

- **phabs, vphabs, zphabs, zvphabs: photoelectric absorption**

A photoelectric absorption using cross-sections set by the **xsect** command. The relative abundances are set by the **abund** command.

$$M(E) = \exp[-n_H \sigma(E)]$$

where $\sigma(E)$ is the photo-electric cross-section (NOT including Thomson scattering). Note that the default He cross-section changed in v11. The old version can be recovered using the command

xsect obcm

par1= n_H equivalent hydrogen column (in units of 10^{22} atoms cm^{-2})

The redshifted variant, **zphabs**, uses the formula

$$M(E) = \exp[-n_H \sigma(E[1+z])]$$

and has parameters

par1= n_H equivalent hydrogen column (in units of 10^{22} atoms cm^{-2})

par2= z Redshift

The variants **vphabs**, **zvphabs** allow the user to set fixed abundance parameters with respect to the solar composition, as defined by the **abund** command. For **vphabs** (rest-frame) the parameters are

par1= n_H equivalent hydrogen column (in units of 10^{22} atoms cm^{-2})

par2-par18 abundances for He, C, N, O, Ne, Na, Mg, Al, Si, S, Cl, Ar, Ca, Cr, Fe, Co, Ni wrt to Solar

While the corresponding redshifted variant **zvphabs** has parameters

par1= n_H equivalent hydrogen column (in units of 10^{22} atoms cm^{-2})

par2-par18 abundances for He, C, N, O, Ne, Na, Mg, Al, Si, S, Cl, Ar, Ca, Cr, Fe, Co, Ni wrt to Solar (defined by the abund command)

par19= z redshift