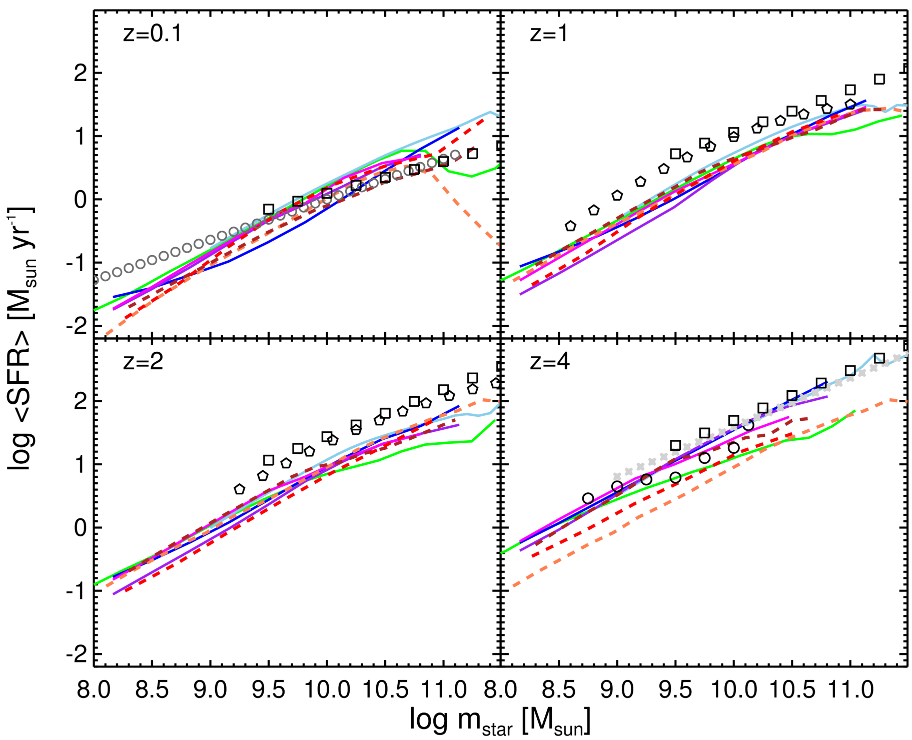

Figure 5:

The average star formation rate in bins of stellar mass, for redshift bins from $z = 0$–4. Grey and black symbols show observational estimates: $z = 0.1$ – Salim et al. (2007, open circles); $z = 1$ and $z = 2$ – Whitaker et al. (2014, pentagons, interpolated in redshift from the published results); $z = 4$– Steinhardt et al. (2014, crosses); Salmon et al. (2014, circles); all panels – fit to data compilation from Speagle et al. (2014, squares). Colored lines show predictions from semi-analytic models and numerical hydrodynamic simulations; key is the same as in Fig. 4. Note that the observational estimates shown are for star forming galaxies; different methods have been used to isolate the "star forming sequence" from "quiescent" galaxies. Some of the modelers have applied a cut to select star forming galaxies, but some have not.

et al. 2013). Inflow into halos is driven primarily by gravitational accretion from the IGM (Dekel et al. 2009, Kereš et al. 2005). The rate at which dark matter halos grow, the *halo mass accretion rate* ($\dot{M}_{\rm halo}$), is well-characterized in ΛCDM, and roughly given by $\dot{M}_{\rm halo} \propto M_{\rm halo}(1+z)^{2.5}$ (Dekel et al. 2009, Faucher-Giguère et al. 2011). However, preventive feedback within galaxy halos can retard gas accretion into the ISM, and outflows can remove fuel for star formation even after it enters the ISM, so $\dot{M}_{\rm inflow}$ may not trace $\dot{M}_{\rm halo}$.

We can rewrite equation 6 as

$$\mathrm{sSFR} = \frac{\zeta(1+z)^{2.5}}{(m_{\rm star}/M_{\rm halo}) \times (1+\eta)}, \tag{7}$$

where ζ is the fraction of material entering the virial radius that makes it into the ISM, and $\eta \equiv \dot{M}_{\rm outflow}/\dot{m}_{\rm star}$ is the outflow mass loading factor. The dependence of sSFR on $m_{\rm star}$ and z therefore reflects the evolving combination of accretion and feedback.