



Newsletter of the INTEGRAL Science Operations Centre



Merry Christmas and a Happy New Year!

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Foreword

Peter Kretschmar, Science Ops. Manager

The end of the year is coming close and early in the new year we will launch the call for proposals under the 7th Announcement of Opportunity. This newsletter briefly summarizes the latest information about the AO, but also brings you news from science operations, the Archive, the 7th Integral Workshop and developments at ISOC.

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AO-6 and AO-7

Peter Kretschmar, Science Ops. Manager

As we reported in the previous newsletter, the IUG¹ adopted a proposal leading to a new scheme for AOs: There is a first call for proposals requesting observation time followed later by a second call for targets to be associated with the selected open time observations (excluding TOO).

Another change that has been agreed by the IUG recently is that the duration of AO-6 has been extended by two months in order to allow cleaning up accumulated carry-over. Similarly, AO-7 will be 14.5 months in duration in order to synchronize AOs with the cycle of mission extensions.

The timetable for AO-7 has changed accordingly and is currently as following:

INTEGRAL AO-7 Timeline	
Release of AO-7:	12 Jan 2009
Due date observ. time proposals:	20 Feb 2009
TAC Meeting:	end Mar 2009
Call for data right proposals:	25 May 2009
Due date data right proposals:	3 July 2009
Associated targets selected:	early Sep 2009
Start AO-7 observations:	mid Oct 2009

Science Operations

**Celia Sanchez,
Operations Scientist**

The following is a summary of the operations at ISOC since the last Newsletter of August 2008. We overview matters related to the *INTEGRAL* instruments and to the observations.

Instrument related issues

The 12th SPI annealing started on 17 August 2008 (rev. 714) and lasted 202 hours (6 revolutions). It allowed to recover SPI's high spectral resolution, which progressively degrades due to the interaction of high-energy particles with the detector. Thanks to this operation, SPI's sensitivity recovered to values similar to those obtained from previous annealings: the energy resolution at 882.5 keV was 2.44 keV. During annealing, ISOC scheduled observations for which IBIS is the main instrument. The next SPI annealing period is currently foreseen from 20 April, 2009 (rev. 796) to 11 May 2009 (rev. 802). Note that in this occasion the annealing will last for 7 revolutions.

The JEM-X unit 1 default high voltage setting was lowered by one step (10V). This took effect from revolution 747 (2008, November 24).

OMC calibrations, necessary to characterise the flat field and dark current, were done as usual every ~12 revolutions.

¹The IUG minutes are available at <http://www.sciops.esa.int/index.php?project=INTEGRAL&page=IUG>



Figure 1. Seventh INTEGRAL Workshop photo taken on September 11, 2008, in front of the Eigtveds Pakhus, showing a little more than a hundred of the about 140 participants. Courtesy DTU Space.

Observations during the last few months

The SPI annealing was carried out during the first 6 revolutions of AO-6. During this period, *INTEGRAL* observed the X-ray pulsar X Persei, the quasar PKS 0208-512 and the Galactic Plane.

A TOO observation on the new Soft Gamma Repeater SGR 0501+4516, discovered by Swift-BAT, was executed on August 27-29. This source was the first new Soft Gamma Repeater detected since SGR 1627-41, roughly a decade ago. After this TOO, we continued with the planned sequence of observations until the end of August, which included monitoring observations of the Galactic Bulge region, observations of the Seyfert galaxy NGC 2110, and further observations of the Galactic Plane.

During the first weeks of September, *INTEGRAL* observed the Galactic Plane, the Perseus Arm region and the High-Mass X-ray binary system SS 433, during the primary orbital eclipse, to study the structure and physical parameters of the corona.

Key Programme (KP) observations of the Galactic Center were planned during of the subsequent 3 revolutions. The monitoring observations of the Galactic Bulge Region and of the binary system

GRS 1915+105 were also executed during this period. The last two revolutions of September were devoted to the Crab Calibration observations.

The first two revolutions in the month of October were spent on the execution the Galactic Disk Scans, and on the monitoring programmes of the Galactic Bulge region and GRS 1915+105. The *INTEGRAL* Long Term Plan of observations was modified again, to accommodate TOO observations of the Anomalous X-ray Pulsar 1E 1547.0-5408, which were triggered by the detection of bursting activity by the Swift satellite. In the same revolution when this TOO observations were planned, *INTEGRAL* also started a monitoring program on the black hole X-ray binary H 1743-322. These TOO observations, were triggered by the detection of an outburst from the source. H 1743-322 was observed every 2 revolutions during the outburst, until it was no longer visible by *INTEGRAL*. This allowed to study the spectral evolution of the source. The rest of October was spent observing the Galactic Center and Disk.

