Closing remarks
17th IACHEC workshop

IACHEC

International Astrophysical Consortium for High Energy Calibration

Attendance

IACHEC year	Location	Number of participants	Number of talks
2006	Iceland	36	26
2007	California	35	30
2008	Germany	36	26
2009	Massachusetts	35	34
2010	Italy	45	50
2011	California	44	38
2012	UK	40	29

IACHEC year	Location	Number of participants	Number of talks (plenary)
2013	Virginia	42	48 (20)
2014	PRC	51	54 (24)
2018	Italy	57 + 37 students	45 (30)
2019	Japan	65	70 (36)
2023	Germany	60	63 (44)
2024	Spain	61	65 (40)
2025	Japan	74	63 (44)

Meeting Statistics

On-site participants: 74

Japan: 32, China: 14, USA: 12, Spain: 5, Italy: 4, Germany: 3,
Netherland: 2, France:1, UK: 1
students: ~17 (including 14 Japanese students)

Online participants: 34

USA: 11, Japan: 7, Germany: 5, China: 3, India: 3,
Italy: 2, UK: 1, Spain: 1, Turkey: 1

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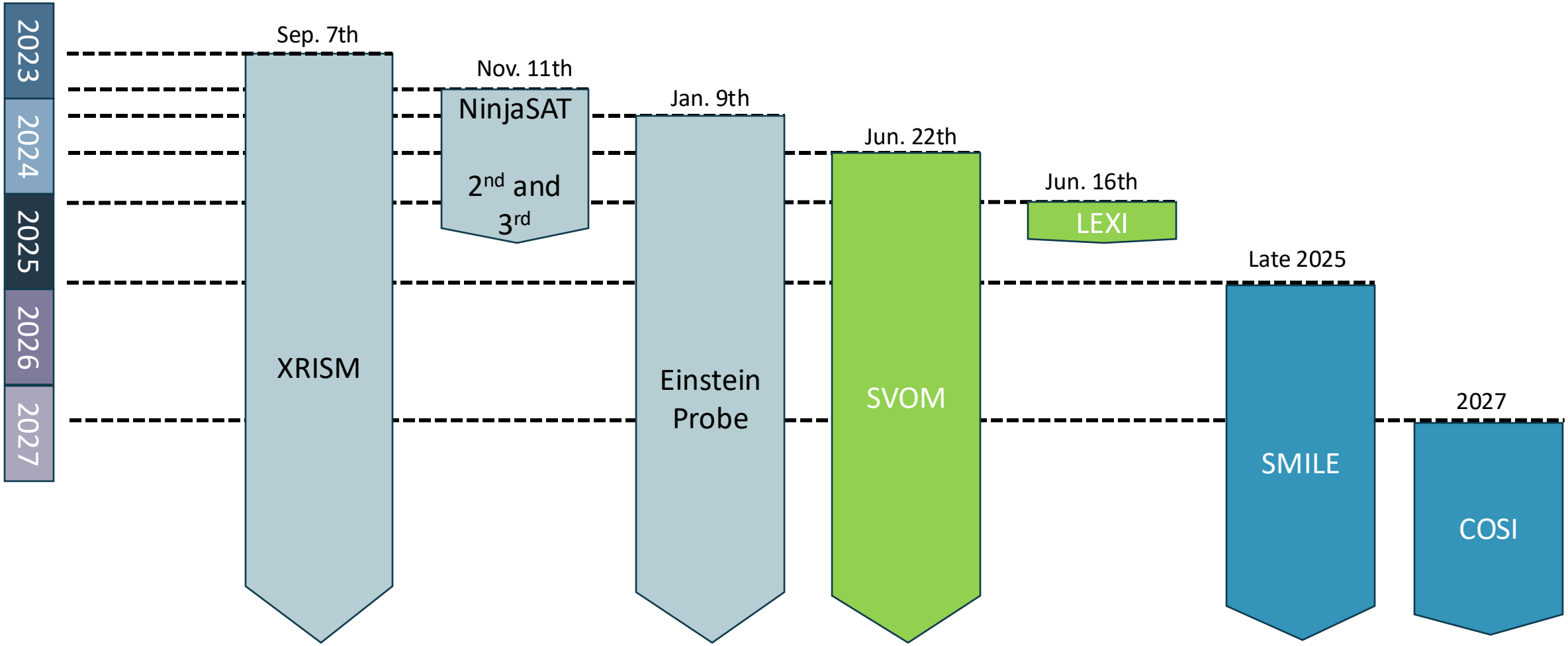
Welcome to the playground



