

npshock, vnps shock: shocked plasma, plane parallel, separate ion, electron temperatures.

Plane-parallel shock plasma model with separate ion and electron temperatures. This model is slow. `par1` provides a measure of the average energy per particle (ions+electrons) and is constant throughout the postshock flow in plane shock models (Borkowski et al., 2001, ApJ, 548, 820). `par2` should always be less than `par1`. If `par2` exceeds `par1` then their interpretations are switched (ie the larger of `par1` and `par2` is always the mean temperature). Additional references can be found under the help for the `equil` model. Several versions are available. To switch between them use the `xset neivers` command. `xset neivers 1.0` gives the version from `xspec v11.1`, `xset neivers 1.1` uses updated calculations of ionization fractions using dielectronic recombination rates from Mazzotta et al (1988), and `xset neivers 2.0` uses the same ionization fractions as 1.1 but uses APED to calculate the resulting spectrum. Note that versions 1.x have no emission from Ar. The default is version 1.1.

The `npshock` version uses relative abundances from the Anders & Grevesse (1993) mix, while the `vnps shock` version allows the user to set the abundances.

Parameters for **npshock** are:

<code>par1</code>	Mean shock temperature (keV)
<code>par2</code>	electron temperature immediately behind the shock front (keV)
<code>par3</code>	Metal abundances (He fixed at cosmic). The elements included are C, N, O, Ne, Mg, Si, S, Ar, Ca, Fe, Ni. Abundances are given by the Anders & Grevesse mixture.
<code>par4</code>	Lower limit on ionization timescale in units of s cm^{-3} .
<code>par5</code>	Upper limit on ionization timescale in units of s cm^{-3} .
<code>par6</code>	redshift z
<code>norm</code>	$\frac{10^{-14}}{4\pi [D_A(1+z)]^2} \int n_e n_H dV$ where D_A is the angular diameter distance to the source (cm) , and n_e , n_H (cm^{-3}) are the electron and hydrogen densities respectively.

For **vnps shock** the parameters are:

par1	Mean shock temperature (keV)
par2	electron temperature immediately behind the shock front (keV)
par3	H density in cm^{-3}
par4-par15	Abundances for He, C, N, O, Ne, Mg, Si, S, Ar, Ca, Fe, Ni wrt Solar (given by the Anders & Grevesse mixture)
par16	Lower limit on ionization timescale in units of s cm^{-3} .
par17	Upper limit on ionization timescale in units of s cm^{-3} .
par18	redshift z
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) , and n_e , n_H (cm^{-3}) are the electron and hydrogen densities respectively.