Galaxies in the Green Valley: Are AGN killing star formation?

Pilar Esquej - UCM

Pablo Perez Gonzalez, Helena Dominguez Sanchez, Carmen Eliche Moral, Belen Alcalde, Guillermo Barro, Antonio Hernan Caballero, +SHARDS

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Outline

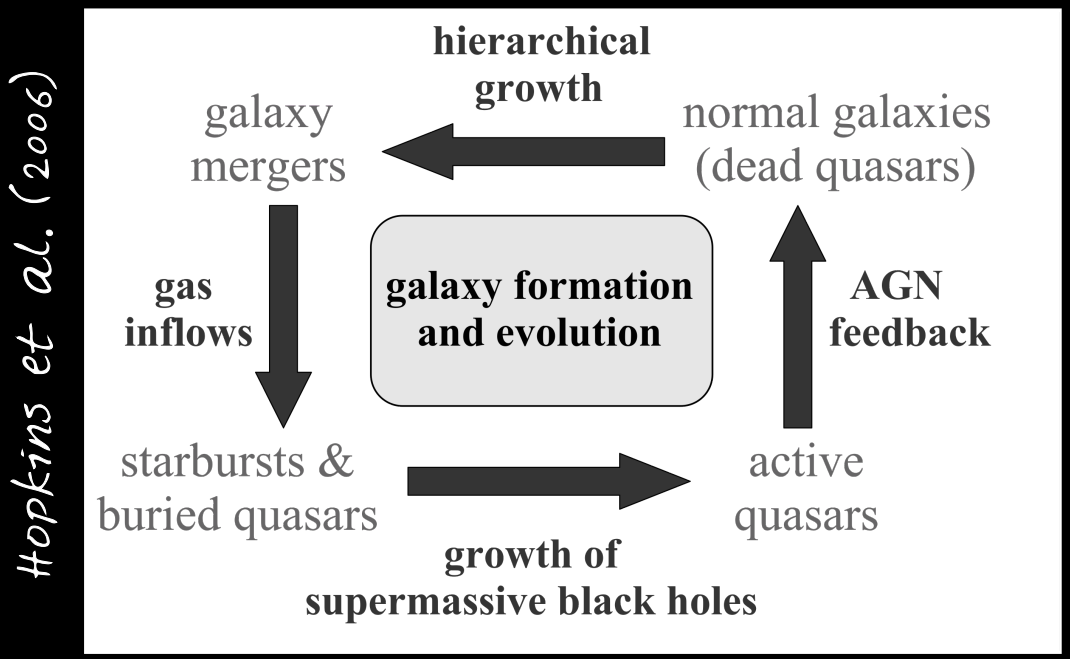
What am I going to talk about?
- Cosmological context of this work:
  - Galaxies/AGN in the Green Valley

How did we approach the question?
- Sample selection:
  - SHARDS+X-ray+grism
- Data analysis:
  - Study of stellar populations

