The Schrödinger’s cat
Or, “On the IACHEC Heritage Working Group”

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IACHEC Heritage Working Group (HWG) Chair
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

Otherwise: we do the dirty jobs for you that you don’t have time to do because you are busy analysing data
WG activities

• Transmit knowledge on the in-flight calibration plan
  • JATIS paper on in-flight calibration sources
  • Support the elaboration of calibration plans of “future” missions

• Maintain calibration documentation

• Document data analysis best practices
  • Statistical methods are covered by CalStat WG

• IACHEC data repository
• Overview of celestial source classes used in the in-flight calibration plans of X-ray observatories

• Covers: rationale, comparative performance

• Aiming at being a reference for “future missions”

• Needs update (cf. K. Forster’s GoogleDoc)
JATIS paper content

Active stars (gratings' energy scale and gain)

Extended sources for CCD CTI/gain/redistribution

Galaxy clusters

... and PSF, timing etc.
A synoptic view of the cross-calibration status

[Out of date: it does not include Plucinsky+17 and Madsen+17]
Support to “future” missions

- The *Hitomi* in-flight calibration plan drew heavily from the IACHEC experience
  - Project-level decision by JAXA
- Many sources therein are “IACHEC standard candles”
- Draft plans discussed at each IACHEC meeting
  - [Coordinated observations dealt with by the corresponding IACHEC WG]
- Similar approach for XRISM (cf. E. Miller’s IACHEC plenary)
- Relations with other missions less structured
IACHEC source data repository

- Concept: a single repository of the data used in IACHEC papers
- Funded over ~2 years by AHEAD, working prototype available
- Requirements and interface iterated at three IACHEC meetings
- Database never populated
- The project has not taken-off

https://iachecdb.iaps.inaf.it
Document data analysis best practices

- Question: which are the “correct” choices of photoelectric absorption model and cross sections, and elemental abundance tables?
- Survey among experts to define standards
- HWG offered a pool of scientists to apply standards to IACHEC calibration data, and evaluate systematics
- Applied so far only on the radio-loud AGN paper (trivial result: ~no impact)
- Application to high-resolution data awaiting next IACHEC paper (N132D? 1E0102-72 came too early)
Repository of calibration documents

https://wikis.mit.edu/confluence/display/iachec/IACHEC+Heritage+Working+Group

- **Concept:** single repository of calibration documents for past and operational missions
- **Entries for most missions**
- **Some still missing**
- **Simple-minded interface - no underlying database allowing smart searches**
- **Inhomogeneous**
- **Not up-to-date (~2018)**
Useful?

Small questionnaire prior to this meeting (still open): 10 replies

The concept of the Heritage Working Group seems sound (small number statistics notwithstanding)

[cf. also the comment by K. Kuntz yesterday.]
... but it does not work any longer

The Heritage Working Group has been dormant in the last ~3 years

- The activities would need a (small) pool of dedicated calibration scientists, that the IACHEC cannot afford

- They are even less glamorous than analysing calibration data - difficult to motivate people

- Funding on a “ad hoc” project basis is basically not existent for the IACHEC - AHEAD window of opportunity is now closed

- The HWG depends on “standard candle” WGs providing inputs. However, last IACHEC paper is ~4 years old

- Some “future” (now operational) missions are still not well integrated in the IACHEC. Others have sufficient “in-house” expertise

- The Chair changed job description and has almost no time available for IACHEC work
Suggestions for further activities

• Promoting the creation of a “Background WG”
  • Now covered by the “CCD and Background” WG

• Promoting the creation of an “X-ray optics WG”

• Creating (and maintain) an IACHEC knowledge database (an idea by K. Forster)

• Update and optimise past activities
  • JATIS-like paper and associated calibration sources' list
  • Data repository (populate database, version control, enhanced functionalities)
  • Document repository (true database, smart interface)
  • Data analysis standards and systematics evaluation applied to future IACHEC papers
Way forward

- A virtual meeting is deemed not efficient: defer the discussion to the first face-to-face IACHEC meeting

- Identify *one new activity* and *one highest-priority past activity* to be updated

- Identify a small pool (3-4) of IACHEC scientists willing to actively work in the HWG

- A new Chair would help (but nobody has volunteered so far)

- In the meantime, some knowledge transmission to future mission still possible parasitically through XRISM/Athena

70% of responders are willing to increase their involvement in the HWG