



The Crab pulsar and nebula, a cornerstone of high-energy astrophysics, has been observed throughout the electromagnetic spectrum. A coherent high-energy picture of the pulsar, extending from soft X-rays to high-energy gamma-rays, has been recently compiled on the basis of the full database from the telescopes on the Compton Gamma-Ray Observatory (CGRO) and from archival data from X-ray missions (Kuiper et al., 2001).

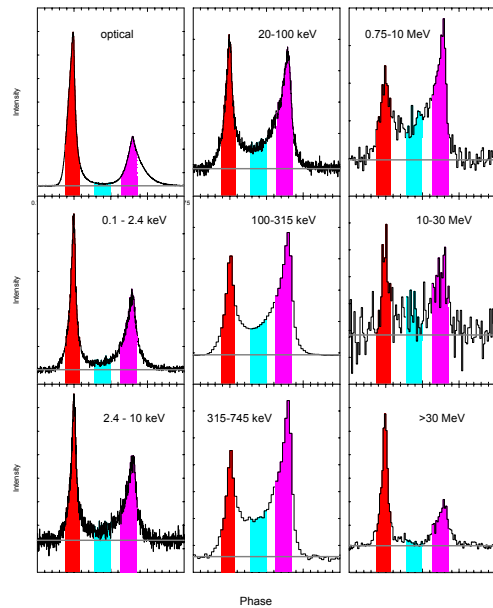


Figure 1: Crab pulsar light-curves at high-energies (Kuiper et al., 2001)

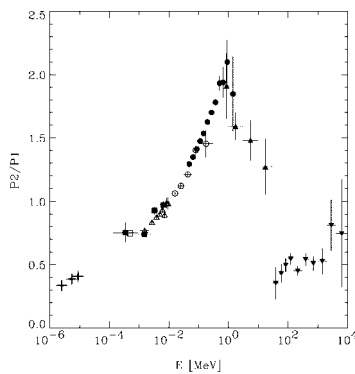


Figure 2: P2/P1 ratio vs. energy. A similar result is found also for the ratio Bridge/Peak1. The 'Bridge' spectrum is in the form of a broad bump with a maximum at ~100 keV.

## References:

- Kuiper L., et al, (2001) *A&A*, **378**, 918  
 Straubmeier, C., et al., (2001) *Exp. Astron.*, **11**, 157

The optical lightcurve was added from recent observations with the OPTIMA photometer (Straubmeier et al., 2001). The lightcurves were analysed under the assumption that individual emission components can be distinguished, e.g. the two main peaks (marked red and pink in fig. 1), an interval or 'bridge' emission (marked cyan). The strength of the pulsed emission and of the components within given phase intervals was quantitatively derived as the excess intensity above a so called 'off-pulse' level (shown as a gray line in fig.1). It is particularly striking how strong the bridge and peak 2 emissions are in the energy interval from ~100 keV to 10 MeV. Figure 2 displays the ratio of Peak2/Peak1 versus energy. The maximum around 1 MeV is also found for the bridge/P1 ratio. This could indicate that the interval emission extends and peaks under the second peak and constitutes a separate emission feature in the Crab magnetosphere. Fig. 3 shows the overall pulsed spectrum of PSR B0531+21. The structures visible in the spectrum, viz. the maxima at ~100 keV and ~1 GeV, are explained in theories of magnetospheric emission as the characteristic spectra of synchrotron emission (red) and inverse Compton or curvature radiation (blue) respectively.

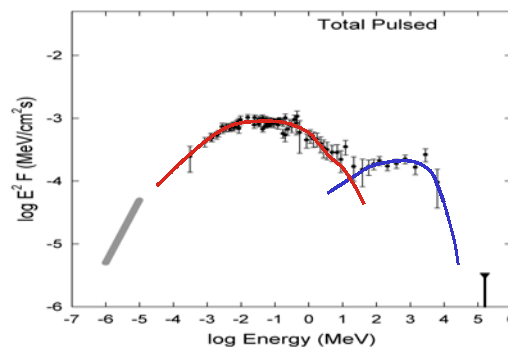


Figure 3: Spectrum of the total pulsed emission from the Crab pulsar.