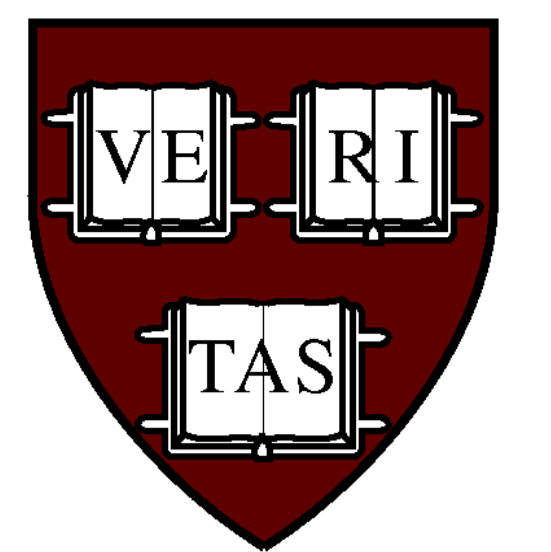


A DS9-BASED INTERFACE TO HRMA ENCLOSED COUNT FRACTION FILES



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ABSTRACT

Recently released HRMA calibration files, based on the SAOsc model of the Chandra PSF, describe the Enclosed Count Fraction vs. distance from PSF center for both circular and elliptical apertures in a 3-D grid of off-axis angle (θ , ϕ) and energy (see <http://cxc.harvard.edu/cal/Hrma/psf/index.html>). The files' organization is well-documented in the on-line help files, but users may find the data difficult to access without developing their own software. We have done so, and present a software package that is launched from DS9. With it, users may display Chandra images or event lists, define one or more regions of interest, and retrieve ECF information for those regions.

WHAT IT IS

- A set of S-LANG scripts that run under the CIAO 3.1 analysis environment and communicate with DS9 through the XPA mechanism;
- A DS9 'analysis command' file that launches the scripts;
- On-line help that may be displayed via DS9;
- A test dataset to verify performance.

WHAT IT DOES

- Retrieves source positions from a Chandra image displayed in DS9 and computes their mirror coordinates (θ , ϕ);
- Reads the HRMA HRC-I ECF calibration file and finds ECF vs. source distance arrays at calibration grid points in (θ , ϕ) and Energy surrounding (θ , ϕ) and user-input energy for each source;
- Determines radius that matches user-desired ECF for arrays at each calibration grid point;
- Linearly interpolates to determine ECF radius for each source;
- Displays results in text window and redraws regions in DS9.

HOW TO GET IT

- For users of the HEAD LAN,
 - set up CIAO 3.1 environment;
 - `setenv APPHOT /proj/fap6/apphot_1.0.0;`
 - `source $APPHOT/bin/setup_apphot.csh;`
- For everyone else, the package may be obtained from http://hea-www.harvard.edu/~fap/apphot_1.0.0.tar.gz. Installation and User's Guides are available at the same web location.

