High Resolution Working Group update

IACHEC Fall WG Meeting

9th Nov 2021

Members (11/8/2021)
Adam Foster (chair)
Keith Arnaud
Renata Cumbee
Megan Eckart
Terry Gaetz
Liyi Gu
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To join: email
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Wiki page:
https://wikis.mit.edu/confluence/display/iachec/High+Resolution

HRWG Projects

- Calibration Source List
- High Res Analysis Pitfalls
- Line lists

New(er) idea

- Library of atomic data (→ line emissivity & wavelength) uncertainty work

Calibration Source List Project

High Resolution Calibration Source List

Added by Adam Foster, last edited by Adam Foster on May 17, 2021 22:31 (view change)

Name	RA J2000	DEC J2000	Type	Best Purpose(s)	Waveband Å	Issues	X-ray Flux (0.5-2keV unless stated) erg cm^{-2} s^{-1}	Restrictions	Missions Used By	Other notes
Capella	**05 16 41.35871**	**+45 59 52.7693**	Binary Star	Energy Scale	>10		$1.2x10^{-10}$		Chandra, Hitomi	

To clarify some of the columns:

- Type: Broad astrophysical object category T-Tauri Star, X-ray binary etc
- Best Purpose: what can be calibrated with it (e.g. fluxes, line response shape, relative sensitivities, absolute uncertainties, very good in Fe lines, etc)
- Waveband: Best waveband for calibration
- Issues: Any problems or items of note in the spectrum (e.g. is a binary so line centroids vary; has no Fe lines; spectrum varies)
- X-ray flux: hopefully self explanatory. Just a rough estimate is fine.
- Restrictions: Any issues with potentially scheduling the observation - variable source etc.
- Missions Used By: if the object has (or is scheduled to be) used by other missions as a semi-regularly observed cal source, list them here.
- Other notes: anything else

On the wiki page. Will populate with (Hitomi/XRISM/Chandra/XMM?) calibration targets.

Idea to identify which sources are interesting for which wavebands, in a quick table.

Analysis “Quirks” Project

High Resolution Analysis Quirks

Added by Adam Foster, last edited by Adam Foster on May 13, 2021 10:39

- High Resolution Analysis Quirks
  - By Instrument
    - Chandra HETG
    - Chandra LETG
    - Hitomi
    - XMM-RGS
  - By Analysis Software (do we want this as a topic?)

High Resolution Analysis Quirks

This page is intended to highlight known issues with spectral fitting, either specific to an instrument or universal. It is intended to be a living page - please edit liberally.

Of note, if something is written up elsewhere, don't feel compelled to re-write it here. Just write a sentence about what it is and add a link/upload the writeup.

Again from the Wiki. Idea is a series of very quick (1-2 sentence) issue descriptions and links to where these have been discussed. Not to write research papers here.

Line List

Long term Capella line list project exists. However the work to actually finish these is probably beyond an IACHEC effort – if someone is going to actually make such a line list happen, they will publish it themselves.

So what can the HRWG produce (apart from links to publications)? How about a curated linelist.

- Line list with ratings for:
  - Visibility
  - Wavelength accuracy
  - Identification accuracy
  - Isolation

Isolation as a measure of the line's usefulness as a diagnostic – what resolution instrument would be required to fully measure a line flux without blending? What level of interference could you expect if your resolution was X?

Based on existing scripts from Liyi Gu, this should be tractable.

Place sortable/filterable line list on wiki page

Plans for Spring

- First draft of line list, including defining “isolation”
- Updates to wiki page projects
- Start on library of uncertainty papers
- AAS HEAD Meeting (13-17 Mar) special session on “How hi-res data can be helpful for cross-calibration” (working title)
- AAS LAD Meeting (12-15 Jun) special session on “using atomic data uncertainties in analysis”