Star Formation Activity in Balmer Break Galaxies at z<1.5.

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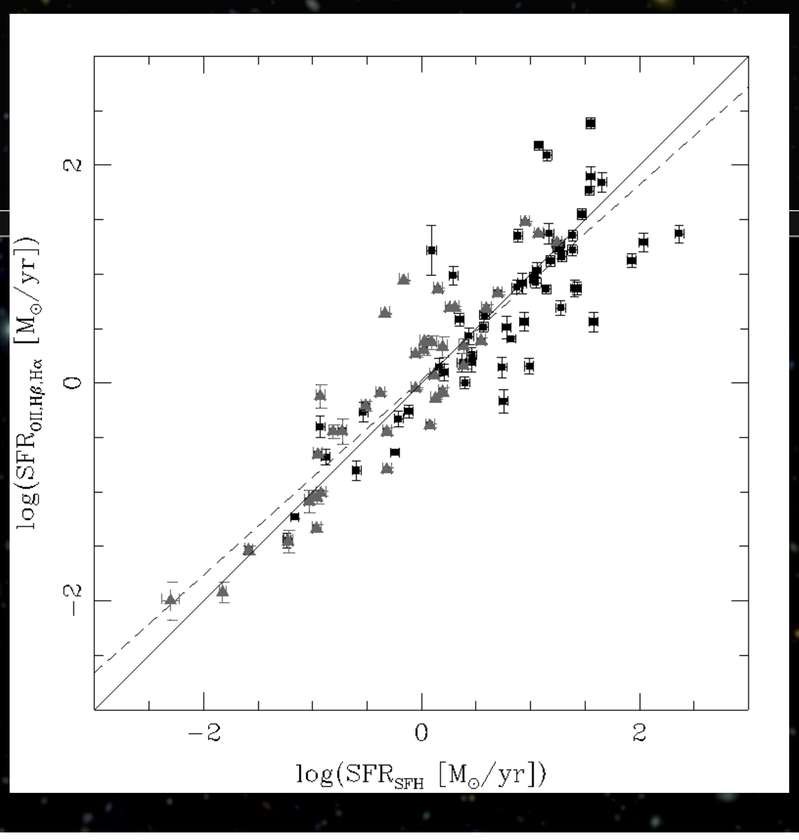
We derived star formation rates (SFR) and investigated the evolution of the SFR–stellar mass, specific SFR (SSFR)–stellar mass and SSFR–color relations as function of the redshift. The studied sample composed of star-forming and post-starburst galaxies, span a redshift range from 0.094 to 1.47, and they have stellar masses from 10^{8}–10^{12} Msun. We observe that for a given mass or color, high-redshift galaxies have higher SFR and SSFR values than local galaxies. A break in the star-forming sequence appears when post-starburst galaxies are included, revealing an increasing trend with redshift for the SFR/SSFR values. Theses results let us hypothesize about a characteristic mass and color at which the red sequence could mostly be formed at a given redshift.



