AGN VS. STAR FORMATION

POSTER SESSION 2
FEEDING

Star-Formation Laws and AGNs for high-z radiogalaxies

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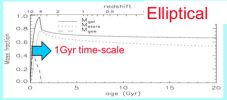
GAS to STAR FORMATION

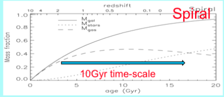
FOR THE HUBBLE SEQUENCE : STAR FORMATION LAWS

$$SFR(t) = \alpha \ Mgas^{P1}(t)$$

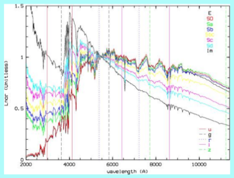
With only 4 main parameters by types: astration α, p1, infall, wind + IMF

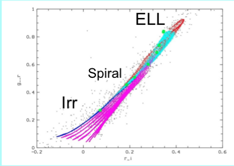
Plus STARBURST.

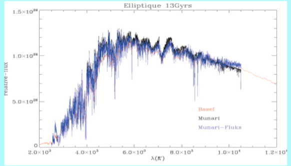


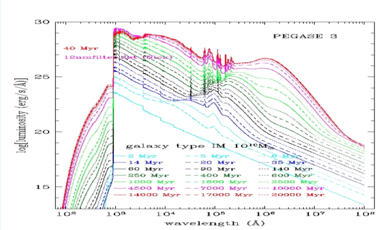


LOCAL Synthetic Colour-Colour diagram
Compared to SLOAN data (dark points)









PEGASE.3 (www2.iap.fr)
Readme near of submission,
Fioc, RV, Dwek , 2014
STAR+GAS+DUST:
Chemical evolution O, C; Si FE
Attenuation/emission
Grain models, radaitive transfer
2 media: clouds + ISM
2 geometries slab + spheroid

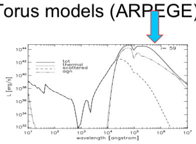
For Hubble sequence:Ell-Spirals and Irr
+ STARBURST

Evolutionary Spectral synthesis (TYPE, MASS and AGE) Applied to the RADIOGALAXY catalog HeRGE ➔ARPEGE

Drouart et al, 2014, 2015, De Breuck et al, 2010, Seymour et al, 2012

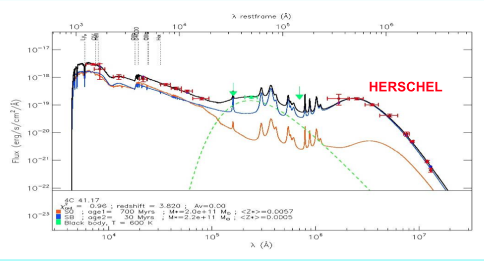
- **70 powerful High-z radiogalaxies,**
- **1<z<5, Herschel observations**
- **SPIRE/PACS, Submm + SPITZER +**
- **VLT + SCUBA + LABOCA**

+ A variety of Fritz's Torus models (ARPEGE)
Drouart et al, 2015



- **The prototype radiogalaxy 4C41.17, @ z=3.8,**
- **UV-Spitzer-Herschel-submm SED**
- **(+) = observations**
- **models: total (black): evolved SB (blue) + AGN (dashed green))**

Rocca-Volmerange et al, 2013,MNRAS, 429, 2780



- **Starburst component of ~30Myrs old and huge 10^{10-11}MΘ : coalescence?**
- **Old early type (Ell-SO), zfor=>10, short timescale ~1Gyr**
- **Normalized IMF: a reduced effect on stellar mass,**
- **Extremely massive @ z>4,**

Towards A Complete Census of Compton-thick AGN & N_H Distribution in the Local Universe (B1)

★ A. Annuar ★ Durham University ★

➢ *What is Compton-thick (CT) AGN?*

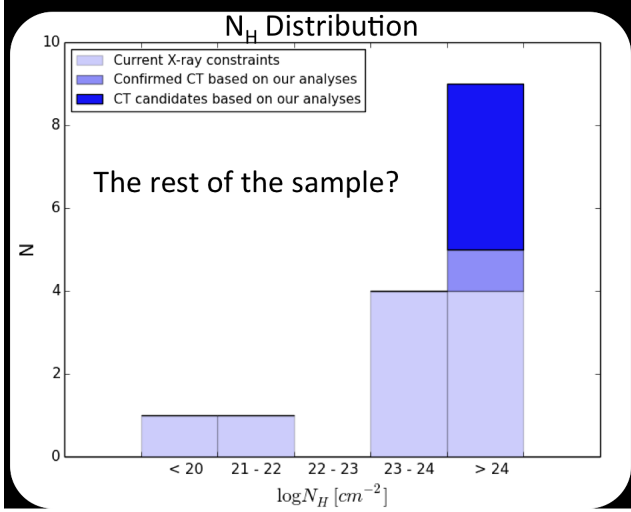
- AGN that are obscured in the X-ray band by the circumnuclear torus with column density, $N_H > 10^{24}$ cm^{-2}.

➢ *Sample*

- Volume-limited mid-IR selected AGN sample within 15 Mpc (Goulding & Alexander 09).

➢ *Methods used to identify CTAGN:*

1. X-ray Spectral Fittings
   - Direct N_H measurements
2. Optical
   - $F_{2\text{-}10keV} / F_{[OIII],corr} < 1$ (Bassani et al. 99)
3. Mid-IR
   - $F_{2\text{-}10keV} / F_{12\mu m} < 0.04$ (Gandhi et al. 09, Rovilos et al. 14)

