

First Circular

ISSI-BJ Workshop on

Gamma-Ray Bursts: a tool to explore the young Universe

13-17 April 2015

Conveners

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The Context of the Workshop

Despite the recent progresses in Gamma-Ray Burst (GRB) science, obtained in particular thanks to the *Swift* and *Fermi* satellites, there are still many open questions in the field. One concerns the mechanisms that power these extreme explosions (in a handful of seconds the isotropic equivalent energy emitted by GRBs spans from 10^{50} to 10^{54} erg, making them the most luminous events in the Universe), which is still unclear after more than four decades since their discovery. In particular the content of the relativistic flow that produces the GRBs, remains to be investigated: especially in terms of its bulk Lorentz factor, its magnetization, its baryon loading and their consequences on the possibility of GRBs being the sources of Ultra High Energy Cosmic Rays (UHECRs).

Another open issue concerns the nature of GRBs progenitors: while thanks to a handful of spectroscopic associations with type I b/c Supernovae, long GRBs are currently considered the endpoint of very massive ($>30\text{-}50 M_{\text{SUN}}$) stars, the situation is less clear for what concerns the short GRBs. The most popular models involve the possibility of a coalescence of two compact objects (black holes or neutron stars), but a direct proof of this model is still lacking.

In addition to particle acceleration, radiation physics, and stellar evolution, GRBs are also pertinent to other branches of astrophysics, like Cosmology. Indeed thanks to their bright afterglows they allow to pinpoint the most distant galaxies, and to study them thanks to the imprinting on the afterglow data of the GRB close environment and the intervening matter

between the GRB and the Earth, gathering a wealth of information on the structure and physical state of the gas in the Universe through absorption lines.

Objectives of the Workshop

This ISSI-Beijing workshop aims to elucidate the connection between GRBs and the deep Universe.

In recent years much effort has been put into the ground based follow-up of GRB afterglows: the median measured redshift of long GRBs is ~ 2 (with the highest value reported to date of ~ 9.4), which means that GRBs are among the best candidates to study the deep Universe. Ten years after the launch of Swift, statistics on GRBs above $z=3$ have been constantly improving, reaching more than 40 events to date. It is hence timely to coherently review and assess the current knowledge on Gamma-Ray Bursts, their progenitors, their environment, and the emission mechanisms of the prompt and afterglow emission, in order to understand their nature and origin. Understanding the GRB phenomenon globally is of paramount importance for the use of GRBs as beacons of the deep Universe.

At the same time it is wise to start thinking about how to develop synergies between the high- z GRB studies and the surveys of the deep Universe, especially in the framework of the future GRB dedicated facilities (e.g. SVOM, POLAR).

The Workshop will cover the following main themes:

The Workshop is designed to review in depth what has been achieved in the research on Gamma-Ray Bursts and on their use to investigate the deep Universe. The main goal of the proposed ISSI-Beijing Workshop is to discuss the state of the art of the research and future prospective.

Following discussions by the Conveners, it is proposed that the Workshop will cover the following main themes:

1. Introduction to the theme
2. Gamma-Ray Bursts Observational Properties
3. Gamma-Ray Bursts Models
4. Progenitors
5. Galaxy Formations and Evolution
6. Gamma-Ray Bursts Host Galaxies
7. Cosmology with Gamma-Ray Bursts
8. Future Directions

This list could, subject to discussion and assessment at the Workshop, become the set of chapter headings for the ISSI-BJ book. All of those attending will be expected to contribute to one or more of the chapters or to the discussions during the talks.

Product

Following the Workshop, Springer will publish its output as a volume in the Space Science Series of ISSI-BJ, in parallel with the publication of the papers in Space Science Reviews. It is expected that a total of about 8 sections and between 20 and 25 review style and quality papers, submitted to the usual refereeing process will be published in the book. Papers will be based on talks presented at the Workshop and will reflect the discussions that will be held among the participants during the Workshop.

Location

The Workshop will be held at the International Space Science Institute-Beijing, China.

Attendance

This will be by invitation only with about 40 participants excluding young scientists.

Young scientists

Under its special programme for supporting young scientists, ISSI-BJ will invite around five early career scientists, within two years of their PhD, to take a full part in the Workshop.

Funding

ISSI-Beijing will provide the subsistence costs (hotel and a per diem to cover meals) to all participants but not the travel costs. There will be no registration fee for the Workshop.

Hotel & VISA

The hotel will be booked by ISSI-BJ. Therefore, in order to make the according hotel reservation, we kindly ask you to send your arrival and departure dates in Beijing as soon as possible directly to Lijuan En enlijuan@issibj.ac.cn. In addition, in order to obtain the necessary visa to enter China, we highly recommend that you apply for a tourist visa – the application process is less complicate and a lot faster. We will send you the needed hotel booking confirmation as soon as you send us your arrival and departure dates.

If you want to apply for a business visa and therefore, need an official invitation letter, please send Lijuan En by e-mail the scanned copy of your passport. Furthermore, she will need the following personal and passport data from you:

- surname:
- given name:
- title:
- gender:
- date of birth:
- nationality:
- passport no.:
- name of your institute:

- arrival date and departure date (for booking hotel):
- the country and city you will apply for the visa:
- 1st time to China?:

You will then receive an invitation letter, which you can use for your visa application at your local Chinese Embassy. It is important that you file your visa application well in time. Once all the forms have been received properly the Chinese Embassy typically needs 4-5 working days to process the visa.

Please be advised that all visitors to China are required to have a passport with at least six months of remaining validity and blank visa pages.

Schedule

Invitations and First Circular:	September 5	2014
VISA & Hotel Deadline	February 1	2015
Second Circular and final program:	March 1	2015
Workshop:	April 13 - 17	2015