Where are we now?
- Summary and conclusions

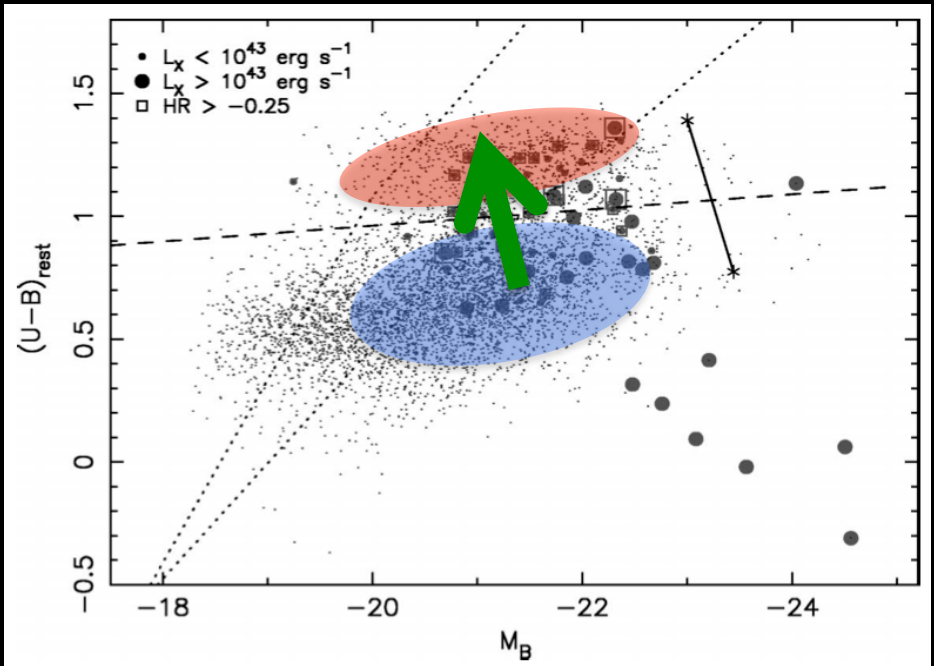
The big picture

The study of galaxy formation and evolution attempts to answer questions regarding how galaxies formed and their evolutionary path over the history of the Universe.



The green valley rocks!

Nandra et al. (2007)

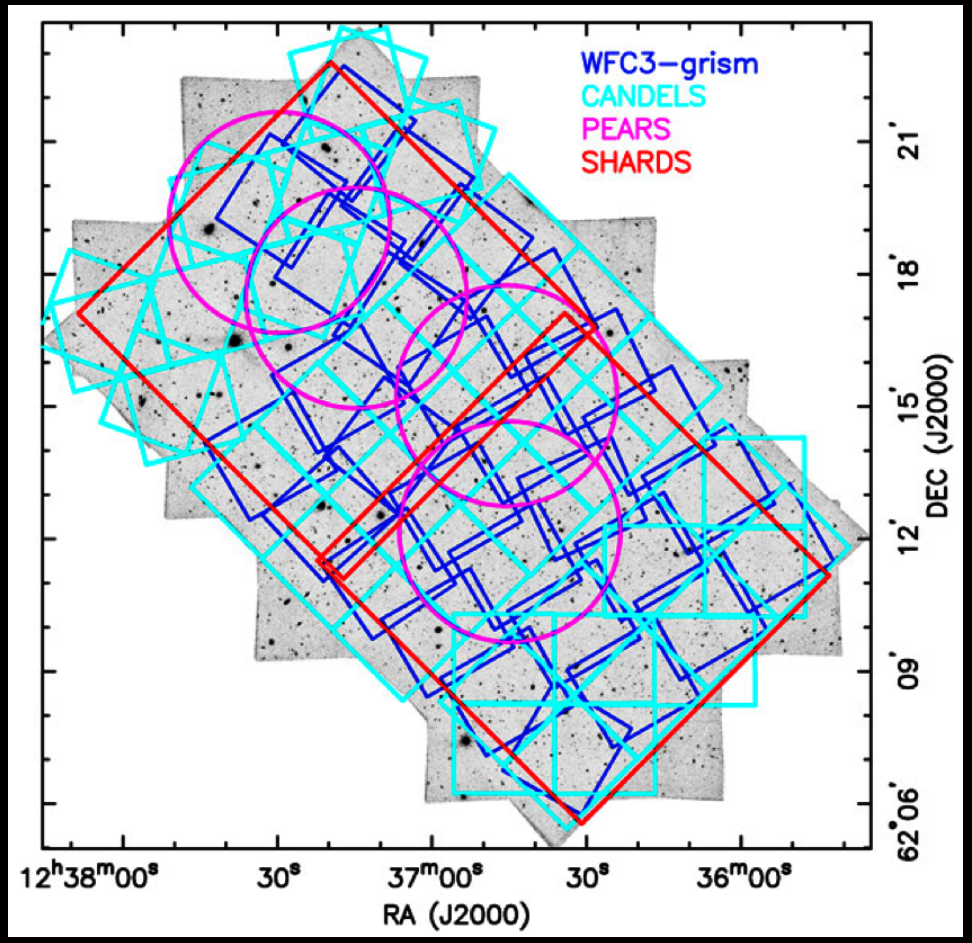


AGN at intermediate redshift prefer to live in the GV.

