

bapec, bvapec: velocity broadened APEC thermal plasma model

A velocity- and thermally-broadened emission spectrum from collisionally-ionized diffuse gas calculated using the APEC code v1.3.1. More information on APEC can be found at

<http://hea-www.harvard.edu/APEC>

which should be consulted by anyone running this model. By default this model reads atomic physics continuum and line data from `apec_v[version]_coco.fits` and `apec_v[version]_line.fits` in the `$HEADAS/./spectral/modelData` directory. Different files can be specified by using the command `xset APECROOT`. There are three options. `APECROOT` can be set to a version number (eg 1.10, 1.2.0, 1.3.1). In this case the value of `APECROOT` will be used to replace 1.3.1 in the name of the standard files and the resulting files will be assumed to be in the `modelData` directory. Alternatively, a filename root (eg `apec_v1.2.0`) can be given. This root will be used as a prefix for the `_coco.fits` and `_line.fits` files. Finally, if neither of these work then the model will assume that the `APECROOT` value gives the complete directory path, e.g.

```
XSPEC12> xset APECROOT /foo/bar/apec_v1.2.0
```

will use the input files

```
/foo/bar/apec_v1.2.0_coco.fits
```

```
/foo/bar/apec_v1.2.0_line.fits.
```

The **bapec** model uses abundances set by the **abund** command. The **bvapec** variant allows the user to set the abundance using additional parameters.

par1	plasma temperature, keV
par2	Metal abundances (He fixed at cosmic). The elements included are C, N, O, Ne, Mg, Al, Si, S, Ar, Ca, Fe, Ni. Relative abundances are set by the abund command.
par3	Redshift, z
par4	Gaussian sigma for velocity broadening (km/s)
norm	$\frac{10^{-14}}{4\pi [D_A(1+z)]^2} \int n_e n_H dV$, where D_A is the angular diameter distance to the source (cm), n_e and n_H are the electron and H densities (cm^{-3})

For the **bvapec** variant the parameters are as follows.

par1	plasma temperature, keV
par2-par14	Abundances for He, C, N, O, Ne, Mg, Al, Si, S, Ar, Ca, Fe, Ni wrt Solar (defined by the abund command)
par15	redshift, z
par16	Gaussian sigma for velocity broadening (km/s)

norm $\frac{10^{-14}}{4\pi[D_A(1+z)]^2} \int n_e n_H dV$, where D_A is the angular diameter distance to the source (cm), n_e and n_H are the electron and H densities (cm^{-3})