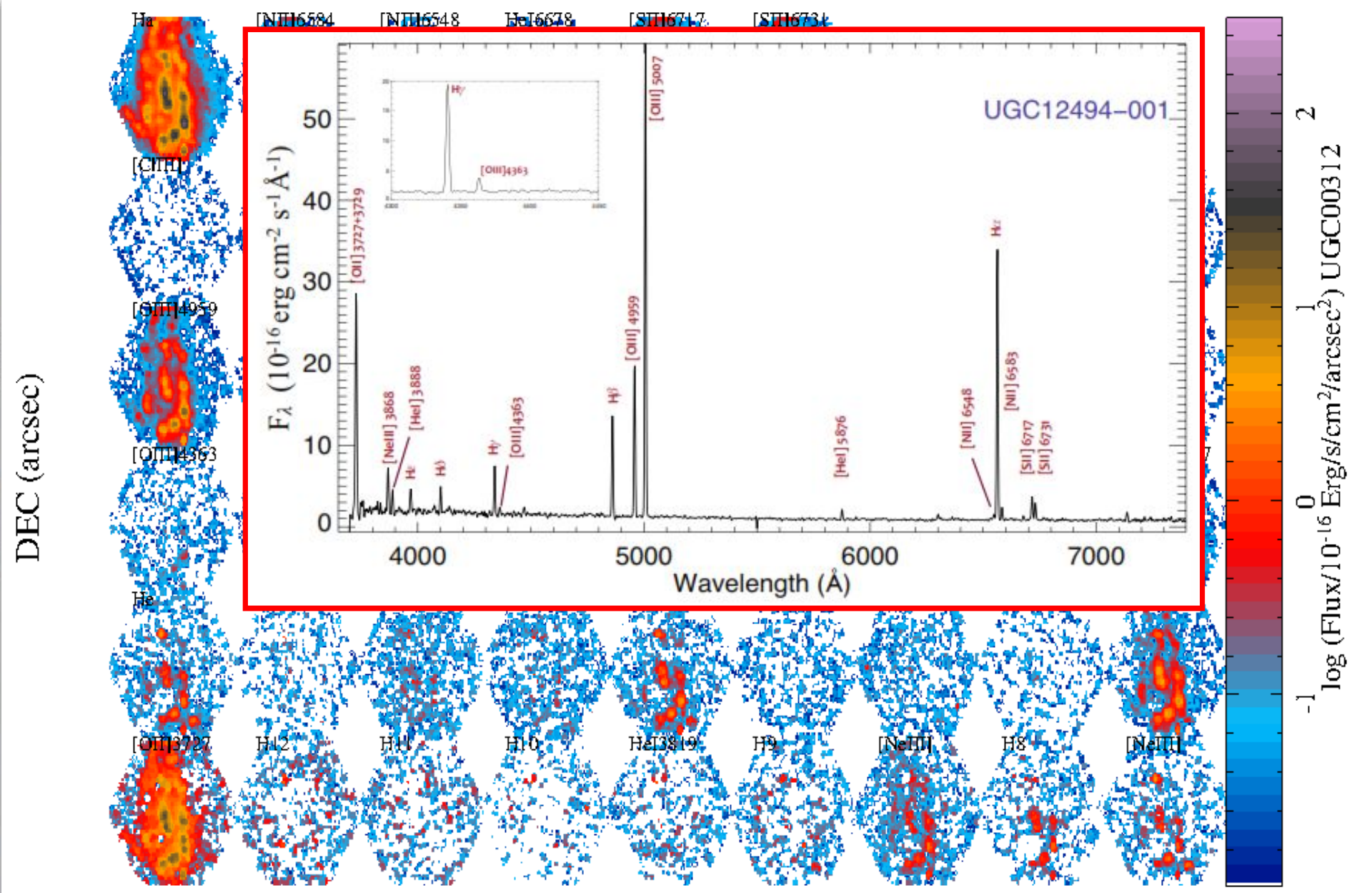
CALIFA: A panoramic view



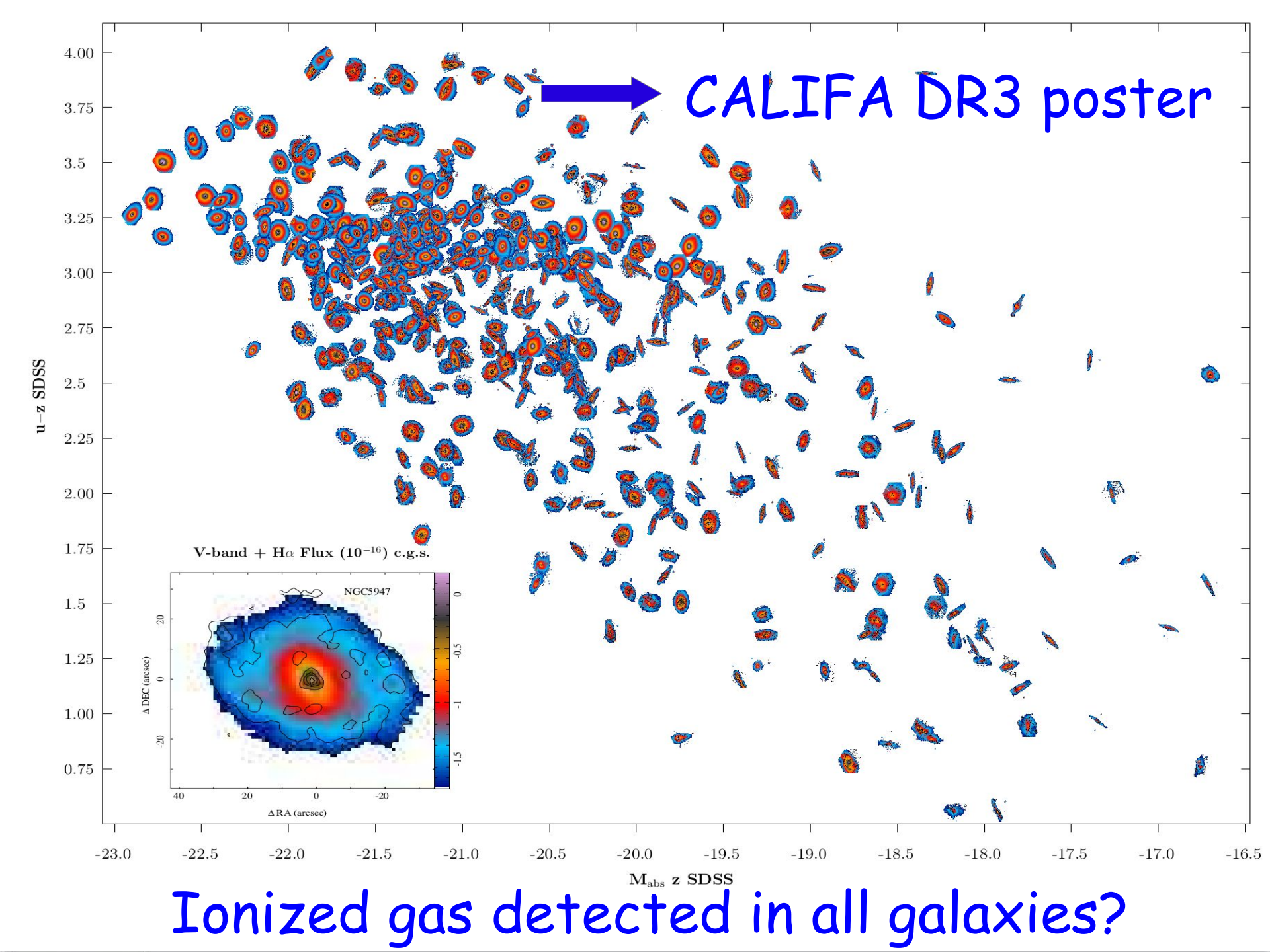
Ionized Gas: Multiple emission lines intensity maps, velocity and velocity dispersion.

