Multiwavelength analysis of galaxies' structure to unveil quenching signatures
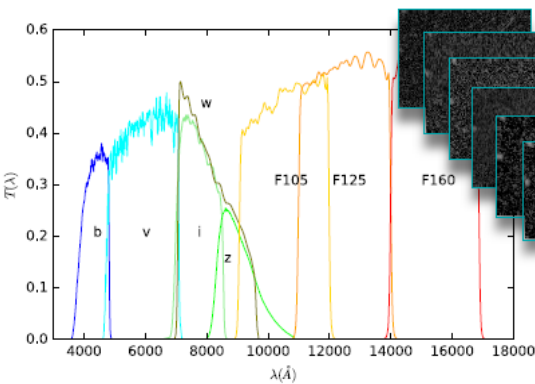
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MINISTÉRIO DA CIÊNCIA, TECNOLOGIA, INOVAÇÕES E COMUNICAÇÕES

PÁTRIA AMADA BRASIL GOVERNO FEDERAL

Observatório Nacional

Bulge-disk decomposition

1) Modeling the surface brightness profile

GalfitM

(Häussler et al. 2013)

$Mag(\lambda)$
$n(\lambda)$
$Re(\lambda)$
$q(\lambda)$

7/4 GOODS/CANDELS bands (400 - 1500 nm)

Wavelength
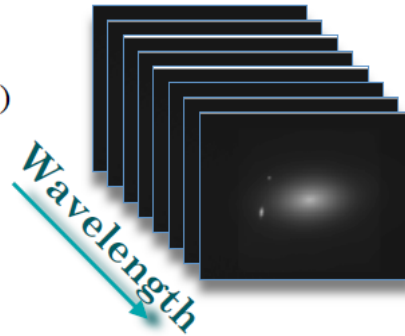
Sersic profile

+

exp. disk

Download the catalog

2) Best model selection

CNN

1 comp

2 comp
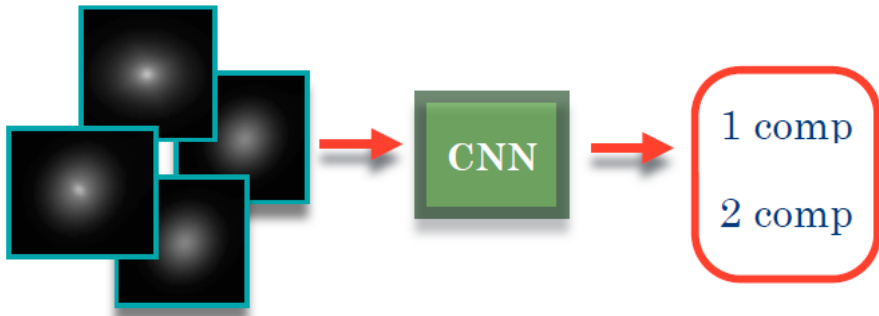
[Dimauro et al. 2018]

3) Spectral Energy Distribution

FAST [Kriek et al 2009]
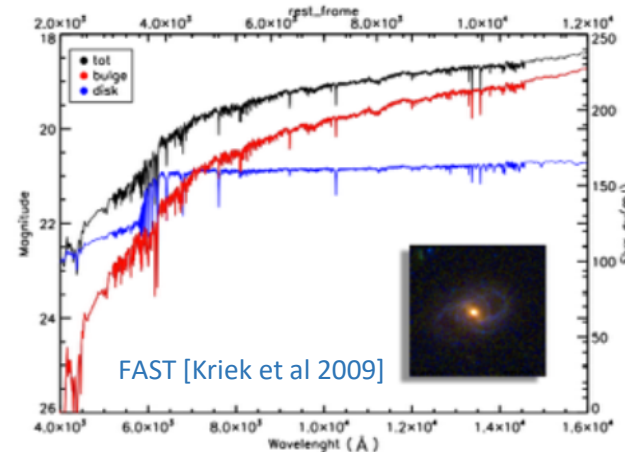
· Stellar masses

· rest-frame colors

Star formation and Bulge/Total mass ratio

[Dimauro et al. 2020 in prep.]