Are AGN the main suspects for the suppression of SF (quenching).

Aim: To test this scenario by characterising the SFH of AGN with the best possible data

Everything is about SHARDS



- ESO/GTC Large Programme
- OSIRIS observations
- 141 arcmin^2 in GOODS-N
- 25 intermediate band filters (R~50)
- Wavelength range: 500-941nm
- Sub-arcsec resolution
- Sensitivity limit m_{AB}>26.5

Perez Gonzalez et al. (2013)

AGN sample selection

-Chandra 2Ms (Alexander et al. 2003)

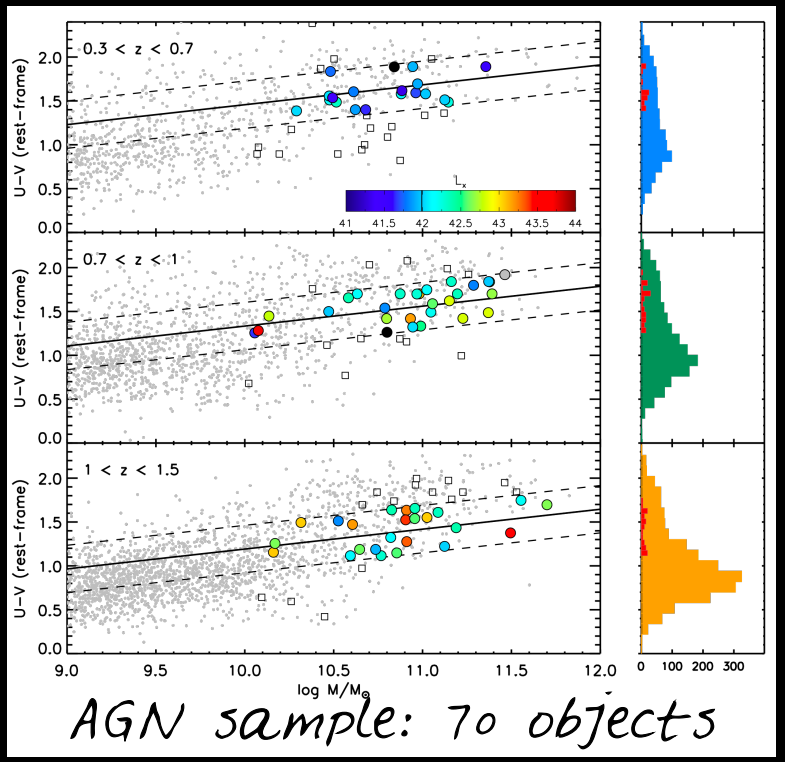
-SHARDS (Perez Gonzalez et al. 2013)

-Green Valley (Borch et al. 2006)

$$(U-V)_{GV} = 0.227\log(M/M_o) - 0.352z - 0.437$$

-Stellar dominated objects

$-0.3 < z < 1.5$; Mass $> 10^{10}\ M_o$



AGN sample: 70 objects

Esquej et al. (in prep.)

Control sample of inactive galaxies

Bootstrapping method (Rosario et al 2013, Hernan Caballero 2014)
$M \pm 0.1$; $z \pm 0.1$; $(U-V) \pm 0.2$; 1000 samples

More data: HST/WFC3 grism

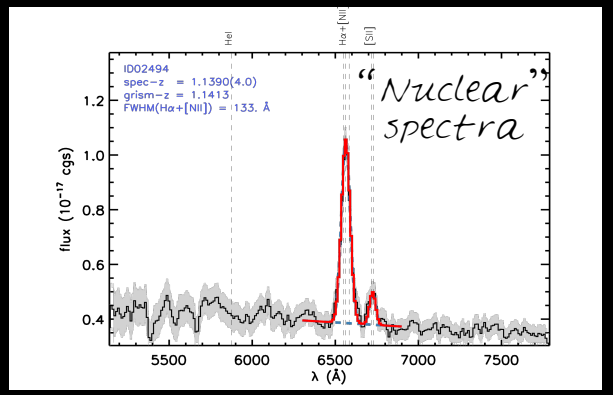
- G141 (PI: Weiner) & G102 (PI: Barro)

