

Celebrating 20 years of Swift Discoveries



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Precursors from Compact Binary Mergers

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A subclass of hybrid Gamma-ray bursts (GRBs) with long duration and peculiar spectral and timing properties was discovered to be related with compact binary mergers. Their main prompt gamma-ray phase is preceded by a fainter and spectrally softer pulse that we interpret as a precursor, possibly produced by a different physical mechanism.

I present the results from the analysis of the brightest GRBs associated with compact binary mergers (GRB 211211A and GRB 230307A) and compare them with leading models for precursor emission, which occurs either before or immediately after the merger.

I show that the high luminosity of some precursors ($>1e49$ erg/s) poses a challenge to most models proposed to explain their origin.

Ultimately, their nature can only be unraveled using joint gamma-ray/gravitational wave detections. I briefly discuss how multi-messenger constraints would help narrow down the range of models for precursors emission and place meaningful constraints to the NS equation of state.

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