

# Galaxies Growing Up

## Star Formation in GAMA and SAMI

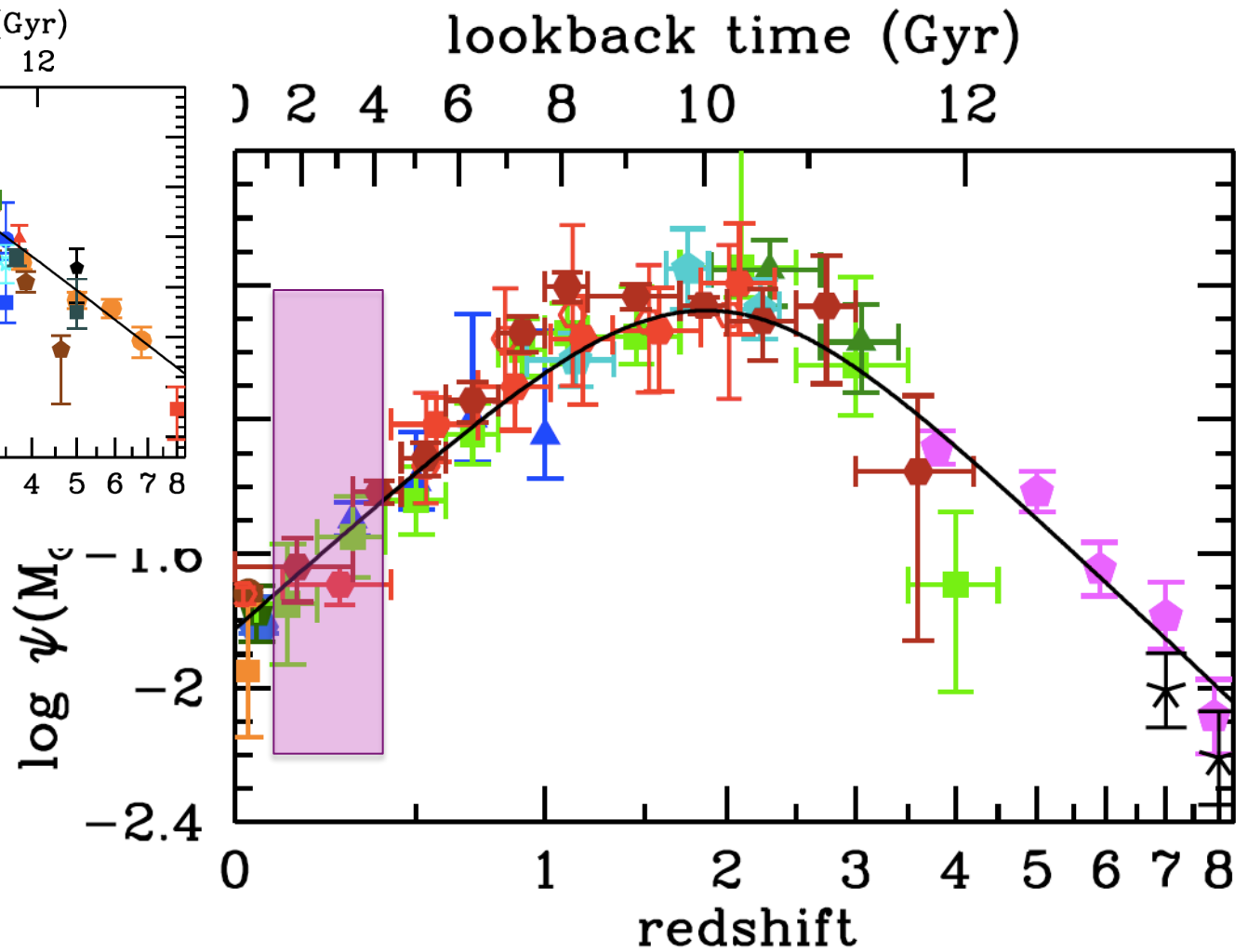
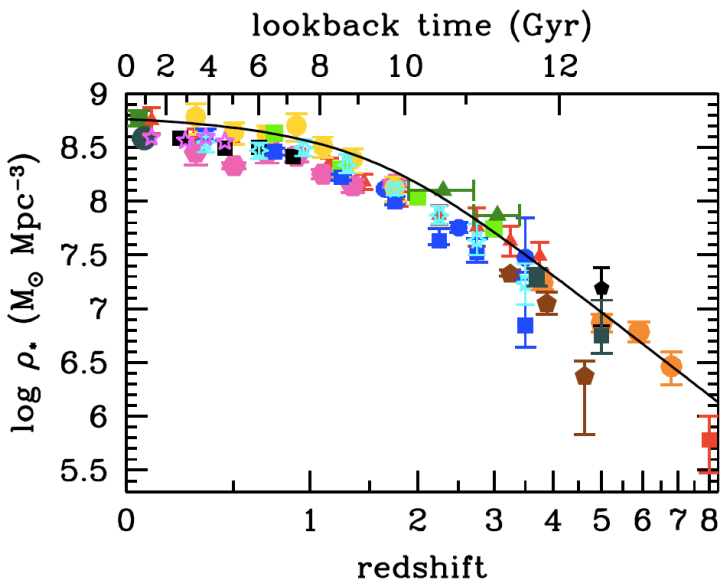
**Dr Amanda E Bauer**  
Astronomer and Outreach Officer

