IACHEC

International Astrophysical Consortium for High Energy Calibration

Galaxy Clusters WG — IACHEC 2026

We study galaxy clusters as broad-band X-ray standard candles.

E. Miller (chair, XRISM, Hitomi, Suzaku/XIS)

I. Aihara (XRISM/Xtend and Resolve)

A. Beardmore (Swift/XRT)

A. Bogdan (Chandra/ACIS)

M. Bonamente

Y. Chen (Insight-HXMT, Einstein Probe FXT)

L. David (Chandra)

J. de Plaa

G. Dewangan (ASTROSAT)

K. Forster (NuSTAR)

F. Gastaldello (XMM-Newton/EPIC)

C. Grant (Chandra/ACIS)

K.D. Kuntz (ROSAT)

K. Madsen (NuSTAR)

C. Markwardt (NICER)

H. Matsumoto (XRISM/Xtend, Hitomi/SXI, Suzaku/XIS)

N. Ota (XRISM, Hitomi, Suzaku/XIS)

A. Read (XMM-Newton/EPIC-MOS)

J. Sanders (eROSITA)

G. Schellenberger (XMM-Newton/EPIC, Chandra/ACIS)

M. Stuhlinger (XMM-Newton/EPIC)

A. Tümer (NuSTAR, XRISM)

I. Valtchanov (XMM-Newton/EPIC)

N-J. Westergaard (NuSTAR)

D. Wik (NuSTAR)

H. Zhao (Insight-HXMT)

Mailing list: iachec-clusters@mit.edu

Contact milleric@mit.edu to join

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Galaxy Clusters WG — Agenda

Thursday

17:15 — Itsuki Aihara, “Cross-Calibration of XRISM Resolve and Xtend with Several Nearby Galaxy Clusters”

17:40 — Eric Miller, “Multi-Mission Study status and general discussion”

