

The formation and evolution early-type galaxies in VIPERS

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Abstract

We present a precise analysis of the Luminosity Function (LF), the Colour-Magnitude Relation (CMR) and the spectroscopic properties using sample more than 60,000 galaxies in the redshift range $0.4 < z < 1.3$ drawn from the ongoing VIMOS Public Extragalactic Redshift Survey (VIPERS) project. Using different selection criteria, we define several samples of early-type galaxies and explore their impact on the evolution of the red-sequence (RS) and the effects of dust since $z=1.3$. The RS is modelled using stellar population models and the spectral properties suggest a rapid build-up of the RS within a short time scale. We find a rise in the number density of early-type galaxies and a strong evolution in LF and CMR since $z = 1$. Massive galaxies are already in place at $z = 1$ and afterwards experience an efficient quenching of their star formation, followed by a passive evolution with only limited subsequent merger activity. In contrast, low-mass galaxies indicate a different mass assembly history and cause a slow build-up of the CMR over cosmic time. By splitting our sample into overdense and underdense regions, we investigate the impact of environment on our results and also examine possible effects due to cosmic variance. We discuss possible physical mechanisms that are relevant for the origin and the build-up of the RS and the quenching of star formation by combining multi-wavelength data, spectroscopic properties derived from stacked spectra and morphologies of our galaxies.