@astropixie



Australian Government





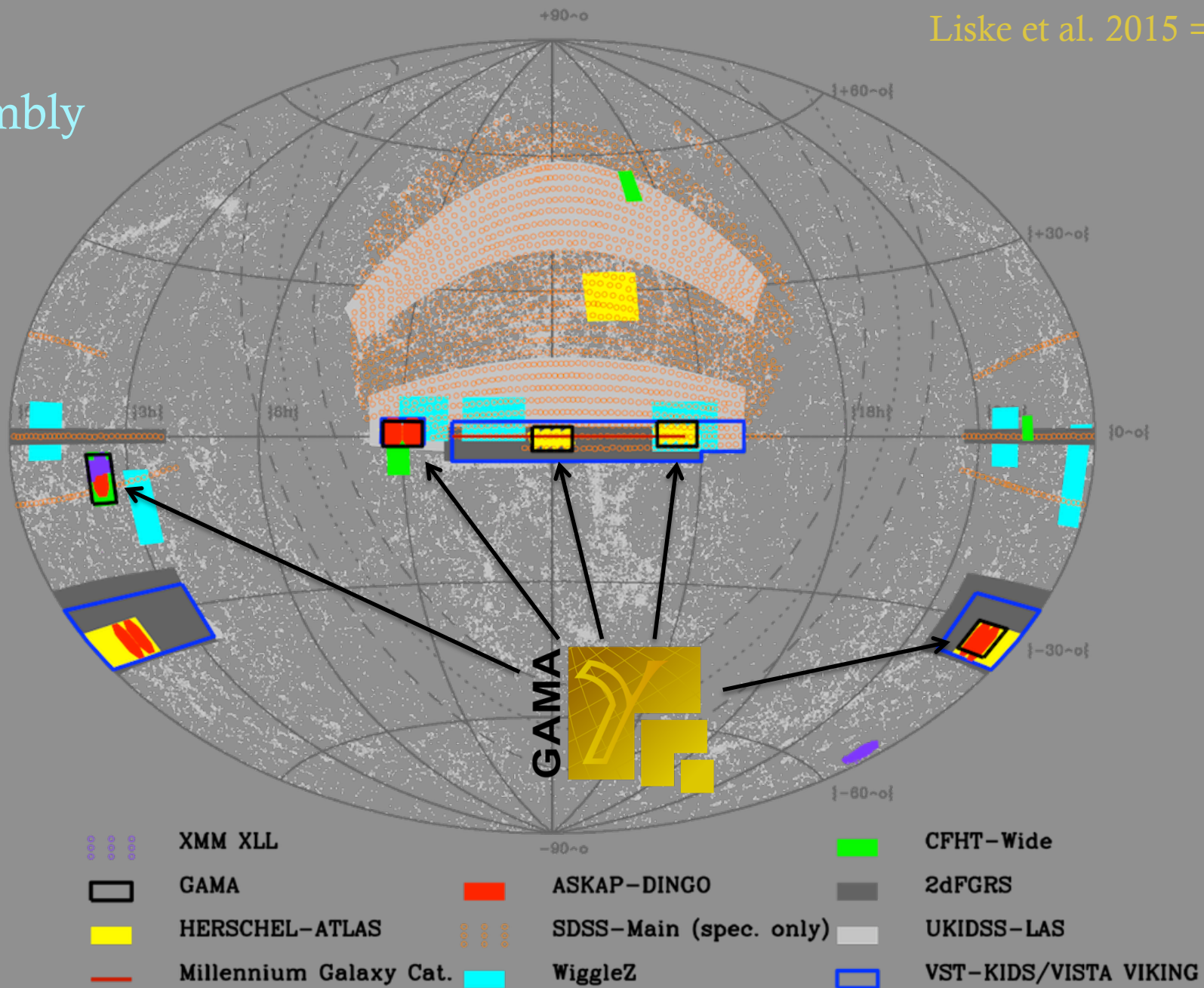
Madau & Dickinson 2014

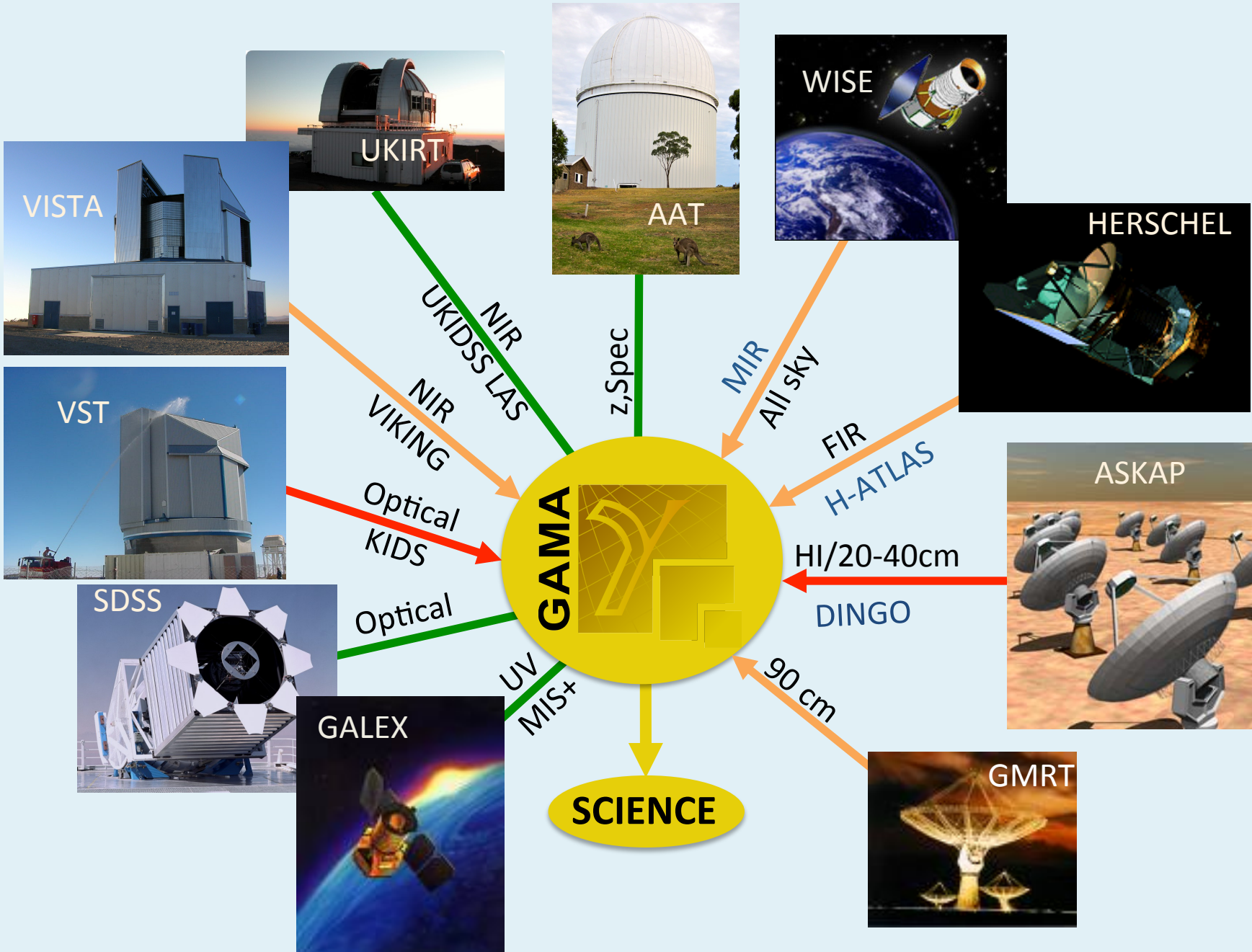
Star formation rate density

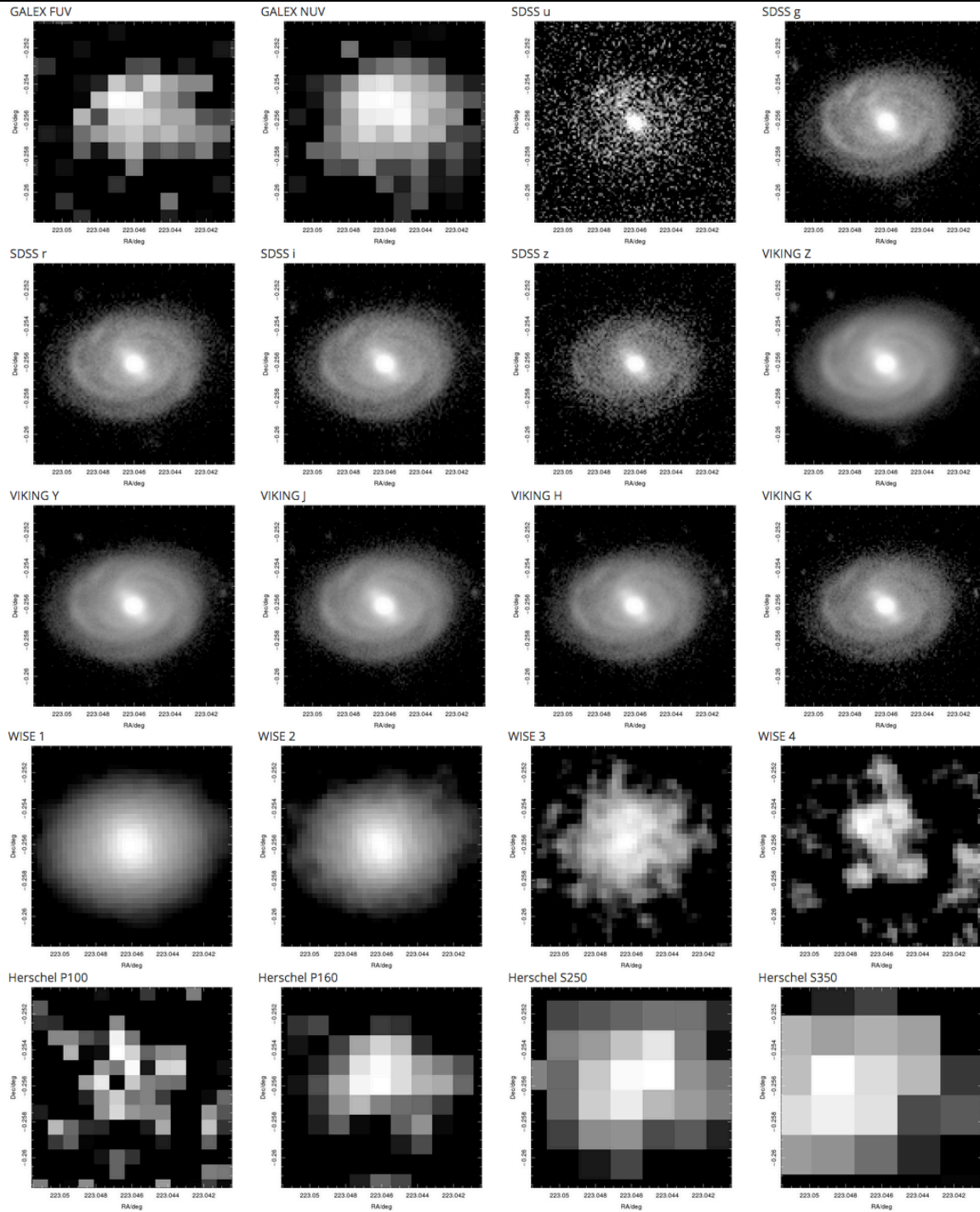
# Galaxy And Mass Assembly

<http://www.gama-survey.org/>