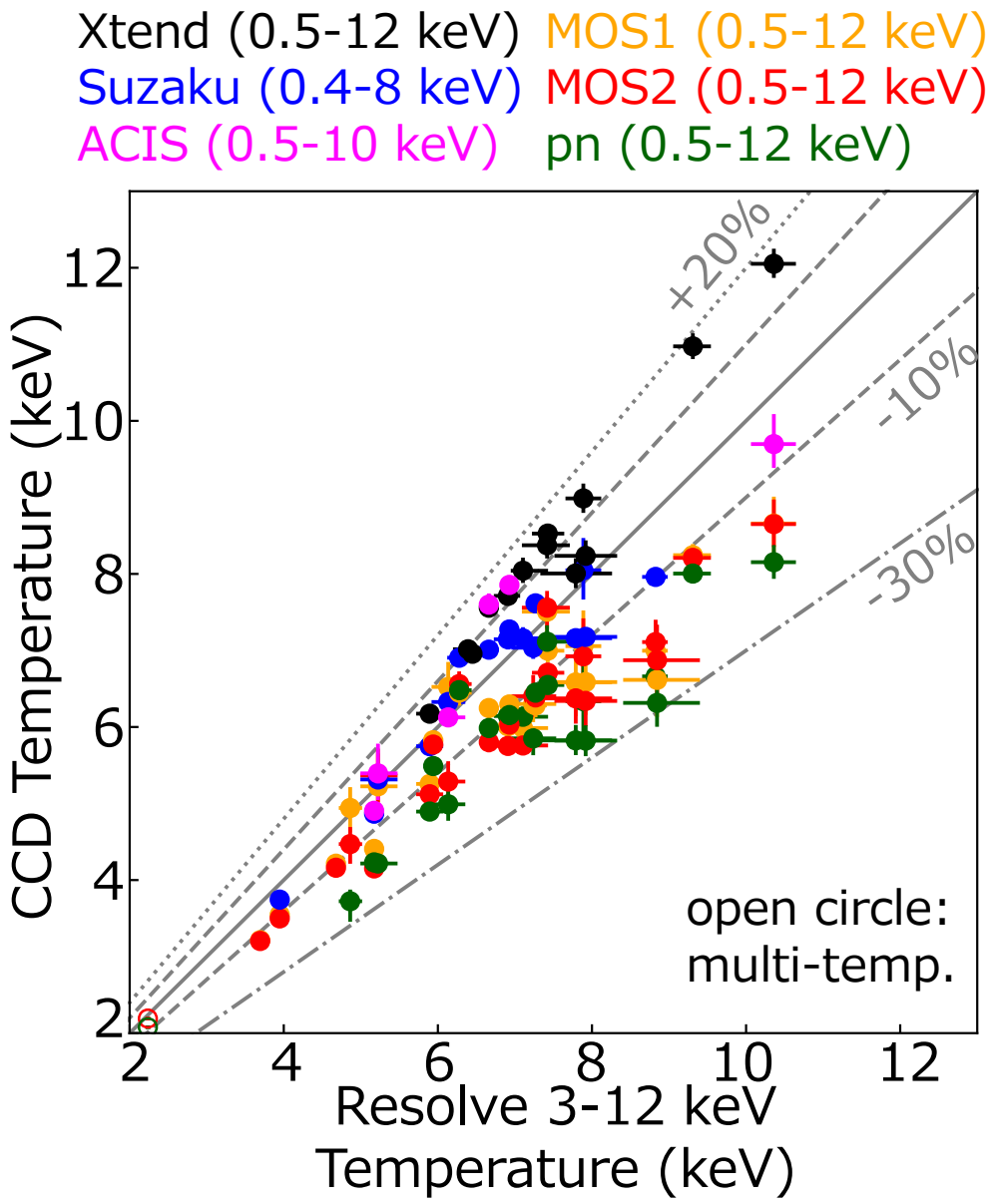
Friday

09:00 — Jeremy Sanders, “Stacking sources to improve the eROSITA in-flight calibration” includes comparisons in Coma cluster regions for eROSITA+EPIC-pn+Chandra

Comparison with Other CCDs (Temperature)

