

The eROSITA Bulletin



No.1, July 2012

0. Foreword

Dear Readers,

with less than two years left before the launch of the SRG mission, work on the preparation of the eROSITA telescope proceeds intensely. But as the hardware parts and the software codes are being integrated and tested, the whole team of scientists, technicians and engineers in the German eROSITA Consortium should also find new occasions to share the progresses made and come together to prepare the intense months of activity ahead of us.

That's why we believed a (semi-regular) Bulletin to disseminate the main news on the preparation and implementation of the eROSITA project would have been a useful and timely addition to the team's means of communication. This first number has all the characteristics of a prototype: rough at the edges, and still somewhat experimental. Please read with a critical eye, and let us have your opinions on how to improve it. We are looking forward to your suggestions!

Peter Predehl (eROSITA Principal Investigator)

Andrea Merloni (eROSITA Project Scientist)

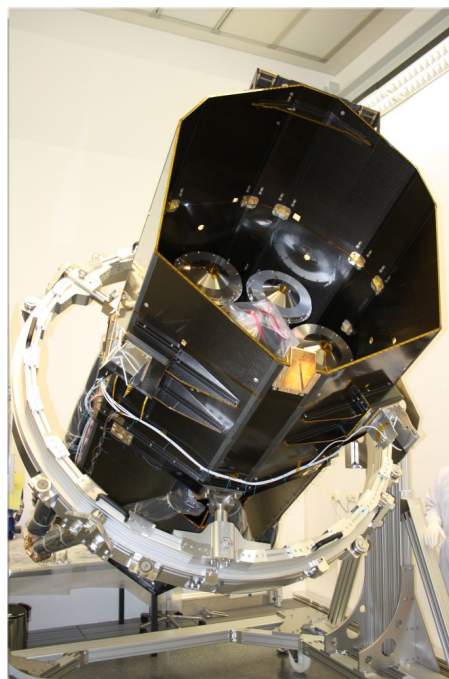
1. Project Status and Milestones

Launch Date 2014: During a meeting in Moscow last May, DLR and Roskosmos agreed to postpone the official launch date of SRG to 2014.

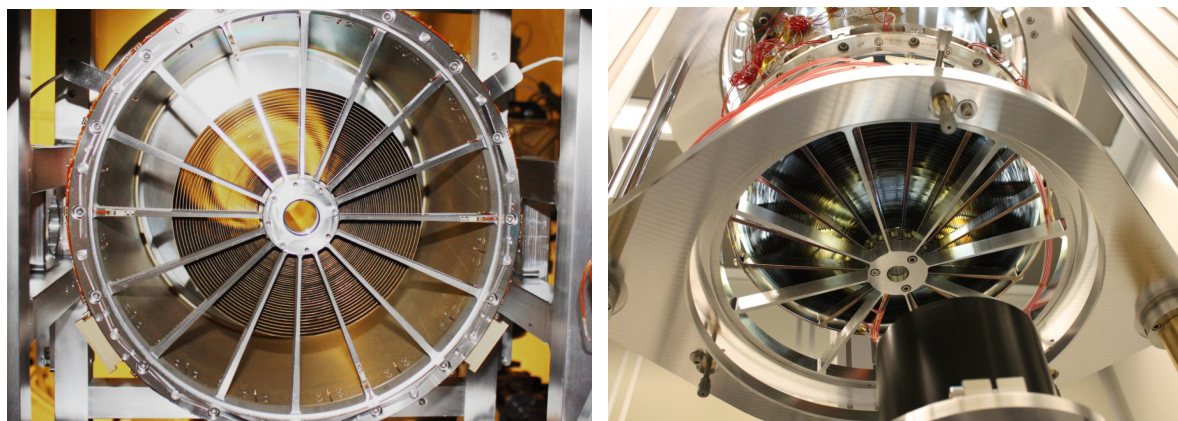
Extended Ground Segment: In depth analysis of the Phobos Grunt failure of last November by the Russian Space Agency has led to the recommendation that the SRG Ground Segment be expanded to include ESA stations in order to maximize the visibility window of the spacecraft in its early stages.

