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Where do I start?

Chandra has been in orbit for 18 years – observations continue to fill the archive with scientifically rich data. In recent years we've been improving the Chandra data analysis package CIAO (Chandra Interactive Analysis of Observations) so that it's easier for astronomers without a specialist background in X-ray astronomy to take advantage of this resource.

CIAO is easy to install: (Linux/MacOS): Get the 'ciao-install' script from cxc.harvard.edu/ciao/download and run it
ciao-install
(and follow prompts to select installation directory)

Chandra data is easy to get: use the archive search web page, or simply
find_chandra_obsid "Arp 220"
download_chandra_obsid 869

- and easy to prepare: (reprocessing data with latest calibrations, filter bad time intervals)
chandra_repro 869

You can then do more extensive interactive data filtering, but the default is usually good enough. Sometimes you don't even need to analyse the data yourself, but can just access the pre-prepared source catalog – Release 2 coming soon, see other posters at this meeting or **get source catalog fluxes** from the command line
search_csc 14 09 22 +26 30 00

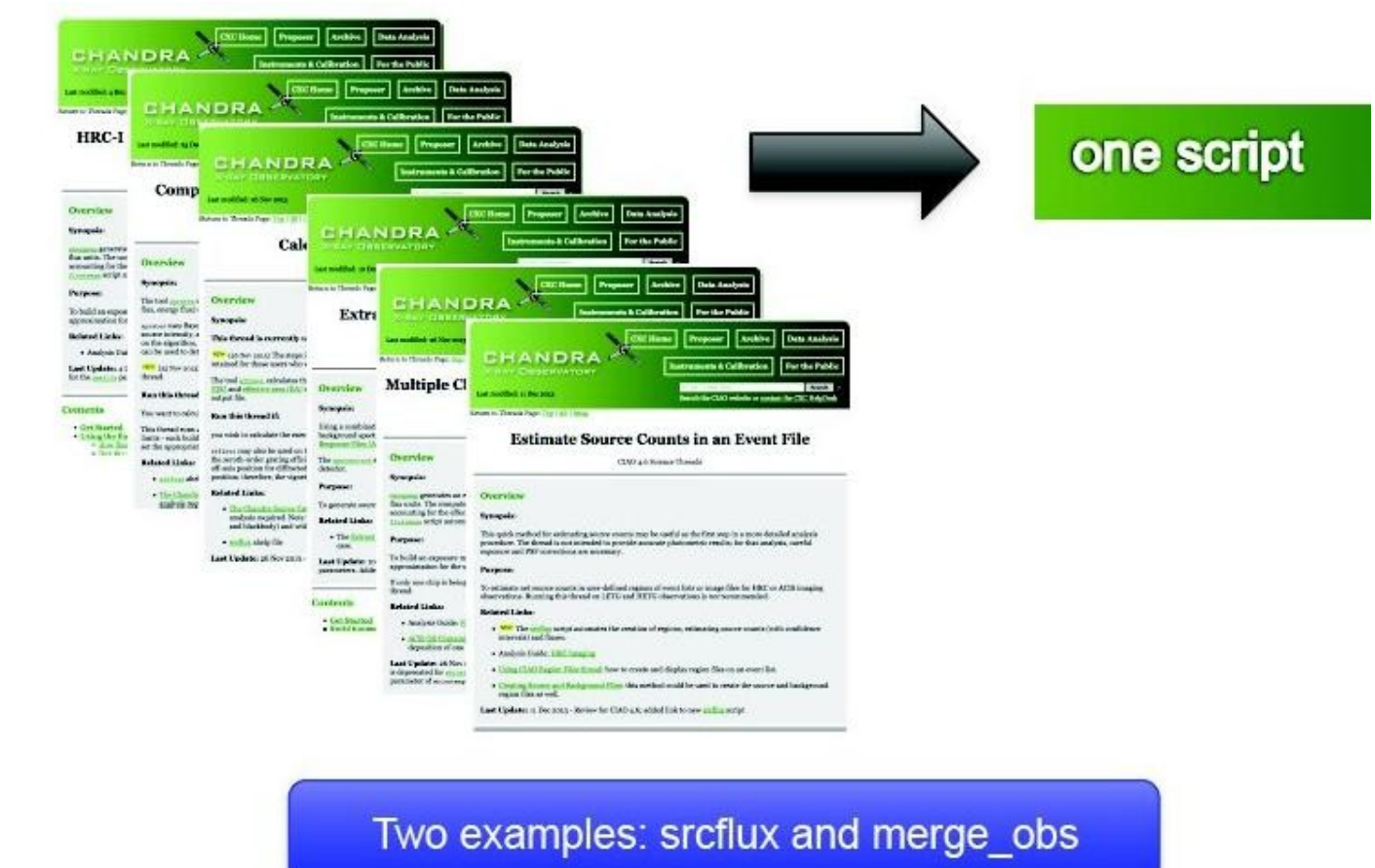
Recent emphasis on high level programs with easy interfaces – particularly helpful for users who are not X-ray astronomy specialists.