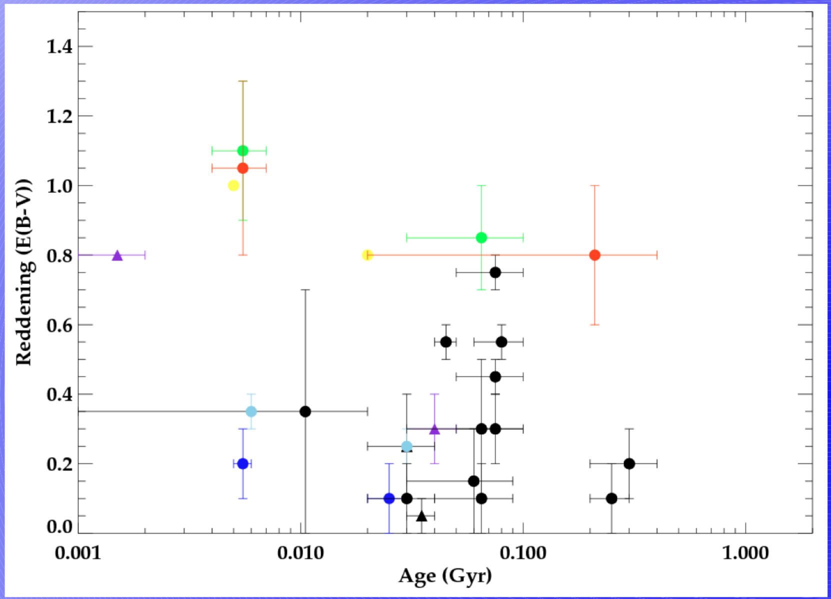


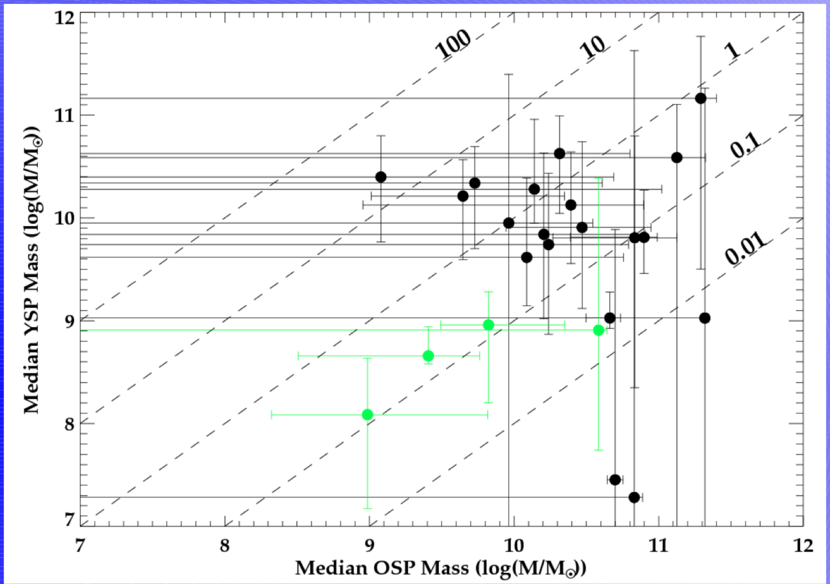
*: private communication with A. D. Goulding.
†: This source has been suggested to be CT in several literatures e.g Cappi et al. (2006).

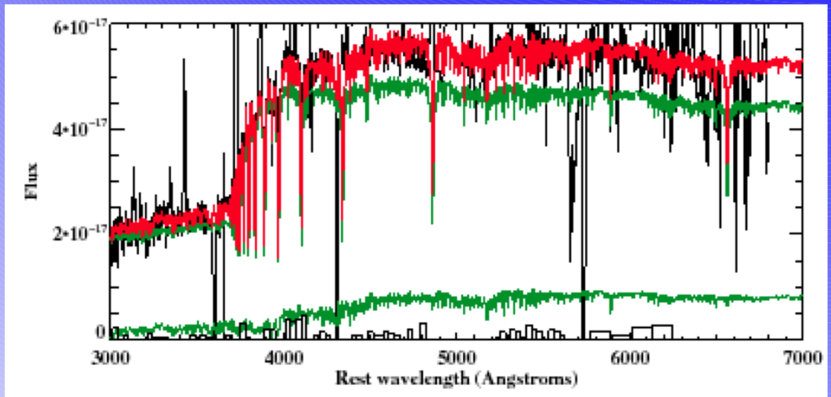
AGN	Optical	MIR	log N_H [cm^{-2}] (X-ray)	Final Classification
Circinus	CT	CT	24.6	CT
ESO 121-G6	?	?	?	?
NGC 0613	No	No	23.6	No
NGC 0660	CT	CT	?	CT?
NGC 1068	CT	CT	> 25.0	CT
NGC 1448	?	CT	?	CT?*
NGC 1792	?	No	?	?
NGC 3486	CT	?	?	CT?†
NGC 3621	No	CT	?	?
NGC 3627	CT	CT	?	CT?
NGC 3628	No	?	?	?
NGC 4051	No	No	23.3	No
NGC 4565	No	?	21.4	No
NGC 4945	No	No	24.7	CT
NGC 5033	No	No	< 20.9	No
NGC 5128	No	No	23.0	No
NGC 5194	CT	CT	24.7	CT
NGC 5195	?	CT	?	?
NGC 5643	CT	CT	?	CT
NGC 6300	No	No	23.3	No
%	35%	45%	20%	25-45%

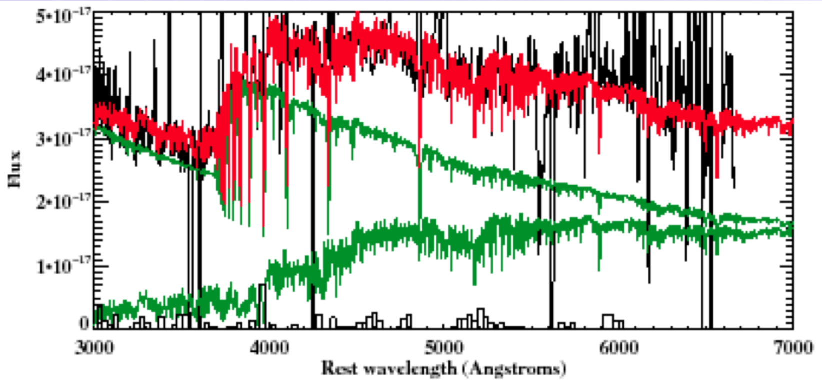
The stellar populations of type II quasars

Patricia Bessiere, C. Tadhunter, C. Ramos Almeida, M. Villar-Martin









AGN in OMEGA - OSIRIS Mapping of Emission-line Galaxies in A901/A902

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http://www.nottingham.ac.uk/~ppzalc

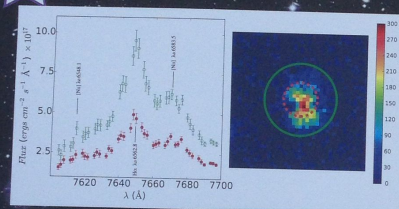
The University of Nottingham
UNITED KINGDOM · CHINA · MALAYSIA

Ana Chies-Santos, Bruno Rodríguez del Pino,
Alfonso Aragón-Salamanca, Steven Bamford and Meghan Gray
University of Nottingham, UK

ABSTRACT

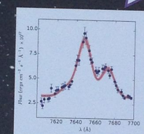
The OMEGA survey is making a census of active galactic nuclei (AGN) in the A901/902 multi-cluster system at z=0.165 with the OSIRIS instrument at the GTC (La Palma). Using the tunable filter mode of OSIRIS we are targeting the Hα and [N II] optical lines in emission for most of the galaxies in the system, which cover about the size of the full moon in the sky. We combine our data with an extensive dataset already available including HST, COMBO-17, Spitzer, GALEX and XMM-Newton. The main goal of the survey is to understand the environmental dependence of AGN and star formation (SF) activity and shed more light into the transformation from star-forming into passive ones. Here, the first results on AGN activity in the highest density regions of the survey are presented.