2. Hardware development

The eROSITA telescope structure comes together: All mechanical hardware is in place and the integration of the telescope structure is now completed. A few weeks ago, the opening mechanism for the front cover has



The telescope structure during the integration phase

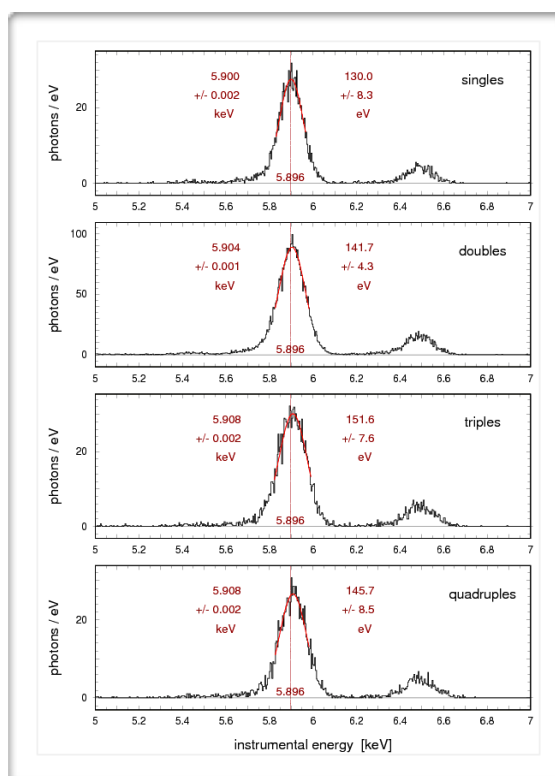


On the left, an image of Flight Mirror Module #3, with the inner 39 shells fully integrated. On the right, the optical metrology system in action to control alignment of the X-ray baffle with a Mirror Module

been successfully tested. In the meantime, the preparation is ongoing of the complete Qualification Module (QM) test. Also for the QM, all hardware except the radiators is available. The QM test campaign is now planned for October/November 2012.

Mirrors and Mirror Modules tests: 61% of all mirror shells have now been integrated. Tests of the mirror modules proceed at full speed in the PANTER facility. So far, all X-ray tests of partially-integrated modules gave results within the desired specifications. Five mirror modules are close to completion, with currently 39 (inner) shells integrated. Individual X-ray tests of the outer (larger) shells are underway; so far, results within specs have been obtained for all tested shells apart from the largest one. A detailed investigation of the reason for this problem, probably due to roundness errors amplified during the mounting are under investigation. The integration of the X-ray baffles into the mirror modules has started. Finally, DLR has agreed to fund the production of an eighth mirror module, that will be kept as eROSITA spare.

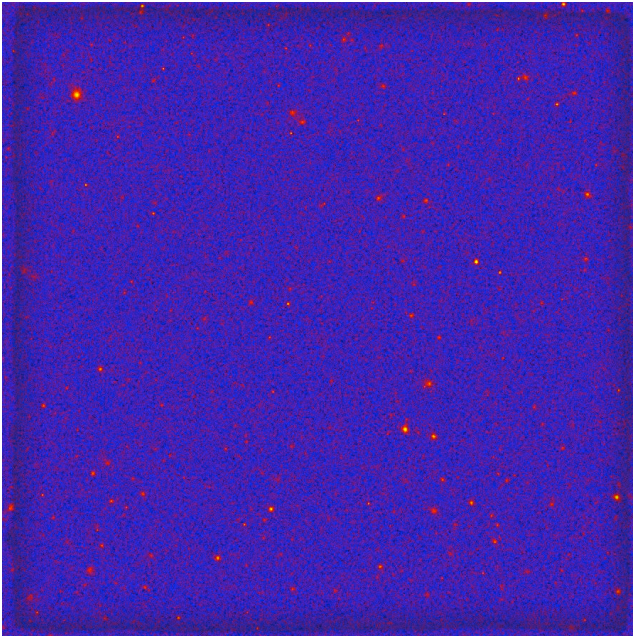
Detectors: The eROSITA CCDs have been produced, tested and are ready for integration. The CAMEX readout ASIC has the same status and is ready for integration, too. After assembly, the performance of the engineering model of the eROSITA detector have been extensively tested. An important part of the tests was to figure out the optimum operating conditions under the given constraints on the satellite. We measured a FWHM for the Mn-K α line at 5.9 keV of ~ 132 eV, which fulfills very well the project specification. The mean detector read noise has a value of 2.6 electrons ENC rms, which is a factor of two better compared with the XMM-Newton PNCCD. Furthermore, the first checks indicate a very low CTI of $\sim 1.1 \times 10^{-5}$. A sub-pixel reconstruction algorithm has been developed and applied to eROSITA mirror module measurements at PANTER. This improves the spatial resolution from the native 9.6 arcsec pixel size to ~ 2 arcsec.



