

Hard X-ray Variations in the Crab Nebula

Colleen A. Wilson-Hodge (NASA/MSFC), M. L. Cherry, G. L. Case (LSU/LaSierra), W. H. Baumgartner (CRESST/NASA/GSFC), E. Beklen (MPE/SDU), P. N. Bhat, M. S. Briggs (UAH), A. Camero-Arranz (IEECC-CSIC), V. Chaplin, V. Connaughton (UAH), M. H. Finger (USRA), N. Gehrels (NASA/GSFC), J. Greiner (MPE), K. Jahoda (NASA/GSFC), P. Jenke (UAH), R. M. Kippen (LANL), C. Kouveliotou (NASA/MSFC), H.A. Krimm (USRA/CRESST/NASA/GSFC), E. Kuulkers (ISOC/ESA/ESAC), N. Lund (Danish National Space Center, Denmark), C. A. Meegan (USRA), L. Natalucci (INAF-IASF), W. S. Paciesas (USRA), R. Preece (UAH), J. C. Rodi (LSU), N. Shaposhnikov, G. K. Skinner (UMD/CRESST/NASA/GSFC), D. Swartz (USRA), A. von Kienlin, R. Diehl, X. Zhang (MPE)

Abstract:

In the first two years of science operations of the Fermi Gamma-ray Burst Monitor (GBM), August 2008 to August 2010, a $\sim 7\%$ (70 mcrab) decline was discovered in the overall Crab Nebula flux in the 15 - 50 keV band, measured with the Earth occultation technique. This decline was independently confirmed with four other instruments: the RXTE/PCA, Swift/BAT, INTEGRAL/IBIS, and INTEGRAL/SPI. The pulsed flux measured with RXTE/PCA from 1999-2010 was consistent with the pulsar spin-down, indicating that the observed changes were nebular. From 2001 to 2010, the Crab nebula flux measured with RXTE/PCA was particularly variable, changing by up to $\sim 3.5\%$ per year in the 15-50 keV band. These variations were confirmed with INTEGRAL/SPI starting in 2003, Swift/BAT starting in 2005, and Fermi GBM starting in 2008. Before 2001 and since 2010, the Crab nebula flux has appeared more stable, varying by less than 2% per year. I will present updated light curves in multiple energy bands for the Crab nebula, including recent data from Fermi GBM, Swift/BAT, INTEGRAL and MAXI, and a 16-year long light curve from RXTE/PCA.