



# Newsletter of the INTEGRAL Science Operations Centre



No. 9

September 2003

## 2nd Announcement of Opportunity (AO-2)

*Christoph Winkler - Project Scientist*

The deadline (05 Sep 2003, 15:00 CEST) for submission of INTEGRAL proposals for AO-2 open time observations is now a few days behind us. All proposals are in the ISOC database. Below are some preliminary statistics on the proposals that have been received.

### *Total number of proposals*

The total number of proposals received was 142. The total observing time requested in all proposals is approximately 144 Msec. Here 10% of the requested total TOO time has been taken into account. Given that ~ 18.000 ksec are available in the first year, this means an oversubscription by a factor of about 8 (see details below). This is an extremely high value, showing the continued high interest of the scientific community.

### *Proposals per category*

In the following table we give the breakdown of number of proposals as a function of the proposal category. Note that the numbers on total requested observing times do include TOO proposals. It has been assumed that a typical TOO proposal requests about 10% of the total observing time as entered into PGT from all the candidate sources included in a TOO proposal. Further analysis may modify this assumption but the impact on the overall results should not be large.

Category	N <sup>a</sup>	T <sup>b</sup> (10 <sup>6</sup> s)	F <sup>c</sup>
Compact objects	64	44.7	2.5
Extragalactic objects	39	46.9	2.6
Nucleosynthesis	21	43.9	2.4
Miscellaneous (incl. GRB)	18	8.9	0.5

a. N = total number of proposals

b. T = total requested observing time

c. F = oversubscription factor, year 2

In number of proposals the *Compact objects* category is the biggest, followed by the *Extragalactic objects* category. *Nucleosynthesis* and *Miscellaneous* are clearly smaller. In amount of requested observing time, however, the *Nucleosynthesis* category is significantly larger.

The Time Allocation Committee, in charge of peer reviewing all proposals and recommending the scientific observing programme to ESA, will meet in October at ESTEC, followed by ESA's announcement of the AO-2 observing programme.

## Science Highlights

*Erik Kuulkers - Operations Scientist*

### *INTEGRAL observing programme*

Over the summer INTEGRAL has observed many extra-galactic objects such as the MCG-6-30-15 and 3C 273, as well as the Centaurus-Circinus region. A few of them were closely coordinated with XMM-Newton (e.g., IC 4329A). Closer to “home”, INTEGRAL observed objects like Algol, as well as the brightest X-ray source known, Sco X-1. Since the issue of the last ISOC Newsletter #8 we have had two Target of Opportunity observations, one on the type Ia supernova SN 2003gs (IAUC #8171) near maximum, and one on the soft gamma-ray repeater SGR 1806-20 (see below).

At the moment we are in the middle of the “autumn” visibility window of the Galactic Center and spend most of the time on either pointed observations of the Galactic Center

and Sgr A\* or the GCDE. Note that the ISWT has decided to abandon the Galactic Plane Scan (GPS) during the Galactic Center visibility window.

Figure 1 shows the current INTEGRAL exposure map, as seen by IBIS. This map is based on all pointings scheduled by the ISOC during the PV phase and AO-1 up to revolution 115 (i.e., September 25, 2003). Taken into account are the fully coded (9 degrees by 9 degrees) and partially coded (up to 29 degrees by 29 degrees) IBIS FOVs. Clearly, the Galactic Center has had the most attention, partly due to the dedicated observations.

### *INTEGRAL and new or old (transient) sources*

As soon as the GCDE started again in the beginning of August a new source was reported: IGR J16479-4514 (ATel #176). On August 8 and August 9 it exhibited fluxes of ~12 mCrab (18-25 keV) and ~8 mCrab (25-50

