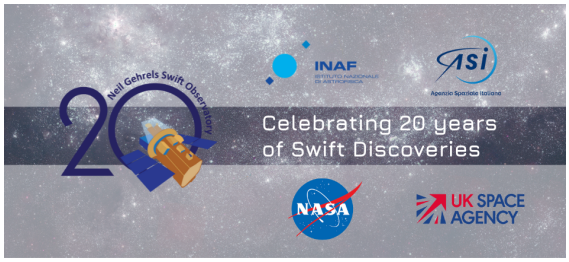

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Insight on GRB physics from a novel data driven method for systematic analysis of X-ray light-curves

Tuesday 25 March 2025 14:29 (1 minute)

Gamma-ray bursts (GRBs) exhibit a rich variety of X-ray lightcurve behaviors, including flares and plateau/shallow decay phases, whose origins remain debated. Existing studies often rely on diverse analysis techniques applied to limited GRB samples, leading to results that may be difficult to generalize. In this study, we introduce a new data-driven, model-independent method for automatically analyzing the Swift XRT dataset. This approach enables a consistent and comprehensive characterization of GRB afterglow X-ray lightcurves, covering an order of magnitude more events than previous studies. By providing a unified framework for large-scale analysis, this method opens new avenues for identifying robust trends and understanding the physical processes shaping GRB lightcurve evolution.

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