1

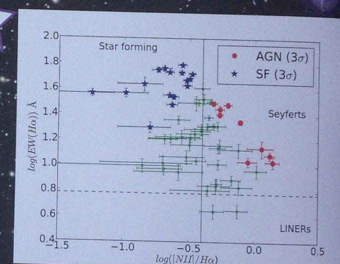


Left: central (red) and total (gree) spectra generated from 42 images of a single galaxy. The location of the Hα and [N II] lines are indicated. Right: the two different apertures used. For a movie ilustrating the different snapshots, see the QRcode below.

2

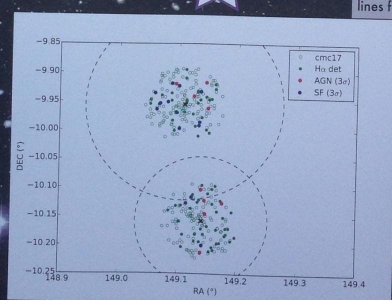


The spectra are modelled with MCMC techniques.



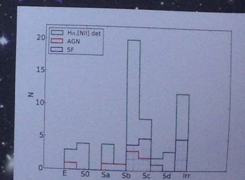
WHAN diagnostics diagram (Cid-Fernandes+10) for A901a and A902 galaxies where the Hα and [N II] lines fall within our wavelength range.

3



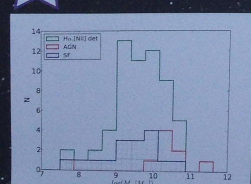
The distribution on the sky of the densest regions of A901/2. The highly likely AGN and SF galaxies tend to avoid the densest regions.

4



The distribution of galaxy types. While AGN tend to be of earlier type, SF galaxies are of later type.

5



The mass distribution of AGN and SF galaxies. AGN tend to have higher mass hosts if compared to SF galaxies.

The background image is from COMBO-17 and can be found here http://www.nottingham.ac.uk/astronomy/stages/

STRUCTURE AND MORPHOLOGY OF X-RAY-SELECTED ACTIVE GALACTIC NUCLEUS HOSTS AT $1 < z < 3$ IN THE CANDELS-COSMOS FIELD

Lulu Fan[1,2] Guanwen Fang[1] Yang Chen[1,3] Kirsten K. Knudsen[2], and Xu Kong[1]
1 Center for Astrophysics, University of Science and Technology of China, 230026 Hefei, China;
2 Department of Earth and Space Sciences, Chalmers University of Technology, Onsala Space Observatory, Sweden
3 Astrophysics Sector, SISSA, Via Bonomea 265, I-34136 Trieste, Italy

By analyzing structure and morphology of a X-ray-selected AGN sample and comparing with the control sample of non-active galaxies, we find that X-ray-selected AGNs have the similar structure and morphology with non-active galaxies at z~2 and major mergers are NOT necessary for triggering AGN activities.

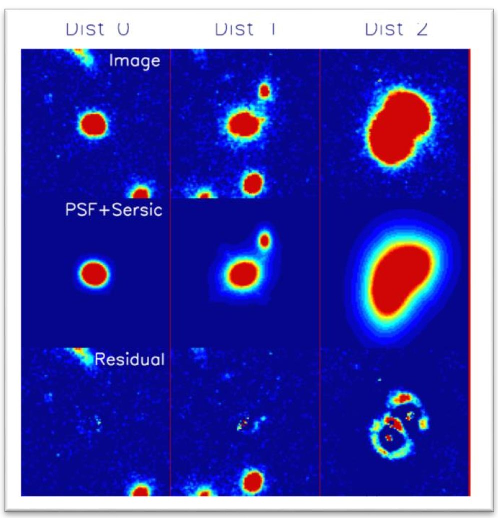


Figure 1

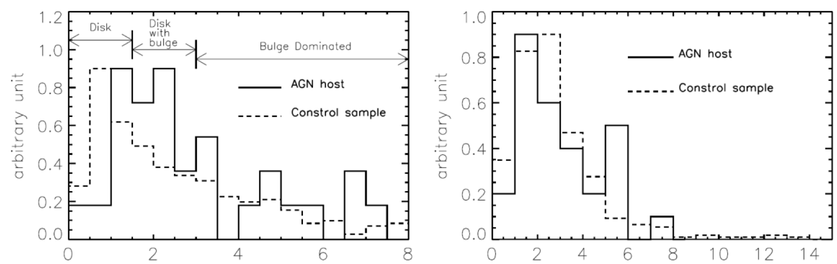


Figure 2

Figure 1: 2-D brightness profile fit and visual classification
Figure 2: Dist. of Sersic index and Re
Figure 3: Dist. of morphological parameters

