

mekal, vmekal: emission, hot diffuse gas (Mewe-Kaastra-Liedahl)

An emission spectrum from hot diffuse gas based on the model calculations of Mewe and Kaastra with Fe L calculations by Liedahl. The model includes line emissions from several elements. The switch parameter determines whether the mekal code will be run to calculate the model spectrum for each temperature or whether the model spectrum will be interpolated from a pre-calculated table. The former is slower but more accurate. Relative abundances are set by the **abund** command for the **mekal** model. The **vmekal** variant allows the user to set the individual abundances for the model.

par1	plasma temperature in keV
par2	H density (cm ⁻³)
par3	Metal abundance (He fixed at cosmic). The elements included are C, N, O, Ne, Na, Mg, Al, Si, S, Ar, Ca, Fe, Ni.
par4	(fixed) redshift
	0 ⇒ calculate
Par5	1 ⇒ interpolate
	2 ⇒ interpolate using APEC model
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.

Parameters for the **vmekal** variant are:

par1	plasma temperature in keV
par2	H density (cm ⁻³)
par3-par16	Abundances for He, C, N, O, Ne, Na, Mg, Al, Si, S, Ar, Ca, Fe, Ni wrt Solar (given by the Anders & Grevesse mixture)
par17	(fixed) redshift
par18	0 ⇒ calculate
	1 ⇒ interpolate

2 \Rightarrow interpolate using APEC model

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.

The references for the MEKAL model are as follows :

Mewe, R., Gronenschild, E.H.B.M., and van den Oord, G.H.J. 1985, A&AS, 62, 197

Mewe, R., Lemen, J.R., and van den Oord, G.H.J. 1986, A&AS, 65, 511

Kaastra, J.S. 1992, An X-Ray Spectral Code for Optically Thin Plasmas (Internal SRON-Leiden Report, updated version 2.0)

Liedahl, D.A., Osterheld, A.L., and Goldstein, W.H. 1995, ApJL, 438, 115

Similar acknowledgement may also be given for the adopted ionization balance:

Arnaud, M., and Rothenflug, M. 1985, A&AS, 60, 425

Arnaud, M., and Raymond, J. 1992, ApJ, 398, 394