Simon Driver et al. 2009  
Liske et al. 2015 = DR2



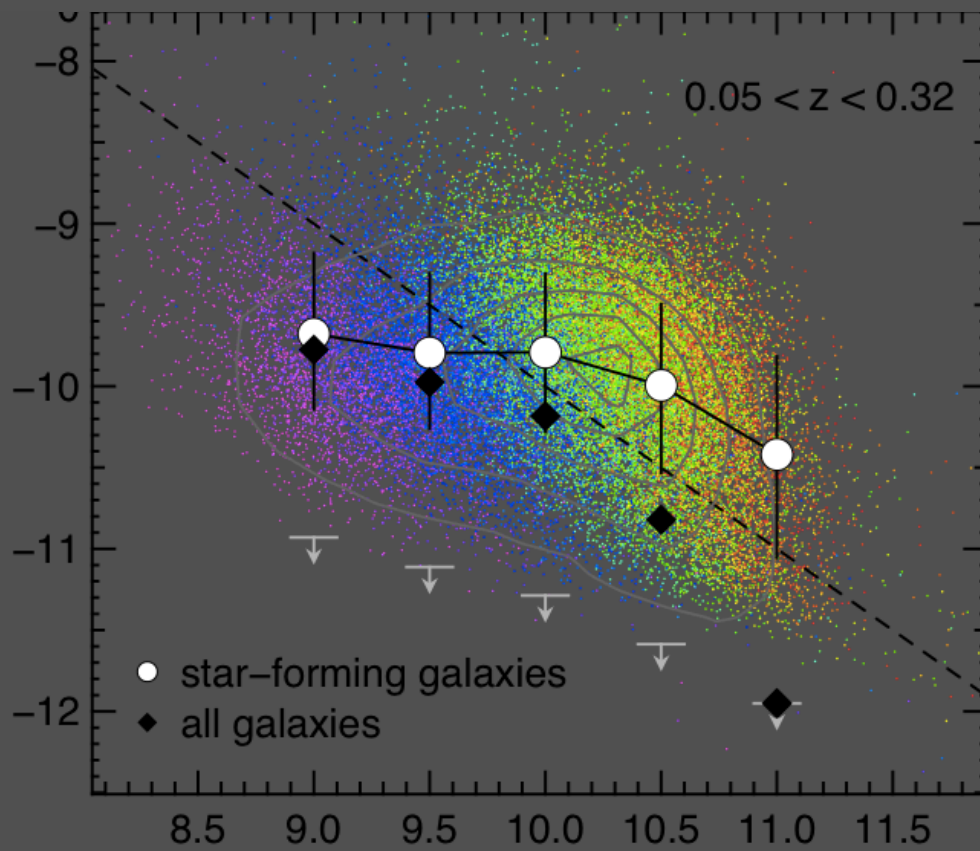




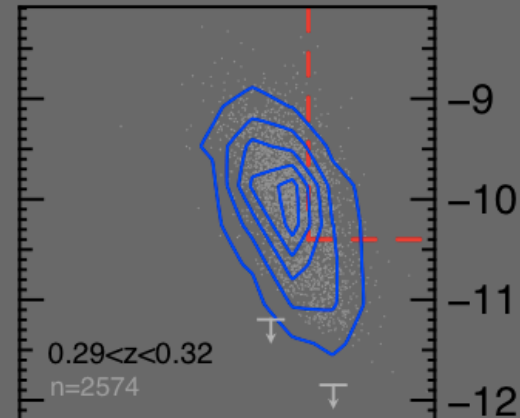
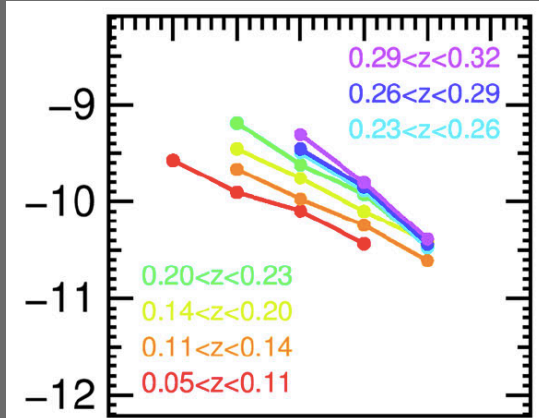
[ict.icrar.org/cutout/](http://ict.icrar.org/cutout/)