- Individual extraction of sources using dedicated 1D spectral extraction software

- Quality control to avoid contamination

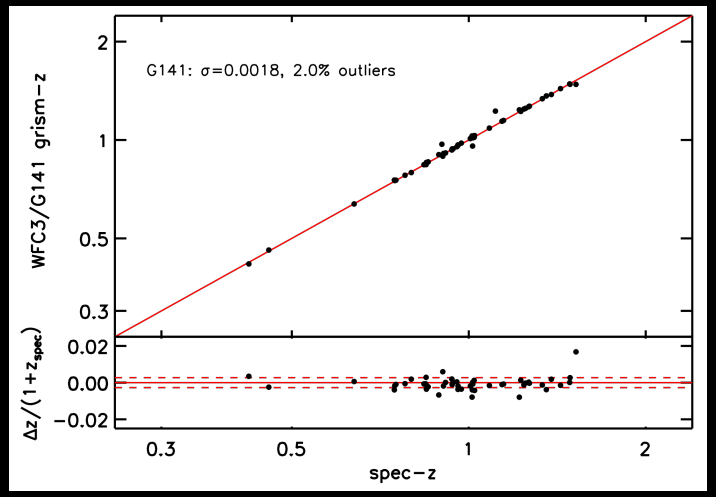
-Available in Rainbow (for all CANDELS sources in GOODS-N)

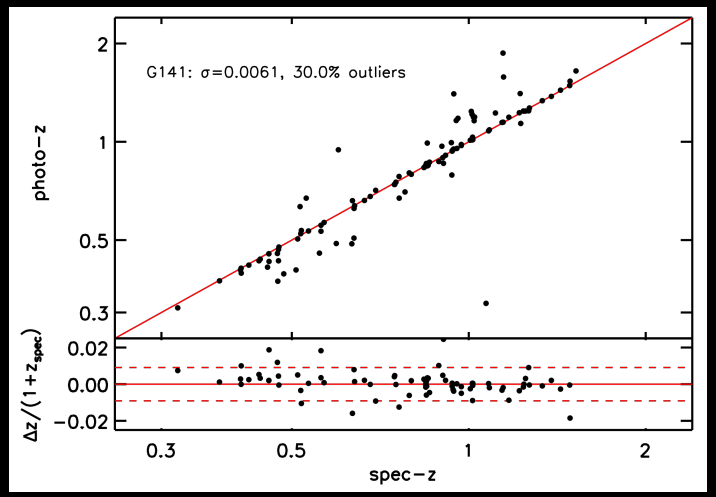
-Sources with emission lines have been used to calculate grism-z.

