

Bernardini Maria Grazia

Position Postdoctoral Research Fellow (Assegnista di Ricerca)

Period covered 2005 - 2009



I Scientific Work

- Analysis of GRB970228 as an example for GRBs characterized by an initial spikelike emission followed by a soft bump like e.g. GRB050724, GRB060614, identifying in this way a possible new class of GRBs whose peculiarities depend on their astrophysical setting.
- Study of the association between Gamma-Ray Bursts and Type Ib/c Supernovae, with particular interest toward the induced gravitational collapse phenomenon as a possible explanation for this association.
- Study of the X-ray flares in the context of the Fireshell model, assuming that they are produced in the interaction with an inhomogeneous CircumBurst Medium. Development of a 2-dimensional numerical code to account for the CBM distribution.
- Statistical analysis of the properties of X-ray flares observed by *Swift*.
- Study of the GRB light curve and spectrum in the AGILE and *Fermi*-GLAST era.

II Conferences and educational activities

Talks presented to international conferences:

- “A complete analysis of GRB060607A within the fireshell model: prompt emission, X-ray flares and late afterglow phase” and “Collisions in the slowing down phase of the prompt emission” at the “*XII Marcel Grossman Meeting on General Relativity*”, Paris (France), July 12-18, 2009.
- “Collisions in the slowing down phase of the prompt emission” at the “*2nd Italian-Pakistani Workshop on Relativistic Astrophysics*”, Pescara (Italy), July 8-10, 2009.
- “GRB060607A: prompt emission and X-ray flares” at the “*6th Italian-Sino Workshop in Relativistic Astrophysics*”, Pescara (Italy), June 29 – July 1, 2009.
- “Preliminary analysis of GRB060607A and GRB060418 within the fireshell model” at the “*Probing Stellar Populations out to the Distant Universe*”, Cefalù (Italy), September 14-19, 2008.

- “The GRB classification within the fireshell model: short, long and fake short GRBs ” at the “3rd Stueckelberg Workshop on Relativistic Field Theories”, Pescara (Italy), July 8-18, 2008.
- “Preliminary analysis of GRB060607A within the fireshell model” at the “2008 Nanjing GRB Conference”, Nanjing (China), June 23-27, 2008.
- “Testing the "Canonical GRB" Scenario” at the “2nd Kolkata Conference on the Observational Evidence for Black Holes in the Universe”, Kolkata (India), February 10-17, 2008.
- “GRB970228 and a class of GRBs with an initial spikelike emission” at the “4th Italian-Sino Workshop on Relativistic Astrophysics”, Pescara (Italy), July 20-30, 2007.
- “A new interpretation of GRB970228” at the “10th Italian-Korean Symposium on Relativistic Astrophysics”, Pescara (Italy), June 25-30, 2007.
- “GRB970228: a prototype for a new GRB class” at the “APS April Meeting”, Jacksonville (USA), April 14-17, 2007.
- “GRB970228 as a prototype for Short GRBs with afterglow” at the “Cesare Lattes Meeting on GRBs Black Holes and Supernovae”, Mangaratiba (Brazil), February 25-March 3, 2007.
- “GRB970228 as a prototype for Short GRBs with afterglow” at the “XII Brazilian School of Gravitation and Cosmology”, Mangaratiba (Brazil), September 10-23, 2006.
- “GRB970228 as a prototype for Short GRBs with afterglow” and “Theoretical interpretation of luminosity and spectral properties of GRB980425” at the “XI Marcel Grossmann Meeting on General Relativity”, Berlin (Germany), July 23-29, 2006.
- “Theoretical model on Gamma-Ray Burst” at the “IX Italian-Korean Symposium on Relativistic Astrophysics”, Seoul (South Korea) – Mt. Kungang (North Korea), July 19-24, 2005.

External Scientific Work:

- Postdoctoral research fellowship at “Osservatorio Astronomico di Brera” within the *Swift* Italian Team.

Work With Students:

- Students of the IRAP-PhD program at University "La Sapienza", Rome, Italy: Letizia Caito, Maria Giovanna Dainotti, Gustavo De Barros, Roberto Guida, Luca Izzo, Barbara Patricelli, Luis Juracy Rangel Lemos.

PhD thesis supervision:

- 2009: Thesis advisor of the IRAP-PhD Degree Thesis by Barbara Patricelli at University "La Sapienza", Rome, Italy.

Other Teaching Duties

- Collaboration with the *Swift* Italian Team

III Service activities

Within ICRA Net

- Member of the Local Organizing Committee for the “4th Italian-Sino Workshop on Relativistic Astrophysics” held in Pescara (Italy) on July 20-30, 2007.

Outside ICRA Net

- Member of the Scientific Organizing Committee and Local Organizing Committee for the ICRA Weekly Seminars organized by the Physics Department of the University of Rome “La Sapienza”

2009 - List of Publications

Publications in refereed journals

Letizia Caito, Maria Grazia Bernardini, Carlo Luciano Bianco, Maria Giovanna Dainotti, Roberto Guida, Remo Ruffini, “*GRB060614: a “fake” short GRB from binary merging*”, **A&A 498 (2009) 501-507**.

Conference proceedings

Maria Grazia Bernardini, Carlo Luciano Bianco, Letizia Caito, Maria Giovanna Dainotti, Roberto Guida, Remo Ruffini, “*Prompt emission and X-ray flares: the case of GRB 060607 A*”, in the Proceedings of “*Probing the Stellar Population out of the Distant Universe: Cefalù 2008*”, in Cefalù, Italy, September 7-19, 2008, ed. G. Giobbi, A. Tornambe, G. Raimondo, M. Limongi, L. A. Antonelli, N. Menci, E. Brocato, AIP Conf. Proc., 1111 (2009) 383.

Carlo Luciano Bianco, Maria Grazia Bernardini, Letizia Caito, Maria Giovanna Dainotti, Roberto Guida, Remo Ruffini, “*The “fireshell” model and the “canonical GRB” scenario. Implications for the Amati relation*”, in the Proceedings of “*Probing the Stellar Population out of the Distant Universe: Cefalù 2008*”, in Cefalù, Italy, September 7-19, 2008, ed. G. Giobbi, A. Tornambe, G. Raimondo, M. Limongi, L. A. Antonelli, N. Menci, E. Brocato, AIP Conf. Proc., 1111 (2009) 587.

Remo Ruffini, Aleksei Aksenov, Maria Grazia Bernardini, Carlo Luciano Bianco, Letizia Caito, Maria Giovanna Dainotti, Gustavo de Barros, Roberto Guida, Gregory Vereshchagin, She-Sheng Xue, “*The Canonical Gamma-Ray Bursts: Long, “Fake”-“disguised” short and “genuine” short GRBs*”, in the Proceedings of “*Probing the Stellar Population out of the Distant Universe: Cefalù 2008*”, in Cefalù, Italy, September 7-19, 2008, ed. G. Giobbi, A. Tornambe, G. Raimondo, M. Limongi, L. A. Antonelli, N. Menci, E. Brocato, AIP Conf. Proc., 1111 (2009) 325.