CONTRIBUTION OF MINOR MERGERS TO THE GROWTH OF ELLIPTICAL GALAXIES

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1. THE CONCEPT

Size evolution studies have shown that the structural properties of the elliptical galaxies have dramatically changed with cosmic time (e.g. Trujillo et al. 2007). This result **challenges** the ideas developed from the detailed analyses of the stellar populations of these galaxies in the nearby universe. The study of the **local elliptical galaxies** has revealed their stars are old, and formed over short-timescales (burst-like event); see the review by Renzini (2006). In order to resolve this discrepancy, it has been **hypothesized** that new material continuously accretes in **minor merger events** (Naab et al. 2007).

In this work, we want to **create line index-index diagrams** of several elliptical galaxies. Since observing such on-going minor mergers through deep imaging of distant galaxies is difficult due to cosmological dimming, and because the analysis of the present-day stellar populations is not sensitive to small star formation episodes that happened more than 1.5 Gyr ago, these diagrams are a promising way to probe the minor merger scenario.

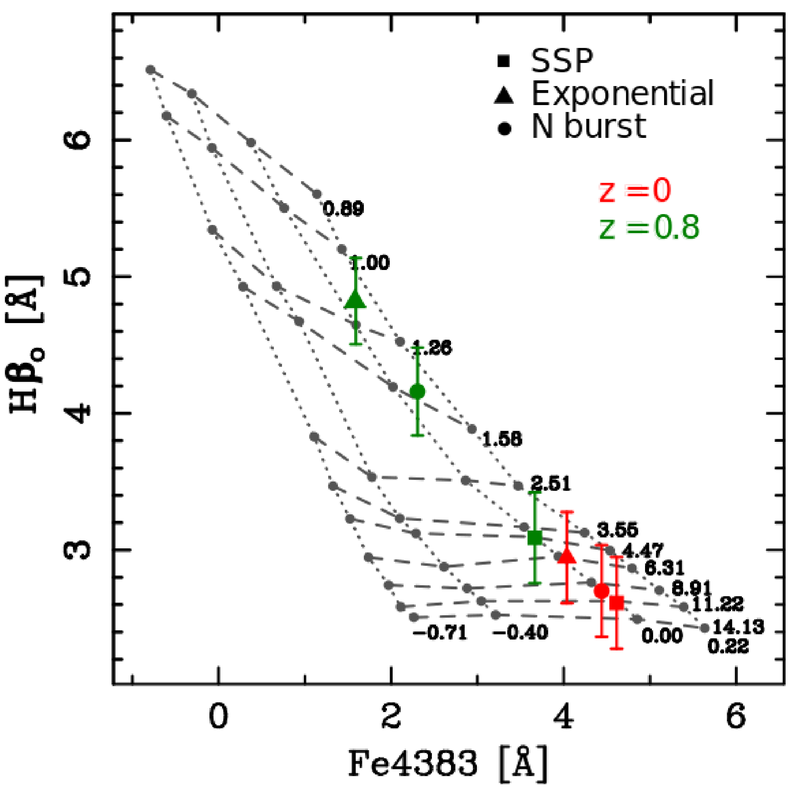

Figure 1. Disentangling a *smooth* accretion history from a series of minor bursts and a passive evolution is possible at high redshift, but not in the nearby universe. This diagnostic diagram has been created with the MILES spectra and made with tools public available on the web-page miles.iac.es.

MINOR MERGERS!

