STELLAR HALOES IN MASSIVE EARLY-TYPE GALAXIES

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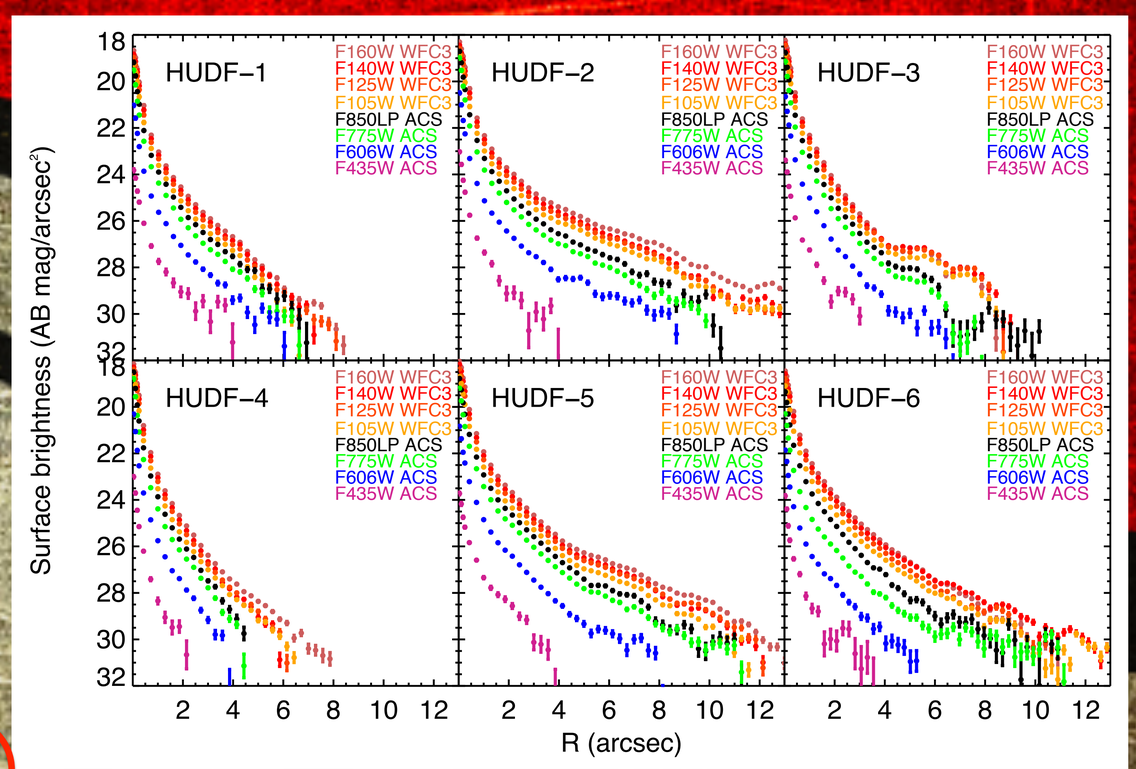
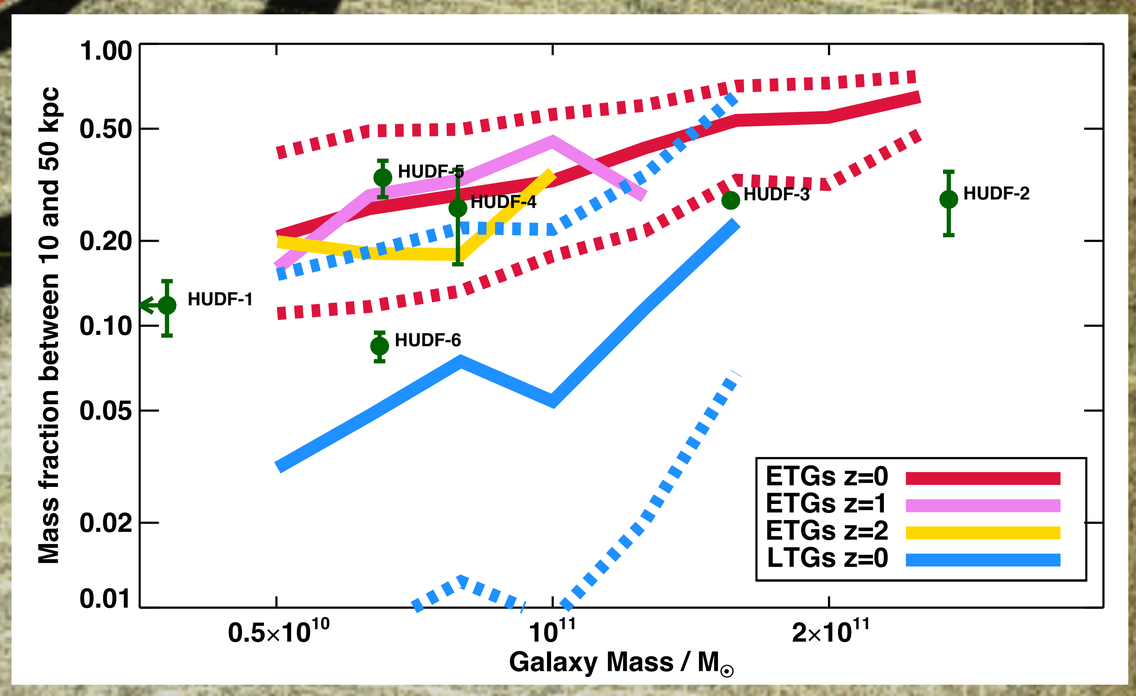
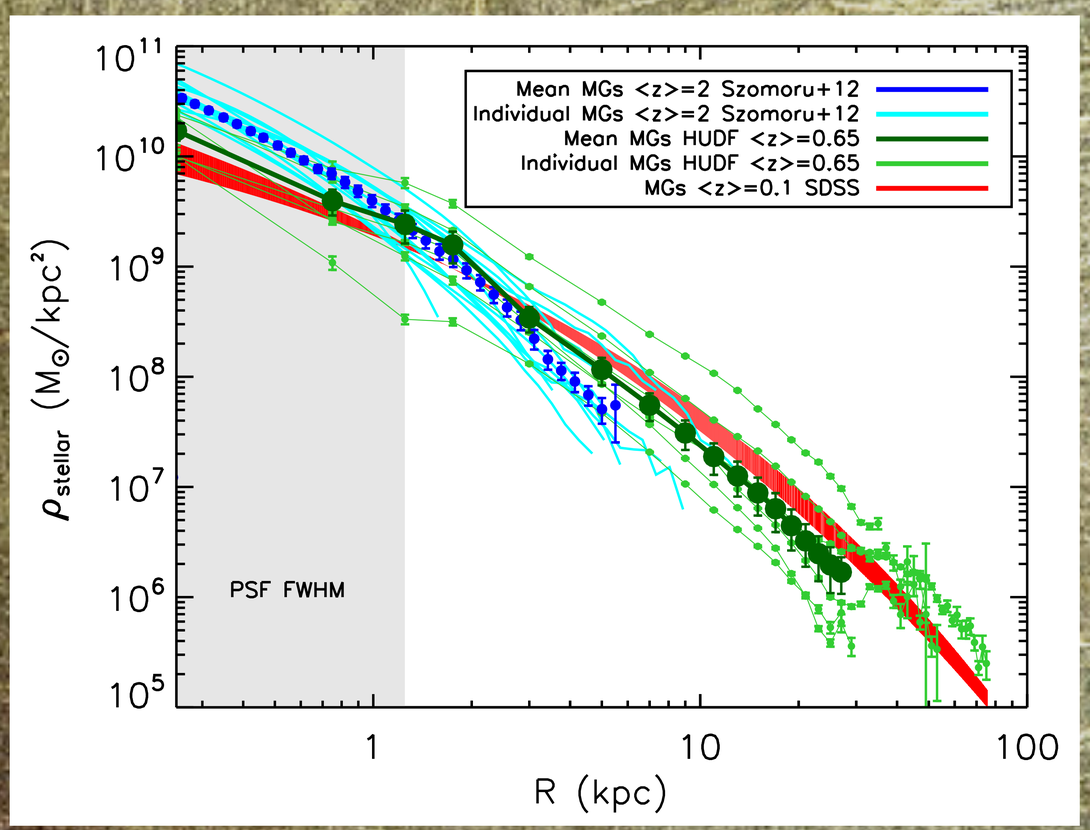
Gotta catch 'em all!

