



CXC Data System CUC Report

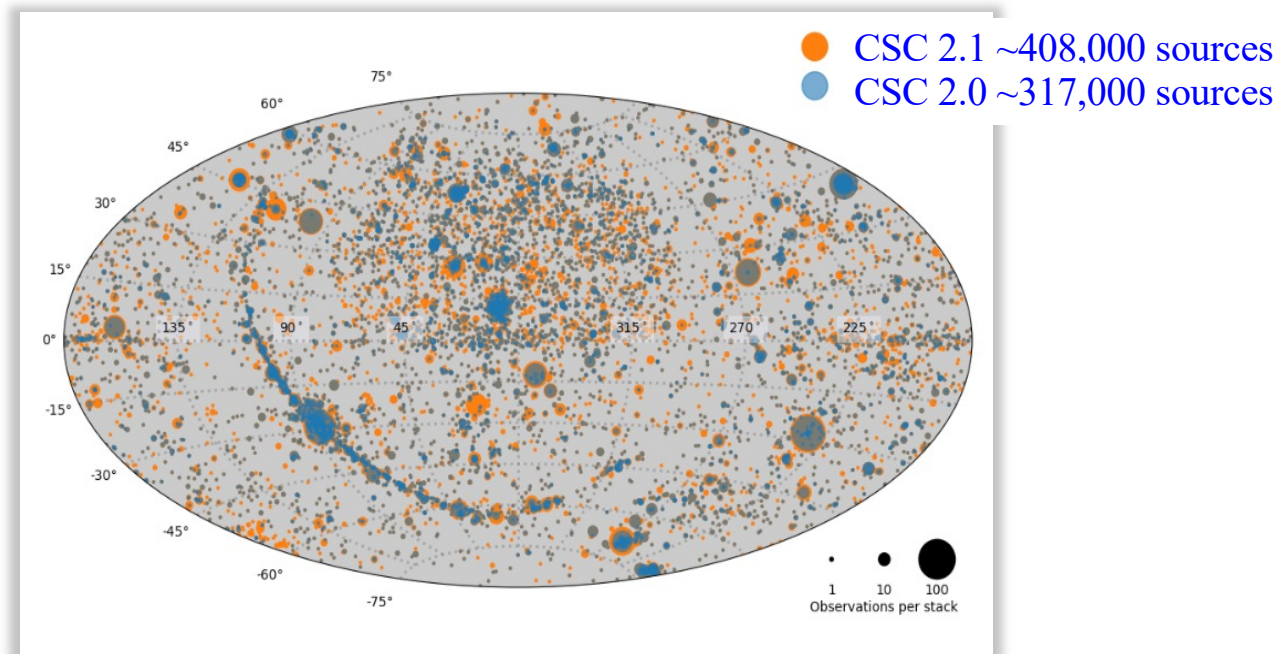
08 Oct 2024

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Chandra Source Catalog

- Released CSC 2.1 on April 2, 2024! ~408,000 unique X-ray sources
 - Chandra imaging observations released publicly up to the end of year 2021
 - Observations with consistent pointing are stacked (co-added)
- Paper describing CSC 2.0/2.1 published in ApJS
 - Evans, I. N., et al. (2024). <https://iopscience.iop.org/article/10.3847/1538-4365/ad6319> — ~150 downloads from IOP in first 14 days
- CSC 2.1 was featured in a Chandra blog: <https://chandra.si.edu/blog/node/879>





CSC2.1 Improvements

- Astrometric accuracy tied to Gaia-CRF3 reference frame
 - Catalog 95% confidence systemic astrometric error 0.29 arcsec per-axis
- Improved detection position estimations for nearby or overlapping detections
- Improved aperture photometry for low-count detections
- Added APEC spectral model fit for bright sources
- Data products tagged with DOIs



