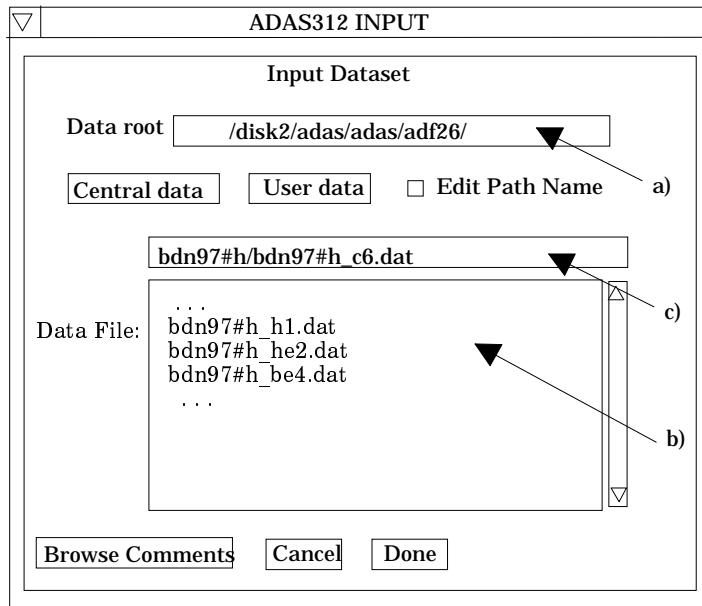


In this release there are two new codes, ADAS312 developed by Harvey Anderson and ADAS602 developed by Jim Lang and David Brooks. ADAS312 allows much more information on beam emission to be extracted from ADAS310 calculations. ADAS602 is the primary spectral fitting code which we have been using to analyse SOHO-CDS and SOHO-SUMER data. As usual a number of corrections and improvements in the existing codes have been made. A substantial amount of new data has been added to the database. The main part is charge exchange data, both fundamental (*adf01*) and derived (*adf12*), for lithium neutral beam donors and excited hydrogen beam donors to light impurity nuclei, and is due to the efforts of Ronnie Hoekstra, Fritz Bliek and Ron Olson. Martin O'Mullane has added to the dielectronic data (*adf09*) and to specific ion file data (*adf04*) and corrected some faulty radiated power data for helium (*adf11*). Stemming from the ADAS312 development, we have designated a new ADAS data format (*adf26*) into which Harvey Anderson has placed data for neutral hydrogen beams.