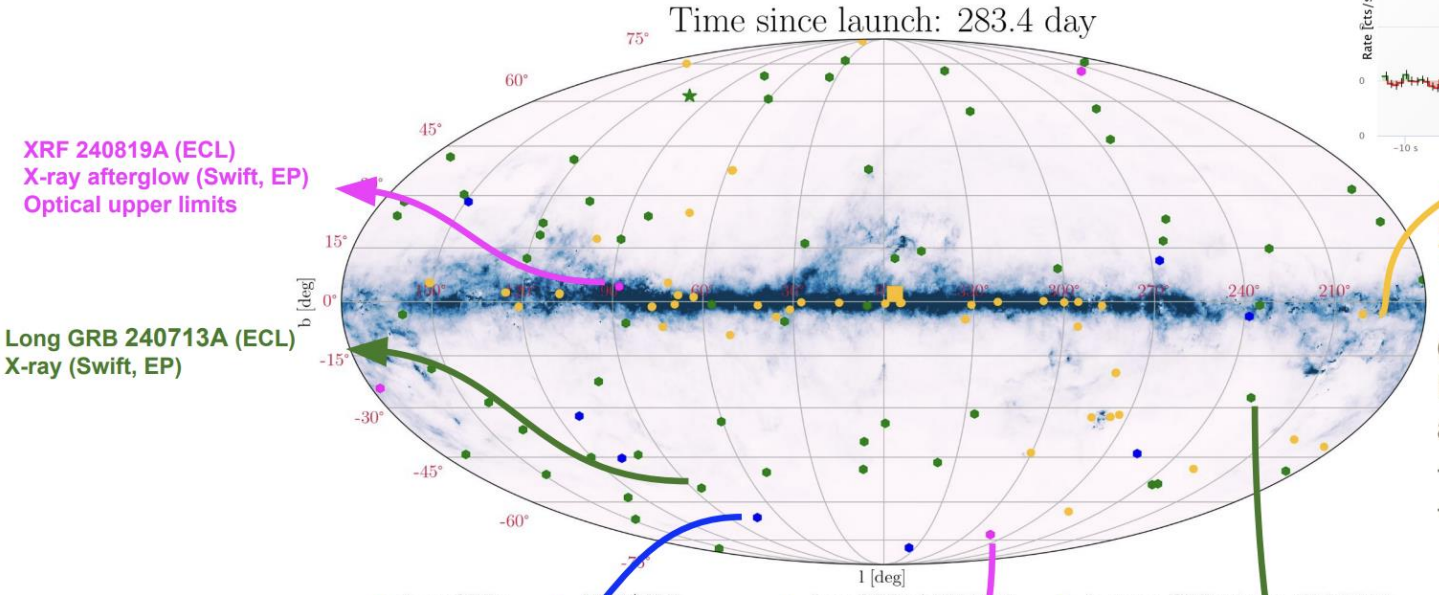
Congratulations

SVOM

SVOM science

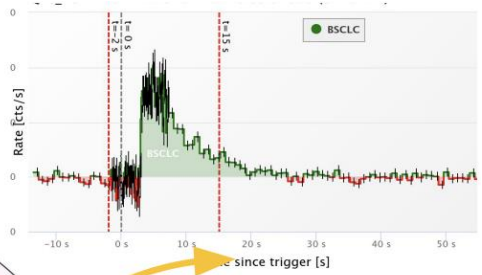
Science summary

2025-04-01T15:24:22.427
Time since launch: 283.4 day



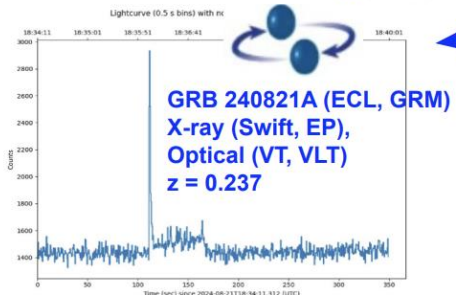
XRF 240819A (ECL)
X-ray afterglow (Swift, EP)
Optical upper limits

Long GRB 240713A (ECL)
X-ray (Swift, EP)



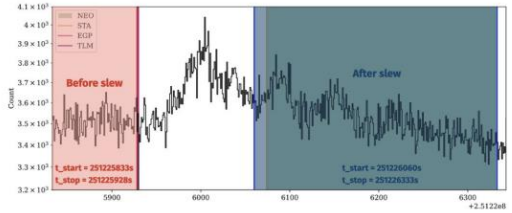
LMXB 4U 0614+091 (ECL+GRM)
Thermonuclear X-ray burst

On 2025/04/01
ECLAIRs has detected and located **35 GRBs** :
- Afterglow emission : 32
- Distance : 15



GRB 240821A (ECL, GRM)
X-ray (Swift, EP),
Optical (VT, VLT)
z = 0.237

XRF 241001A (ECL)
X-ray afterglow (Swift, EP)
+ Optical afterflow and JWST supernova
z = 0.573



Ultra-long GRB 241217A (ECL+GRM)
X-ray (MXT, EP) and optical (VT)

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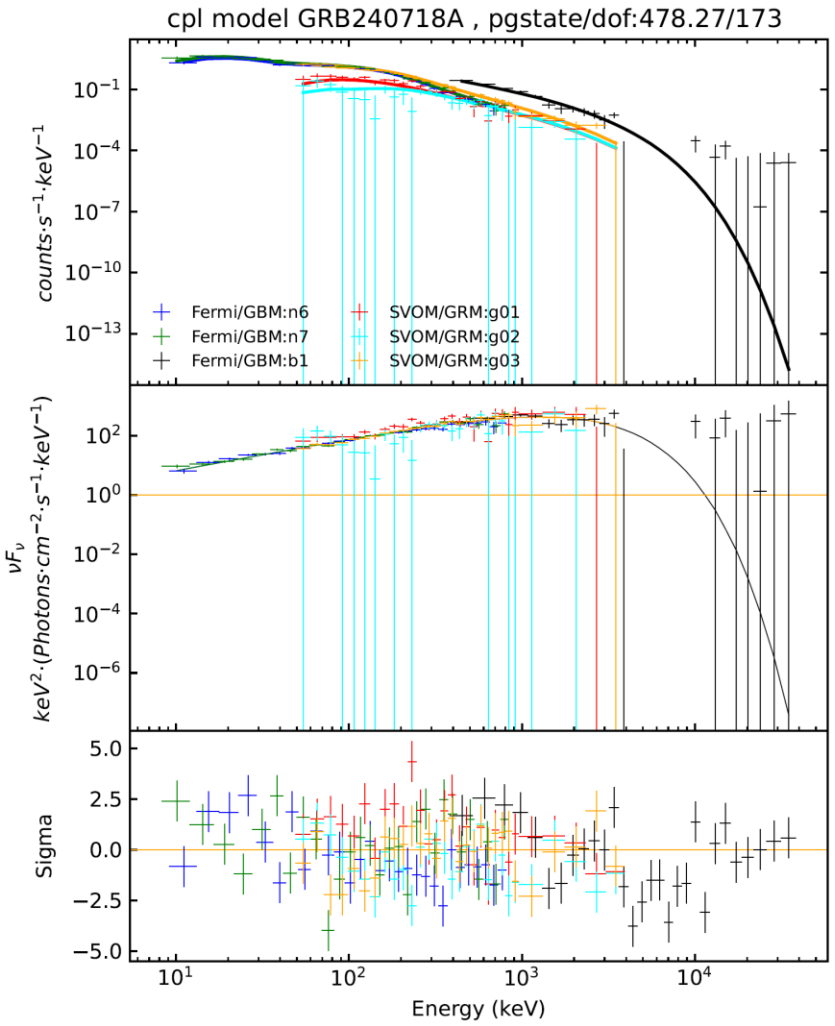
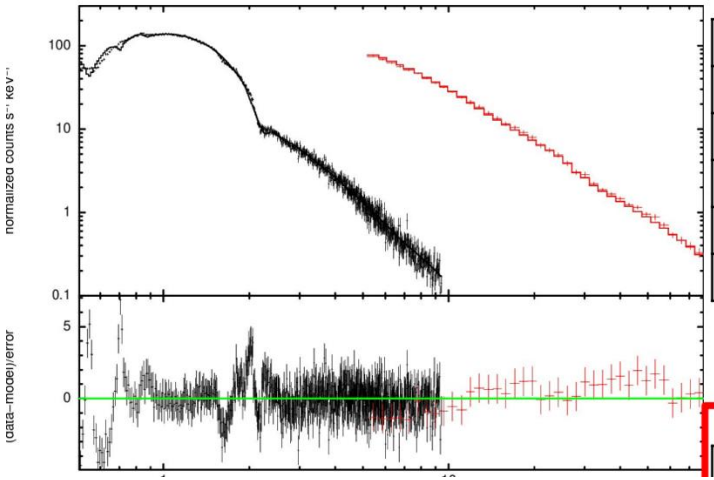
SVOM: Lots of cross-calibration!

