Chandra X-ray Center

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

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Synopsis

Comptonization by relativistically moving matter. XSpec model.

Description

This is an analytic model describing Comptonization of soft photons by matter undergoing relativistic bulk–motion. The typical scenario involves thermal X–rays from the inner region of an accretion disk in a black–hole binary illuminating in–falling matter in close proximity to the black–hole event horizon. For a detailed description of the model, refer to one of the following:

- Titarchuk, Mastichiadis and Kylafis 1997, ApJ, 487, 834
- Titarchuk and Zannias, 1998, ApJ, 493, 863
- Laurent and Titarchuk 1999, ApJ, 511, 289
- Zannias, Borozdin, Revnivtsev., Trudolyubov, Shrader, and Titarchuk, 1999, ApJ, 517, 367
- Shrader and Titarchuk 1999, ApJ 521, L21

The model parameters are the characteristic black–body temperature of the soft photon source, a spectral (energy) index, and an illumination parameter characterizing the fractional illumination of the bulk–motion flow by the thermal photon source.

It must be emphasized that this model is not an additive combination of power law and thermal sources, rather it represents a self–consistent convolution. The bulk–motion up–scattering and Compton recoil combine to produce the hard spectral tail, which combined with the thermal source results in the canonical high–soft–state spectrum of black hole accretion. The position of the sharp high energy cutoff (due to recoil) can be determined using the theta function Theta (E_c–E). The model can also be used for the general Comptonization case when the energy range is limited from above by the plasma temperature (see "ahelp xscomptt" and "ahelp xscompst").

xsbmc Parameters

Number	Name	Description
1	kT	temperature of thermal photon source in keV
2	alpha	energy spectral index

| 3 | logA | log of the A parameter. Note that f in Borozdin et al 1999 and Shrader and Titarchuk 1999 is 10^logA. |
| 4 | norm | A_N, defined in in Borozdin et al 1999 and Shrader and Titarchuk 1999 |

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, 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, xsplcabs, 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

slang

usermodel

URL:
http://cxc.harvard.edu/ciao3.4/xsbmc.html
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