CIAO Documentation

and the *Chandra* Data Archive

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"ahelp" — *AXAF* Help in CIAO

- CIAO, Sherpa, and ChIPS comes with the command-line **"ahelp"** system.
- **ahelp** has corresponding online counterpart, which is updated between software releases.
  - cxc.harvard.edu/ciao/ahelp
  - cxc.harvard.edu/sherpa/ahelp
  - cxc.harvard.edu/chips/ahelp
- Python-environments also supports document strings, which Sherpa is migrating towards as its primary documentation system.
- Every component of CIAO has a help text: tools, packages (Sherpa and ChIPS), scripts and Python modules, and concepts (regions, coords, datamodel, etc.).

```
unix% ahelp <toolname>
unix% ahelp <context>
unix% ahelp -c
```

- In Sherpa and ChIPS, the string must be in quotes:

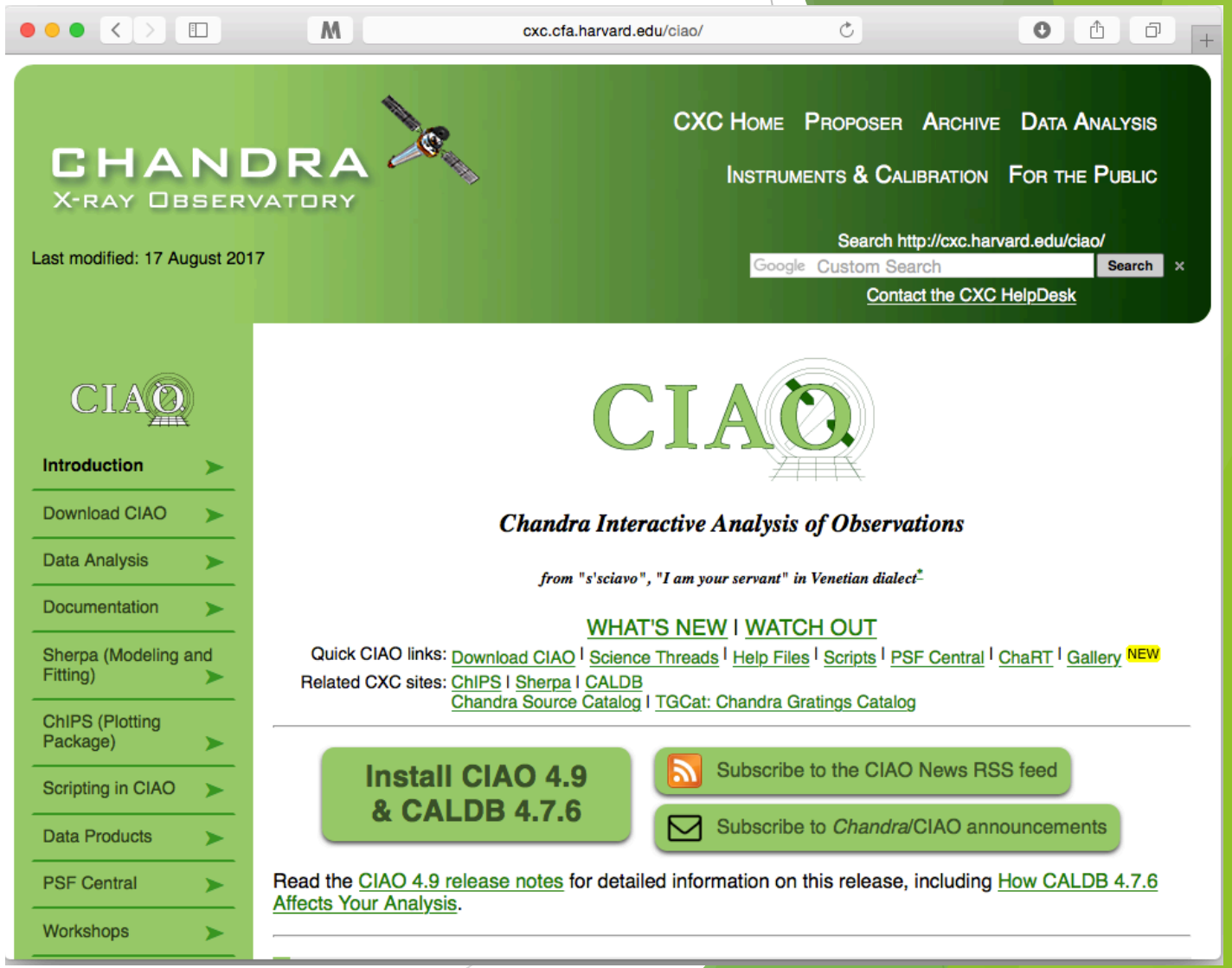
```
sherpa> ahelp "toolname"
sherpa> ahelp("toolname")
sherpa> help("docstring")
```

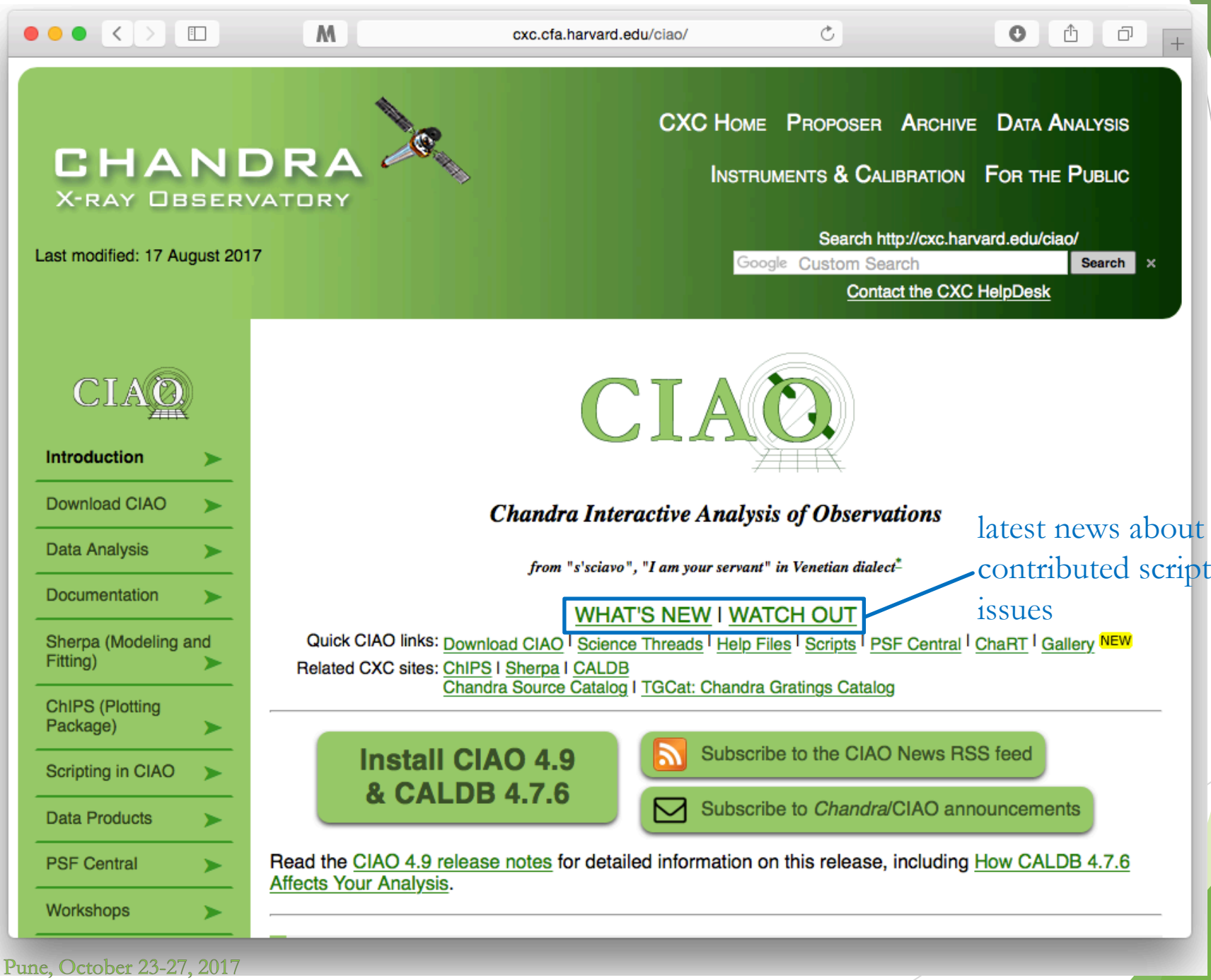
Tip: if you run a tool in the default interactive mode, when prompted for a parameter, entering '?' opens the tool's ahelp file

```
unix% dmextract
Input event file  (): ?
```

It all starts here: cxc.harvard.edu/ciao

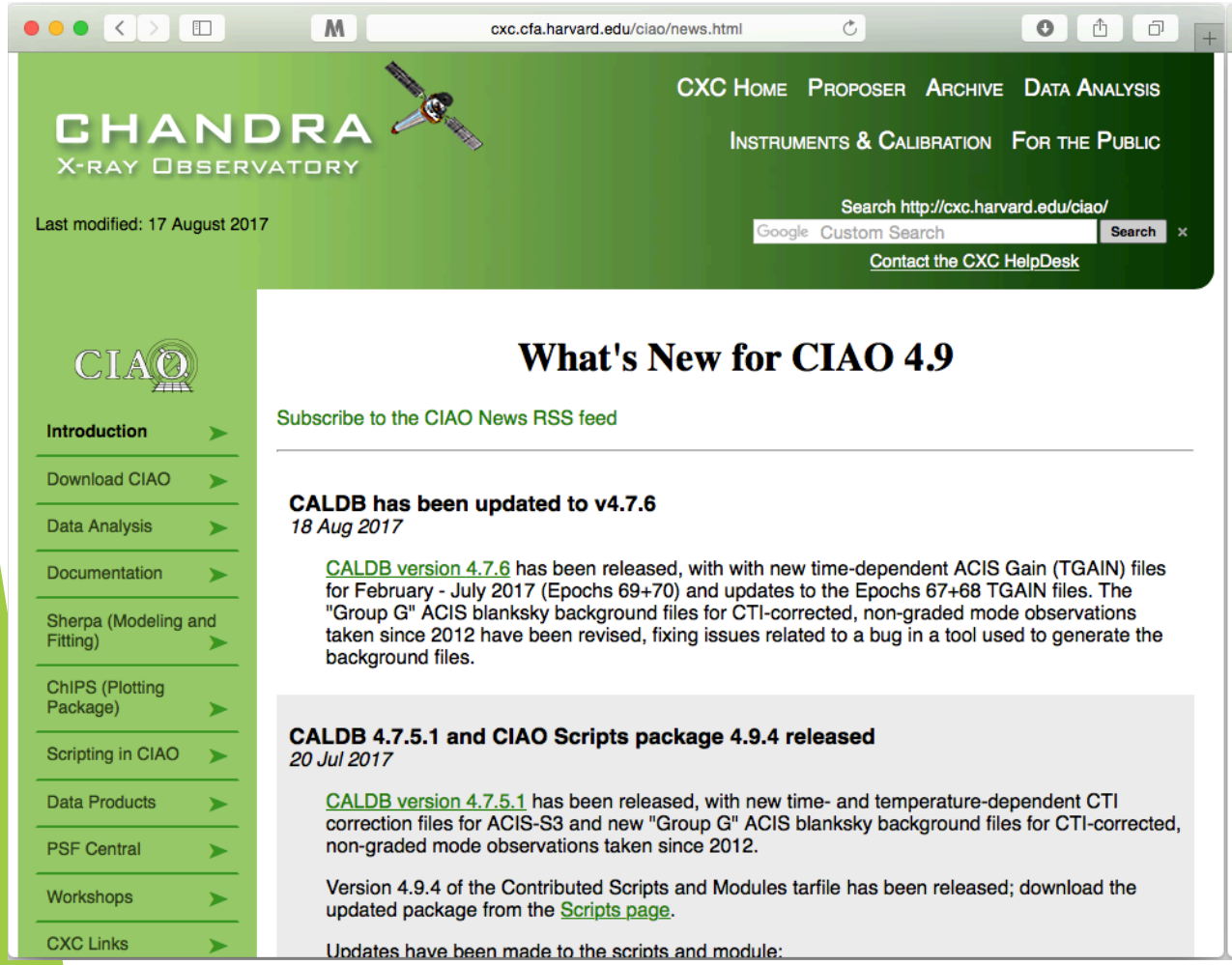
- forwards to the most recent release version of CIAO
- version-specific website can be found at: `cxc.harvard.edu/ciaoX.Y`
- similar address structure for Sherpa and ChIPS pages:
  - `cxc.harvard.edu/sherpa`
    `cxc.harvard.edu/sherpaX.Y`
  - `cxc.harvard.edu/chips`
    `cxc.harvard.edu/chipsX.Y`