Wrap laborious thread analysis steps with a single command line script

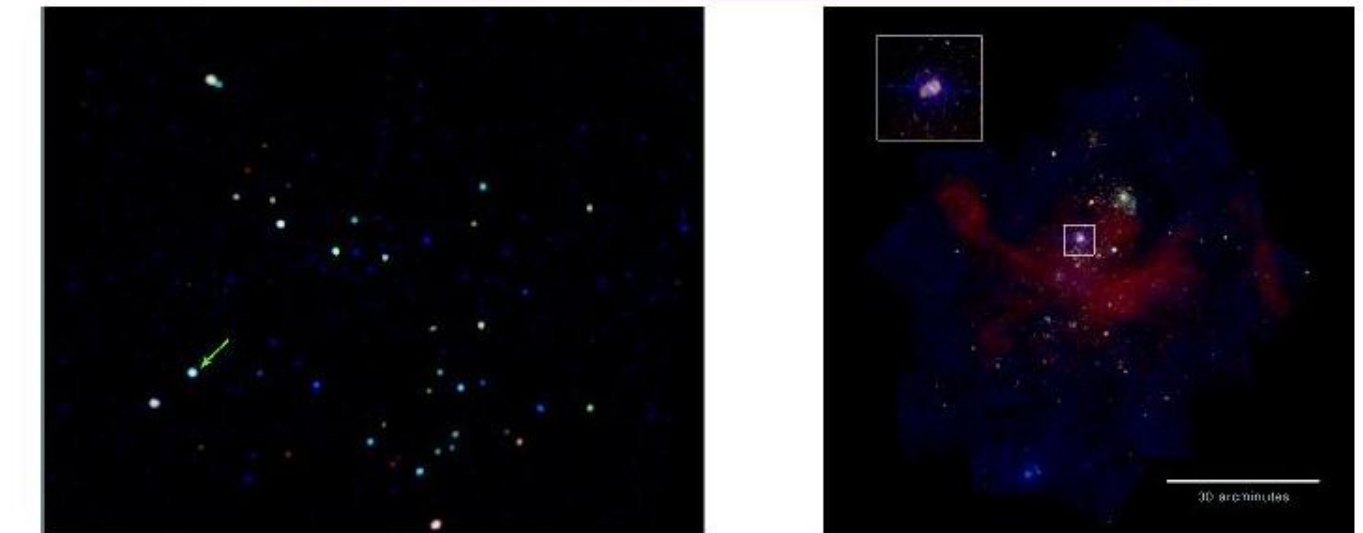
Handle the various special cases by inspecting the metadata in the data files

