# ADAS811: Compare adf04 files

The program provides extended interrogation of *adf04* files. All types of rate coefficient data in the *adf04* file are handled. Comparison of coefficient data from different adf04 files is supported. The program is a substantial extension and replacement for ADAS201.

## Background theory:

The full specification of the adf04 file organisation is given in Appendix A/ADF04. The transition data displayed by ADAS811 includes:

- electron impact excitation - Note that type 1, 2 and 3 transitions are distinguished by the lead character of the transition line data string. The upsilon parameter is tabulated in the adf04 file. The upsilon, excitation rate coefficient and Burgess C-plot scaled upsilon parameter may be displayed (see Chapter 2-02 for details)
- proton impact excitation – P-lines in the adf04 file
- electron impact ionisation – S-lines in the adf04 file.
- free electron recombination – R-lines in the adf04 file.
- charge exchange recombination – H-lines in the adf04 file.

## Program steps:

The code is implemented entirely in the IDL language. Access to the *adf04* file data is by the procedure *read_adf04.pro*. Note that such procedures are FORTRAN wrappers with parameter checking and control mediated through a C language interface.

## Interactive parameter comments:

The program interrogates archived ADAS datasets of format *adf04* and initiates an interactive dialogue with the user in two parts, namely, input file selection and display/comparison of selected data. There is only graphical output.