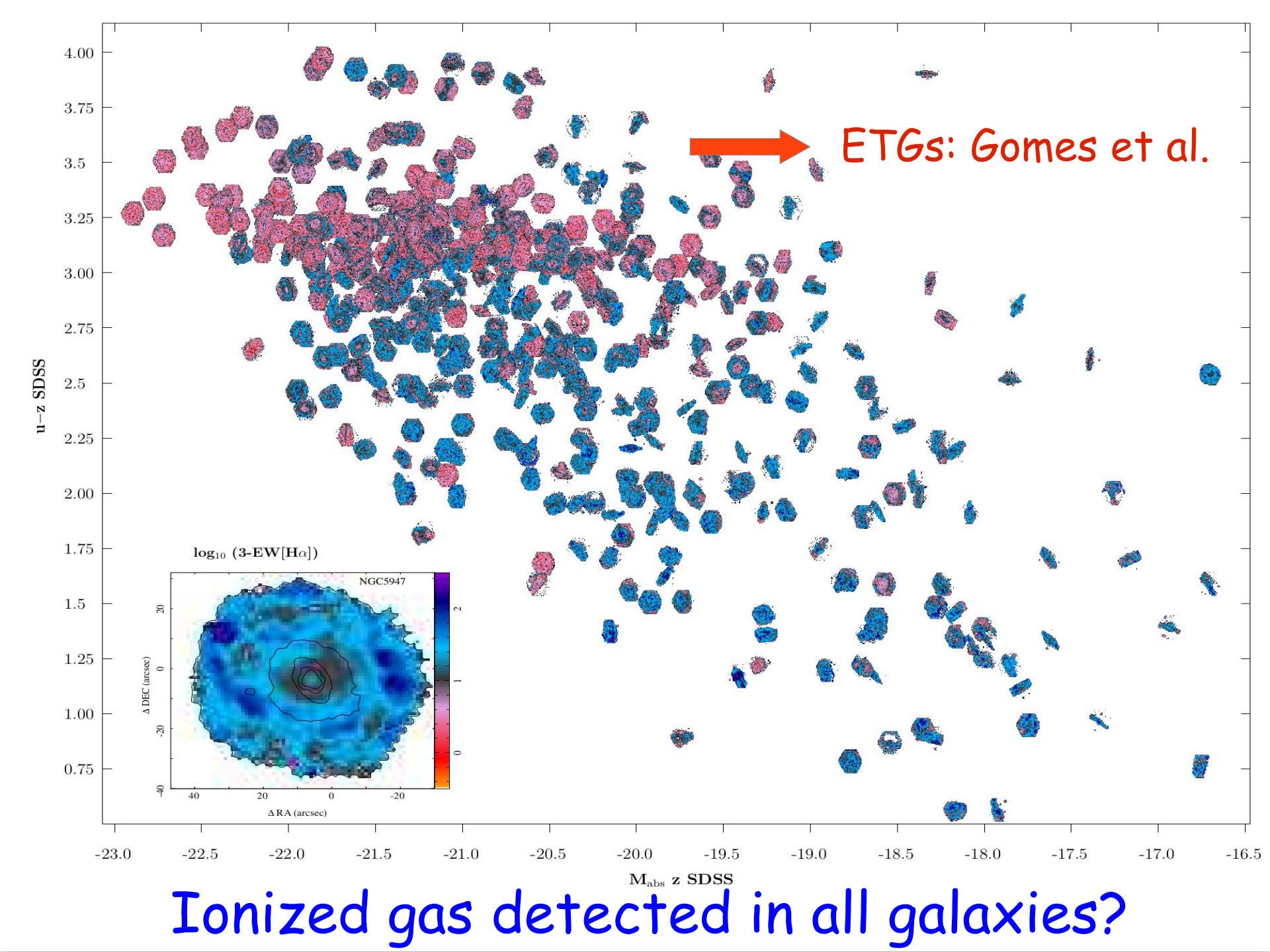


CALIFA: weak lines



CALIFA: weak lines


CALIFA DR3 poster
u−z SDSS
M_abs z SDSS
V-band + Hα Flux (10^−16) c.g.s.
NGC5947
Δ DEC (arcsec)
Δ RA (arcsec)
Ionized gas detected in all galaxies?