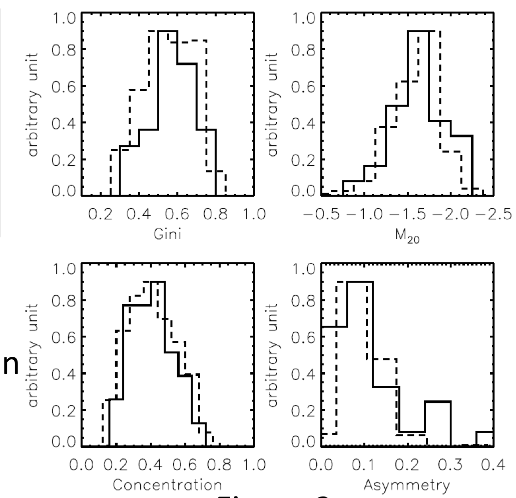


Figure 3

NGC 3998

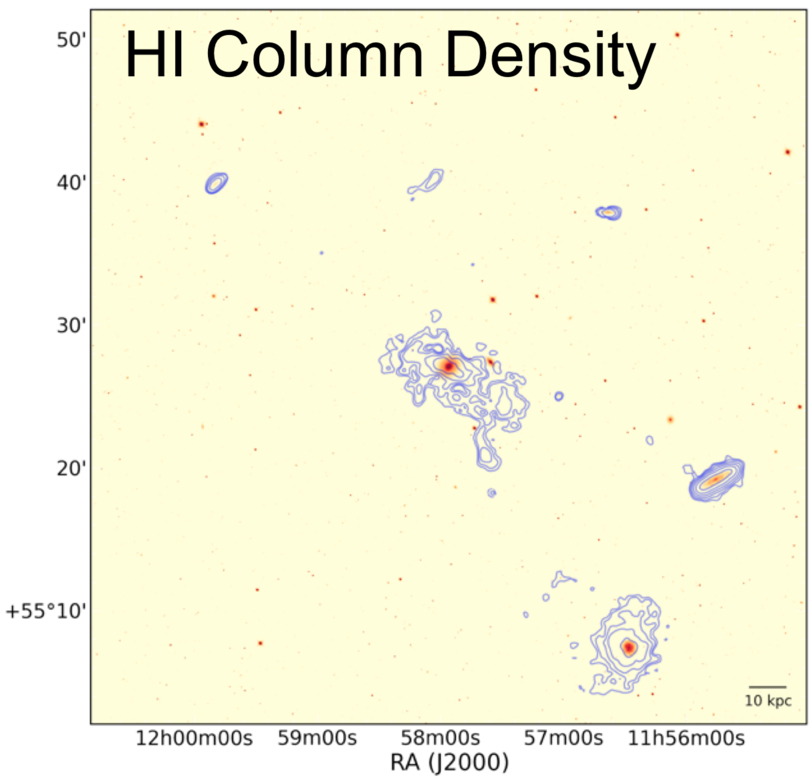
Radio Bubbles and Ongoing Interaction

Bradley Frank[1], Raffaella Morganti[1,2], Tom Oosterloo[1,2]

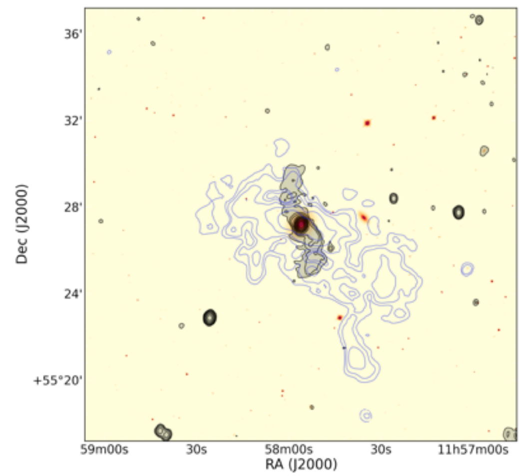
[1] Netherlands Institute for Radio Astronomy - ASTRON

[2] Kapteyn Astronomical Institute, Rijks Universiteit Groningen

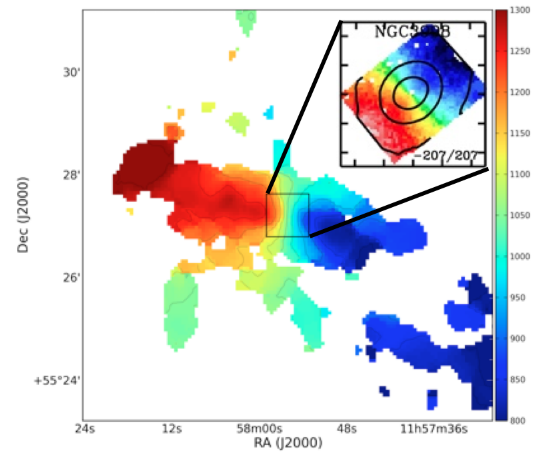
Poster B5



+ Radio Continuum



Velocity Fields



- NGC 3998: Red and Dead Early Type S0 Galaxy
- LINER / LLAGN
- Large rotating HI disk, offset from stars
- Signs of recurrent radio emission

- Is the diffuse radio emission starburst or AGN driven?
- Is there any relation between the ongoing interaction and the triggering of radio continuum?
- Use HI, radio continuum, and optical to compute timescales to answer these questions in a *qualitative* way.
- Come to **Poster B5** to see more!

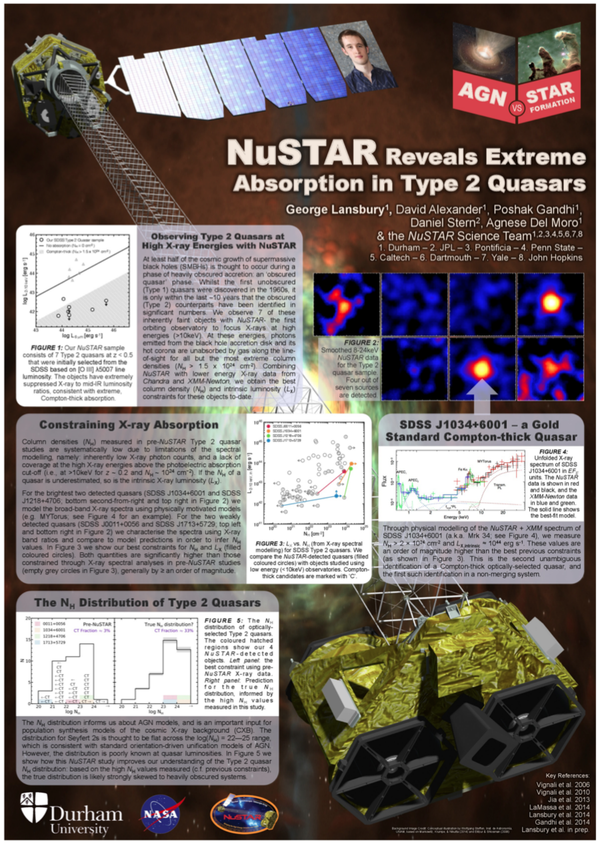
ASTRON
Netherlands Institute for Radio Astronomy

George Lansbury (Durham)

Supervisors: David Alexander (Durham)
Poshak Gandhi (Durham)
Daniel Stern (JPL)