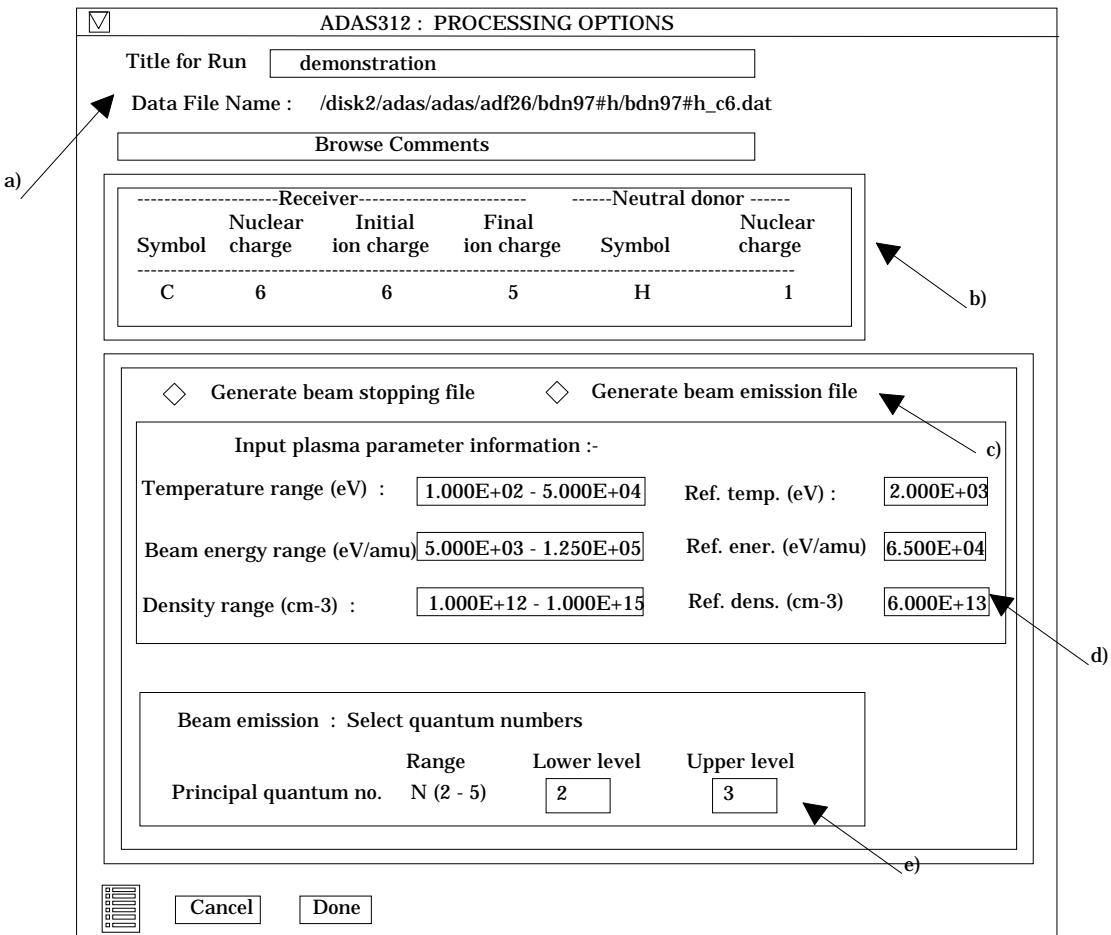
1. **ADAS206** The code has been failing to accept *adf04* datasets of the form *.../adf04/copha#<>/...* on input. The problem was pointed by research students of Kurt Behringer at Augsburg who have done a very complete review of the proper acceptance of *adf04* datasets. The above datasets contain the maximum allowed number of temperatures (that is fourteen). The array dimensions in ADAS406 were still set to allow at most eight temperatures. The array dimensions have been reset.
2. **ADAS208** It turns out that in the transfer of ADAS208 from the IBM mainframe to UNIX workstations, we missed out a small piece of the functionality. This was pointed out by Kurt Behringer. It concerns the normalisation of output photon emissivity coefficients, '*pecs*' and total line power loss, '*plts*'. In the ADAS208 processing screen, one is required to select the metastable states. Collisional radiative coefficients are calculated with respect to their populations. When a **only** single metastable state (the ground state) is selected, the coefficients then would be normalised to that ground state population. In some applications, especially in astrophysics, one deals in ionisation balance studies with the whole population of ionisation stages rather than that of the ground states of the stages. In these circumstances it is helpful to normalise the '*pecs*' and '*plts*' to the total stage population. You will observe a slight change therefore in the ADAS208 processing screen with a choice of ground state or whole stage normalisation. This widget is only activated if a single metastable is selected. You will notice in the main tabulations of '*pecs*' (*adf15*) that some of the data is normalised to the whole stage population - a code letter '*T*' in the headers and descriptors advises of this. Note also that ADAS206, which also works out total radiated power, has the above choice included already. We did not miss it there!
3. **ADAS312** In the generation of beam stopping coefficients and Balmer alpha beam emission coefficients using the code ADAS310, very complete calculations of the excited population structure of hydrogen are in fact performed. From these only the one piece of information, the stopping coefficient or Balmer alpha beam emission coefficient, is extracted and tabulated into the data formats *adf21* or *adf22*. The whole collection of information is actually available in formatted pages as a passing file *adas310.pass1* sent to the pass directory. Harvey has written a new code which accesses data collections of the above passing file organisation and allows extraction of any hydrogen line spectral emissivity rather than just Balmer alpha. The extracted data is again returned as output in the *adf21/adf22* format. Such data consists of two dimensional arrays of coefficients in density and beam energy and then one dimensional scans in temperature and Zeff away from a set of reference conditions. We thought it would be helpful to display the surface plot of the extracted coefficient as function of density and beam energy as part of the routine. IDL of course handles such things easily, so Harvey has created a new pattern of graphical output widget for ADAS which does this. I hope to include more of this type of display in appropriate ADAS codes in the future, however I welcome your views. Because of this development we have started to save the

adas310.pass1 files in a new data format, *adf26*. Also we use the mnemonic ‘*bdn*’, standing for the ‘bundle-n’ population model, for such data.