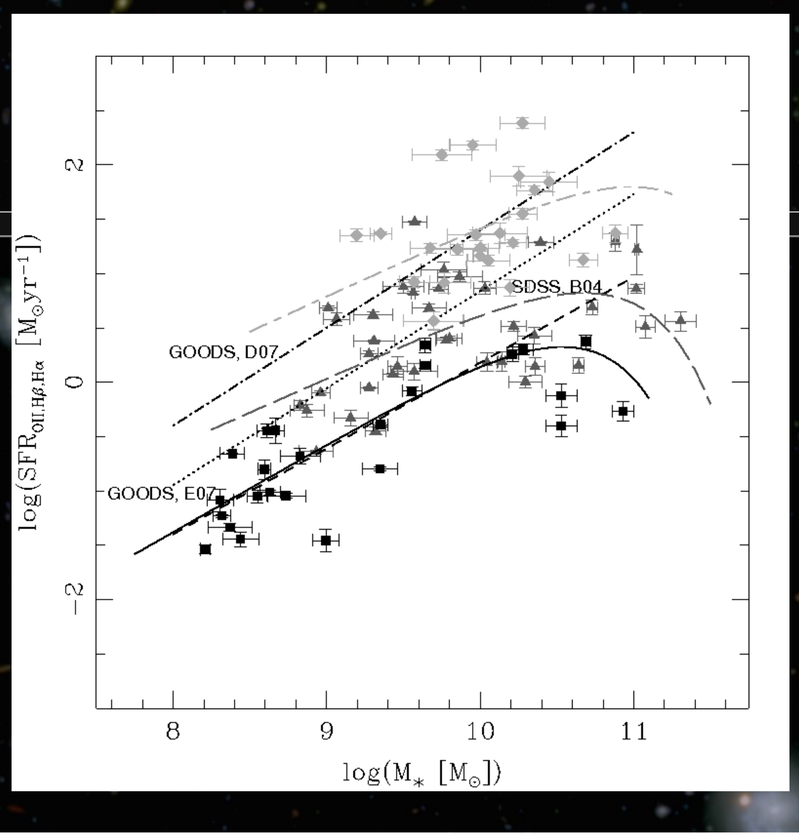
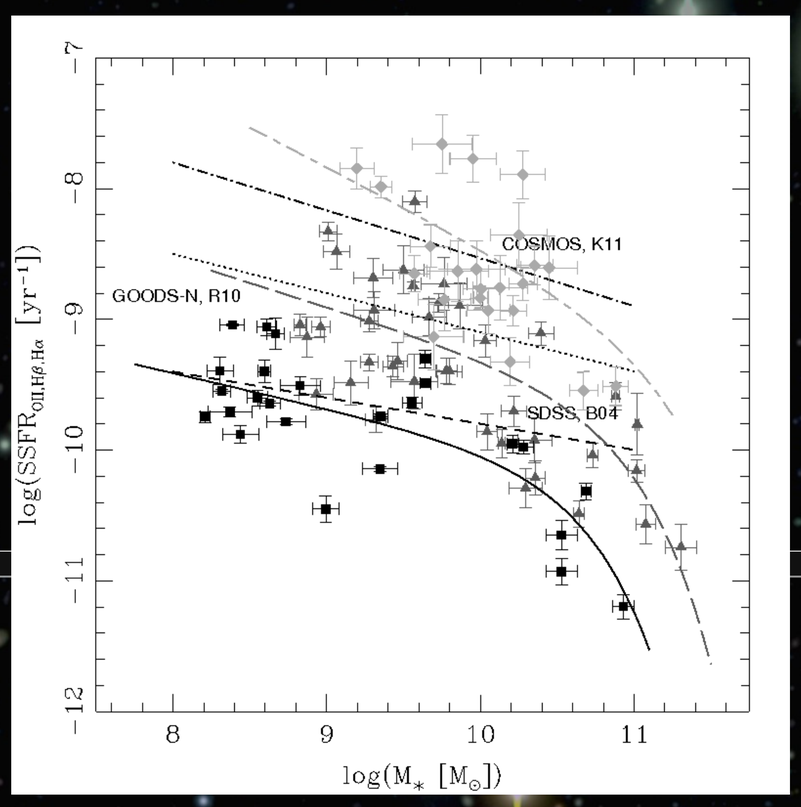


Fig. 1: - LEFT: Comparison between $SFR_{[OII],H\beta,H\alpha}$ versus SFR_{SFH} obtained using exponentially declining SFHs. Black squares show the SFR values obtained for the spectroscopic sample presented in this work, while gray triangles show the SFR values obtained from the Díaz Tello et al. (2013) sample. The solid line represent a 1:1 relation, while the dashed line shows the linear fit applied to the sample. It can be seen that the SFR derived from both methods correlate fairly well but with a slightly trend of SFH models to give higher SFR values at larger SFRs.
- RIGHT: SFR as function of total stellar mass. Black squares represent our low-redshift galaxies (0<z<0.5), gray triangles are our intermediate-redshift galaxies (0.5<z<1.0), while light gray diamonds are our high-redshift galaxies (1.0<z<1.5). The solid, long-dashed and short-long-dashed lines show the fitting function (power-law and break component) applied to each group. The short-dashed line shows the trend observed in SDSS at redshift z<0.2 (Brinchmann et al. 2004), the dotted line shows the trend observed in GOODS by Elbaz et al. (2007) at redshift 0.8<z<1.2, while the dot-dashed line shows the trend found by Daddi et al. (2007) in GOODS at 1.4<z<2.5. It can be seen how the mass break in the power-law shape appear to be necessary for following the trends showed by star-forming and post-starburst galaxies.