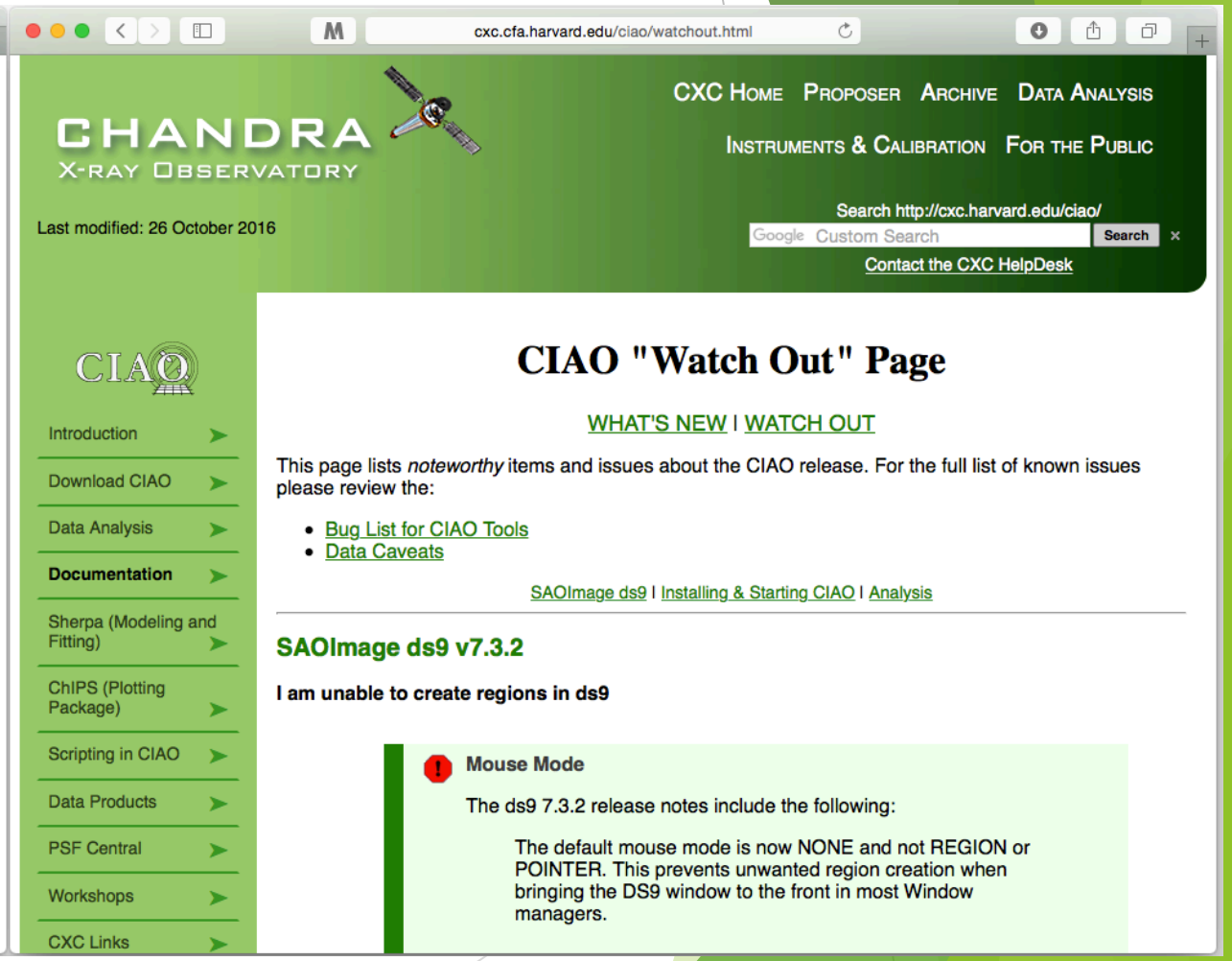


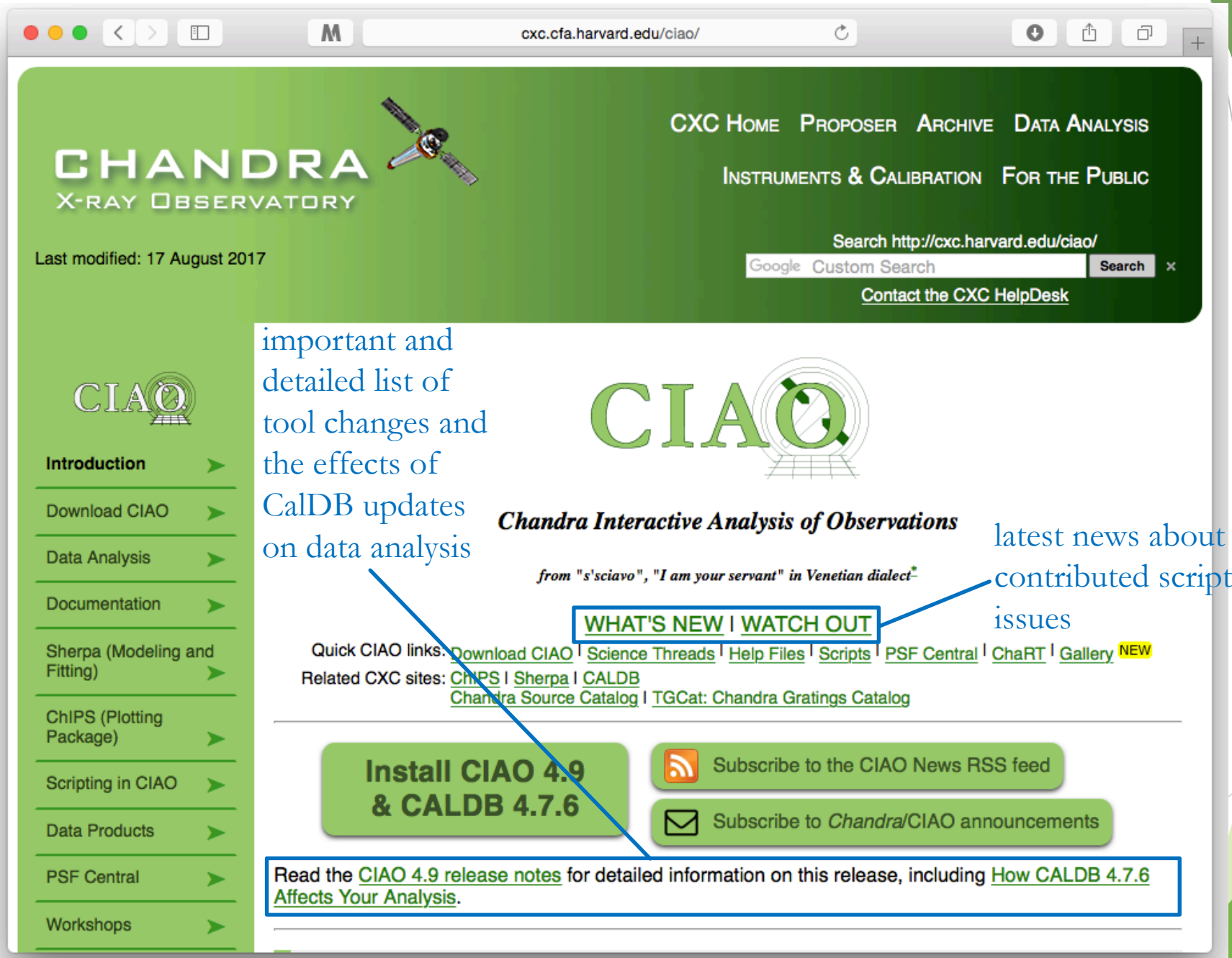


latest news about the software, contributed scripts, CalDB, and issues

The "What's New" and "Watch Out" Pages





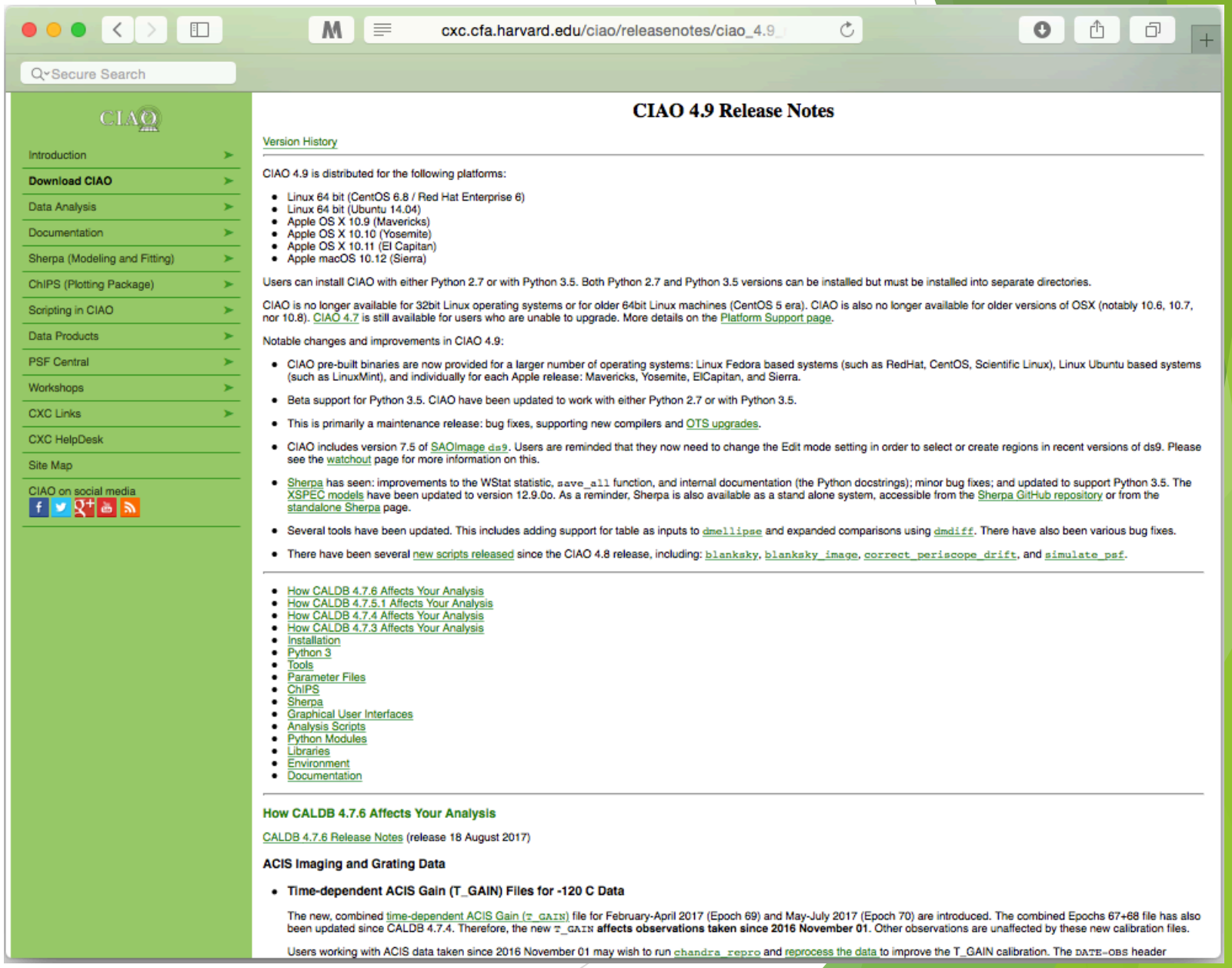


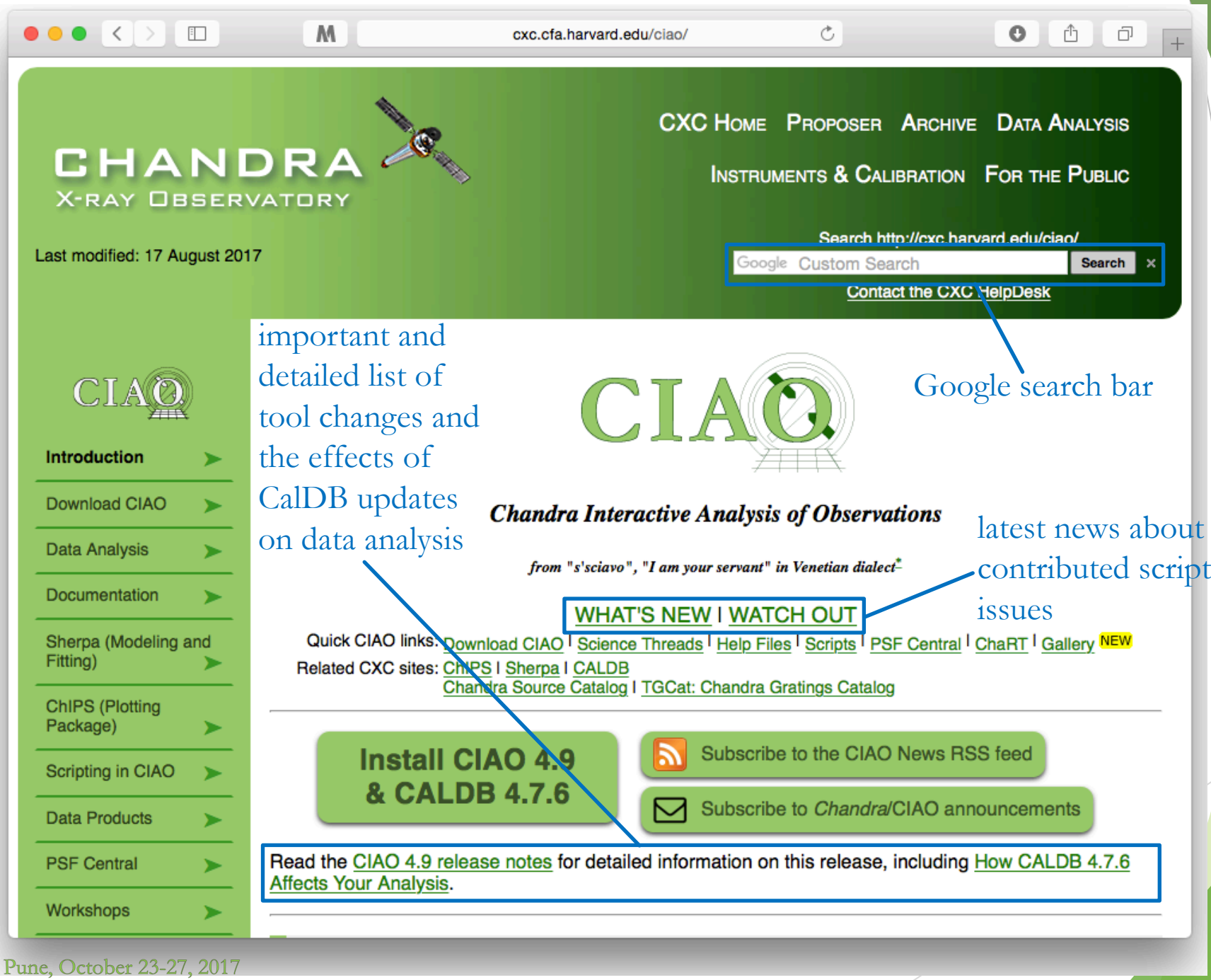
important and detailed list of tool changes and the effects of CalDB updates on data analysis

latest news about the software, contributed scripts, CalDB, and issues

CIAO Release Notes

- CIAO release notes are revised whenever a new version or patch of a package is updated.
- CalDB components are updated periodically, but will vary from one release to the next.
  - categorized by detector and instrument configuration
  - describes files changed and affects on tools, analysis type, and threads
  - since calibrations evolve with time, note the dates calibration files go into effect for the observation
  - more details on the CalDB can be found at: `cxc.harvard.edu/caldb`
- Details of changes to contributed scripts can be seen at: `cxc.harvard.edu/ciao/download/scripts/history.html`





important and detailed list of tool changes and the effects of CalDB updates on data analysis