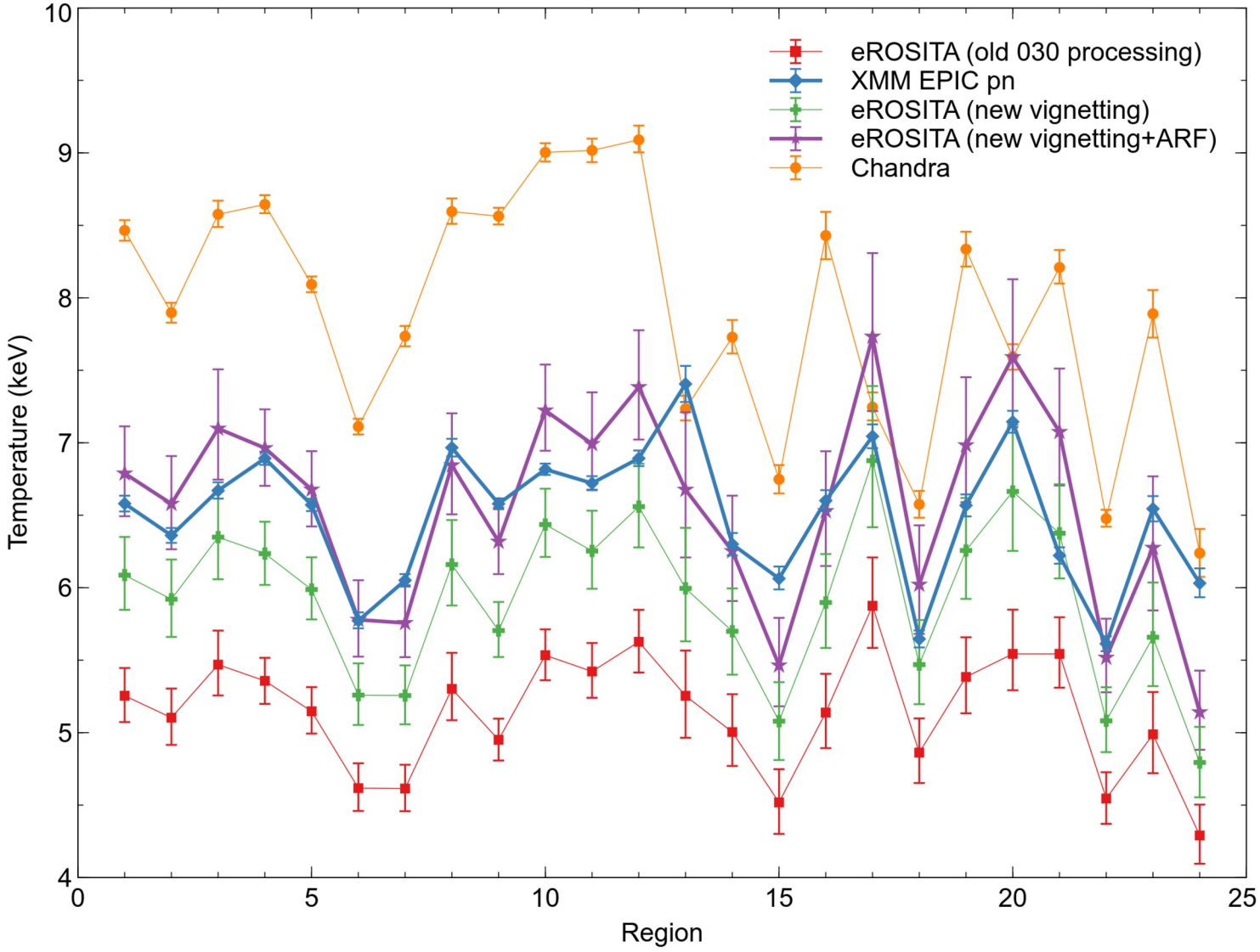
Itsuki Aihara,
“Cross-Calibration of XRISM Resolve and Xtend with Several Nearby Galaxy Clusters”

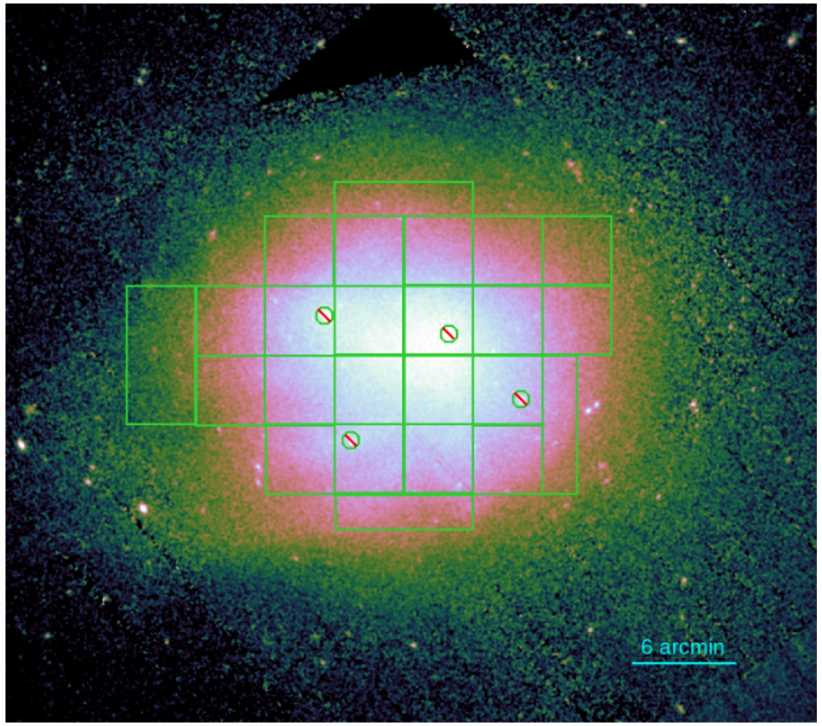
- **Suzaku and Chandra** are **consistent** with Resolve within ±10%.
- **XMM-Newton** temperatures are about **10-30% lower** than Resolve.
- Even compared with other CCD instruments, **Xtend temperatures tend to be higher.**



