GRB light curve decay indices in the afterglow phase

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I will start with presentation of basic information about cosmic Gamma-ray Burst (GRB) phenomenon.

Then our study of the distribution of temporal power-law decay indices, α, in the GRB afterglow phase

will be described, based on a sample of 176 GRBs with known redshifts. In this analysis we discovered a convincing regular trend between α and the afterglow luminosity at the end time of the plateau phase, Lα . Even stronger systematic trend is visible between α and the luminosity ratio computed by dividing

Lα by the respective luminosity at the fitted Luminosity-Time correlation line (Dainotti et al. 2008).

This systematic effect provides a new constraint on the GRB physical models. Finally, a proposed toy model accounting for this systematics applied to the luminosity of the analyzed GRB distribution results in a slight decrease of the scatter within the LT correlation, possibly a small step towards turning GRBs into cosmological standard candles.

Serdecznie zapraszam,
Agnieszka Majczyna