correspond to the uncertainties in the descendant luminosity, extracted from P10. As can be seen, the ratio is significantly higher than unity at $z > 0.6$ in both bands, indicating the need for mergers between ETGs in order to diminish their number density towards $z = 0$. Lower redshift samples show number densities similar to their expected descendants. As can be seen, the photo-z based maximum likelihood method (crosses, shown only for the r-band for clarity) provides results in agreement with those from the PML based LFs.

Taking advantage of the measured LFs for the high-redshift ETG samples, we calculate the ratios between the luminosity densities of the high-z ETGs and that of their $z = 0$ likely descendants, using the PML and B04/Be07 LF measurements for the MUSYC and SDSS ETGs, respectively. This is shown in the bottom panel of Figure 1 as squares (solid symbols correspond to results in the r-band, the open symbols to the B-band). As can be seen, regardless of the photometric band the data shows that as the redshift decreases the ratio of luminosity densities of progenitor and descentant ETGs is consistent with the unit value (bear in mind that our different high redshift ETG samples are *not* in the same evolutionary line).

The results from this analysis show that ETGs at $z = 1$ are likely to descend into $z = 0$ ETGs undergoing a decrease in space-density of a factor between 3 and 11 (the ranges cover the results from the B and r bands). But, due to the constant luminosity density, mergers would provide the required increase in luminosity without the need for important episodes of star-formation. Notice that the amount of mergers derived here (of two or more mergers since $z = 1$ for each $z = 0$ galaxy) is higher than that estimated from close pairs of stellar mass selected samples at different redshifts; Robaina et al. (2010) find that galaxies undergo $\sim$0.7 mergers between $z = 1.2$ and 0. We suggest that a more consistent measurement of merger rates using close pairs would require the use of samples in a more likely progenitor-descendant relationship than that provided by a stellar mass selection.

Upcoming surveys such as those planned for the Large Synoptic Survey Telescope (LSST Science Collaboration 2009), will allow much better statistics by increasing the solid angle with respect to the currently available deep photometric surveys such as MUSYC and COMBO17. With a higher signal it will be possible to apply this method and measure with high accuracy the importance of mergers in the evolution of the ETG population. Furthermore, with a careful treatment of sources and sinks in the samples of progenitors and descendants, it could also be possible to produce measurements of the expected merger rates and star formation history of combined samples of early and late type galaxies, and via comparisons with models of galaxy formation, help improve our understanding of the evolution of galaxies from high redshifts to the present day.

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