Bulges in Main Sequence galaxies

Lack of passive bulgeless disk galaxies
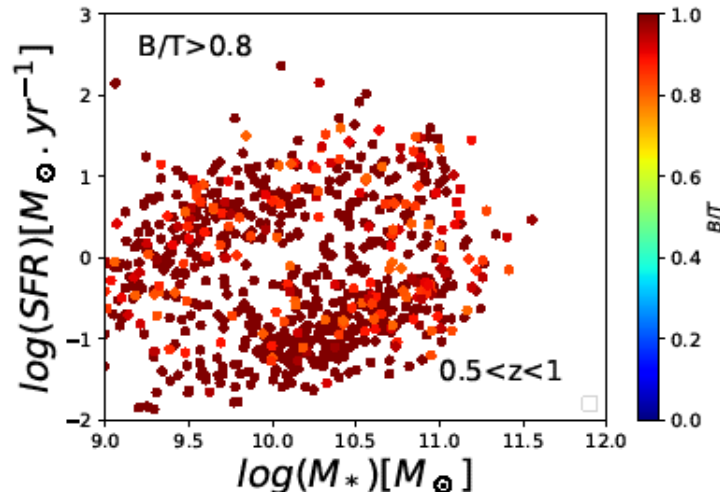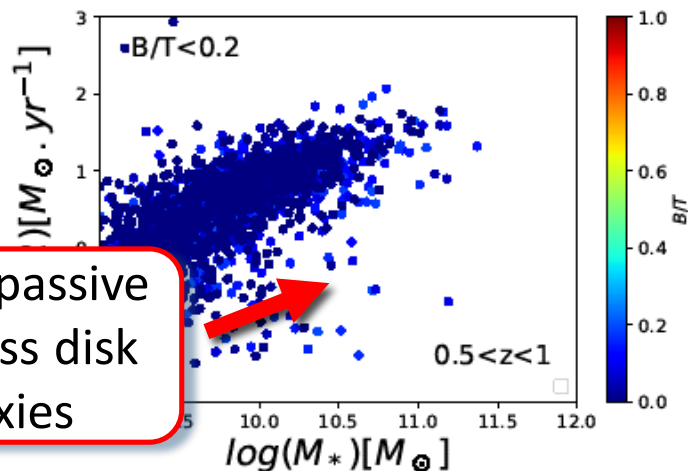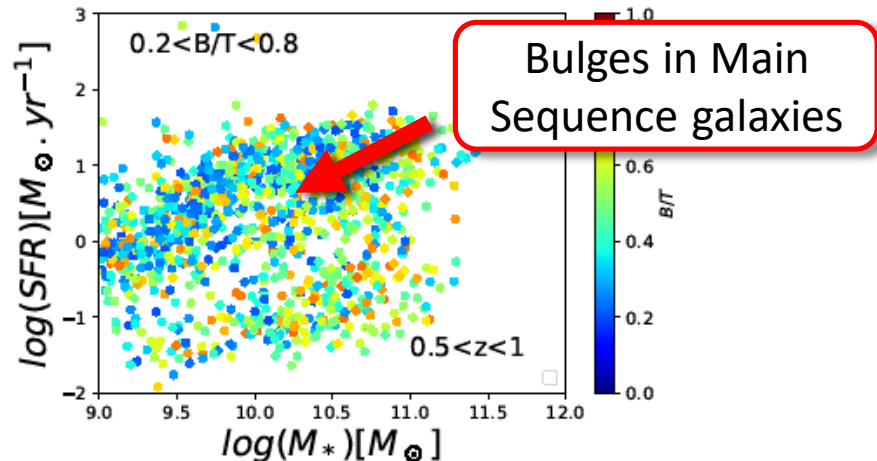