With Fermi



With HXMT, Swift/BAT, and INTEGRAL



	MXT (0.5 – 10 keV)	ECL (5 – 80 keV)	Diff.
Model	*Tbvarabs*PL	PL	
Gamma	2.212 ± 0.012	2.152 ± 0.017	2.7%
K	15.8 ± 0.2 ph/cm²/s/keV	13.2 ± 0.6 ph/cm²/s/keV	16.5%
Chi² / dof		1093.7 / 749 dof	
Flux [4 – 10 keV]	(1.56 ± 0.02) 10^{-8} erg/cm²/s	(1.45 ± 0.03) 10^{-8} erg/cm²/s	7%

* Model: Tbvarabs*PL with abundance parameters fixed to MXT best-fit values

Model = Const*Tbvarabs*PL with parameters fixed to MXT best-fit

MXT MXT ECL

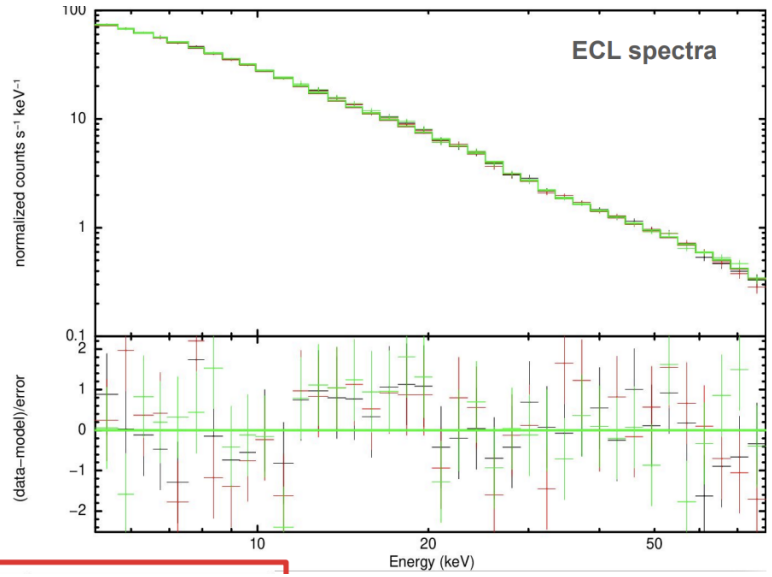
Observing campaigns ECL (inc. with MXT, GRM):

- The Crab with Swift/BAT and INTEGRAL
- Cyg X-1 with Swift/BAT in two occasions + EP
- Sco X-1 for localization

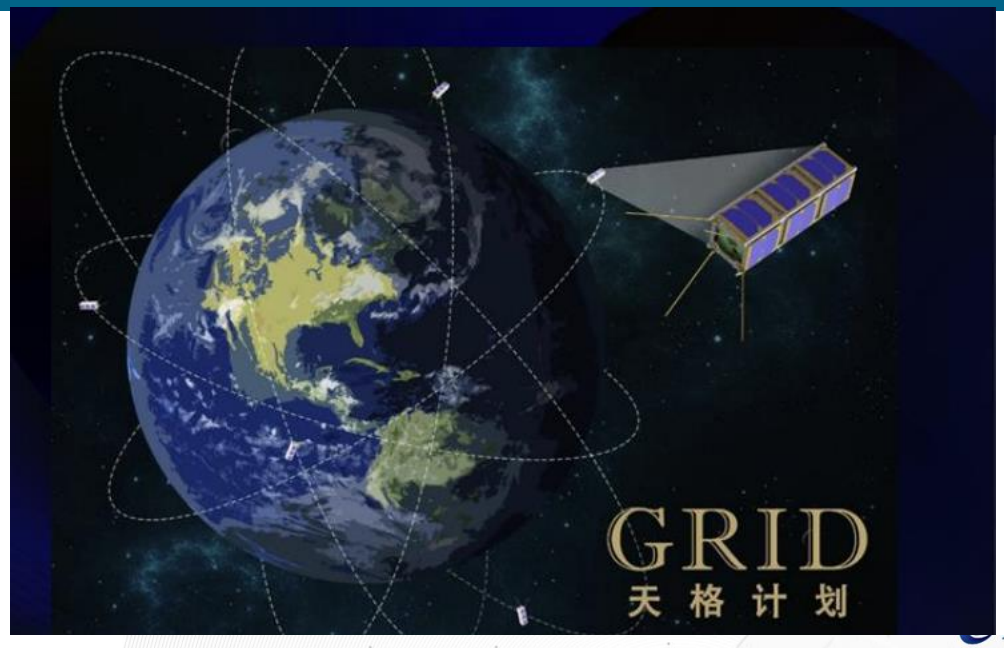
Preliminary results on the Crab spectrum are rather good

