

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

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M. Stuhlinger (XMM-Newton/EPIC)

I. Valtchanov (XMM-Newton/EPIC)

N-J. Westergaard (NuSTAR)

D. Wik (NuSTAR)

H. Zhao (Insight-HXMT)

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

- Extension of cross-correlation bias analysis to other missions and instruments
- Begun in 2017, on hiatus 2019–2023
- 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.

Multi-Mission Study (MMS)

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	☺	☺	☺	☹	☹

X: XMM/EPIC

C: Chandra/ACIS

R: ROSAT/PSPC

SW: Swift/XRT

SU: Suzaku/XIS

A1835?

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	☺	☺	☹	☹	☹

- **A correction to *Chandra*'s hard band effective area similar to *XMM-Newton*'s achieves better agreement with *NuSTAR*, although it's not perfect**
- **The *XMM-Newton* effective area correction tends to exacerbate disagreement with *NuSTAR*; temperatures pushed even lower**
- **Need to do spatially resolved comparisons across the archives, find patterns to track down potential origins of discrepancies**

Cluster	t_{Nu} (ks)	t_{Ch} (ks)	t_{XMM} (ks)	Cluster	t_{Nu} (ks)	t_{Ch} (ks)	t_{XMM} (ks)
Bullet	294	584	47	Abell 754	124	190	312
ZWCL 1856d8	268	43	13	Abell 2255	123	45	42
A2146	265	2386	-	Abell S753	121	87	133
SPT CLJ2031m4037	238	259	30	Abell 2163	117	90	153
Ophiuchus	232	283	230	Abell 2029	102	184	198
Abell 478	222	153	130	Coma	60	486	281
Abell 523	209	30	230	ZWCL 1856d8p6616	29	43	12
Abell 3266	208	35	187	RXC J1504	24	164	300
Abell 665	198	161	266	Abell 3112	22	152	228
CL 0217p70	177	25	-	Abell 3158	22	62	32
RX J1347d5m1145	172	331	38	Abell 1644S	21	71	34
Abell 2256	166	218	296	Abell 3558	21	15	68
MACS J0717d5p3745	163	247	195	Abell 496	20	105	291
CIZA 0107d7p5408	159	165	-	Abell 3391	20	68	69
Abell 1795	154	3552	137	Abell 1651	20	10	27
Abell 2199	138	160	180	Abell 3571	18	34	34
Abell 2319	134	91	92	Abell 1650	18	252	43
Abell 3395	129	120	30				

Cluster	ObsID	ACIS-I exp(ks)	comments	Seq. no	exp(ks)	comments	ObsID
A478	6102	10		109880101	127		80500[1245]010
Coma	13996	125		300530201	28		801097010
A1795	Many	15		97820101	67		800012010
A2029	6160	10		551780301	47		804024010
A2199	10748	41		723801101	57		801056010
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	Michael Freyberg
XRISM	Eric Miller Itsuki Aihara?
ROSAT	?

- **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!**