

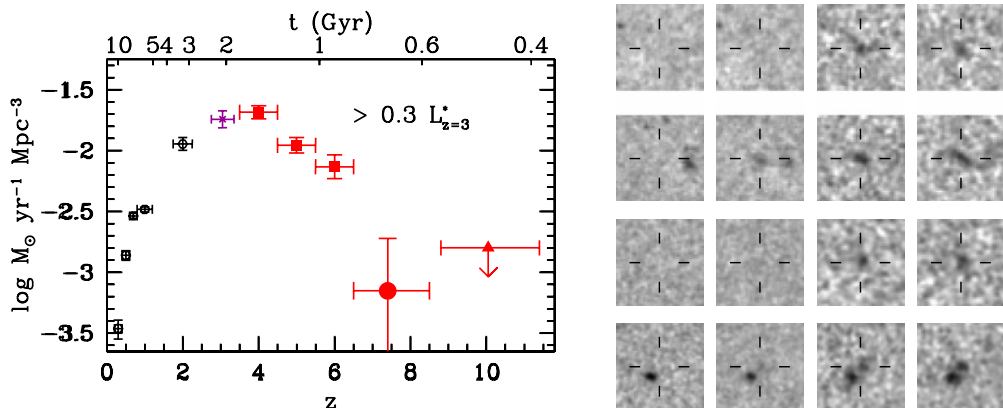
# Lyman break galaxies at $z > 6$

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**Abstract.** Extending the study of star-forming galaxies to  $z > 6$  is extremely difficult due to the faintness of the sources and the challenging nature of deep near-infrared observations. Nevertheless, current observations are now just good enough that we can begin drawing some conclusions about the nature of galaxies at  $z \gtrsim 7$ . At present, deep near-infrared observations with NICMOS (reaching  $\gtrsim 27$  AB mag at  $5\sigma$ ) cover more than  $20 \text{ arcmin}^2$  of area with deep optical coverage and allow us to identify four strong  $z \simeq 7-8$  candidates. Comparing this sample with dropout samples at later times ( $z \simeq 4-6$ ), we are able to study evolution in the rest-frame UV LF over the range  $z \simeq 8$  to  $z \simeq 4$ . We find strong evidence for significant evolution in the characteristic luminosity with time (brightening by  $\sim 2$  mag, from  $z \simeq 8$  to  $z \simeq 4$ ). The observed evolution appears to be the direct result of hierarchical growth in the galaxy population.

**Keywords.** galaxies: evolution, galaxies: formation, galaxies: high-redshift



**Figure 1.** *Left:* Star formation history of the universe (uncorrected for extinction and integrated down to  $0.3 L_{z=3}$ ). Shown are our determinations at  $z \simeq 4-6$  (large red squares: Bouwens *et al.* 2006 and Bouwens *et al.* 2006, in preparation), our recent determination at  $z \simeq 7.4$  (large red circle: Bouwens & Illingworth 2006), and upper limits at  $z \simeq 10$  (red triangle: Bouwens *et al.* 2005). Included are also determinations at  $z \simeq 0-2$  (Schiminovich *et al.* 2005) and  $z \simeq 3$  (Steidel *et al.* 1999). The star formation rate density is observed to increase rather dramatically from  $z \simeq 8$  to  $z \simeq 4$ . *Right:* Optical and near-infrared images of four candidate star-forming galaxies at  $z \simeq 7-8$ . These galaxies were found in deep NICMOS imaging available over the Ultra Deep Field and GOODS fields (Bouwens & Illingworth 2006).

## References

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