

The SAO Joint GRB Data Base of observed and calculated parameters for applications in cosmological tests (concept)

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SPbD SAO RAS, SPbSU, INASAN, ETU, INAF, SAO RAS

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Attempts to collect information about GRBs

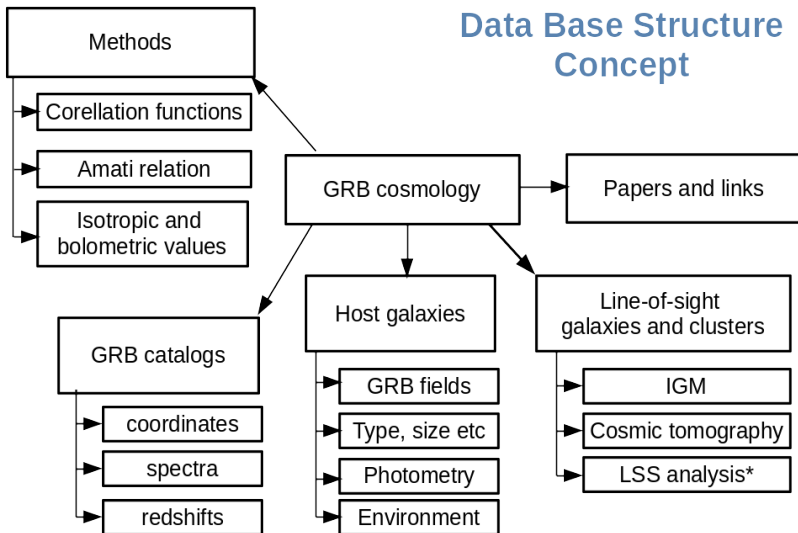
- The Lorenzo Amati home page
<http://www.iasfbo.inaf.it/amati/>
(papers collected from 1997 to the present)
- Feifei Wang et al. *A comprehensive statistical study on gamma-ray bursts*, arXiv:1902.05489

One does need an Internet resource, in which relevant main observed and calculated data at all times and in all missions are collected, as well as methods and calculation tools for working with GRBs, to effectively work with GRBs for cosmology applications.

Purpose

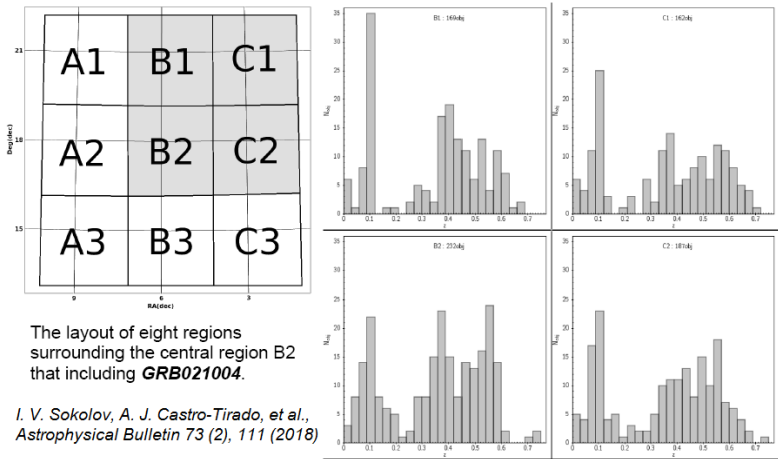
To create in collaboration with the THESEUS mission the SAO GRB Cosmology Data Base (DB) including orbital telescopes data, BTA, GTC, Elbrus-2 observations and more others.

