

# Evolution of galaxy dynamics over the last 10 Gyrs with MUSE/VLT

l'Observatoire  
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# Galaxy evolution through time



# Why studying kinematics ?



Explain the co-evolution of morphology with kinematics

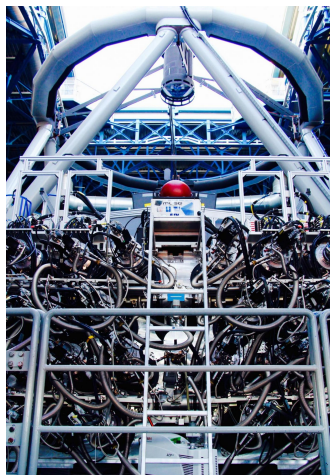
- ▷ main processes responsible for disc formation and settling ?
- ▷ impact of merging, inflows and outflows on these processes ?
- ▷ kinematics  $\rightarrow$  rotation curve  $\rightarrow$  dark matter and angular momentum distribution ?

## IFS:

- ▷ 3D cubes (2D spatial + 1D spectral)  
→ **photometry + kinematics**

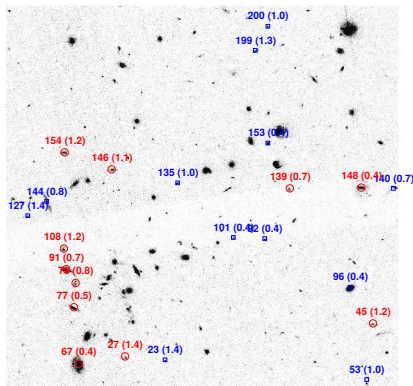
## MUSE:

- ▷  $1 \times 1 \text{ arcmin}^2$  FoV → **environment**
- ▷ 0.2 arcsec spatial sampling
- ▷ spectral range [4650 Å, 9300 Å]
- ▷ seeing-limited or AO observations
- ▷ high sensitivity  
→ **low-mass galaxies + blind surveys**



MUSE instrument. Credit:  
Contini Thierry (IRAP)

# Our sample



HST image of COSMOS group CGr30

- ▷ 16 MUSE fields in COSMOS area
- ▷ exposures from 1 to 10 hr
- ▷ seeing-limited ( $\text{FWHM} \lesssim 0.7''$ ) or AO ( $\text{FWHM} \lesssim 0.5''$ )
- ▷  **$\sim 500$  field galaxies with [OII] detection**
  - HST-ACS counterparts
  - **$0.4 \leq z \leq 1.4$**

# Methodology

## I. Morphological information

- ▷ **half-light radius**  $R_{1/2}$  to select resolved galaxies
  - Cassata, Tasca and Zurich catalogues
- ▷ **ellipticity** to compute the inclination
  - fixed input for the kinematical model

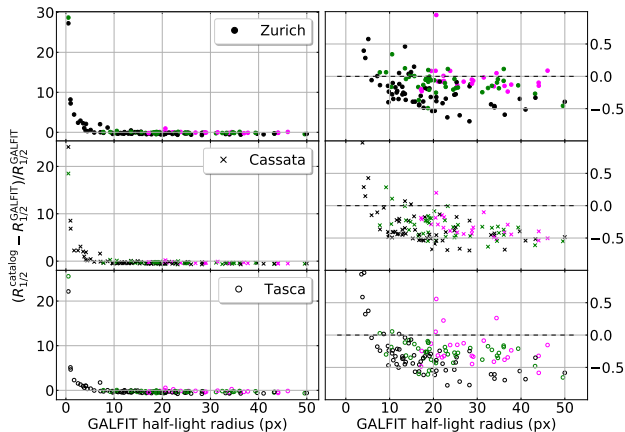
## II. Kinematical modelling

- ▷ recover  $V_{\max}$  and  $\sigma_v$

## III. Tully-Fisher relation

# Checking morphological parameters

## Half-light radius

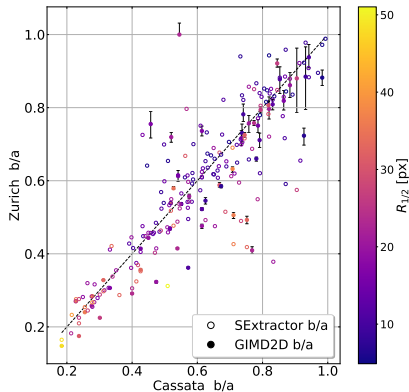


spheroidal disk-like irregulars

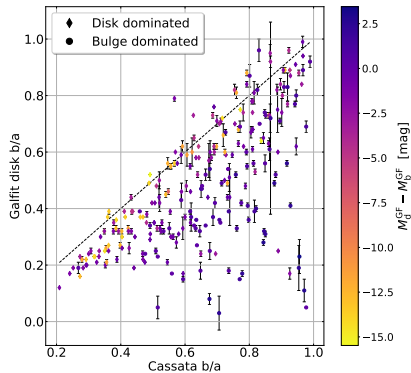
GALFIT run by V.  
Abril-Melgajero (LAM)  
on structure galaxies  
▷ GALFIT radius  
used as a reference

