Photoionization

The heavy elements ionization equilibrium equation, when photoionization balances radiative or dielectronic recombination, can be written in a similar way as the ionization equilibrium equation generally used for the interstellar medium, $(1 - \chi)\beta_1 \mathrm{ph} = \chi n_{\mathrm{e}} \sum_j a_j = \chi n_{\mathrm{e}} \alpha$, as:

$$\boxed{(1 - \chi)\beta = \chi n_{\mathrm{e}} \alpha},$$

where we omit the ionization rate subscript.

j: any leve of the atom

α: recombination coefficient