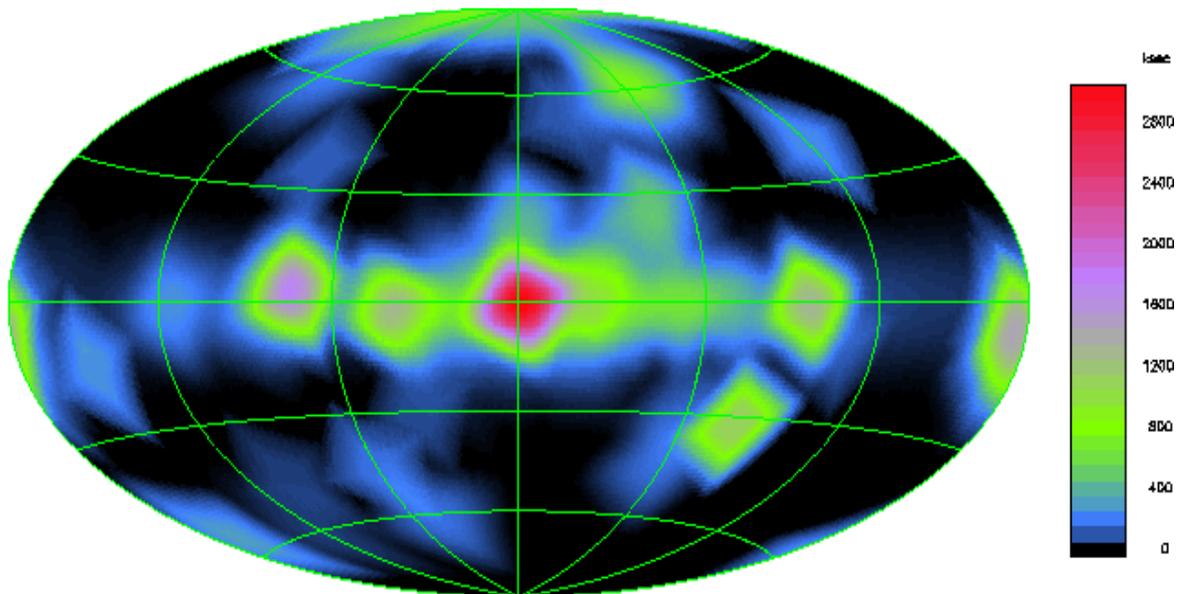


Fig. 1

Integral PV+AO1 (Rev 11–115) exposure map (IBIS/FC+PCFOV)

keV). During later observations the source temporarily increased by a factor ~2.

A new source was reported to have become active on Aug. 26, 2003 at the level of ~70 mCrab (18-50 keV). The source flux was found to be highly variable (by a factor of ~10) on a time-scale of thousands of seconds. The source was designated IGR J17391-3021 (ATel #181), but its position is consistent with that of the known transient X-ray pulsar XTE J1739-302 which has a possible spin period of ~1500 sec (ATel #182; see also ATel 181). The duration of the outbursts of this transient is rather short, probably on the order of a few days (ATel #186).

The soft gamma-ray repeater SGR 1806-20 became active in the beginning of June (GCN 2283). During INTEGRAL observations of the Galactic Center performed on August 24-25, SGR 1806-20 was in the FOV of IBIS. Several soft gamma-ray bursts with different durations (40-250 msec) and intensities were detected. Two of them were strong; they had a duration of about 250 msec and seemed to have a complex structure (ATel #183). INTEGRAL performed a Target of Opportunity (ToO) observation on SGR 1806-20 between September 3 and 7 (GCN 2372). During the ToO observation two bursts triggered the IBAS system, which were also in the FOV of IBIS (GCN 2377).

The low-mass X-ray binary MXB 1730-335 (The Rapid Burster) became active during the INTEGRAL observations on Aug. 28 of the Galactic Center with a flux of ~30 mCrab (15-40 keV). The next day its flux increased by more than a factor of two (ATel #187).

The X-ray transient and black-hole candidate IGR J17464-3213 (=H1743-322) detected during the 2003 "spring" GCDE observations (see our previous Newsletter) is currently still active (ATel #180). Jem-X observed a flux of

about 0.5 Crab in the 4-10 keV band. The spectrum at this stage is rather soft; both Jem-X and IBIS/ISGRI did not detect the source above ~20 keV.

### ***INTEGRAL and Gamma-ray Bursts***

The Anti-Coincidence Shield (ACS) of SPI continues to detect Gamma-Ray Bursts (GRBs) on a regular basis and positions are distributed through the IBAS. Since the last Newsletter (#8, June 2003), however, no further GRBs have been seen in the FOV of the SPI and IBIS instruments.

### **Mission Status**

*Rudolf Much - Deputy Project Scientist*

The INTEGRAL spacecraft is working without problems. The spacecraft behaved nominally during the last eclipse season from June 24 to July 18, 2003.

The second SPI annealing cycle was executed between July 18 to 30, 2003. The annealing cycle itself was executed without problems. Analysis of post-annealing data showed, however, that the SPI energy resolution was not fully recovered with the second annealing. The energy resolution at 2.754 MeV was only improved from 4.7 keV to 4.3 keV rather than to the expected 4.0 keV. This indicates that the bake-out period of 36 hours (the detector temperature is kept at 100 degrees Celsius for 36 hours) was not long enough and the next annealing cycle will have a longer bake-out period. The date for the next annealing cycle is still under discussion.

On August 6, 2003 it was realized that the Front End Electronics (FEE) #57 of the SPI Anticoincidence System (ACS) produced zero counts. Three recovery actions were taken twice on August 8 and one on August 27 without success. Due to the redundant concept of the ACS (each ACS element is viewed by two

PMTs/FEEs) no loss of functionality has occurred so far.

The electronics of the radiation monitor IREM “crashed” seven times since launch. All crashes are believed to be caused by Single Event Upsets (SEUs). In the cases where these events occurred above the radiation belts during science operation the operations of IBIS, JEM-X and OMC were interrupted (transition to safe/standby mode), because these three instrument are reacting on the IREM Broadcast Packets to terminate operation in case of high radiation. A study is on-going to make the operations more robust against IREM crashes caused by the SEUs.

Overall, the operations of SPI (see above for specific items, however), IBIS, OMC and JEM-X is nominal.

### Any Other Business

*Christoph Winkler - Project Scientist*

A number of accepted papers have appeared in the literature (ApJ, A&A). Major efforts have been invested for the special issue of A&A Letters “First Science with INTEGRAL” to be published in November 2003. Currently the volume will contain 77 papers describing the mission (flight and ground segment, instrument description, calibration, in-flight performance), as well as scientific results obtained during the first months of the mission.

### How to reach the ISOC?

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**Table 1: ISOC personnel**

Name	Function	Phone	Mailcode
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Nolan, J.	Operations Engineer	3401	SCI-SDG
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Orr, A.	Operations Scientist	3943	SCI-SDG
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