Chandra X-ray Center

AHELP for CIAO 3.4   **xsplcabs**   Context: sherpa

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Synopsis

Cutoff power law observed through dense, cold matter. XSpec model.

Description

This model describes X–ray transmission of an isotropic source of photons located at the center of a uniform, spherical distribution of matter, correctly taking into account Compton scattering. The model can be used for radial column densities up to 5e24 cm^–2. The valid energy range for which data can be modeled is between 10 and 18.5 keV, depending on the column density. Details of the physics of the model, the approximations used and further details on the regimes of validity can be found in Yaqoob (1996; ApJ, vol 479). In this particular incarnation, the initial spectrum is a power law modified by a high–energy exponential cutoff above a certain threshold energy.

Also, to improve the speed, a FAST option is available in which a full integration over the input spectrum is replaced by a simple mean energy shift for each bin. This option is obtained by setting the parameter "FAST" to a value of 1 or greater and freezing it. Further, for single–scattering albedos less than acrit (parameter 8), energy shifts are neglected altogether. The recommended value is acrit=0.1, which corresponds to about 4 keV for cosmic abundances.

Note that for column densities in the range 10^23 – 10^24 cm^–2, the maximum number of scatterings which need be considered for convergence of the spectrum of better than 1% is between 1 and 5. For columns as high as 5e24, the maximum number of scatterings which need be considered for the same level of convergence is 12.

xsplcabs Parameters

Number	Name	Description
1	nH	column density in units 10^22 cm^–2
2	nmax	maximum number of scatterings to consider; must be frozen
3	FeAbun	iron abundance
4	FeKedge	iron K edge energy
5	PhoIndx	power law photon index
6	HighECut	high–energy cutoff threshold energy
7	foldE	high–energy cutoff e–folding energy
8	acrit	critical albedo for switching to elastic scattering
9	FAST	If FAST > 1, mean energy shift is used instead of integration (see

		DESCRIPTION for details)
10	Redshift	source redshift, z
11	norm	normalization

This information is taken from the XSpec User's Guide. Version 11.3.1 of the XSpec models is supplied with CIAO 3.2.

Bugs

For a list of known bugs and issues with the XSPEC models, please visit the XSPEC bugs page.

See Also

sherpa

atten, bbody, bbodyfreq, beta1d, beta2d, box1d, box2d, bpl1d, const1d, const2d, cos, delta1d, delta2d, dered, devaucouleurs, edge, erf, erfc, farf, farf2d, fpsf, fpsf1d, frmf, gauss1d, gauss2d, gridmodel, hubble, jdpileup, linebroad, lorentz1d, lorentz2d, models, nbeta, ngauss1d, poisson, polynom1d, polynom2d, powlaw1d, ptsrc1d, ptsrc2d, rsp, rsp2d, schechter, shexp, shexp10, shlog10, shloge, sin, sqrt, stephi1d, steplo1d, tan, tpsf, tpsf1d, usermodel, xs, xsabsori, xsacisabs, xsapec, xsbapec, xsbbody, xsbbodyrad, xsbexrav, xsbexriv, xsbknpower, xsbmc, xsbremss, xsbvapec, xsc6mekl, xsc6pmekl, xsc6pvmkl, xsc6vmekl, xscabs, xscemekl, xscevmkl, xscflow, xscompbb, xscompls, xscompst, xscomptt, xsconstant, xscutoffpl, xscyclabs, xsdisk, xsdiskbb, xsdiskline, xsdiskm, xsdisko, xsdiskpn, xsdust, xsedge, xsequil, xsexpabs, xsexpdec, xsexpfac, xsgabs, xsgaussian, xsgnei, xsgrad, xsgrbm, xshighecut, xshrefl, xslaor, xslorentz, xsmeka, xsmekal, xsmkcflow, xsnei, xsnotch, xsnpshock, xsnsa, xsnteea, xspcfabs, xspegpwrlw, xspexrav, xspexriv, xsphabs, xsplabs, xsposm, xspowerlaw, xspshock, xspwab, xsraymond, xsredden, xsredge, xsrefsch, xssedov, xssmedge, xsspline, xssrcut, xssresc, xssssice, xsstep, xstbabs, xstbgrain, xstbvarabs, xsuvred, xsvapec, xsvarabs, xsvbremss, xsvequil, xsvgnei, xsvmcflow, xsvmeka, xsvmekal, xsvnei, xsvnpshock, xsvphabs, xsvpshock, xsvraymond, xsvsedov, xswabs, xswndabs, xsxion, xszbbody, xszbremss, xszedge, xszgauss, xszhighect, xszpcfabs, xszphabs, xszpowerlw, xsztbabs, xszvarabs, xszvfeabs, xszvphabs, xszwabs, xszwndabs

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usermodel