Spectra for all singles and recombined valid patterns, obtained from HK11205.045 at Mn-K

Internal calibration source: The design of the internal calibration source is almost finalized; it consists of a Fe-55 source emitting Mn-K X-rays, which hit a target plate containing Al, Ag, and Ti, providing calibration lines at 1.5 keV (Al-K), 3.0 keV (Ag-L), 4.5 keV (Ti-K), and 6.0 keV (Mn-K).

3. eROSITA Ground Software



Simulated equatorial 3.6x3.6 deg² eROSITA field, with galaxy clusters, AGN and particle background

Source Detection: Recent activities include the completion of an initial version the eROSITA Maximum Likelihood PSF-fitting source detection package (derived from XMM-Newton software). Code development and testing of other source detection algorithms (Bayesian background-source separation, Wavelet detection) and of a more sophisticated PSF-model is ongoing.

Pipeline and Catalogs: The control software of the eROSITA data processing pipeline, as well as a pre-processor, preparing the data for pipeline processing (science and near-realtime analysis), are currently being tested. Work on an eROSITA catalogs and data access tool was recently started. Preparations for managing mission planning activities are under way in collaboration with our IKI colleagues.

Simulations: A one-day meeting entirely dedicated to simulations for the preparation of eROSITA data analysis and scientific exploitation

of the data has been held at MPE on June 13. A detailed report and copies of all presentations can be found on the eROSITA Wiki page (https://wiki.mpe.mpg.de/eRosita/erosita_simulation_meeting_jun2012).

4. Multi-wavelength surveys and follow-up preparation

Multiband Imaging: The LMU team is moving forward with preparations for the multi-band image processing to provide the optical counterparts and photometric redshifts for the eROSITA sources. For our side of the sky, these data will come primarily from the Pan-STARRS1 and DES surveys, and the DES dataset is also complemented by JHK imaging with the VISTA telescope. We are working to use our data management system to process, calibrate and deliver catalogs from PS1 and DES. There is plenty to do, and we welcome collaboration with anyone within the collaboration who is willing to help!

Recent progress includes the publication of our analysis of the Blanco Cosmology Survey dataset (Desai et al 2012) as well as the successful installation of our data management system on the new SuperMUC system at LRZ. We will use the LRZ instance of our system to carry out stress tests on the SuperMUC filesystem and our dedicated database at USM in early August.

SPIDERS: SPIDERS is an “early” eROSITA spectroscopic follow-up survey that has been approved as a part of the planned “After-Sloan 3” (AS3) program at the SDSS telescope. At the beginning of

May, M. Blanton (AS3 Director) and D. Eisenstein (SDSS-III Director and chair of the AS3 Steering Committee) were invited to a meeting with representative of the Sloan foundation to discuss possible Sloan support of the AS3 program. At the end of the meeting they were invited to submit a full proposal for 10 Million Dollars, which was submitted at the beginning of July. In the meantime, in order to assess the efficiency of AGN/QSO targeting using simultaneous information from X-ray catalogues and variability data, a BOSS ancillary pilot survey has been submitted and approved. This pilot survey aims at using two full BOSS plates to take spectra of ~ 2000 variable and X-ray sources (mainly AGN) over two PanSTARRS medium deep fields of 7 deg^2 each: MD01 (in the XMM-XXL area) and MD03 (the Lynx field).

4MOST: 4MOST is the concept study for a next-generation multi-object spectrograph for an ESO 4-meter-class telescope. Its goal design features very high multiplex (~ 3000 fibers), full optical wavelength coverage (390-1000 nm) and a very large field-of-view ($\sim 3^\circ$ diameter). The main science drivers will be the systematic follow-up of GAIA and eROSITA sources. The 4MOST telescope selection review process has been completed by ESO, with the following main conclusion: "ESO endorses the wishes of the consortium to complete Phase A with VISTA as the baseline." The 4MOST project enters now in Phase A2 of the conceptual design study, which will last until February 2013. The ESO decision on the project selection is expected for May 2013.