The **file selection window** has the appearance shown below

1. Selection of up to three adf04 files is permitted. At least one file, *adf04 file 01*, must be selected.
2. Selection of *adf04 file 01* follows the standard ADAS pattern. Data root shows the full pathway to the appropriate *adf04* data subdirectories. Click the *Central Data* button to insert the default central ADAS pathway to the correct data type. Click the *User Data* button to insert the pathway to your own data. Note that your data must be held in a similar file structure to central ADAS, but with your identifier replacing the first *adas,* to use this facility. The Data root can be edited directly. Click the *Edit Path Name* button first to permit editing.
3. Available sub-directories are shown in the large file display window. Scroll bars appear if the number of entries exceed the file display window size. Click on a name to select it. The selected name appears in the smaller selection window above the file display window. Then its sub-directories in turn are displayed in the file display window. Ultimately the individual datafiles are presented for selection. Datafiles all have the termination *.dat*.
4. Once *adf04 file 01* is selected, the set of buttons at the bottom of the main window become active. Clicking on the *Browse Comments* button displays the comment line information stored with the *adf04 file 01* datafile. It is important to use this facility to find out what is broadly available in the dataset. The possibility of browsing the comments appears in the subsequent main window also.
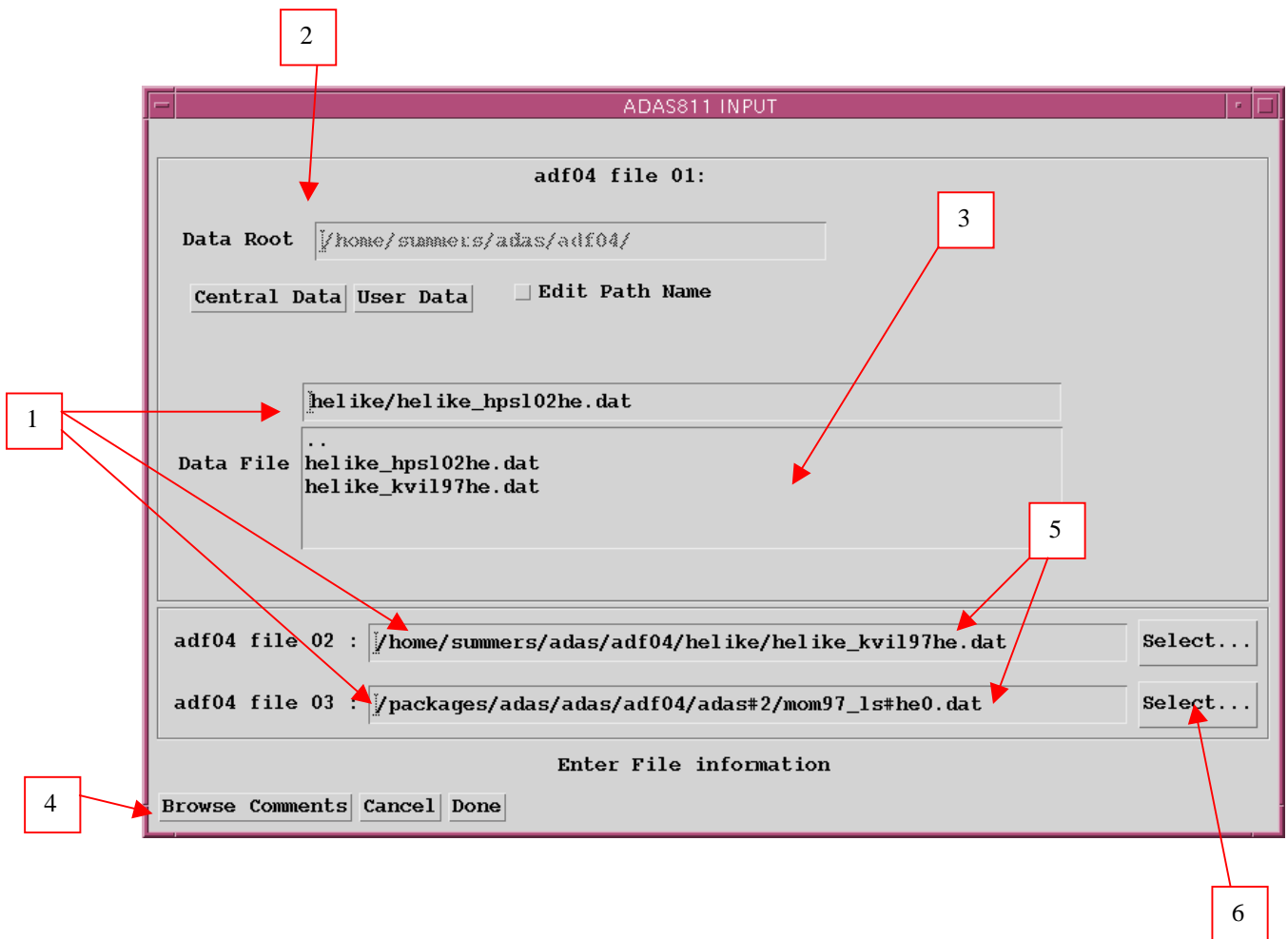
5. Two additional adf04 files may be selected.
6. Click the *Select…* button for *adf04 file 02* or *adf04 file 03*. A pop-up Select-a-File widget is presented as shown below. Note that this is a general non-ADAS specific widget, not targetted specifically on *adf04* files. Only comparison of adf04 files is allowed by ADAS811.
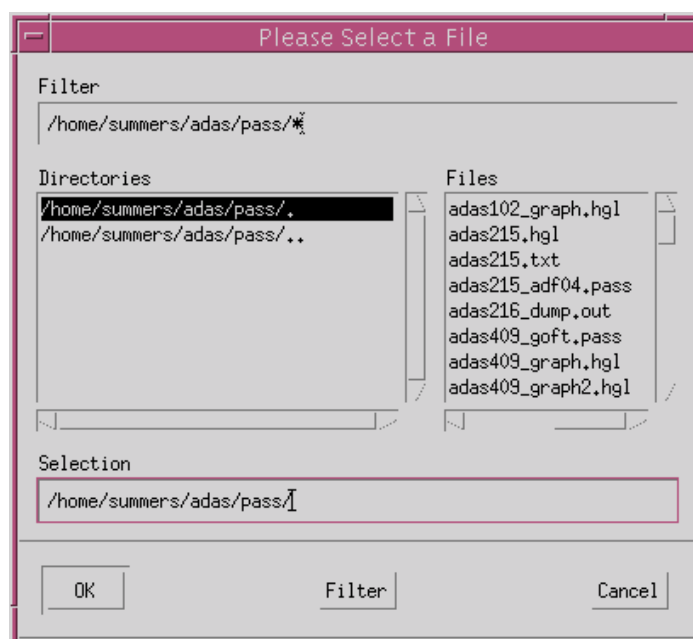
The **processing options window** has the appearance shown below

1. The selected adf04 files are shown at the top of the screen. If there is more than one file, click the appropriate button for the primary file you wish to scan through. If there is more than one adf04 file, the program will seek to match transitions between them. The matching does depend on standard configuration labelling and formatting in the adf04 files. The graphical display plots the coefficients from each transition from the primary file but plots the same coefficient from the other files only if it is unambiguously matched.