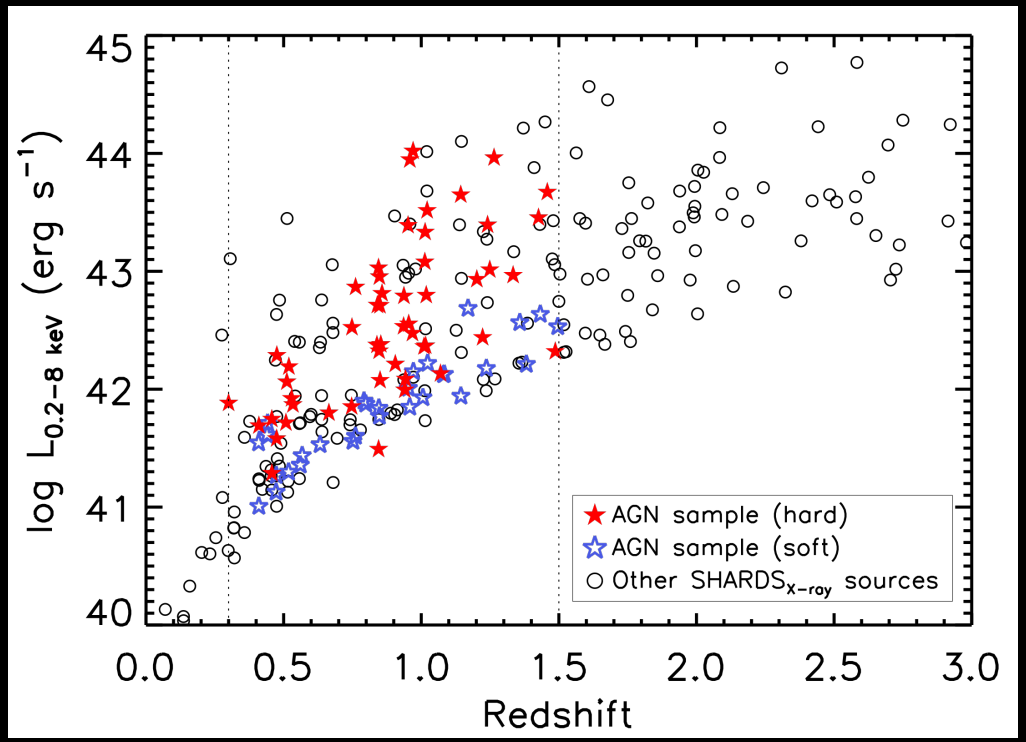


SHARDS+grism -> best data ever down to mag 26.5!

z & L distribution







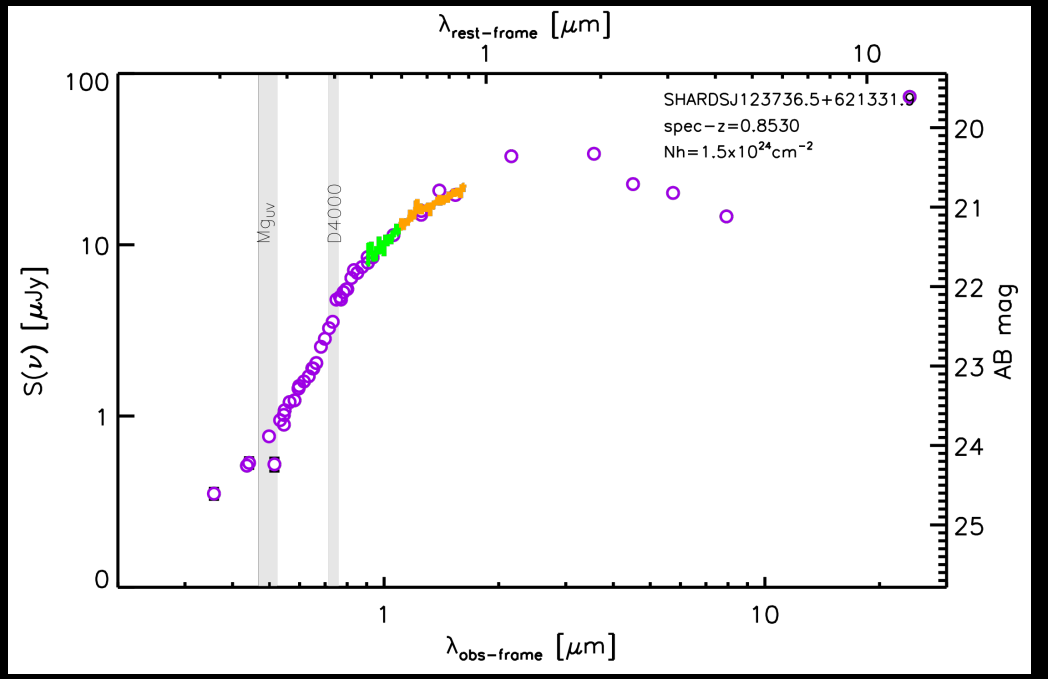
SED fitting: synthesizer

- One stellar population
- tau-models

$$SFR(t) \propto e^{-t/\tau}$$

$$SFR(t) \propto t e^{-t/\tau}$$

- Kroupa IMF
- Bruzual-Charlot library
- Calzetti extinction law
- Solar metallicity