5. Recent Bibliography

We list here scientific papers appeared in the last 6 months containing the word "eROSITA" in their abstract (from ADS):

- **Guglielmetti, Fischer & Dose**, *Bayesian mixture models for Poisson astronomical images*. To appear in the Proceedings of "Statistical Challenges in Modern Astronomy V"; arXiv:1202.0390
- **Perinati et al.**, *The radiation environment in L-2 orbit: implications on the non-X-ray background of the eROSITA pn-CCD cameras*. *Experimental Astronomy*, 33, 39 (2012)
- **Hamilton-Morris et al.**, *A Weak-lensing and Near-infrared Study of A3192: Disassembling a Richness Class 3 Abell Cluster*. *ApJL*, 748, 23 (2012)
- **Valegeas and Clerc**, *Redshift-space correlation functions in large galaxy cluster surveys*. *A&*, submitted; arXIV:1205.4847
- **Pillepich, Porciani & Reiprich**, *The X-ray cluster survey with eRosita: forecasts for cosmology, cluster physics and primordial non-Gaussianity*. *MNRAS*, 422, 44 (2012)
- **Huetsi, Gilfanov & Sunyaev**, *Angular fluctuations in the CXB: Is Fe 6.4 keV line tomography of the large-scale structure feasible?* *A&A*, submitted. arXiv:1206.2375
- **Khabibullin, Sazonov & Sunyaev**, *SRG/eROSITA prospects for detection of GRB afterglows*. *MNRAS*, submitted; arXiv:1206.6801
- **Clerc et al.**, *The cosmological analysis of X-ray cluster surveys - II. Application of the CR-HR method to the XMM archive*. *MNRAS*, 423, 3561 (2012)

6. Upcoming Meetings and events

SRG/eROSITA Meetings:

- [Hamburg, Germany](#), July 23-24, 2012: *German eROSITA Consortium Meeting*
- [Kazan, Russia](#), September 3-7, 2012: *Science with eROSITA and ART-XC aboard SRG*

Meetings of General Interest (Sep 2012 - Mar 2013; from CADC):

- [Beijing, China](#), September 3-7, 2012: *Black Hole Growth in the Universe*

- [ESA/ESAC, Villanueva de la Cañada, Spain](#), September 10-13, 2012: *Growing Up at High Redshift: From Proto-Clusters to Galaxy Clusters*
- [Garching, Germany](#), September 10-14, 2012: *Supernovae Illuminating the Universe: from Individuals to Populations*
- [Mykonos Island, Greece](#), September 17-21, 2012: *Half A Century of X-Ray Astronomy*
- [Toulouse, France](#): September 24-27, 2012: *Second LOFT Science Meeting*
- [Hamburg, Germany](#), September 24-28, 2012: *Annual Meeting of the Astronomische Gesellschaft: The Bright and the Dark Sides of the Universe*
- [Milan, Italy](#), October 1-5, 2012: *X-Ray Astronomy: Towards the Next 50 Years!*
- [Garching, Germany](#), October 15-18, 2012: *Science from the Next Generation Imaging and Spectroscopic Surveys*
- [Paris, France](#), October 15-19, 2012: *An INTEGRAL View of the High-Energy Sky: the First 10 Years*
- [Seoul, Korea](#), October 29-November 4, 2012: *The 5th KIAS Workshop on Cosmology and Structure Formation*
- [Bonn, Germany](#), November 6-8, 2012: *Nuclei of Seyfert galaxies and QSOs - Central engine & conditions of star formation*
- [NASA's Goddard Space Flight Center, Greenbelt, MD, USA](#), November 13-16, 2012: *Multi-Messenger Time Domain Astronomy*
- [Tucson, AZ, USA](#), November 29-30, 2012: *Binary Black Holes and Dual AGN, a Workshop in Memory of David S. De Young*
- [Sao Paulo, Brazil](#), December 16-20, 2012: *26th Texas Symposium on Relativistic Astrophysics*
- [Madonna di Campiglio \(Trento, Italy\)](#), March 17-22, 2013: *Galaxy cluster masses from the core to the outskirts: the need for a multi-wavelength approach*

IMPRINT

Realisation: A. Merloni

Contributors: P. Predehl, P. Friedrich, N. Meidinger, K. Dennerl, H. Brunner, C. Schmid

Image credits: Page 1: (1) Peter Predehl (MPE); Page 2: (1 & 2) P. Friedrich (MPE), (3) K. Dennerl (MPE); Page 3: (1) C. Schmid (Bamberg)

Send your suggestions to A. Merloni; E-Mail to am@mpe.mpg.de

This newsletter is distributed periodically by the **German eROSITA Consortium**
Max-Planck-Institut für Extraterrestrische Physik,
Giessenbachstr., D-85748 Garching,
www.mpe.mpg.de/erosita