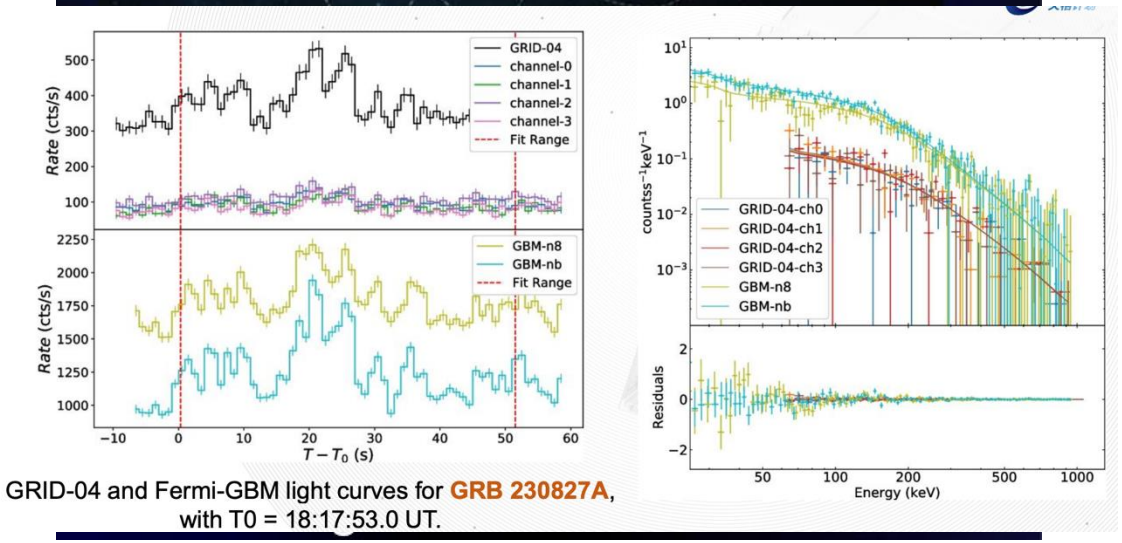
➜ Spectral files are performing well

➜ ECLAIRs scientific pipeline works overall nicely



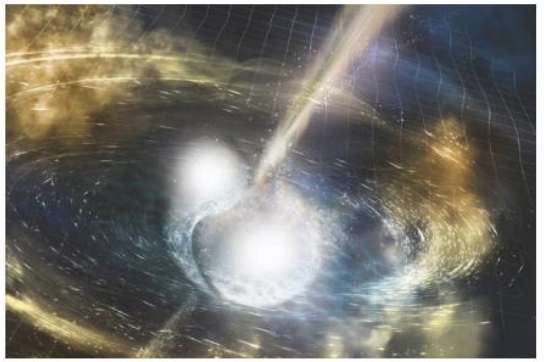
GRID and KOYOH





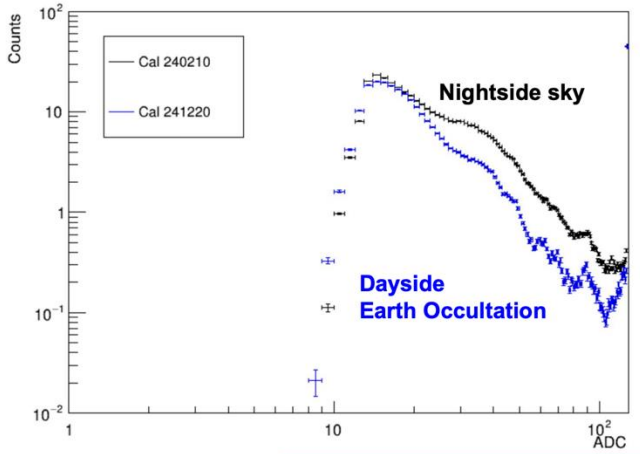
GRID-04 and Fermi-GBM light curves for **GRB 230827A**, with T0 = 18:17:53.0 UT.

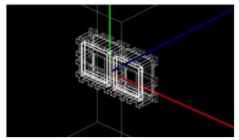
KOYOH micro satellite, Kanasawa University



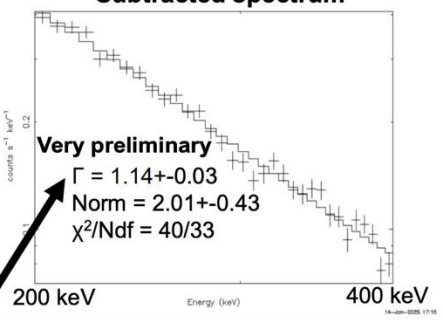
credit: NSF/LIGO/Sonoma State University/A. Simonnet

On-orbit Background Spectrum: Comparison between Deep Space and Earth Occultation





Response function constructed with Geant4



Harder than CXB – contribution from Galactic plane X-ray sources?

Student training

At IACHEC: ~17 (14 Japanese students)

GRID and KOYOH – cube sat and microsatellites as training platforms

- 8 Students operate and manage!!
- 28 sources were observed
- 3 science papers
- 4 Atel

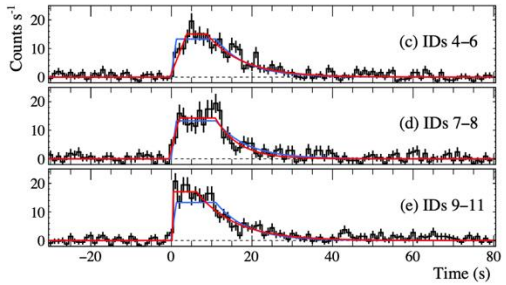
Scientific results

Astronomical papers: 3

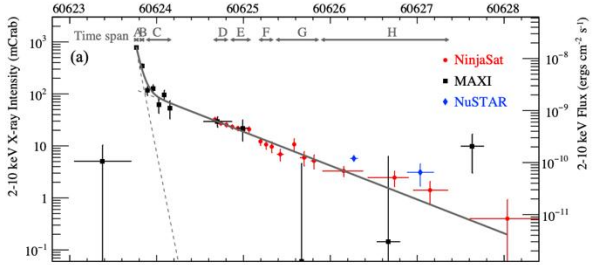
- SRGA J144459.2−604207 Clocked burster
  - Takeda et al., PASJ77 2025
  - Dohi et al., PASJ77 2025
- MAXI J1752−457 Super-burst
  - Aoyama et al. (under review) given by Amira Aoyama's talk
  - Separation angle from sun: 40–50° ➡ **NinjaSat can observe** >35°
- Other papers are in progress

