



AHELP for CIAO 3.4

## tps1d

Context: [sherpa](#)

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## Synopsis

A 1-D TCD-model-based instrument model.

## Description

TPSF1D is a model-based instrument model. It utilizes the predefined Gaussian, box, and top hat functions of the TCD library.

Note that Top Hat function cannot be used in version 3.2

The convolution can be performed using either Fast Fourier Transforms (FFTs, the default), or the sliding cell technique (see the parameter `fft`). If the axis length is  $N$  and the length of the kernel axis is  $M (= 2 * xsize + 1)$ , then the computation time for the sliding cell goes as  $N * M$ , i.e. for large kernels the best choice is using the FFT. A rough rule-of-thumb for 1-D fits is to use the FFT if  $M > 10$ .

In Sherpa version 3.0.2, a new parameter is introduced: `radial`. If set to 1 the kernel array will be extended and its values reflected across the edge boundary. The resultant function will be symmetric. The default value (set to 0) should be used in version 3.2.

See the documentation on the INSTRUMENT command.

### TPSF1D Parameters

| Number | Name                 | Description                                  |
|--------|----------------------|--|
| 1      | <code>xsize</code>   | x-axis kernel width (pixels)                 |
| 2      | <code>nsigma</code>  | sigma kernel width (Gaussian only)           |
| 3      | <code>funcTyp</code> | Gaussian (1) / box (2) / top-hat (3)         |
| 4      | <code>fft</code>     | convolution type: 1 = FFT / 0 = sliding cell |
| 5      | <code>radial</code>  | radial profile: 1 = yes / 0 = no             |

## Example

This example illustrate the definition of the TPSF1D model.

```
sherpa> tpsf1d[t1]
sherpa> show t1
tps1d[t1]
```

| Param | Type    | Value  | Min | Max   | Units |
|-------|---------|--------|-----|-------|-------|
| ----- | -----   | -----  | --- | ---   | ----- |
| 1     | xsize   | frozen | 4   | 1     | 1024  |
| 2     | nsigma  | frozen | 2   | 1e-02 | 100   |
| 3     | funcTyp | frozen | 1   | 0     | 7     |
| 4     | fft     | frozen | 1   | 0     | 1     |
| 5     | radial  | frozen | 0   | 0     | 1     |

The Function Type is: Gaussian.

The parameter funcTyp in t1 model indicate that the Gaussian function will be used. The 1 sigma width of the Gaussian is set to xsize=4 bins and the total size of the Gaussian kernel is set to 2 sigma.

## Bugs

See the [Sherpa bug pages](#) online for an up-to-date listing of known bugs.

## See Also

### sherpa

[atten](#), [bbody](#), [bbodyfreq](#), [beta1d](#), [beta2d](#), [box1d](#), [box2d](#), [bpl1d](#), [const1d](#), [const2d](#), [cos](#), [delta1d](#), [delta2d](#), [derez](#), [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](#), [steph1d](#), [steplo1d](#), [tan](#), [tpsf](#), [usermodel](#), [xs](#), [xsabsori](#), [xsacisabs](#), [xsapec](#), [xsbapec](#), [xsbbody](#), [xsbbodyrad](#), [xsbexrav](#), [xsbexriv](#), [xsbknpower](#), [xsbmc](#), [xsbremss](#), [xsbvapec](#), [xsc6mekl](#), [xsc6pmekl](#), [xsc6pvmkl](#), [xsc6vmekl](#), [xscabs](#), [xscemekl](#), [xscvmkl](#), [xscflow](#), [xscmpbb](#), [xscmpls](#), [xscmpst](#), [xscmpstt](#), [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](#), [xspcpwrlw](#), [xspexrav](#), [xspexriv](#), [xsphabs](#), [xsplabs](#), [xsplcabs](#), [xspesm](#), [xspowerlaw](#), [xspshock](#), [xspwab](#), [xsraymond](#), [xsredden](#), [xsredge](#), [xsrefsch](#), [xssedov](#), [xssmedge](#), [xsspline](#), [xssrcut](#), [xssresc](#), [xssssice](#), [xsststep](#), [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](#)

### tools

[aconvolve](#), [acrosscorr](#), [apowerspectrum](#), [arestore](#), [csmooth](#)

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URL:  
<http://cxc.harvard.edu/ciao3.4/tpsf1d.html>  
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