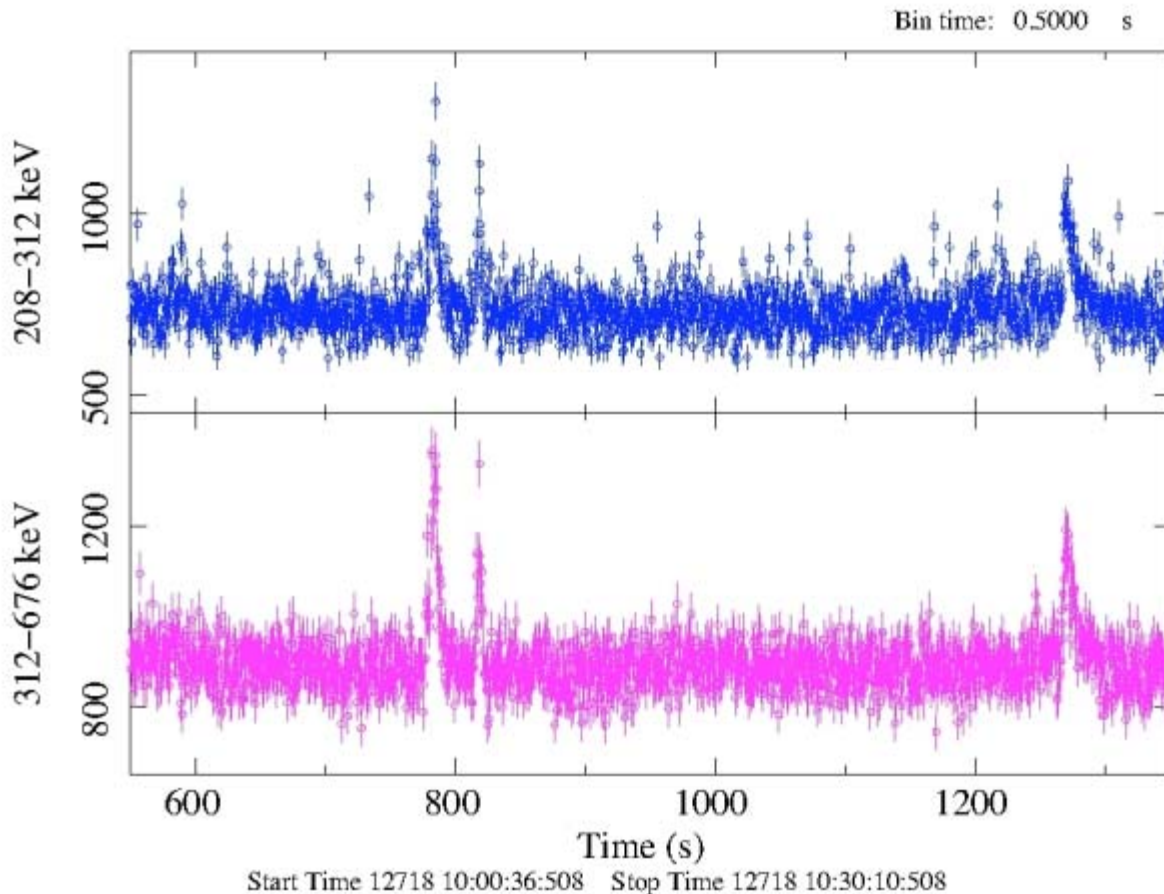


Picture of the Month

September 2009



IBIS/PICsIT detects high energy prompt emission from Gamma Ray Bursts

Gamma Ray Bursts (GRB) are extreme powerful cosmic phenomena, being observed in a wide range of light-curve shapes and durations, as well as energetic spectral properties. Their origin is thought to be related to dramatic episodes of collapse of massive stars (for long events) or compact objects within binary systems (for short events), however the underlying physical processes are still not fully understood. Direct observation of the prompt emission at high energy is therefore of importance.

During the time period from March 2003 until December 2006, after having analyzed data from 56 revolutions, eleven GRB events have been positively detected by the PICsIT instrument aboard the

INTEGRAL satellite, the high energy (~300 keV to ~ 3 MeV) detector of the IBIS telescope. PICSiT represents an important tool to explore the prompt emission from GRBs at high energies. With its Spectral Timing acquisition mode, IBIS/PICSiT allows a time resolution down to 1 ms, while keeping spectral information in up to 8 energy channels, from 208 to 2600 keV.

On March 20th 2003, IBIS/PICSiT registered the peculiar light curves shown here in two energy channels and rebinned at 0.5 seconds. Two GRB trigger events are present. The first event shows a double-peaked structure, with the two peaks being separated by about 40 seconds, and it has been identified with GRB 030320. This GRB was also observed by SPI-ACS and IBIS/ISGRI (e.g. see von Kienlin et al. 2003; Vianello et al. 2009). The second event, detected approximately 500 seconds after the first one, has not been identified yet and its origin remains unclear, since spatial information or documented position has not been provided by other instruments/observatories.

This result confirms the importance of a spectrally-resolved timing analysis for the study of GRB up to several hundreds of keV, and the significant contribution that IBIS/PICSiT is giving in this field.

Related links:

- GRB observed by IBIS/PICSiT in the MeV energy range.
Bianchin V., Foschini L., di Cocco G., et al., 2009, AdSpR, 43, 1055
(<http://adsabs.harvard.edu/abs/2009AdSpR..43.1055B>)
- The updated spectral catalogue of INTEGRAL gamma-ray bursts.
Vianello G., Goetz D., Mereghetti S., 2009, A&A, 495, 1005
(<http://arxiv.org/abs/0812.3349>)
- INTEGRAL results on GRB 030320: A long gamma-ray burst detected at the edge of the field of view.
von Kienlin A., Beckmann V., Covino S., et al., 2003, A&A 411,L321
(<http://adsabs.harvard.edu/abs/2003A%26A...411L.321V>)
- INTEGRAL newsletter
(<http://isdcul3.unige.ch/Newsletter/N15/#picsit>)

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