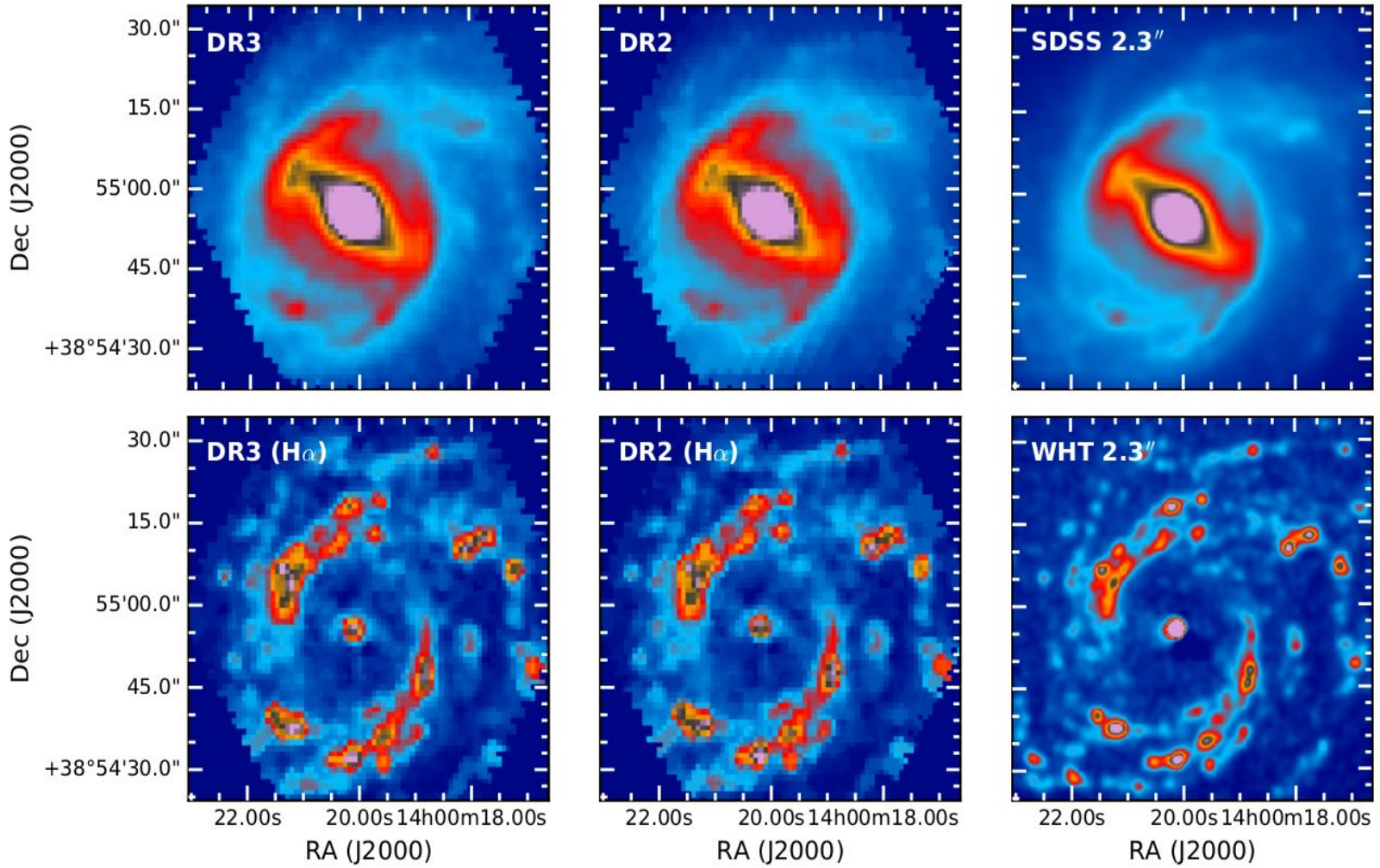


Ionized gas detected in all galaxies?

CALIFA: Spatial Resolution & coverage

- Final PSF FWHM~2.5"

Garcia-Benito et al. 2015, A&A, 576, 135
Sánchez et al., 2016, submitted



~9000 Hii regions, with CALIFA

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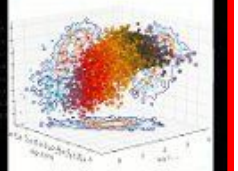

