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

pimms

Context: proposaltools

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Synopsis

PIMMS (Portable, Interactive Multi−Mission Simulator) converts source fluxes and count rates between missions.

Description

PIMMS can be run over the WWW using a browser, such as Netscape, or run locally using the command−line interface (CLI). PIMMS is part of the Proposal toolkit. The toolkit is distributed with CIAO.

PIMMS is a tool for estimating the source flux or count rate for a specific mission from either a count rate estimated by a previous mission or flux in some energy bound. It is very useful for simple source spectra, but not for complicated spectral or spatial structures. PIMMS also estimates the amount of Chandra ACIS pile−up assuming a point source on−axis, and accounts for this when estimating count rates. The tool was developed at NASA−GSFC, and the CXC implemented its own version for use as a Chandra proposal tool. Detailed information concerning PIMMS is available at: http://heasarc.gsfc.nasa.gov/docs/software/tools/pimms.html.

Cycle 9 Effective Areas: The calibration files required for the command line interface of PIMMS are included in CIAO 3.4. **There is no CALDB version requirement for PIMMS.** It is also possible to use the PIMMS effective area viewer online to view the latest effective area curves.

ACIS Pile−up: As mentioned above, PIMMS estimates the effect of pile−up on ACIS counting rates. However, if a grating is inserted, the impacts of pile up are only estimated for the counting rate of the zeroth order image.The pile−up fraction in PIMMS software is defined as the ratio of the number of frames with two or more spurious pile−up events to the number of frames with a single, unpiled event. Note that the command−line version of PIMMS assumes that the entire ACIS bandpass is used.

RAYMOND−SMITH MODELS: (1) The calculation only extends to 8 keV regardless of output AND input energy ranges. Any input model will be truncated at 8 keV, no attempt will be made to "convert" counts above 8 keV. Similarly, the output gives flux/counts up to 8 keV. (2) The available temperatures are listed in a pop−up menu from which the user selects that closest to his/her desired temperature.

RUNNING PIMMS OVER THE WEB

PIMMS can be accessed via the URL:

http://cxc.harvard.edu/toolkit/pimms.jsp

A general help file for the Proposal Planning Toolkit is available by clicking the 'HELP' button. Descriptions for each parameter may be found by clicking the appropriate parameter name. The web version of PIMMS has some features not found in the command−line version, such as background count rates for Chandra mission, the ACIS frame time option, and the truncation of energy at 8 keV in Raymond−Smith Models.

BACKGROUND COUNT RATES: The web version of PIMMS provides background in a 1.5" radius circle for imaging (ACIS or HRC) observations. Extended source size specification affects only background determination. PIMMS also estimates the background per resolution element for HRC−S/LETG spectra.

ACIS FRAME TIME:In the web version of PIMMS, the user can either enter the ACIS frame time or choose to have PIMMS calculate the most efficient frame time for a given number of CCDs and sub−array. In the latter case, PIMMS will calculate the frame time that results in the least amount of pile−up and will present the corresponding results. The actual frame time used in performing these calculations can be examined using the "View Output" button.

RUNNING PIMMS FROM THE COMMAND_LINE

To run PIMMS in the interactive CLI mode, type 'prop_pimms' at the Unix prompt. The NASA HEASARC web site includes a PIMMS user guide, and there is a 'HELP' command in PIMMS. To view HELP, simply type 'help' or 'h' at the PIMMS prompt. To exit or go up one level in HELP, hit the return key. To exit PIMMS, type either 'QUIT' or 'EXIT', or simply 'q' or 'e'.