Google search bar

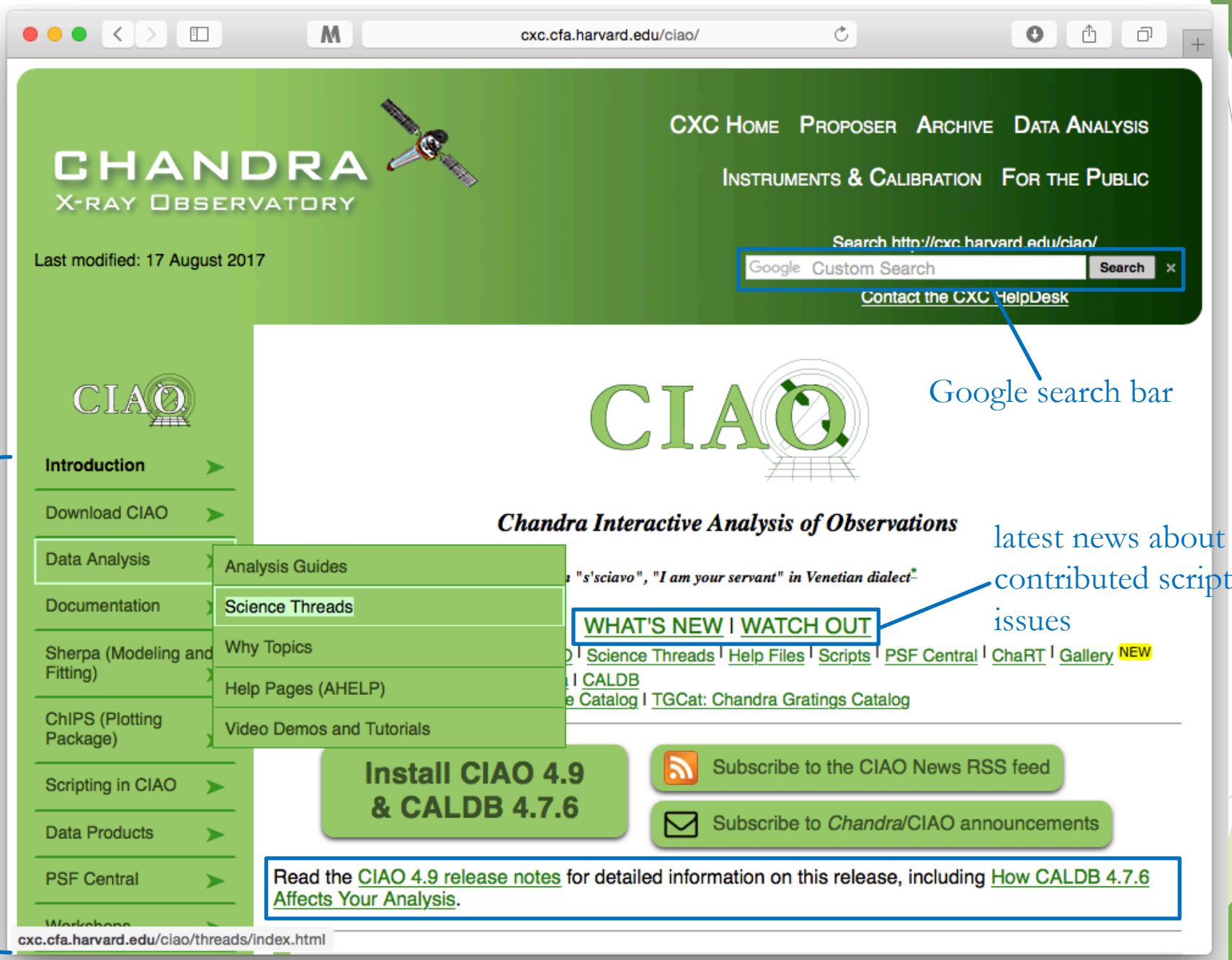
latest news about the software, contributed scripts, CalDB, and issues

navigation bar

important and detailed list of tool changes and the effects of CalDB updates on data analysis

Google search bar

latest news about the software, contributed scripts, CalDB, and issues



Google search bar

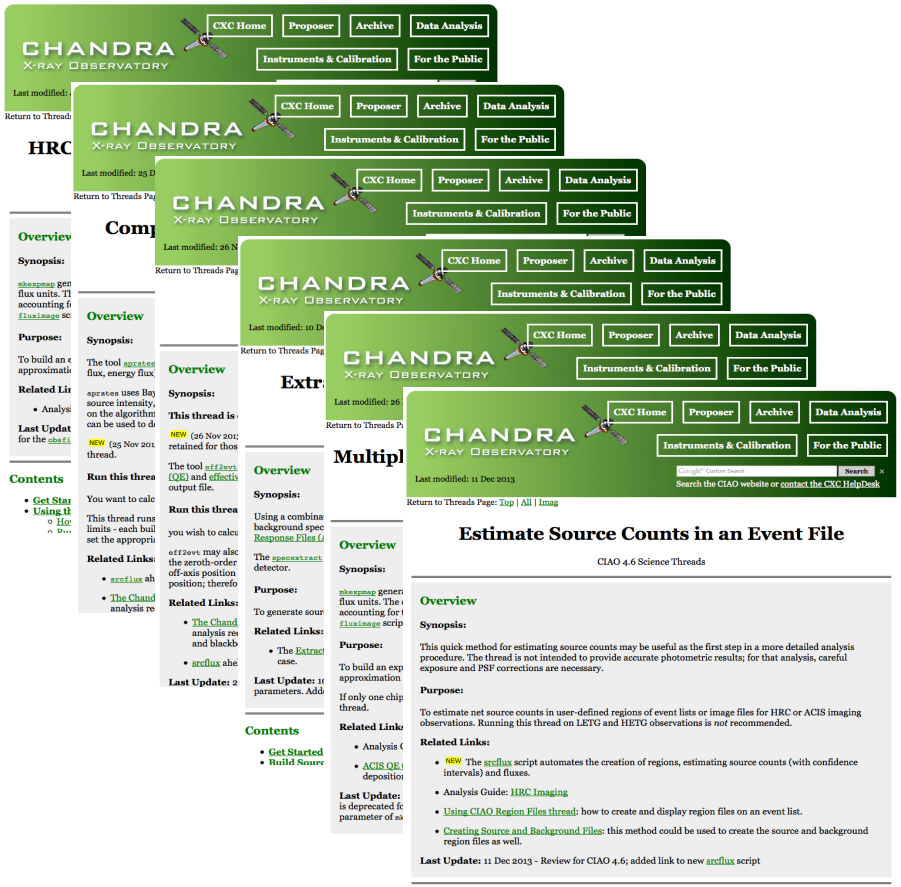
latest news about the software, contributed scripts, CalDB, and issues

navigation bar

"Guides", "Threads", and "Why" Pages

- Analysis Guides are a roadmap to broad categories of analysis; organized based on detector and instrument configuration or source morphology, providing links to more detailed documents.
- Science Threads are the most important document type. Primarily organized based on science analysis categories.
  - over 150 CIAO and Sherpa threads, designed to teach users the approach and concerns that go along with analysis
  - all threads begin with a "quick overview" to provide a synopsis, purpose, and 'when to use' the thread
  - updated and added to as needed; look for "new" and "updated" icon tags
- Why Topics supplement threads with more detailed information.
  - some topics highlight common pitfalls and nuances in the software
  - others topics discuss aspects of *Chandra* and the data obtained with it
  - some of these topics will also discuss why certain science decisions are made, enabling the user to tailor the analysis to a particular dataset

More on Science Analysis Threads



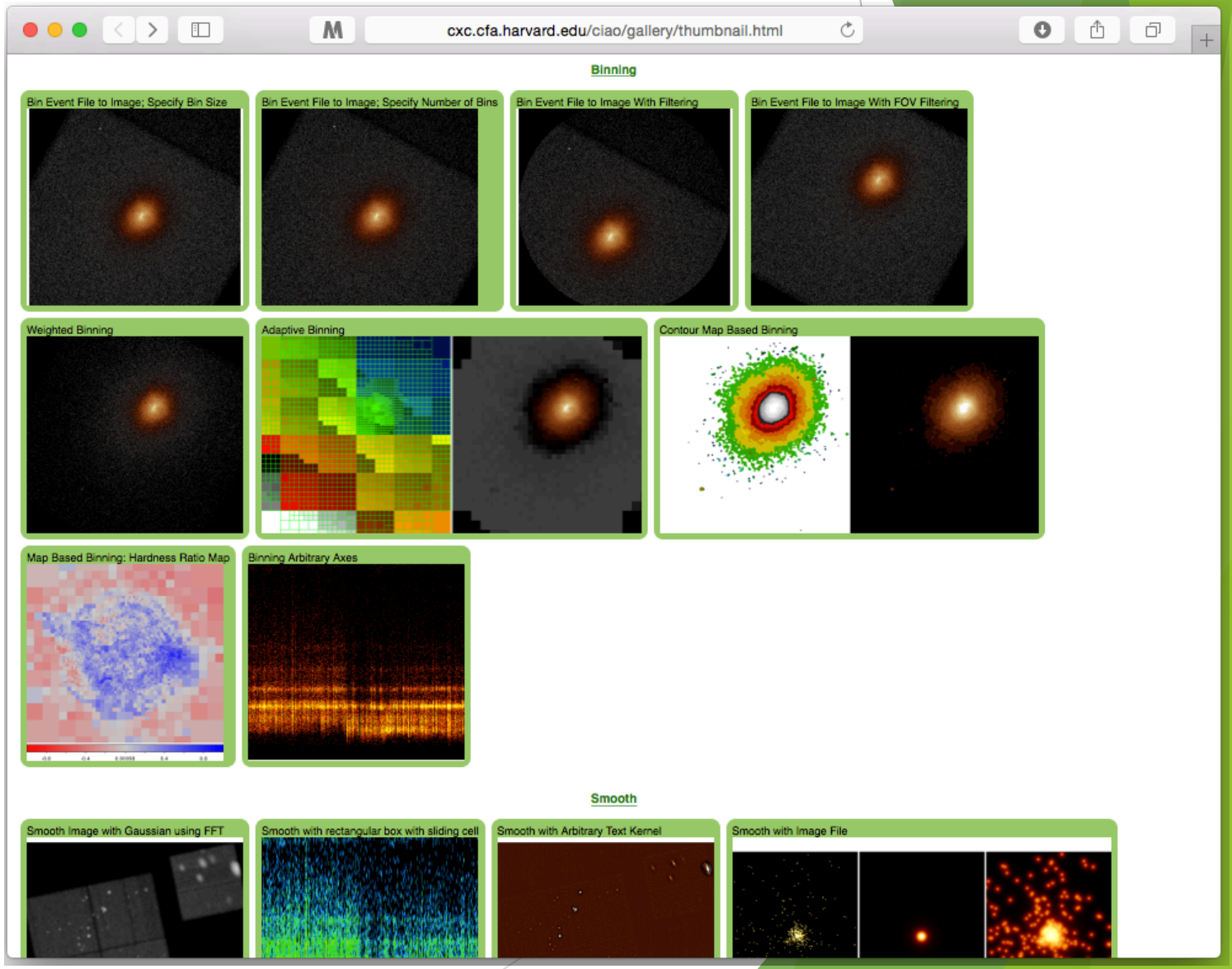
- Threads are just an example on approaching a problem. Don't blindly follow the examples verbatim, the threads are not strict recipes.
- Threads answer more detailed issues that may affect science; ahelps give the details behind the tool itself.
- An effort in the last few years is to wrap laborious thread analysis steps with a single command-line script.

`srcflux` script

NEW!

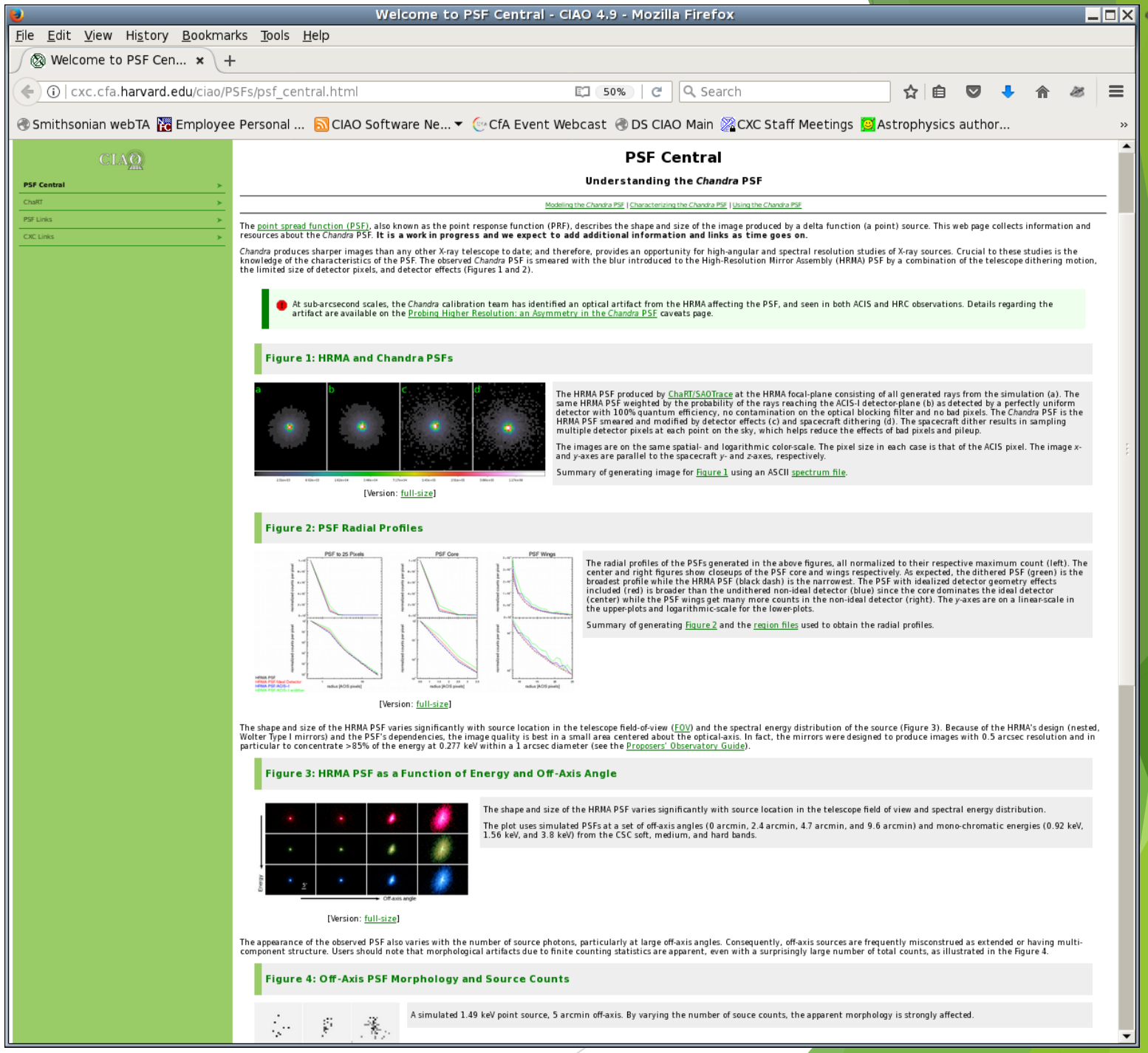
The CIAO Gallery of Examples

- Categorized based on type of manipulation to imaging data.
- A description of each type of specific manipulation technique.
- Image included of what the resulting image manipulation returns.