Data Base Structure Concept



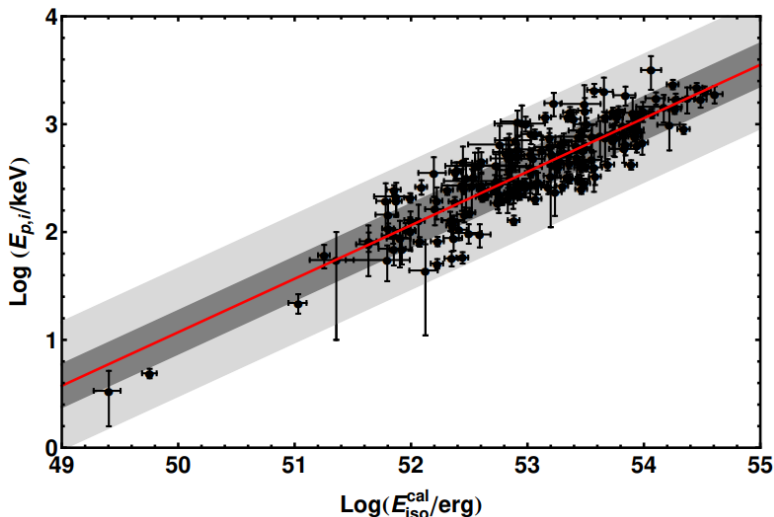
The Cosmic Tomography on BTA

From catalog data the size of the whole inhomogeneity in distribution of the galaxy cluster with the peak near $z \approx 0.56$ was also estimated as about $6^\circ\text{--}8^\circ$ or 140–190 Mpc due to *cosmic tomography* method.



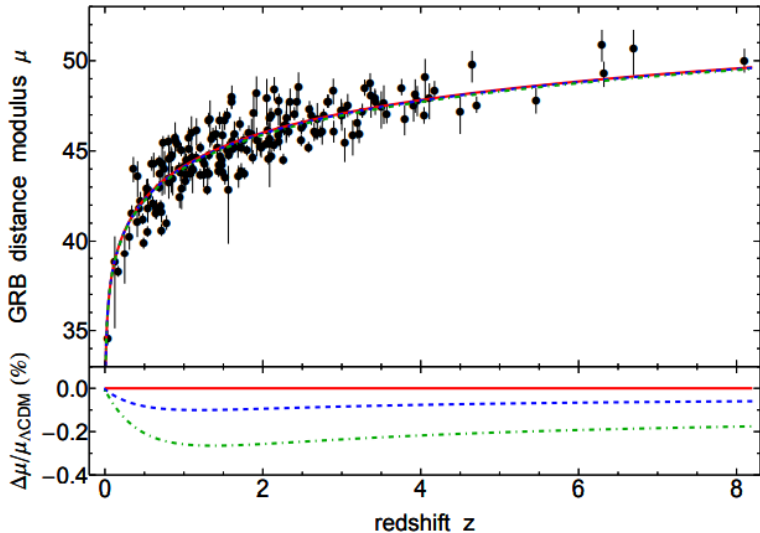
arXiv:1805.07082

The Amati relation



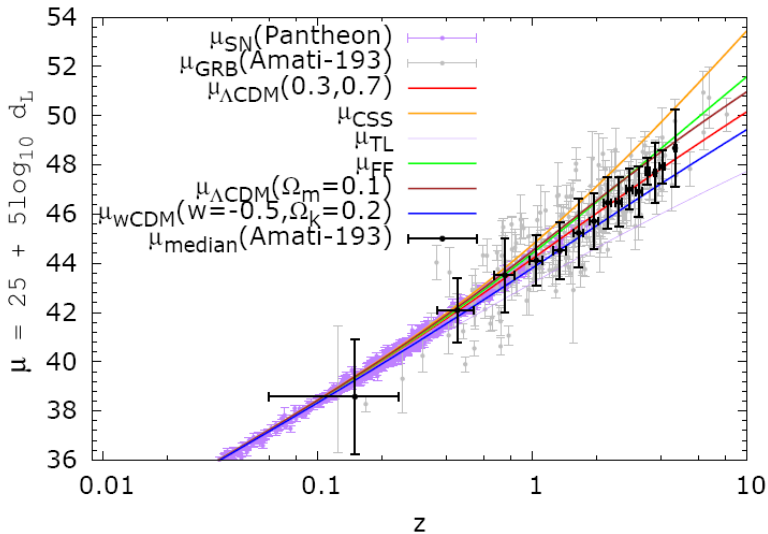
e.g. L. Amati et al., MNRAS, 486, L46-L51 (2019), arXiv:1811.08934v3
(first paper Amati L. et al., 2002, A&A, 390, 81, astro-ph/0205230)

