Cosmic star formation history: pure luminosity vs. number galaxy evolution

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We study the evolution of the cosmic star formation in the universe by computing the luminosity density (in the UV, B, J, and K bands) and the mass density of galaxies in two reference models of galaxy evolution: the pure-luminosity evolution (PLE) model developed by Calura & Matteucci (2003) and the semi-analytical model (SAM) of hierarchical galaxy formation by Menci et al. (2002). Our results suggest that at low-intermediate redshifts ($z < 1.5$) both models are consistent with the available data on the luminosity density of galaxies in all the considered bands. At high redshift the luminosity densities predicted in the PLE model show a peak due to the formation of ellipticals, whereas in the hierarchical picture a gradual decrease of the star formation and of the luminosity densities is predicted for $z > 2.5$. Both scenarios allow us to fit the observed stellar mass density evolution up to $z = 1$. At $z > 1$, the PLE and SAM models tend to overestimate and underestimate the observed values, respectively.