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Statistical Properties of Gamma-Ray Burst Host Galaxies†

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Abstract. GRBs are the most luminous events in the Universe. They are detectable from local to high-z universe and may serve as probes for high-z galaxies (e.g., Savaglio *et al.* 2009; Kewley & Dopita 2002). We compile the observations for 61 GRB host galaxies from literature. Their redshifts range from 0.0085 to 6.295. We present the statistical properties of the GRB host galaxies, including the stellar mass (M^*), star-forming rate (SFR), metallicity (Z), extinction (A_V), and neutral hydrogen column density ($N_{\rm H}$). We explore possible correlations among the properties of gamma-ray burst host galaxies and their cosmic evolution with observations of 61 GRB host galaxies. Our results are shown in Figure 1. A clear Z-M^* relation is found in our sample, which is $Z \sim M^{0.4}$. The host galaxies of local GRBs with detection of accompanied supernovae also share the same relation with high-z GRB host galaxies. A trend that a more massive host galaxy tends to have a higher star-formation rate is found. The best linear fit gives a tentative relation, i.e, $SFR \sim M^{0.75}$. No any correlation is found between A_V and N_H. A GRB host galaxy at a higher redshift also tends to have a higher SFR. Even in the same redshift, the SFR may vary over three orders of magnitude. The metallicity of the GRB host galaxies is statistically higher than that of the QSO DLAs. The full version of our results please refer to Chen *et al.* (2012).

Keywords. gamma rays: bursts — galaxies: evolution

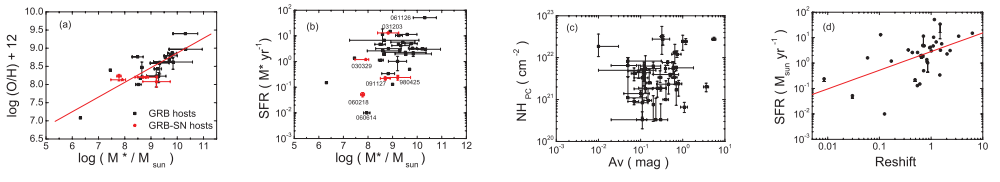

Figure 1. (a) and (b)–Metallicity and star formation rate as a function of Stellar messes; (c) N_H value as a function of A_V for the GRB host galaxies, where N_H and A_V are measured from X-ray and optical observations, respectively; (d)Star formation rate as a function of redshift. Lines are the best to the data.

References

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