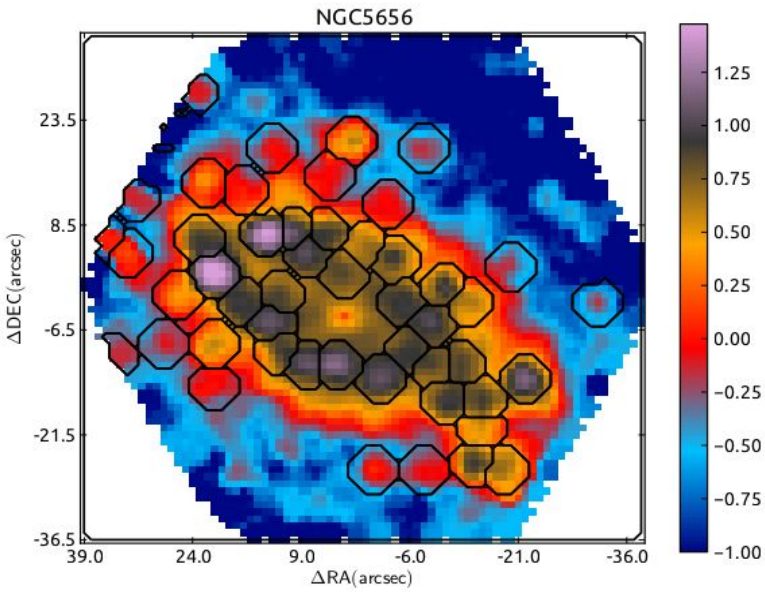

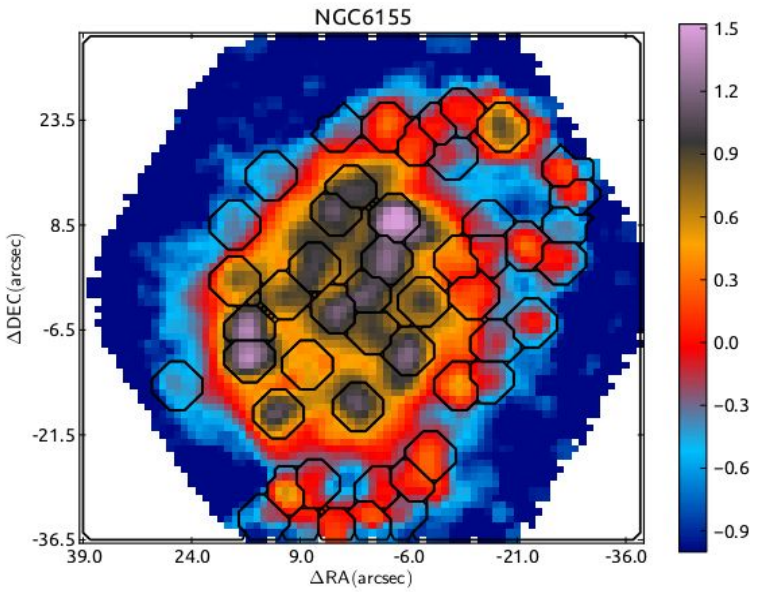

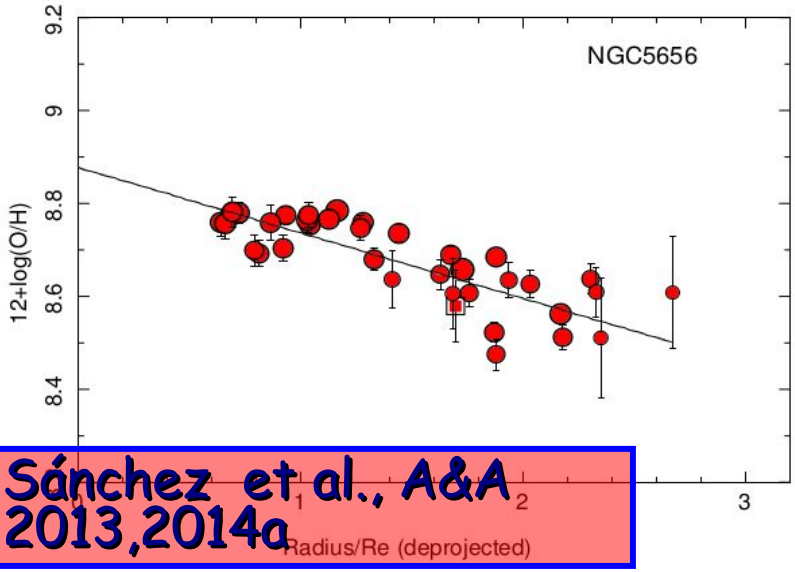

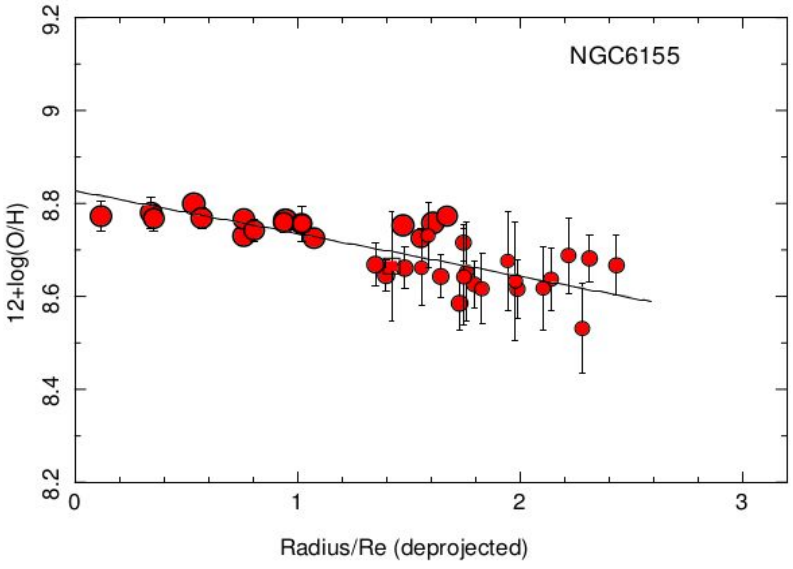

Sánchez et al., A&A 2013,2014a