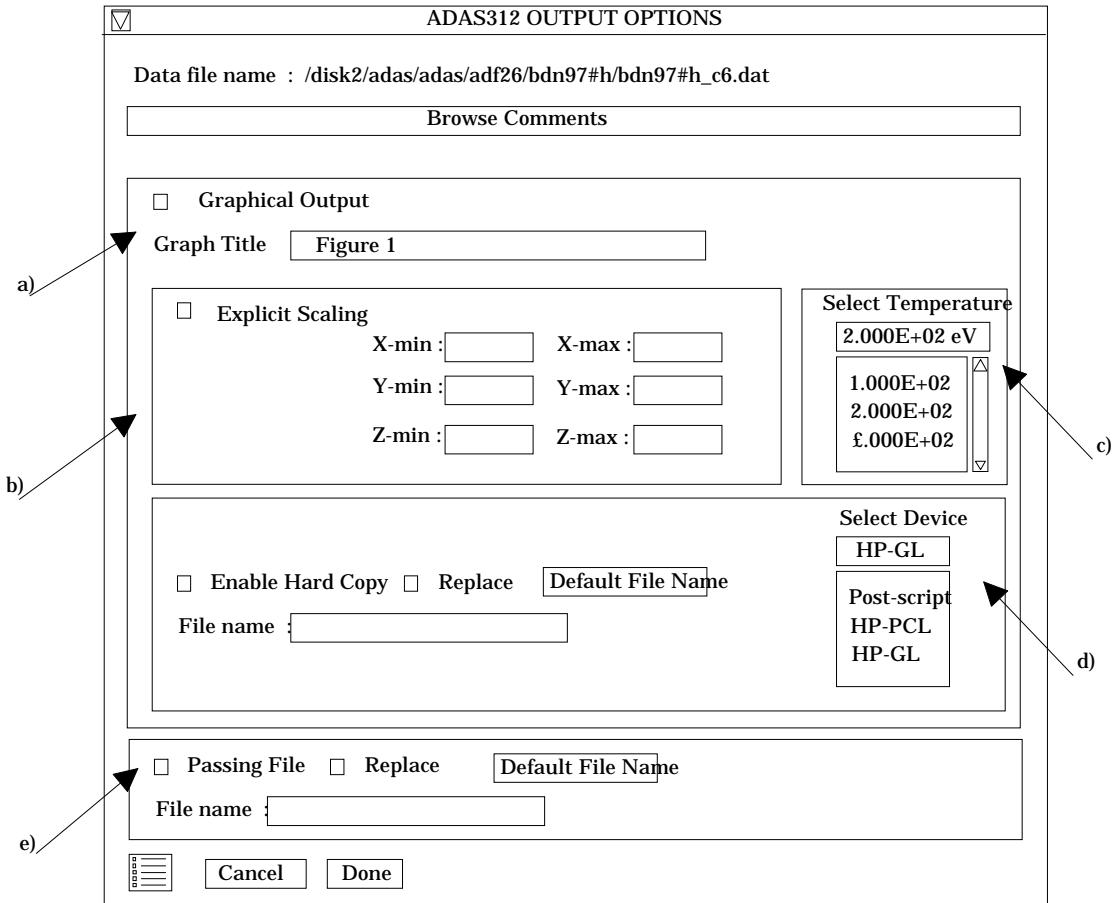
- 3.1. The **file selection window** has the appearance shown below
 - 3.1.1. Data root a) shows the full pathway to the appropriate data subdirectories. Click the *Central Data* button to insert the default central ADAS pathway to the correct data type. Click the *User Data* button to insert the pathway 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.
 - 3.1.2. The Data root can be edited directly. Click the *Edit Path Name* button first to permit editing.