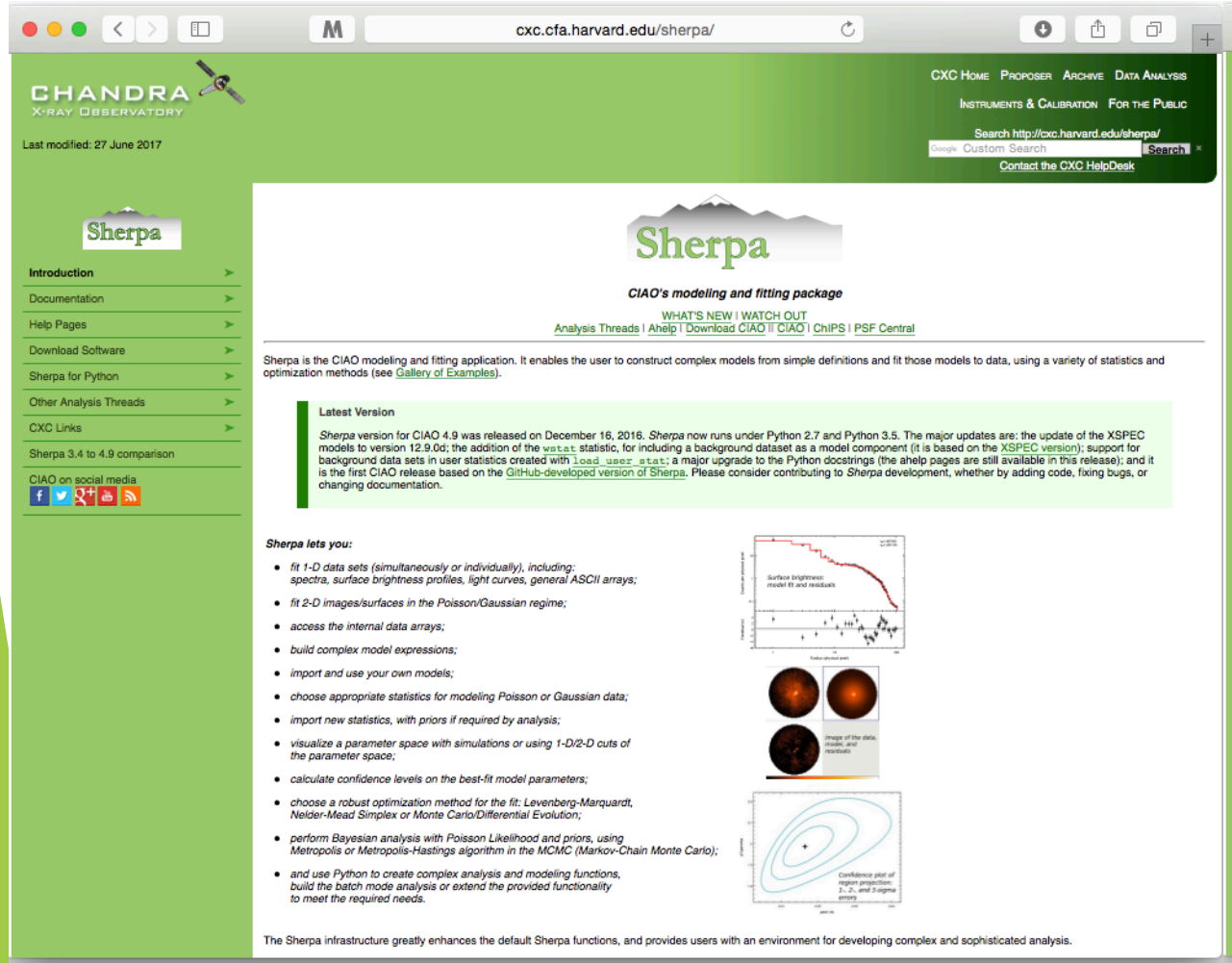


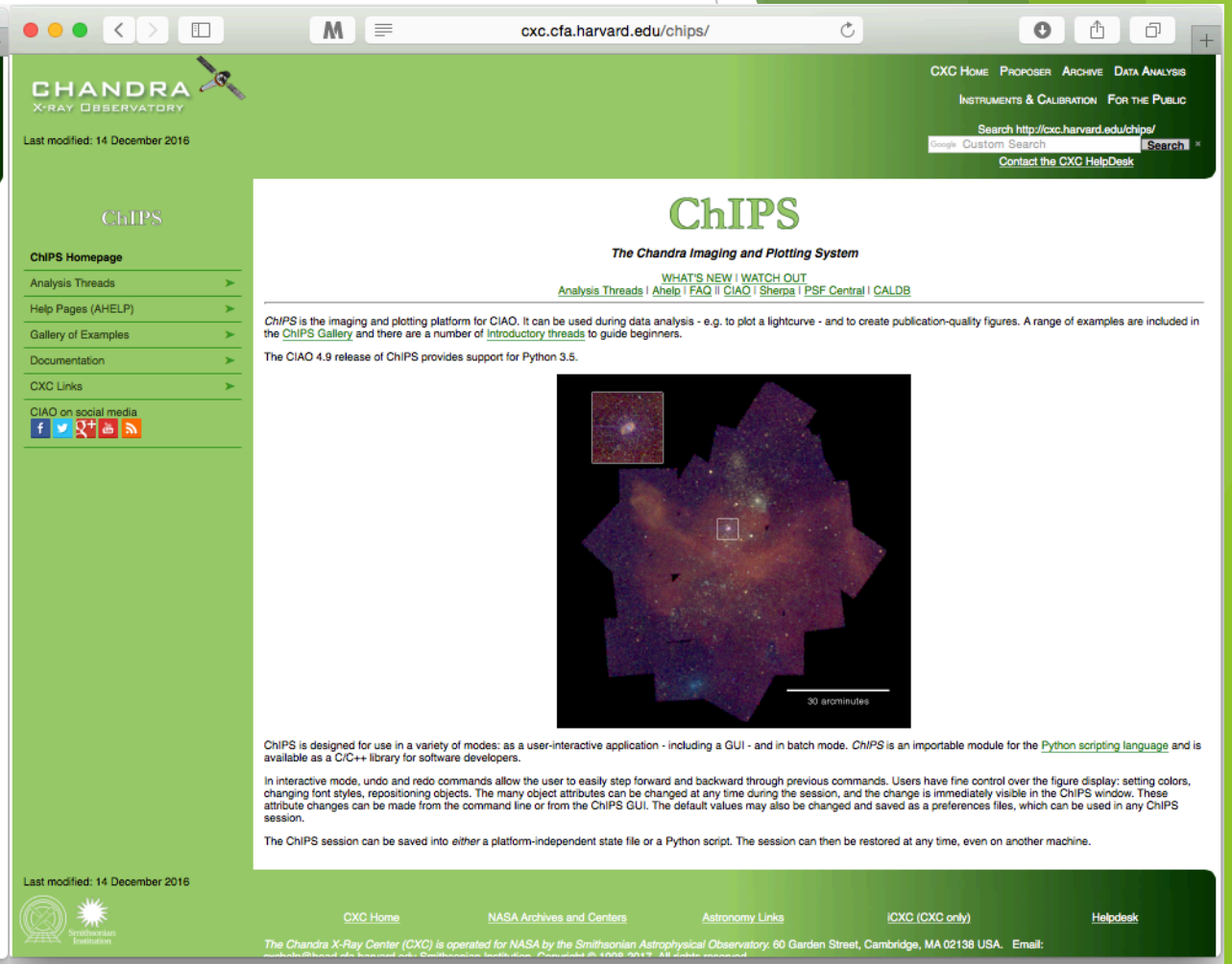
PSF Central

- Umbrella page unifying the abundance of information about the *Chandra* PSF scattered in the various dictionary, ahelps, threads and why topics in the CIAO and CXC website.
- Organized by tool; planned to also be organized by scientific question in the future.
- Includes connection between observation, SAOTrace/ChaRT, and MARX simulations.



Sherpa and ChIPS Pages



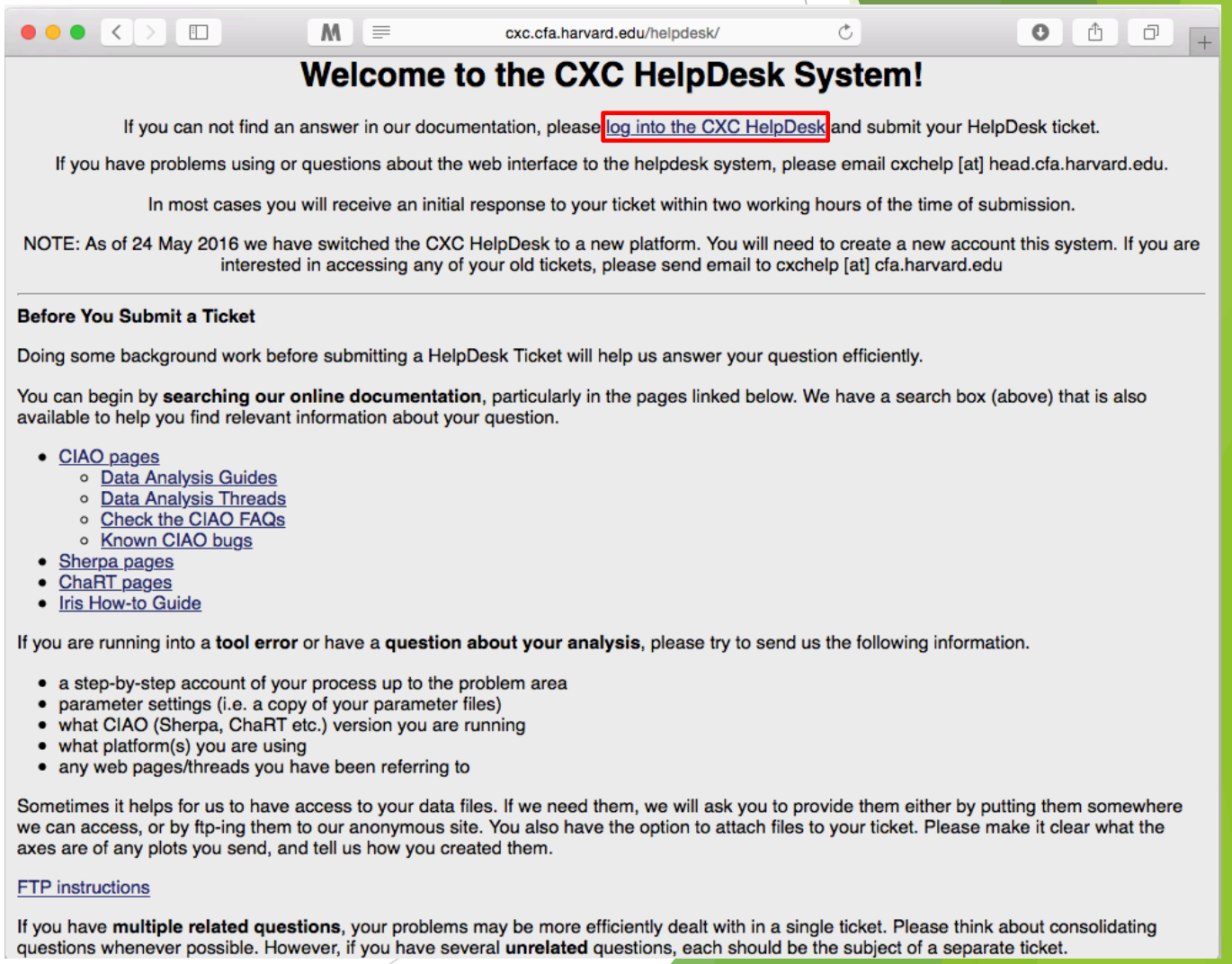


The *Chandra* Helpdesk

cxc.harvard.edu/helpdesk

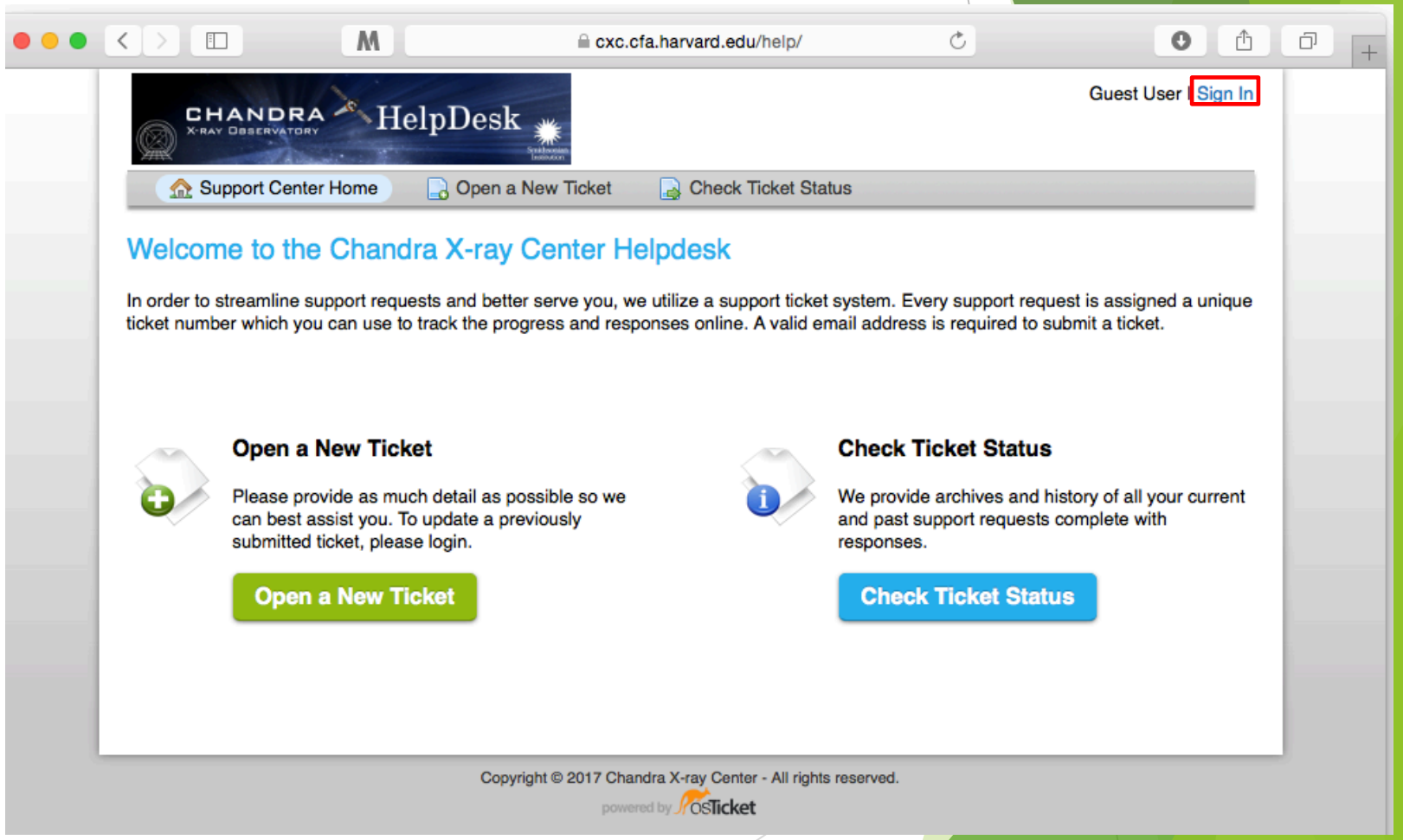
Provides support for:

- proposals
- proposal planning
- observation scheduling and issues
- proprietary data
- data archive
- data analysis and DS9
  - help with data processing steps and to understand why they are applied
  - help highlight and understand the kinds of mistakes that are made during analysis