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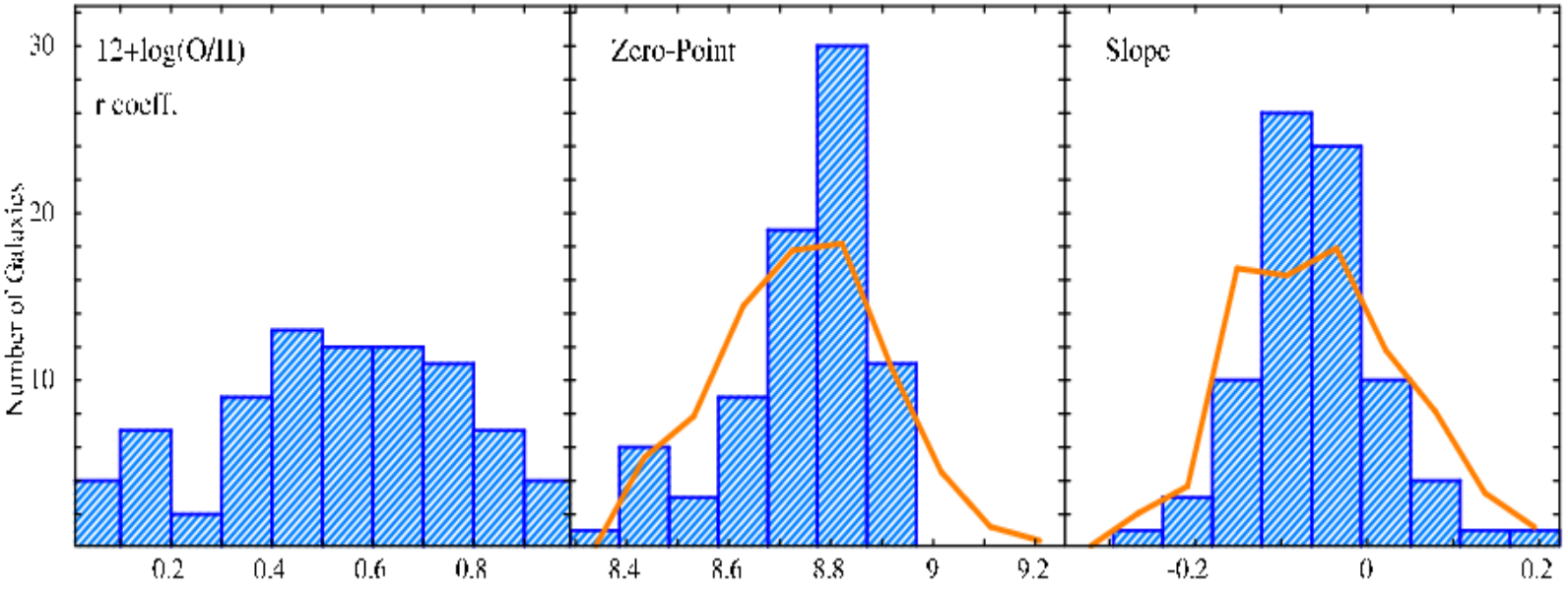
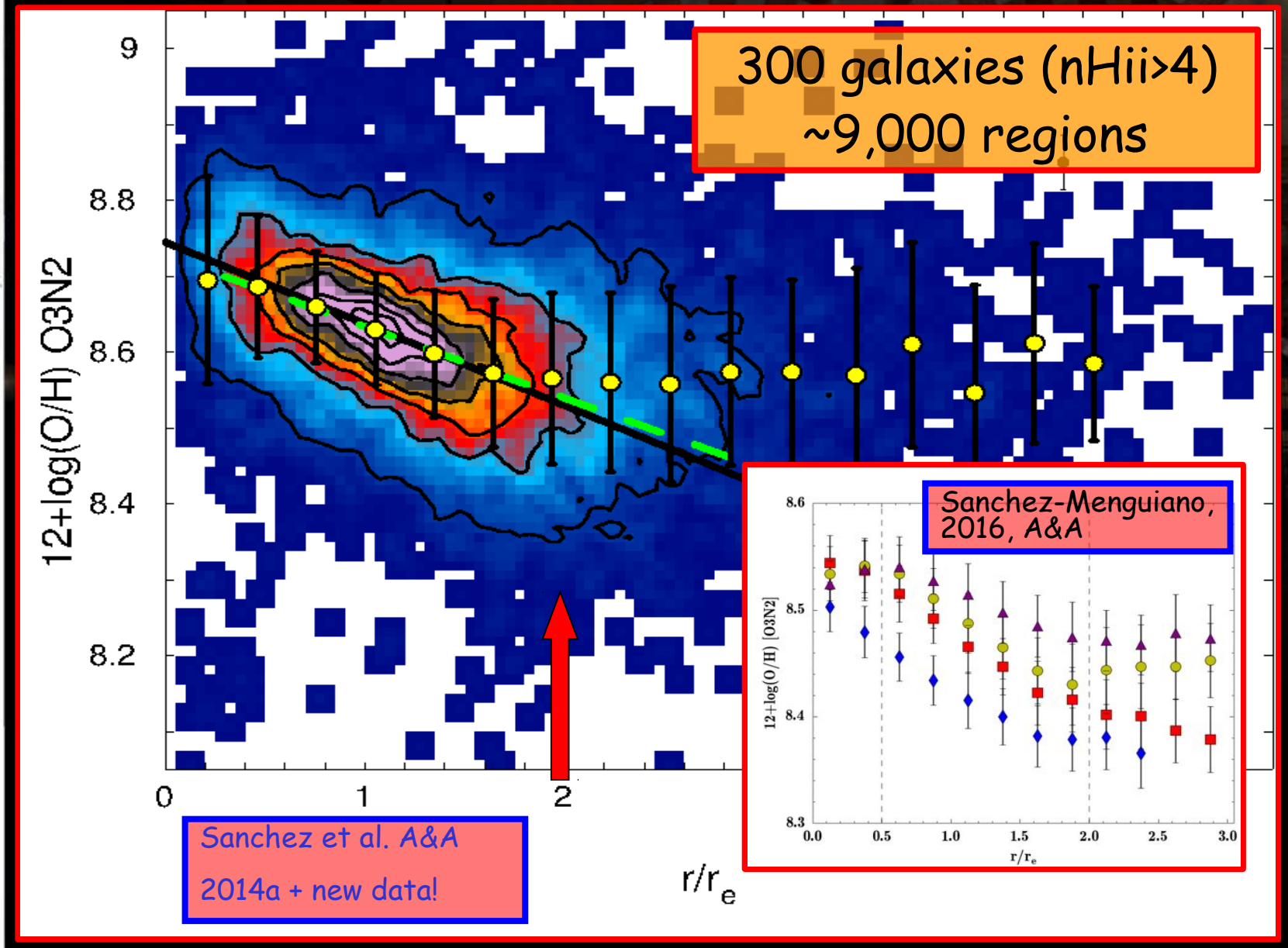
O/H Abundance gradients With CALIFA galaxies

