Section 6: Ionization
AE435
Spring 2018

0   Intro

We can specify the state of a plasma via the species continuity equation:

State of Plasma

$$a$$

Where

a is the rate of change of species i in the volume

a is the convection rate for species i into the volume

a is the net generation of species i in the volume due to process j

For instance, we could use

- Electron-impact ionization

- Radiative recombination

And so on through all the processes of the last chapter, Chapter V.

We could, in principle solve N equations for N species if we knew all the reaction rate constants . For very simple, low-density plasmas, we use the corona model to do just that. For higher-density plasmas we have to use a collisional-radiative model, which is more general but requires lots of number-crunching and assumptions.

For really high density, the gas reaches equilibrium, and ionization modeling becomes much simpler.