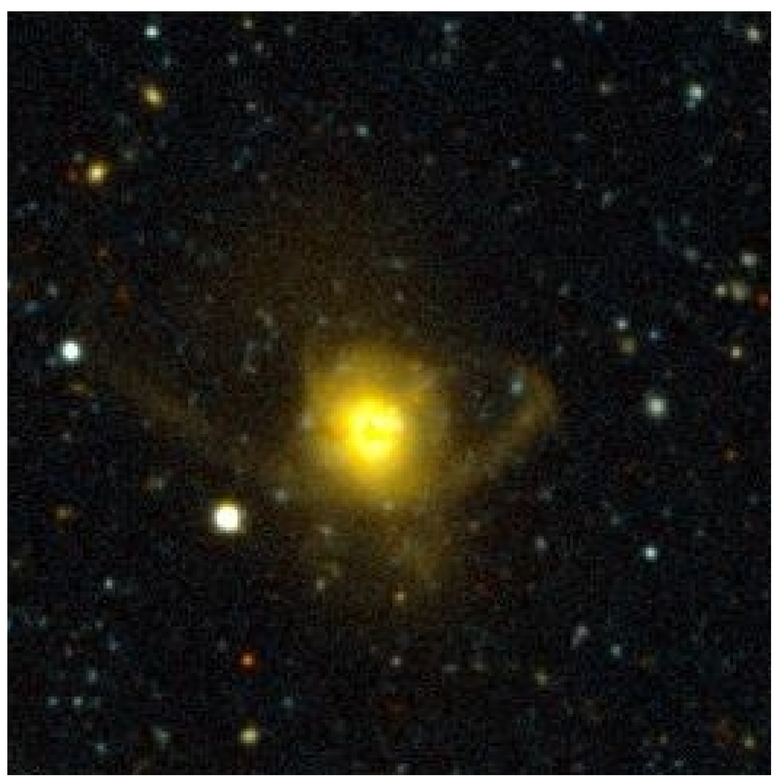

Image taken from van Dokkum (2005)

2. THE DATA

We have selected the available spectra in the DEEP2 DR4 survey (Newman et al. 2012) of the galaxies in Trujillo et al. (2007) with Sérsic index greater than 2.5:

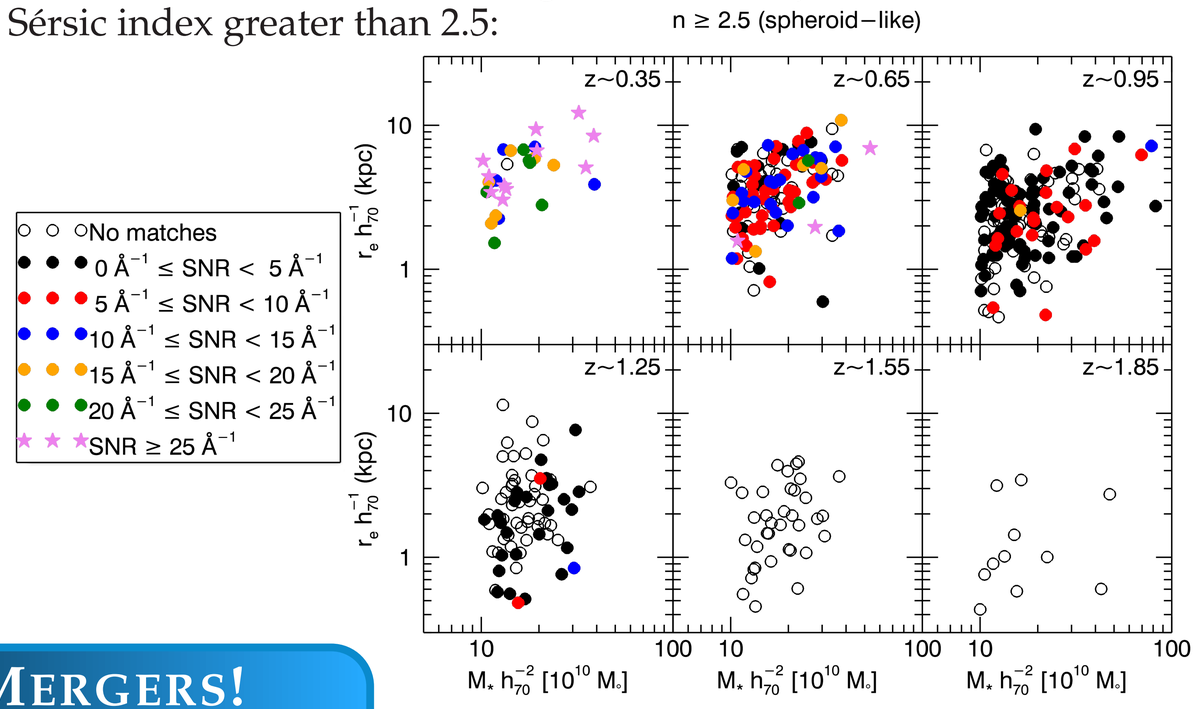

Figure 2. Stellar mass-size relations of the spheroid-like galaxies in Trujillo et al. (2007). Overplotted with different colors (according to the quality of the spectra) those objects with spectra taken by the DEEP2 DR4 survey.