Example 1

Converting a flux to an ACIS−S counting Rate

```
PIMMS > inst chandra−ao9 acis−s
PIMMS > from flux ergs 2−10
PIMMS > mo pl 1.68 7e22
PIMMS > go 1.8e−10


* For power law model with photon index = 1.6800; NH =  7.000E+22
  and a flux (    2.000−   10.000keV) of  1.800E−10 ergs/cm/cm/s
  (Internal model normalization =  6.571E−02)
* PIMMS predicts  5.903E+00 cps with CHANDRA−AO9 ACIS−S
% Pileup estimate for ACIS:
  Pile−up is too high (38.5 %) at the fastest single−chip frame time (0.2 s)
  Consider using the Continuous Clocking mode
```

A count rate estimation for the Chandra Cycle 9 with the detector ACIS−S no grating, from a flux 1.8e−10 ergs/cm/cm/s in energy range of 2−10keV. A power−law model was used with photon spectral index of 1.68 absorbed by a hydrogen column of 7e22 cm −2.

PIMMS predicts 5.903 count/s with CHANDRA−AO9 ACIS−S

Example 2

A Count rate estimation for the Chandra ACIS−I Cycle 9 from the count rate detected from the Chandra ACIS−S Cycle 8 observation.

```
PIMMS> inst chandra−ao9 acis−i 0.3−8
PIMMS> from chandra−ao8 acis−s 0.3−8
PIMMS> mo br 5 4e21
PIMMS> go 1.0

* For thermal Bremsstrahlung model with kT=  5.0000 keV; NH =  4.000E+21
  and  1.000E+00 cps in CHANDRA−AO8 ACIS−S  (    0.300−    8.000keV)
  (Internal model normalization =  1.947E−03)
%!% No pile−up correction will be applied
* PIMMS predicts  8.057E−01 cps with CHANDRA−AO9 ACIS−I  (    0.300−    8.000keV)
% No instrument specific information available when energy range is specified.
```

Example 3

Running PIMMS with an input file. See 'HELP' for details.

```
PIMMS> @input.xco

PIMMS > inst chandra−ao9 acis−i 0.3−8
PIMMS > from chandra−ao8 acis−s 0.3−8
PIMMS > mo br 5 4e21
PIMMS > go 1.0

* For thermal Bremsstrahlung model with kT=  5.0000 keV; NH =  4.000E+21
  and  1.000E+00 cps in CHANDRA−AO8 ACIS−S  (    0.300−    8.000keV)
%!% No pile−up correction will be applied
  (Internal model normalization =  1.947E−03)
* PIMMS predicts  8.057E−01 cps with CHANDRA−AO9 ACIS−I  (    0.300−    8.000keV)
% No instrument specific information available when energy range is specified.
```

The input.xco contains

```
inst chandra−ao9 acis−i 0.3−8
from chandra−ao7 acis−s 0.3−8
mo br 5 4e21
go 1.0
```

Example 4

Converting a flux to an ACIS−S counting Rate with a redshifted absorber.

```
PIMMS > inst chandra−ao9 acis−s 0.2−10
PIMMS > model pl 2.0 2e22 z 1.0 1.2e20
PIMMS > from flux ergs .5−2.0
PIMMS > go 5e−14

* For power law model with photon index = 2.0000; NH =  2.000E+22
 ...redshifted with z=  1.0000 and a Galactic Nh= 1.200E+20
   and a flux (    0.500−    2.000keV) of  5.000E−14 ergs/cm/cm/s
```

```
  (Internal model normalization =  2.146E−04)
* PIMMS predicts  2.162E−02 cps with CHANDRA−AO9 ACIS−S  (    0.200−   10.000keV)
% No instrument specific information available when energy range is specified.
```

This gives the predicted count rate in the 0.2−10 keV band using ACIS−S of a source with a (0.5 − 2.0 keV) flux of 5.0e−14ergs/cm/cm/s, through a Galactic NH column of 1.20E+20, assuming that the source is at z=1.0 with a powerlaw slope of 2.0, and an intrinsic column at that redshift of 2.0e22. Note that the Galactic column comes last on the model input line.

See Also

proposaltools

colden, dates, obsvis, precess, prop−coords, prop−time, prop−tools

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