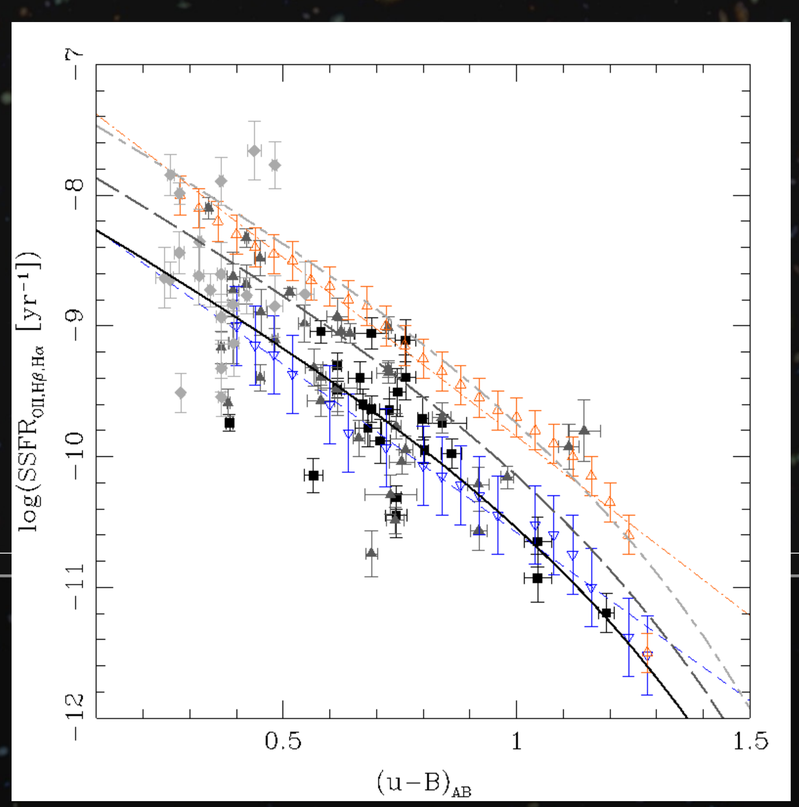


Fig. 2: - LEFT: SSFR as function of total stellar mass. As was shown in Figure 9, black squares are our low-redshift galaxies, gray triangles our intermediate-redshift galaxies and light gray diamonds our high-redshift galaxies. The solid, long-dashed and short-long-dashed lines show the fitting function applied to each group. As comparison, the short-dashed line shows the trend observed in SDSS at redshift z<0.2 (Brinchmann et al. 2004), the dotted line shows the trend observed in GOODS-N by Rodighiero et al. (2010) at redshift 0.5<z<1.0, while the dot-dashed line shows the trend found by Karim et al. (2011) in COSMOS at 1.6 < z < 2.0. It can be seen that the information retrieved in this plot is equivalent to figure 1 (right). In addition, a higher break mass value at higher redshift appears also be necessary for following the trend observed in our galaxies.
- RIGHT: SSFR as function of rest-frame color $(u - B)_{AB}$. As in Figure 9, black squares are our galaxies at 0<z<0.5, gray triangles our galaxies at 0.5<z<1.0, while light gray diamonds are our galaxies at 1.0<z<1.5. The solid, long-dashed and short-long-dashed lines show the fitting function applied to each group. For comparison, we have included the trends found by the Cooper et al. (2008) data, with the blue empty inverted triangles being galaxies at redshift 0.05<z<0.1 from SDSS, while the red empty triangles are galaxies from the DEEP2 sample at 0.75<z<1.05. The blue dashed line and red dot-dashed lines show the linear fits estimated for the Cooper et al. (2008) galaxies. It can be observed in these data that signs of a break color in the transition from the blue sequence to the red sequence also appears to be significant. This color break might represent the characteristic color of post-starburst galaxies for which a possible color evolution as a function of redshift would not be discarded.

_ This research with additional analysis has been recently submitted to the Monthly Notices of the Royal Astronomical Society.
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