The Astronomer's Telegram: 4

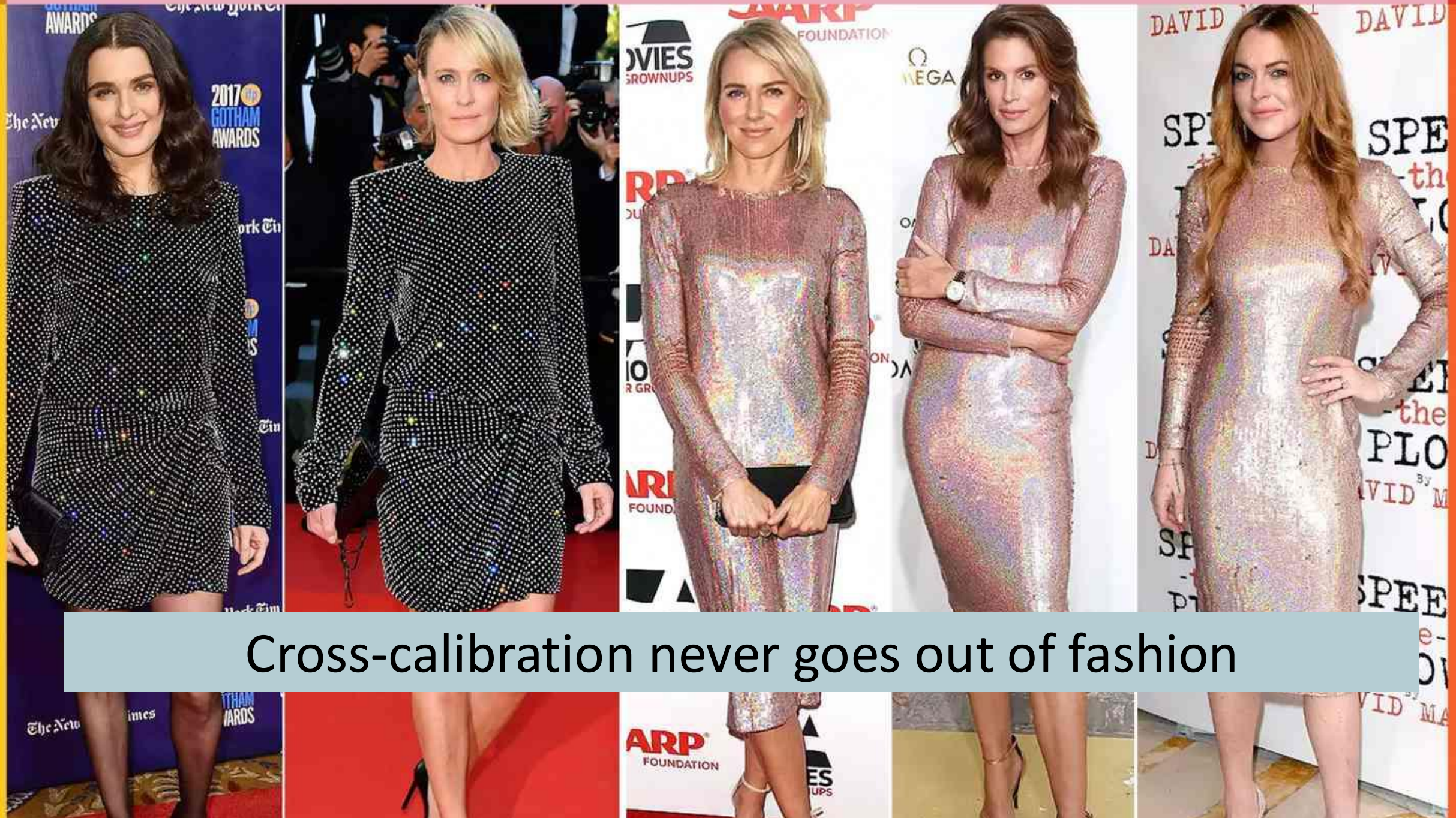
SRGA J144459.2−604207 burst profile



MAXI J1752−457 MAXI J1744 -294 Follow-up

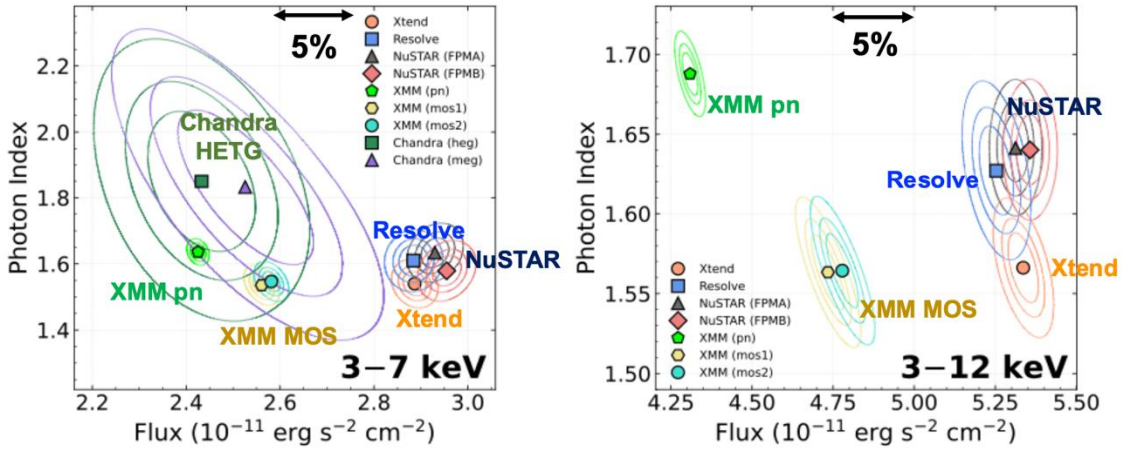


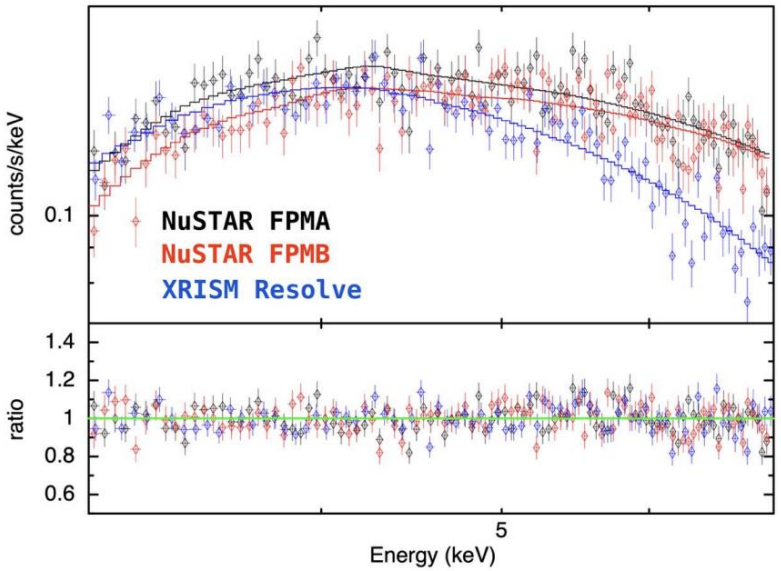
Chandra, XMM-Newton, Swift, NuSTAR, MAXI, HXMT, IXPE, Nicer, eROSITA, XRISM, EP



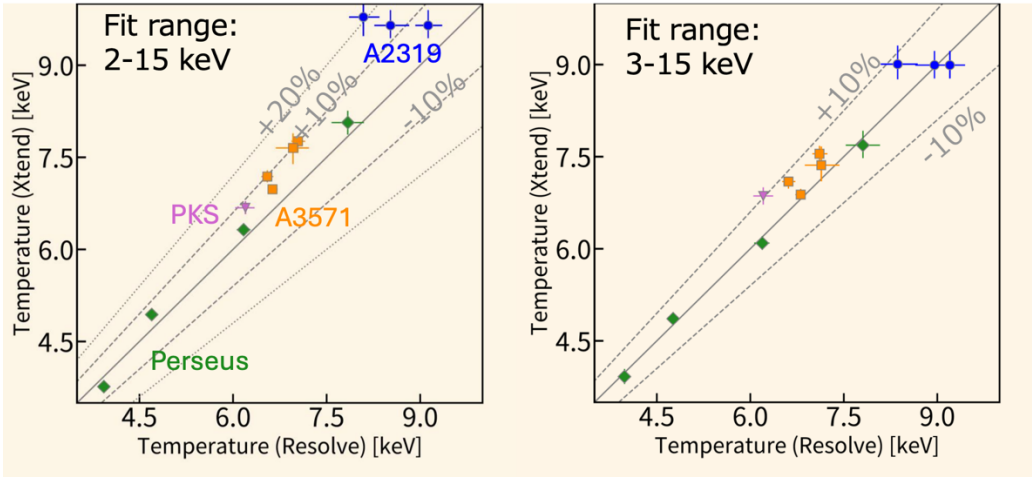
Cross-calibration never goes out of fashion

