

The ionisation state of ions in a plasma

Callable ADAS Exercises

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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 regime *//*.
4. Use `read_adf15` to read the PEC for the 977Å line 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 `/u/momullan/ADAS-EU_course/partition_example.dat`.
 - Modify the partition and explore how the various ions move in and out of being bundled */*.