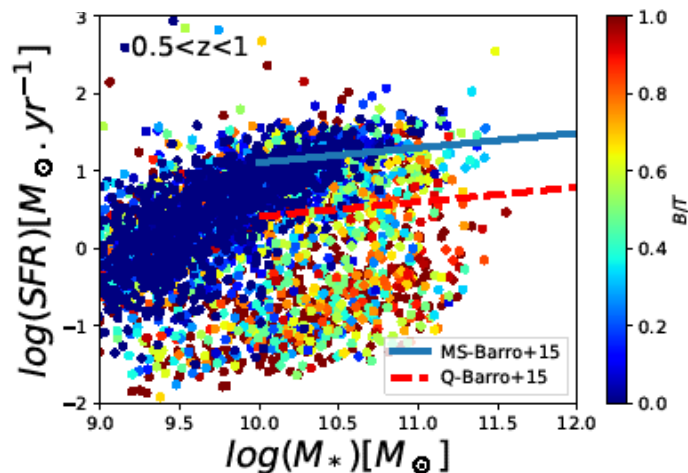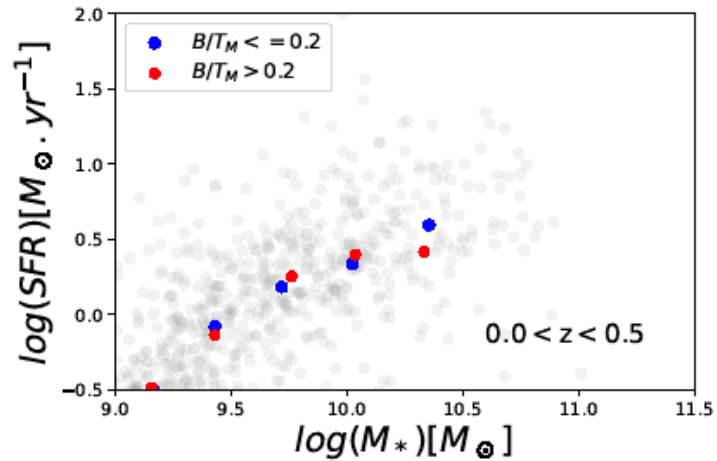
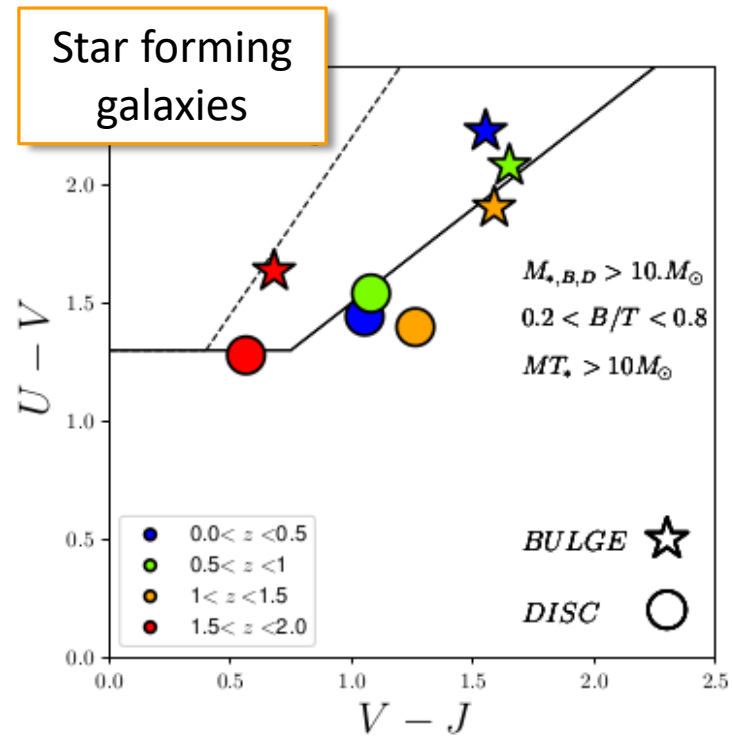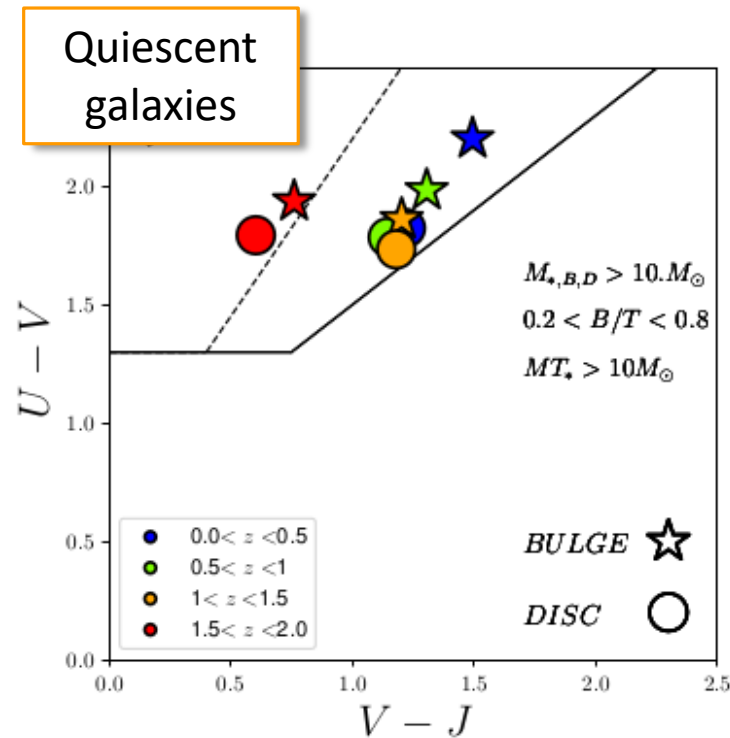**Bulge is a required but not sufficient condition to quench**