XRISM: Cross-calibration within and without

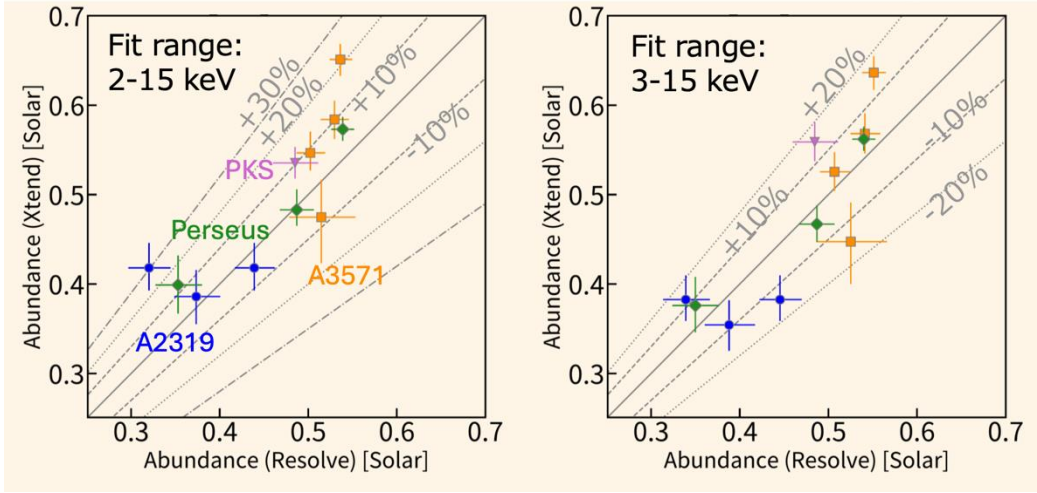




Resolve vs Xtend (kT)



Resolve vs Xtend (Abundance)



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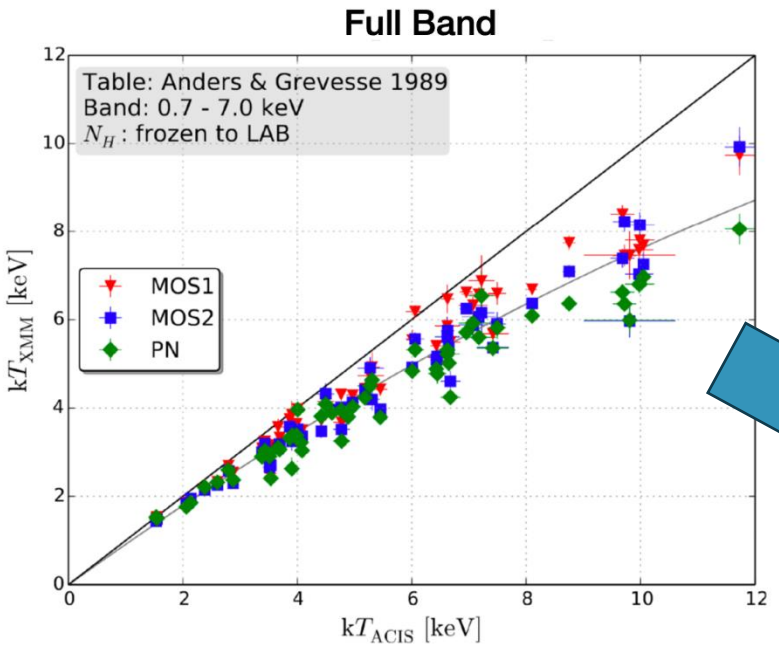
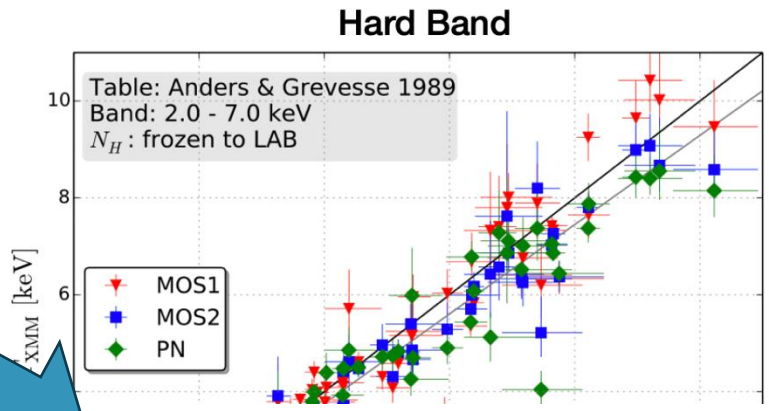
Mission independent cross-calibration projects

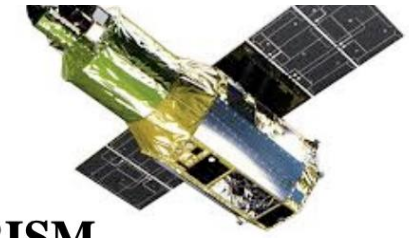




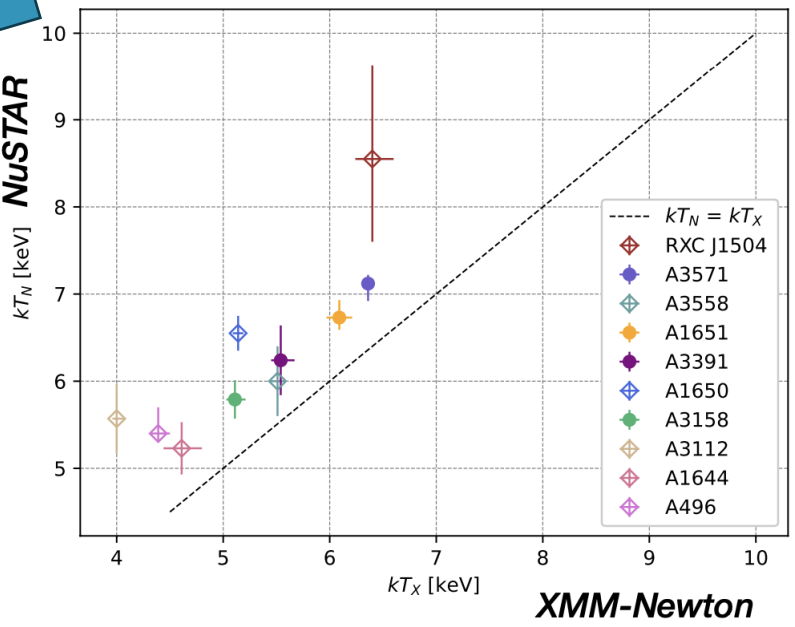
nparisons

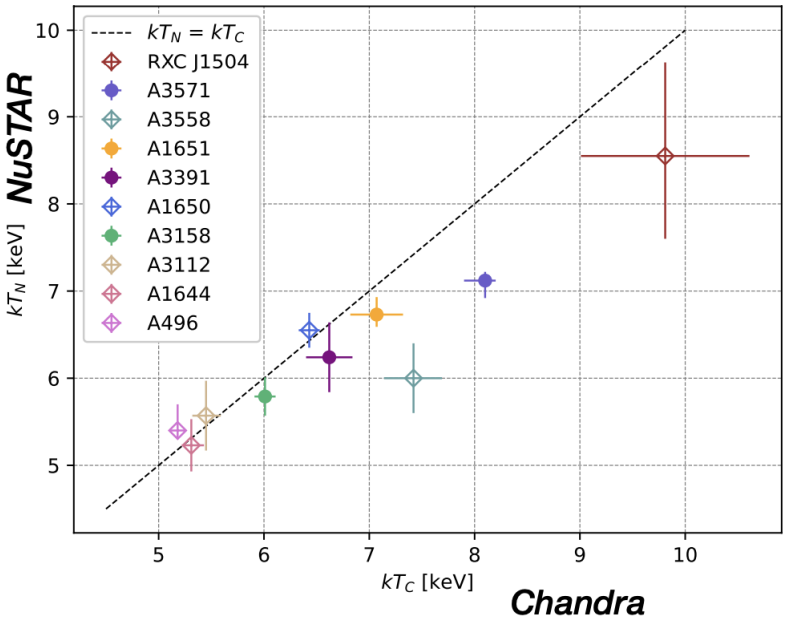
Emission from

MM-Newton,



XRISM





Lopez+ 2025 (*Chandra*/*XMM-Newton kT*s from Schellenberger+ 2015)

