The ionisation state of ions in a plasma
Callable ADAS Exercises

July 7, 2010

1 Aim

The aim is to familiarise you with callable ADAS for working with the ionisation state of ions in a plasma, mainly in an IDL environment. Please feel free to expand any of the tasks or change them slightly to deal with your favourite ion! The tasks marked with 🥕s should be considered optional and are often more difficult so don't spend too much time on them unless they are of particular interest.

2 Tasks

1. Use `read_adf11` to read ionisation and recombination coefficients for carbon.

   - Plot the temperature where the ionisation and recombination rates are equal as a function of ion charge 🥕🥕.

2. Use `run_adas405` to generate an equilibrium ionisation balance for carbon.

   - Compare the temperature of peak abundance (as a function of ion charge) with the points where the rates are equal (see above) 🥕🥕🥕.

3. Use `run_adas405` to generate radiated power coefficients and plot them as a function of temperature.

   - Find an interesting density regieme 🥕🥕.

4. Use `read_adf15` to read the PEC for the 977Åline of $C3+$

   - Compare the power radiated in this line with the total line power for $C3+$ in coronal equilibrium conditions 🥕🥕🥕.

5. Use `run_adas416` to produce partitioned data using the file
   `/home/omullane/ADAS-US_course/partition_example.dat`.

   - Modify the partition and explore how the various ions move in and out of being bundled 🥕.