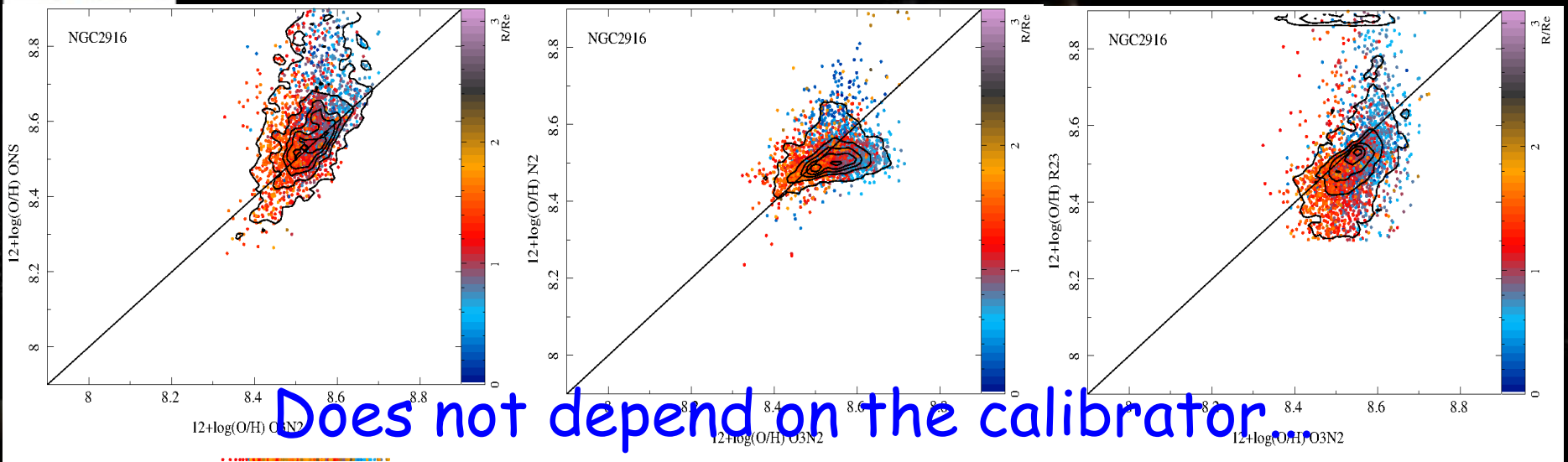


- Gradients determined at 0.3<R/Re<2.1.
- 207 galaxias, ~6500 regions → 9000 reg!!!
- Gradients distribution compatibles with of single Gaussians.
- Slope ~ -0.11+-0.08 dex/Reff.

