

gnei, vgnei: collisional plasma, non-equilibrium, temperature evolution

Non-equilibrium ionization collisional plasma model. This is a generalization of the **nei** model where the temperature is allowed to have been different in the past *i.e.* the ionization timescale averaged temperature is not necessarily equal to the current temperature. For example, in a standard Sedov model with equal electron and ion temperatures, the ionization timescale averaged temperature is always higher than the current temperature for each fluid element. The references for this model can be found under the description of 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 **vgnei** variant allows the user to set the abundances of the model.

For the **gnei** model the parameters are:

par1	plasma temperature (keV)
par2	Metal abundances (He fixed at cosmic). The elements included are C, N, O, Ne, Mg, Si, S, Ar, Ca, Fe, Ni. Abundances are defined by the abund command
par3	Ionization timescale in units of s cm ⁻³ .
par4	Ionization timescale averaged plasma temperature (keV)
par5	(fixed) redshift
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 (cm ⁻³) are the electron and hydrogen densities respectively.

For **vgnei** the parameters are:

par1	plasma temperature (keV)
par2-par13	(Fixed) Abundances for He, C, N, O, Ne, Mg, Si, S, Ar, Ca, Fe, Ni wrt Solar (defined by the abund command)

par14	Ionization timescale in units of s cm^{-3} .
par15	Ionization timescale averaged plasma temperature (keV)
par16	(fixed) redshift
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.