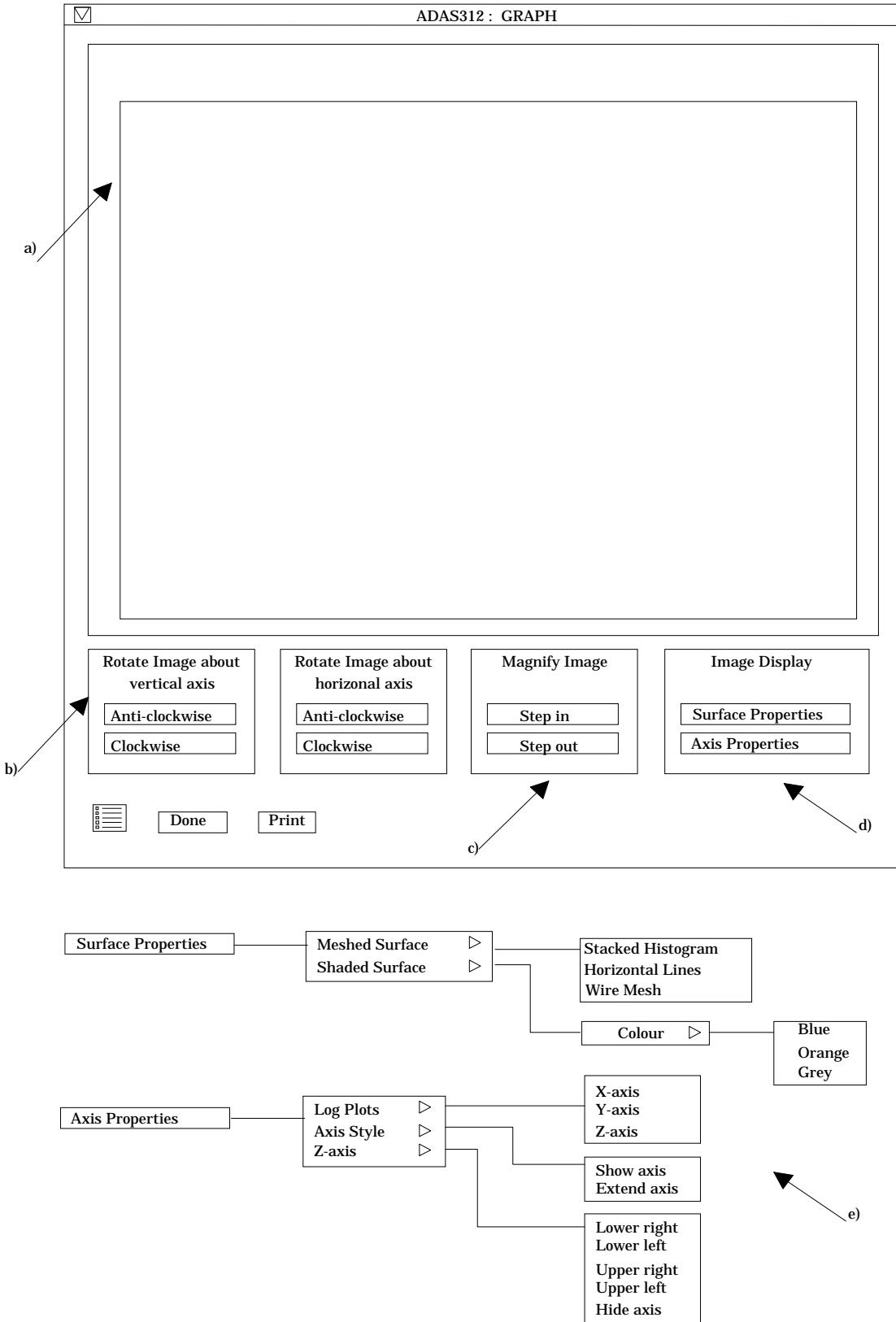
- 3.1.3. Available sub-directories are shown in the large file display window b). Scroll bars appear if the number of entries exceed the file display window size.
 - 3.1.4. Click on a name to select it. The selected name appears in the smaller selection window c) above the file display window. Then its 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*.
 - 3.1.5. Once a data file is selected, the set of buttons at the bottom of the main window become active.
 - 3.1.6. Clicking on the *Browse Comments* button displays any information stored with the selected 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.
 - 3.1.7. Clicking the *Done* button moves you forward to the next window. Clicking the *Cancel* button takes you back to the previous window.
- 3.2. The **processing options window** has the appearance shown below.
 - 3.2.1. An arbitrary title may be given for the case being processed. For information the full pathway to the dataset being analysed is also shown at a). The button *Browse comments* again allows display of the information field section at the foot of the selected dataset, if it exists.
 - 3.2.2. At b) some additional information on the beam donor species and the impurity in the plasma which is the receiver in charge exchange reactions. These data are extracted from the data set name. Note that a bundle-n population data set of type *adf26* being analysed is for a single plasma impurity.