Comparison with other telescopes

Jeremy Sanders
eROSITA Coma cluster temperature comparison





- `tbabs(apec)` model fits, fixed N_H
- eROSITA: 0.3-9.0 keV range
- EPIC-pn: 0.3-7.0 keV range
- Chandra: 0.5-7.0 keV range

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Multi-Mission Study (MMS)

- Extension of cross-correlation bias analysis to other missions and instruments
- Begun in 2017, on hiatus starting 2019
- Cluster sample criteria (flexible)
  - kT > 6 keV
  - z < 0.1
  - >100,000 cts in central 6 arcmin
  - center < 3 arcmin off-axis
- Action items for the Multi-Mission Study
  - Update compiled list of available clusters, ObsIDs, and t_{exp} for your mission that fulfill our criteria.
    → Most missions have supplied this information.

X: XMM/EPIC

C: Chandra/ACIS

R: ROSAT/PSPC

SW: Swift/XRT

SU: Suzaku/XIS

A1835?

cluster	X	C	R	SW	SU
A85	☺	☺	☺	☹	☹
A119	☺	☺	☺	☹	☹
A399	☺	☺	☺	☹	☹
A401	☺	☺	☺	☺	☹
A478	☺	☺	☺	☹	☹
A754	?	☺	☹	☹	☹
A644	☺	☺	☺	☹	☹
A1413	☺	☺	☺	☹	☹
A1650	☺	☺	☹	☹	☹
A1651	☺	☺	☺	☺	☹
Coma	☺	☺	☺	☺	☺
A1689	☺	☺	☺	☹	☹
A1795	☺	☺	☺	☺	☺
A1914	☺	☺	☺	☹	☹
A2029	☺	☺	☺	☺	☺
A2065	☺	☺	☹	☹	☹
A2142	☺	☺	☺	☹	☹
A2163	?	?	☹	☹	☹
A2204	☺	☺	☺	☹	☹

cluster	X	C	R	SW	SU
A2244	☺	☺	☺	☺	☺
A2255	☺	☺	☺	☹	☹
A2256	☺	☺	☺	☹	☺
A2319	☺	☺	☹	☹	☹
A3158	☺	☺	☹	☹	☹
A3266	?	☺	☹	☹	☹
A3391	☺	☺	☺	☹	☹
A3558	☺	☺	☹	☹	☹
A3571	☺	☺	☺	☹	☺
A3627	?	?	☺	☹	☺
A3667	?	☺	☺	☹	☺
A3827	☺	☺	☹	☹	☹
A3888	☺	☺	☺	☹	☹
Ophiu	☺	☺	☺	4ks	☺
Perse	☺	☺	☺	☺	☺
PKS0745	☺	☺	☺	☺	☺
RXCJ1504	?	?	?	☹	?
Triang	☺	☺	☺	☹	☺
ZwCl1215	☺	☺	☹	☹	☹