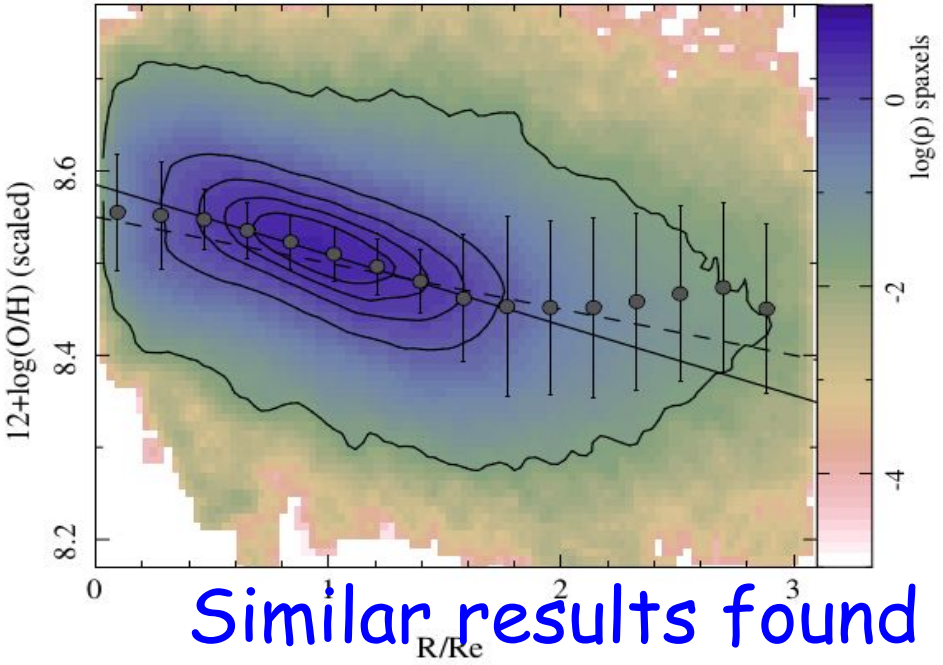
O/H Abundance gradients

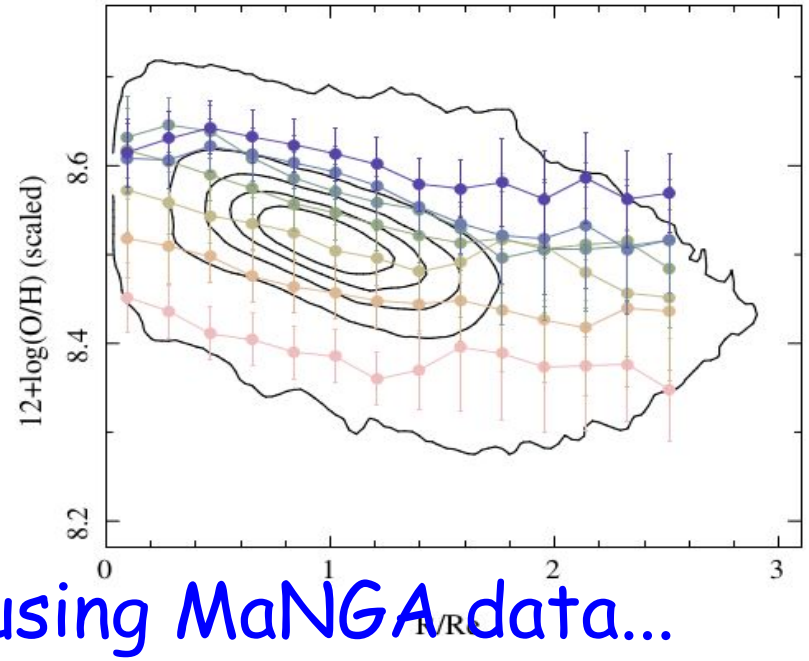


O/H Abundance gradients

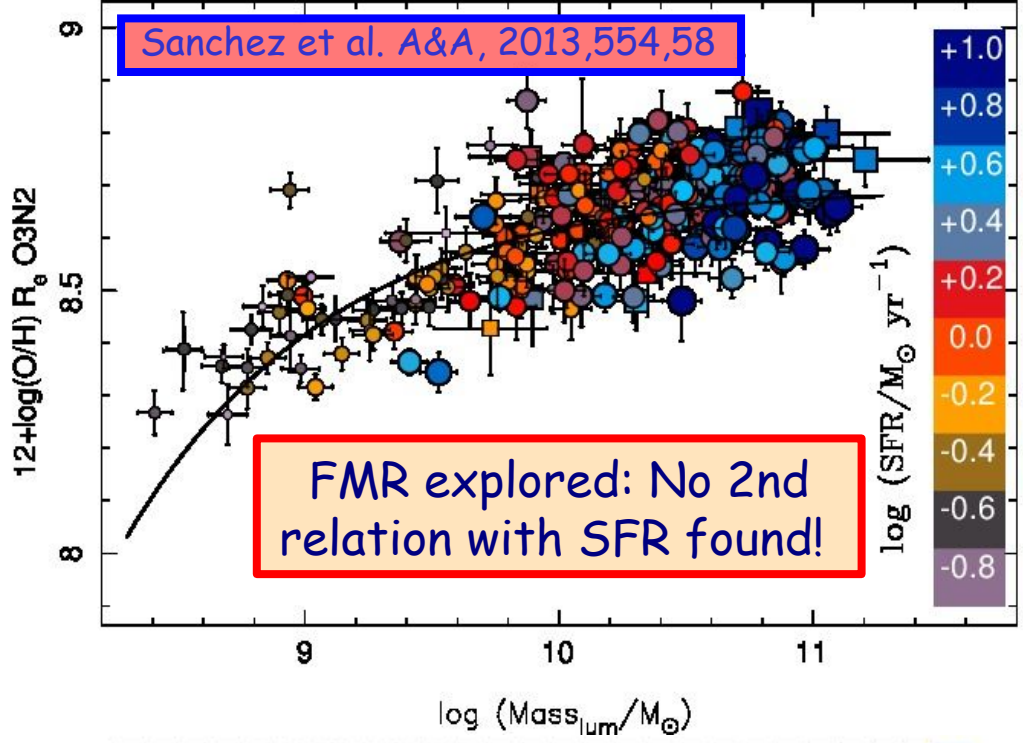


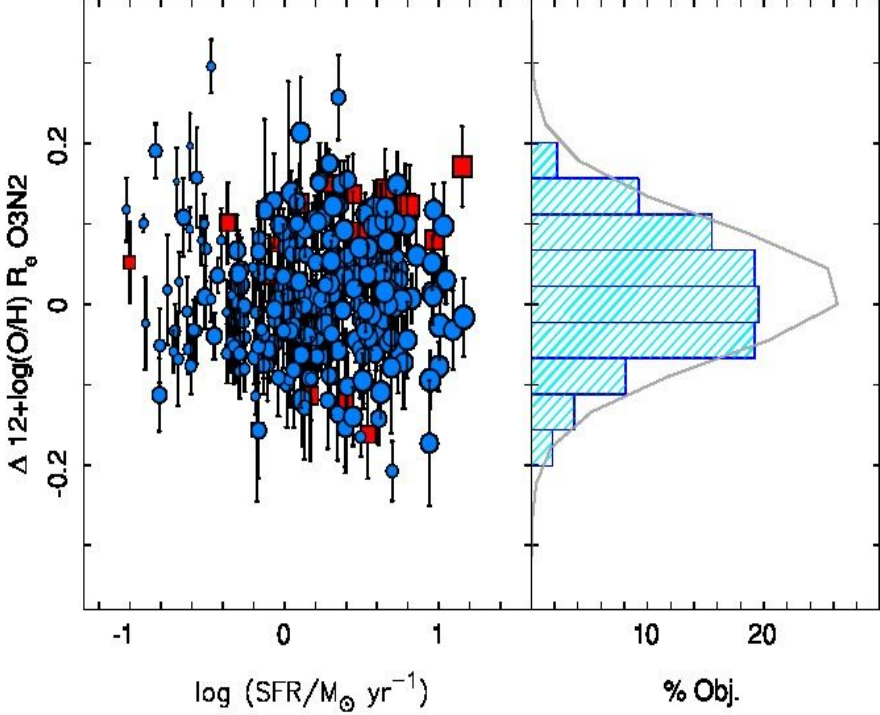
Does not depend on the calibrator...