- 3.2.3. The code scans the very extensive tabulations in the data set and extracts selected data from them according to the type of output file required by the user. The choices available at this time are beam stopping coefficients and beam emission coefficients. Select the output you wish to be generated at c). The *adf26* data sets in fact contain a large variety of other population information which may be provided at a later stage. With *Generate beam emission file* selected, additional information must be entered at e).
- 3.2.4. Additional information on the plasma temperature, beam energy and plasma density ranges used in the creation of the *adf26* data set is given at d) together with the reference conditions used. Note that the *adf26* data set contains two-dimensional arrays of beam energy and ion density data and a one dimensional array in ion temperature from a reference condition.
- 3.2.5. The sub-window at e) becomes active if generation of beam emission data is requested. The choices available are the upper and lower principal quantum numbers of the radiative transition of the hydrogen beam species. The range of choice has been restricted to principal quantum numbers less than or equal to five. The *adf26* data set contains results for much higher quantum shells also, so we can extend the available range in the future if desired.
- 3.2.6. At the base of the window, the icon for *Exit to Menu* is present. This quits the program and returns you to the ADAS series 3 menu. Remember that *Done* takes you forward to the next screen while *Cancel* takes you back to the previous screen.
- 3.3. The **output options window** appearance is shown below
- 3.3.1. As in the previous window, the full pathway to the file being analysed is shown for information at a). Also the *Browse comments* button is available.



- 3.3.2. Graphical display is activated by the *Graphical Output* button a). This will cause a graph to be displayed following completion of this window. When graphical display is active, an arbitrary title may be entered which appears on the top line of the displayed graph.
- 3.3.3. By default, graph scaling is adjusted to match the required outputs. Press the *Explicit Scaling* button at b) to allow explicit minima and maxima for the graph axes to be inserted. Activating this button makes the minimum and maximum boxes editable. In this case, a three-dimensional surface plot is presented with x-axis: beam energy, y-axis: density, z-axis: selected coefficient.
- 3.3.4. The surface plot is produced at a selected plasma ion temperature. Make this choice at c).
- 3.3.5. Hard copy is activated by the *Enable Hard Copy* button. The File name box then becomes editable. If the output graphic file already exists and the *Replace* button has not been activated, a ‘pop-up’ window issues a warning.
- 3.3.6. A choice of output graph plotting devices is given in the Device list window at d). Clicking on the required device selects it. It appears in the selection window above the Device list window.
- 3.3.7. At e) output of the *Passing File* of results is enabled. This is of *adf21* or *adf22* format according to earlier choices.. The *passing* is written on exiting ADAS312 and is placed by default in your */pass* directory as *adas312.pass*. It is fully structured for reassignment into your personal ADAS data base of the appropriate data format.
- 3.4. The **graphical output window** appearance is shown below
- 3.4.1. This is a new style of graphical output widget to ADAS. A three-dimensional surface plot is given at a). There is much more control over it than in our usual graph displays.



3.4.2. At b), there are the controls for the orientation of the figure. By clicking repeatedly on a button, the figure may be rotated clockwise or anti-clockwise in small steps. You may rotate about a vertical or horizontal axis.

3.4.3. At c), there are two buttons to zoom in or out on the figure.

- 3.4.4. At d), the controls on the appearance of the figure are available. Note the nesting of menu buttons in more than one layer. The choices are laid out at e) below the main figure. Thus one may choose a meshed surface or shaded surface, the colour of the shaded surface may be selected and so on. You may feel we have gone to overkill here.
- 3.4.5. Then there are choices on the axes, whether they are linear or logarithmic, whether they are to be displayed or not etc. There is an additional point. At b) when the figure is rotated the position of the axis of rotation matters. For rotations about a vertical axis, the figure Z-axis is used and it may be moved to any corner of the projected area on the X/Z plane.
- 3.4.6. Finally note that when the figure is printed, it is the figure as displayed in the graphic output window which you get.
- 3.4.7. At the base of the window, the icon for *Exit to Menu* is present. This quits the program and returns you to the ADAS series 3 menu. Remember that *Done* takes you back to the previous screen. The *Print* button appears if graphical hardcopy is selected on the output options window.
4. **ADAS407** In the last alterations to this code, new subroutines were included to check the linkages between metastables and parents. In doing so, I omitted proper protection for the case of the the hydrogen-like/bare nucleus pair case.
- 4.1. Recall that the `./adf04/copmm#<elem>/..` member for the bare nucleus is essentially a fake incomplete file just to obtain the parent. It is given a single bound state with an empty configuration and 1S_0 level designation. The empty configuration gave a problem with the routines which checked the configuration form. Now ADAS407 will accept the bare nucleus configuration as blank, '00' or '01'. The latter two are vaguely consistent with what one might guess when using the Eissner notation for configuration specification.
- 4.2. I should perhaps add that Lorne Horton and I are having some discussion about the 'ISYS' and 'IPRT' labels given in the *mainbn.pass* file from ADAS407. For later consistency and convenience in using ADAS204, I may alter the 'ISYS' to a label 'IGRD' denoting the lowest metastable within the parent/spin system. I shall sort this out for release 1.12.
5. **ADAS602** The code fits multi-Gaussian line profiles and a background to an observed spectral segment. It uses a maximum likelihood method together with statistical analysis to calculate the integrated counts under the line profiles along with their estimated standard errors and 95% confidence limits. The underlying Fortran procedure is due to Jim Lang and it has been adapted by David Brooks as a principal ADAS code with an IDL user interface and extended capabilities. It has been designed to interface easily with SOHO-CDS and SOHO-SUMER data organisation although a simple interface is also provided.
- 5.1. The **file selection window** has the appearance shown below
- 5.1.1. The form of the primary input spectral data is selected at a). Input data sets are expected to be in the form of IDL 'SAVE' files. Forms allowed are as follow:
- 5.1.1.1. The form *Standard* comprises a single array defined as
- ```
spectrum : dblarr()
header : " or structure (ie.=a:a, b:b,...)
```
- spectrum* contains the spectral counts as a function of pixel position. The array length must be  $\leq 1024$ . The array may be two-dimensional in which case the first index is the pixel number in the dispersion direction and the second the pixel number in the spatial (or other) direction. This latter case allows the cycling option described in section 5.2.
- header* is an optional string of the user's choice or may be a structure