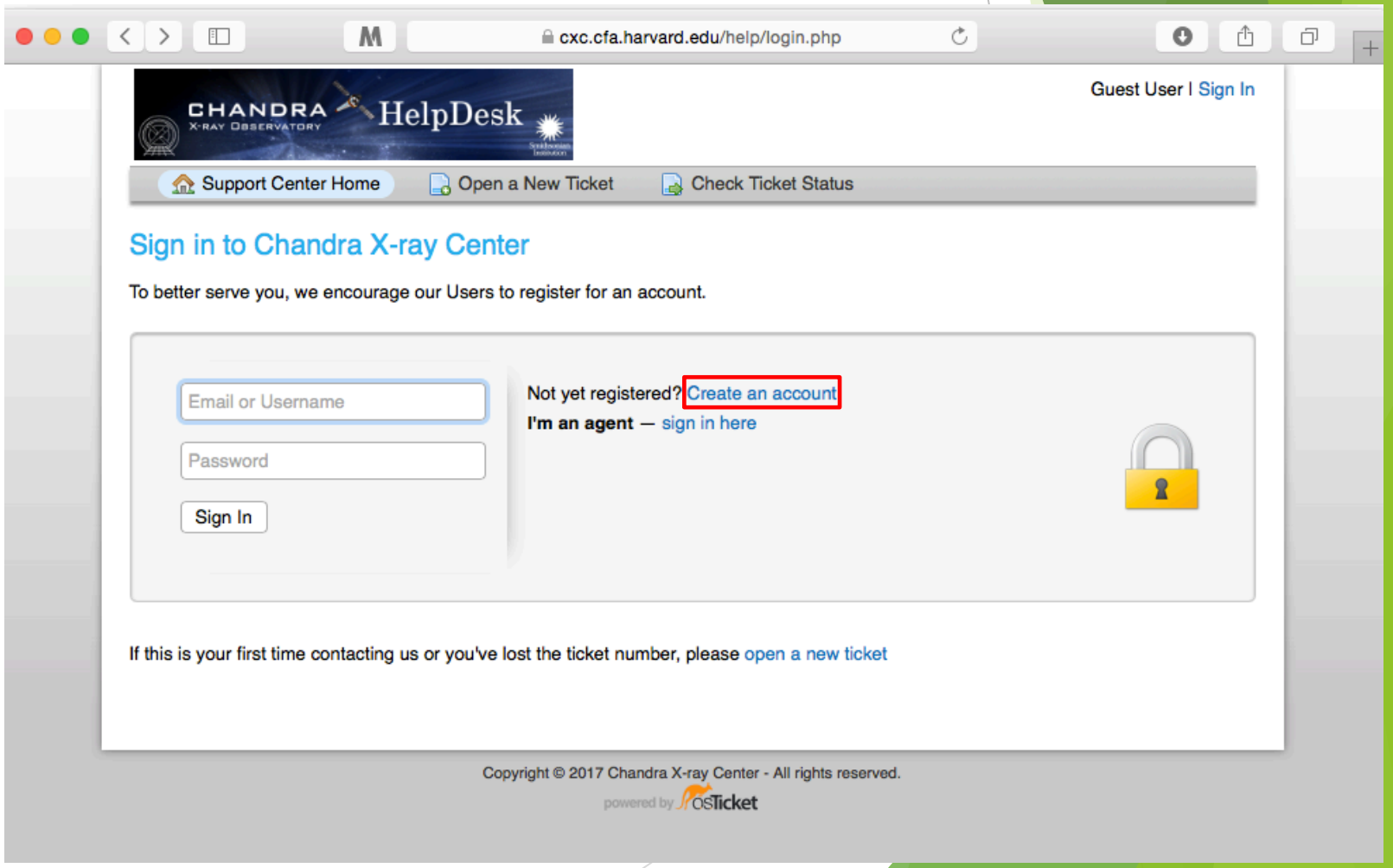
Helpdesk "Log-in" Page

- guest user page
  - open ticket and check ticket responses
- users are not required to create an account to submit a ticket
- upon ticket submission, a ticket reference number is emailed to check on ticket status

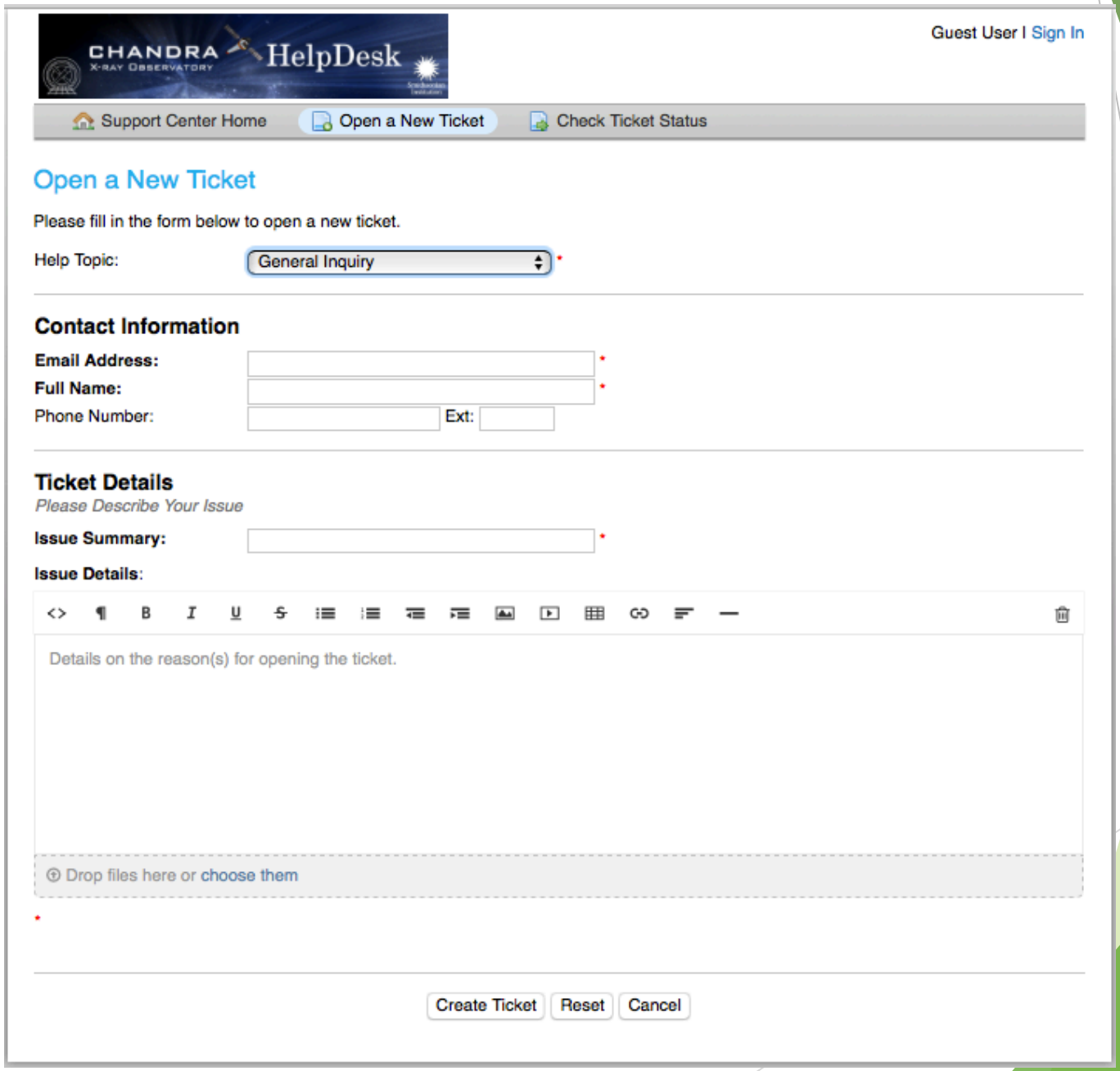


Registered Users' Log-in Page

- registered users can look at ticket submission history and see all past tickets.
- account creation requires an email address, name, and password.



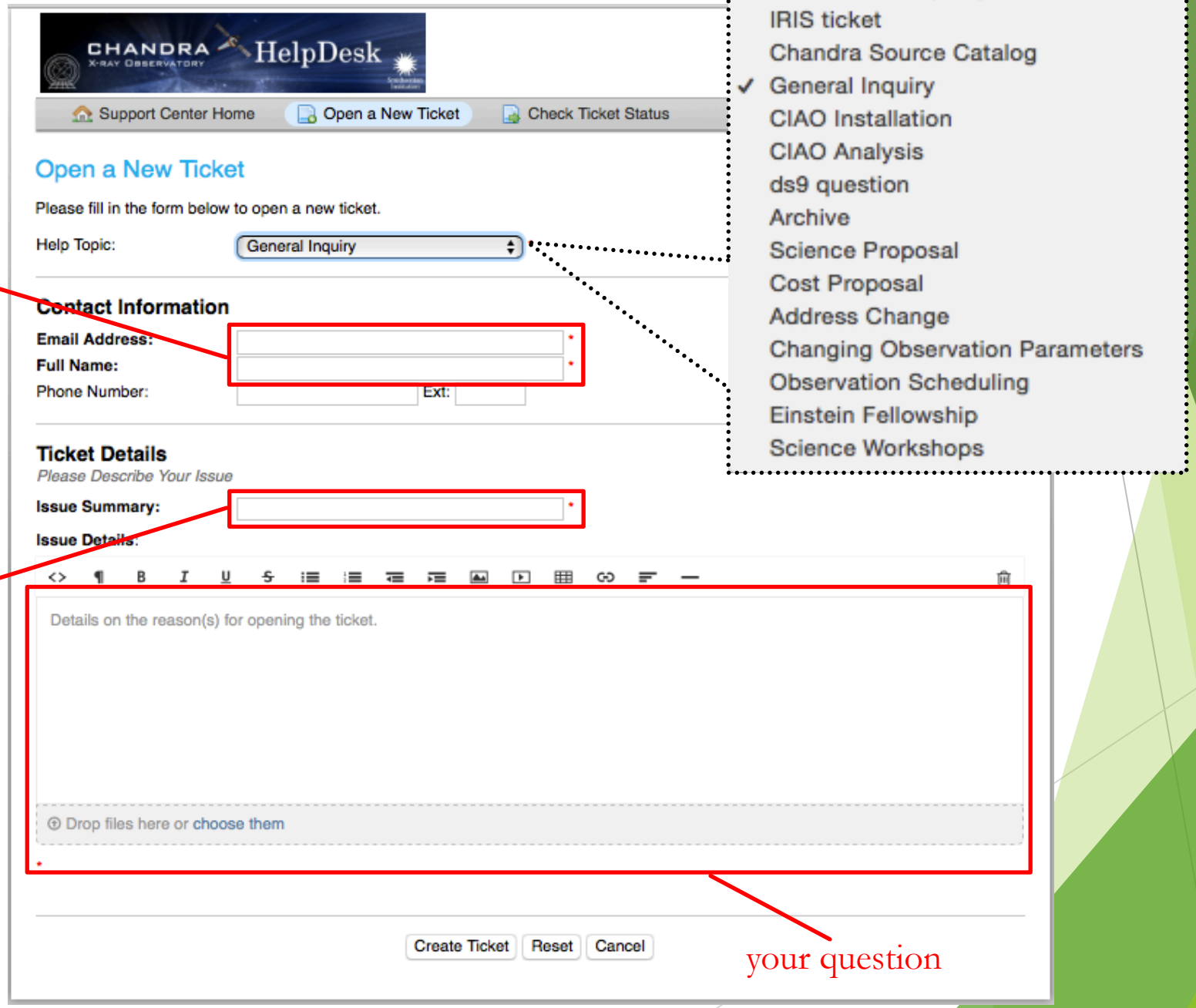
Opening a New Ticket



Opening a New Ticket

guest user provides contact information to get notification of ticket updates

summary of issue; the subject header



your question

Contents of a Ticket

- software information
  - CIAO version
  - CalDB version
  - Sherpa—stand alone or CIAO distribution
- platform and operating system
- question
  - what is the problem or concern encountered?
  - contextualize the question: what are you trying to do, what is your goal?
    - if referencing a document, include citation beyond just the authors (journal, volume, page)
- what did you do?
  - describe what you've done and the steps taken
  - provide commands used
    - copy-and-paste text or provide a log file; no screenshots please
  - include any messages returned by tool, including warning and error messages
  - provide supporting data files

Typical Helpdesk Ticket Questions

- I'm following this thread, but get an error message when running acis_process_events on an ACIS-S/HETG observation in CC-mode:
  `# acis_process_events (CIAO 4.9): ERROR: CHIPY value < 1 or > 512.`
- I am trying to extract a spectrum for an ACIS observation and get zero exposure in the source region, help!
- I'm trying to figure out the pixel area of an image after removing a large number of regions (e.g. after removing some point sources). Can I do this with the **`dmstat`** tool? I'd like to compare the result with what I'm getting out of DS9/dax.
- There is a typo in the extracting spectra from point-like sources thread: a parameter name is misspelled in the example.
- I have a good idea, can this functionality be added into Sherpa?

"Borderline" Questions

- I noticed that most of the counts in my region are at very soft energies and is also evident in the spectrum of this region. Deciding whether or not to include photons below 0.3 keV in the imaging/spectral analysis is critical for my case, so to what extent can the counts at very soft energies be trusted, given the known instrumental effects in that energy range?
- I have been searching for long-term periodic variation (5d-3yr) in eight components of M87. Six components display no significant variation. The remaining two each have identical periodicities corresponding to 182.7 days (almost exactly half a year). The sources are not in close proximity to one another. Is there a known characteristic/aberration exhibited by *Chandra* that would account for this finding? All data used was recorded on ACIS-S3/ACIS-I3. My search of the CIAO threads and other forums does not seem to offer any information on the matter.
- unsupported platforms
  - I want to install on an old OS: Slackware/CentOS 5/Red Hat 5/Ubuntu 12/Play Station 3/etc... (missing libraries or operating system is too old that the latest available libraries are incompatible with the libraries used to build the binary)
  - I'm installing on Fedora 26/Ubuntu 17 and encountering problems (too new, libraries clash with binary CIAO built with older libraries)

Questions that are too General...

- I am doing analysis by counting counts to obtain the density of the circumstellar mass by obtaining luminosity and then flux. I am already familiar with doing this with *Swift*, but I am now having trouble with *Chandra*. I was wondering if based on my needs could you instruct me on how to use CIAO for my purpose?
- How do you remove a double source if it's contaminating the flux from the target source?

... or Beyond the Scope of the Helpdesk

- I can only see the abstracts of accepted proposals, can the entire proposal be made public?
- I am currently studying supernovae listed on the ChaSeR catalog and I need information to evaluate them. I was wondering if there would be a list of all these supernovae where more information (like the redshift or the explosion time) about these objects would be listed.
- I am fitting a spectrum but the nature of the source is unknown. I have tried many common models but the result is not good enough. The aim is to get a good fit to constrain the nature of the source, is there any way to tell which is the best model?
- How do I use HEASoft/FTools, XSpec, SAS, or ACIS Extract.

