

Bernardini Maria Grazia

Position: Postdoctoral Research Fellow
(Assegnista di Ricerca)
Period covered: 2005 - 2010



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.
- Analysis of the X-ray afterglow of Gamma-Ray Bursts and interpretation of the X-ray flares in the context of internal and external shock models.

II Conferences and educational activities

Talks presented to international conferences:

- "The canonical GRB scenario: light curves and spectra" at "The second Galileo-Xu Guangqi Meeting", Ventimiglia (Italy) and Nice (France), July 12-18, 2010.
- "How to get a flare out of a prompt pulse: let the time go" at the conference "Deciphering the Ancient Universe with GRBs", Kyoto (Japan), April 19-23, 2010.
- "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”.
- Collaboration with 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.
- 2010: Thesis advisor of the PhD student Elena Zaninoni at University of Padova, Padova, Italy.

III Service activities

Within ICRANet

- 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 ICRANet

- 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”

2010 List of Publications

Publications in refereed journals

- Maria Grazia Bernardini, Raffaella Margutti, Guido Chincarini, Cristiano Guidorzi, Jirong Mao, “Gamma-Ray Burst long lasting X-ray flaring activity”, *A&A* (2010) accepted for publication.
- Raffaella Margutti, Maria Grazia Bernardini, Rodolfo Barniol Duran, Cristiano Guidorzi, Ronfen Shen, Guido Chincarini, “On the average gamma-ray burst X-ray flaring activity”, *MNRAS* (2010) accepted for publication.
- Raffaella Margutti, Cristiano Guidorzi, Guido Chincarini, Maria Grazia Bernardini, Frank Genet, Jirong Mao, Francesco Pasotti, “Lag-Luminosity relation in Gamma-Ray Burst X-ray flares: a direct link to prompt emission”, *MNRAS* 406 (2010) 2149-2167.
- Guido Chincarini, Jirong Mao, Raffaella Margutti, Maria Grazia Bernardini, Cristiano Guidorzi, Francesco Pasotti, Demetrios Giannios, Massimo Della Valle, Alberto Moretti, Patrizia Romano, Paolo D’Avanzo, Giancarlo Cusumano, Paolo Giommi, “Unveiling the origin of X-ray flares in gamma-ray bursts”, *MNRAS* 406 (2010) 2113-2148.
- Letizia Caito, Lorenzo Amati, Maria Grazia Bernardini, Carlo Luciano Bianco, Gustavo De Barros, Luca Izzo, Barbara Patricelli, Remo Ruffini, “GRB071227: an additional case of disguised short GRB”, *A&A* 521 (2010) 80-84.