5.1.1.2. The form *Processed* is that of the output structure from ADAS602 itself. This form allows re-entry of output data for re-analysis. The input file contains a structure *lstr* defined as:

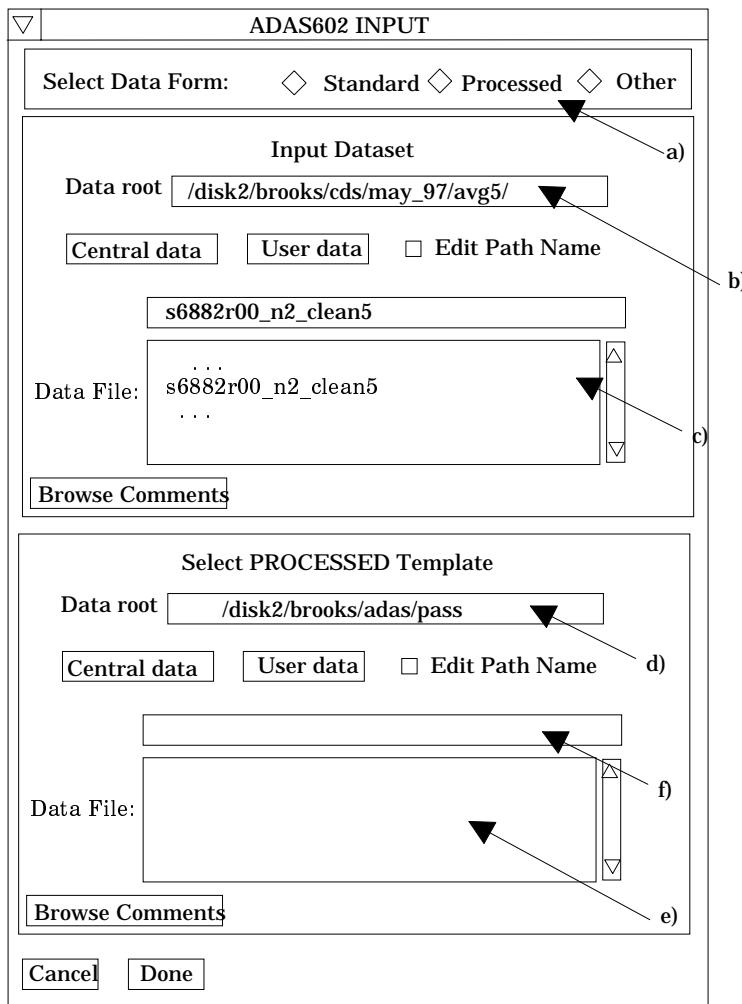
|                       |                   |                       |                   |
|-----------------------|-------------------|-----------------------|-------------------|
| <i>lstr.b0</i> :      | 0.0               | <i>lstr.eseb0</i> :   | 0.0               |
| <i>lstr.eclb0</i> :   | 0.0               | <i>lstr.b1</i> :      | 0.0               |
| <i>lstr.eseb1</i> :   | 0.0               | <i>lstr.eclb1</i> :   | 0.0               |
| <i>lstr.b2</i> :      | 0.0               | <i>lstr.eseb2</i> :   | 0.0               |
| <i>lstr.eclb2</i> :   | 0.0               | <i>lstr.w</i> :       | <i>dblarr(10)</i> |
| <i>lstr.esew1</i> :   | 0.0               | <i>lstr.eclw1</i>     | 0.0               |
| <i>lstr.xo</i> :      | <i>dblarr(10)</i> | <i>esexo</i> :        | <i>dblarr(10)</i> |
| <i>lstr.eclxo</i> :   | <i>dblarr(10)</i> | <i>eclh</i> :         | <i>dblarr(10)</i> |
| <i>lstr.esewv</i> :   | <i>dblarr(10)</i> | <i>eclwv</i> :        | <i>dblarr(10)</i> |
| <i>lstr.flux</i> :    | <i>dblarr(10)</i> | <i>esef</i> :         | <i>dblarr(10)</i> |
| <i>lstr.eclf</i> :    | <i>dblarr(10)</i> | <i>getfit</i> :       | <i>intarr(6)</i>  |
| <i>lstr.exptime</i> : | 0.0               | <i>lstr.info</i> :    | 0                 |
| <i>lstr.header</i> :  | ‘’                | <i>lstr.xmin</i> :    | 0                 |
| <i>lstr.xmax</i> :    | 0                 | <i>lstr.x</i> :       | <i>indgen()</i>   |
| <i>lstr.y</i> :       | <i>dblarr()</i>   | <i>lstr.ya</i> :      | <i>dblarr()</i>   |
| <i>lstr.nsize</i> :   | 0.0               | <i>lstr.numline</i> : | 0                 |
| <i>lstr.nfxl</i> :    | 0                 | <i>lstr.bchl</i> :    | 0.0               |
| <i>lstr.bchr</i> :    | 0.0               | <i>lstr.lineid</i> :  | <i>strarr(10)</i> |