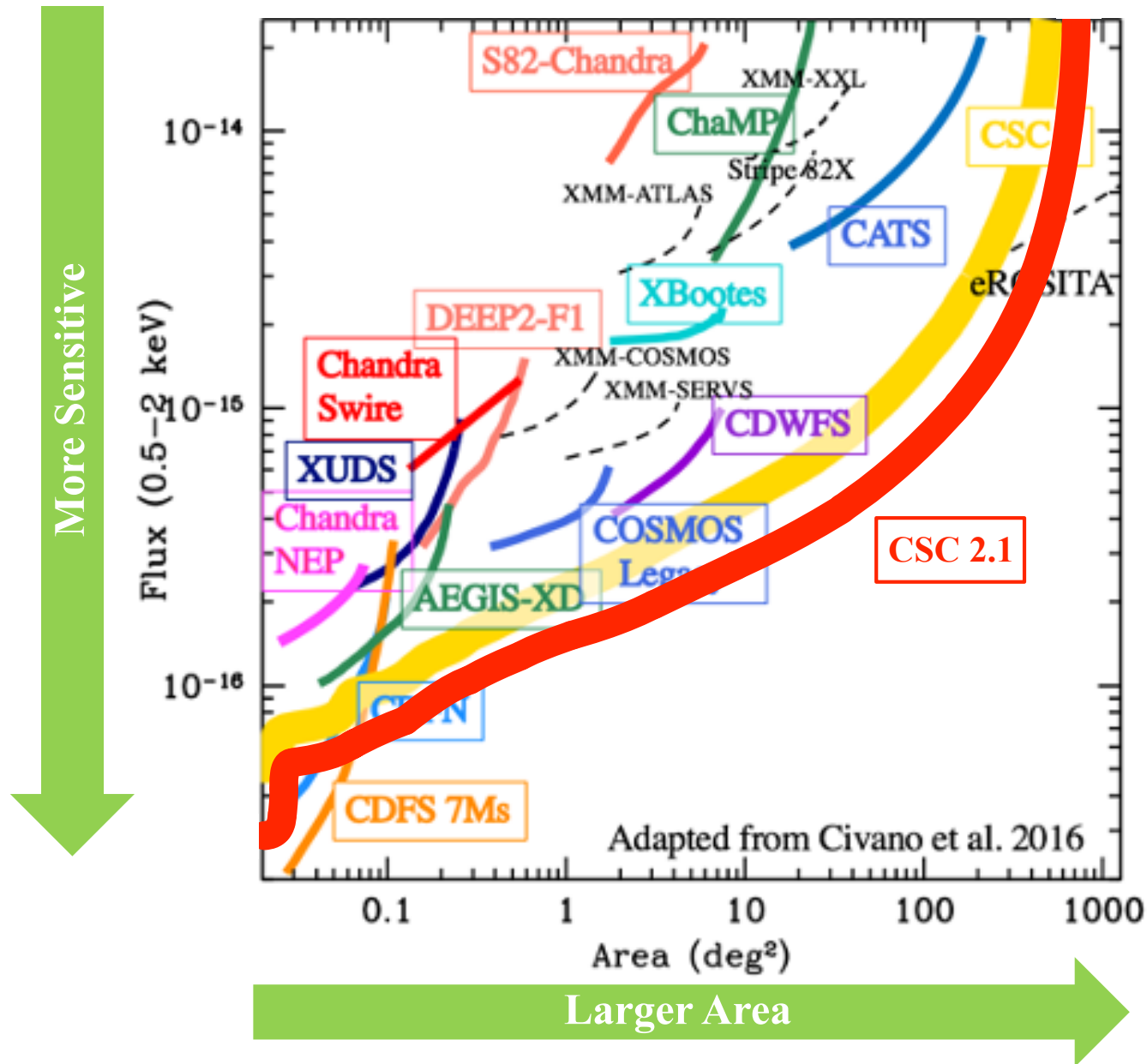
CSC 2.1 (April 2, 2024 release)

CXC

	CSC 2.1	CSC 2.0
Number of Master Sources	407,806	317,167
Number of Stacked-Observation Detections	493,236	376,343
Number of Stacked-Observation Detections Including Photometric Upper Limits	855,402	620,555
Number of Individual Observation Detections	1,304,376	928,280
Number of Individual Observation Detections Including Photometric Upper Limits	2,143,847	1,420,545
Sky Coverage (ACIS; deg ²)	681.068	517.373
Sky Coverage (HRC; deg ²)	67.288	56.166
Total Sky Coverage (deg ²)	730.374	558.646