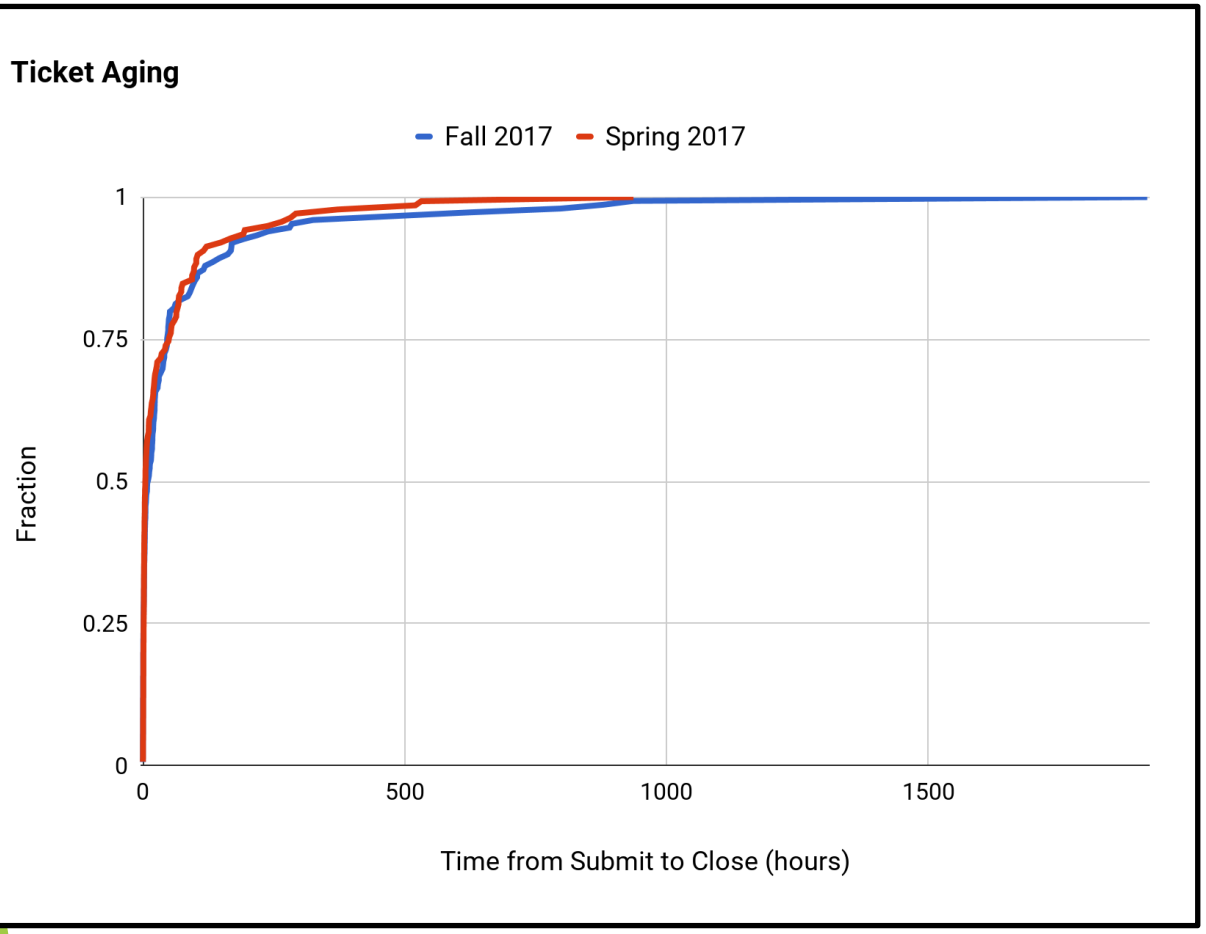
Resolving a Ticket

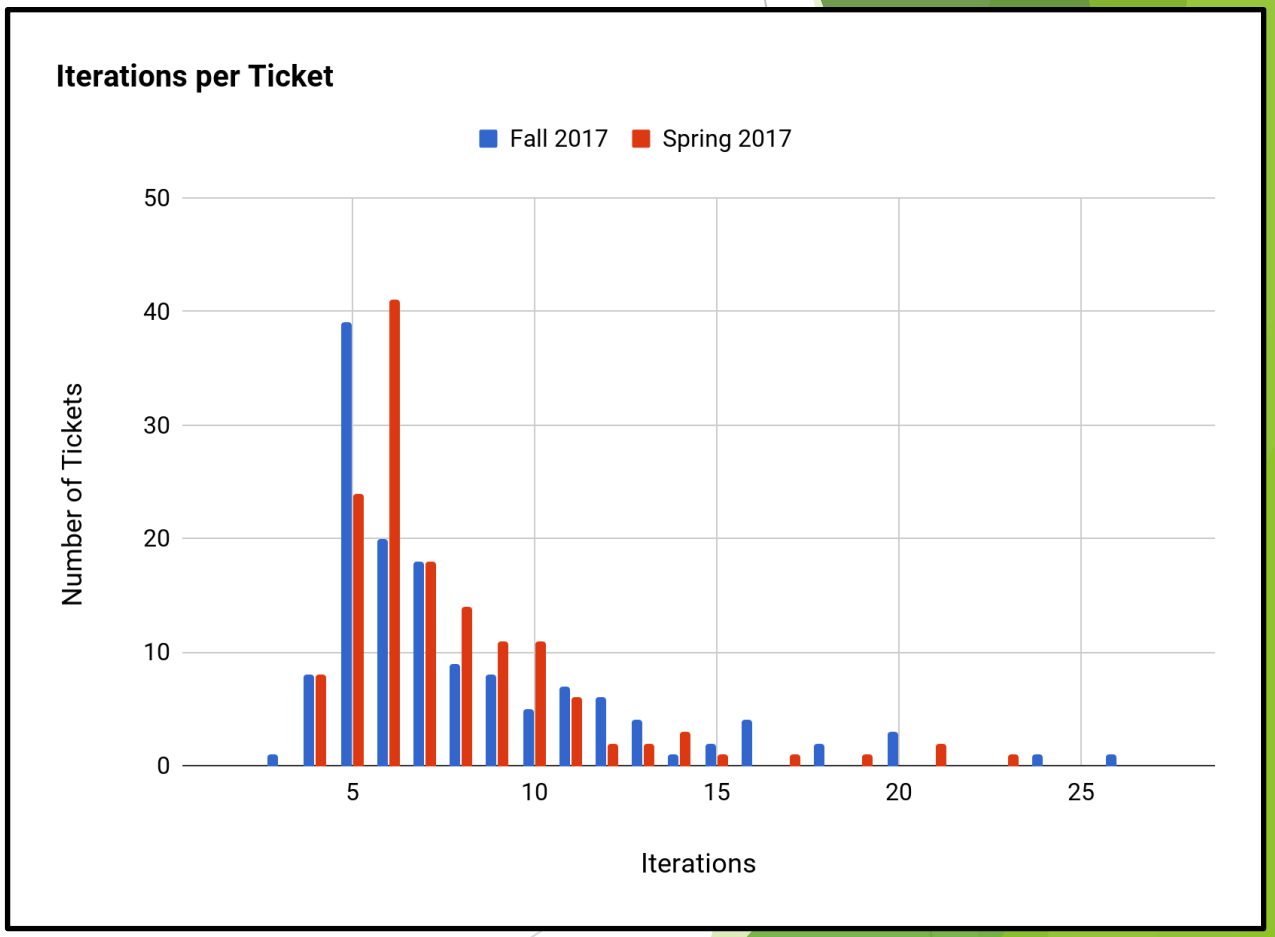
- with information and data in hand...
  - confirm issue by reproducing problem
  - test in another version of the software and operating system
  - check bugs page (`cxc.harvard.edu/ciao/bugs`) and list of known issues
- if necessary, consult:
  - a Scientist or Developer
    - software: CXC Data Systems group
    - science: CXC Science Data Systems and Calibration groups
  - instrument team (ACIS/HRC/Gratings)
  - subject-matter expert
- closing the ticket
  - get you an answer
  - improve the documentation: bug list update; add threads caveats; new idea for thread or why page
  - improve the software: bug report, software enhancement request, new tool specification

Helpdesk Metrics

	2017	2016
Number of Tickets	285	307
Median time 1st contact [hrs]	1.28	3.48
Median time close [hrs]	6.08	17.32
Maximum time to close [hrs]	1918 ChaRT/MARX/PSF reopen	1470
% requiring consultation	12%	13%

Helpdesk Metrics [continued]





Real Life Example (good) — I

April 7, 2016 10:39

I was wondering whether there are any tools etc for dealing with correcting an off-axis point source for pileup.

I have been following the pileup guide on the CIAO and Sherpa pages using the jdpileup model, but this seems to be based around an on-axis point source, where all the photons are spread over relatively few pixels. Is there any analogue or guidance for the case where the point source is off-axis, and photons are spread over many pixels (but still with significant pileup)?

A related, probably dumb question (but I am coming to this from particle physics so I am not an expert):

If I reduce the pileup fraction for a source by choosing a region with a central area of high pile-up excluded, (i.e. to extract from the wings of the point spread function), does specextract know about how the point spread function behaves well off-axis, and the way the higher energy photons are spread out than the lower energy ones? I presume the answer is yes, but like I said this is a new subject for me :)

Real Life Example (good) — I — comments

- I was wondering whether there are any tools etc for dealing with correcting an off-axis point source for pileup.

  Clear question that's to the point.

- I have been following the pileup guide on the CIAO and Sherpa pages using the jdpileup model, but this seems to be based around an on-axis point source, where all the photons are spread over relatively few pixels. Is there any analogue or guidance for the case where the point source is off-axis, and photons are spread over many pixels (but still with significant pileup)?

  Puts question into context, and for the case that he's interested in.

- If I reduce the pileup fraction for a source by choosing a region with a central area of high pile-up excluded, (i.e. to extract from the wings of the point spread function), does specextract know about how the point spread function behaves well off-axis, and the way the higher energy photons are spread out than the lower energy ones?

  Puts forward an analysis idea in clear terms and asks for verification that a script can account for this case.

Real Life Examples (bad) — I

- August 15, 2016 13:42

  Good morning I am new to CIAO, and when loading the file of SN2015G just as shown in the introduction of ciao I get an error message saying it was unable to download the fits. Do you know why this could happen?

- October 30, 2015 14:11

  Hi, I am trying to make a nicer image for publication using the following thread. (http://asc.harvard.edu/ciao/threads/diffuse_emission/). I made a merged image by combining 3 ObsIDs using merge_obs tool. I then used exposure corrected image and followed above thread. It either gives "# dmfilth (CIAO 4.7): WARNING: Skipping bkg region #51 - no data (region outside image boundary?)." error or the output image (diffuse.img) is not fill the point sources.

Real Life Examples (bad) — I — comments

- Good morning I am new to CIAO, and when loading the file of SN2015G just as shown in the introduction of ciao I get an error message saying it was unable to download the fits. Do you know why this could happen?

  No, more information is needed. What ObsID is the user looking at? What file is he using? Which introductory page is he referring to and what tools and commands are being used? What is the actual error message that's seen?

- I made a merged image by combining 3 ObsIDs using merge_obs tool. I then used exposure corrected image and followed above thread. It either gives "# dmfilth (CIAO 4.7): WARNING: Skipping bkg region #51 - no data (region outside image boundary?)." error or the output image (diffuse.img) is not fill the point sources.

  While a description of steps are provided, what were the actual commands used? No files provided to test on to see the problem the user's concerned about.

Real Life Examples (good) — II

January 27, 2015 18:29

Hello, I am following the HETGS grating spectra thread (http://cxc.harvard.edu/ciao/threads/spectra_hetgacis/index.html)

I am encountering a SIGSEGV error

```
===
-bash-4.1$ ciao
ERROR: The current environment is configured for:
CIAO 4.6 Monday, December 2, 2013
bindir : /nfs/cxc/a1/linux-x86_64/opt/packages/ciao-4.6/bin
CALDB : 4.5.9

Variables used:
i=13850
SPECOUT=hetgs_spectra
flt=13850/secondary/acisf13850_000N001_flt1.fits.gz

-bash-4.1$ dmcopy "$SPECOUT/$i\_evt1a_flt.fits[EVENTS][@$flt][cols -phas]"
$SPECOUT/$i\_evt2.fits
# 5961: Received error signal SIGSEGV-segmentation violation.
# 5961: An invalid memory reference was made.
# 5961: segmentation fault: DMCOPY (1) is: exit_upon_error->NULL
===
```

I am attaching the evt1a and the flt file.

Real Life Examples (good) — II — comments

- I am encountering a SIGSEGV error

  The user describes the problem encountered.

- ```
  CIAO 4.6 Monday, December 2, 2013
  bindir : /nfs/cxc/a1/linux-x86_64/opt/packages/ciao-4.6/bin
  CALDB : 4.5.9
  ```

  Provides the software and CalDB version used.

- ```
  -bash-4.1$ dmcopy
  "$SPECOUT/$i\_evt1a_flt.fits[EVENTS][@$flt][cols -phas]"
  $SPECOUT/$i\_evt2.fits
  # 5961: Received error signal SIGSEGV-segmentation violation.
  # 5961: An invalid memory reference was made.
  # 5961: segmentation fault: DMCOPY (1) is: exit_upon_error-
  >NULL
  ```

  She defines the files and variables used; the command executed; and the entire error message returned by the tool.

- I am attaching the evt1a and the flt file.

  Includes all the files used leading to the problem.

Real Life Examples (bad) — II

- December 1, 2014 14:58

  I saw a chandra specialist did wavdetect in an uniqe way. He used dmcopy to make fits file for every single CCD, then he ran wavdetect for every fits file. Do you know that is for what? Is it better to run wavdetect on a single ccd?

- July 6, 2010 14:51

  Hi,
  I've attached a script for you, i need help with the sherpa script...
  thank you

Real Life Examples (bad) — II — comments

- I saw someone use `wavdetect` in an unique way. He used `dmcopy` to make FITS files for each CCD, then he ran `wavdetect` for each file. Do you know why he did this?

  Without context and seeing exactly how he filtered the data, it's impossible to say why he did what he did. The user is better off asking the person directly. Be explicit!

  Is it better to run `wavdetect` on a single CCD?

  Too general of a question that's a judgement call which only the user can answer. "Better" is relative, with the trade offs that come with any computational problem.

- I've attached a script for you, I need help with the Sherpa script...

  What does the user think is wrong with the script? What result does it return that's wrong?

Real Life Examples (good) — III

June 5, 2013 13:06

CIAO version 4.5
CALDB version 4.5.5.1

Trying on both a Macbook Pro (OS 10.8.3) and Linux (Ubuntu 12)
=======
I am trying to take a general survey of quasars Chandra archive. I have been going through a list of obsids, but am finding some issues with determining which chip the target point source is on. I have noticed in the past that the CCD_ID listed in the evt2 file fits header does not always agree with the actual chip id that the target is on.

For example, with ObsID 3472 (and HETGS observation):

```
>> evt2=`ls primary/*evt2*`
>> dmkeypar $evt2 CCD_ID echo+
4
```

But I know the zeroth order of the source is centered on chip 7.

If I open the evt2 file in ds9, I can overlay a region centered on the point source. When I then use the Analysis -- CIAO -- Coords -- Chip tool, it returns chip 7.

However, if I move the region to a different part of the image that is clearly a different chip, the Coords--Chip tool still returns 7. This makes it very difficult to check what is printed as CCD_ID in the header, making it very difficult to automate the process. Please help!

Real Life Examples (good) — III — comments

- CIAO version 4.5
  CALDB version 4.5.5.1
  Trying on both a Macbook Pro (OS 10.8.3) and Linux (Ubuntu 12)

  The user provides software information and shows which platforms she's encountered the issues on.

- I have noticed in the past that the CCD_ID listed in the evt2 file fits header does not always agree with the actual chip id that the target is on.

  Primary concern concisely stated.

- ```
  >> evt2=`ls primary/*evt2*`
  >> dmkeypar $evt2 CCD_ID echo+
  4
  ```

  But I know the zeroth order of the source is centered on chip 7.

  Shows what she did, given a specific ObsID, and what is returned by the tool, which contradicts what she knows about the observation.

- If I open the evt2 file in ds9, I can overlay a region centered on the point source. When I then use the Analysis -- CIAO -- Coords -- Chip tool, it returns chip 7. However, if I move the region to a different part of the image that is clearly a different chip, the Coords--Chip tool still returns 7.