Fit parameters

Timescale

Dust extinction

Age

Mass (from normalization)

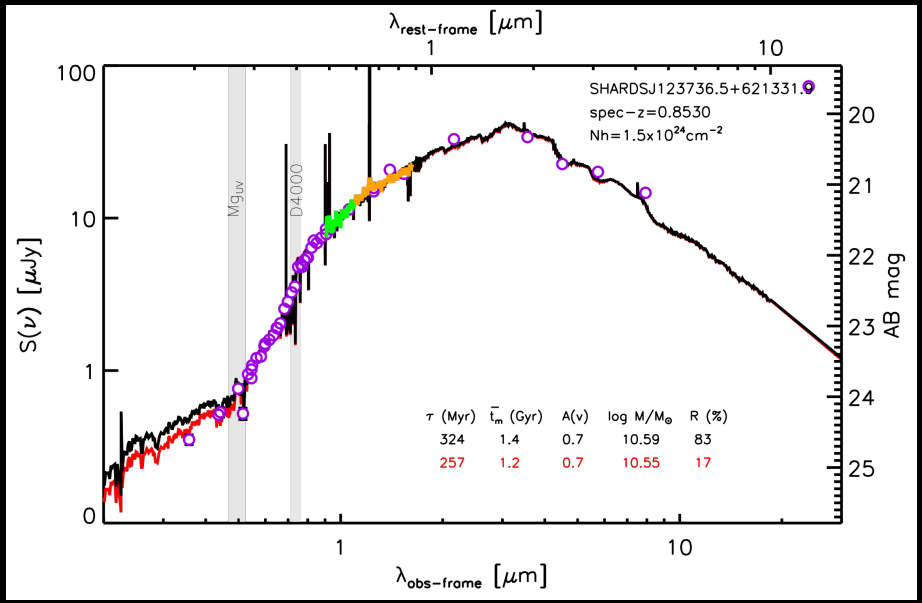
Fitting process

-1000 simulations, parameter space $\tau=[6.5,10]$; $t=[7.6,10]$; $A_V=[0,4]$

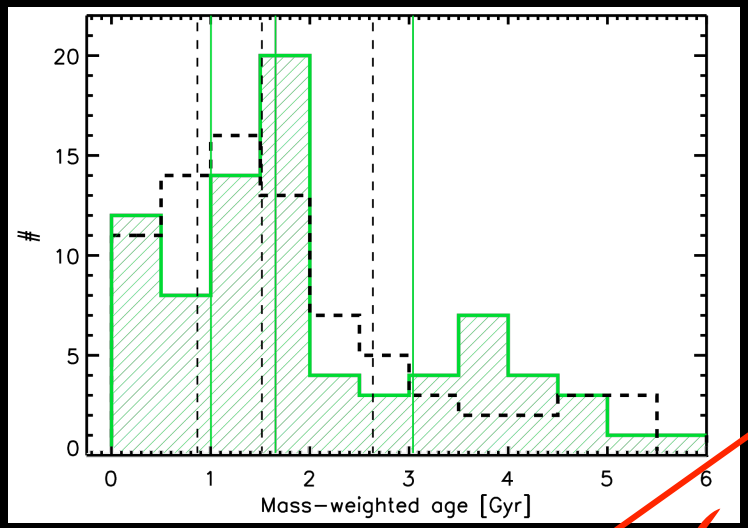
-photometic datapoints randomly vary following a Gaussian distribution of width equal to the photometric uncertainty.