The Hubble Ultra Deep Field (HUDF) opens up an unique window to witness galaxy assembly at all cosmic distances. Thanks to its extraordinary depth, it is a privileged tool to beat the cosmological dimming, which affects any extragalactic observations and has a very strong dependence with redshift –$(1+z)^4$–. In particular, massive ($M_{stellar} > 5x10^{10}\ M_{\odot}$) Early Type Galaxies (ETGs) are the most interesting candidates for these studies, as they must grow in an inside-out fashion developing an extended stellar envelope/halo that accounts for their remarkable size evolution (~5 times larger in the nearby Universe than at z=2-3). To this end we have analysed the 6 most massive ETGs at z < 1 in the HUDF12. Because of the careful data reduction and the exhaustive treatment of the Point Spread Function (PSF), we are able to trace the galaxy surface brightness profiles up to the same levels as in the local Universe but at <z> = 0.65 (31 mag arcsec^{-2} in all 8 HST bands, ~29 mag arcsec^{-2} restframe or beyond 25 effective radii). This fact enables us to investigate the galactic outskirts or stellar haloes at a previously unexplored era, characterising their light and mass profiles, colors and for the first time the amount of mass in ongoing mergers.

HUDF is the deepest HST image







LESSONS LEARNED

- 10-30% of the stellar mass for these galaxies is contained at 10 < R/kpc < 50
- This is in agreement with simulations, and typically 2-3x higher than for late-types
- The fraction of stellar mass stored in the outer envelopes/haloes of Massive Early-Type Galaxies increases with decreasing redshift, being 28.7% at <z> = 0.1, 22.6% at <z> = 0.65 and 3.5% at <z> = 2
- 1-3% of the galaxy mass is in ongoing mergers in agreement with minor merging growth

WHAT DO YOU NEED TO GO ULTRADEEP

- PSF to be known up to 1.5x the galaxy size
- Data reduction must preserve the low surface brightness wings of extended sources

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