  The user also describes another problem she sees in DS9: what was done, what was returned, and what she finds confusing.
  ```

Real Life Examples (bad) — III

- November 26, 2009 10:47

  Hello
  I use dmextract to get the light curve for a point source in ACIS data, and I have been received these warnings:
  # dmextract (CIAO 4.1): WARNING: Input file, "acis_dstrk_evt2.fits[ccd_id=2,sky=region(source.reg)]", has no rows in it.

  # dmextract (CIAO 4.1): WARNING: Input file, "acis_dstrk_evt2.fits[ccd_id=2,sky=region(back.reg)]", has no rows in it.

  I am sure about the ccd id and source.reg, back.reg. I don't know what my mistake is .

- July 8, 2010 15:43

  You know what I'm doing, it's Cassiopeia A, all I need is to get the energy spectrum... The way u said worked... I used specextract and got the files i needed... but then something seems to be not right with sherpa script. I thought i was supposed to get a clear one like the ones from Mrk 421, but I don't understand it...

Real Life Examples (bad) — III — comments

- `"acis_dstrk_evt2.fits[ccd_id=2,sky=region(back.reg)]", has no rows in it.` I am sure about the `ccd_id`, `source.reg`, and `back.reg`. I don't know what my mistake is.

  The files named in the error/warning messages aren't provided. The problem is that with generic file names, an ObsID is needed to begin an investigation. This problem is compounded if generic region names are also used in the command-line syntax, in which case the contents of the region files need to be provided too.

- You know what I'm doing, it's Cassiopeia A. All I need is the energy spectrum... the way you said worked... I used `specextract` and got the files I need...

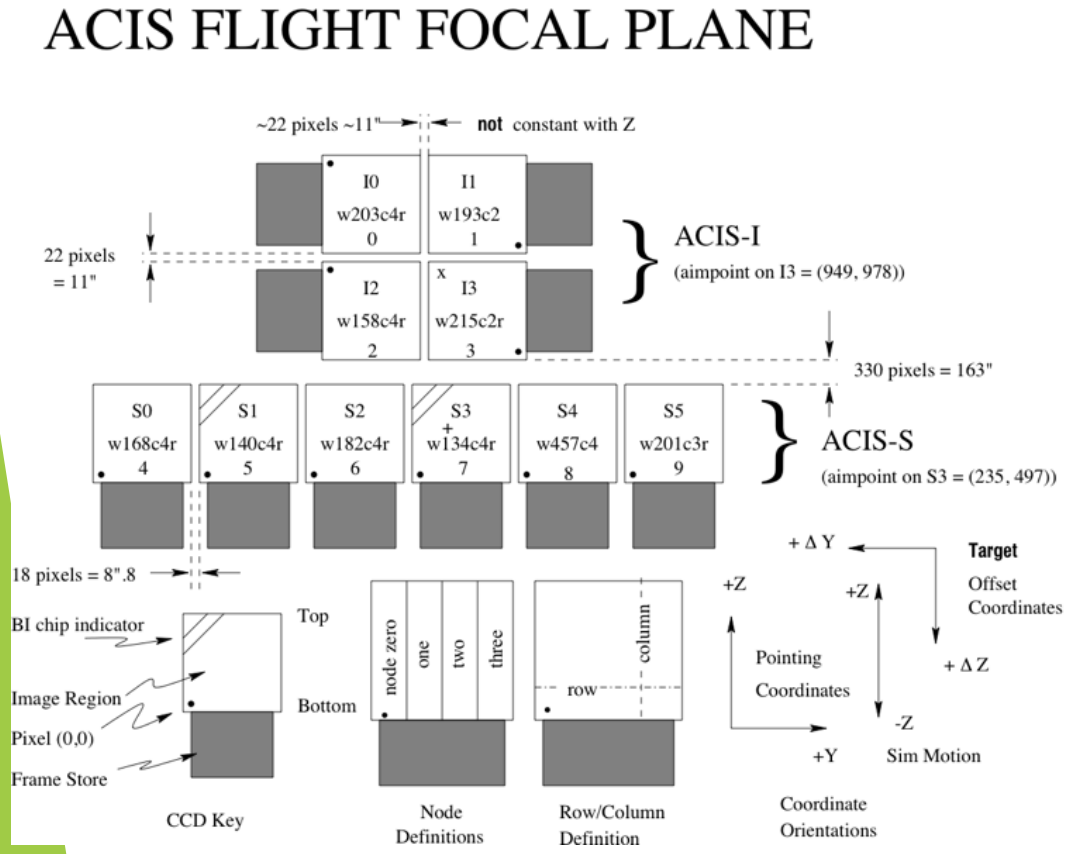
  The user assumes the ticket will be assigned to the same support staff member, so she doesn't provide any details for the question.

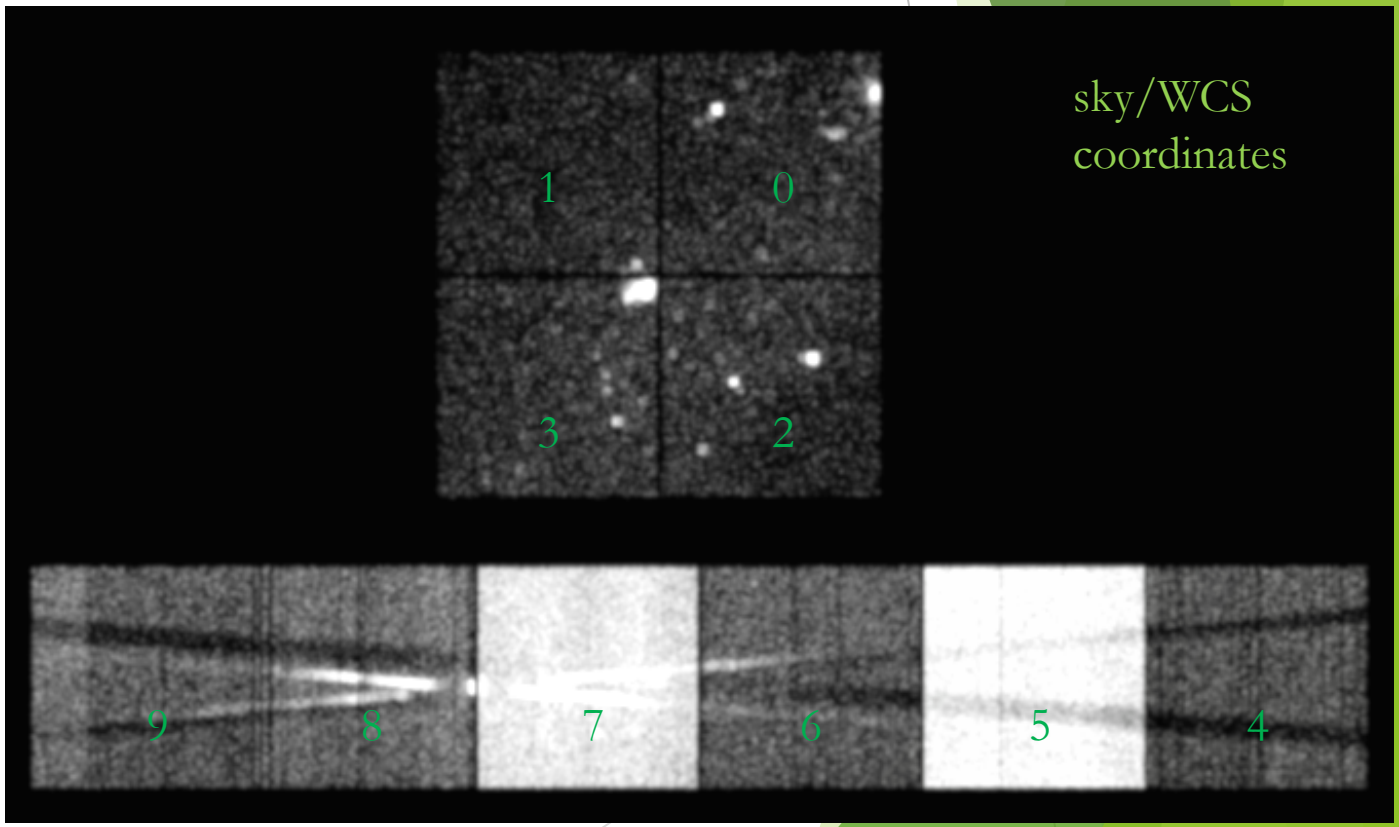
  something seems not to be right with the Sherpa script. I thought I was supposed to get a clear one like the ones from Mrk 421, but I don't understand it...

  What seems wrong with the Sherpa results? What does "clear one" mean? What doesn't the user understand?

An aside on the Previous `dmextract` Ticket

How can the CCD_ID be mistaken in an observation? It's really easy to, especially if only the ACIS-I array is used...





Collated Real Life Example

July 2016

I am currently reading the paper "X-ray Study of Sources in Incognito with *Chandra*" by Zaphod, et al 2008 (MNRAS) and I am trying to generate the lightcurve for Incognito data. In the paper they have identified *N* different sources within the galaxy and plotted the lightcurves for source *x* and source *y*.

I did everything and got the result. I downloaded the data and plotted the light curve for the single evt2 file available for HRC-I. The two plots do not match. Is my method correct?

How do I find out about the energy range the source is emitting? Is there any command or something to specify the energy range or know the energy range of the source? I also searched the analysis guides on the website and found the command under the topic energy filter, `[energy=2000:3000]`, and when I used it, I got an error saying: "`IOError: Error: Could not find identifier energy.`" In the paper, why do they filter the energy value? Can I use the other observation, which uses ACIS-S data, to generate a lightcurve?

Real Life Example — comments

- I am currently reading the paper "X-ray Study of Sources in Incognito with *Chandra*" by Zaphod, et al 2008 (MNRAS) and I am trying to generate the lightcurve for Incognito data.

  The user is clear about wanting to create lightcurves, but what is the full journal reference to the article? It's probable the reference will be found after querying ADS, but occasionally the title provided is the pre-print title found in "astro-ph" that differs from the published version, making the search tougher.

- I did everything and got the result. I downloaded the data and plotted the light curve for the single evt2 file available for HRC-I.

  What does "I did everything" mean? Need more information about what's actually done before being able to move forward.

- The two plots do not match.

  What plots? Is it that the lightcurves extracted don't match each other, or do the extracted lightcurves not match the lightcurves in a figure in the paper? If the latter, what are the figure numbers?

Real Life Example — comments [cont.]

- Is my method correct?

  Did some of the text get lost? Some information and context is missing about the "method" used. That is, between downloading the data and plotting the light curve, what data processing was done? What commands were used to extract the lightcurve? What are the defined regions? Which ObsIDs are used?

- How do I find out about the energy range the source is emitting? Is there any command or something to specify the energy range or know the energy range of the source?