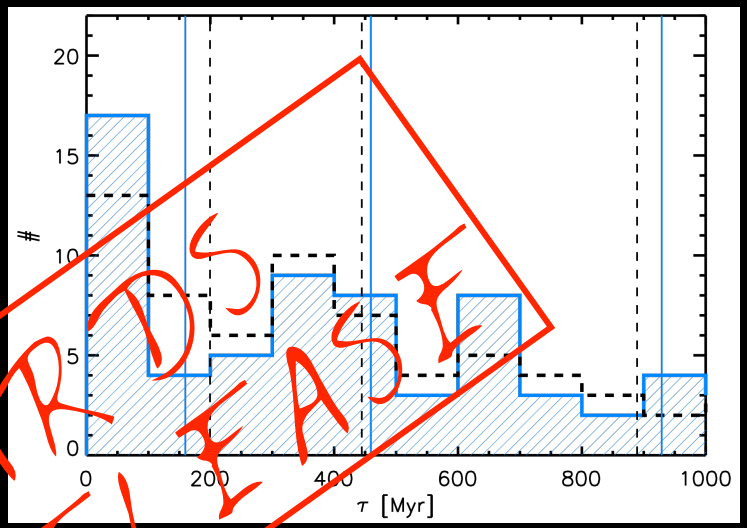
-best-fit model: χ^2 minimization criteria

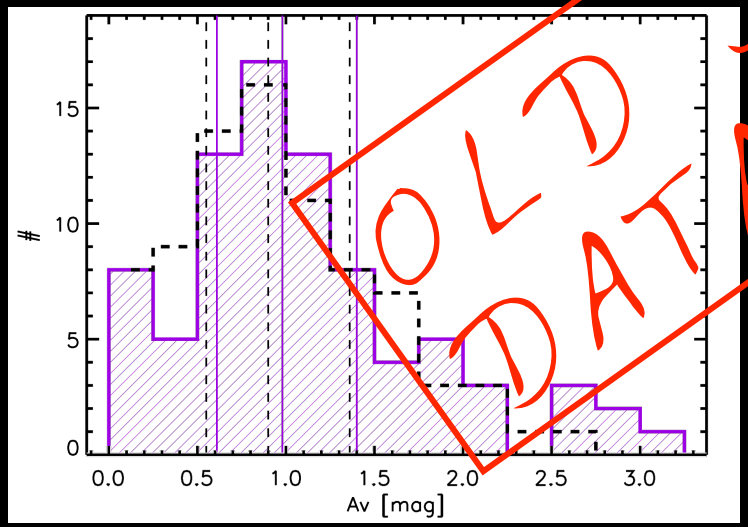
-solutions: k-means clustering (tau-age, A_V-age planes)