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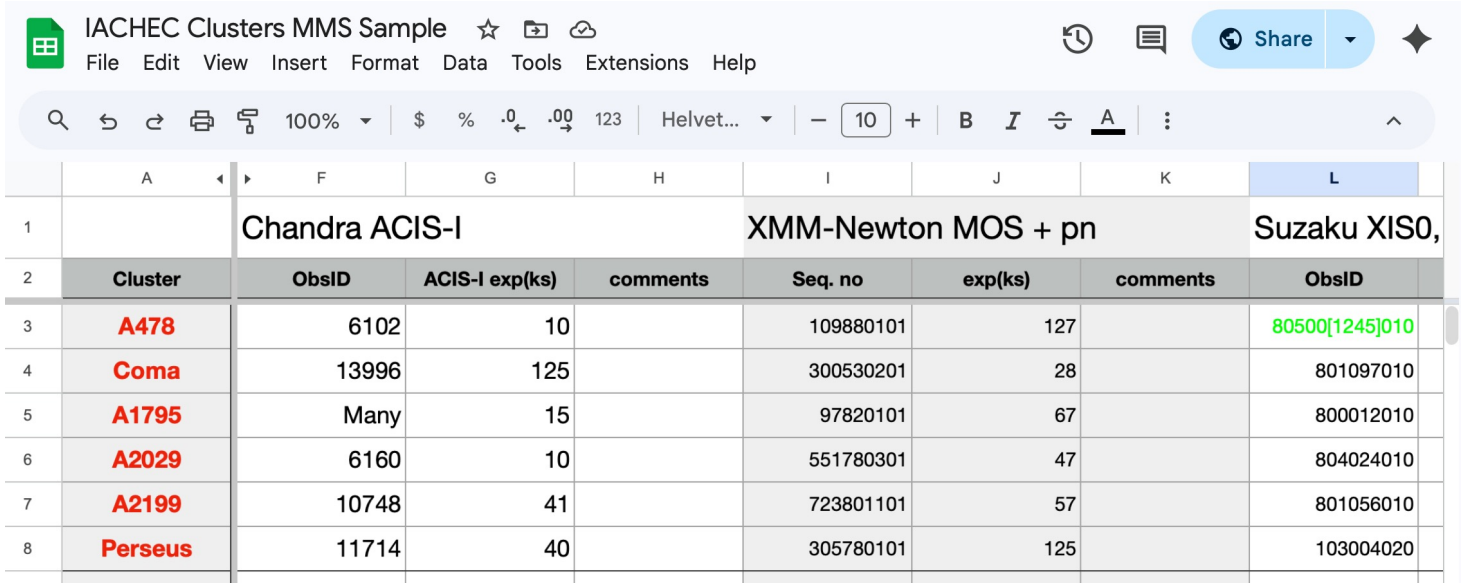
Multi-Mission Study (MMS)


IACHEC Clusters MMS Sample

File Edit View Insert Format Data Tools Extensions Help

Share

		Chandra ACIS-I			XMM-Newton MOS + pn			Suzaku XIS0,
2	Cluster	ObsID	ACIS-I exp(ks)	comments	Seq. no	exp(ks)	comments	ObsID
3	A478	6102	10		109880101	127		80500[1245]010
4	Coma	13996	125		300530201	28		801097010
5	A1795	Many	15		97820101	67		800012010
6	A2029	6160	10		551780301	47		804024010
7	A2199	10748	41		723801101	57		801056010
8	Perseus	11714	40		305780101	125		103004020

Mission	Contact
XMM-Newton	Ivan Valtchanov
Chandra ACIS	~~Larry David~~ Akos Bogdan?
Suzaku XIS	Eric Miller
NuSTAR	Dan Wik
Swift	Andy Beardmore
AstroSat	Gulab Dewangan
HXMT	Yong Chen
EP FXT	Yong Chen
NICER	Craig Markwardt
eROSITA	Jeremy Sanders
XRISM	~~Eric Miller~~ Itsuki Aihara?
ROSAT	Kip Kuntz?

- Future plans
  - Collect data, extract spectra and responses.
  - Focus on providing data for Concordance effort.

