

equil, vequil: collisional plasma, ionization equilibrium

Ionization equilibrium collisional plasma model. This is the equilibrium version of Kazik Borkowski's NEI models. 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 **vequil** variant allows the user to set the abundances for the model.

For the **equil** 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	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 is the electron density (cm^{-3}), and n_H is the hydrogen density (cm^{-3})

For the **vequil** model, the parameters are:

par1	plasma temperature (keV)
par2-par13	Abundances for He, C, N, O, Ne, Mg, Si, S, Ar, Ca, Fe, Ni wrt Solar (defined by the abund command)
par14	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), n_e is the electron density (cm^{-3}), and n_H is the hydrogen density (cm^{-3})

The references for this model are as follows:

Borkowski, Lyerly & Reynolds, 2001, ApJ, 548, 820

Hamilton, A.J.S., Sarazin, C. L. & Chevalier, R. A. , 1983,ApJS, 51,115
Borkowski, K.J., Sarazin, C.L. & Blondin, J.M. 1994, ApJ, 429, 710
Liedahl, D.A., Osterheld, A.L. Goldstein, W.H. 1995, ApJ, 438, L11