sSFR functions out to $z = 1.4$ combining the COSMOS and GOODS surveys

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Abstract

The mass-SFR relation characterizes how the instantaneous star formation is determined by the galaxy past star formation history. Its evolution is linked to the growth of the dark matter structures. I will present a novel approach to study the mass-SFR relation by measuring the sSFR functions in several stellar mass bins out to $z = 1.4$. I will demonstrate that such approach is necessary to avoid selection effects. We base our analysis on the COSMOS field including the new SPLASH/Spitzer data, MIPS and Herschel data over 2 deg^2. We also combine COSMOS and GOODS data. I will show that the shape of the sSFR function is invariant with time at $z < 1.4$ but depends on the mass, with a broadening of the sSFR function ranging from 0.28 dex at $\mathcal{M} \sim 10^{10}\mathcal{M}_{sun}$ to 0.46 dex at $\mathcal{M} > 10^{11}\mathcal{M}_{sun}$. Such broadening results from an increasing diversity of SFHs as the stellar mass increases. We obtain a new parametrisation of the sSFR evolution as a function of mass and redshift. I will link these results with the evolution to the cosmological accretion rate and the numerous physical processes, as gas exhaustion in hot gas halos or secular evolution, which can gradually reduce the sSFR and increase the SFH diversity.