Two New Working Groups

- Ground Calibration WG
  - Chair: Vadim Burwitz (MPE)
  - Co-chair: Takashi Okajima (GSFC)

- Mission and Science WG
  - Chair: Felix Fürst (ESA)
  - Co-chair: Hannah Earnshaw (Caltech)

For membership in either group we will circulate directions in an upcoming newsletter (which will also have the SLACK directions)

After the meeting

Paper status

Paper	WG shepherd	Status
Concordance #3, cstat, pileup, sys cal.	Cal. Stats	In prep's
Contamination	Contamination	Overleaf outline circulated
3c273	Coordinated	Data analysis almost done; check analysis
Background	Detector & Background	Under consideration; discuss next meeting
MMS	Galaxy Custers	Data review/collection: very mature
Crab	Non-thermal	On overleaf; mature draft; include data up to 2020
G21.5-0.9	Non-thermal	Elected a "project manager" (Y. Motogami) who will organize meetings
PSR B1509-58	Non-Thermal	Delayed until further notice
N132D	Thermal	Published
Crab cross-timing calibration	Timing	Matteo Bachetti; Drafting by next 2025
XRISM timing	Timing	Published; Terada et al
RXJ1856-3754 + WD	WD & INS	Make overleaf outline and circulate

Initiatives - 2024

Initiatives - 2024	Action		continue?
Optics calibration special session at next Workshop	Find out who will plan it	Did not happen	subsumed in new WG
Apply for ADAP and APRA funding for specific cross-calibration tasks	US specific	Did not happen	revisit in better times
Heritage WG resurrection	Execute “3c273 online”	webpage exists	yes
Create ‘current activities’ on the Webpage with easy access to IACHEC products	Include links to background models	Did not happen	yes
Advance papers	WG chair delegate tasks to members	some activity	yes
IACHEC online for 3C273	Start regular meetings – resurrect Heritage WG for this effort	Met with HEASARC	yes

Initiatives - 2025

Initiatives - 2025	Action
The two new WG to prepare charters	Chair and co-chair to lay out goals
Heritage WG is chair-less	Look for new chair or discontinue
Advance papers	WG chair delegate tasks to members
Create ‘current activities’ on the Webpage with easy access to IACHEC products	Include links to background models Include links to stat cal wiki products
Check in to review initiatives and goals	Set up a meeting for October/November time frame with the chairs
Bring Fermi back into the fold	Contact the Fermi team
Get the two new WG included on webpage	send out newsletter and contact info for joining

IACHEC WG procedures

- Setting yearly goals
- Pursue the yearly goals in a timely fashion
  - WG management
- **Write the IACHEC report early!**
- Inform the community of the progress
- Feedback from community
  - Involve members

WG short term 2025 goals

WG	Goals - 2025
Detector & Background	• Update background information on wiki and provide links to the "current activities" page • Review if we can do something about micrometeoroids
Timing	• Update 'barycen' to use DE430 , or update 'barycorr' to apply Suzaku/Hitomi/XRISM; heasarc to handle • Timing paper preparation • Update timing table in WIKI • Use Fermi ephemeris for Crab instead of Jordrell Bank • Co-chair -> chair: Megumi Shidatsu
Clusters of Galaxies	• Review eROSITA+XMM+Chandra temperature comparison and communicate with authors • Multi-Mission Study (MMS) • Provide data for Calstats WG concordance effort
High Resolution	• Adam and Vinay presented several activities • Search for a Co-chair; potential candidate from XRISM resolve

WG short term 2025 goals

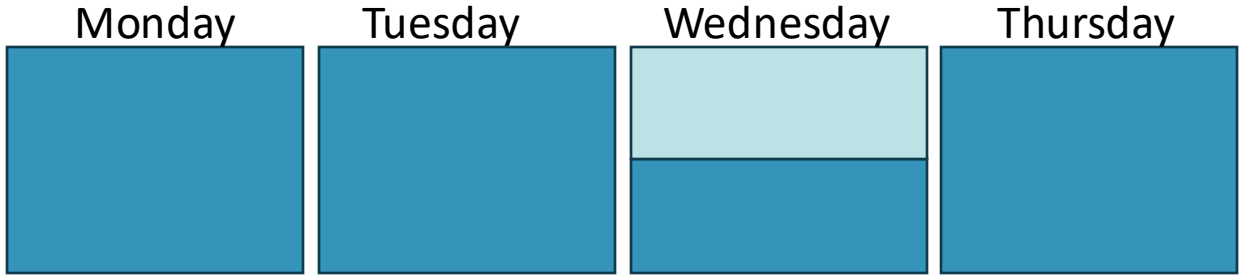
WG	Goals - 2024
Calibration Statistics	• Progress papers: Concordance paper #3 • Obtain plain text files from mission contacts to use MC Cal • review and prioritize list of future direction • Maintain a library and updated wiki: background; concordance • Co-chair: Ivan Valtchanov
Thermal SNR	• Two smaller groups; work on developing CasA and N132D models • Co-chair: Hiromasa Suzuki
Contamination	• White paper draft complete by 2025
WD and INS	• Get data from EP and SVOM • Search for Co-chair
Non-thermal	• Finish the L. Natalucci Crab paper • Co-authors to add text in sections on calibration of instruments • Kick-off G21 regular telecons • Concordance data • Co-chair: Craig Markwardt

WG short term 2025 goals

WG	Goals - 2024
Coordinated Obs	• Improve communications with new missions • Continued calibration support across missions • January 2026 3c273 campaign • NuSTAR-SVOM cross-calibration observations • Summer to do first draft of “3c273 online” • Concordance data
Ground Calibration (Gcal)	• Chair: Vadim Burwitz.; Co-chair: Takashi Okajima • Establish charter and goals
Mission and Science Operations	• Chair: Felix Fürst; Co-chair: Hannah Earnshaw • Establish charter and goals

2024 Meeting feedback -> 2025

- Half day (off or working session) in the middle, with a full day on Thursday
  - How well did it work?



- What would YOU like?
  - More WG time
  - Shorter talks to give more time in WG
  - Ask for talks earlier so there can be preparation

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Special Thanks to

Megumi Shidatsu (Ehime Univ.)
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Hiromasa Suzuki (Miyazaki Univ.)
Masayoshi Nobukawa (Nara Univ. of Education)
Toshihiro Takagi (Ehime Univ.)
Aya Bamba (Univ. of Tokyo)
Katsuaki Asano (Univ. of Tokyo)

Administrative staff

Seiko Sakurai (Saitama Univ.)
Ikuko Onuma (Saitama Univ.)

