Supernovae

Contents

1 Topics

- Follow-up of Supernovae (Photometric and Spectroscopic Evolution, Rates)

- Supernova and Gamma-ray Burst connection

- Galactic and Extragalactic Novae

- Supernovae-Ia and Gamma-ray Bursts as rulers for cosmological parameters

- Follow-up of kilonovae (Photometric and Spectroscopic Evolution, Rates)

- Developing new instrumentation for the study of the Transient Universe

1.1 ICRANet participants

- Carlo Luciano Bianco

- Filippo Frontera

- Luca Izzo

- Massimo Della Valle

- Lorenzo Amati

1.2 Past collaborators

- John Danziger (INAF-Trieste)

- Roberto Gilmozzi (ESO, Garching, Munchen)

- Mario Livio (STScI, Baltimore)

- Piero Madau (Santa Cruz, California University)

- Nino Panagia (STScI, Baltimore)

- Saul Perlmutter (Lawrence Berkeley National Laboratory, University of California)

- Sumner Starrfield (Arizona State University)

- Evan Scannapieco (Arizona State University)

- Guido Chincarini (Bicocca University, Milano) and the SWIFT team

- Bruno Leibundgut (ESO)

1.3 Ongoing collaborations

- Lorenzo Amati (INAF-Bologna)

- Filippo Frontera (Ferrara University)

- Roberto Gilmozzi (ESO, Garching, Munchen)

- Filippo Mannucci (INAF-Arcetri, Firenze)

- Dani Maoz (Tel-Aviv University)

- Francesca Matteucci (Trieste University, Trieste)

- Ken Nomoto (University of Tokyo)

- Nino Panagia (STScI, Baltimore)

- Andrea Pastorello (Queen's University, Belfast)

- Robert Williams (STScI, Baltimore)

- Martin Henze (Max-Planck)

- Giampiero Tagliaferri (INAF-Milano)

- Sergio Campana (INAF-Milano)

- Maurice van Putten (Sejong University-Korea)

- Enrico Cappellaro (INAF-Padova)

- Massimo Turatto (INAF-Padova)

- Marica Branchesi (GSSI)

- Enzo Brocato (INAF-Teramo)

- Stephen Smartt (Queen's University, Belfast)

- Brian Schmidt (ANU)

1.4 Sabatical Visits, 2005-2010

- European Southern Observatory, Munchen (2005)

- STScI, Baltimore, (2005)

- KAVLI Institute, Santa Barbara (2006, 2007)

- Tokyo University (2006)

- Dark Cosmology Center, Niels Bohr Institute, Copenhagen (2007)

- Aspen Center for Physics (2007)

- Queen's University, Belfast (2007)

- European Southern Observatory, Munchen (2008-2009)

- Laboratoire d'Annecy de Physique des Particules (2018)

- Istituto de Astrophisica de Andalucia (2018)

2 Brief description

My research field concern the study of several classes of transient phenomena such as: supernovae, gamma-ray bursts, kilonovae and classical novae .

Gamma-ray bursts and their Afterglows. My interest in this area started in 2000 when I became member of the SWIFT follow-up team. Most efforts were (and still are) devoted to the study of i) the connection between Supernovae and GRBs; ii) characterisation of the properties of the host galaxies of GRB-SNe. About fifty refereed papers on GRB subject have been published in the last 15 years, which provide the rationale for the gamma-ray mission Theseus [6]

Supernovae. Photometric and the spectroscopic study of all types of SNe (Ia, Ib/c, II-linear, II-plateau) near maximum light and at late stages and their theoretical modelling. The observations at maximum provide us with the necessary data for using SNe (Ia and II) as standard candles. The observations at later stages allow one to discriminate among different energy sources (i.e. radioactive decay, magnetar, light-echo), to model the mechanisms of the explosion, and to shed light on the nature of the progenitor. Most observations are carried out with ESO telescope in the framework of ePESSTO/STARGATE/Euclid collaborations [1, 2, 3, 4, 5, 9]

Novae. Systematic study of classical novae and related objects is carried out on galactic and extragalactic (Local Group) sources [7,8].

Follow-up of kilonovae. A considerable number of efforts have been in searching and following up the optical counterparts of high energy phenomenons like the merging of compact objects. This search was successful and lead to the complete characterisation (photometric and spectroscopic) of GW170817, the first kilonova discovered and observed in the framework of multimessenger astronomy. In [10] we have explored the astrophysical consequences on surveys carried out by future ground based facilities (e.g. LSST, SKA).

3 Publications 2018

refereed publications

1. *Euclid: Superluminous supernovae in the Deep Survey*, Inserra et al. 2018, A&A, 609, 83

2. *The Early Detection and Follow-up of the Highly Obscured Type II Supernova 2016ija/DLT16am*, Tartaglia et al. 2018, ApJ, 853, 62

3. *The host of the Type I SLSN 2017egm. A young, sub-solar metallicity environment in a massive spiral galaxy*, Izzo et al. 2018, A&A 610, 11

4. *SN 2017dio: A Type-Ic Supernova Exploding in a Hydrogen-rich Circumstellar Medium*, Kuncarayakti et al. 2018, ApJ, 854, L14

5. *On the nature of hydrogen-rich superluminous supernovae*, Inserra et al. 2018, MNRAS, 475, 1046

6. *The THESEUS space mission concept: science case, design and expected performances*, Amati et al. 2018, AdSpR, 62, 191

7. *What We Learn from the X-Ray Grating Spectra of Nova SMC 2016*, Orio et al. 2018, ApJ, 862, 164

8. *Beryllium detection in the very fast nova ASASSN-16kt (V407 Lupi)*, Izzo et al. 2018, MNRAS, 478, 1601

9. *SN 2017ens: The Metamorphosis of a Luminous Broadlined TypeIc Supernova into an SN IIn*, Chen et al. 2018, ApJ, 867, L31

10. *GW170817: implications for the local kilonova rate and for surveys from ground-based facilities*, Della Valle et al. 2018, MNRAS, 481, 4355