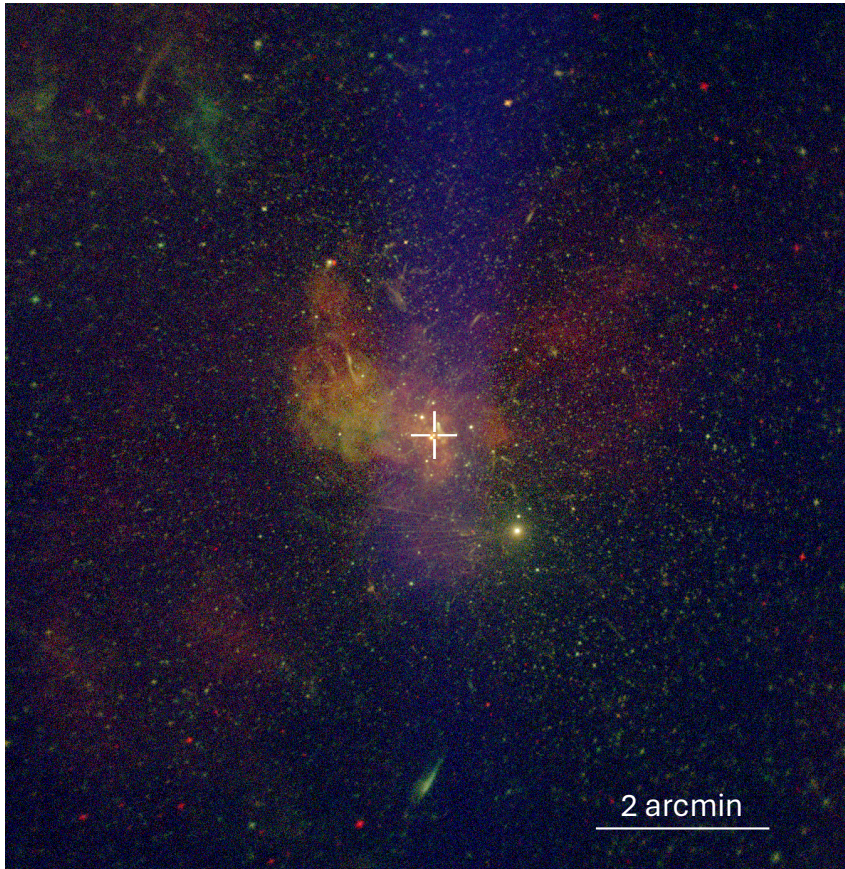
CSC 2.1 Sensitivity



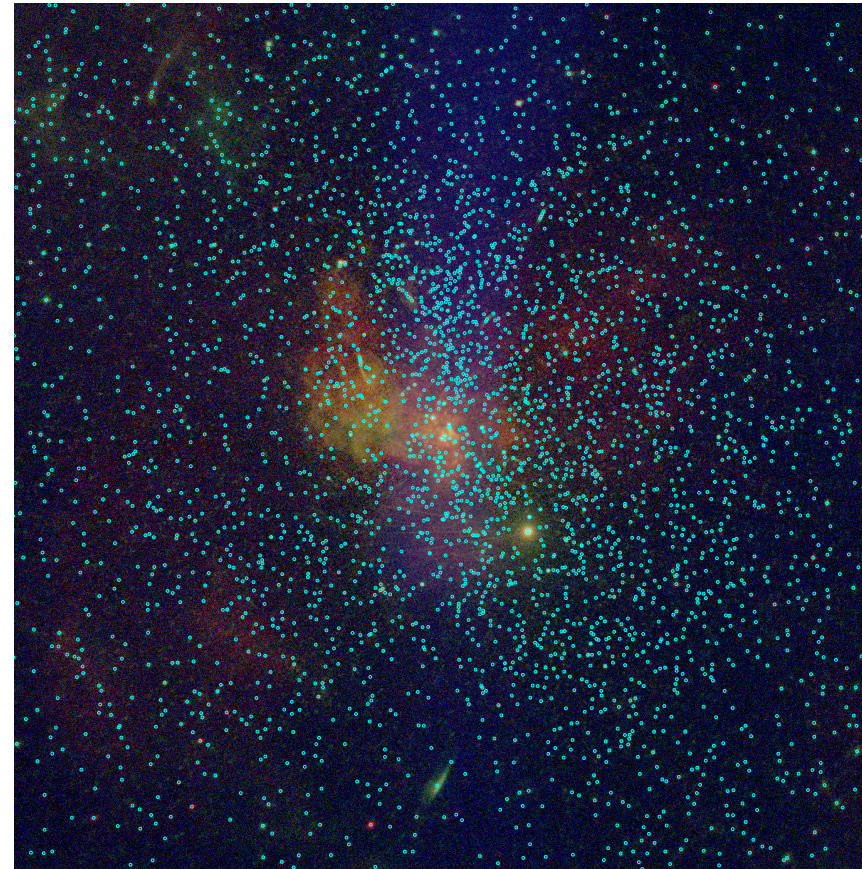


CSC 2.1 — Sgr A*

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Central Sgr A* region from 3Ms
— 86 observations stack



~3,300 CSC 2.1 sources in this
region



Chandra Source Catalog Usage Statistics

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Release 2.0 + 2.1		Reporting Period 2023 Sep 01 – 2024 Aug 30	
Provider	Metric	Number	% Non-CfA
CXC	<i>CSCview</i> browser properties searches	9,310	86%
	<i>CSCview</i> browser data products browse	501,717	97%
	Command-line (CLI) searches	147,198	84%
	Data product (file) downloads	900,930	98%
	VO cone searches	1,458,019	~100%
HEASARC	<i>Browse+Xamin</i> queries ^{1,2}	53,349	
CDS	<i>VizieR</i> queries ¹	278,212	

¹ These services provide access to the CSC 2.0 master sources table *only*

² Includes 11 months, 2023 Oct–2024 Aug



CSC2.1 Post-Release Activities

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- Completed processing all CSC 2.1 stacks, data migrations, and limiting sensitivity computations
- Completed release structural and science database sanity checks
- Updated catalog documentation and top-level website for CSC 2.1
- Updated CDA user interfaces for CSC 2.1



CSC 2.1.1 Patch Release

- CSC 2.1.1 planned for release Mid-October
 - Currently working data validation

Issues Addressed in CSC 2.1.1

- 400 source names in CSC 2.0 have been incorrectly changed in CSC 2.1