B6

Identifying Heavily Obscured Type 2 Quasars with NuSTAR

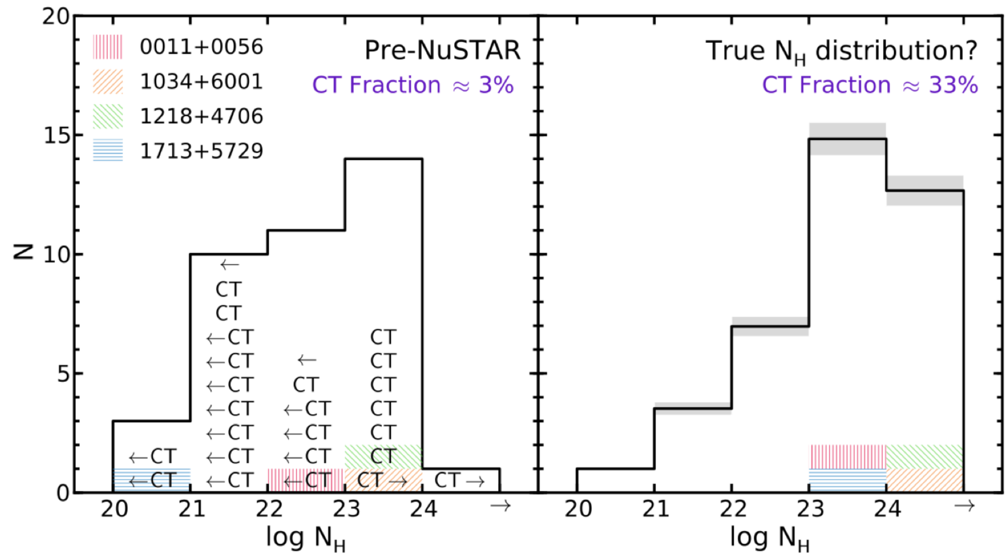


Why?

Constrain AGN models

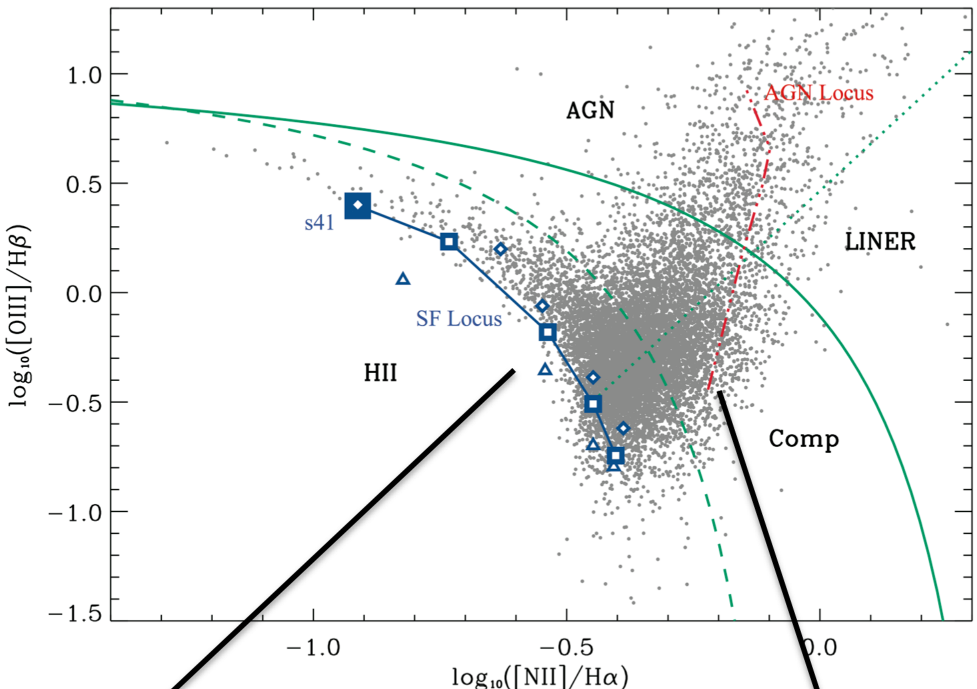
Explain Cosmic X-ray Background (CXB)

The N_H distribution of SDSS Type 2 quasars:

