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 AHELP for CIAO 3.4

# dmimages

Context: [dm](#)

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## Synopsis

Images in CIAO: logical and physical coordinate systems

## Description

In the DM, an 'image' is a single N-dimensional rectangular array of data together with its metadata (header info, coordinate systems, etc). The concept maps closely to a single FITS image file, although in future releases we expect to be able to treat the contents of table array columns in the same way.

Although an image may have 1, 2, 3, or more dimensions, we provide special support for the case of a 2-dimensional image, and the examples below assume such an image. To create any of these images, simply use `dmcopy` to bin on any number of columns: e.g. to create a 1-d image of the x-axis, you could say

```
dmcopy "evt.fits[bin x=1:1024:1]" img_x.fits
```

One complication with images is the distinction between the actual pixels of the image (which we call 'logical' coordinates, and the DS9 display program calls 'image' coordinates) and the original pixels (which we call 'physical coordinates') of the data from which the image was created. Sometimes these are the same, but often we make images at reduced resolution. For example,

```
dmcopy \
  "evt2.fits[bin detx=3000.5:5000.5:2.0,dety=4000.5:6000.5:2.0]" \
  by2.img
```

makes an image which is 1000 x 1000 pixels in size. Its logical pixel numbers then run from 1 to 1000, and so the logical coordinate values run from 0.5 (left hand edge of first pixel) to 1000.5 (right hand edge of last pixel).

To distinguish between the logical and physical systems, we use the notation "#1,#2,.." to denote the 1st, 2nd,... logical coordinate axes, and actual variable names "detx,dety,.." etc. to denote the corresponding physical axes. Non-CIAO FITS images without axis names are given the default physical axis names X,Y,Z (if N is up to 3). To see the physical axis names on your image, use

```
dmclist by2.img cols
```

In this example, logical pixel #1=0.5 corresponds to physical pixel x=3000.5.

See 'ahelp dmimfiltering' for help on filtering an image. The various coordinate systems used when analyzing Chandra data are discussed in the coordinate–system document ('ahelp coords').

## Bugs

See the [bugs page for the Data Model library](#) on the CIAO website for an up–to–date listing of known bugs.

## See Also

*calibration*

[caldb](#)

*chandra*

[coords](#), [guide](#), [isis](#), [level](#), [pileup](#), [times](#)

*chips*

[chips](#)

*concept*

[autoname](#), [parameter](#), [stack](#), [subspace](#)

*dm*

[dm](#), [dmbinning](#), [dmcolls](#), [dmfiltering](#), [dmimfiltering](#), [dmintro](#), [dmopt](#), [dmregions](#), [dmsyntax](#)

*gui*

[gui](#)

*modules*

[paramio](#), [pixlib](#), [stackio](#)

*slang*

[overview](#), [slang](#), [tips](#)

*tools*

[acisspec](#), [dmappend](#), [dmcontour](#), [dmcopy](#), [dmextract](#), [dmfilth](#), [dmimg2jpg](#), [dmimgcalc](#), [dmimghist](#), [dmimgpick](#), [dmimgthresh](#), [dmlist](#), [dmregrid](#), [get\\_sky\\_limits](#)

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URL:  
<http://cxc.harvard.edu/ciao3.4/dmimages.html>  
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