

### Hard Burst Emission from the Soft Gamma Repeater SGR 1900+14

Authors: Peter M. Woods, Chryssa Kouveliotou, Jan van Paradijs, Michael S. Briggs, Kevin Hurley, Ersin Gogus, Robert D. Preece, Timothy W. Giblin, Christopher Thompson, Robert C. Duncan

Comments: 11 pages (text and figures), submitted to ApJ Letters, corrected erroneous hardness ratios

We present evidence for burst emission from SGR 1900+14 with a power-law high energy spectrum extending beyond 500 keV. Unlike previous detections of high energy photons during bursts from SGRs, these emissions are not associated with high-luminosity burst intervals. Not only is the emission hard, but the spectra are better fit by Band's GRB function rather than by the traditional optically-thin thermal bremsstrahlung model. We find that the spectral evolution within these hard events obeys a hardness/intensity anti-correlation. Temporally, these events are distinct from typical SGR burst emissions in that they are longer ( $\sim 1$  s) and have relatively smooth profiles. Despite a difference in peak luminosity of  $> 1E+11$  between these bursts from SGR 1900+14 and cosmological GRBs, there are striking temporal and spectral similarities between the two kinds of bursts, aside from spectral evolution. We outline an interpretation of these events in the context of the magnetar model.

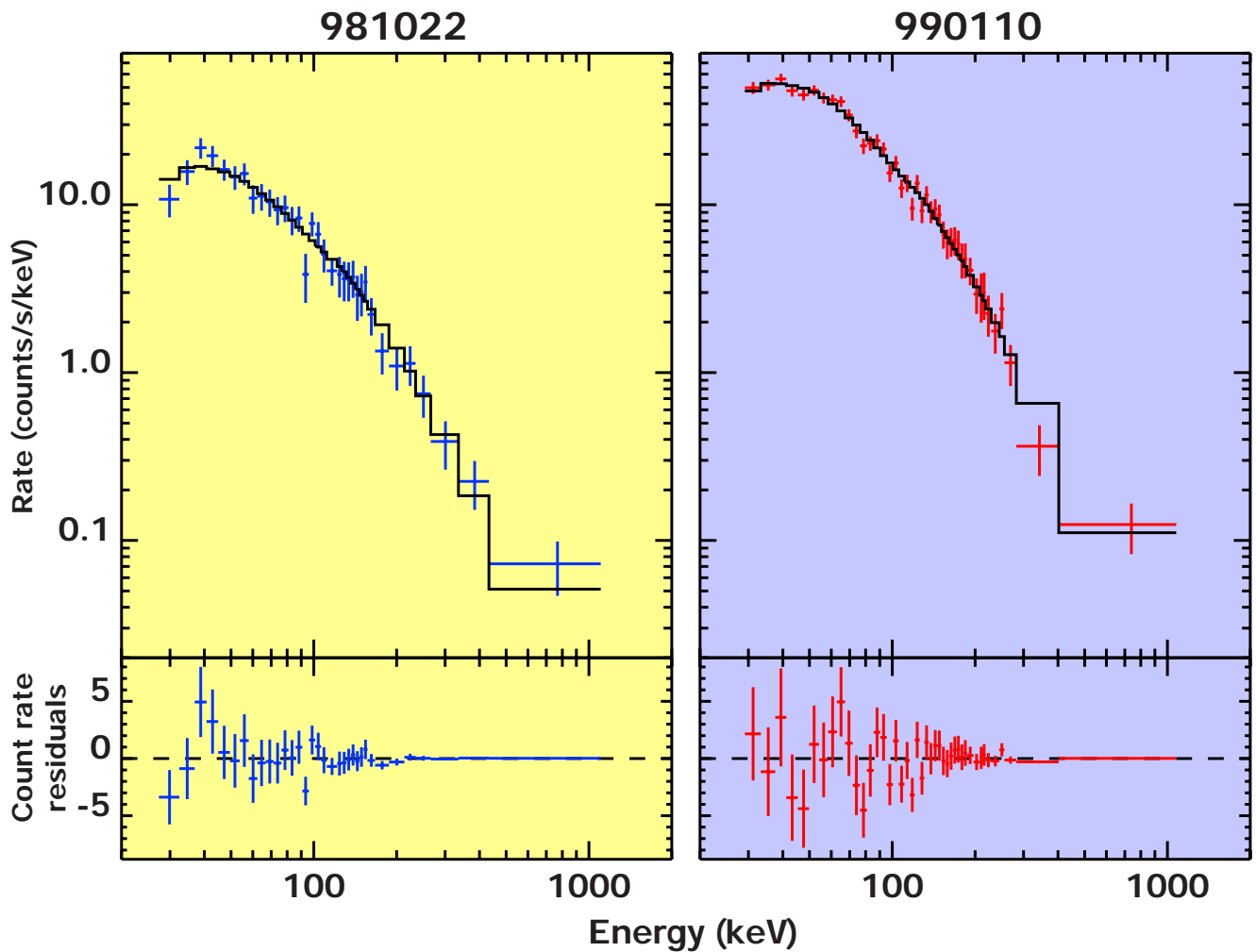


Fig. 3. Count spectrum of 981022 (a) and 990110 (b) as fit to Band's GRB function. See Table 1 for spectral fit information. The spectrum has been binned for display purposes.

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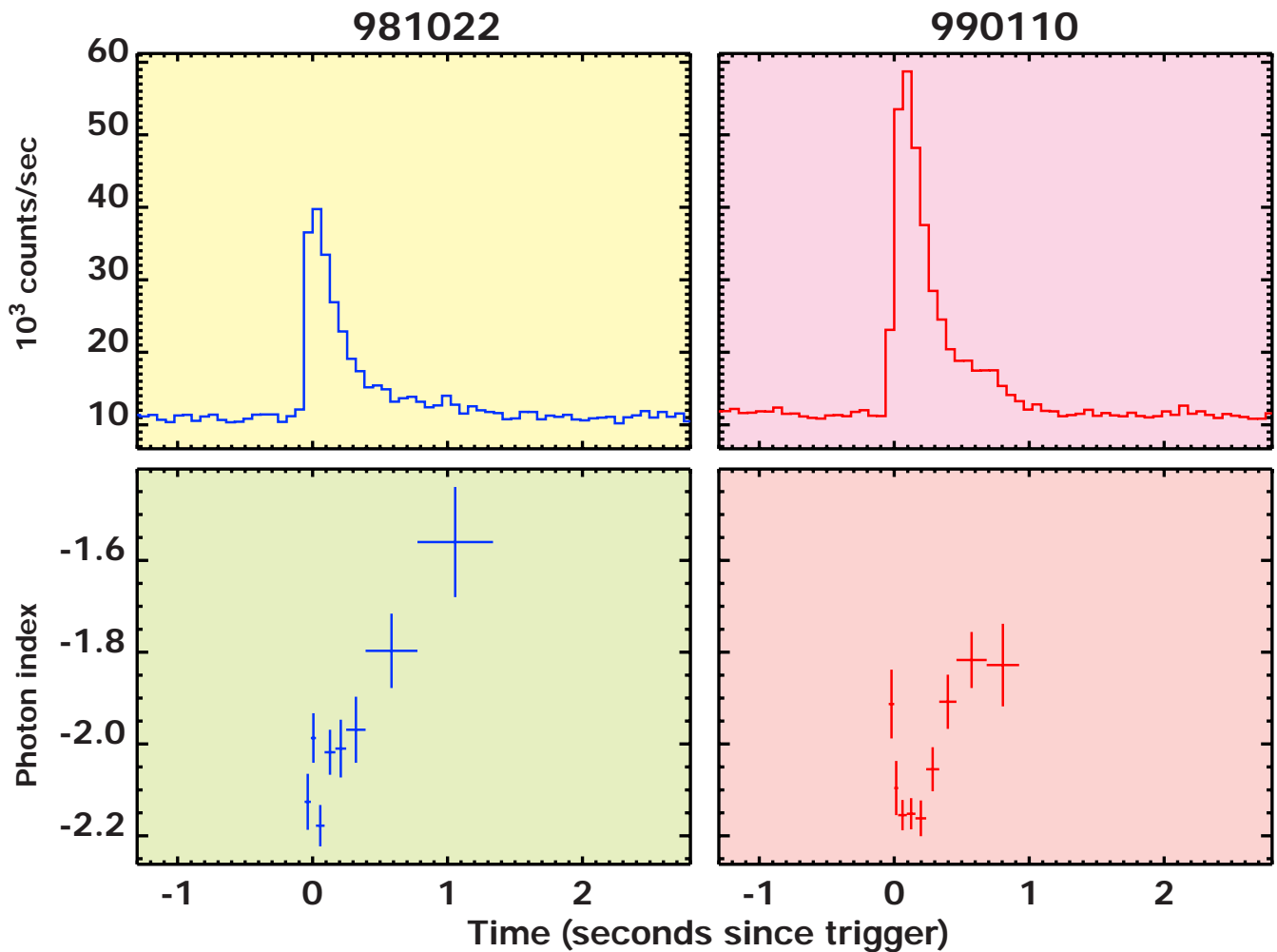