Student volunteers:

Yugo Motogami (Saitama Univ.)
Chulsoo Kang (Ehime Univ.)
Taichi Nakamoto (Ehime Univ.)
Yuma Aoki (Kindai Univ.)
Kota Takayama (Kindai Univ.)

Core-to-Core Program

UTokyo Next-generation Neutrino Science and Multi-messenger Astronomy Organization

Society for Promotion of Space Science 公益財団法人 宇宙科学振興会

JSPS

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17th IACHEC Song

To the tune of 'Let It Be' by The Beatles

[Verse 1]
When a multimission fit gives trouble
I-A-CHEC then comes to me
Speaking words of wisdom
Carefully
And in my hour of darkness
They are conferring annually
Publishing their wisdom
Carefully

[Chorus]
Calibrate, Calibrate
Calibrate, Calibrate
So much cross-cal wisdom
Calibrate

[Verse 2]
And when the broken-hearted people
Fitting data disagree
We align responses
Helpfully
And when a weird line pops up in there,
A micrometeorite hits me
I-A-CHEC's the answer
Naturally

[Chorus]
Calibrate, Calibrate
Calibrate, Calibrate
Cross-checking responses
Calibrate
Calibrate, Calibrate
Calibrate, Calibrate
Spectral truth in teamwork
Calibrate

[Chorus]
Calibrate, Calibrate
Calibrate, yeah, Calibrate
X-rays up to gammas
Calibrate

[Verse 3]
And when the night is cloudy
There is still a satellite for me
Photons for tomorrow
Hopefully
We welcome missions old and recent
All one high E family
Worldly words of wisdom
Usefully

[Outro]
Calibrate, Calibrate
Calibrate, yeah, Calibrate
Oh, there will be an answer
Calibrate
Calibrate, Calibrate
Calibrate, yeah, Calibrate
Oh, there will be Concordance
Calibrate
Calibrate, Calibrate
Calibrate, yeah, Calibrate
IACHEC's the answer
Calibrate

Lyrics by Herman and Matteo B.

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Plan for 18th IACHEC Meeting in 2026

2006: Iceland
2007: North America
2008: Europe
2009: Asia
2010: North America
2011: Europe
2012: North America
2013: Europe
2014: North America
2015: Asia
2016: Asia
2017: North America
2018: Europe
2019: Asia
2020: Virtual
2021: Virtual
2022: Virtual
2023: Europe
2024: Europe
2025: Asia

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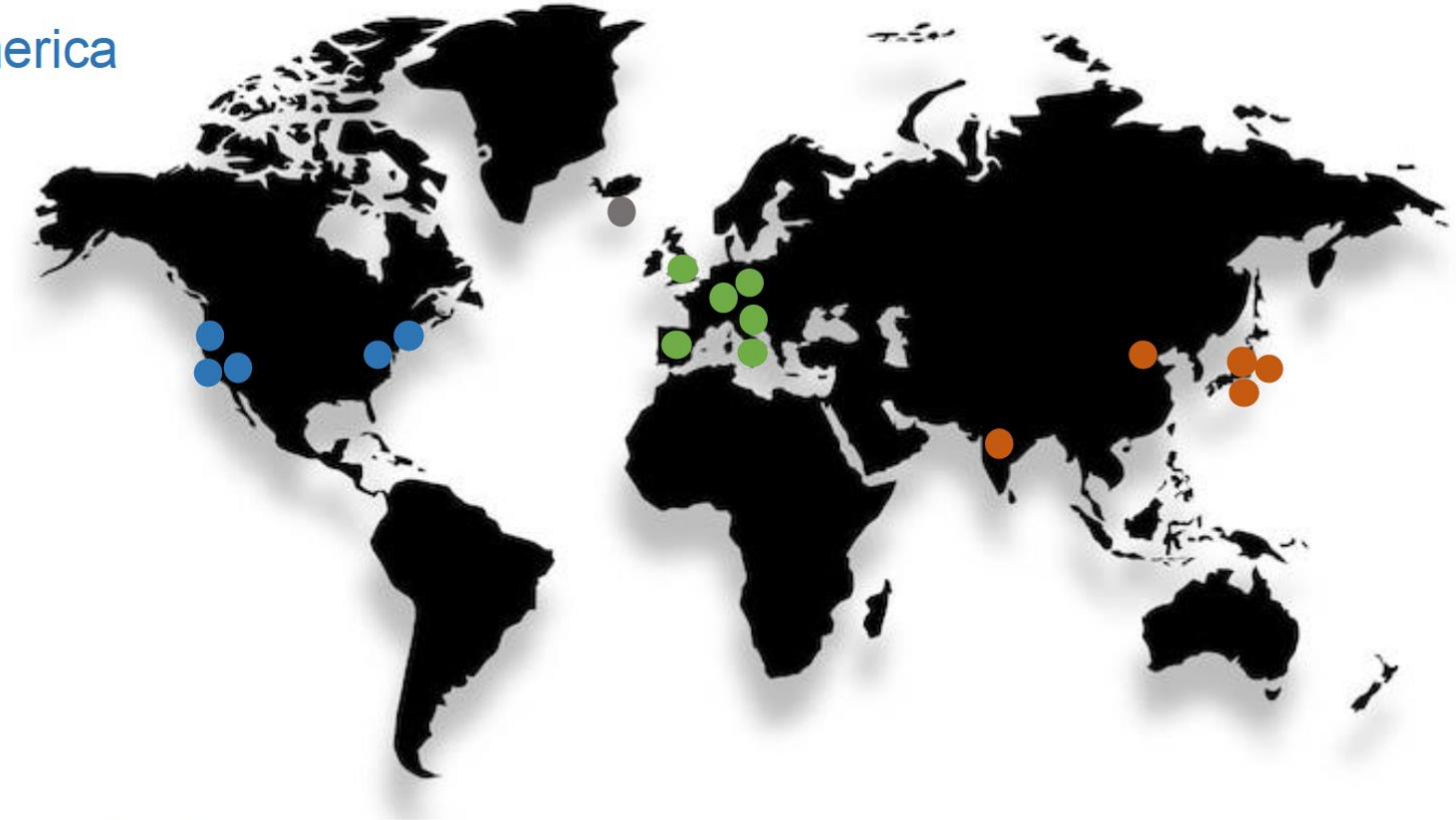

…next meeting should be in North America!

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Plan for 18th IACHEC Meeting in 2026

- Montreal or Halifax, Canada
  - Pros: no US immigration issues
  - Cons: no local IACHEC members (but local X-ray community)
- Boston or Washington, USA
  - Pros: LOC location, convenient for GSFC/CfA/MIT
  - Cons: US immigration issues
- ~ April–May 2026
- Input welcome!
  milleric@mit.edu