  Knowing the basic characteristics of the instrument used for an observation is important.

- In the paper, why do they filter the energy value?

  Is it explained somewhere in the paper? At the very least, provide the information about the range the authors filtered on, so an educated guess can be made.

- Can I use the other observation, which uses ACIS-S data, to generate a lightcurve?

  Understanding the capabilities of the instrument of interest is useful. Looking at the paper's text and figures referenced in the ticket, the authors used ACIS data to generate the lightcurves.

Finally…

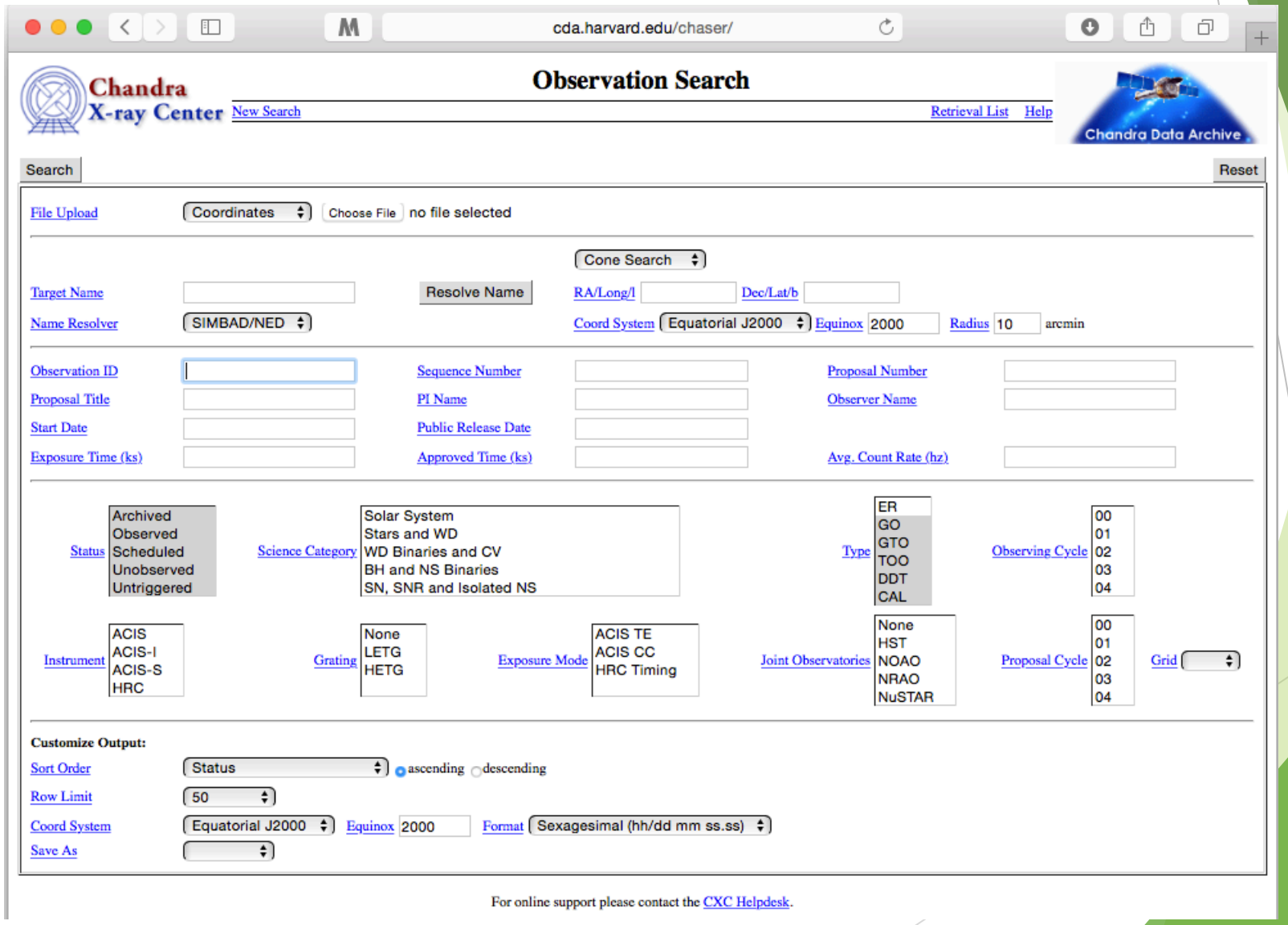
- Please reply back if you're satisfied with the answer/solution so we can go ahead and close the ticket.
- If you have a completely unrelated question, instead of adding to an existing ticket, just open a new ticket.
- Help us help you!
  - the more information you're able to provide up front means a quicker resolution to the concern
- Ultimately, the documentation, software, and helpdesk are meant to help you get to a specific data product.
  - what you do with the data product will be determined by your science goals and judgement
  - doing science is outside the scope of what helpdesk can support

The *Chandra* Data Archive

cxc.harvard.edu/cda

ChaSeR: *Chandra* Search and Retrieval System

cda.harvard.edu/chaser



ChaSeR: *Chandra* Search and Retrieval System

cda.harvard.edu/chaser

- browse the observation catalog with a variety of search criteria
- search fields are self-explanatory, links lead to description of usage and input format
- cone search or range of coordinates around a celestial position or target name
  - target name can be be resolved to a position with SIMBAD and NED
  - a list of up to 5000 positions can also be supplied to query the catalog
- syntax for a range of dates: T_1/T_2, $T_1/$, $/T_2$
  - T_n format: `YYYY-MM-DD`
  - between T_1 and T_2, after T_1, before T_2

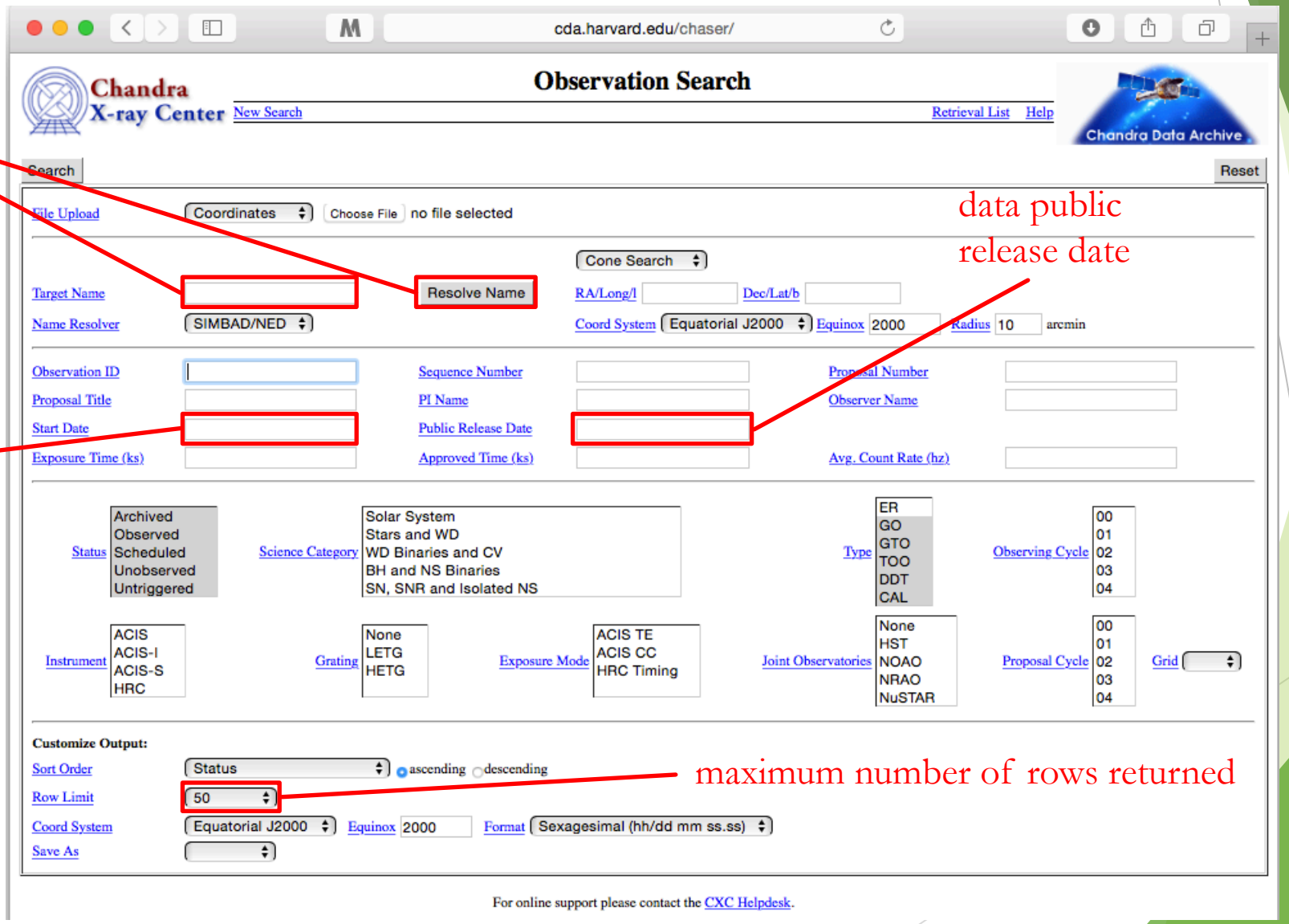
ChaSeR (continued)

source name and name resolver

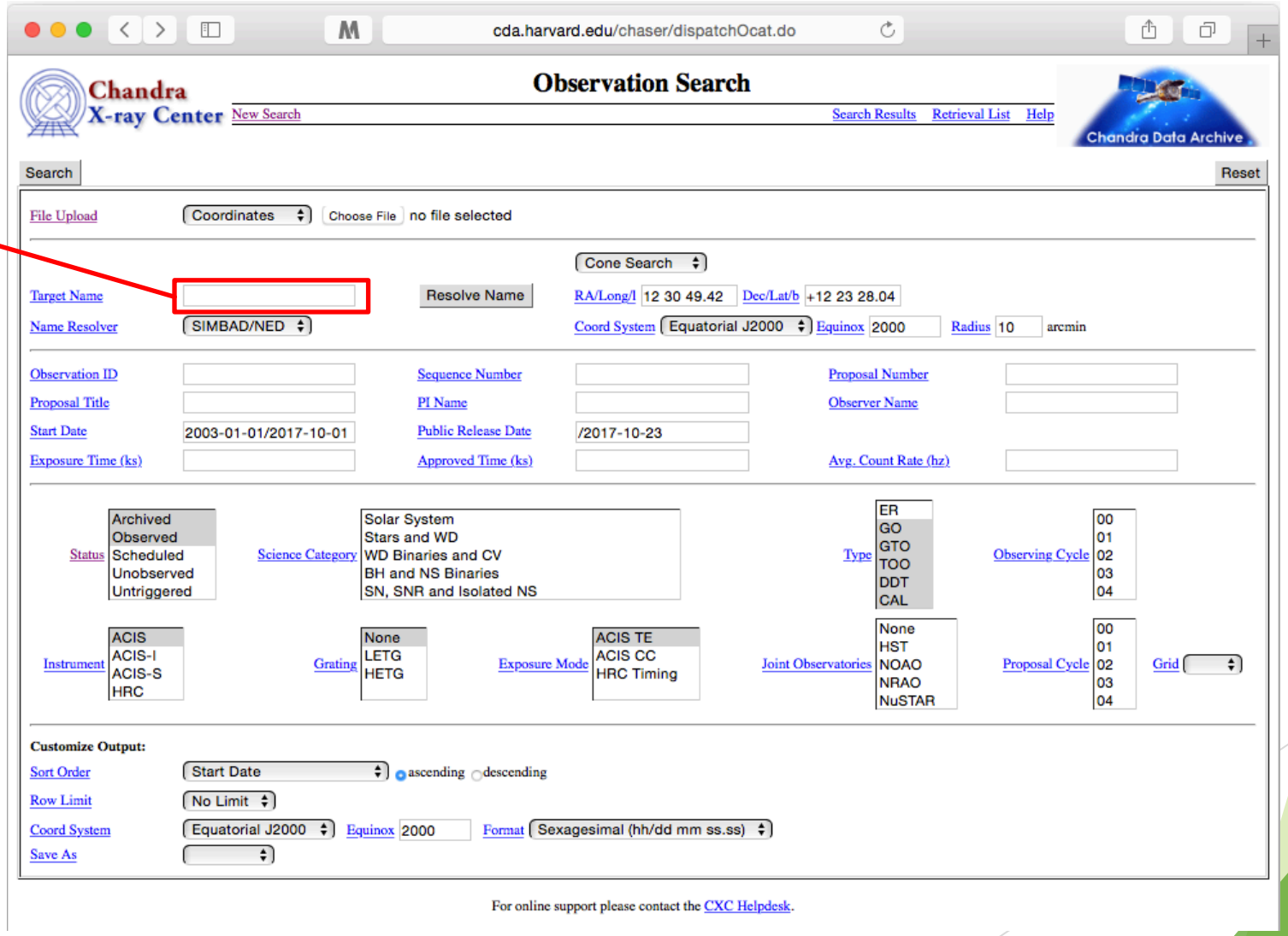
observation start date

data public release date

maximum number of rows returned



ChaSeR (continued)



ChaSeR Query Results

Chandra X-ray Center

Search Results

New Search | Search Results | Retrieval List | Help

Chandra Data Archive

View Observation Information

Add Products to Retrieval List

Primary package
Secondary package
Custom selection

Select all | Unselect all

Select	Row	Seq Num	Obs ID	Instrument	Grating	Appr Exp	Exposure	Target Name	PI Name	RA	Dec	Status	Data
☐	1	700656	3977	ACIS-S	NONE	5.0	5.28	M87	Harris	12 30 49.00	+12 23 30.00	archived	H
☐	2	700657	3978	ACIS-S	NONE	5.0	4.85	M87	Harris	12 30 49.00	+12 23 30.00	archived	H
☐	3	700658	3979	ACIS-S	NONE	5.0	4.49	M87	Harris	12 30 49.00	+12 23 30.00	archived	H
☐	4	700659	3980	ACIS-S	NONE	5.0	4.79	M87	Harris	12 30 49.00	+12 23 30.00	archived	H
☐	5	700660	3981	ACIS-S	NONE	5.0	4.68	M87	Harris	12 30 49.00	+12 23 30.00	archived	H
☐	6	700661	3982	ACIS-S	NONE	5.0	4.84	M87	Harris	12 30 49.00	+12 23 30.00	archived	H
☑	7	700998	4917	ACIS-S	NONE	5.0	5.03	M87	Biretta	12 30 49.00	+12 23 30.00	archived	H
☐	8	700686	4007	ACIS-S	NONE	40.0	36.18	NGC 4486B	Fabbiano	12 30 31.80	+12 29 26.00	archived	V
☐	9	700999	4918	ACIS-S	NONE	5.0	4.68	M87	Biretta	12 30 49.00	+12 23 30.00	archived	H
☐	10	701000	4919	ACIS-S	NONE	5.0	4.7	M87	Biretta	12 30 49.00	+12 23 30.00	archived	H
☐	11	701002	4921	ACIS-S	NONE	5.0	5.25	M87	Biretta	12 30 49.00	+12 23 30.00	archived	H

104 observations found
Position=cone of radius 10 arcmin around RA: 12 30 49.42, Dec: +12 23 28.04 (frame=j2000 equinox=2000)
Start Date=2003-01-01/2017-10-01
Public Release Date=/2017-10-23
Status=archived; observed; scheduled; unobserved; untriggered
Instrument=ACIS
Grating=NONE
Type=GO; GTO; TOO; DDT; CAL
Exposure Mode=TE
Sort Order=Start Date ascending

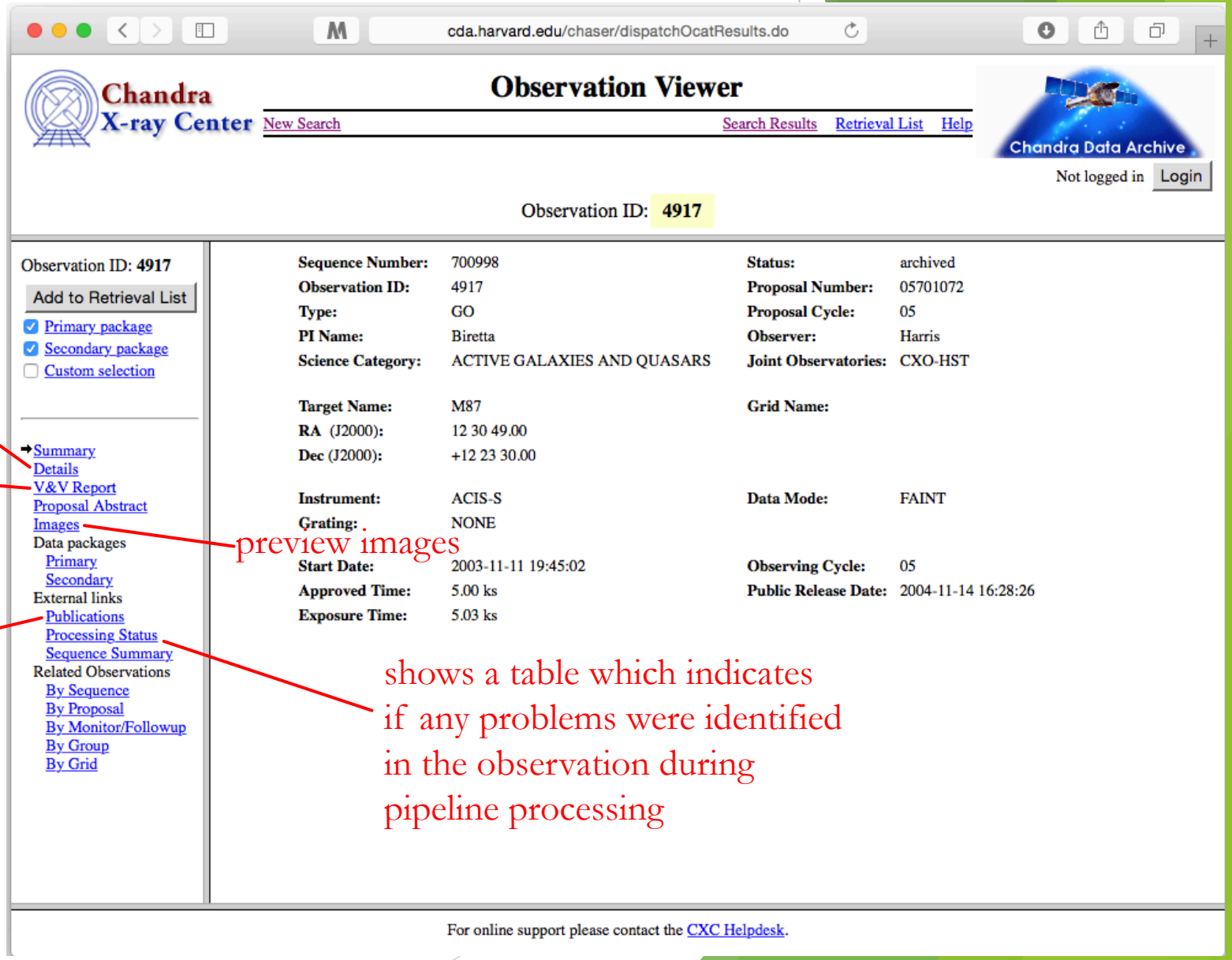
For online support please contact the CXC Helpdesk.

ChaSeR ObsID Entry

details of the instrument configuration for the observation

V&V—Verification and Validation—report includes a summary of any anomalies during the observation, usually noted in the Comments section

list of ADS links to publications that have made use of the observation data



preview images

shows a table which indicates if any problems were identified in the observation during pipeline processing

ChaSeR ObsID Entry

- for non-proprietary data:
  - option to stage primary, secondary, or customized set of data products for retrieval
  - for typical analysis, once you have the ObsID of interest, just use `download_chandra_obsid`
- ChaSeR is required to obtain proprietary data.
- If the existing archive interfaces do not meet your needs, the archive team may consider a special request: `cxc.harvard.edu/cgi-gen/cda/specreq`