

Finite Density Effects on Ionization Equilibrium in Astrophysical Plasmas

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We have been reviewing the available ionization and recombination rates from different atomic databases and incorporating high density effects, which are often not included in databases. These effects are important in the solar transition region, where densities in the range $\log N_e=10-13 \text{ cm}^{-3}$ are common. Inclusion of these effects is of particular importance for the analysis of data from the IRIS satellite, but in general are important in high density plasmas, especially laboratory plasmas. Following on from this, we have calculated the ion charge state distributions in ionization equilibrium and compared them with available ones for a range of astrophysically-important elements. The improvements are important for the measurements of the plasma distribution in temperature and for with diagnostics applications such as measuring relative elemental abundances.