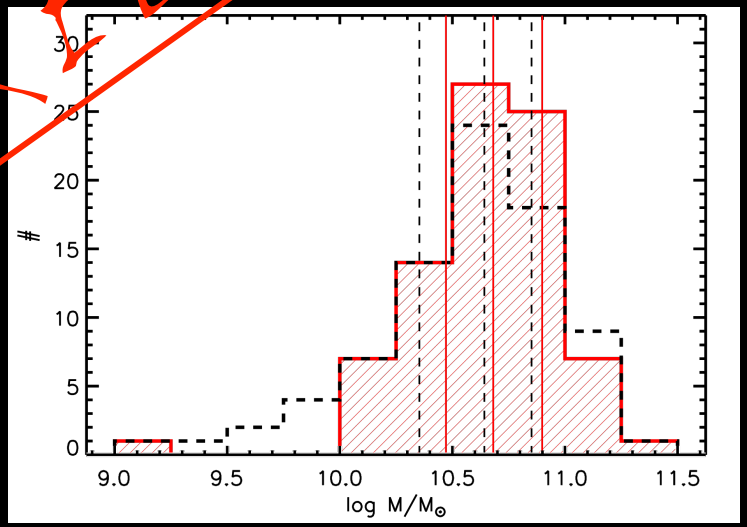


Results: preliminary



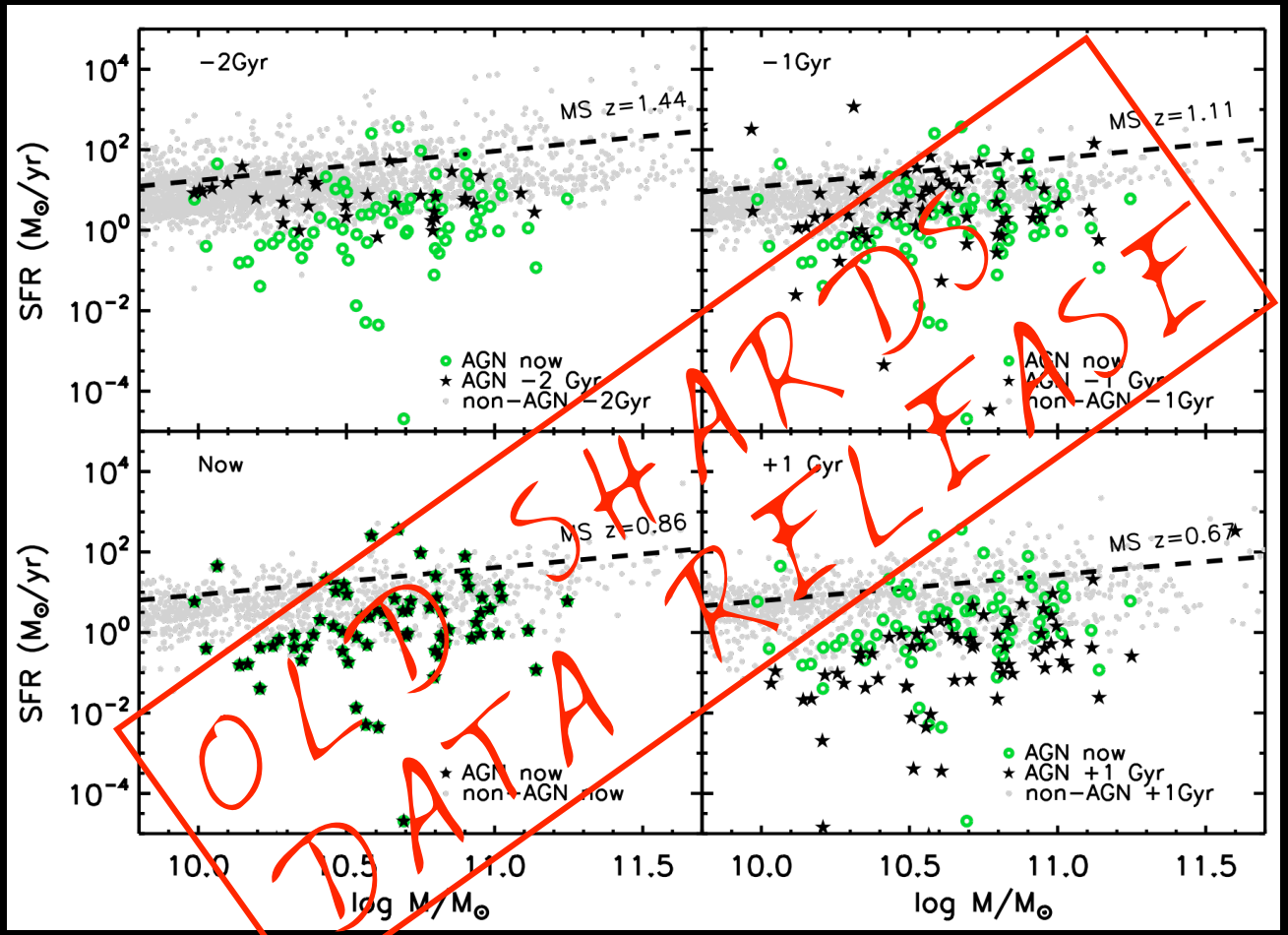






OLD SHARDS DATA RELEASE

Results: preliminary



Summary

Question: AGN seem to enjoy living in the GV, are they responsible of the star formation quenching?

Aim: to characterise the SFH of AGN with the best possible data.

Method: SED fitting of AGN plus control sample.

Preliminary results: the stellar populations of AGN do not seem to differ much from those of inactive galaxies.

Coming soon: paper!