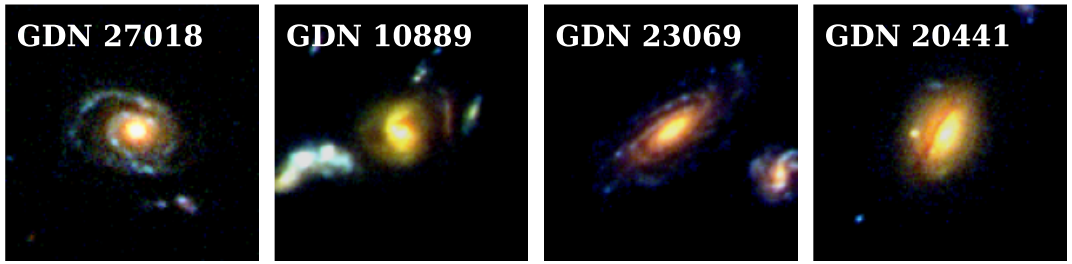
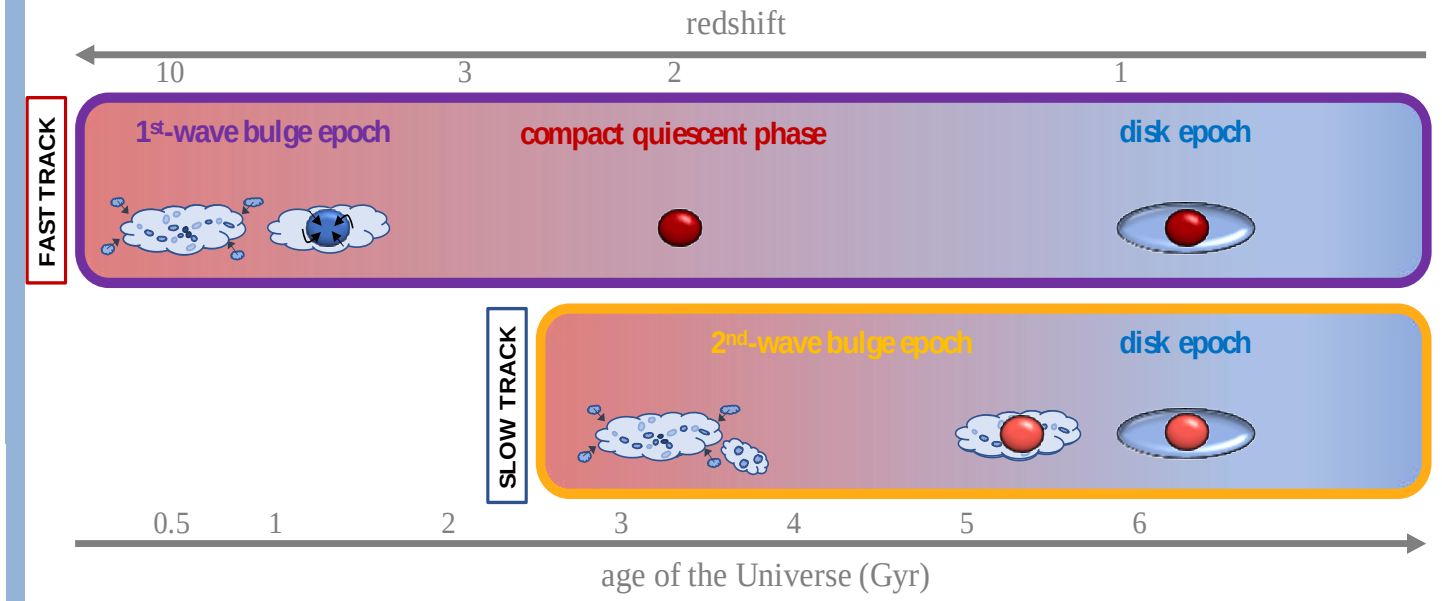
How do massive disk galaxies shape their morphology?



This work focuses on the mass assembly history of about 100 massive disk galaxies in GOODS-N at redshift 0.1 < z < 1. In particular, a novel technique of spectro-photometric decomposition allows to separate the light of the central bulge from that of its disk and study their intrinsic stellar population properties. The analysis reveals that bulges form in two waves and two modes (see also Costantin et al. 2021). On the other hand, the disk component formed at z ~ 1 for both first and second-wave bulges. These results were achieved by analyzing a dataset from the Survey for High-z Absorption Red and Dead Sources (SHARDS; PI: P. G. Pérez-González), a state-of-the-art imaging survey that provides multifilter photometry in 25 bands with spectral resolution R=50.

This cartoon summarizes the morphological evolution of our galaxies. First-wave bulges (upper panel) formed at redshift z>3 and assembled their mass fast (timescales around 200 Myr) in an extreme event of gas compaction. After that, they stopped forming stars and evolved unperturbed for as long as 5 Gyr. For the second wave of bulges (lower panel), assembling at redshift z<3, a slower mode of formation started to become relevant. At redshift z ~ 1, both first and second-wave bulges acquire an extended stellar component, marking the beginning of the disk epoch.



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COSTANTIN L. ET AL. 2022, THE ASTROPHYSICAL JOURNAL, 929, 121
https://iopscience.iop.org/article/10.3847/1538-4357/ac5a57