URL: http://cxc.harvard.edu/ciao3.4/ciao.html
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AHELP for CIAO 3.4

ciao

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Synopsis

Chandra Interactive Analysis of Observations

Description

The remarkable science capabilities of the Chandra X−ray Observatory demanded new, flexible, multi−dimensional, software to analyze the data it returned. The result is CIAO − the Chandra Interactive Analysis of Observations − a system that has proven itself useful for the analysis of data from other, non−X−ray missions, because of the mission independence that is the basis of the CIAO design. This document provides an introduction to the CIAO software; more information is available on the web − at either the main Chandra site or the European mirror site − and via CIAO's command−line help system, ahelp (see "ahelp ahelp").

Introduction to CIAO Tools

CIAO is a data analysis system written for the needs of users of the Chandra X−ray Observatory. Because Chandra is the first mission with 4−dimensional data (2 spatial, time, energy) in which each dimension has many independent elements, CIAO was built to handle N−dimensional data without concern about which particular axes were being analyzed. Also, apart from a few Chandra instrument tools, CIAO is mission independent.

CIAO also needed to be able to filter down and project the 4−D Chandra event data to managable sizes and convenient arrays. This has to be done flexibly, so we have built all CIAO tools to take a `filtering and binning' specification on the command line, making use of a general purpose `regions' syntax. See "ahelp dm" for information on the Data Model that makes all this possible.

Since Chandra data can be sliced and diced in so many ways, and because the Chandra calibration is spatially and energy dependent, we needed to keep track of just how the data had been filtered and binned, which we do in a `data subspace'. The tools keep track of this subspace automatically and allow users to review previous data processing. See "ahelp subspace".

The CIAO design allows close interconnection of tools. For example, the output of any of the source DETECT programs can be fed into dmextract to create a summed spectrum which can then be fit in Sherpa.

The modelling and fitting tool Sherpa is central to the CIAO system. Sherpa performs forward fitting of models to data in N−dimensions. Sherpa includes the "S−Lang" language which can be used for scripting and data manipulation. GUIDE links Sherpa results to the APEC/APED plasma database, enabling the identification of spectral lines and the use of their properties in further fitting. See the ahelp documents on

"sherpa", "slang" and "guide".

In order to allow users of Chandra data to use pre−existing tools, all CIAO tools read and write several formats, including FITS images and tables (which includes event files) and IRAF imh files.

Altogether CIAO is a powerful system for the analysis of all types of data.

Further information:

- See "ahelp ahelp" for an introduction to the CIAO on−line help system
- Use "about <keyword>" for a list of subjects related to your query (ie whatever value you use for <keyword>)
- See "ahelp −c tools" for a list of the tools in CIAO
- See "ahelp dm" for a list of topics related to the CIAO data model
- See "ahelp dmintro" for an introduction to the CIAO Data model
- See "ahelp chips" for an introduction to the CIAO plotting package, ChIPS
- See "ahelp sherpa" for information on modelling and fitting data with Sherpa
- See "ahelp guide" for an introduction to using GUIDE for identifying atomic features in spectra
- See "ahelp gui" for an introduction to the graphical user interfaces available within CIAO

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