 - Mostly affects regions around SNR E0102-72.3
 - Caveat posted; fixed in CSC 2.1.1
- Photometric properties for master sources and stack-level with observations that used onboard ACIS PHA filters are incorrectly set to NULL
 - Mostly affected region in the core of Sgr A*
 - Caveat posted; fixed in CSC 2.1.1



Other Software Activities

- Data System Software code base has been migrated to GitLab/Conda to modernize the release system management previously maintained in ClearCase
 - The DS 10.13 release is Oct 15
- Sherpa 4.17 support continues with infrastructure upgrades, code reviews, build support and platform testing in preparation for an Oct 8 release
- CIAO 4.17 system infrastructure upgrades have been completed and tested
 - Bugfixes and priority SDS requests are now the focus
 - In early Nov we will move into the platform testing stage in preparation for a Dec 19 release
 - CIAO was migrated to GitLab last year
- Cycle 27 review and updates have been initiated with CDO & MP in prep for the Dec 19 proposal planning release



Data Processing & Archive

- Reprocessing of the early 1999 data
 - 'Early mission data required 'special' attention
 - Only a few obsids still to be finished
- Archival Data Volume
 - Total over the mission: 71 TB → 2.8 TB / year
 - Years 2022–2023: 11.3 TB / year (CSC data products)
- Downloaded Data
 - Total over the mission: 247 TB → 9.9 TB / year
 - Years 2022–2023: **28 TB / year (CSC data products)**