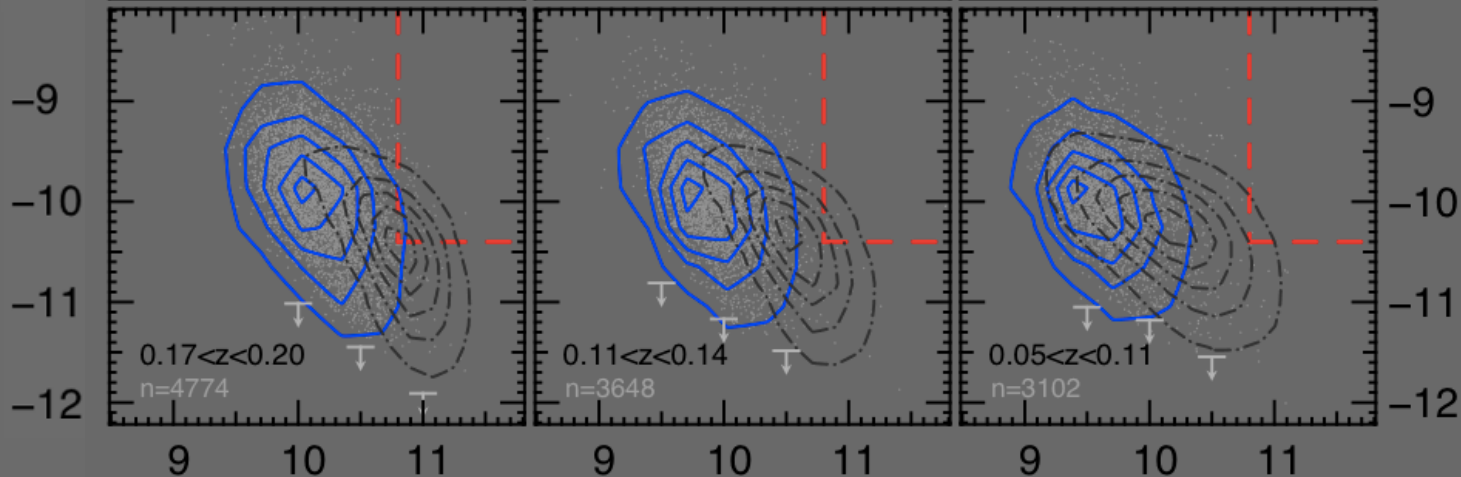
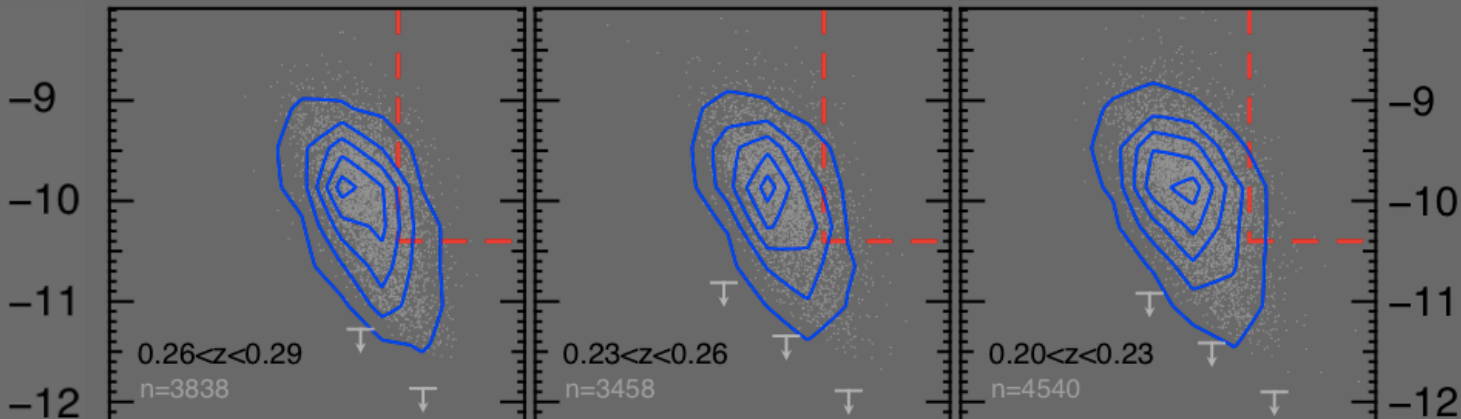
log Specific Star Formation Rate / yr



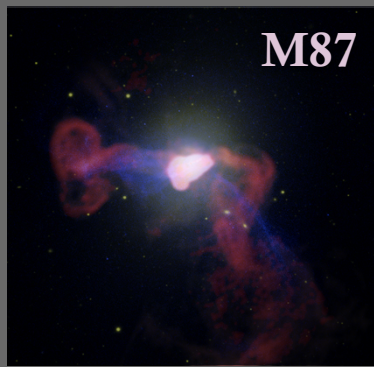
log Stellar Mass [ $M_{\odot}$ ]