Bending of the Main Sequence

[Dimauro et al. 2020 in prep.]
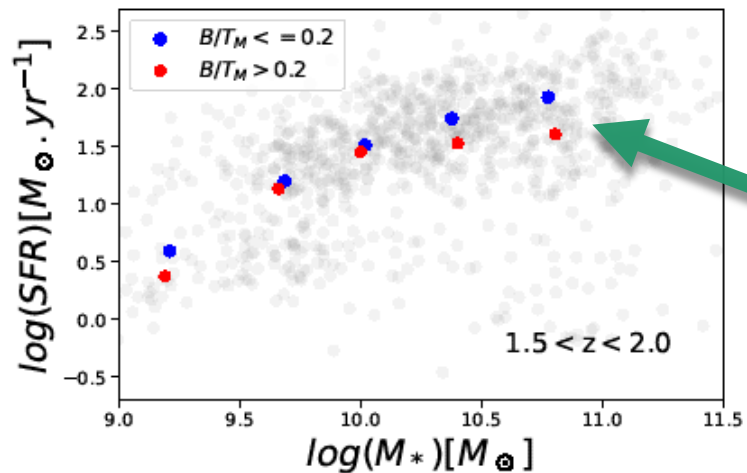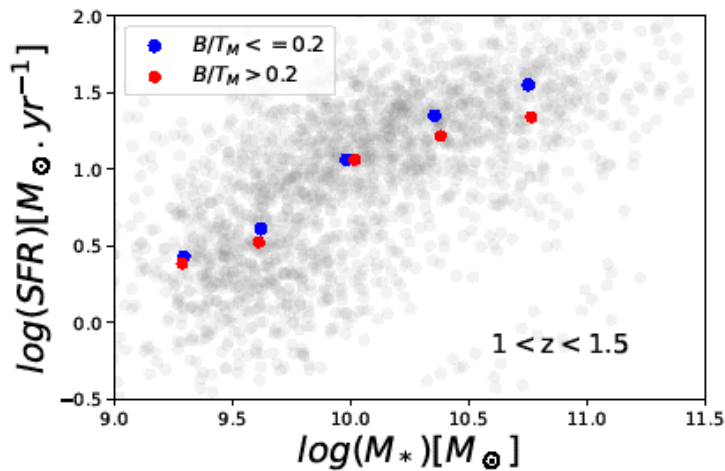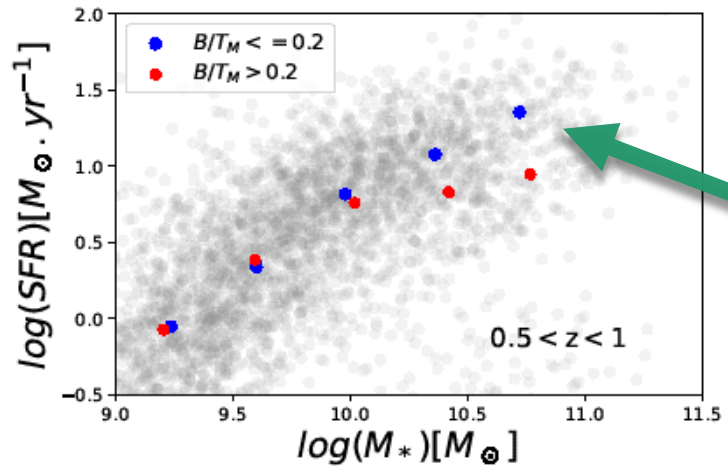
Linked to the presence of massive bulges

