Star-Forming Galaxies at redshift 6

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Abstract

We have discovered a population of star-forming galaxies at $z \sim 6$ and beyond (within the first billion years) through the i'-drop Lyman-break technique. The first application of this to *HST*/ACS imaging was presented in Stanway, Bunker & McMahon (2003 MNRAS 342, 439), using the public GOODS survey. We were able to prove this technique through Keck/DEIMOS spectroscopy (Bunker et al. 2003, MNRAS 342, L47). Using the same i'-drop selection, our first analysis of the Hubble Deep Field revealed 50 star forming galaxies at redshifts around 6 with magnitudes $z_{AB} > 28.5$ (Bunker, Stanway, Ellis & McMahon 2004, MNRAS 355, 374). *Spitzer* observations with IRAC enable us to estimate the stellar masses and luminosity-weighted ages for this population; we find in some cases that there are Balmer breaks, indicating ages of > 200 Myr and formation redshifts of $z \sim 10$ (Eyles, Bunker, Stanway et al. 2005, MNRAS 364, 443). Star formation at early epochs may have provided the UV flux necessary to reionize the Universe by $z = 6$. I will discuss the stellar mass density, and the implications for the previous star formation history and for reionization. Our work is the strongest constraint to date on the star formation history at $z > 6$.