

Tutorial session 4 examples

1. ADAS 304 Test Case

1. Move to your directory `./../<uid>/adas/pass`. Start ADAS and move to the ADAS3 series menu. Select ADAS304.
2. The Input window is different from the usual. Click on *Central Data*, the data root to the data class ADF21 should appear in the window above. Now enter the Group name for input files. This is the directory of the look-up tables of stopping data for a particular beam species. Type `bms93#h`. Remember the `{return}`.
3. Now you must decide on the mixture of impurity nuclei (and hydrogen nuclei) which cause the total stopping. Click the button *Select Ion List*. The button incidentally becomes *Reselect Ion List* on later passes through. A button table pops up. Click on the buttons for the nuclei you wish to include, for example, Be4, C6, H1 and click *Done*. Note the Stopping Ion List. Click *Done* to advance to the Processing Options window.
4. Click on the *Fit polynomial* button, then type 5 in the adjacent active editable box
5. Now move to the Stopping ion fractions. Click on the *Edit Table* button to activate Table Editor. Enter 0.1,0.1,0.8 for Be, C, H respectively and click *Done*.
6. Now Select the co-ordinate type for the output graph. Click the *Energy* button for the first try.
7. Click on the *Default Output Values* button. You may find a warning widget pops up. If so, click the *Confirm* button.
8. Click the button for *Graphical output*. Finally click *Done* to see the graph.
9. Click *Done* to return to the Output options screen. You may *Exit to menu* using the icon in this program.

2. ADAS 310 Test Case

1. Move to your directory `./../<uid>/adas/pass`. Start ADAS and move to the ADAS3 series menu. Select ADAS310.
2. The Input window is considerably different from the usual. Enter beam species details (H for hydrogen and its isotopes) and the atomic charge of the beam species.
3. There are two files to be selected, the expansion file and the charge exchange file. To select the expansion file, click on the *Central Data* button, the *Data root* to the data class ADF18 should appear in the window above. Now select the data file `bndlen_exp#h0.dat`. To select the charge exchange file, click on *Central Data*, the *Data root* to data class ADF01 should appear in the window. Select `qcx#h0`. Now select the data file `qcx#h0_e2p#h1.dat`. Click on the *Done* button to advance to the Processing options window.
4. The control parameters of the collisional-radiative calculation are organised into three groups, selected in turn by the buttons *general*, *switches (I)* and *switches (II)*.
 - General button: Click on the *general* button to view the general parameter settings. The default values are reasonable.
 - Switches (I) button: Click on the *switches (I)* button to view the settings associated with electron collisions. Working down the list set the parameters to the following: 2, 3, NO, YES.
 - Switches (II) button: Click on the *switches (II)* button to view the settings associated with the ion collisions. Working down the list set the parameters to the following: YES, 0, YES, YES.
5. Now you must decide what range of principal quantum numbers that you want to include in the calculation. Click on the *Representative N-shells* button. Enter 1 and 110 as the minimum and maximum n-shells. Now click on the *Edit Table* button and enter the following values into the editor: 1,2,3,4,5,6,7,8,9,10,12,15,20,30,40,50,60,70,80,90,100. Click on *Done* to return to the processing widget.
6. Now you need to decide the impurity content of the target plasma. Click on the *Impurity information* button. Now click on the *Selection mode* button and choose *Multiple impurities*. Click on the *Edit Table* button and enter the following information into the

editor

H	1.0	0.9
C	12.0	0.05
Be	11.0	0.05

Click on the *Done* button to return to the processing window.

7. Click on the *electron/proton density scan* button to choose the range of plasma densities. In the usual manner enter the following values into the table editor.

1.0e13	1.0
2.0e13	2.0
3.0e13	3.0
4.0e13	4.0
5.0e13	5.0

Click Done to return to the processing window. Enter the value 3 as the *Index for the reference density*.

8. Now click on the *electron/proton temperature* button and enter the following values into the text editor

1.0e3
2.0e3
3.0e3
4.0e3
5.0e3

Click on the *Done* button to return to the processing widget. Enter the value 3 as the *Index for the reference temperature*.

9. Click on the *beam energy scan* button and enter the following values into the table editor

2.0e4
3.0e4
4.0e4
5.0e4
6.0e4

Click on the *Done* button to return to the processing widget. Enter the value 3 for the *Index for the reference beam energy* and 1.0e8 as the *Beam density*.

Now click on *Done* to advance to the Output window.

10. There are several possible outputs but our interest is in the contents of the first passing file. The first passing file is of type ADF26 and contains the tabulated population structure and effective stopping coefficients as a function of plasma parameters. It should be noted that the fourth passing file contains the stopping coefficients assembled according to format ADF21. The preferred route to obtaining the stopping coefficients is via ADAS312.
11. Click on the *First passing file* button and enter a filename. Now click on *Run now*. An Information widget appears. After the calculation, click on the *Exit to Menu* button to return to the ADAS3 series menu.