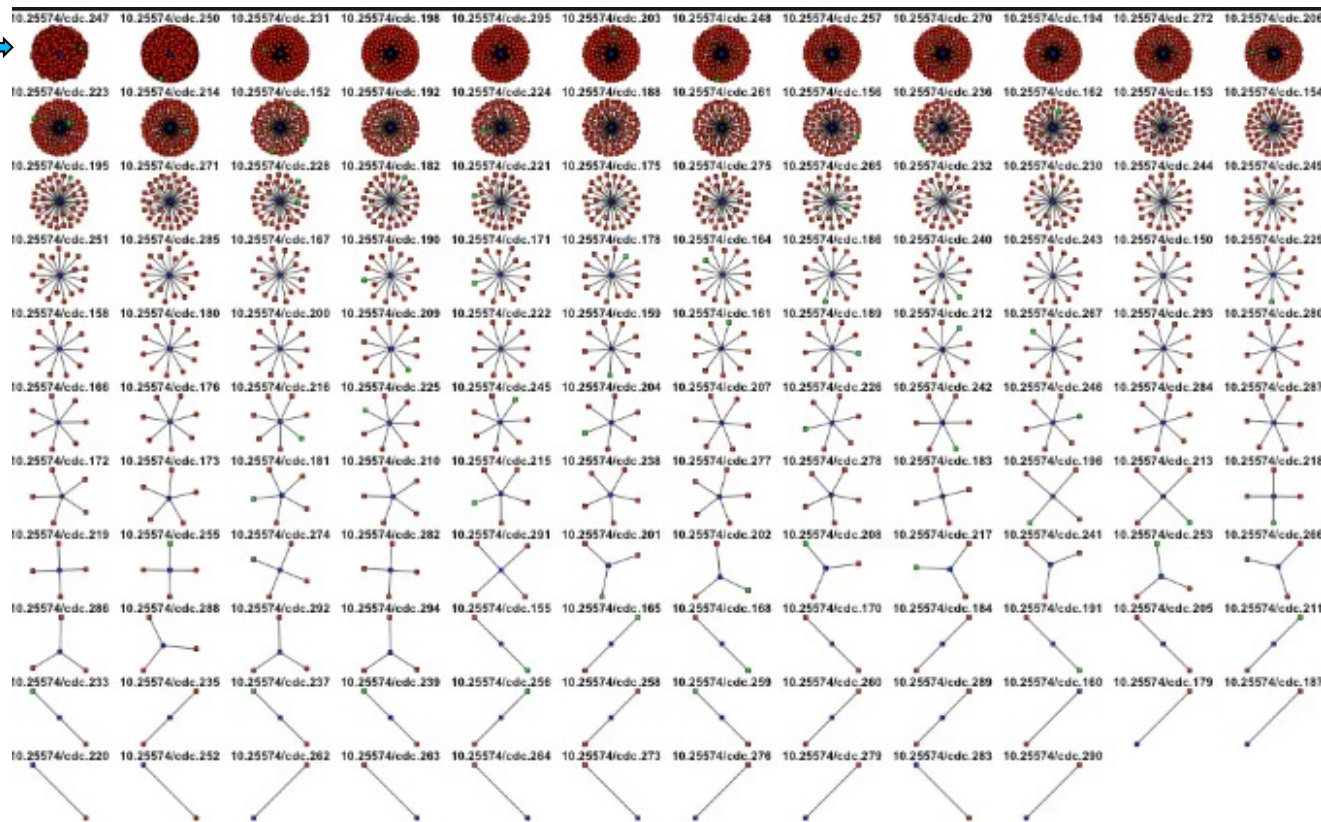


Data Data Collection DOI

- Chandra Data Collection DOI
 - CDC DOI collect multiple Chandra/CSC data products used in the same publication for easy citeability
 - 136 CDC DOI created so far
 - ~2.2 CDC DOIs per week