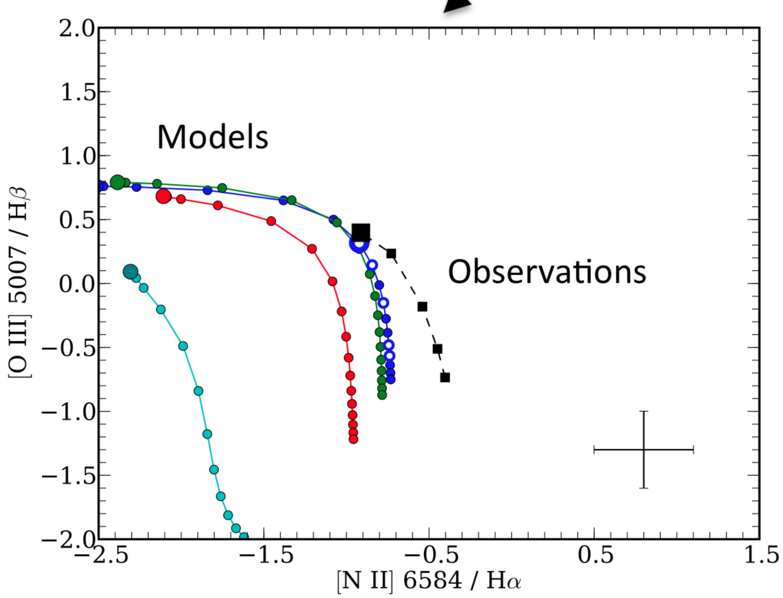


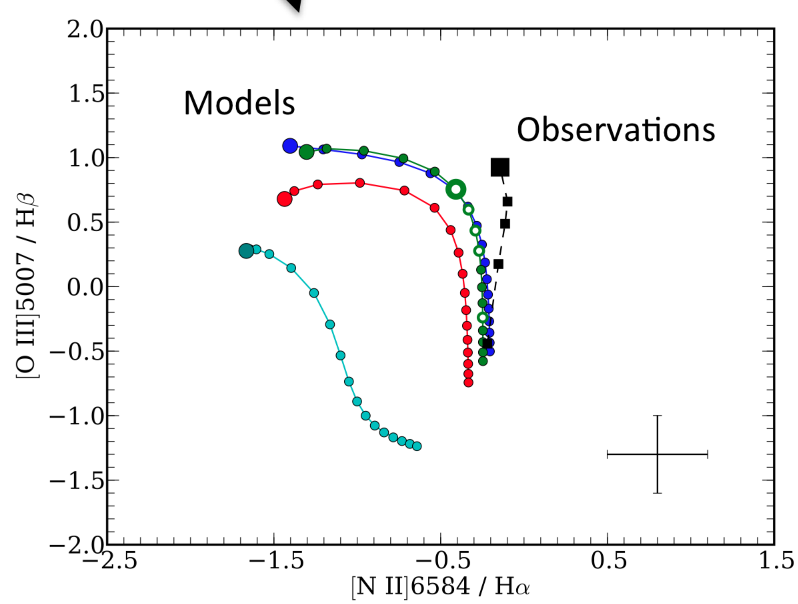
(N_H = Hydrogen Column Density)

The radial and density distributions of clouds are the physical parameters responsible for the sequences of AGN and SF galaxies on the BPT diagram



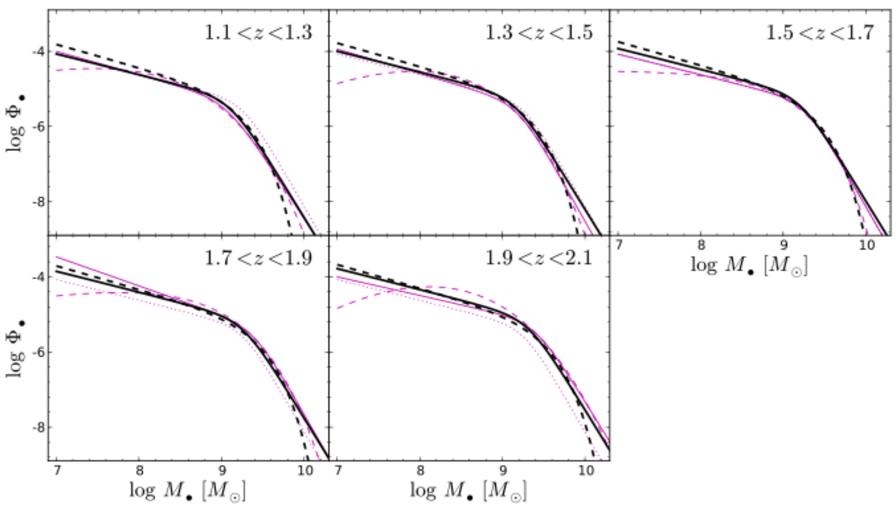
Higher ionization galaxies have more centrally concentrated emission line regions than lower ionization galaxies (Richardson et al. 2014)

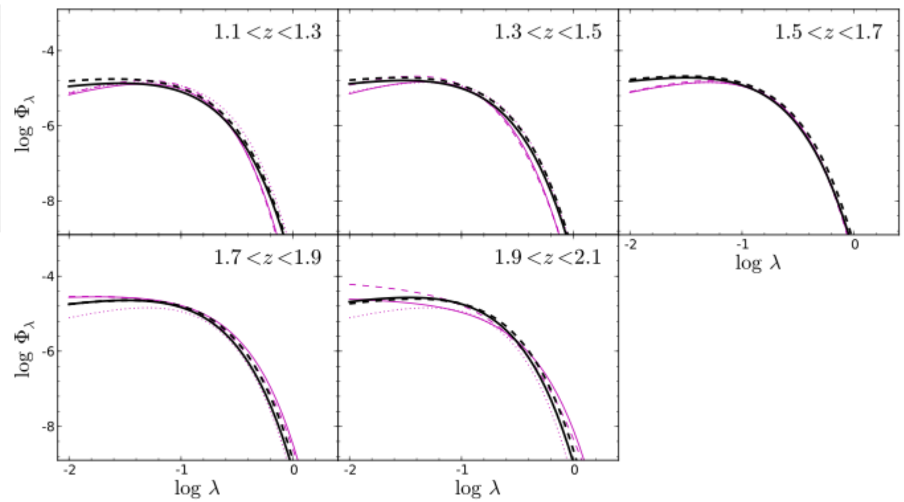




B10: The cosmic growth of the active black hole population (Andreas Schulze, Kavli IPMU)

⇒ determine **active black hole mass function and Eddington ratio distribution function** at $1 < z < 2$ for broad line AGN from combination of SDSS, VVDS and zCOSMOS.

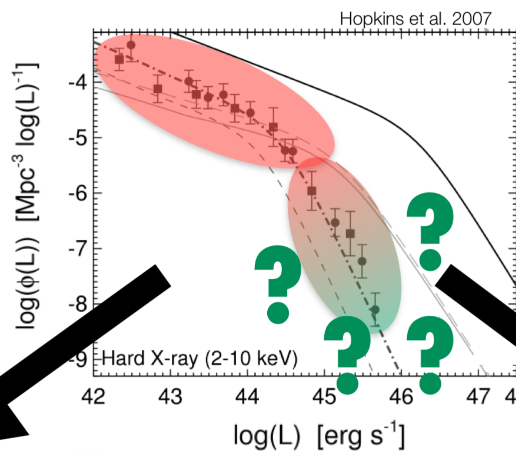




⇒ BH mass main driver of AGN downsizing

Triggering AGN from Seyferts to Quasars: Do mergers matter?