Scripts have parameters which allow the expert user to tune them

This new suite of scripts makes analysis quicker

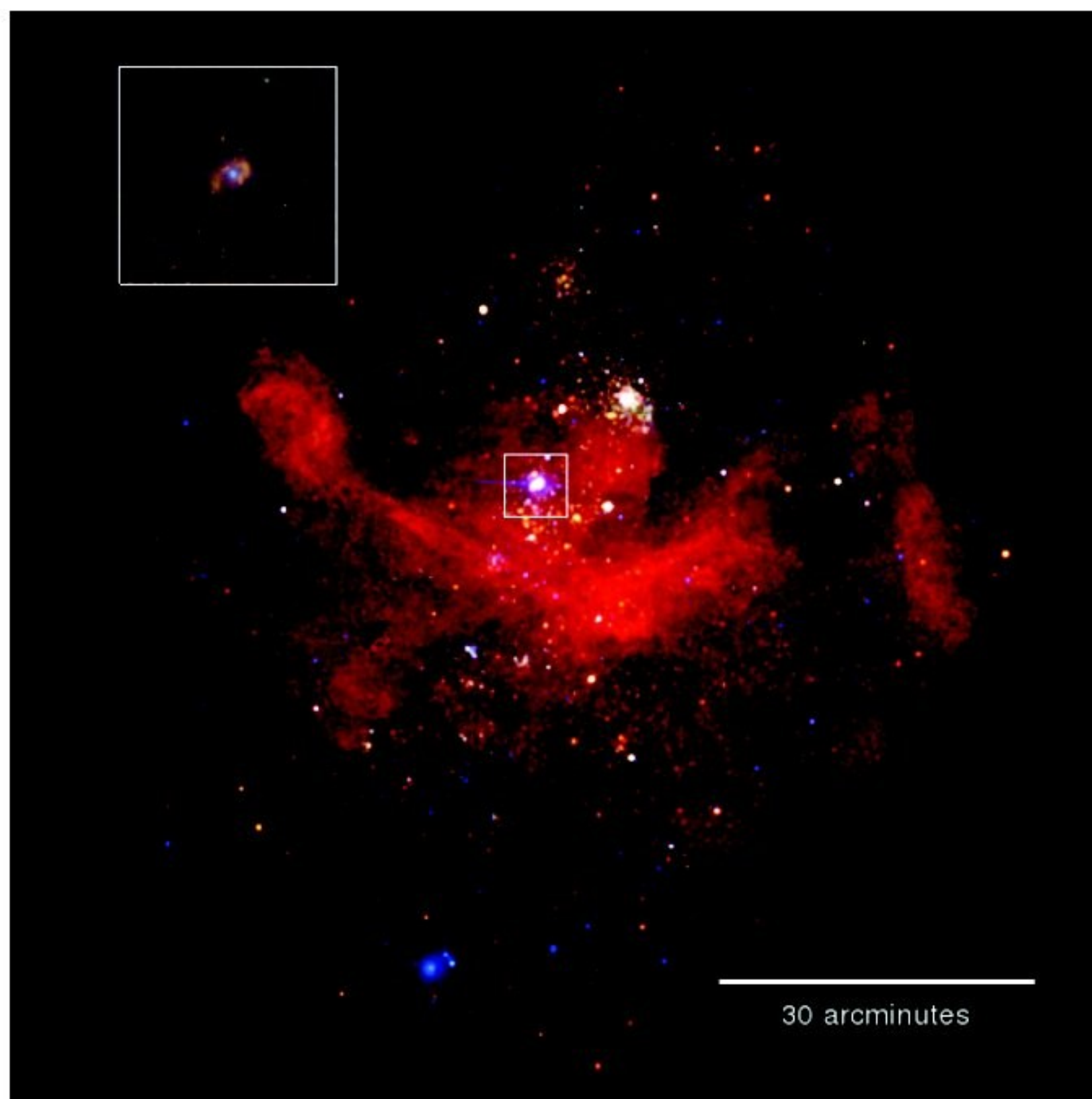


Two examples: srcflux and merge_obs