with the meaning of the variables as follow:

|                |                                                       |
|----------------|-------------------------------------------------------|
| <i>b0</i>      | fitted constant part of the background                |
| <i>eseb0</i>   | estimated standard error in <i>b0</i>                 |
| <i>eclb0</i>   | estimated 95% confidence limit in <i>b0</i>           |
| <i>b1</i>      | fitted linear part of the background                  |
| <i>eseb1</i>   | estimated standard error in <i>b1</i>                 |
| <i>eclb1</i>   | estimated 95% confidence limit in <i>b1</i>           |
| <i>b2</i>      | fitted quadratic part of the background               |
| <i>eseb2</i>   | estimated standard error in <i>b2</i>                 |
| <i>eclb2</i>   | estimated 95% confidence limit in <i>b2</i>           |
| <i>w</i>       | fitted line widths                                    |
| <i>esewl</i>   | estimated standard error in <i>w</i> (fixed)          |
| <i>eclwl</i>   | estimated 95% confidence limit in <i>w</i> (fixed)    |
| <i>xo</i>      | fitted line centroid positions                        |
| <i>esexo</i>   | estimated standard error in <i>xo</i>                 |
| <i>eclxo</i>   | estimated 95% confidence limit in <i>xo</i>           |
| <i>h</i>       | fitted line heights at centroid                       |
| <i>eseh</i>    | estimated standard error in <i>h</i>                  |
| <i>eclh</i>    | estimated 95% confidence limit in <i>h</i>            |
| <i>esewv</i>   | estimated standard error in <i>w</i> (variable)       |
| <i>eclwv</i>   | estimated 95% confidence limit in <i>w</i> (variable) |
| <i>flux</i>    | fitted line flux (counts under profile)               |
| <i>esef</i>    | estimated standard error in <i>flux</i>               |
| <i>eclf</i>    | estimated 95% confidence limit in <i>flux</i>         |
| <i>getfit</i>  | options selected (see code)                           |
| <i>exptime</i> | the exposure time (1.0 if expval not set)             |
| <i>info</i>    | error from MINPACK routine (see XXDER1)               |
| <i>header</i>  | comment                                               |
| <i>xmin</i>    | minimum pixel for fitting range                       |
| <i>xmax</i>    | maximum pixel for fitting range                       |
| <i>x</i>       | pixel values                                          |
| <i>y</i>       | spectral data                                         |
| <i>ya</i>      | fit to data                                           |
| <i>nsize</i>   | spectral range width                                  |
| <i>numline</i> | number of fitted lines                                |