6990 obsid →

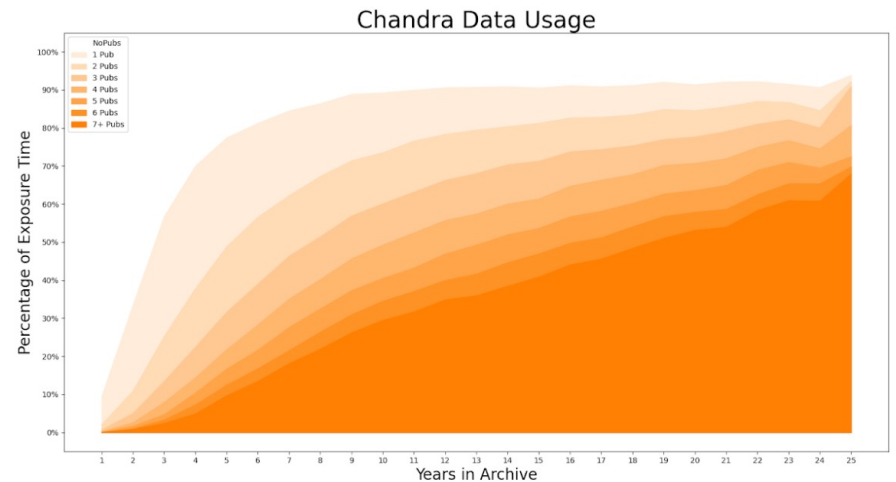
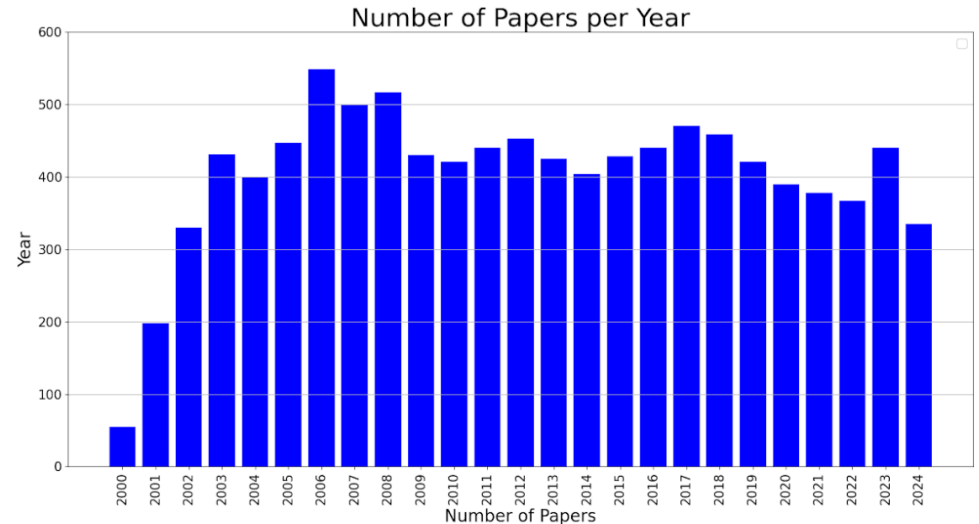
- DOI
- OBSID
- Papers





Chandra Bibliography (up the end of August 2024) ^{CXC}

- Chandra Science Papers (CSPs): 10,129
CSPs/year: 405
- Chandra-related publications: 26,463
- Mission H-index (ADS): 247 (total), 246 (refereed)
- Literature-Obs links: 155,084
 - *on average*, each ObsIds is referred to by 7.4 papers and each paper refers to 16.5 ObsIds
- Since 1 January 2022, 167 papers related to the Chandra Source Catalog have been included in the CXC bibliography





Chandra CalDB

- We continue to maintain the Chandra CalDB
- During the past year we supported 5 CalDB updates/releases, including 4 public releases.
- Upcoming CalDB work will include:
 - Proposal Cycle 27 updates
 - Several CalDB releases, depending on status of the HRC detectors
- A CalDB poster abstract has been submitted for the 25 Years of Chandra Science (in December 2024)