

CONTROL ID: 2097408

SUBMISSION ROLE: Research Contributed

DATE/TIME CREATED: September 30, 2014, 11:36 AM

TITLE: When a Standard Candle Flickers: Hard X-ray Variations in the Crab Nebula

ABSTRACT BODY:

Abstract (2,250 Maximum Characters): In the first two years of science operations of the Fermi Gamma-ray Burst Monitor (GBM), August 2008 to August 2010, a ~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 ~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. At higher energies, above 50 keV, the Crab flux appears to be slowly recovering to its 2008 levels. I will present updated light curves in multiple energy bands for the Crab nebula, including recent data from Fermi GBM, Swift/BAT, INTEGRAL, MAXI, and NuSTAR and a 16-year long light curve from RXTE/PCA. We will compare these variations to higher energies as well, e.g. Fermi LAT.

Contributing Teams:

PRESENTATION TYPE: Research Contributed

CURRENT * SESSION TYPE: Contributed Oral Session

AUTHORS (FIRST NAME, LAST NAME): Colleen Wilson-Hodge¹, Michael L. Cherry², Gary L. Case³, Wayne H. Baumgartner⁴, Elif Beklen⁵, Narayana P. Bhat⁶, Michael S. Briggs⁶, Rolf Buehler⁷, Ascension Camero-Arranz⁸, Valerie Connaughton⁶, Roland Diehl⁹, Mark H. Finger¹⁰, Neil Gehrels¹¹, Jochen Greiner⁹, Fiona Harrison¹², Elizabeth A. Hays¹¹, Keith Jahoda¹¹, Peter Jenke⁶, R. M. Kippen¹³, Chryssa Kouveliotou¹, Hans A. Krimm⁴, Erik Kuulkers¹⁴, Kristin Madsen¹², Craig Markwardt¹¹, Charles A. Meegan⁶, Lorenzo Natalucci¹⁵, William S. Paciesas¹⁰, Robert D. Preece⁶, James Rodi², Nikolai Shaposhnikov⁴, Gerald K. Skinner¹⁶, Douglas A. Swartz¹⁰, Andreas von Kienlin⁹, Xiao-Ling Zhang⁹

INSTITUTIONS (ALL):

1. NASA's MSFC, Huntsville, AL, United States.
2. LSU, Baton Rouge, LA, United States.
3. La Sierra Univ., La Sierra, CA, United States.
4. CRESST & NASA/GSFC, Greenbelt, MD, United States.
5. NRAO, Charlottesville, WV, United States.
6. UAH, Huntsville, AL, United States.
7. DESY, Hamburg, Germany.
8. IEECC-CSIC, Barcelona, Spain.
9. MPE, Munich, Germany.
10. USRA/MSFC, Huntsville, AL, United States.
11. NASA's GSFC, Greenbelt, MD, United States.
12. CalTech, Pasadena, CA, United States.
13. LANL, Los Alamos, NM, United States.
14. ISOC/ESA/ESAC, Madrid, Spain.
15. INAF-IASF, Rome, Italy.
16. Univ. of Birmingham, Birmingham, United Kingdom.

AUTHORS/INSTITUTIONS: C. Wilson-Hodge, C. Kouveliotou, NASA's MSFC, Huntsville, Alabama, UNITED STATES|M.L. Cherry, J. Rodi, LSU, Baton Rouge, Louisiana, UNITED STATES|G.L. Case, La Sierra Univ., La Sierra, California, UNITED STATES|W.H. Baumgartner, H.A. Krimm, N. Shaposhnikov, CRESST & NASA/GSFC, Greenbelt, Maryland, UNITED STATES|E. Beklen, NRAO, Charlottesville, West Virginia, UNITED STATES|N.P. Bhat, M.S. Briggs, V. Connaughton, P. Jenke, C.A. Meegan, R.D. Preece, UAH, Huntsville, Alabama, UNITED STATES|R. Buehler, DESY, Hamburg, GERMANY|A. Camero-Arranz, IEECC-CSIC, Barcelona, SPAIN|R. Diehl, J. Greiner, A. von Kienlin, X. Zhang, MPE, Munich, GERMANY|M.H. Finger, W.S. Paciesas, D.A. Swartz, USRA/MSFC, Huntsville,

Alabama, UNITED STATES|N. Gehrels, E.A. Hays, K. Jahoda, C. Markwardt, NASA's GSFC, Greenbelt, Maryland, UNITED STATES|F. Harrison, K. Madsen, CalTech, Pasadena, California, UNITED STATES|R.M. Kippen, LANL, Los Alamos, New Mexico, UNITED STATES|E. Kuulkers, ISOC/ESA/ESAC, Madrid, SPAIN|L. Natalucci, INAF-IASF, Rome, ITALY|G.K. Skinner, Univ. of Birmingham, Birmingham, UNITED KINGDOM|