The intriguing life of massive galaxies
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Massive galaxies: born as disks, dead as spheroids

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Abstract. Present day massive ($M_{stellar} > 10^{11} M_{\odot}$) galaxies are composed mostly of early-type objects. To ascertain whether this was also the case at higher redshift, we have compiled over a thousand massive galaxies at $0 < z < 3$ with HST imaging and spectroscopic redshifts for the majority of them. We have also analyzed using 3D spectroscopy another sample of 10 massive galaxies at $z = 1.4$. Both works highlight the progressive change between a late-type/peculiar nature at $z > 2$ and a predominance of early-type morphologies only since $z = 1$.

Keywords. galaxies: evolution, galaxies: high-redshift, galaxies: structure

1. Description of the present communication

Massive galaxies change dramatically their observational properties from low to high redshift, namely their sizes (e.g. Buitrago *et al.* 2008), other structural parameters and star formation rates (e.g. Bell *et al.* 2012). This must be reflected in their morphology. To shed light into this transformation we have analysed in Buitrago *et al.* (2013) a representative (> 1000) sample of massive galaxies at $0 < z < 3$ both quantitatively (using the Sérsic index) and qualitatively (by visual classification). The rise of galaxies displaying large Sérsic indices is connected with the development of the galaxy outskirts, and possibly their bulges. Massive galaxies also increase their number density by an order of magnitude, and the mechanism in charge is most efficient creating early-type objects.

The evidence for this morphological transformation is based so far on the detailed morphological analysis of these objects which ultimately rests on the shape of their surface brightness profiles. To explore the consistency of this scenario, it is necessary to have access to the dynamical status of these galaxies. We have studied in Buitrago *et al.* (2012, in preparation) 10 massive galaxies at $z \sim 1.4$ with the SINFONI integral field spectrograph in the H-band by mapping the Hα emission line. Most of these objects show large rotational field maps, with half of them being consistent with rotationally supported disks. We conclude that massive galaxies acquire more rapidly a given morphology and gravitational equilibrium than less-massive objects. Mass is crucial for understanding the galaxy morphological development, whereby massive galaxies progressively join the observational properties of their local Universe counterparts.

References

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