Rest-frame colors

All the galaxies show a negative color gradient.
Possible signature of inside-out quenching

The star formation is localized in the disk

[Dimauro et al. 2020 in prep.]

Main results

The structure of internal components weakly depend on the star-formation activity neither on the morphology of the hosting galaxy
[Dimauro et al, 2019]

The bending of the main sequence is directly linked to the morphological gradient.

No passive bulgeless disk are observed: bulge growth is a required condition to quench.

Galaxies with a significant bulge populate the main sequence:
bulge formation starts while galaxies are still star forming.
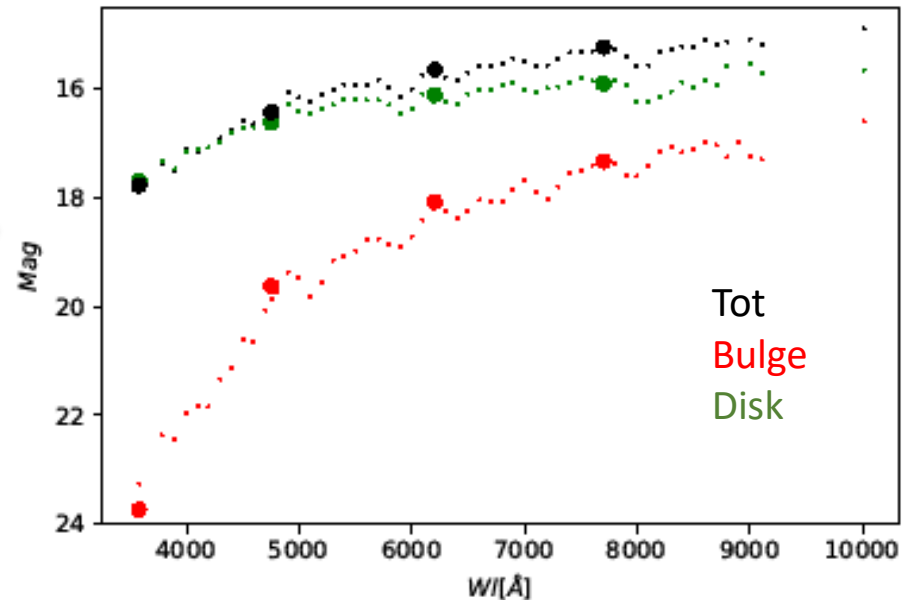Bulge is a required but not sufficient condition to quench.

All the galaxies show a negative color gradient. Bulge are always quenched. The star formation is localized in the disk.

