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Galaxies in most dense environments at z ∼ 1.4

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Abstract. The X-ray luminous system XMMU J2235-2557 at z∼1.4 is among the most massive of the very distant galaxy clusters, and remains a unique laboratory to observe environment-biased galaxy evolution already 9 Gyr ago (Lidman *et al.* 2008, Rosati *et al.* 2009, Strazzullo *et al.* 2010). At a cosmic time when cluster cores start showing evidence of a still active galaxy population, star-forming ($M > 10^{10} M_{\odot}$) galaxies in XMMU J2235-2557 are typically located beyond ∼250kpc from the cluster center, with the cluster core already effectively quenched and dominated by massive galaxies on a tight red sequence, showing early-type spectral features and bulge-dominated morphologies. While masses and stellar populations of these red-sequence galaxies suggest that they have largely completed their formation, their size is found to be typically smaller that similarly massive early-type galaxies in the local Universe, in agreement with many high-redshift studies. This would leave room for later evolution, likely through non-secular processes, changing their structure to match their local counterparts. On the other hand, uncertainties and biases in the determination of masses and sizes, as well as in the local mass-size relation, and the possible effect of progenitor bias, still hamper a final conclusion on the actual relevance of size evolution for early-type galaxies in this dense high-redshift environment.

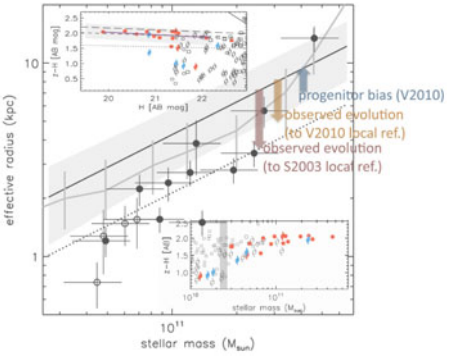

Figure 1. The main panel shows the effective radius vs stellar mass of quiescent early-type galaxies on the red sequence (small insets) of XMMU J2235-2557. Downward arrows show the measured size evolution with respect to the Shen *et al.* (2003) and Valentinuzzi *et al.* (2010) local relations, while the upward arrow shows the effect of progenitor bias as estimated by Valentinuzzi *et al.* (2010). Adapted from Strazzullo *et al.* (2010), see original paper for details.

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