

## Second Circular

### Workshop on

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

April 13-17 2015

### **Conveners**

Zi Gao Dai	Nanjing University, China
Maurizio Falanga	ISSI-BJ, Beijing, China
Neil Gehrels	NASA GSFC, Greenbelt Md., USA
Diego Götz (Chair)	CEA Saclay, Irfu/Service d'Astrophysique, France
Emeric Le Floc'h	CEA Saclay, Irfu/Service d'Astrophysique, France
Nial Tanvir	University of Leicester, UK
Bing Zhang	University of Nevada, Las Vegas, USA

### **Local organisation:**

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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 ( $>30$ - $50 M_{\text{SUN}}$ ) 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 at elucidating 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  $\sim 2$  (with the highest value reported to date of  $\sim 9.4$ ), 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, Einstein Probe, THESEUS...).

## **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.

## **Young scientists**

Under its special programme for supporting young scientists, ISSI-BJ will invite around five Chinese 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](mailto:enlijuan@issibj.ac.cn).

In order to obtain the necessary visa to enter China, please contact as well Lijuan En as soon as possible. **We highly recommend to apply for a tourist visa** – the application process is much faster and less complicated. 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 and accommodation certificate, send us the following information **as soon as possible and no later than February 28<sup>th</sup>**:

1. the place you will apply for visa:
2. surname:
3. given name:
4. title:
5. gender:
6. date of birth:
7. nationality:
8. passport no.:
9. arrival date and departure date (for hotel booking):
10. scan your passport: it is mandatory as our applying official invitation letter requests.
11. 1st time to China?
12. Institute Name:

PLEASE NOTE: Your passport should be valid for at least another six months in order to apply for the visa.

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.

### **Schedule**

Invitations and First Circular:	September 5 <sup>th</sup>	2014
Second Circular and final program:	January 20 <sup>th</sup>	2015
VISA Deadline	February 28 <sup>th</sup>	2015
Hotel deadline:	March 15 <sup>th</sup>	2015
Workshop:	April 13 <sup>th</sup> - 17 <sup>th</sup>	2015