

Exploring the Buildup of Galaxies at $z \sim 7+$: Rest-Frame UV LFs and Stellar Masses

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Abstract

We have assembled a large sample of ~ 500 galaxies at $z \sim 6$, allowing for a robust determination of the galaxy luminosity function, luminosity density, and star formation rate to very faint luminosities ($0.04L^*$). Relative to $z \sim 3$ LFs, we find significant evidence for evolution from $z \sim 6$. At $z \sim 6$, the characteristic luminosity is only half that at $z \sim 3$, providing strong evidence for hierarchical buildup. Extending this to even higher redshifts ($z > 6$) into the reionization epoch is challenging, but a few $z \sim 7$ candidates have been found over the HUDF. Significant limits have also been placed at $z \sim 10$ using over 800 orbits of deep NICMOS data. We have substantially extended these results using deep new HST data over many fields (~ 20 arcmin²) around the HUDF that reach to between ~ 27.0 and 28.5 AB mag ($\sim 0.2 - 0.8L^*$) in both the optical and infrared. Here we will describe the $z \sim 7$ and $z \sim 10$ samples we are able to compile from this more comprehensive set of deep HST ACS+NICMOS fields, compare them with expectations from $z \sim 6$, and comment on the dramatic evolution in the UV LF at these early times. We will also be presenting the first measurements of the stellar mass in $z \sim 7$ galaxies.