The GRB Hubble Diagrams



e.g. L. Amati et al., MNRAS, 486, L46-L51 (2019), arXiv:1811.08934v3

The GRB Hubble Diagrams



The open source code for figures and tables will be available in the DB

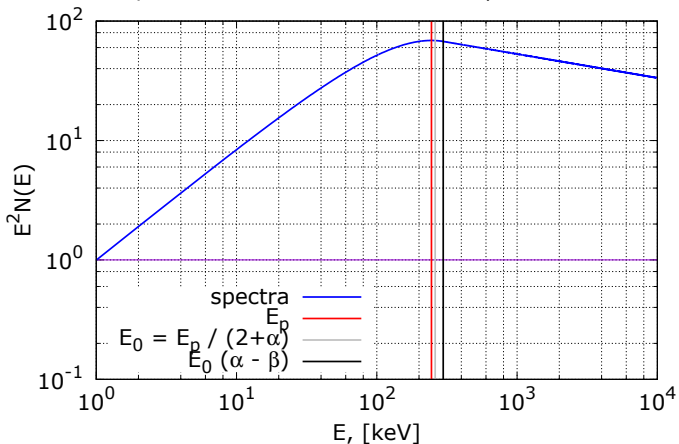
The GRB parameters catalogs

```
#26 IsoA
#27 IsoAerr
#28 IsoAerr2
#29 muSN
#30 muSNerr
#31 muSNerr2
#32 muA
#33 muAerr
#34 muAerr2
#35 instrument
#
# 1 name          2 z          3 Emin          4 Emax          5 T90          6 T90err
10326          2.9300          2
10613          0.6400          2
20127          1.9000          2
20801          1.2100          2
21016          2.8000          2
21021          1.0000          40
30416          0.1100          2
30824          0.2600          2
31026          6.6700          2
41016          3.4900          2
41127          0.9600          2
41228          2.3000          2
50123          1.5300          2
50126          1.2900          15
50408          1.2357          2
30 0.18390000E+02 0.59000000E+00
400 0.14674000E+03 0.24400000E+01
400 0.69900000E+01 0.26000000E+00
400 0.46033000E+03 0.36300000E+01
30 0.80630000E+02 0.95000000E+00
700 0.31200000E+03 0.81000000E+01
400 0.14290000E+02 0.29000000E+00
400 0.10130000E+02 0.14000000E+00
30 0.65580000E+02 0.45500000E+01
30 0.21960000E+02 0.17000000E+01
30 0.49140000E+02 0.22600000E+01
400 0.48900000E+02 0.00000000E+00
30 0.96900000E+01 0.93000000E+00
350 0.29000000E+02 0.12000000E+01
30 0.28390000E+02 0.56000000E+00
```

(the machine readable form)

The GRB spectra examples

The GRB020305B spectra at $z = 1.9800$,
 $E_p = 245.1000$, $\alpha = -1.0600$, $\beta = -2.2000$



Band D., et al., 1993, ApJ, 413, 281

Conclusions

- The DB can be used as repository for “The 6m telescope proposal” program GRB data by performing fast photometric observations (with MANIA), imaging (in the BVRI-bands) and spectroscopy (with SCORPIO).
- The GRB name, instrument, coordinates, fluence, photon index, duration, redshift, energy frame, spectral parameters, bolometric values, isotropic equivalent energy and luminosity, and other key parameters, including known corrections for different biases and selection effects, SN Ia calibration of Amati relation also are included in catalogs.
- The catalogs can be used for such cosmological tests as Hubble diagram construction, spatial large scale GRB sources distributions, spatial distribution of galaxies and galaxy clusters indicated by GRB’s line-of-sight, photometric and spectroscopic redshifts of galaxies in the deep GRB fields.

Thanks for your attention

Send your offers and wishes to E-mails, please:

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