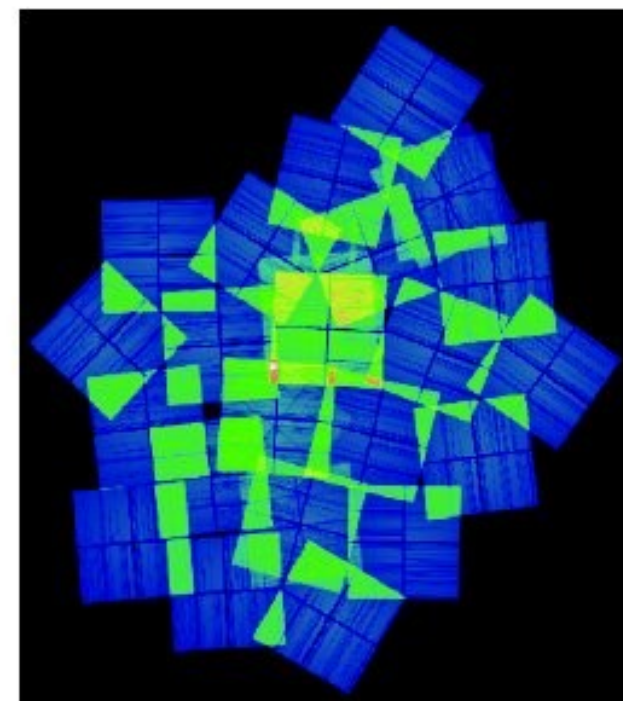


Where are my sources?

Eta Carinae Nebula



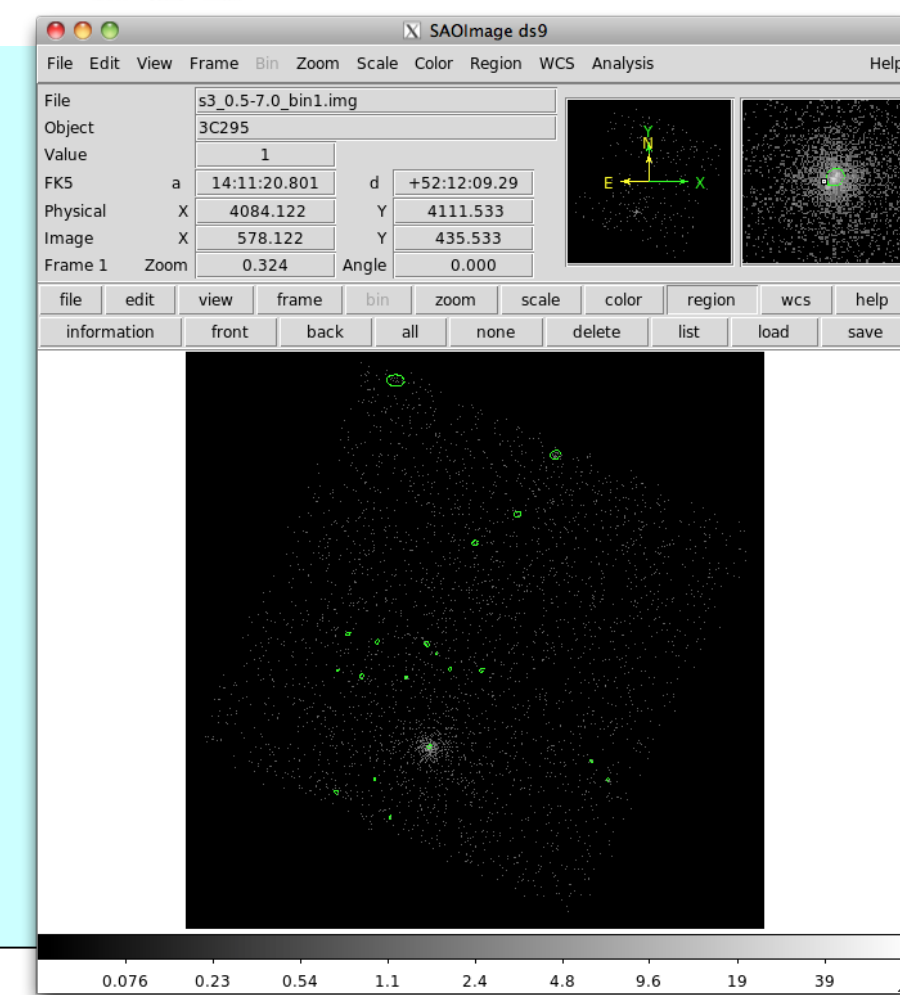
Three-color image of 41 combined ACIS-I observations (0.5-7 keV)



