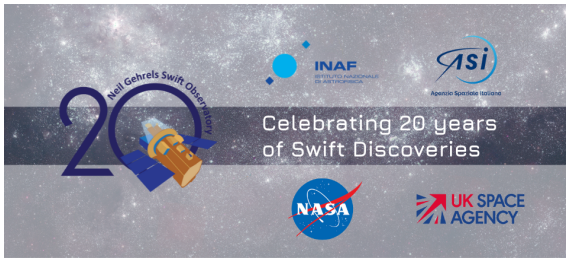

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A study of GRB mechanisms through an automatic modelling of all Swift XRT light curves

Tuesday 25 March 2025 14:29 (1 minute)

Gamma-ray burst light curves exhibit a wide range of temporal shapes, and understanding these features may help to understand the progenitors and processes involved in the prompt afterglow emission. We present laff, a code to automatically fit *Swift*-XRT GRB afterglow light curves, identifying and modelling both the flares with fast-rise exponential-decay peaks, and the underlying fading afterglow with a series of broken power laws. With this code, we present a systematic study, fitting all *Swift*-XRT light curves to date, producing a catalogue of fitted flare and afterglow parameters. In this talk, we demonstrate correlations and results of these parameters, and discuss how this can be used to establish investigations in several areas of GRB physics: we use the modelling of high energy X-ray flares to search for the possibility of prompt coherent radio flares as a means of investigating the GRB jet composition, and the identification of progenitors through modelled flare and afterglow characteristics combined with the classification of prompt emission with machine learning.

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