# Checking morphological parameters

## Ellipticity



▷ values are consistent between catalogues

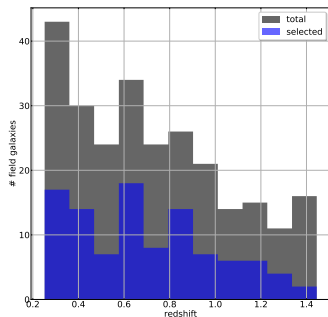
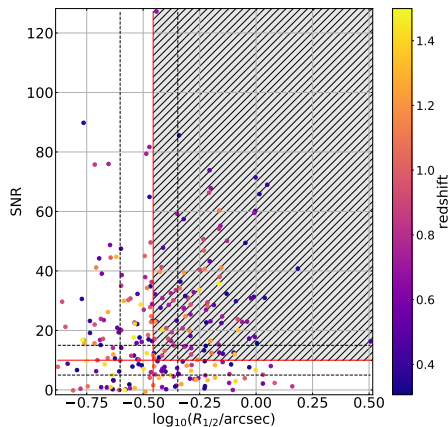


▷ scatter is due to bulge dominated (spherically symmetric) systems



# Characteristics of our sample

## Redshift distribution



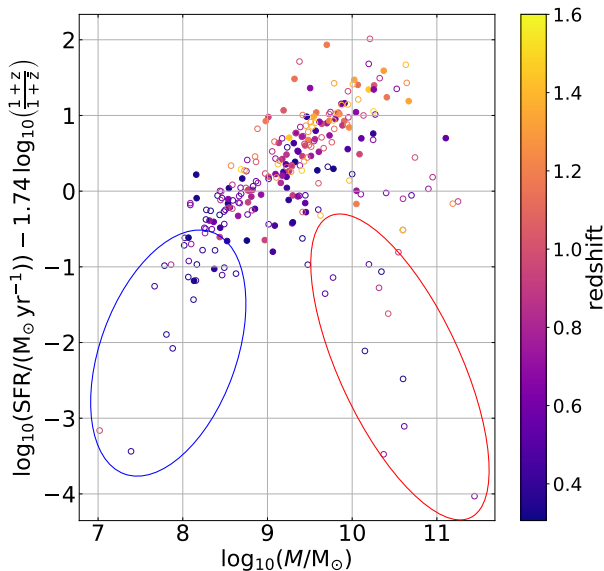
The total number corresponds to galaxies with photometric data in Cassata and/or Zurich catalogues.

- ▷ sample of **103 galaxies** with  $R_{1/2} > 0.35''$  and SNR  $> 5$
- ▷ we loose galaxies at  $z \approx 1.4$
- ▷ redshift distribution is not drastically changed

# Characteristics of our sample

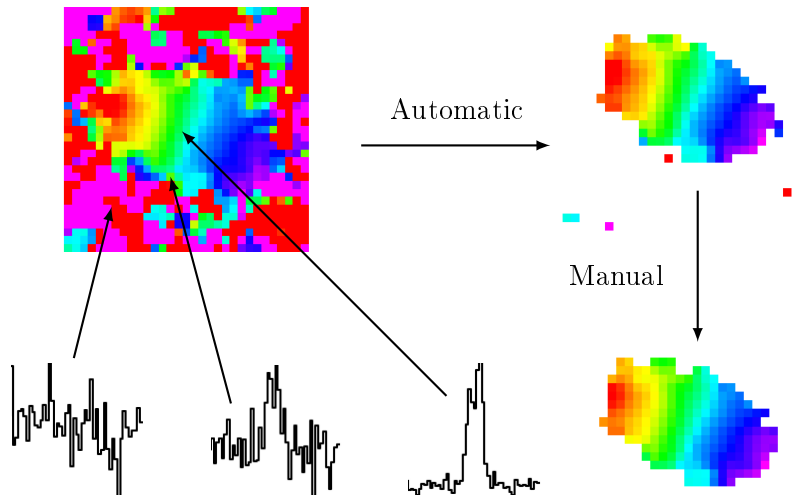
## Mass-SFR relation

- ▷ Most of our sample galaxies are on the main sequence
- ▷ massive quiescent (low [OII]) and very low mass galaxies are lost



# Kinematical modelling

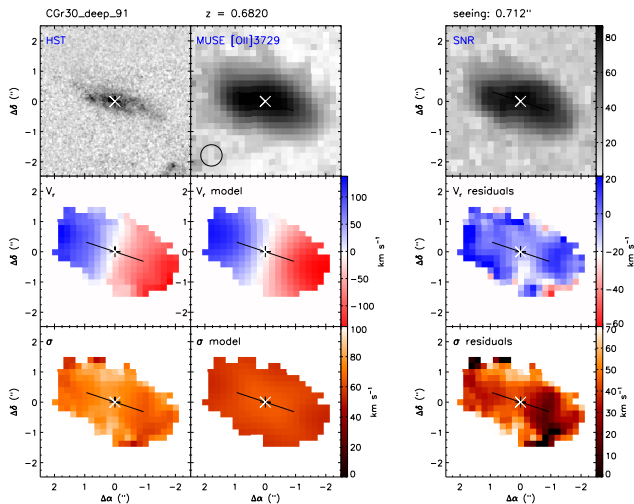
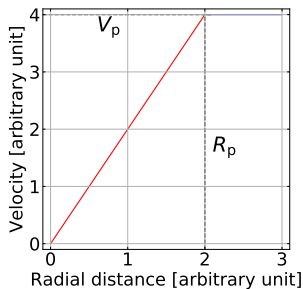
## Cleaning galaxies



# Kinematical modelling

## Fitting a model

Use a ramp model with a **linear** internal variation and a **plateau**.



# First results

## $V_{\text{max}}/\sigma_v$ distribution



## Short term:

- ▷ Tully-Fisher evolution with  $z$
- ▷ Variation between morphological and kinematical PA ?

## Long term:

- ▷ Morphological modelling
- ▷ Angular momentum evolution ?
- ▷ Dark matter vs. luminous mass ?
- ▷ **better selection + larger sample**

