

Heritage Working Group

11th IACHEC meeting summary

Scope of the WG

Preserve the IACHEC corpus of knowledge, know-how and best practices for the benefit of future missions and the community at large

- provide a platform for the discussion of experiences coming from operational missions
- facilitate the usage of good practices for the management of pre- and post-flight calibration data and procedures, and the maintenance and propagation of systematic uncertainties (the latter task in strict collaboration with the "Systematic uncertainties" IACHEC Working Group)
- document the best practices in analysing high-energy astronomical data as a reference for the whole scientific community
- ensure the usage of homogeneous data analysis procedures across the IACHEC calibration and cross-calibration activities
- consolidate and disseminate the experience of operational missions on the optimal calibration sources for each specific calibration goal

Activities during the last year, agreements for the future

1. JATIS (SPIE) paper on the in-flight calibration plans accepted
2. work to prepare a IACHEC source database (data, analysis procedures, literature) to be started soon (AHEAD funding)
3. community expert's survey to define an IACHEC set of "best-practices" on: a) photoelectric absorption models and associated cross-sections; b) elemental abundance tables now completed
 - White Paper on the results to be circulated to the IACHEC mailing list, with the proposal to assume these recommendations as data analysis standard for IACHEC papers
 - Evaluation of the impact that different prescriptions may have on cross-calibration results in the 3C273/PKS2155-304 paper
4. repository of calibration documents on the WG Wiki includes now Chandra, INTEGRAL, NuSTAR, XMM-Newton
5. launch a survey to build a "IACHEC knowledge database" (instrument and scientific/source expertise)
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Journal of
**Astronomical Telescopes,
Instruments, and Systems**

AstronomicalTelescopes.SPIEDigitalLibrary.org

**On the in-flight calibration plans of
modern x-ray observatories**

Matteo Guainazzi
Laurence David
Catherine E. Grant
Eric Miller
Lorenzo Natalucci
Jukka Nevalainen
Robert Petre
Marc Audard

JATIS, 1(4), 047001

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multiple choices possible

Search page

Source:
Source type:
Instrument:
Calibration goal:

- 1E0102-72
- 3C273
- Abell1795
- Andromeda
- ...
- Galaxy clusters
- X-ray Binaries
- AGN
- Active stars
- ...
- ACIS
- EPIC-MOS
- IBIS
- XIS
- ...
- Energy scale
- Redistribution
- LSF
- Timing
- ...



Results page

XSPEC model files and plots of multi-instrument campaigns

3C273 PKS2155 Mkn421 Mkn509

```
spectra/acis/3C273_20060915_acis.pi          xcal/fit_3C273_ACISEPICXIS_2002.xcm
spectra/acis/3C273_20060915_acis.rmfi       xcal/3C273_ACISEPICXIS_2002.ps
spectra/acis/3C273_20060915_acis.xcm
spectra/acis/plots/3C273_20060915_acis.ps
spectra/epic/3C273_20010906_pn.pi
...
papers/iachec/Smith_ApJ_802_546.pdf
papers/science/Page_MNRAS_749.34.pdf
...
models/iachec.mdl
models/Page_MNRAS_749_34.mdl
models/3C273_summaryModelTable.txt
```

spectra and responses

link to best-fit plot on individual instrument

link to papers

XSPEC model files

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2. Community survey - current status

Item	Photoelectric absorption model	Photoelectric absorption cross-sections	Elemental abundances
	tbnew (XSPEC) hot+am01 (SPEX)	Verner & Yakovlev (1995)	Lodders & Palme (2009)

*this is not lodd in XSPEC!

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3. Repository of calibration documents

Library of ground-based and in-flight calibration documents:

- [Chandra](#)
- XMM-Newton:
 - [EPIC public calibration documents](#)
 - [RGS public calibration documents](#)
 - [telescopes' calibration documents](#)
- NuSTAR
 - NuSTAR in-orbit calibration paper: ["Calibration of the NuSTAR High-energy Focusing X-ray Telescope"](#), K. K. Madsen et al, *ApJS*, 220, 8, 2015
 - SPIE telescope articles:
 - ["In-flight PSF calibration of the NuSTAR hard X-ray optics"](#), H. An et al, 9144, 1, 2014
 - "NuSTAR on-ground calibration: I. Imaging quality", N. J. Westergaard, 8443, 2012
 - "NuSTAR on-ground calibration: II. Effective area", N. Brejnholt et al, 8443, 2012
 - "Coatings for the NuSTAR mission", F. Christensen et al, 8147, 2011
 - "NuSTAR ground calibration: The Rainwater Memorial Calibration Facility (RaMCoF)", N. Brejnholt et al 2011, 8147, 2011
 - "First results from the ground calibration of the NuSTAR flight optics", J. Koglin, 8147, 2011
 - "Fabrication of the NuSTAR flight optics", W. Craig et al, 8147, 2011
 - "NuSTAR: system engineering and modeling challenges in pointing reconstruction for a deployable x-ray telescope", I. Harp et al, 7738,
 - "Optimizations of Pt/SiC and W/Si multilayers for the Nuclear Spectroscopic Telescope Array", K. K. Madsen et al, 7437, 16, 2009
 - SPIE detector articles:
 - "Inflight performance and calibration of the NuSTAR CdZnTe pixel detectors", T. Kitaguchi et al, 9144, 2014
 - "Spectral calibration and modeling of the NuSTAR CdZnTe pixel detectors", T. Kitaguchi et al, 8145, 2011
 - "Development of focal plane detectors for the Nuclear Spectroscopic Telescope Array (NuSTAR) mission", V. Rana et al, 7435, 2009
 - SPIE operations articles:
 - "NuSTAR observatory science operations: on-orbit acclimation", K. Forster et al, 9149, 2014
 - "Highly automated on-orbit operations of the NuSTAR telescope", B. Roberts et al, 9149, 2014

+ INTEGRAL!

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