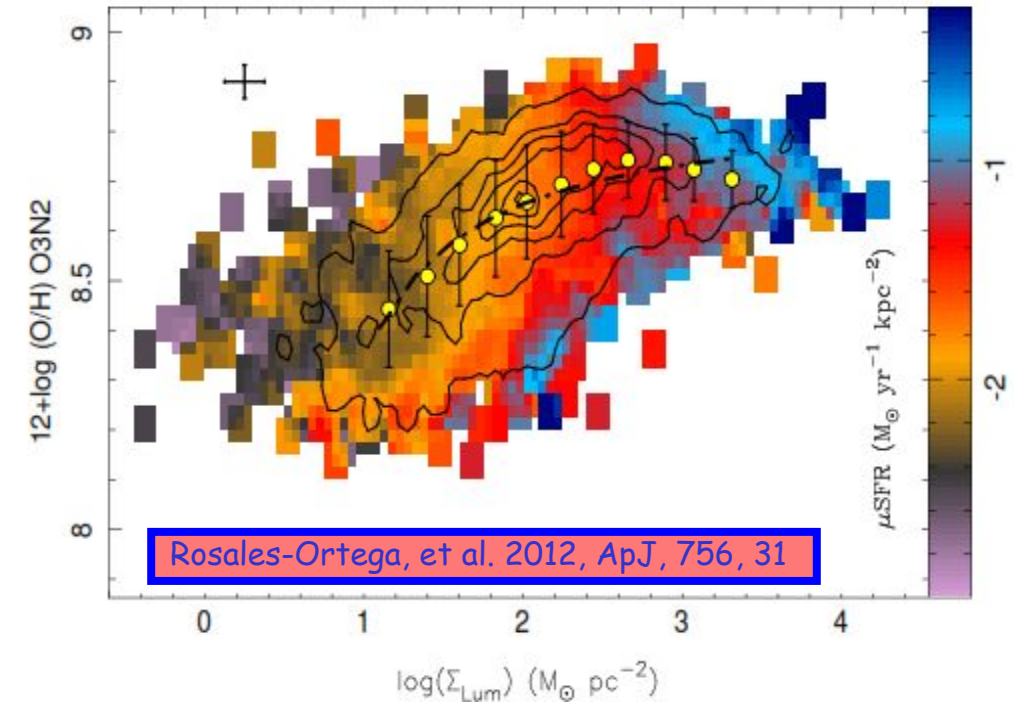


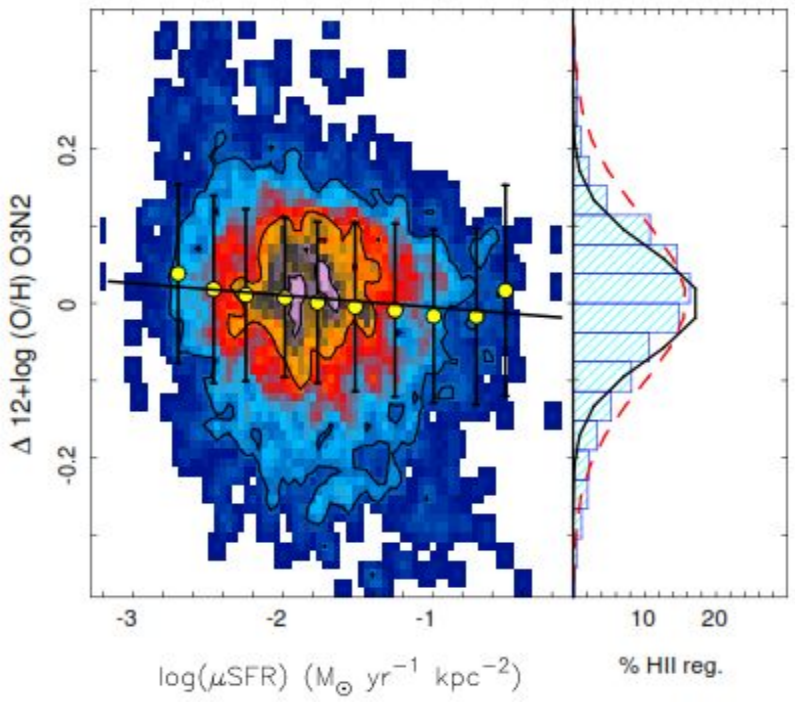


Similar results found using MaNGA data...


Sanchez et al. A&A, 2013,554,58
FMR explored: No 2nd relation with SFR found!
12+log(O/H) R_e O3N2
log (Mass$_{lum}$/M$_\odot$)
log (SFR/M$_\odot$ yr^{-1})
+1.0
+0.8
+0.6
+0.4
+0.2
0.0
-0.2
-0.4
-0.6
-0.8


Δ 12+log(O/H) R_e O3N2
log (SFR/M$_\odot$ yr^{-1})
% Obj.


Rosales-Ortega, et al. 2012, ApJ, 756, 31
12+log (O/H) O3N2
log(Σ$_{Lum}$) (M$_\odot$ pc^{-2})
μSFR (M$_\odot$ yr^{-1} kpc^{-2})


Δ 12+log (O/H) O3N2
log(μSFR) (M$_\odot$ yr^{-1} kpc^{-2})
% HII reg.

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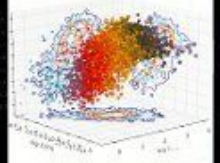

Summary

- CALIFA provides with unique datasets to understand the properties the Ionized Gas in galaxies.
- We found Ionized gas in (almost) all galaxies to our detection limit.
- The emission in ETGs seems come from a combination of ionization sources.
- The Oxygen abundance present a common gradient in all galaxies, with a shape that changes with stellar mass.
- We reproduce the M-z relation, with a local relation (Σ-z) that seems to be more fundamental.
- We cannot reproduce the secondary relation with the SFR.