Morphological transformation as a main quenching path
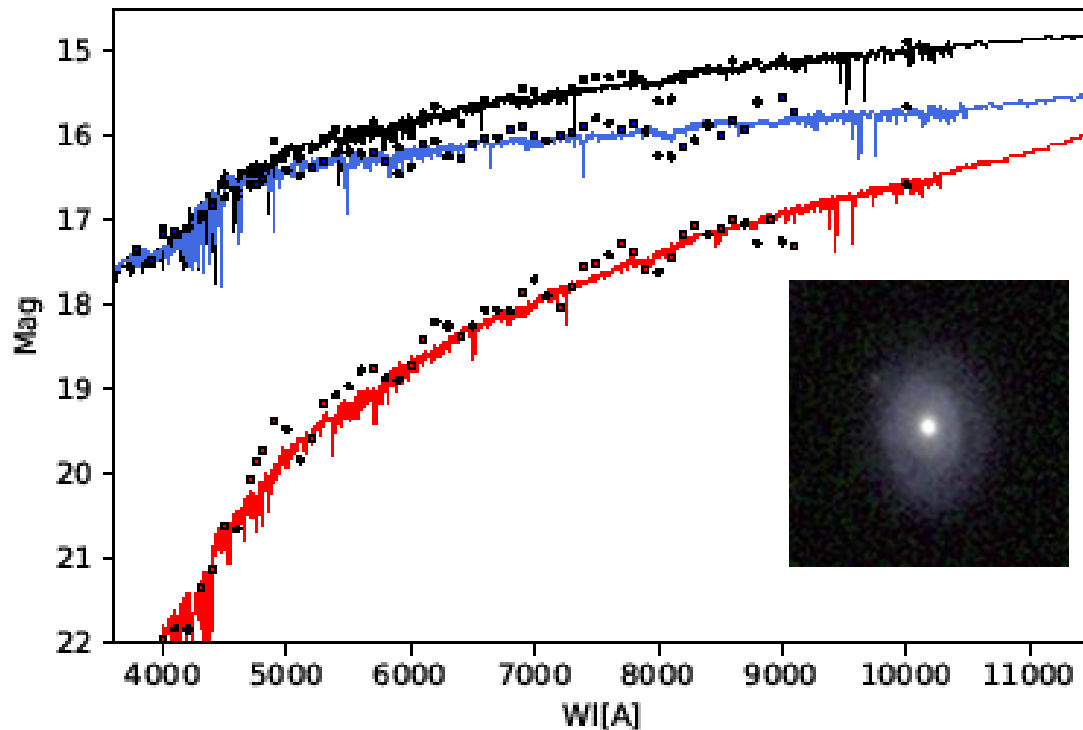
Bulge-disk decomposition with J-PAS

4 broad bands
+
55 narrow bands
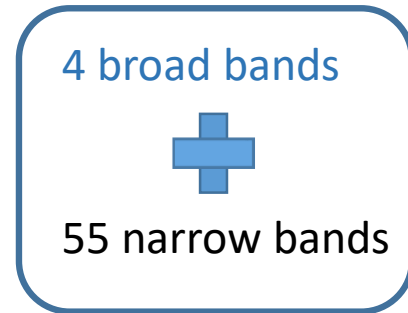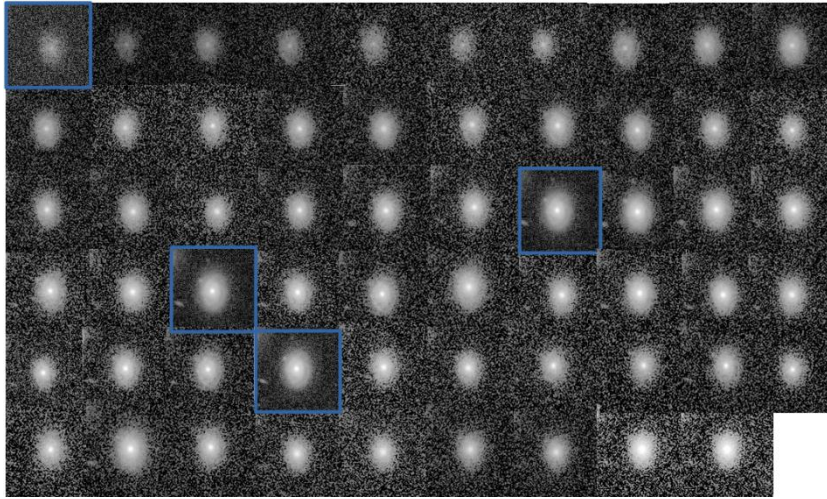
GalfitM

[Häußler et al. 2013]

Tot
Bulge
Disk

Bulge-disk decomposition with J-PAS

Promising results combining broad and narrow bands!

Preliminary results

	Bulge	Disk
Mass	10.52	10.8
lsfr	-	0.42
Av	1.90	0
lage	10	9.60

SED fitting code: FAST [Kriek et al 2009]

What else:

- Morfometryka to automatically classify galaxies (Ferrari et al. 2015)

- Curvature method (Lucatelli, Ferrari et al. 2019) to predict number of components as well as to estimate starting values for GalfitM

- Compare final modes with the output of CICLE (Jiménez et al)

See the poster of Cortesi et al.