A WORD OF CAUTION

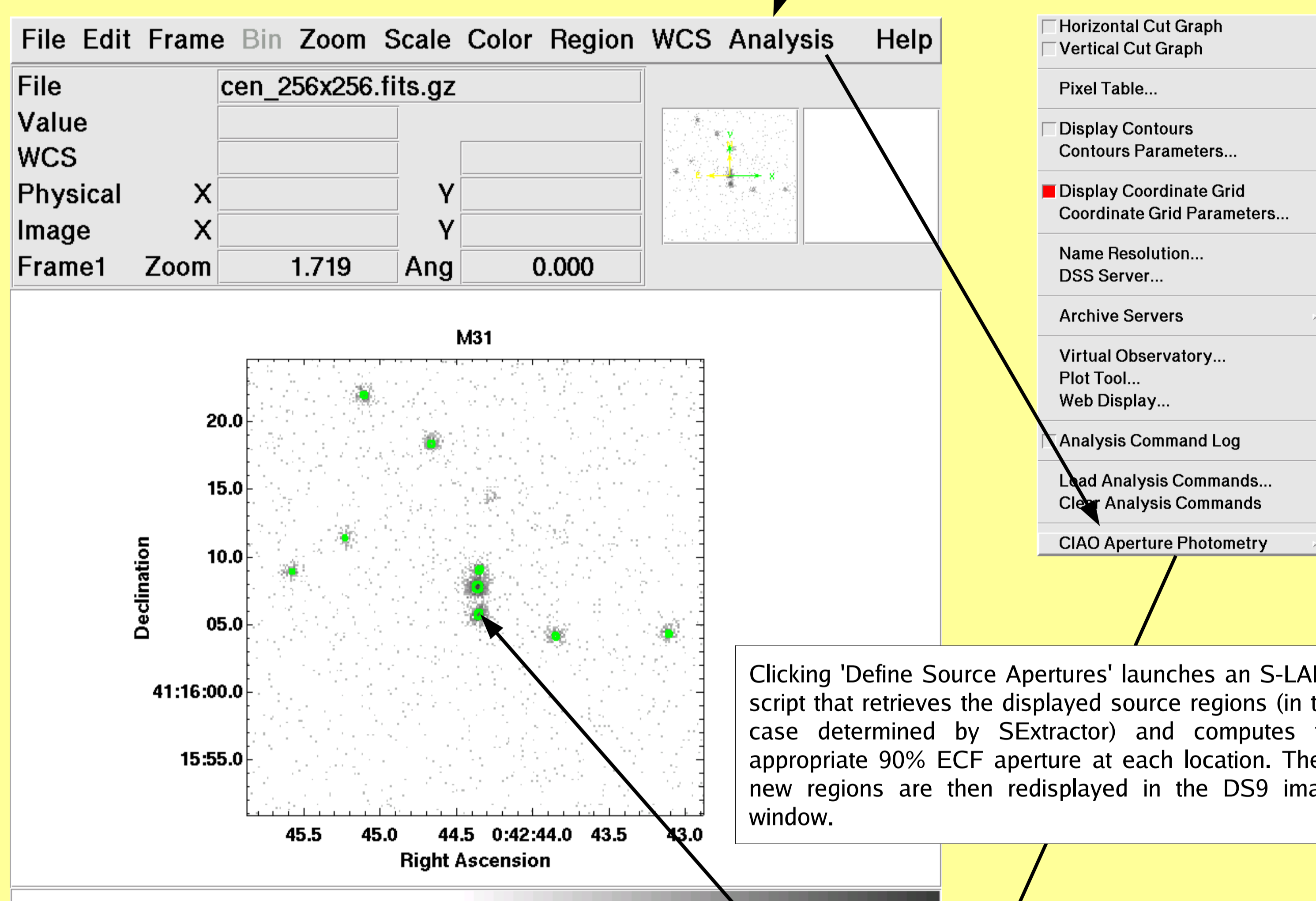
Actually, several words:

The ECFs are not derived directly from calibration data, but rather from raytraces, using a model for the HRMA. Detector effects and aspect dither are not included (for more information see, e.g., <http://cxc.harvard.edu/chart/caveats.html>). Moreover, they assume a single infinite tangent plane with no detector edges. The 90% and 95% ECFs should be reasonably accurate for HRC-I or ACIS-I, but users are discouraged from estimating ECFs on ACIS-S for an ACIS-I aimpoint, or vice versa.

Finally, the current APPHOT package linearly interpolates in the ECF (Energy, θ , ϕ) hypercube to obtain the ECF at the desired energy and source position. The interpolation accuracy has not been extensively verified.

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Executing the command line
`ds9 foo.fits -analysis apphot.ds9`
loads analysis commands in the 'CIAO Aperture Photometry' package.



The DS9 parameter editor allows the user to define input parameters such as the energy at which the ECF is required, or the percentage of enclosed counts in the returned ECF radius.

Energy: 1.49
ECF%: 90.0
ECF File: APPHOT
Verbosity: 0

OK Cancel

