



Figure 4:

Galaxy stellar mass function at redshifts $z \sim 0-4$. In the $z = 0.1$, $z = 1$, and $z = 2$ panels, black square symbols show a double-Schechter fit to a compilation of observational estimates. Observations included in the fit are: $z = 0.1$ – Baldry et al. (2008), Moustakas et al. (2013); $z = 1$ and $z = 2$ panels – Tomczak et al. (2014), Muzzin et al. (2013). The fits shown at $z = 1$ and $z = 2$ are interpolated to these redshifts from adjacent redshift bins in the original published results. The formal quoted 1σ errors on the estimates shown in these three panels are comparable to the symbol size, and are not shown for clarity (the actual uncertainties are much larger, but are difficult to estimate accurately). In the $z = 0.1$ panel, the estimates of Bernardi et al. (2013) are also shown (open gray circles). In the $z = 4$ panel we show estimates from Duncan et al. (2014, squares), Caputi et al. (2011, crosses), Marchesini et al. (2010, circles, for $z = 3-4$), and Muzzin et al. (2013, pentagons, $z = 3-4$). Solid colored lines show predictions from semi-analytic models: SAGE (Croton et al. in prep, dark blue), Y. Lu SAM (Lu et al. 2013, magenta), GALFORM (Gonzalez-Perez et al. 2014, green), the Santa Cruz SAM (Porter et al. 2014, purple), and the MPA Millennium SAM (Henriques et al. 2013). The dotted light blue line shows the Henriques et al. (2013) SAM with observational errors convolved (see text). Colored dashed lines show predictions from numerical hydrodynamic simulations: EAGLE simulations (Schaye et al. 2014, dark red), ezw simulations of Davé and collaborators (Davé et al. 2013, bright red) and the Illustris simulations (Vogelsberger et al. 2014b, orange).

at reproducing the SMF of galaxies at $z \sim 0$ by invoking a plausible, if still in most cases schematic, set of physical processes. Fig. 4 shows a compilation of predictions of recent numerical hydrodynamic simulations and semi-analytic models for the SMF from $z = 4$ to $z \sim 0$. These models are all taken directly from the original publications and no attempt has been made to calibrate them to the same set of observations or to correct for the