In November, the Galactic Center was not visible anymore. Most of *INTEGRAL*'s observing time was spent on KP observations of: the 'Cygnus Region', the '47 Tuc and SMC region', and the 'Virgo Clus-

ter'. Until the end of the year, we will continue these observations, as well as observations of the 'North Ecliptic Pole', the quasar PKS 0208–512 and the radio Galaxy Centaurus A.

The 7th *INTEGRAL* Workshop

Erik Kuulkers,
Operations Scientist

The seventh *INTEGRAL* Workshop "An *INTEGRAL* view of compact objects" took place from 2008 September 8th to 11th at the Eigtveds Pakhus in Copenhagen. More than 140 participants (see Figure 1) experienced a lively conference with a mixture of overview talks on all aspects of science covered by *INTEGRAL* and detailed presentations with special emphasis on observations of compact objects - black holes, neutron stars and white dwarfs, as well as a view on some future missions. A few highlights are given below.

The study of gamma-ray line emission in the Galaxy remains a topic of fundamental importance. An ongoing widely discussed topic is the origin of the 511 keV emission from annihilation of positrons. *INTEGRAL* has shown that this is dominated by a bright, extended spherical region centered on the Galactic Centre, plus an, apparently asymmetric, contribution from the disk. Various theoretical explanations are still being discussed, ranging from accreting binaries to Dark Matter. Studying the global properties of gamma-ray bursts observed by *INTEGRAL* - the most sensitive instrument for such studies - a new population of faint bursts has been identified. These gamma-ray bursts show distinctive gamma-ray emission and faint afterglows in the lower-energy X-ray and visible wavelengths. They appear to originate in our cosmic neighbourhood, within the nearby clusters of galaxies (see Figure 2). *INTEGRAL* has in recent years both determined the cosmic high-energy background with unprecedented precision and raised a puzzle for its explanation by not finding the expected population of "Compton-thick" AGN. The properties of the heavily absorbed AGNs observed in the local universe with *INTEGRAL* were presented in several talks.

One of the new source classes detected by *INTEGRAL* are the so-called Supergiant Fast X-ray Transients. These sources are similar to other transient sources but flare up only for timescales of hours instead of weeks and thus can only be detected serendipitously. Observations of such sources with *INTEGRAL* and other space telescopes were the topic of several presentations and of lively discussions on the mechanisms to explain their behaviour - clumpy

stellar winds, interaction with outflow disks, rapid changes between accretion regimes, magnetic inhibition were among the explanations brought up. Other speakers discussed the similarities and differences between SFXTs and the variability in 'classical' Supergiant sources or Be transients.

One of the social event highlights was a boat trip and visit to the Swedish (before 1658 it was Danish property) island Hven (or Ven). The Danish astronomer Tycho Brahe (born Tyge Ottesen Brahe) housed on the island up to 1600. Here he built astronomical instruments and performed accurate astronomical observations. The conference dinner was situated near the Little Mermaid.

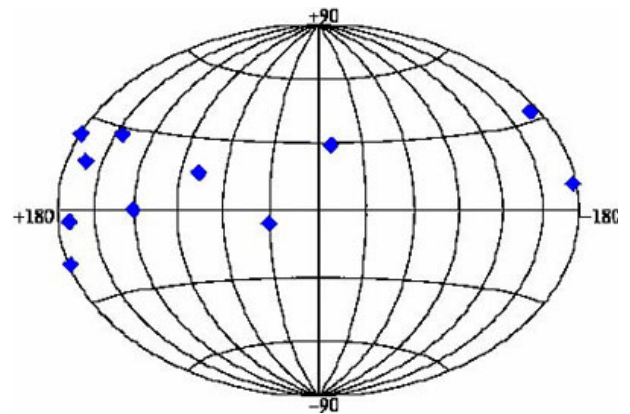


Figure 2. Distribution of faint gamma-ray bursts as observed by *INTEGRAL*/*IBIS*, in supergalactic coordinates. As it can be seen, they are mainly distributed along the supergalactic plane. Credits: S. Foley/UCD.

Changes at ISOC

Guillaume Bélanger,
Operations Scientist

A new young graduate trainee, Delphine Anger, started on 2008, October 1 to work on the integration of the APSI *INTEGRAL* Mission Scheduler (AIMS, i.e., ISOC's new long-term planning tool) into the ISOC software system. This involves the implementation of a front and back-end to AIMS, as well as testing and evaluating the new tool.

Simone Migliari joined ISOC as a research fellow one month after Delphine, on November 1. He did his PhD in Amsterdam and three years of post-doctoral work at the Center for Astrophysics and Space Sciences of the University of California in San Diego. He studies jets/outflows and accretion disks using multi-wavelength observations of X-ray binaries. A lot of his work has been related to timing analysis in these systems, looking for connections between stellar mass black holes, neutron stars and AGNs.

This *Newsletter* is based on inputs from members of ISOC, and edited by C. Sánchez.

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