Produced with four "simple" commands

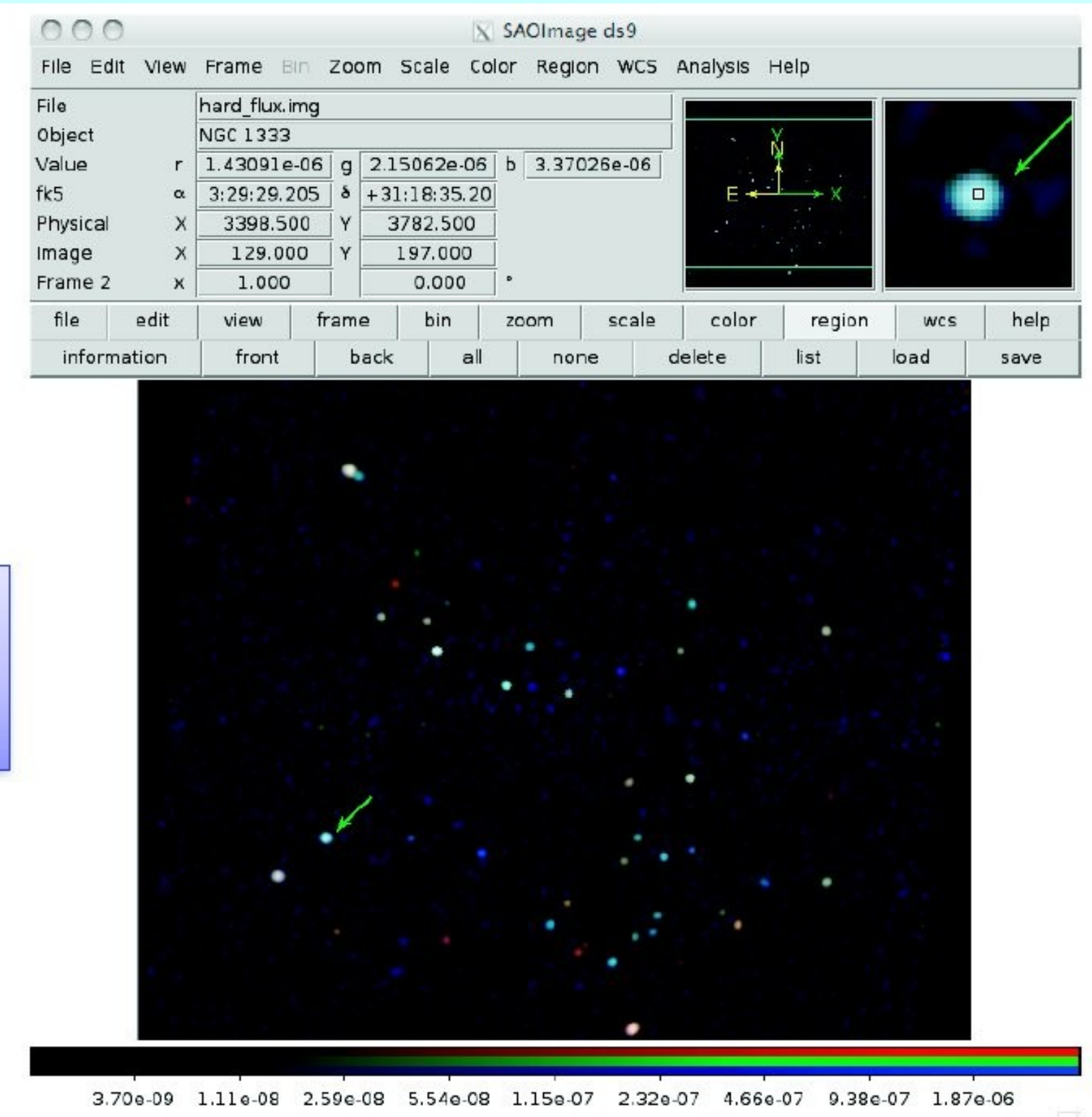
1. find and download the data (download_chandra_obsid)
2. reprocess the observations (chandra_repro)
3. create the combined, exposure corrected images (merge_obs)
4. create the three-color image to display (dmimg2jpg)

Source positions may be measured directly from ds9. For systematic detection of faint sources in a crowded field you can use the wavdetect program which returns a set of source regions (example at right).