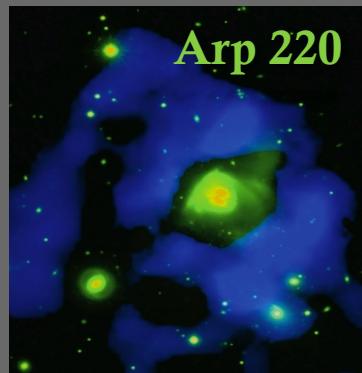
Specific Star Formation Rate



log Stellar Mass



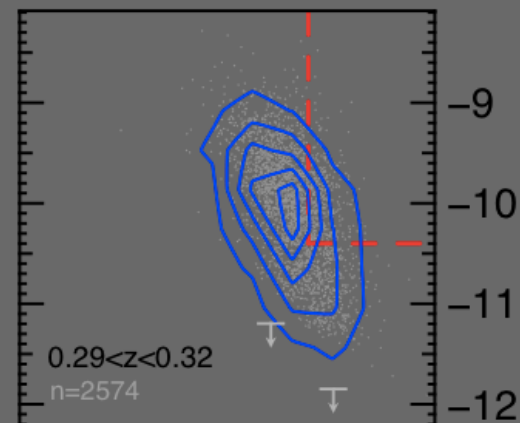
M87



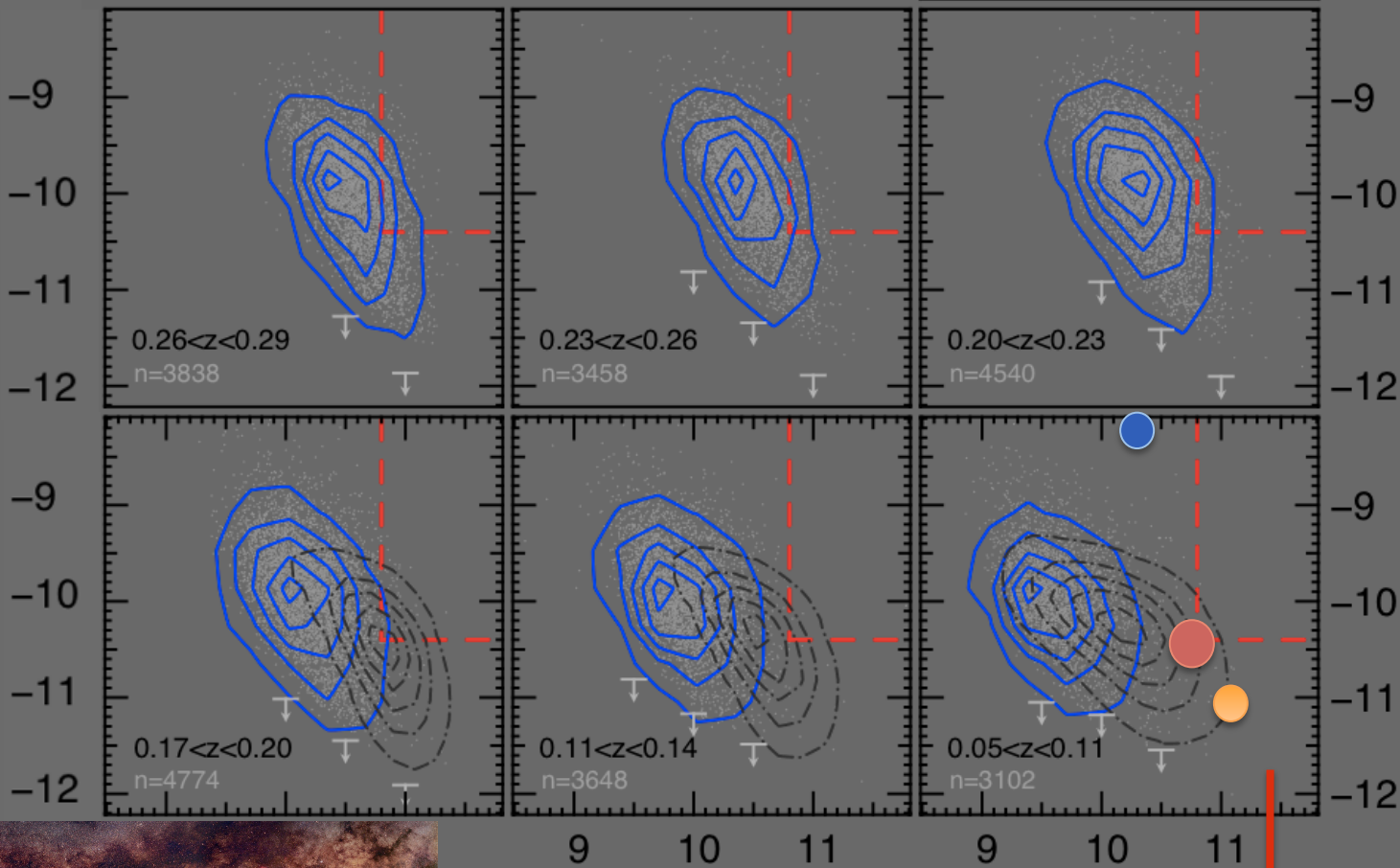
Arp 220



M31



Specific Star Formation Rate

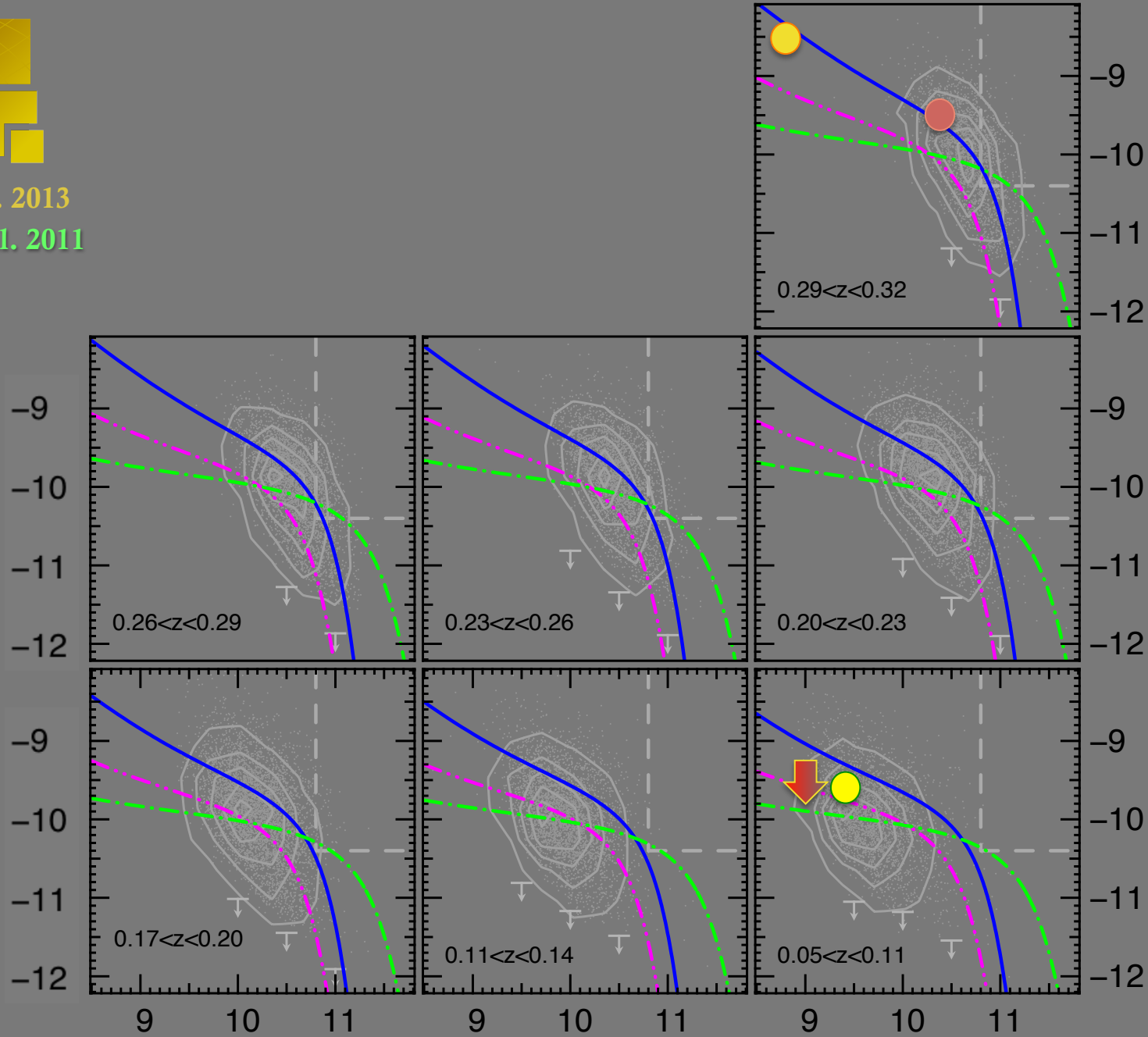


$\log \text{Stellar Mass}$

