Galaxy Evolution and Link with the Environment

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Galaxy Evolution

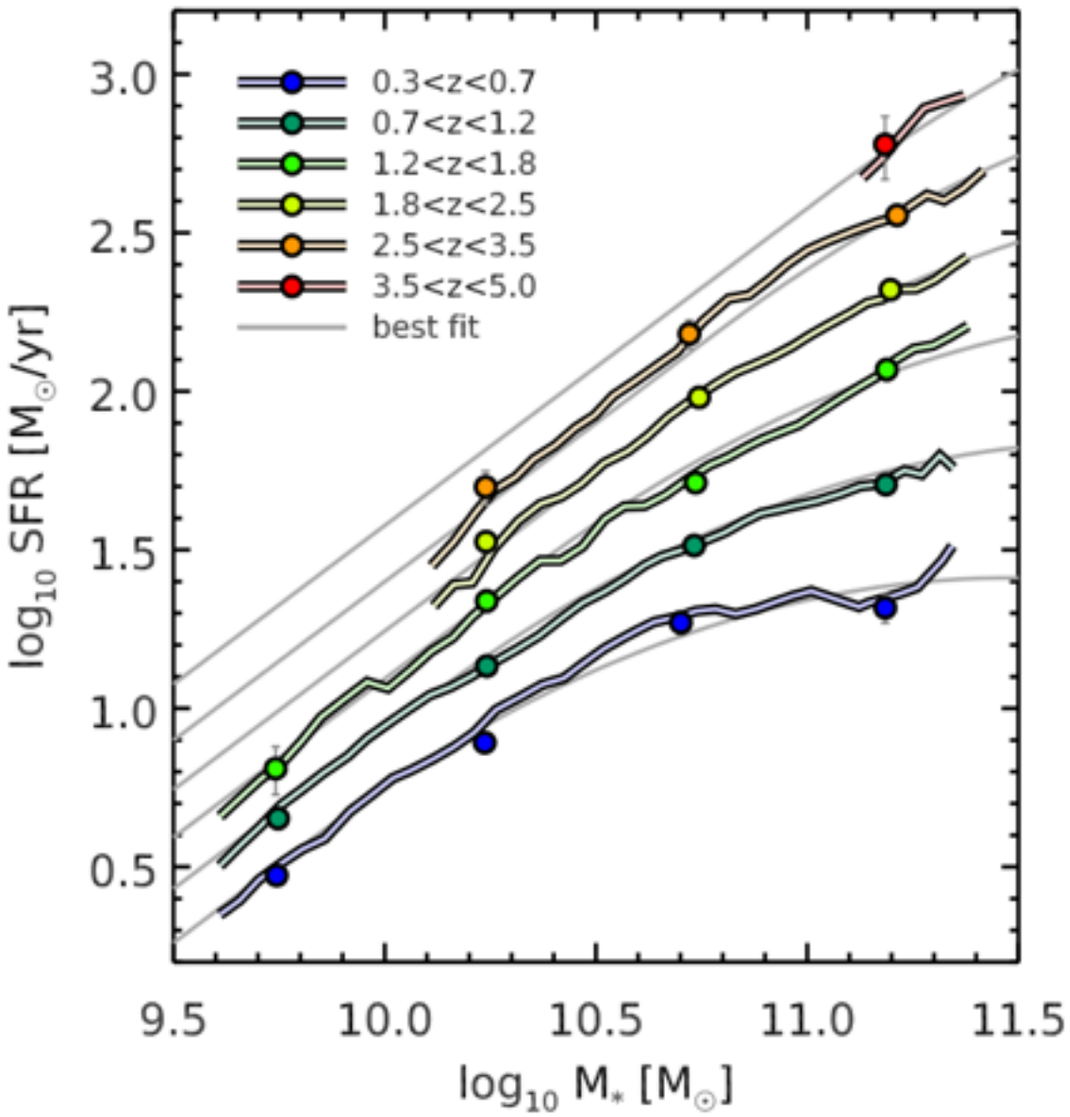
- We will focus here on galaxies at z $<$ 3.0
- Difficult to escape a "à la Prévert" inventory here
  - From the answer to 2015 call:
    - Star Formation (2) , SED fitting, AGNs and AGN feedback (2), ETG, surveys (3), ISM, Environment...
    - All but one proposals are data and observations driven.
    - Galaxy evolution was one of the main theme of Herschel. As such, this theme beneficed from CNES support while it lasted
    - PNCG supported OHP observations (GHASP, SOPHIE for Gaia calibration) until 2015, but this was a small fraction in PNCG budget,

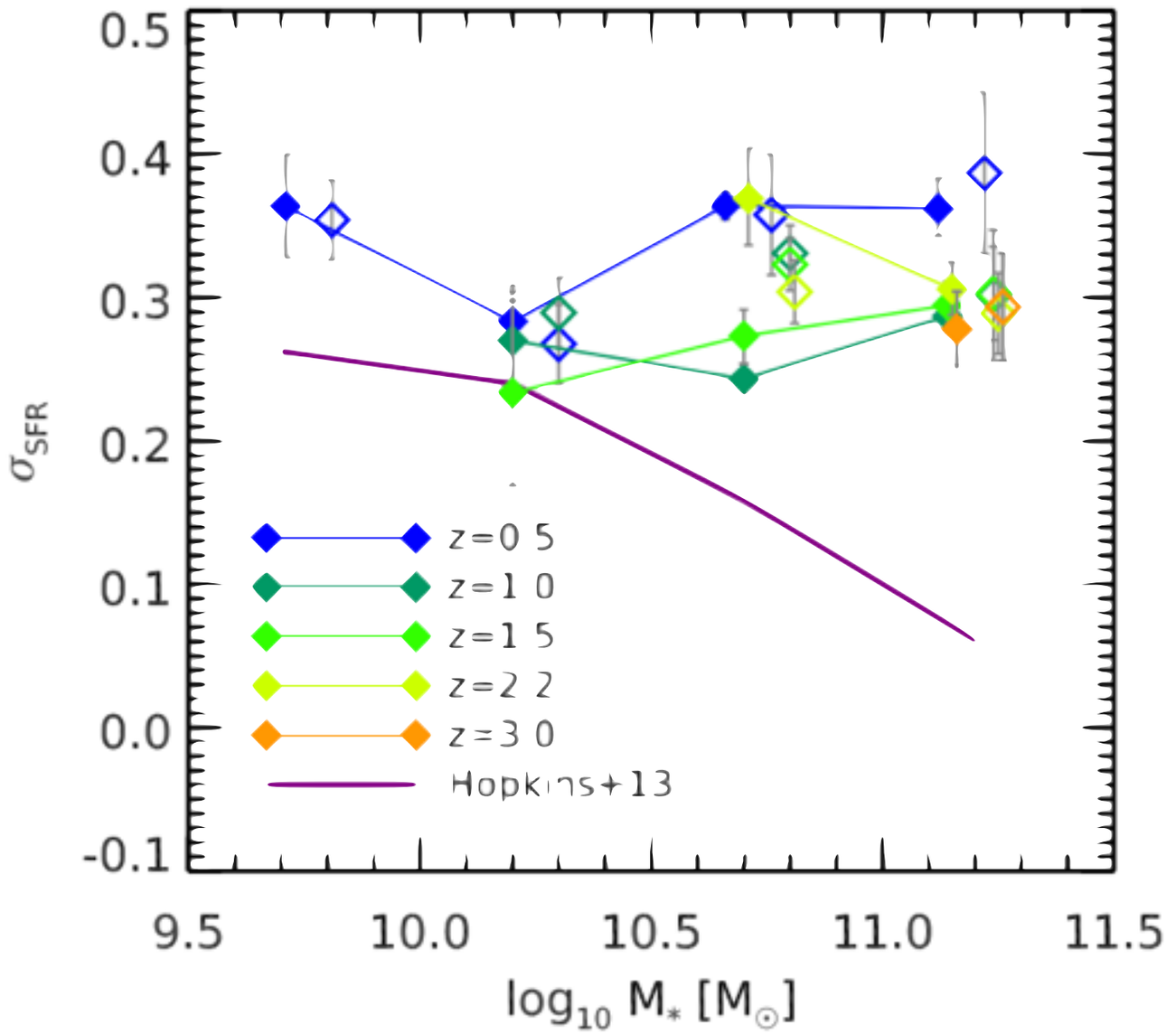
PNCG call results for AO

Year	Requested	# Request	Funded (k€)	CNES Herschel (k€)		# Rejected
2014	110	13	64	36	58%	2
2015	127	15	60	20	56%	3
2016	120	16	49	-	40%	6

- The impact of Herschel support by CNES is clearly visible during the period.
- Theme 4 will now benefit from CNES Support to GAIA
- CNES Support to JWST will probably be at higher z.

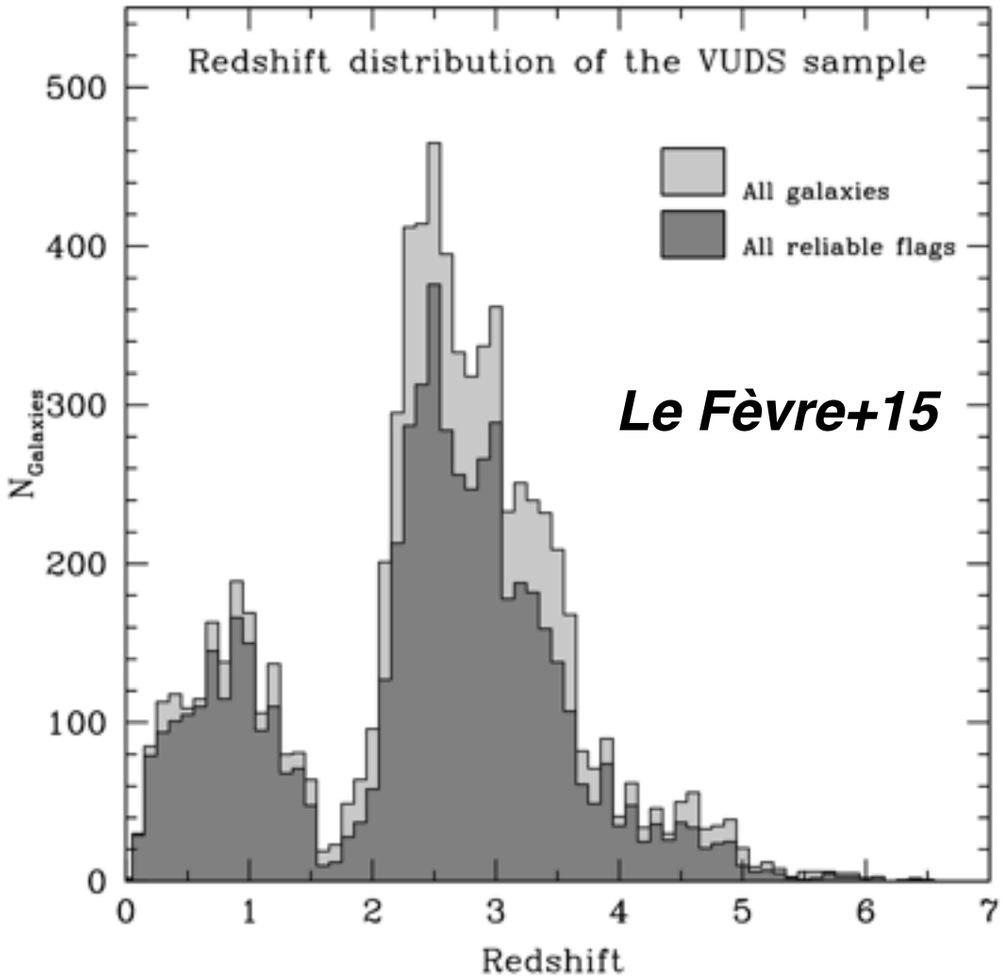
The Main Sequence of Star Forming Galaxies





