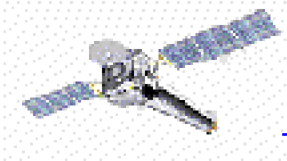


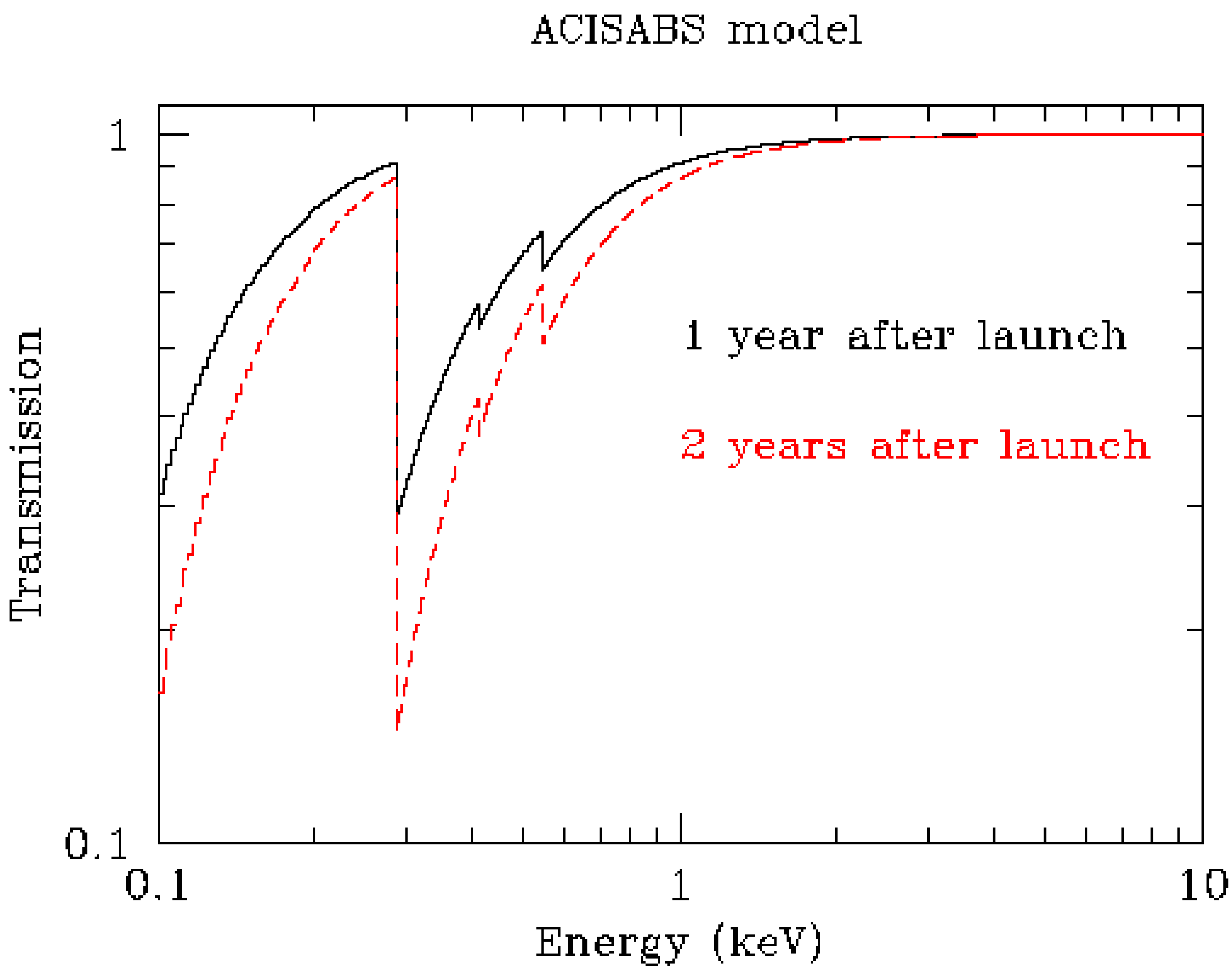
ACIS QE time dependence

- Due to a build up of contaminants on the ACIS-I and -S optical blocking filters the QE of ACIS is time dependent

http://cxc.harvard.edu/cal/Acis/Cal_prods/qeDeg/

- This decrease is not accounted for within CIAO 2.3
- "Ad-hoc" solutions are currently available to:
  - include the transmission model as a component in the fit
  - multiply the ARF by the transmission model

These corrections are based upon the ACISABS parameterisation by George Chartas and Konstantin Getman (Penn State).


ACISABS model
1 year after launch
2 years after launch
Transmission
Energy (keV)
1
0.1
0.1
1
10

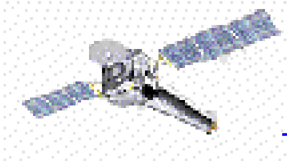
As a component of the fit

The XSPEC ACISABS model (v1.1) is available from the Penn State group (via the CXC software exchange page[1]).

This model has been converted to S-Lang for use within Sherpa; this version is available from the CIAO scripts page[2] and is described in a thread[3]. It can be used just as any other model component:

```
sherpa> source = xsraymond[clus]*xsphabs[gal]*acisabs[qedeg]
```

[1] http://cxc.harvard.edu/cont-soft/software/ACISABS.1.1.html
[2] http://cxc.harvard.edu/ciao/download/scripts/
[3] http://cxc.harvard.edu/ciao/threads/sherpa_acisabs/



Modifying the ARF

A shell script has been developed that will multiply an ARF by the S-Lang version of the transmission model[1]. The Penn State group have an equivalent IDL version[2], and the Calibration team provide a fortran program[3].

[1] http://cxc.harvard.edu/ciao/threads/apply_acisabs/
[2] http://cxc.harvard.edu/cont-soft/software/ACISABS.1.1.html
[3] http://cxc.harvard.edu/cal/Acis/Cal_prods/qeDeg/

- **For non-dispersed data:** modify the ARF

- **For dispersed data:** include the model in the fit and allow the composition parameters to vary

NOTE: the ACISABS model is an approximation so residuals at low energies may still be noticeable (e.g. high s/n grating data).

Future Plans

An approach has been identified for how the time dependence of the contamination will be included in the ARF:

- For the user, it will be handled *transparently* by the CIAO instrument response tools (`mkarf, mkgarf, mkwarf, mkinstmap`).

- The transmission function of the contaminant will be tabulated as a function of wavelength and time. This file will be stored in the CALDB.

- The necessary code and data format are independent of the details of the model supplied by the calibration group (e.g. if it becomes apparent a new contaminant is required).