2. Five types of rate coefficient can be displayed, namely electron impact excitation, positive ion excitation, recombination, ionisation and charge exchange. Make the appropriate selection.

3. A number of different forms for display of the selected coefficient may be permitted. The choices are displayed are selected by button click.

4. Coefficients are plotted as a function of temperature. The units, K or eV, may be chosen.
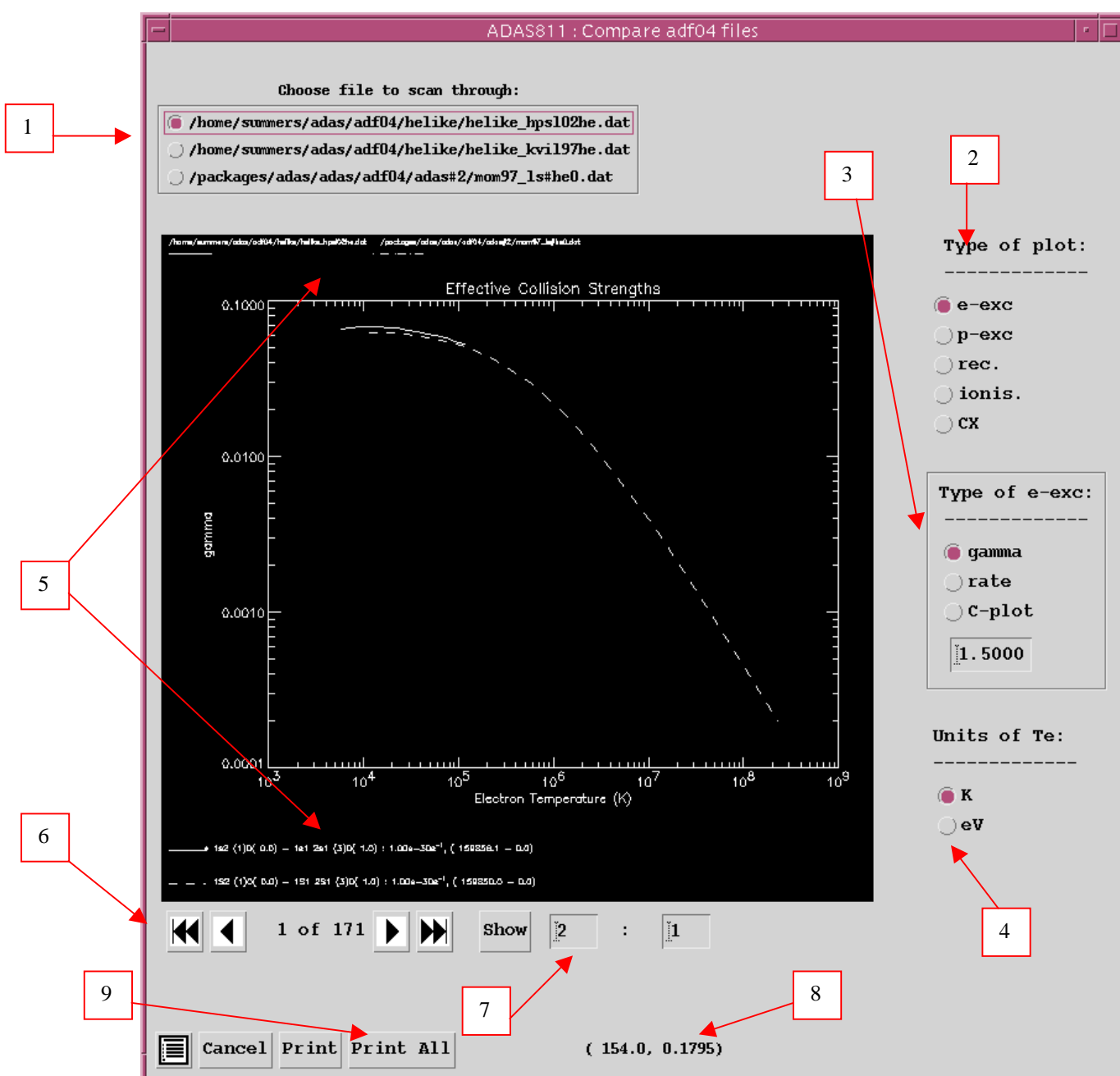
5.  The legend of the graph plot line appearances is at the top of the graph and the identification of the particular transition given at the bottom.
6.  Tape recorder type controls are provided to move between transitions.
7.  The indices of the transition may be typed in explicitly, then click *Show*.
8.  Note that the cursor position in graph axis coordinates is given.
9.  The button controls allow printing of the current graph , *Print*, or of all the graphs, *Print All*, of the selected type.  Be cautious in using *Print All*.  The *Escape to Menu* icon is also available for a quick exit to the main ADAS menu.  The *Cancel* button returns the user to the input file selection screen.