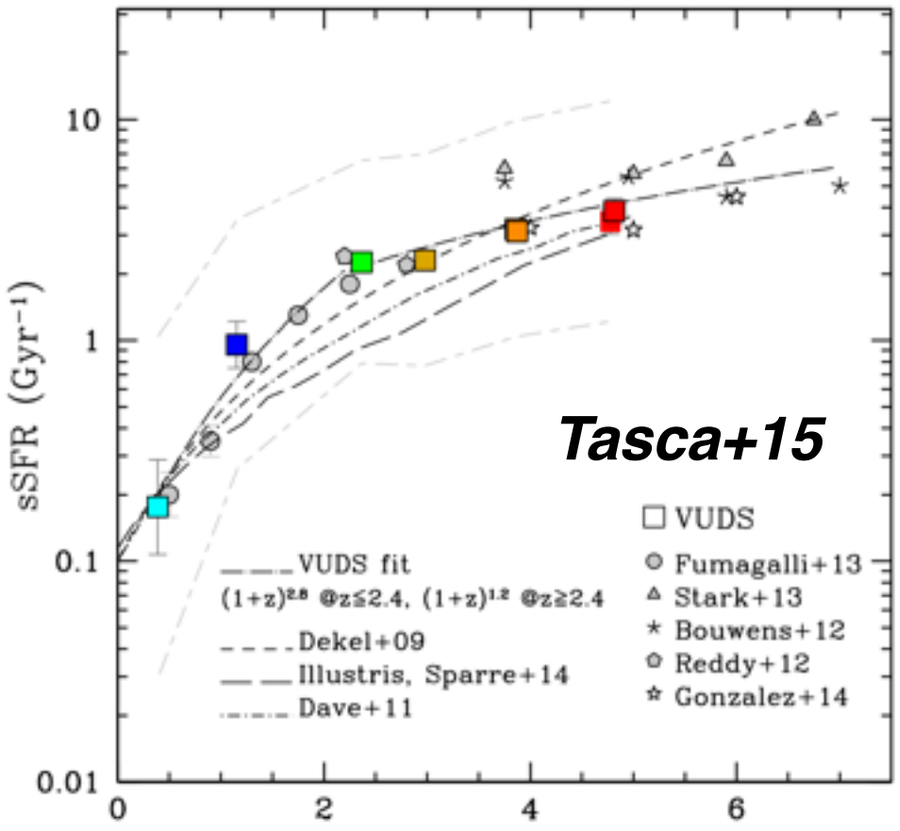
- The MS is now firmly established, thanks to Herschel Surveys (e.g. Schreiber et al., 2015).
- It now become a test for numerical simulations (Illiustris, Horizon-AGN).

VUDS: VIMOS Ultra-Deep Survey

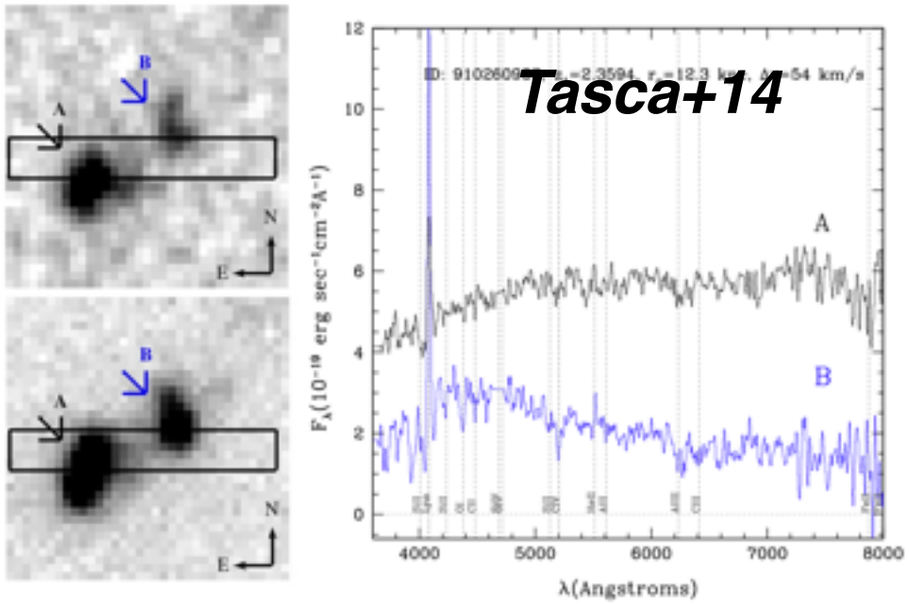


10 000 galaxies up to z ~ 6

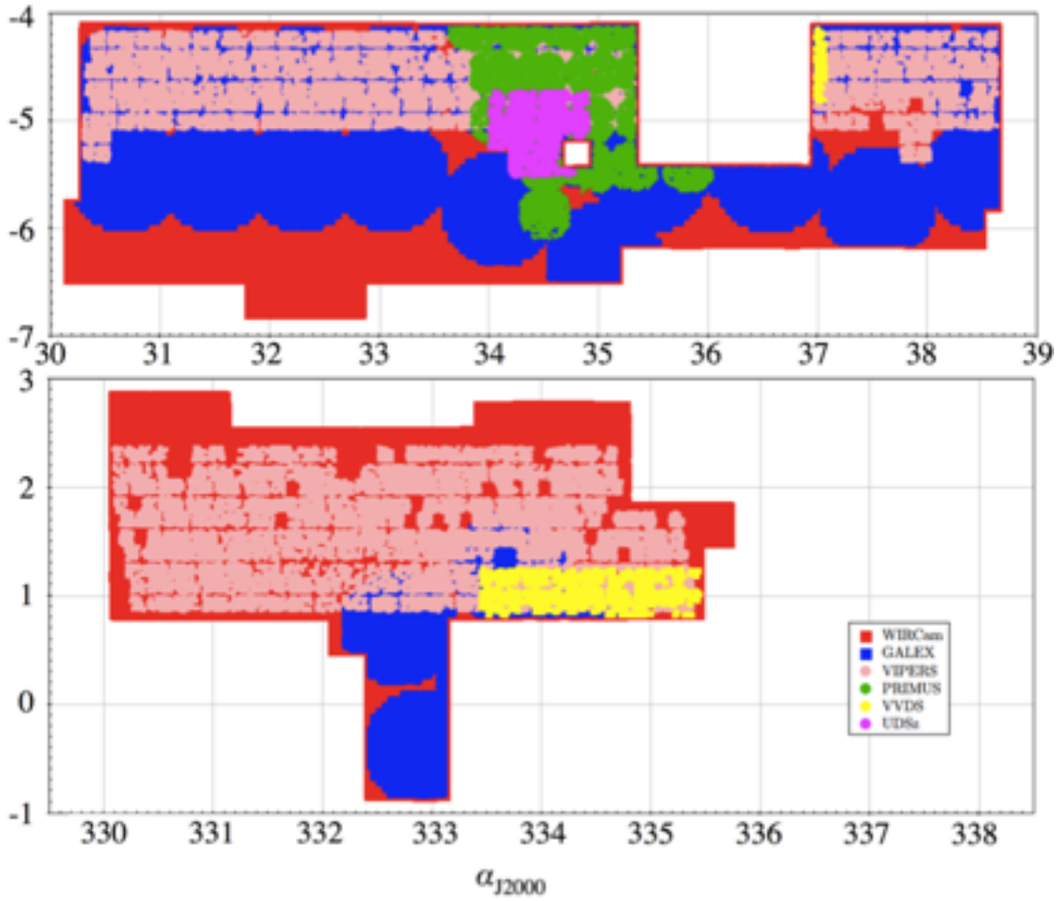
Major mergers @ z~3



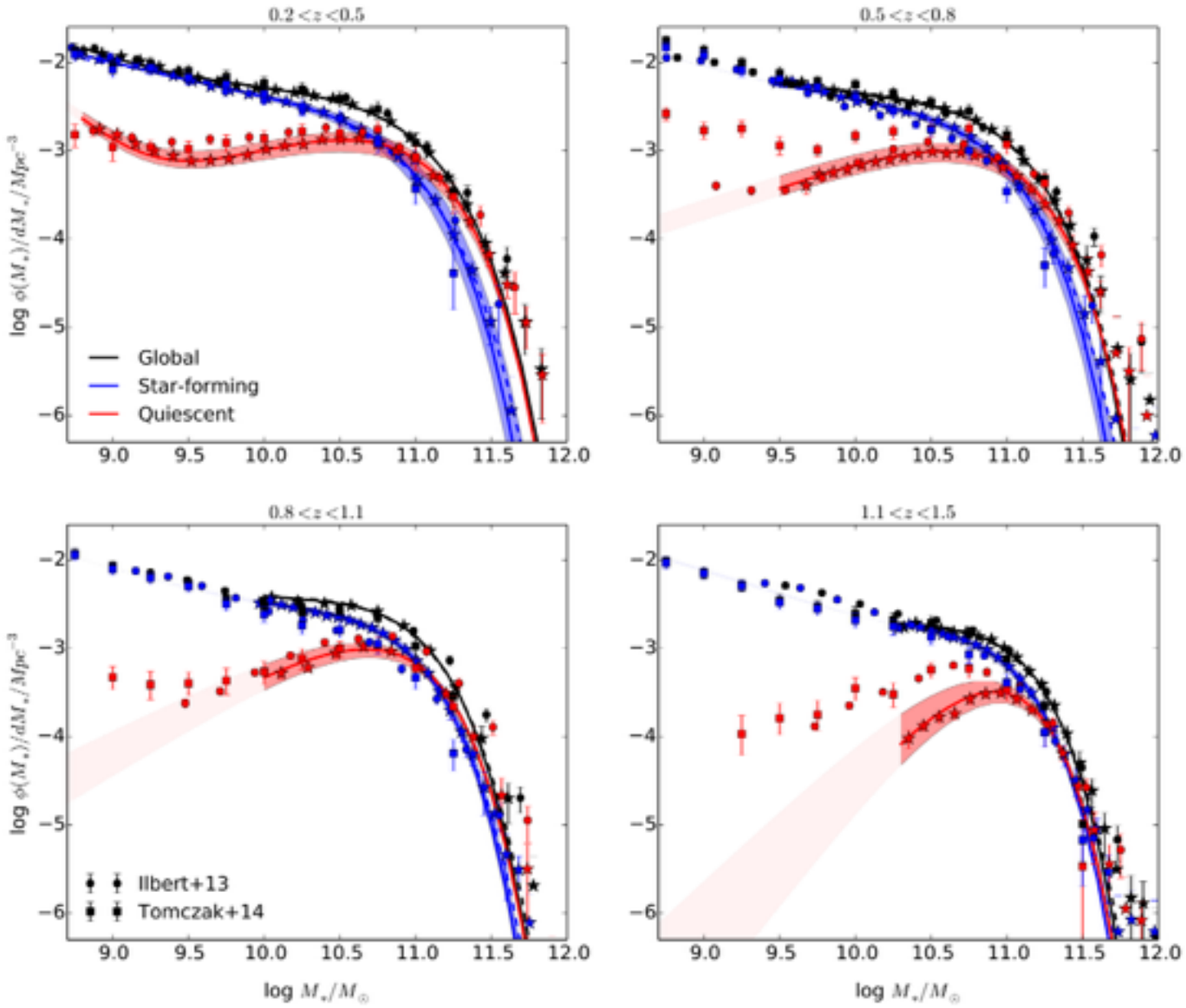
SFG Main-sequence up to z~5



Stellar Mass Function Evolution at z < 1.5



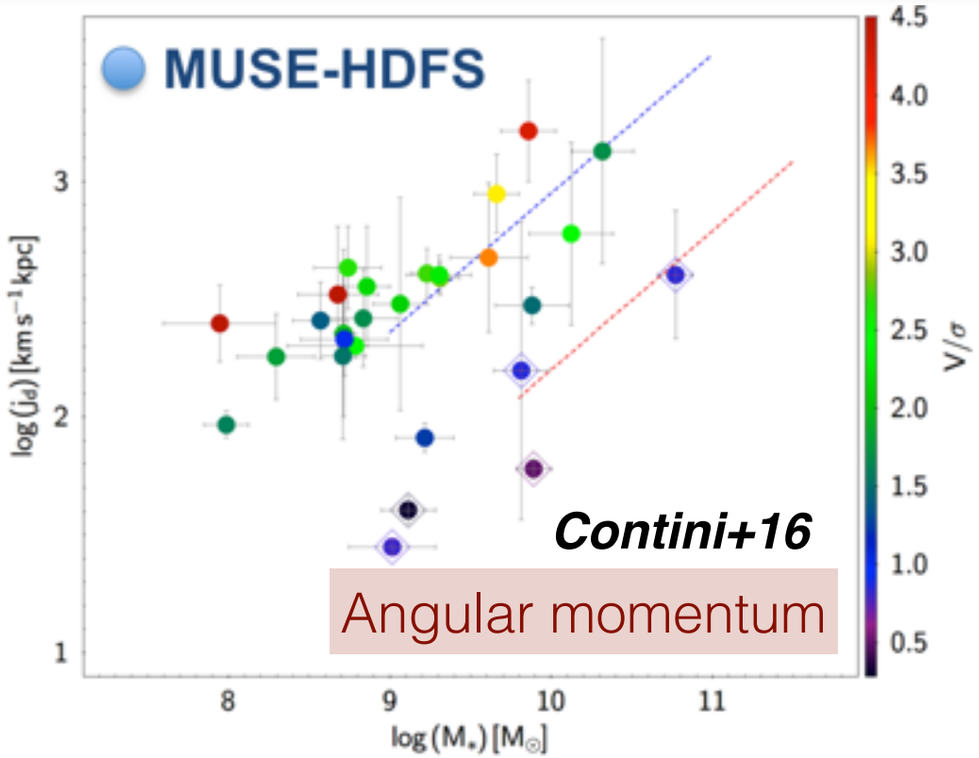
Moutard+16

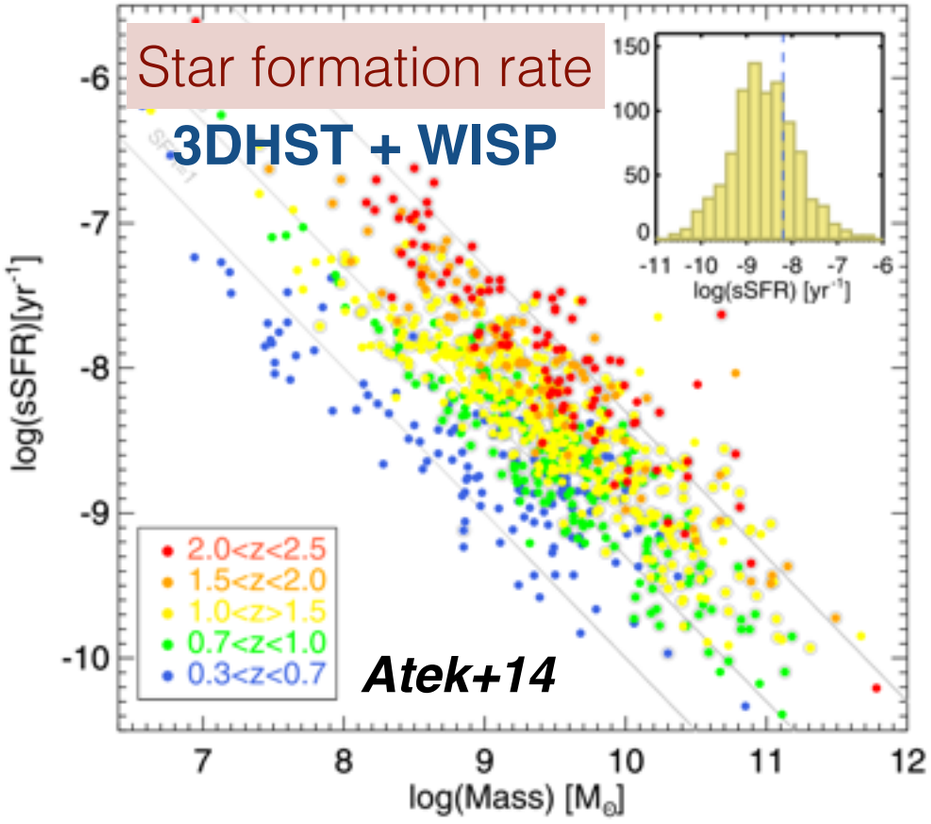


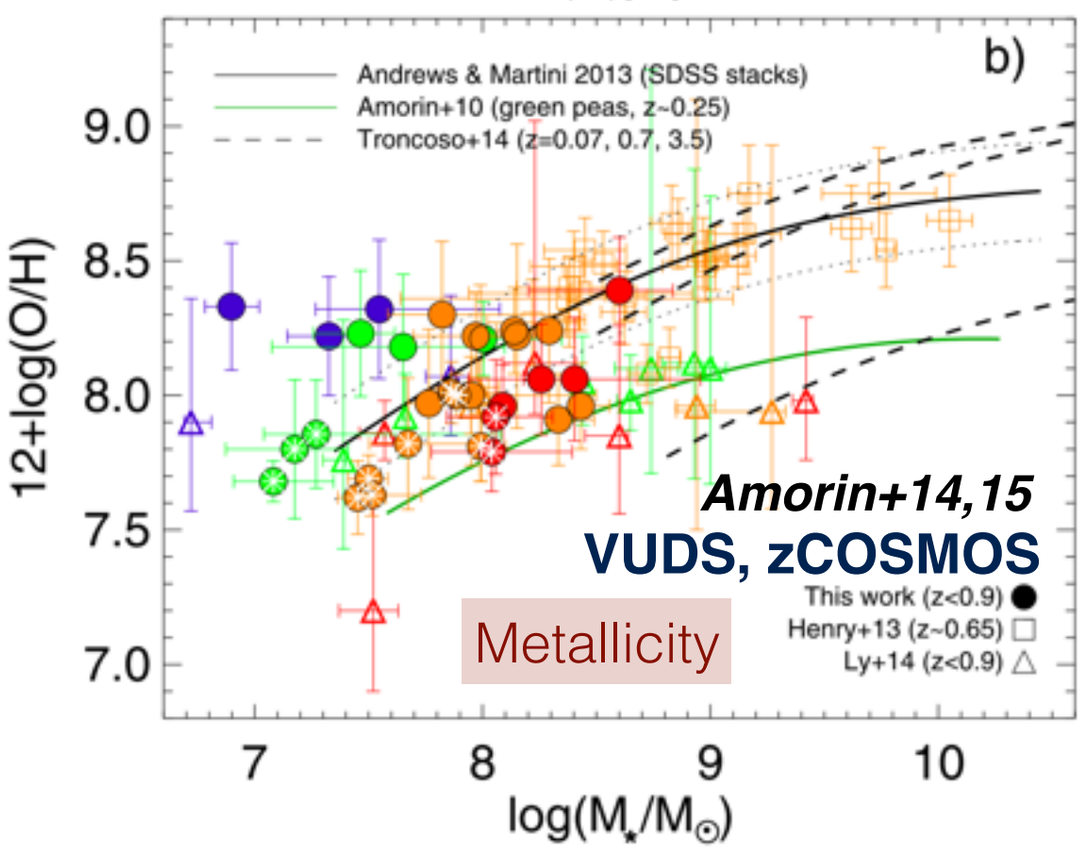
- 22 square degree with CFHTLS + Ks and VIPERS redshifts
- Number of massive ETG x 2 between z=1 and 0 ⇒ dry merger
- Stable knee of the SF MF at $\log M_*/M_\odot = 10.65$

Low-mass galaxies up to z~1

- Properties of low-mass galaxies (log M* < 9.5 $M_\odot$) over 8 Gyr.

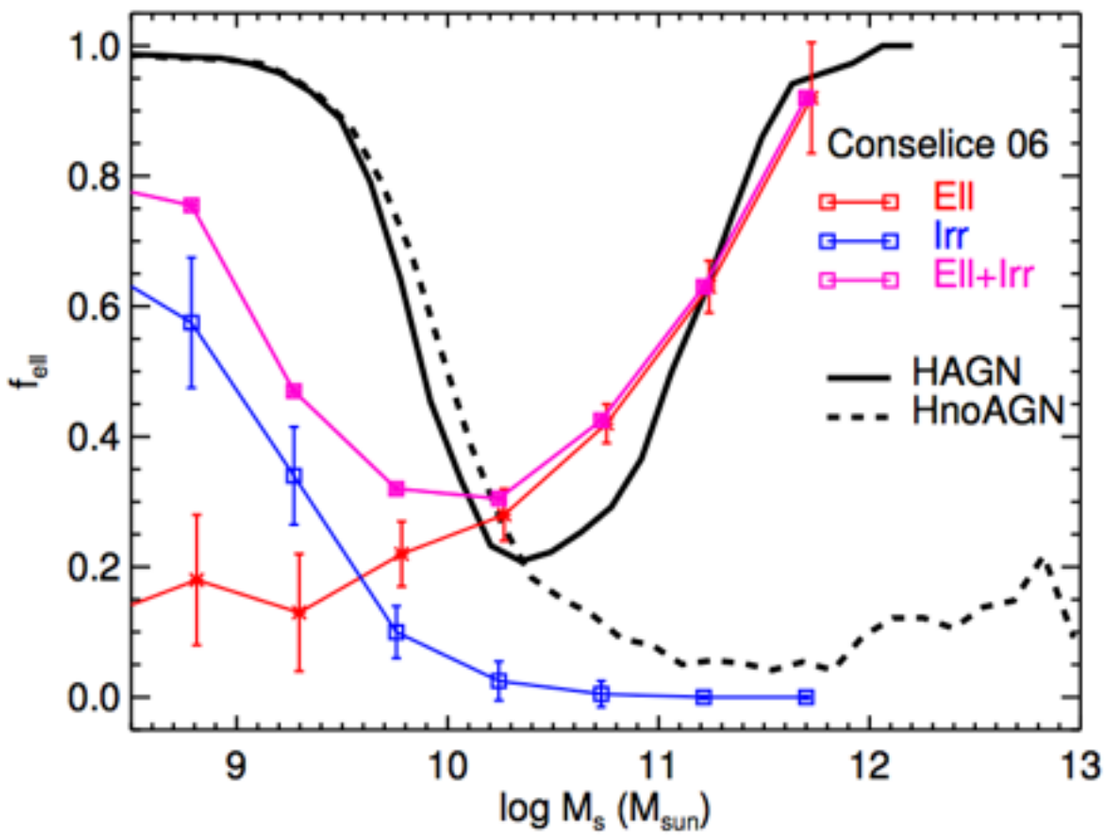


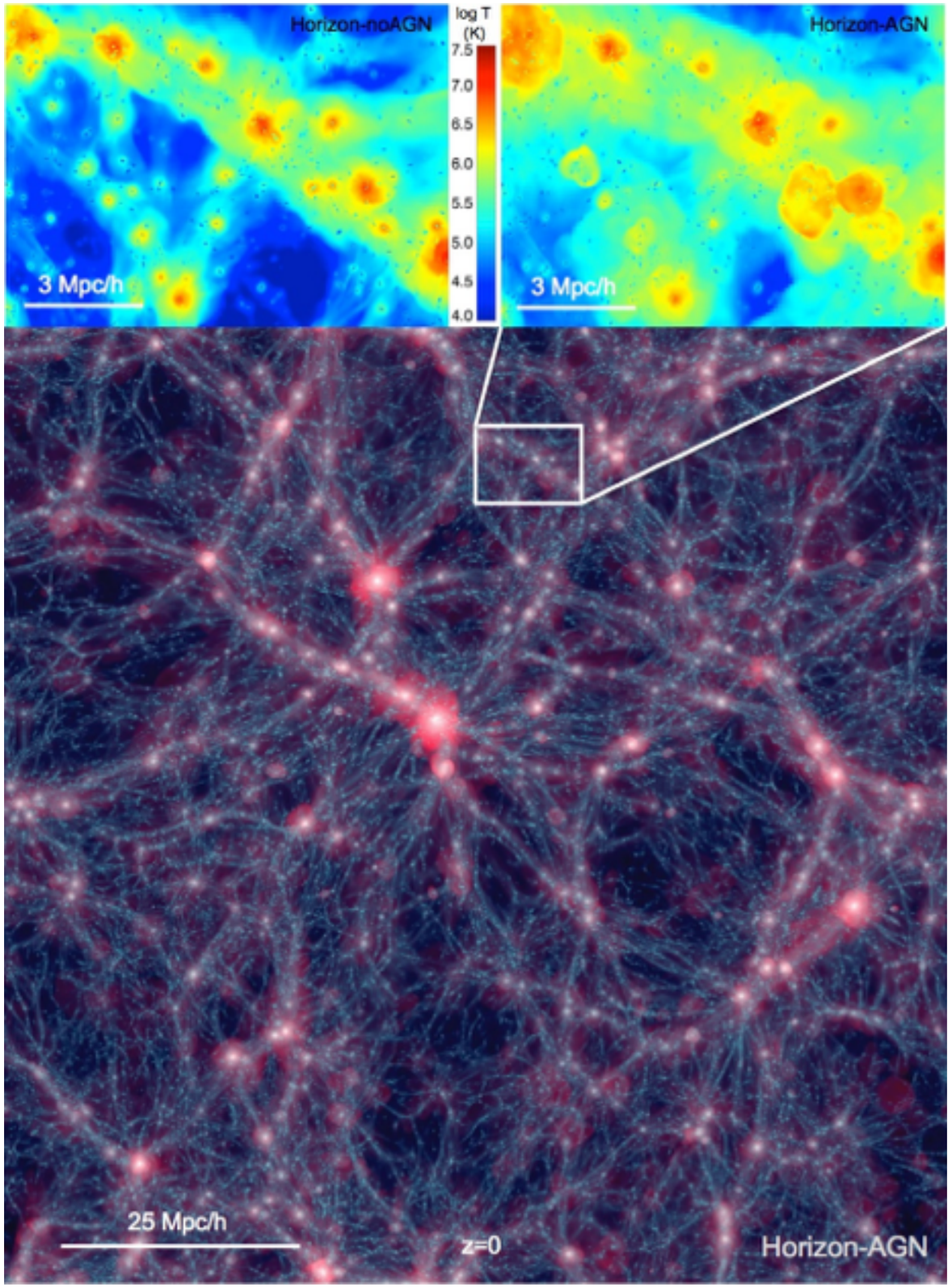




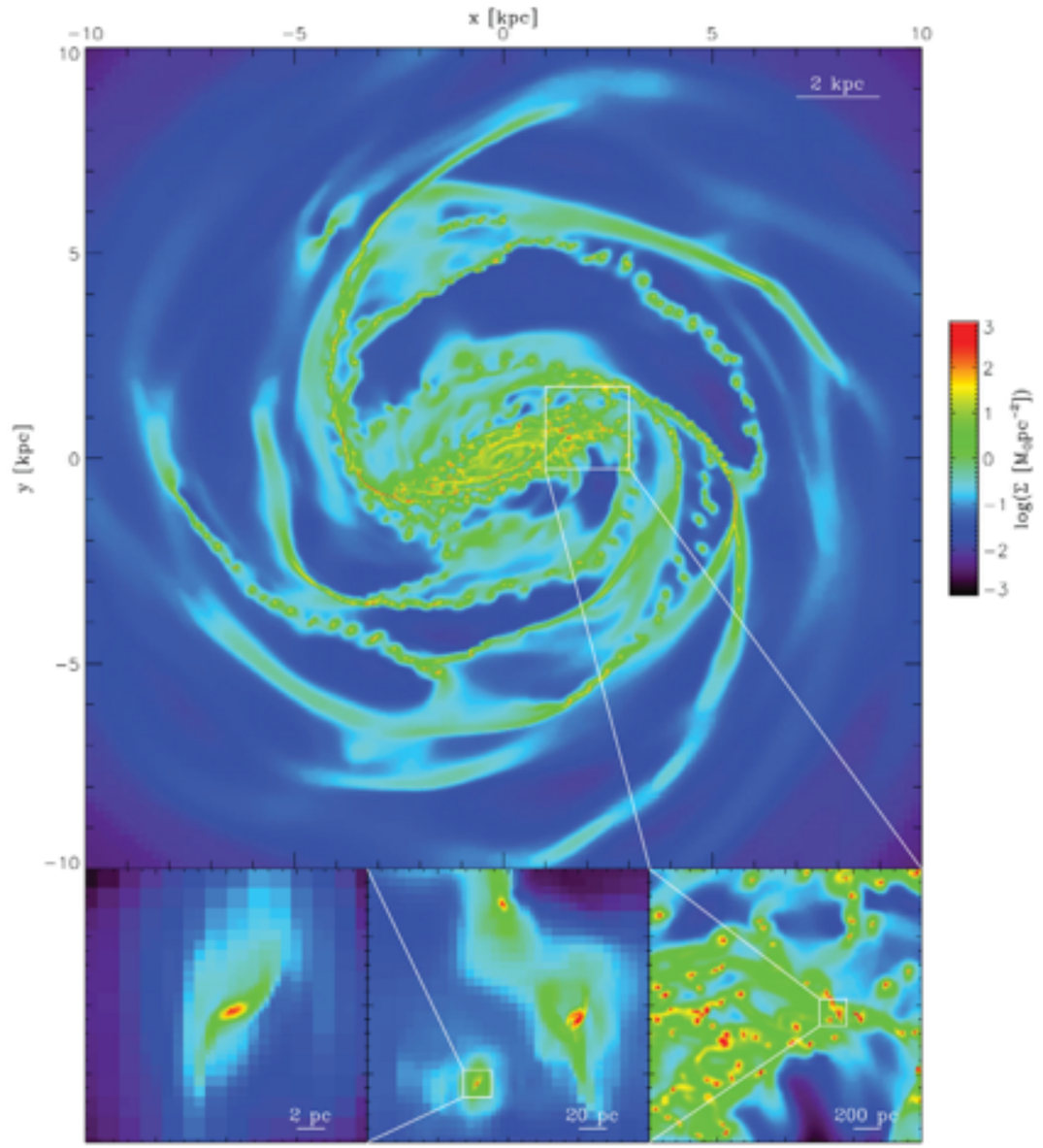
Simulations: the role of AGNs

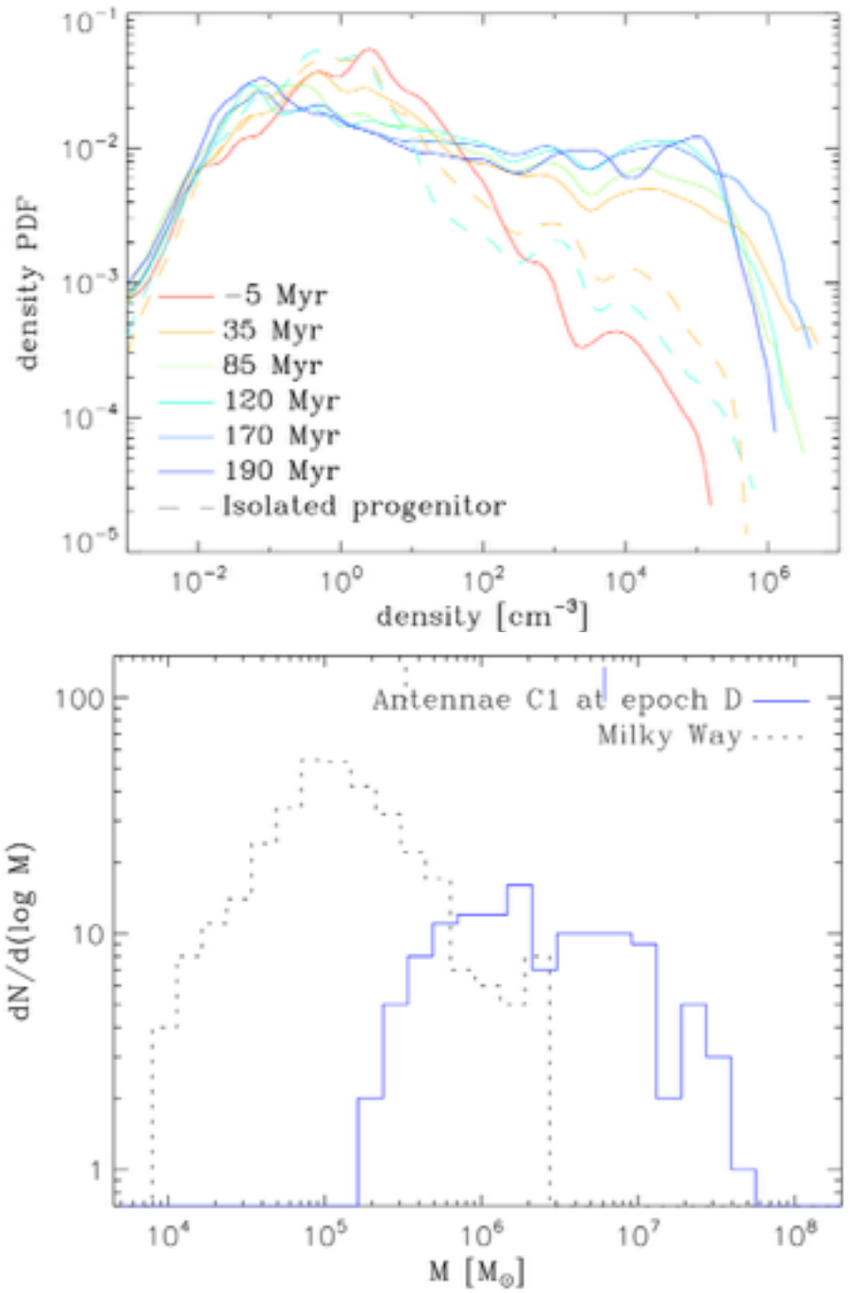
- Horizon-AGN : AGN feedback allows for recovering the correct morphological mix of the galaxy population at high mass (Dubois et al., 2016)





Simulations: turbulence and star formation

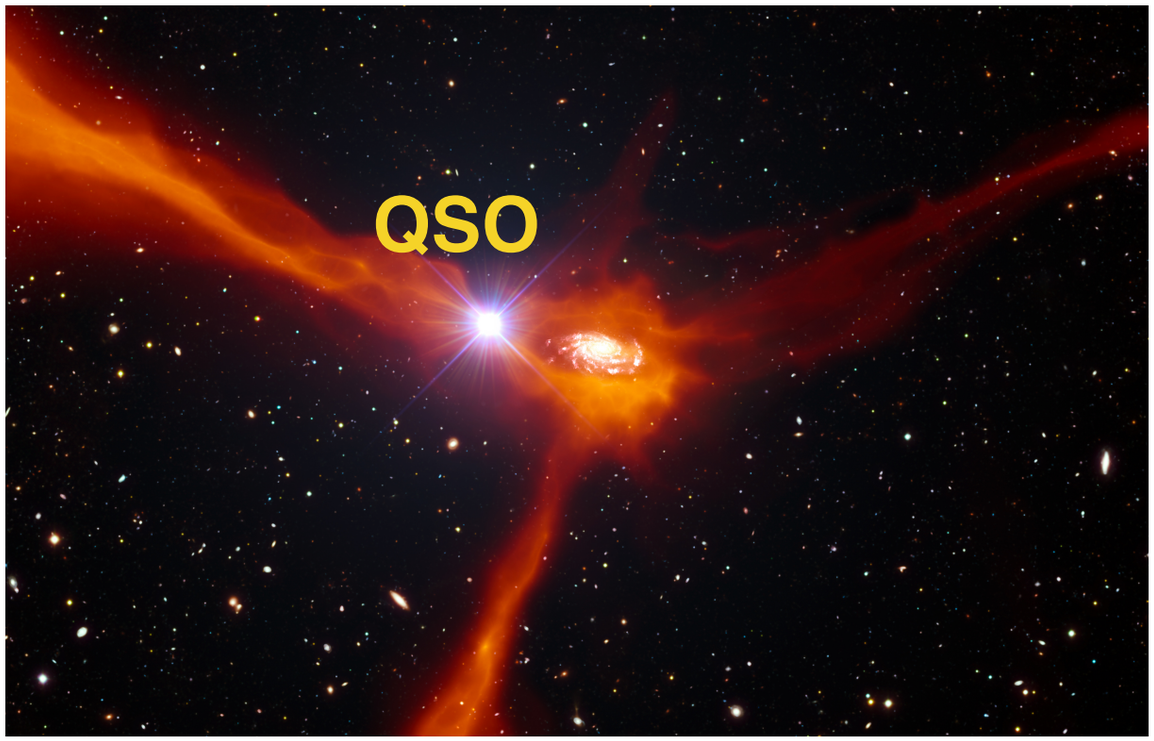




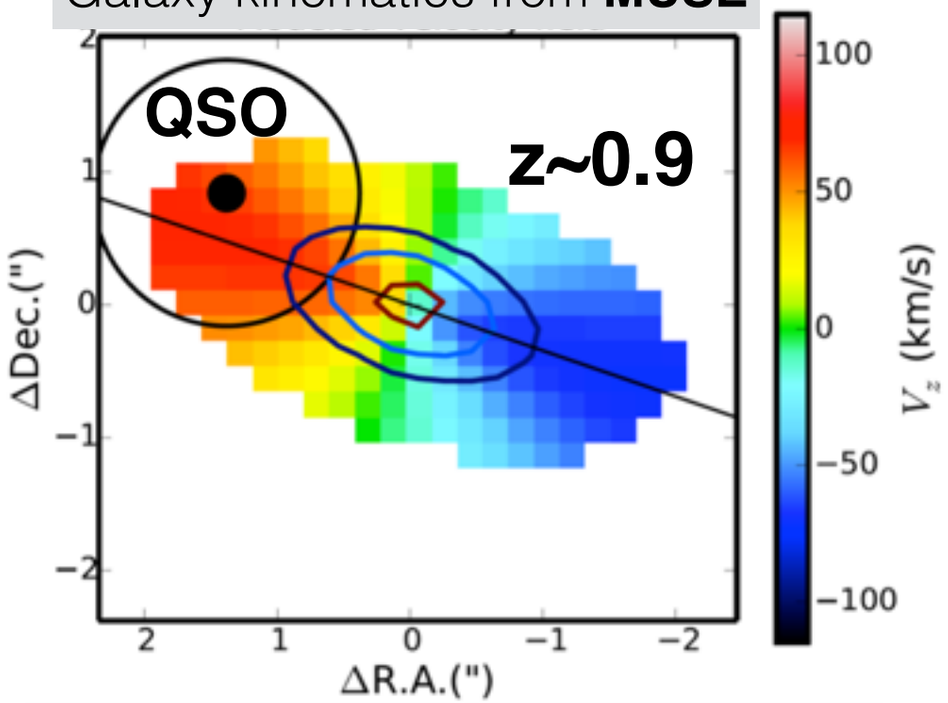
- High resolution needed to understand turbulence and star formation.
- We are almost here...

Renaud+13, 14, 15

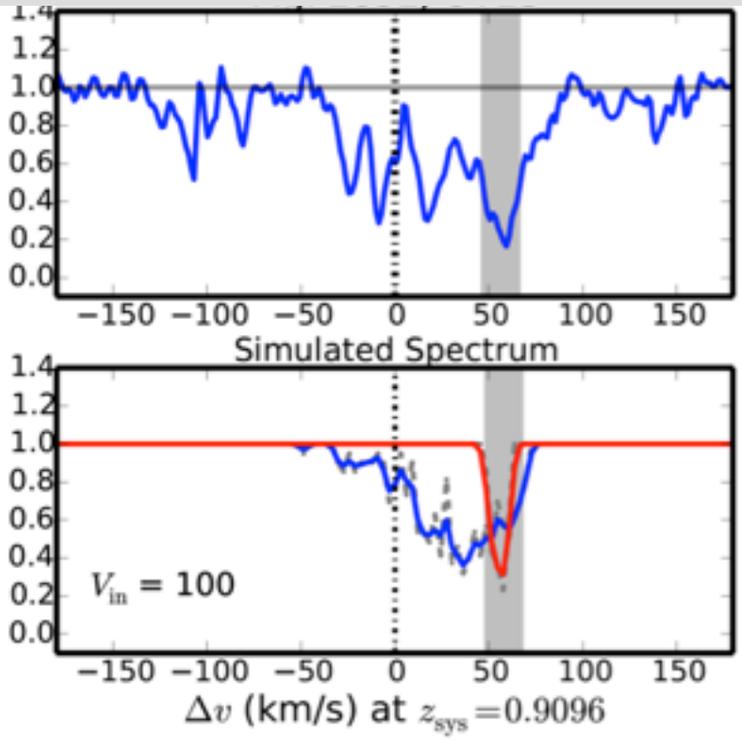
Gas Accretion



Galaxy kinematics from **MUSE**



Accreting gas kinematics from **UVES**

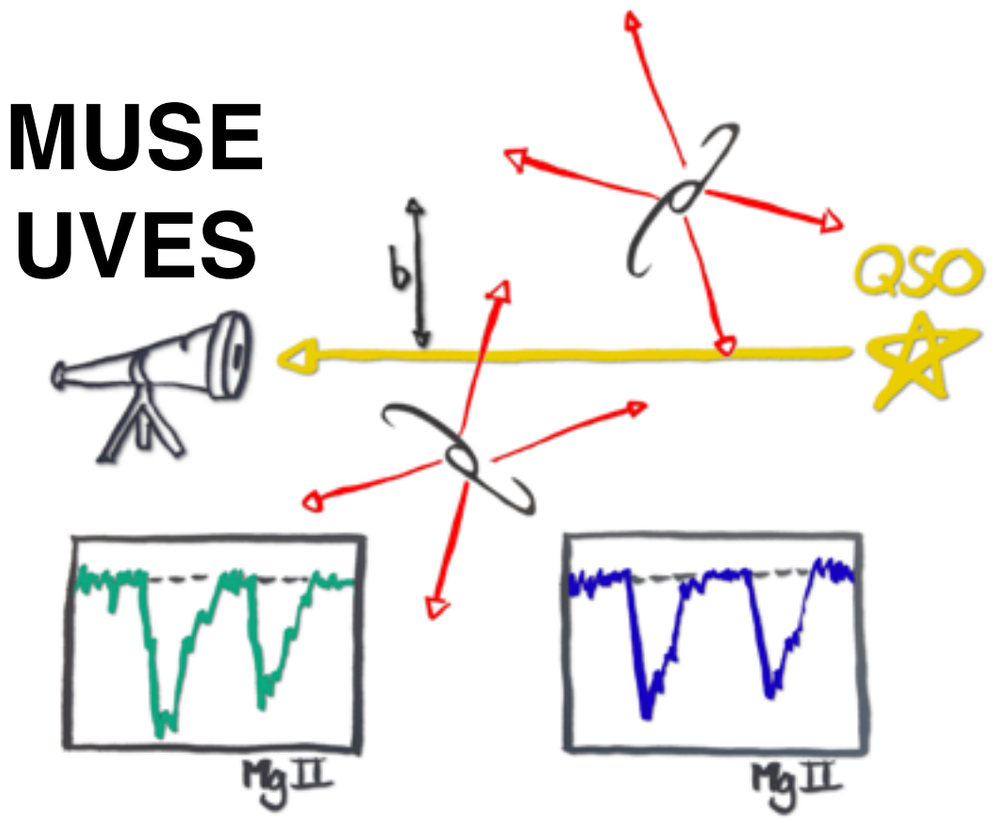


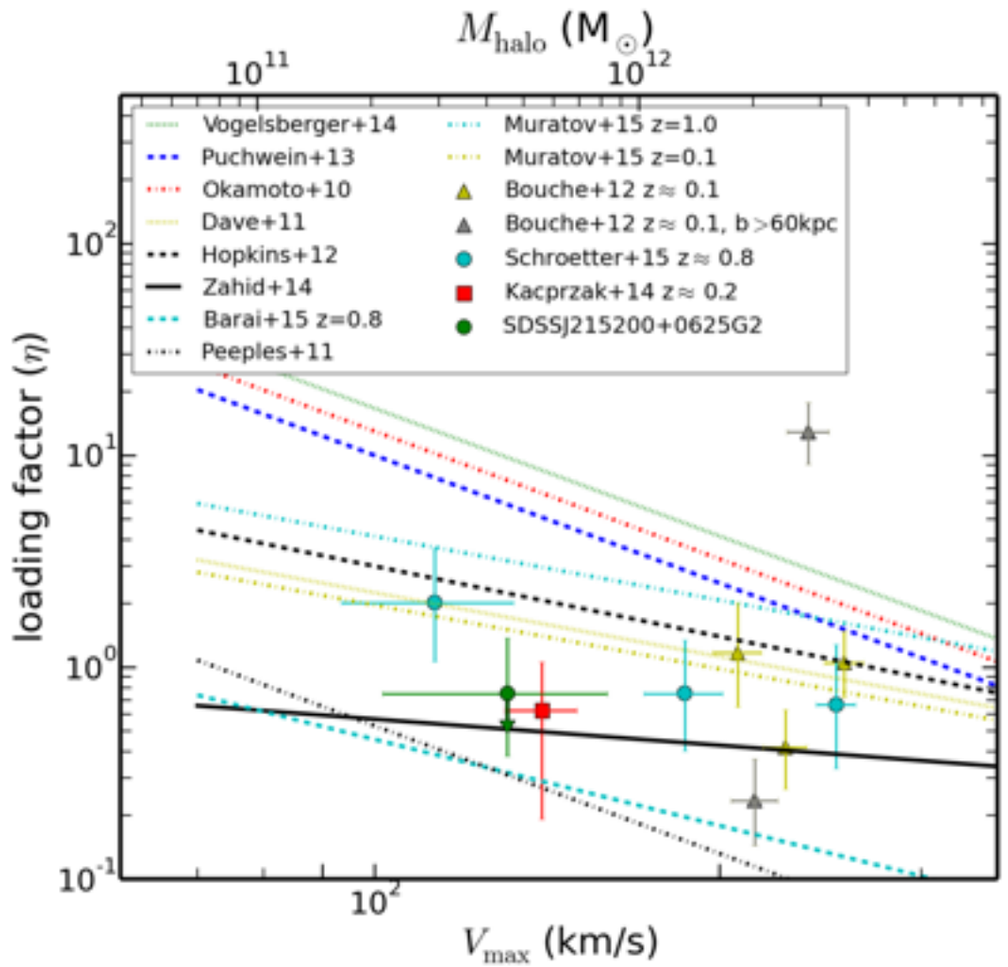
Signature of accreting gas,
co-rotating with the host galaxy

Cold flow disk with $dM_{in}/dt \sim 2\text{-}3 \times SFR$

Bouché+13,16, *also Peroux+16*

Supernovae Feedback

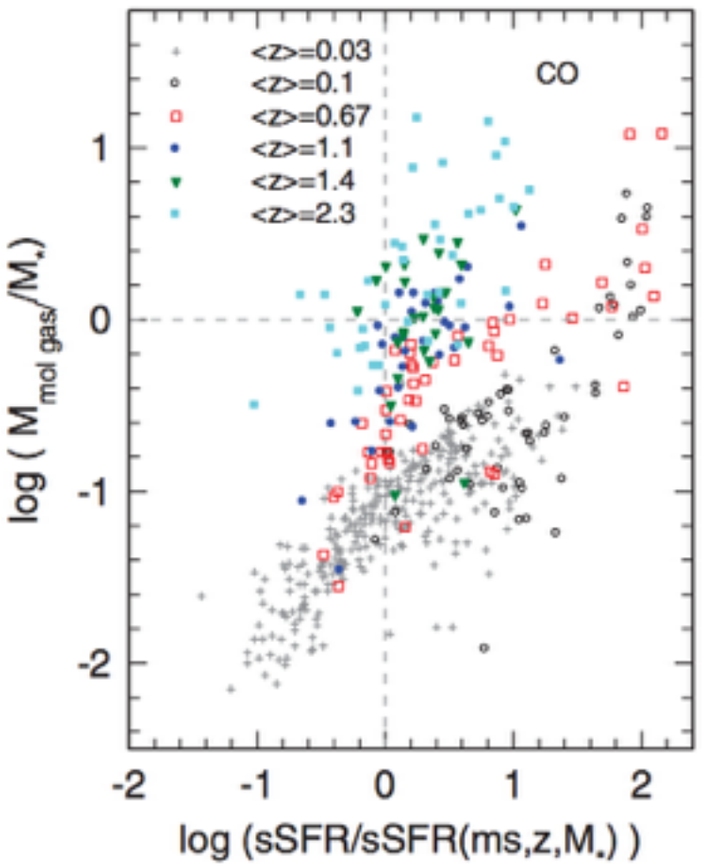


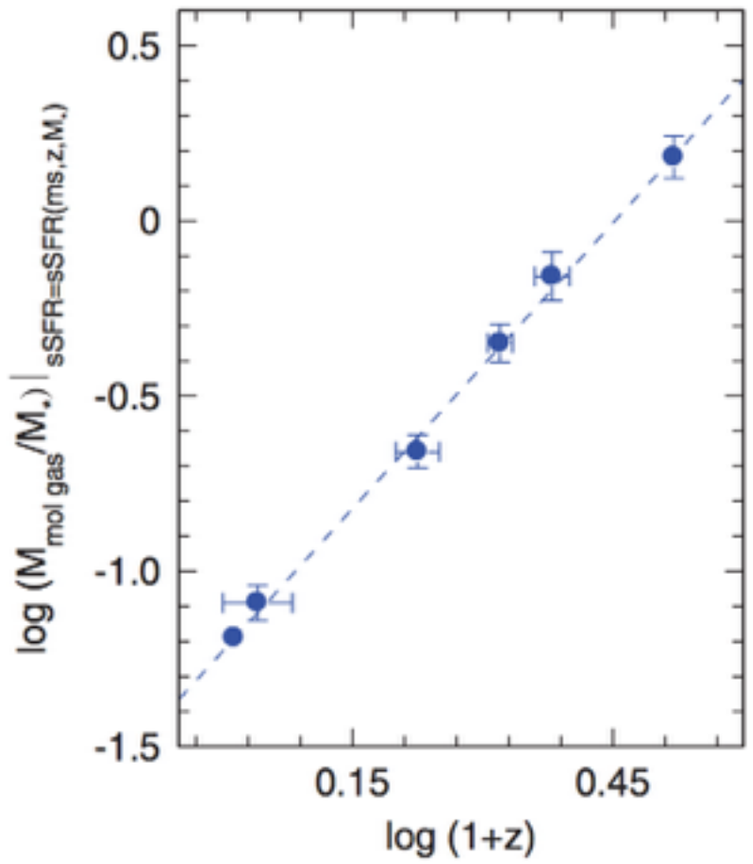


- SN-driven Wind Properties with MEGAFLOW
  - Goal: 80 star forming galaxies @ z~1
  - First constraints on mass loading $dM_{out}/dt \sim 0.7 \times SFR$

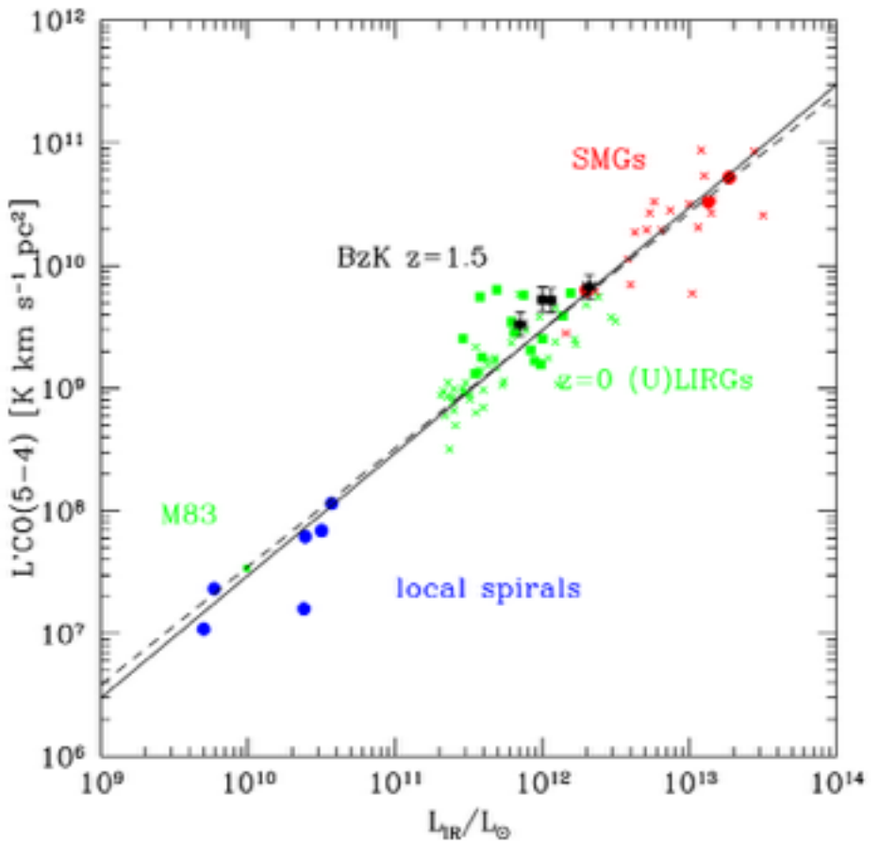
Schroetter+15,16, *also Quiret+15*

Molecular gas fraction evolution





Genzel+15



Daddi+15

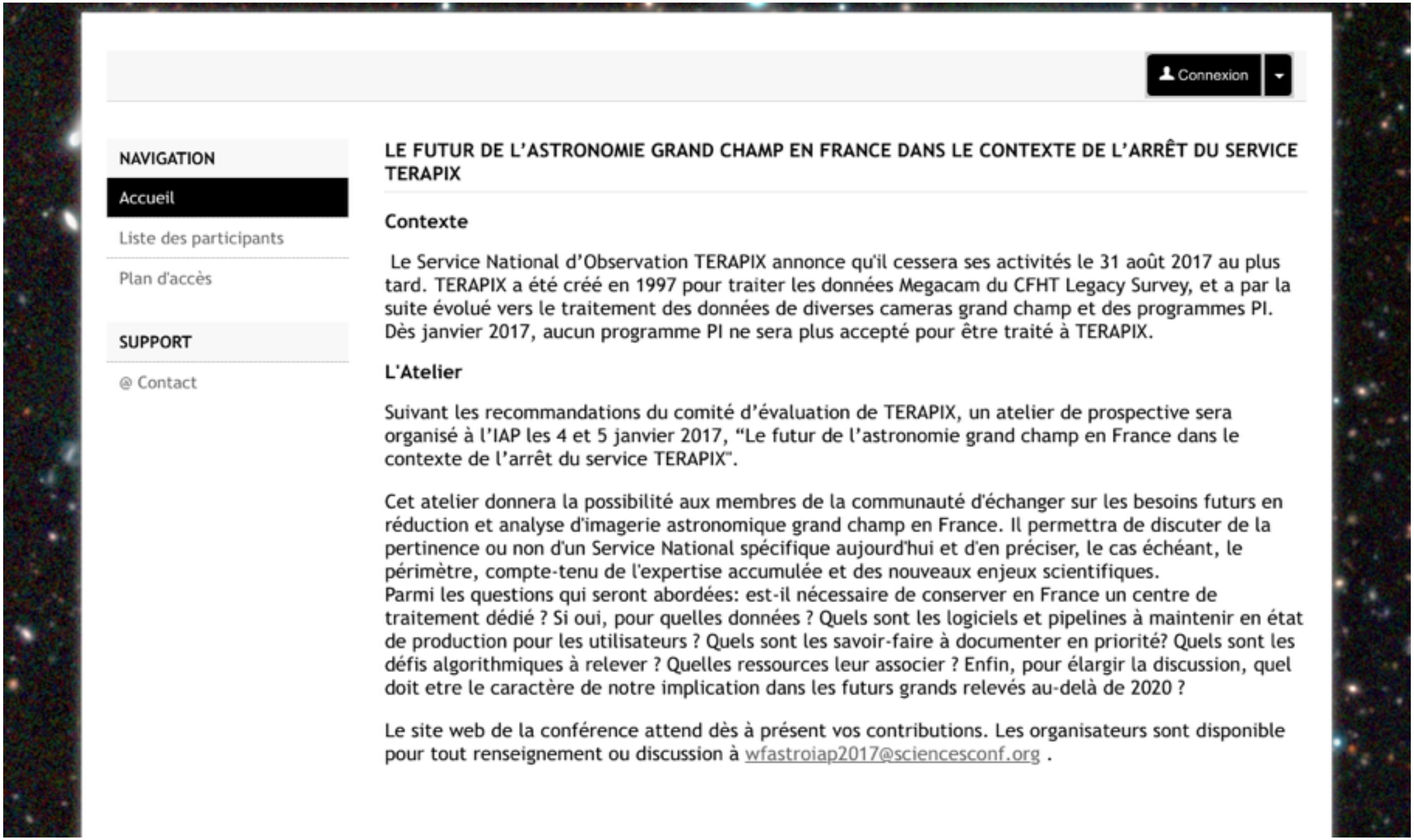
- PHIBSS+PHIBSS2 LPs @ PdBI : Evolution of the gas fraction as a function of redshift.
- Use of dust continuum as a proxy
- Dense gas tracers are hard. CO (5-4) as a good proxy ?

The role of environment: Virgo

Boselli+16

- Ram pressure striping is effective for massive galaxies in massive clusters
- Ram pressure can remove 100 x more gas than nuclear AGN feedback
- New Large Program VESTIGE of systematic Hα imaging of Virgo with Megacam.

WF Workshop @ IAP, January 4-5



Connexion

NAVIGATION

Accueil

Liste des participants

Plan d'accès

SUPPORT

Contact

LE FUTUR DE L'ASTRONOMIE GRAND CHAMP EN FRANCE DANS LE CONTEXTE DE L'ARRÊT DU SERVICE TERAPIX

Contexte

Le Service National d'Observation TERAPIX annonce qu'il cessera ses activités le 31 août 2017 au plus tard. TERAPIX a été créé en 1997 pour traiter les données Megacam du CFHT Legacy Survey, et a par la suite évolué vers le traitement des données de diverses cameras grand champ et des programmes PI. Dès janvier 2017, aucun programme PI ne sera plus accepté pour être traité à TERAPIX.

L'Atelier

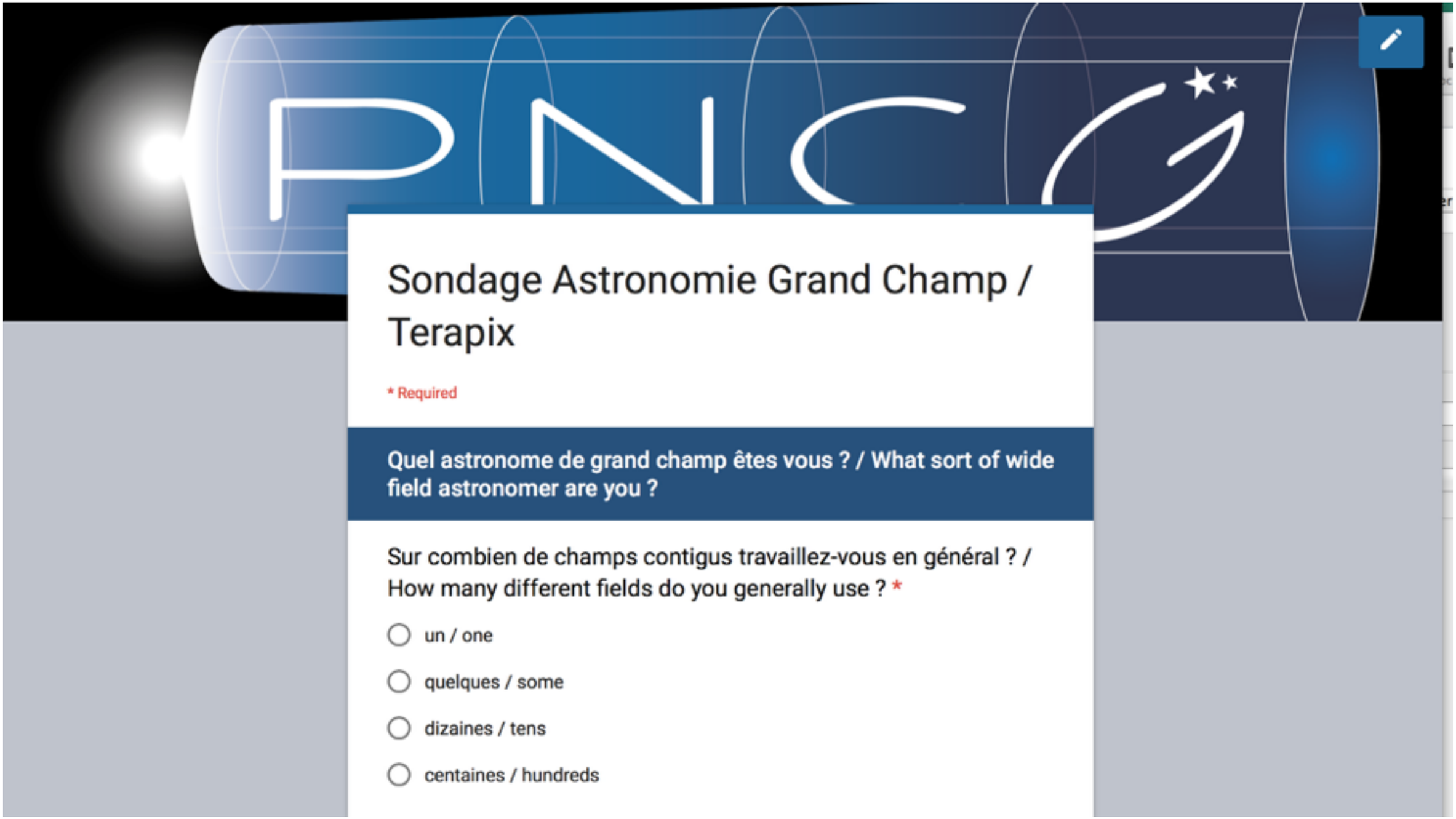
Suivant les recommandations du comité d'évaluation de TERAPIX, un atelier de prospective sera organisé à l'IAP les 4 et 5 janvier 2017, "Le futur de l'astronomie grand champ en France dans le contexte de l'arrêt du service TERAPIX".

Cet atelier donnera la possibilité aux membres de la communauté d'échanger sur les besoins futurs en réduction et analyse d'imagerie astronomique grand champ en France. Il permettra de discuter de la pertinence ou non d'un Service National spécifique aujourd'hui et d'en préciser, le cas échéant, le périmètre, compte-tenu de l'expertise accumulée et des nouveaux enjeux scientifiques.
Parmi les questions qui seront abordées: est-il nécessaire de conserver en France un centre de traitement dédié ? Si oui, pour quelles données ? Quels sont les logiciels et pipelines à maintenir en état de production pour les utilisateurs ? Quels sont les savoir-faire à documenter en priorité? Quels sont les défis algorithmiques à relever ? Quelles ressources leur associer ? Enfin, pour élargir la discussion, quel doit etre le caractère de notre implication dans les futurs grands relevés au-delà de 2020 ?

Le site web de la conférence attend dès à présent vos contributions. Les organisateurs sont disponible pour tout renseignement ou discussion à wfastroiap2017@sciencesconf.org .

- https://wfastroiap2017.sciencesconf.org

Survey of WF astro / Terapix



- Will be announced today.

Future prospects: spectroscopy

MOONS in a nutshell

Field of view: 500 sq. arcmin at the 8.2m VLT

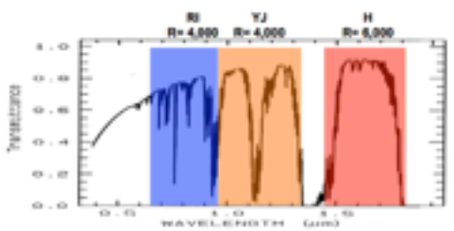
Multiplex: 1024 fibers, with the possibility to deploy them in pairs

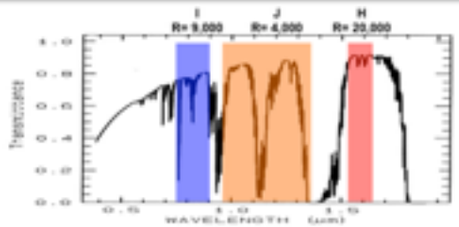
Medium resolution:

Simultaneously 0.64μm-1.8μm at R=4,000 – 6,000

High resolution:

Simultaneously 3 bands:
- 0.76-0.90μm at R = 9,000
- 0.95-1.35μm at R=4,000
- 1.52-1.63μm at R=20,000





Throughput: ~ 30 %

MOONS Extragalactic Surveys

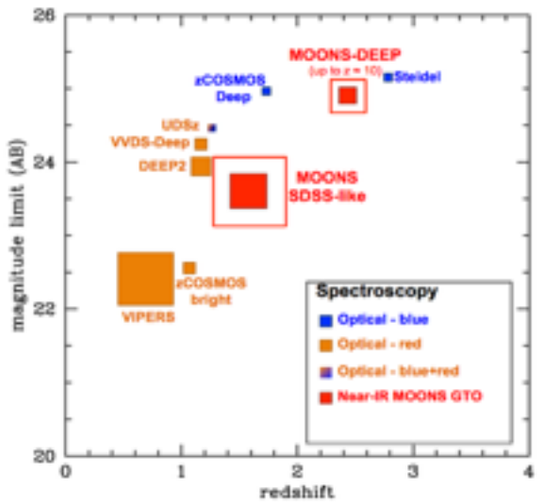
SDSS-like + Deep Surveys

Physical, Chemical and Environmental properties for ***~1M galaxies at 0.8 < z < 10***

Optimised observation strategy:

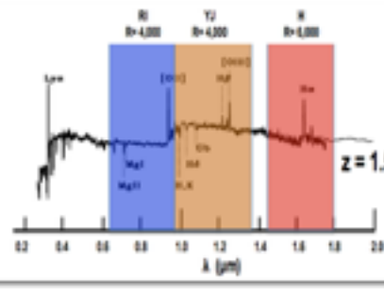
$H_{AB} < 23.5$ 1-8hr over 30sq. deg.

$23 < H_{AB} < 25$ 8-40hr over 5-6sq. deg.



$M \sim 10^9\ M_\odot$ and $SFR < 1\ M_\odot/yr$ at z~1-2 with multiple lines diagnostics to measure:
SFR, Metallicity, Ionisation state, AGN, Dust, Environment, etc …

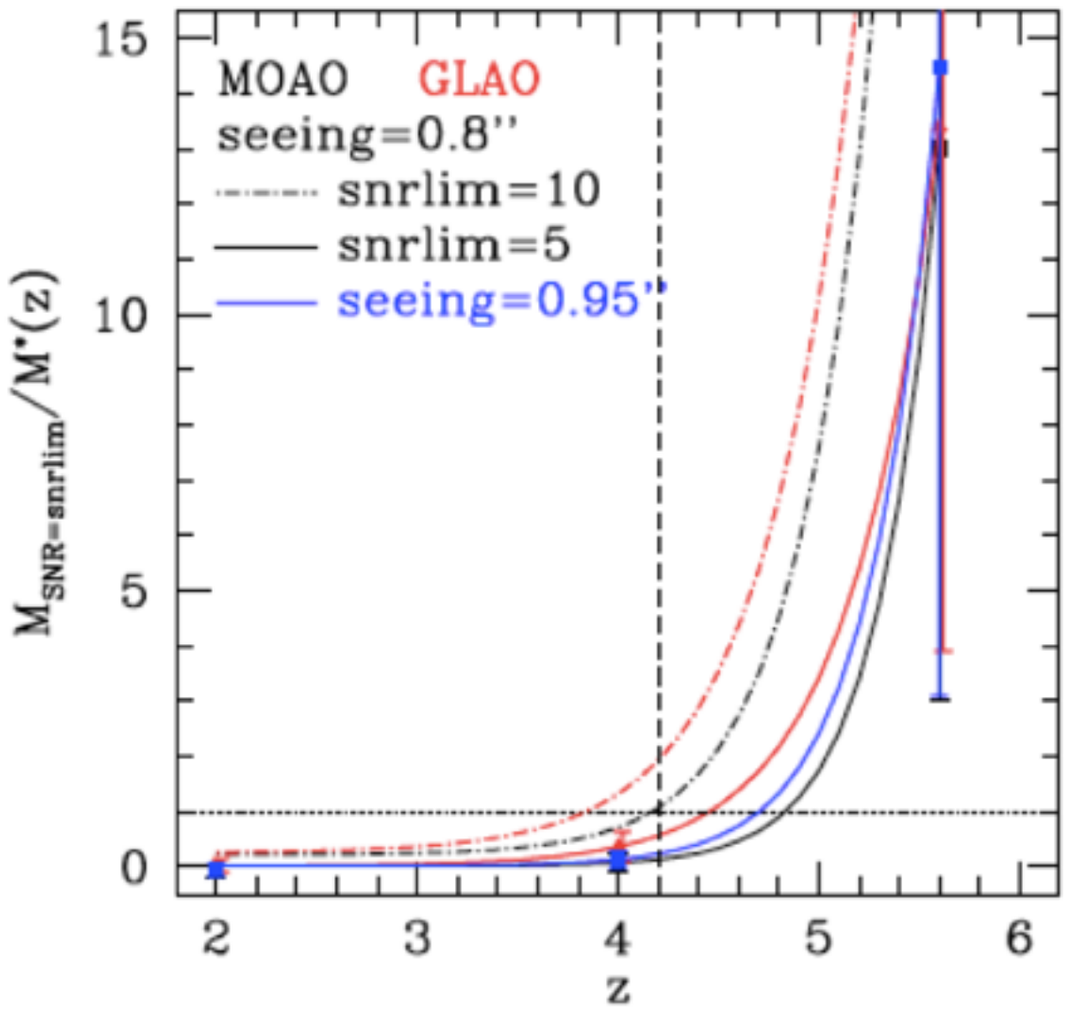
Considerably deeper if only interested in determining the redshift

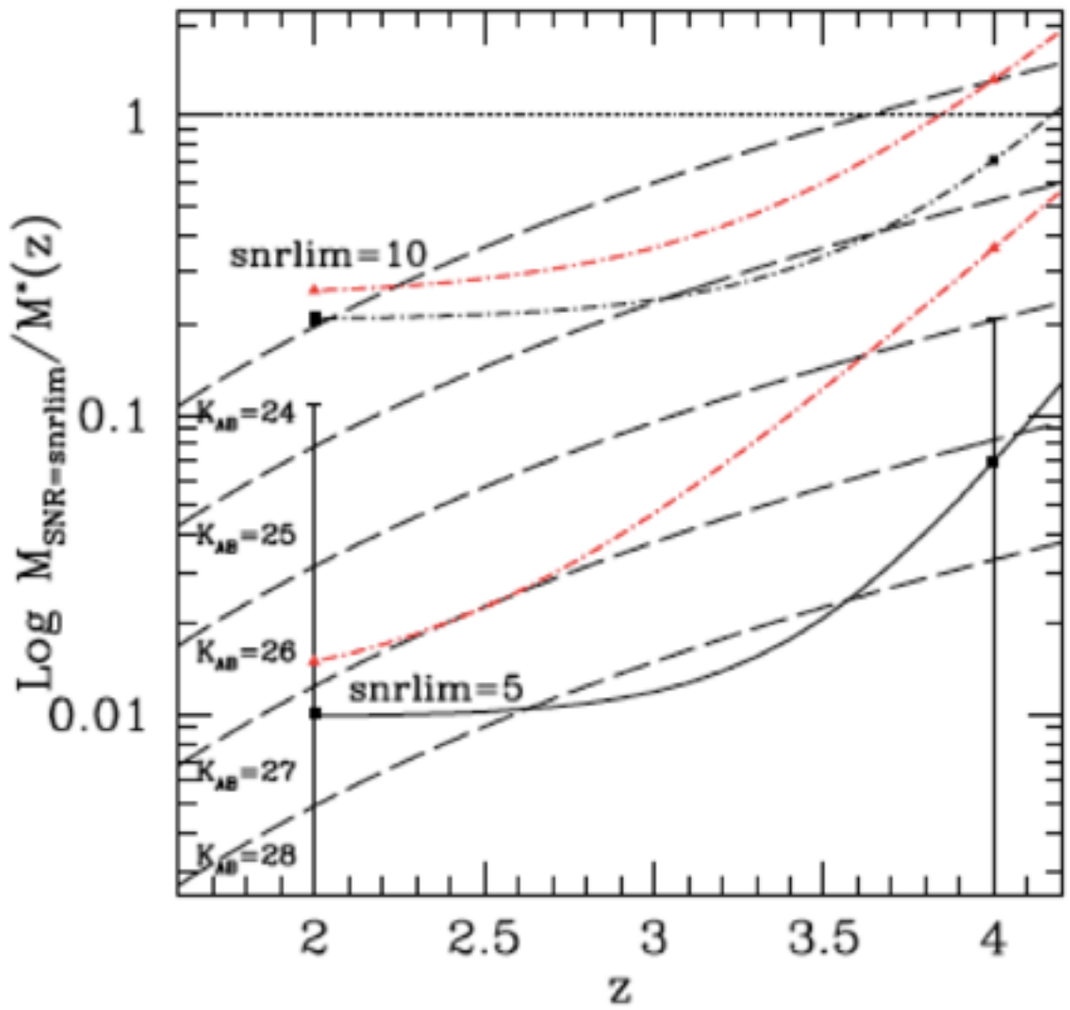


Flores+16

- MOONS is coming to VLT. Start of science operations late 2019, early 2020.
- WEAVE has a Galaxy Evolution survey, but small french participation on this theme
- MSE

Future Prospects: E-ELT





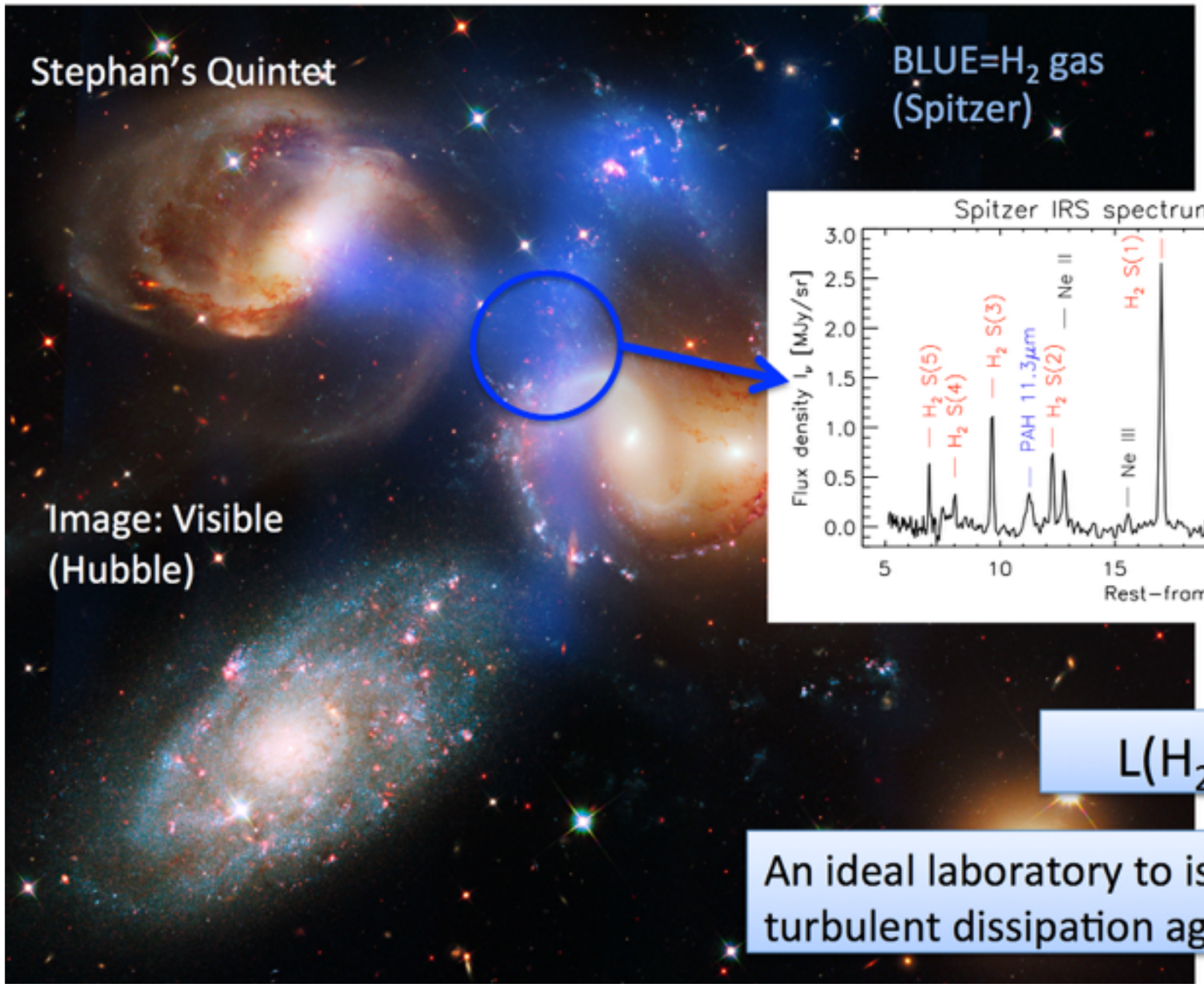
- PNCG community: Evans+15
  - Harmoni
  - MOSAIC: Need to ensure the instrument status.
- Will allow studies at high redshift.

Future Prospects: Molecular and Atomic Gas

- Noema and Alma : slowly building large samples of galaxies.
- SKA: open a new window on the atomic gas.

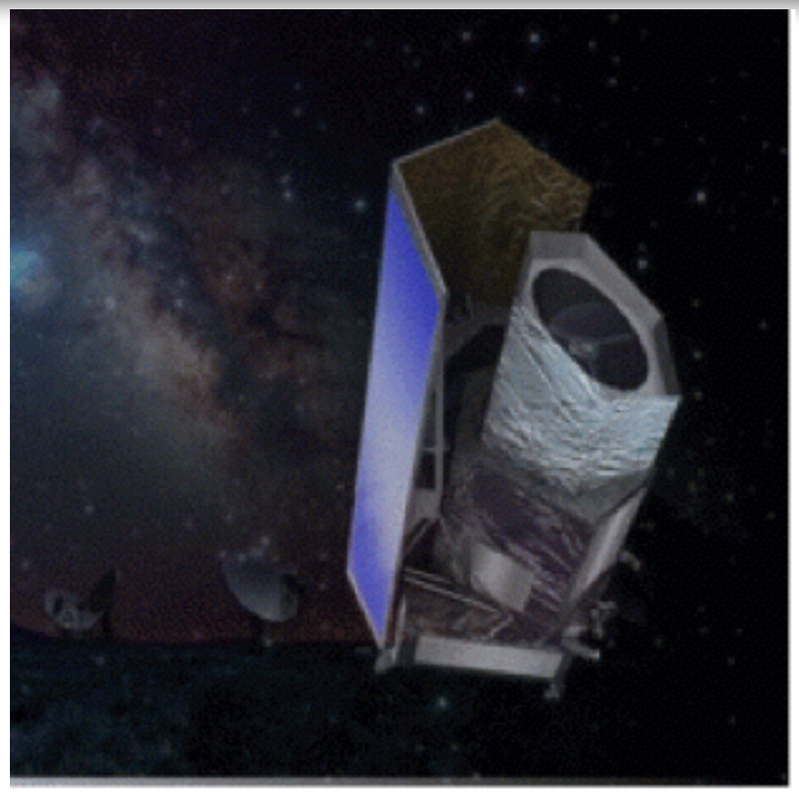
Future Prospects : JWST

Shock-powered H_2 emission in galaxy interactions



- Guillard+15

Future Prospects: Euclid



- Euclid is a cosmology mission
- Euclid was adopted also thanks to its legacy value.
- Euclid will provide HST-like morphologies for 2.10^8 Galaxies with H<22.5
- Euclid will allow for detailed studies of the SMHM Relation.

Leauthaud+12