Carolin Villforth (University of St Andrews)

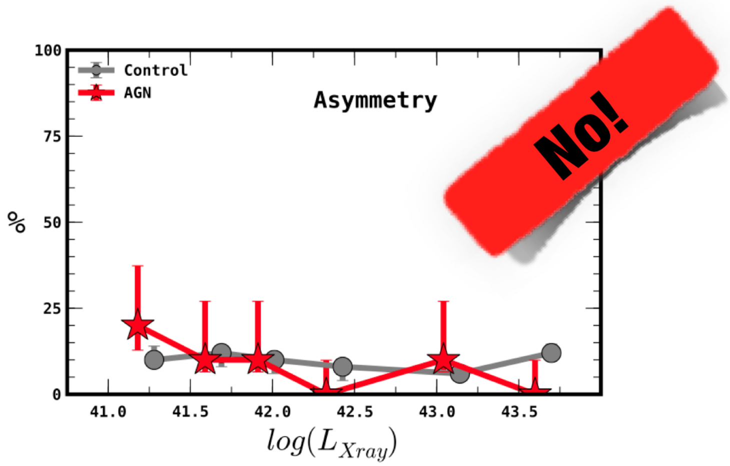


Moderate luminosity AGN in CANDELS

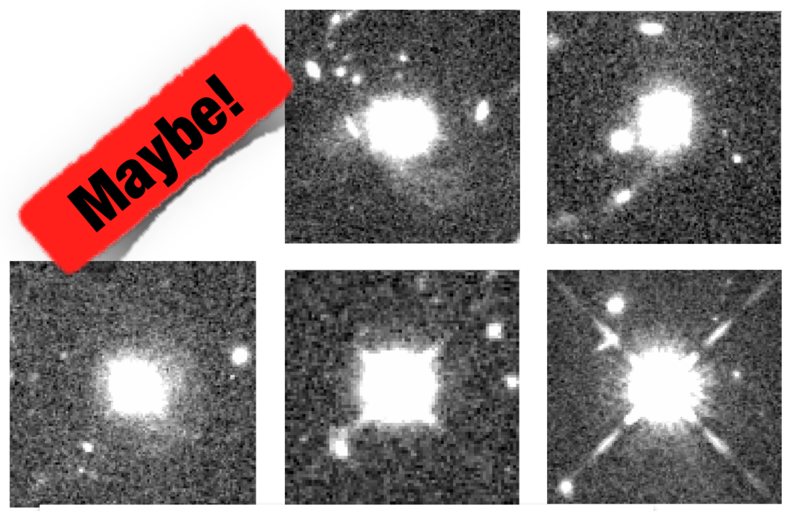
➧ no enhanced disturbances when compared to control

Luminous X-ray selected quasars

➧ 40% show some signs of disturbance



Published: Villforth et al. 2014



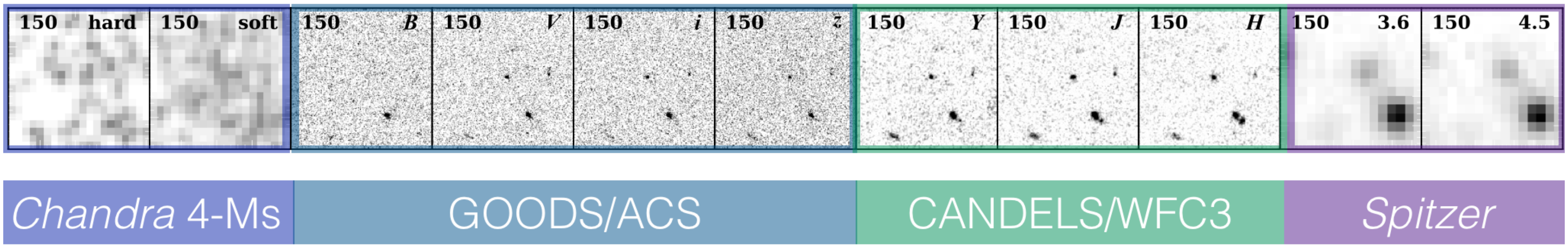
Preliminary: Villforth et al. in prep

The systematic search for z > 5 AGN in the *Chandra* Deep Field South

B13

Anna K. Weigel (ETH Zurich),

Kevin Schawinski, Michael Koss, Ezequiel Treister, C. Megan Urry, Benny Trakhtenbrot



> we ask: how & when do BHs form & evolve?

> we apply: Lyman Break Technique, colour-criteria, photometric redshift code & X-ray Hardness Ratio

> we find: 3 z > 5 candidates, most likely low z interlopers

> why do we **not find** any high z AGN?

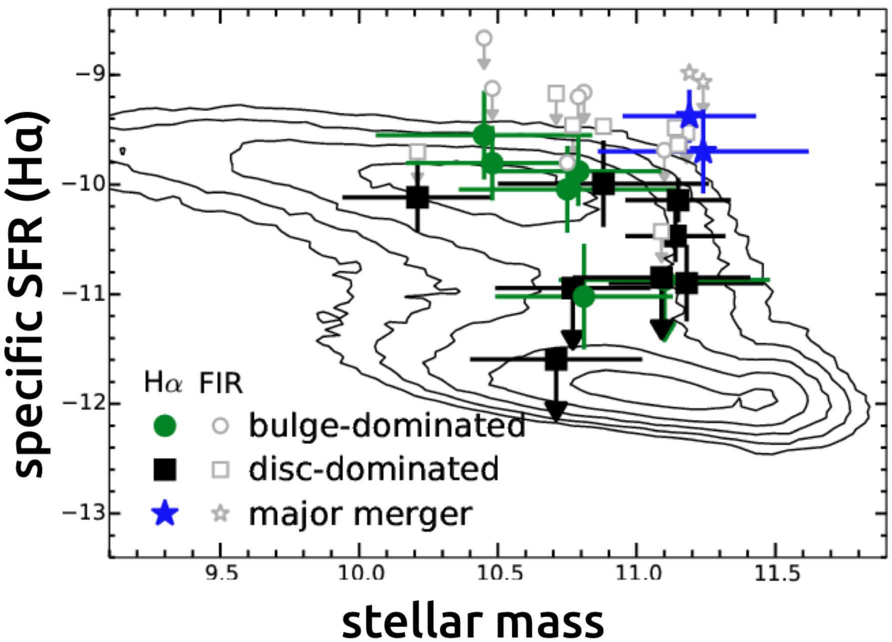
Quenching of star formation in luminous QSOs?