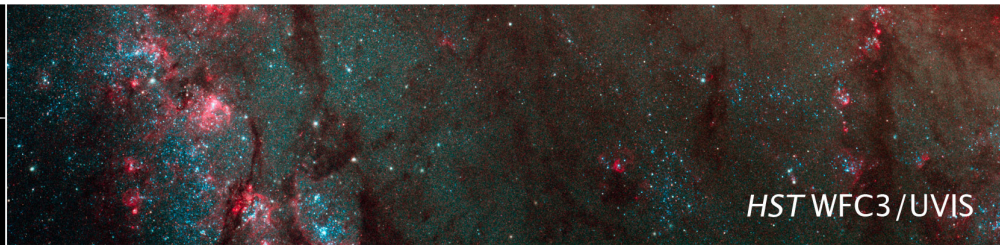
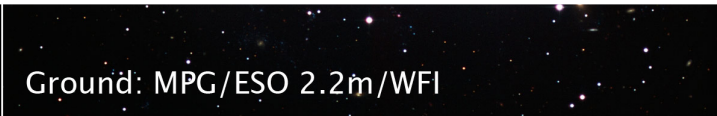
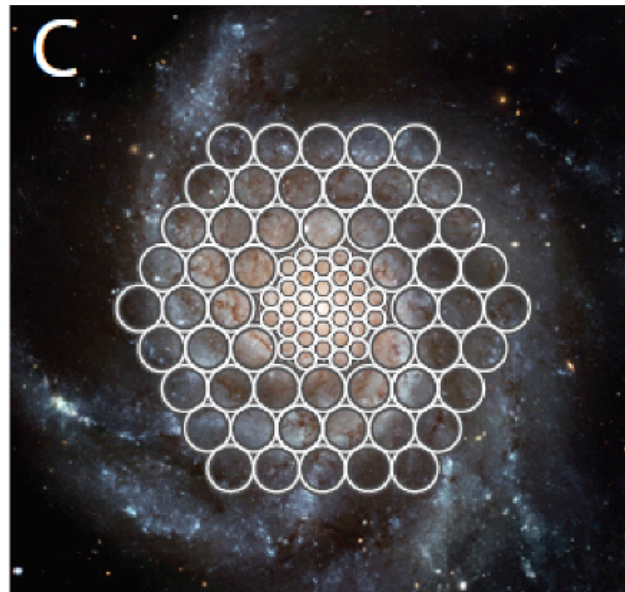
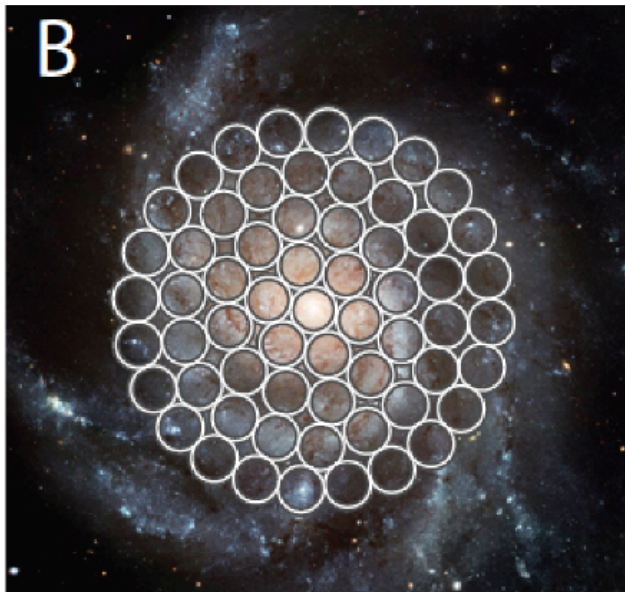




Specific Star Formation Rate



log Stellar Mass



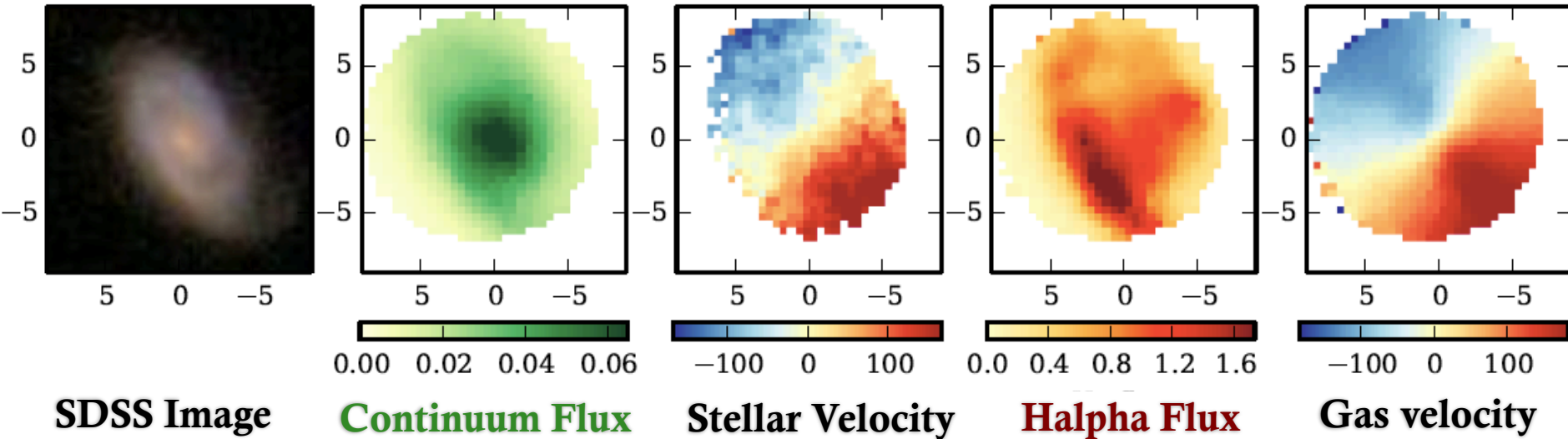
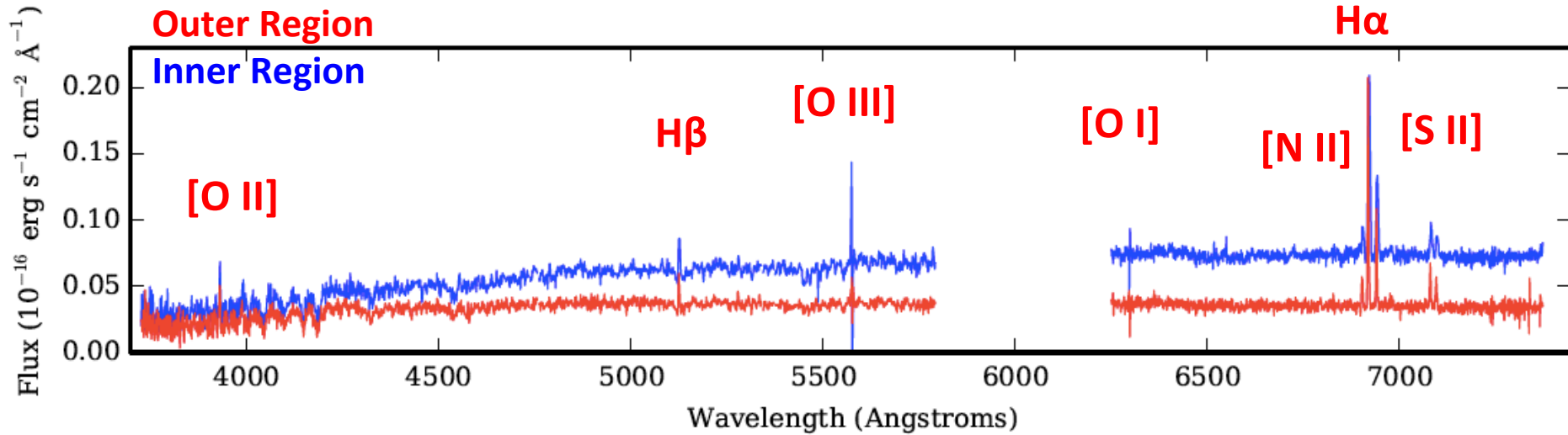
HST WFC3/UVIS

**Spiral Galaxy M83**  
*Hubble Space Telescope* ■ WFC3/UVIS

Sydney-AAO Multi-object Integral field spectrograph Galaxy Survey

VIDEO: <https://youtu.be/ywPI0tfnp2Y> Croom et al. 2012

# Integral Field Spectroscopy with SAMI





**SDSS Image**

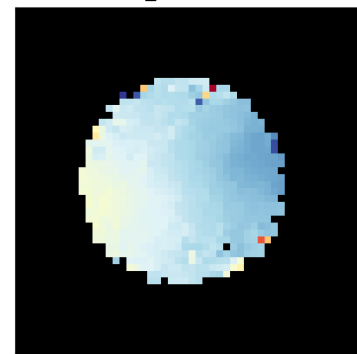
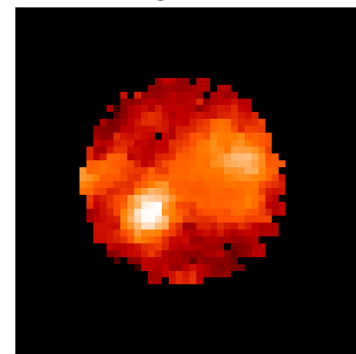
**Ha Flux**

**Ha Velocity**

SDSS Thumbnail

log10(Ha)

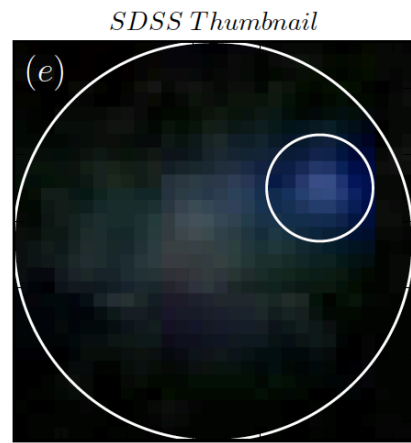
Ha\_vel (km/s)



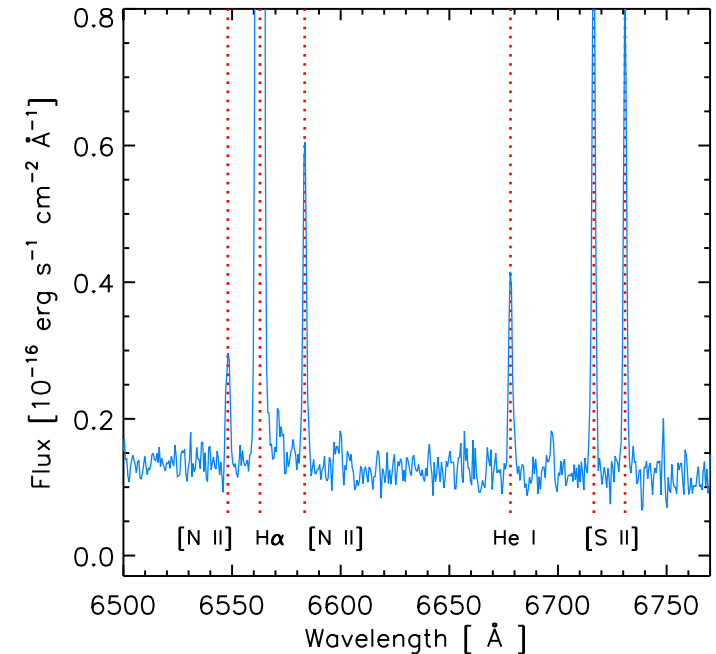
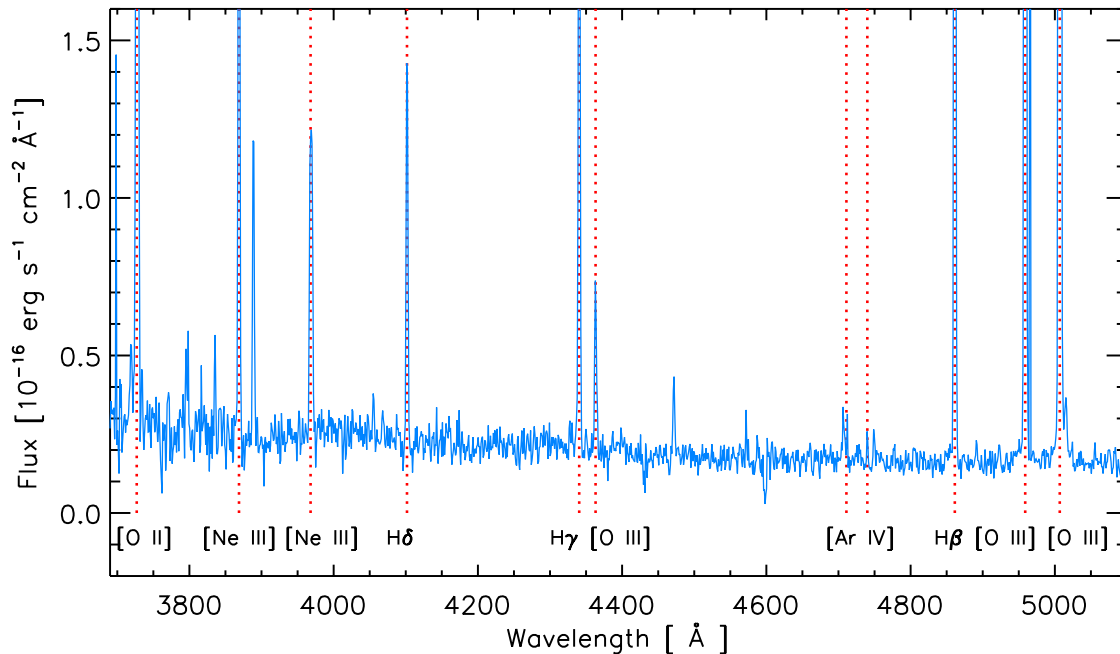
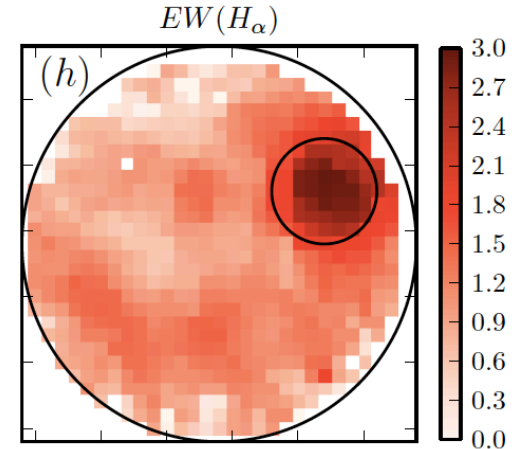
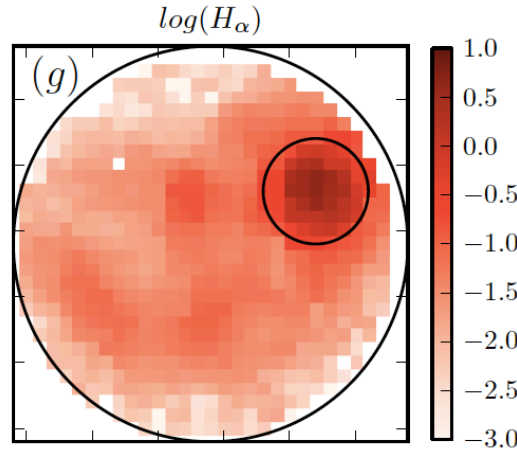
Low-mass galaxies with unimpressive images  
BUT clumps of Ha emission!