How bright is my source?

What is the X-ray flux of this source?



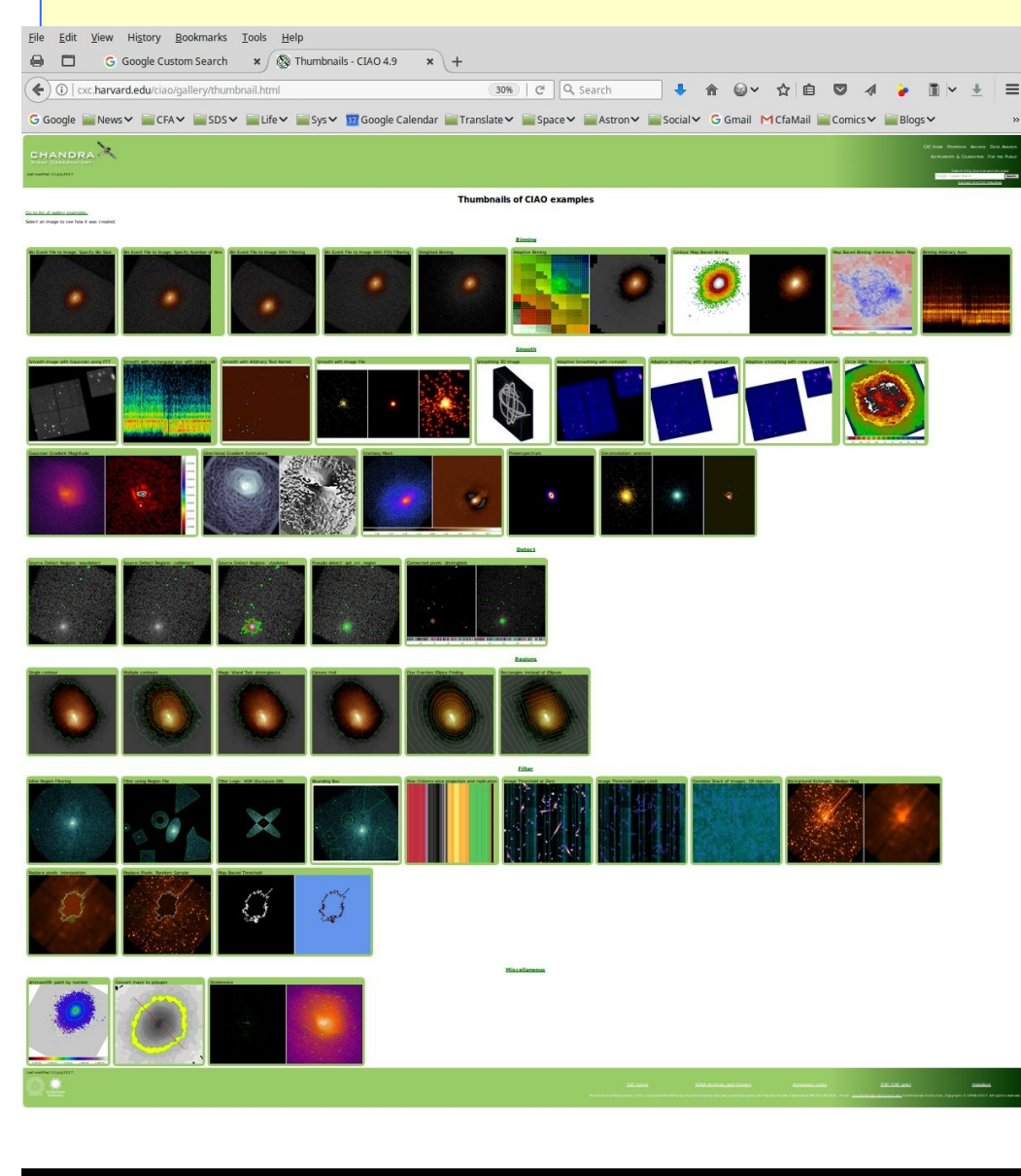
srcflux evt2.fits "03:29:29.2 +31:18:34.7" myflux.out

