

First Circular – Workshop of the International Space Science Institute (ISSI)

30 August 2013

The Strongest Magnetic Fields in the Universe

3 - 7 February 2014

Conveners

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Vasily Beskin	(Lebedev Physical Institute, Moscow)
Maurizio Falanga	(ISSI Bern)
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Sandro Mereghetti	(INAF Milano)
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The Context of the Workshop

The International Space Science Institute (ISSI) has been holding a series of three Workshops on Cosmic Magnetic Fields so far comprising the Solar-interplanetary, Terrestrial and Planetary magnetic fields. In addition, in order to also cover our knowledge about astrophysical magnetic fields, a fourth Workshop on Large-scale Magnetic fields in the Universe took place at ISSI in March 2010. This latter Workshop also included our contemporary knowledge about the primordial magnetic fields and the origin of the weak-field large-scale cosmological magnetic structure. The series, so far, leaves open the question of the generation and effects of the very strong magnetic field found near the most compact objects in the Universe, as there are Magnetic Stars, White Dwarfs, Neutron Stars and AGNs, their interaction with matter and observational phenomena, among them shock waves and all kinds of radiation. The present Workshop intends to fill this gap.

Objectives of the Workshop

One great challenge of modern astrophysics is the understanding of the origin of magnetic fields at different scales from planetary to the largest scale structures of the universe. The present Workshop, which is the last in a series of Workshops organized at the International Space Science Institute on Cosmic Magnetic Fields, intends to deal

with the compact magnetized objects encountered in the Universe, understanding how the observed very strong magnetic fields that are sometimes found in the environment of these objects are generated and what effects they produce on their environment as well as the generation of the radiation emitted from them which is the only carrier of the remote information. Among these effects the generation of Jets and their complex physics, the occurrence of Gamma Ray Bursts, the formation and properties of Relativistic Shocks, and the production of High-Energy Particles by the Cosmic Engines are of tantalizing interest.

The Workshop will review observations and theory of the magnetic field production at the observed strengths as well as their effects on the objects and the environment.

The Workshop will cover the following main themes:

The Workshop is designed to review in depth what has been achieved in the research on strong magnetic field in the universe. The main goal of the proposed ISSI 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. Magnetic Stars
2. White Dwarfs
3. Neutron Stars
4. Magnetars
5. Pulsar Wind Nebulae
6. AGNs/GRBs
7. Jet Acceleration/Collimation
8. Reconnection/Particle Acceleration

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

Product

Following the Workshop, its output will be published as a volume in the Space Science Series of ISSI by Springer, in parallel with the publication of the papers in Space Science Reviews. It is expected that a total of about 9 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, Hallerstrasse 6, 3012 Bern, Switzerland.

Attendance

This will be by invitation only with ~ 40 participants maximum including young scientists.

Young scientists

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

Funding

ISSI 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.

Schedule

Invitations and First Circular:	30 August 2013
Registration deadline:	1 November 2013
Second Circular and final program:	8 January 2014
Hotel deadline:	15 January 2014
Workshop:	3–7 February 2014