# GAMA J141103.98-003242.3 with SAMI

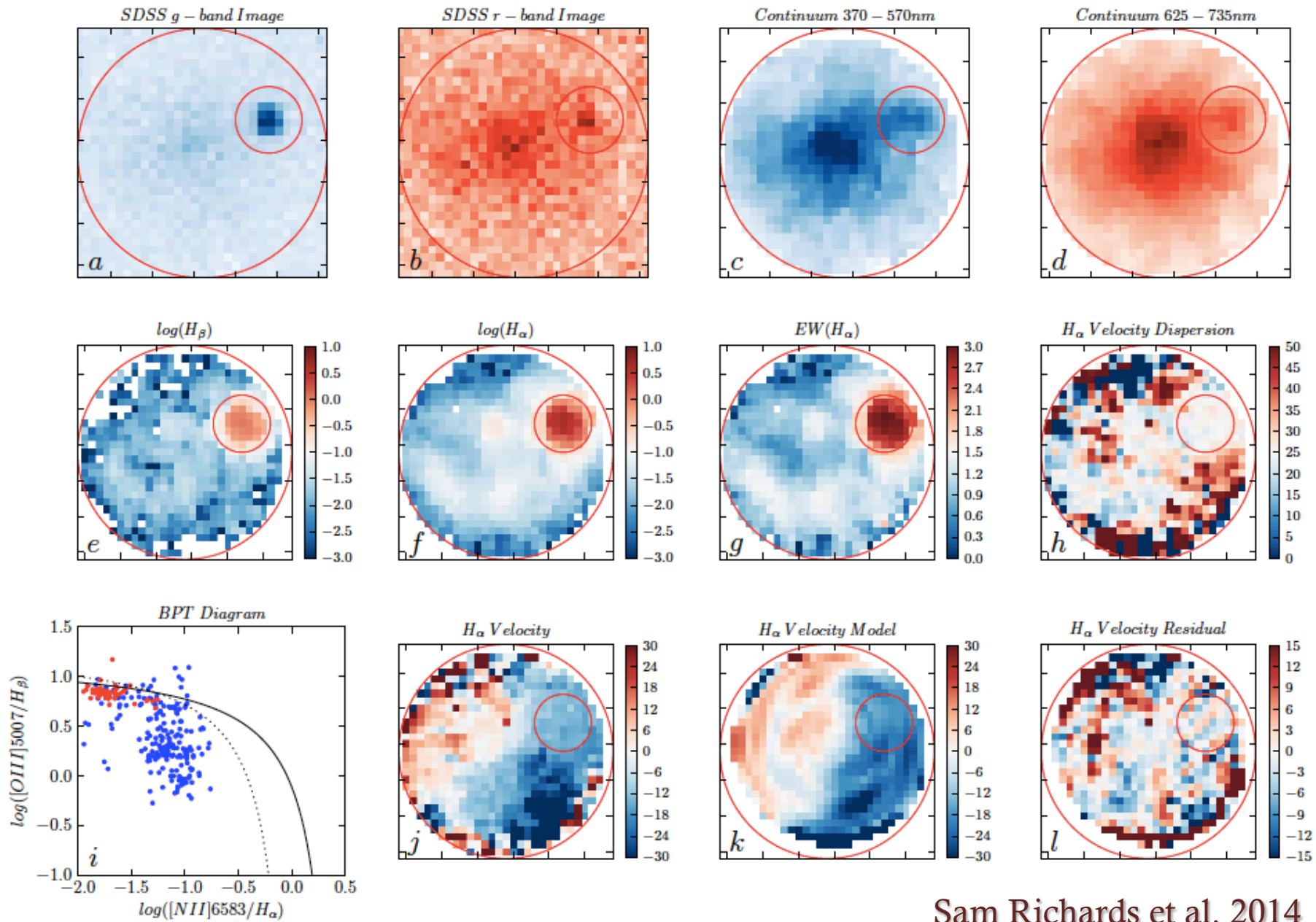
Richards et al. 2014



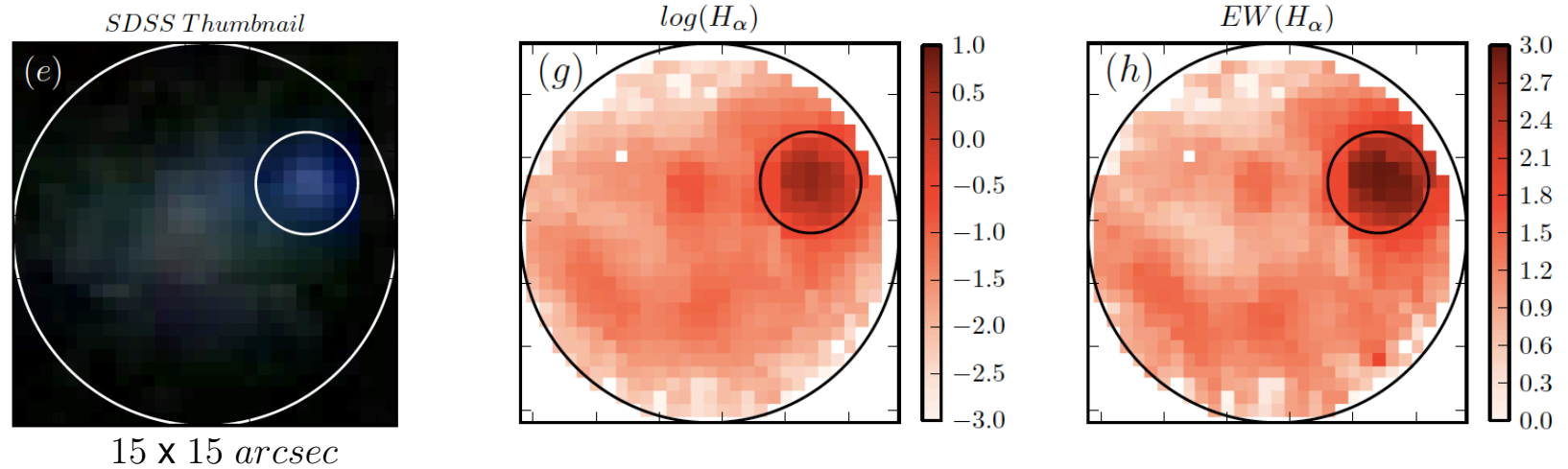
15 x 15 arcsec



# Integral Field Spectroscopy with SAMI



# GAMA J141103.98-003242.3 with SAMI



Stellar mass.  $\log(M^*/M_{\text{sun}}) = 8.52$

HI detected.  $\log(M_{\text{gas}}/M_{\text{sun}}) = 9.6$

Isolated

$z = 0.0259$  (106 Mpc)

HII complex/clump has lower metallicity than galaxy by 0.2dex



# GAMA

- [gama-survey.org](http://gama-survey.org) : Data Release 2 out 2015
- upper envelope of SSFR vs  $M_*$  decreases with redshift
- GAMA galaxies have higher SSFRs than predicted by SFH from  $z = 1$
- Low mass galaxies are *bursting* for attention. Bauer et al. 2013 (arXiv:1306.2424)

# SAMI

- multi-IFU galaxy survey – have observed 1200 of 3400 galaxies.
- SAMI will observe 400 dwarf galaxies
- 800 galaxies within clusters
- [sami-survey.org](http://sami-survey.org) – data for 100 galaxies available now