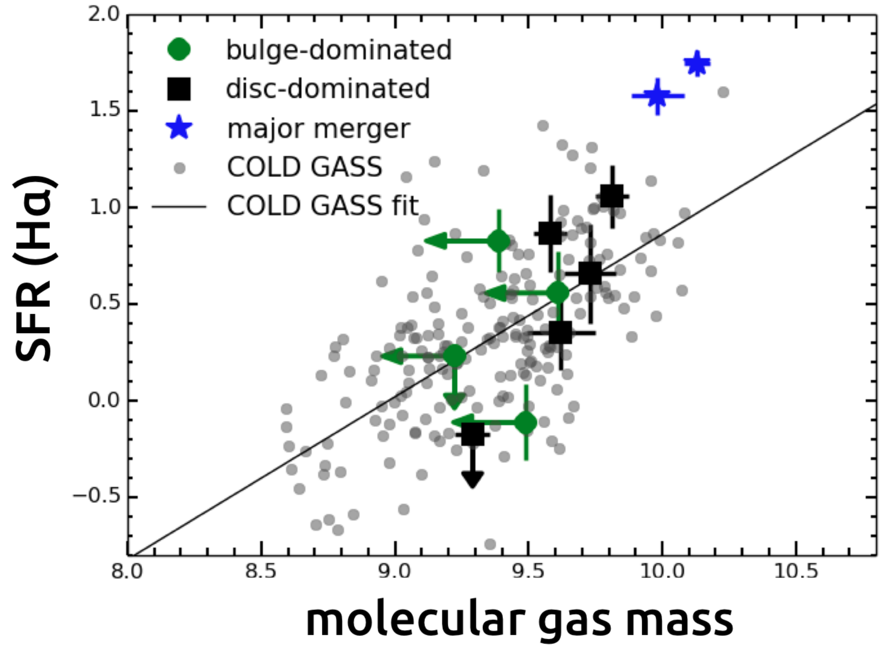
VLT-VIMOS
IFU data

combine

IRAM 30m
CO(1-0)

18 type-1 QSOs (z<0.2)





Local type-1 QSOs are on the MS in terms of sSFR and gas mass

➔ **Quenching of star formation is not obvious in majority of QSOs**

Galaxy Evolution at z≥2 in the Argo Simulation: *Cosmological Starvation, Mergers, and Morphology*

Robert Feldmann[1], Davide Fiacconi[2], Lucio Mayer[2]

[1]Department of Astronomy, University of California, Berkeley [2]Institute for Computational Science, University Zurich

Poster C3

Quenching via Cosmological Starvation*

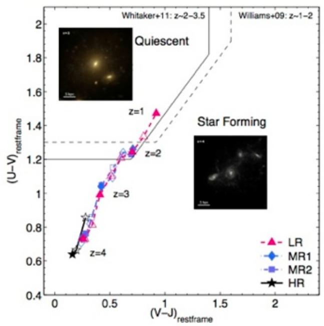


Figure (left): *UVJ diagram of the primary (most massive) galaxy. It turns quiescent at z~2 according to the UVJ classification. The inlets are mock images in the HST I, J, and H bands (logarithmic stretch). Between z=4 and z=2 the primary galaxy evolves from a blue, compact, star forming galaxy with a disk component into a much redder, still compact, early-type galaxy.*

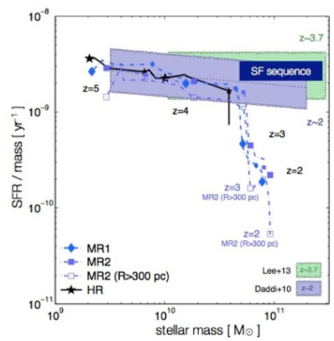


Figure (right): *Specific star formation rate vs stellar mass of the primary galaxy. Different lines correspond to different re-runs as indicated. The observed star formation sequence is shown by the blue and green shaded areas at the top. The primary galaxy lies on the star forming sequence until z~3.5. At z~3.5 the specific star formation rate drops by a large factor (5-10) within a few 100 Myr.*

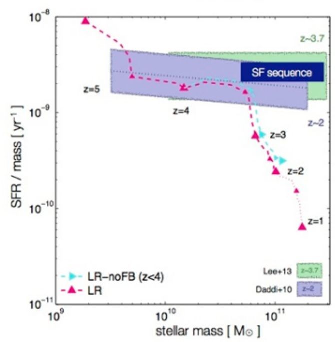


Figure (right): *Same as figure above but for two LR runs (red curve: default feedback model, cyan curve: no supernova feedback). The figure shows that the drop in the specific star formation rate is* ***not initiated by feedback processes.***

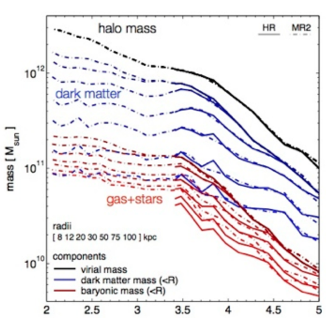
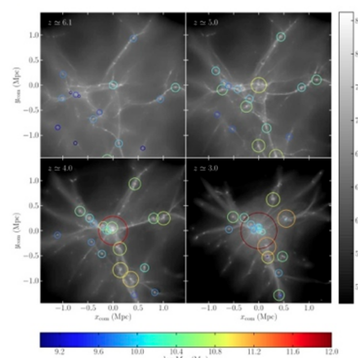


Figure (left): *Evolution of the dark matter and baryonic mass of the primary galaxy* ***within fixed proper radii*** *(see legend). The black line at the top shows the virial mass of the halo. The virial mass increases steadily as a result of continued accretion at large radii (≥100 kpc) and the drop of the background density of the Universe with cosmic time. In contrast, the dark matter and baryonic masses grow strongly only at z > 3.5 and show little growth afterwards.*

What is shutting down SF in massive galaxies at z~2?

Cosmological Simulation without AGN feedback

The Argo Simulation



- A cosmological, zoom-in simulation of a galaxy group (Mvir ~ 2×10^{13} M☉ at z=0)
- high resolution region ~3 comoving Mpc across inside a box of 123 comoving Mpc
- focus on a typical region of the Universe (overdensity ~1.4 within 7 Mpc)
- run with the SPH code GASOLINE
- physics: star formation, supernova feedback, atomic cooling, UV background, stellar mass loss

Figure: *The Argo simulation volume at various redshifts. Brightness indicates gas surface density, circles show positions and virial radii of the 22 galaxies in our sample. The primary (most massive) galaxy is at the center.*

Table: *The low, medium, and high resolution runs of the Argo simulation. The second column provides the gravitational softening length and the mass of SPH particles. Columns 3 and 4 show the gas density threshold for star formation and the final redshift, respectively.*

LR:	~ 300 pc, m_{SPH} ~ 10^6 M☉	n_{SF}=0.1 Hcc	to z=1
MR:	~ 150 pc, m_{SPH} ~ 10^5 M☉	n_{SF}=0.1 Hcc n_{SF}=5 Hcc	to z=2
HR:	~ 100 pc, m_{SPH} ~ 10^4 M☉	n_{SF}=5 Hcc	to z~3

Reproduce global galaxy properties & "Quenching"

see Feldmann & Mayer: arXiv:1404.3212