Summary of source fluxes

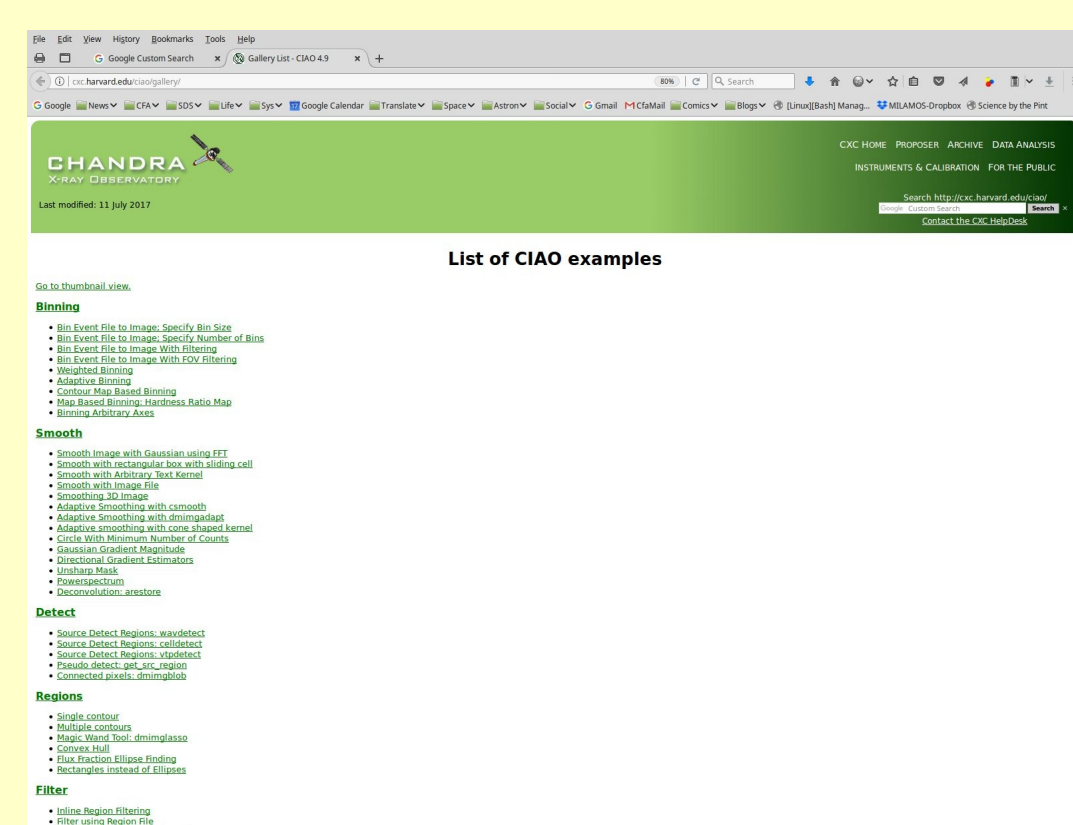
Position	0.5 - 7.0 keV
Value	90% Conf Interval
3 29 29.25 +31 18 34.7	Rate 0.0398 c/s (0.0381,0.0415)
	Flux 5.17E-13 erg/cm2/s (4.94E-13,5.39E-13)
	Mod.Flux 4.38E-13 erg/cm2/s (4.2E-13,4.57E-13)

To support more detailed analysis srcflux creates output files (pha, arf, rmf) for use in the model fitting program Sherpa – also available as a standalone Python application outside of CIAO

How do I find out how to do other things to Chandra data?