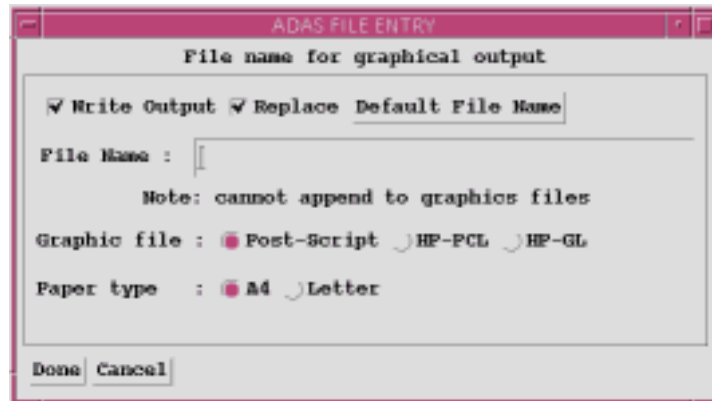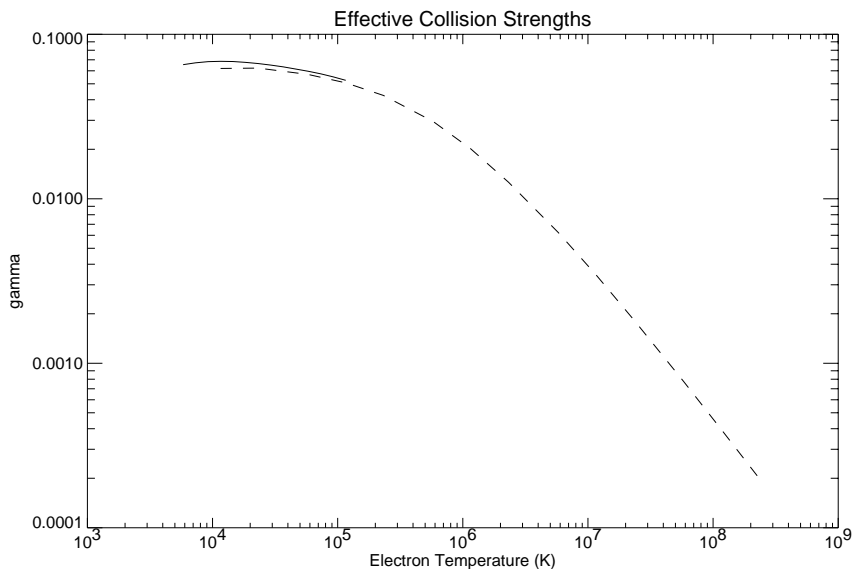The **graphical file output pop-up** is shown below.



## Illustration:

A typical output graph from the program is illustrated for an electron impact excitation  transition in figure 9.1.

Figure 9.1

————* 1s2 (1)0( 0.0) - 1s1 2s1 (3)0( 1.0) : 1.00e-30s⁻¹, ( 159856.1 - 0.0)  [/home/summers/adas/adf04/helike/helike_hpsl02he.dat]

─  ─  . 1S2 (1)0( 0.0) - 1S1 2S1 (3)0( 1.0) : 1.00e-30s⁻¹, ( 159850.0 - 0.0)  [/packages/adas/adas/adf04/adas#2/mom97_ls#he0.dat]

## Notes: