

- **suzpsf: suzaku surface brightness model**

Mixing model for Suzaku data. Mixes the spectra between datagroups based on the PSF overlap between selected regions. A surface brightness model is required to calculate the mixing and this can be supplied in several ways. If SUZPSF-IMAGE has been set to some image file (using **xset**) then this image will be used for the surface brightness distribution. If SUZPSF-IMAGE has not been set then either a beta or two power-law model is used. In this case the model parameters determine the shape of the surface brightness distribution. If SUZPSF-RA and SUZPSF-DEC are set they are used as the center of the distribution. They should be specified either in decimal degrees or as hh:mm:ss.s and dd:mm:ss.s. If SUZPSF-RA and SUZPSF-DEC are not set then the centroid of the wmap will be used as the center of the surface brightness distribution.

The PSF used is an empirical model of a sum of two exponentials and a Gaussian with coefficients determined from an observation of MCG-6-30-15 performed early in the mission.

The model works by calculating the mixing factors. It will recalculate these factors if any of the SUZPSF-* or any of the model parameters are changed. Calculating the mixing factors is very slow so should be avoided as much as possible. To speed things up, it is possible to save the mixing factor array to a FITS file and re-use it during a later calculation. To save a mixing factor calculation, prior to loading the mixing model (using the **model** command), use **xset** to set the variable SUZPSF-MIXFACT-OFIEn to the name of the output FITS file, and where n is an integer corresponding to the observation number:

```
XSPEC12> xset SUZPSF-MIXFACT-OFIEn fact_obs1.fits
```

Conversely, a saved factor array can be read in by setting SUZPSF-MIXFACT-IFILEn:

```
XSPEC12> xset SUZPSF-MIXFACT-IFILEn fact_obs1.fits
```

Multiple observations can be fit simultaneously. In this case the observations should be read in each datagroup in the same order, e.g.

```
XSPEC12> data 1:1 obs1reg1 1:2 obs2reg1 1:3 obs3reg1 2:4 obs1reg2 2:5 obs2reg2
```

par1	Alpha (not used if Switch=0)
par2	Beta
par3	Core (arcmin)
par4	Switch (0 = beta model, 1 = 2-power-law)