  - **Find a Deputy WG Chair to help move the work along!**

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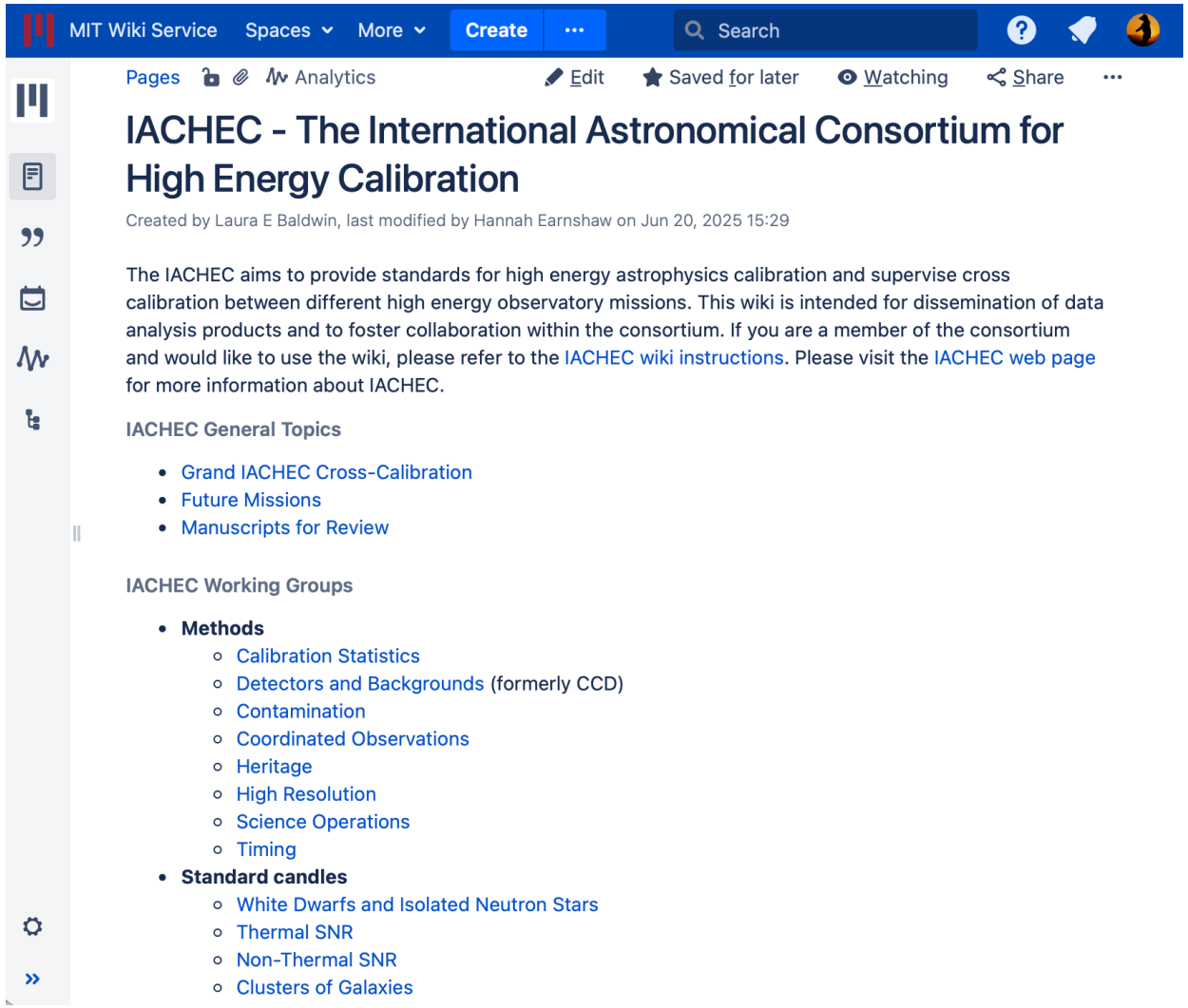
Information about the wiki



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  - ✓ Reference information
  - ✓ Data analysis results, spectral models
- Do not use for:
  - x Large datasets (event lists, responses)
  - x Proprietary or private data
- Contact Eric Miller (milleric@mit.edu) to request account — please provide:
  - Full name
  - Email address
  - Date of birth (YYYY-MM-DD)
  - Phone number