Fig. 2. Light curves (25-2000 keV) of two bursts from SGR 1900+14 detected with BATSE. BATSE trigger 7171 (981022) is shown in panel (a) and trigger 7315 in panel (b). Panels (c) and (d) give the photon index as a function of time to illustrate the spectral evolution observed during these events.

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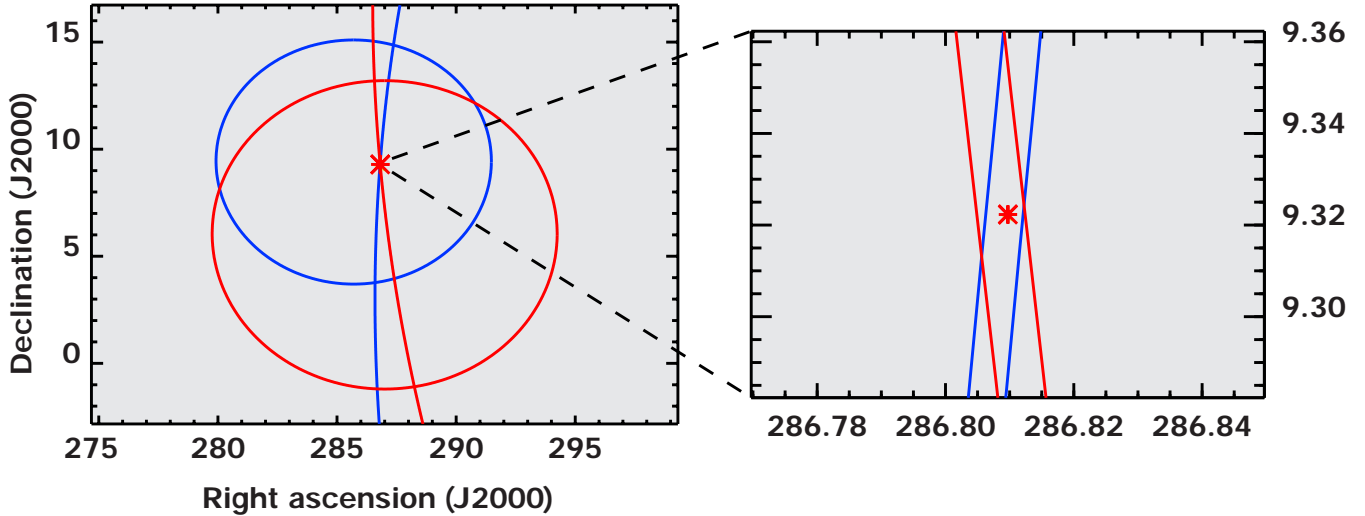


Fig. 1. Localizations of 981022 (dotted) and 990110 (solid) with BATSE (circles denote 90% statistical + systematic error radii) and BATSE/Ulysses IPN arcs (99% statistical + systematic error). VLA location of SGR 1900+14 is denoted by the asterisk.

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