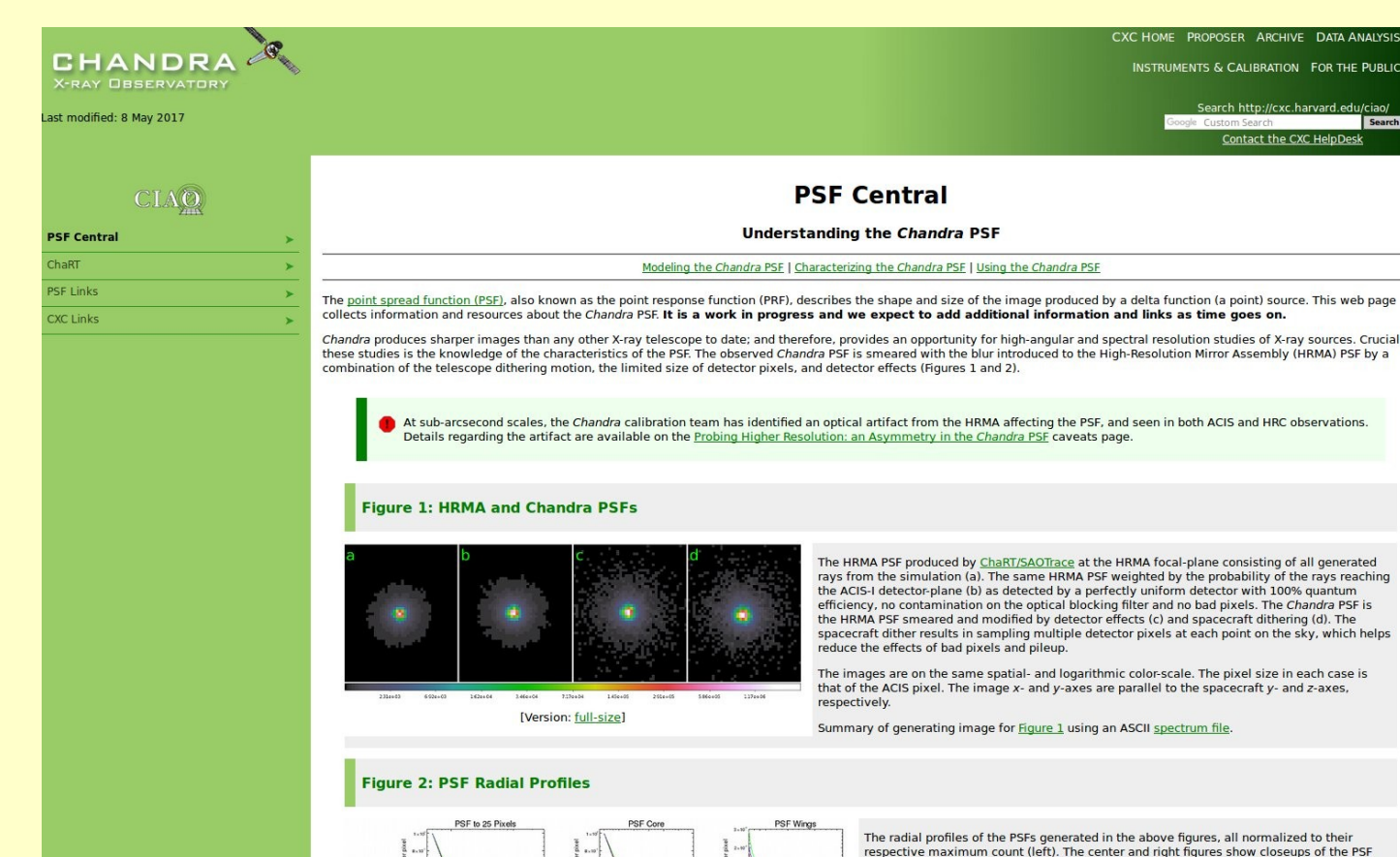
CIAO Gallery: Click on the thumbnail and get instructions on commands needed to make the image



CIAO Threads: step-by-step instructions for all Chandra analysis



Sherpa – fitting of parameterized models to 1D and 2D datasets, including support for fitting X-ray spectra. Python user interface



PSF Central: collection of documentation on the Chandra point spread function. Example: simulate_psf : script to run MarX ray trace tuned to your particular source



cxc.harvard.edu/ciao