3. DATA PROCESSING

- Masking telluric absorption
- In the case of low SNR, stacking
- Removing gas with pPXF (Cappellari & Emsellem 2004) and GANDALF (Sarzi et al. 2006) codes
- Measuring indices in clean spectra
- Estimating errors with Monte Carlo simulations

4. STACKING SPECTRA

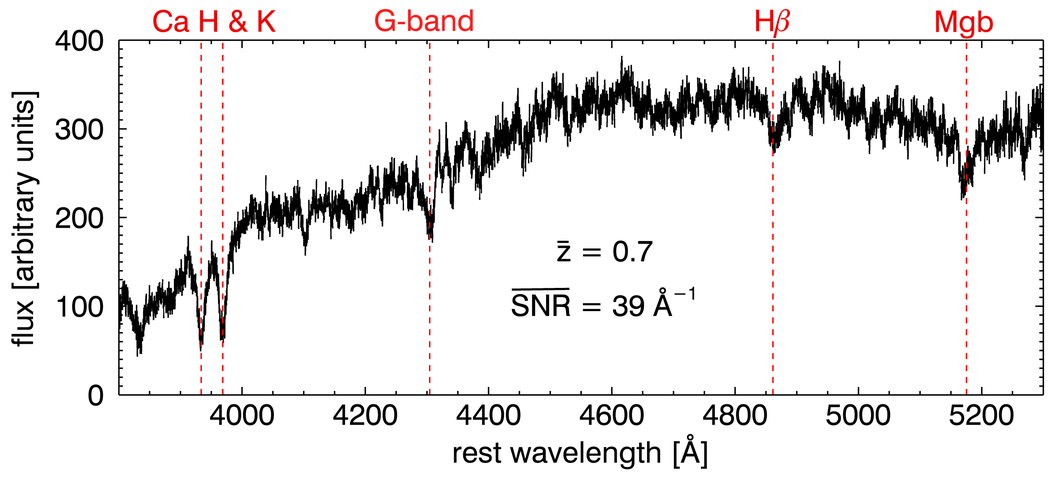

Figure 3. An example of stacked spectra calculated in this work. In particular, this case corresponds to a stacking of 22 galaxies which satisfy: $0.5 < z < 0.8$, $5\,\text{Å}^{-1} < \text{SNR} < 15\,\text{Å}^{-1}$, $M_\star > 1.65\,h_{70}^{-2}\,10^{11}\,\text{M}_\odot$, $r_e > 3.5\,h_{70}^{-1}\,\text{kpc}$.

5. PRELIMINARY RESULTS

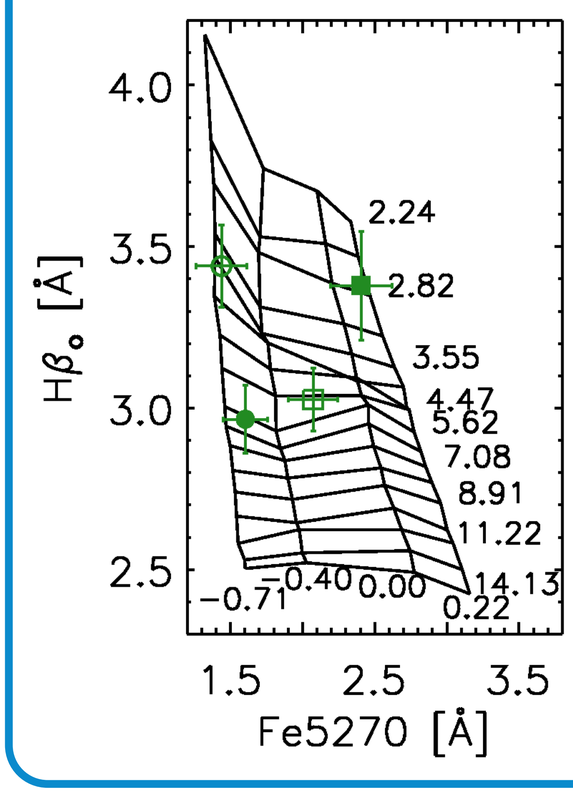

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Figure 4. An example of index-index diagram constructed with stacked spectra.

6. FUTURE WORK

- Correction of telluric absorption (now it has been masked)
- Implementation of continuum normalization in stacked spectra
- A detailed analysis of the obtained results

7. DOWNLOAD THIS POSTER

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8. ACKNOWLEDGMENTS

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