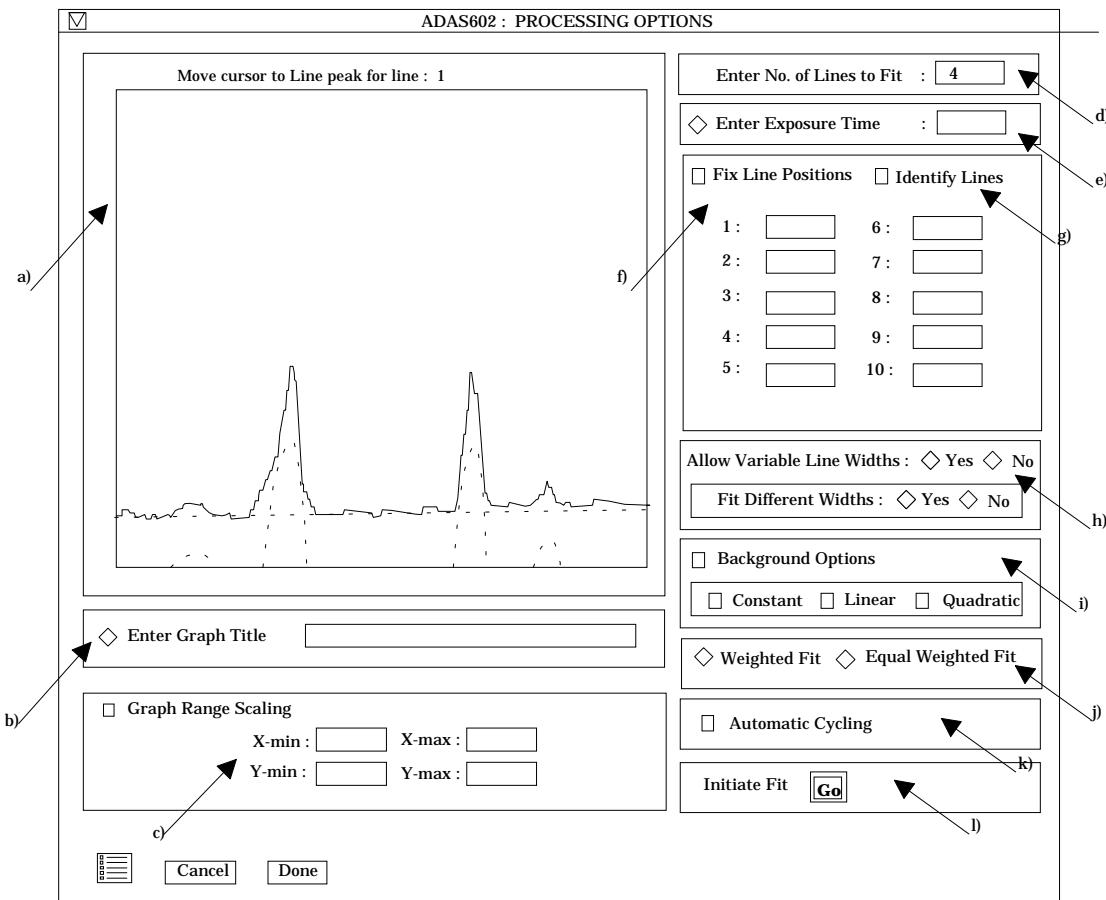
|               |                                             |
|---------------|---------------------------------------------|
| <i>nfxl</i>   | number of fitted lines with fixed positions |
| <i>bchl</i>   | initial estimate of background              |
| <i>bchr</i>   | initial estimate of background              |
| <i>lineid</i> | preliminary line identification labels      |

- 5.1.1.3. The form *Other* is not yet implemented and we are open to suggestions for it (eg. and ascii tabulated version of *lstr* or *spectrum/header*?)
- 5.1.2. Data root b) shows the full pathway to the appropriate data subdirectories. Click the *Central Data* button to insert the default central ADAS pathway to *../adas/adas/arch602*. Note that there are only some sample data in this subdirectory (viz. a standard data set ‘*...clean*’ and a processed data set ‘*fit....*’) as there is no formal central ADAS data of archive type. Click the *User Data* button to insert the pathway to your own archived data for ADAS602.

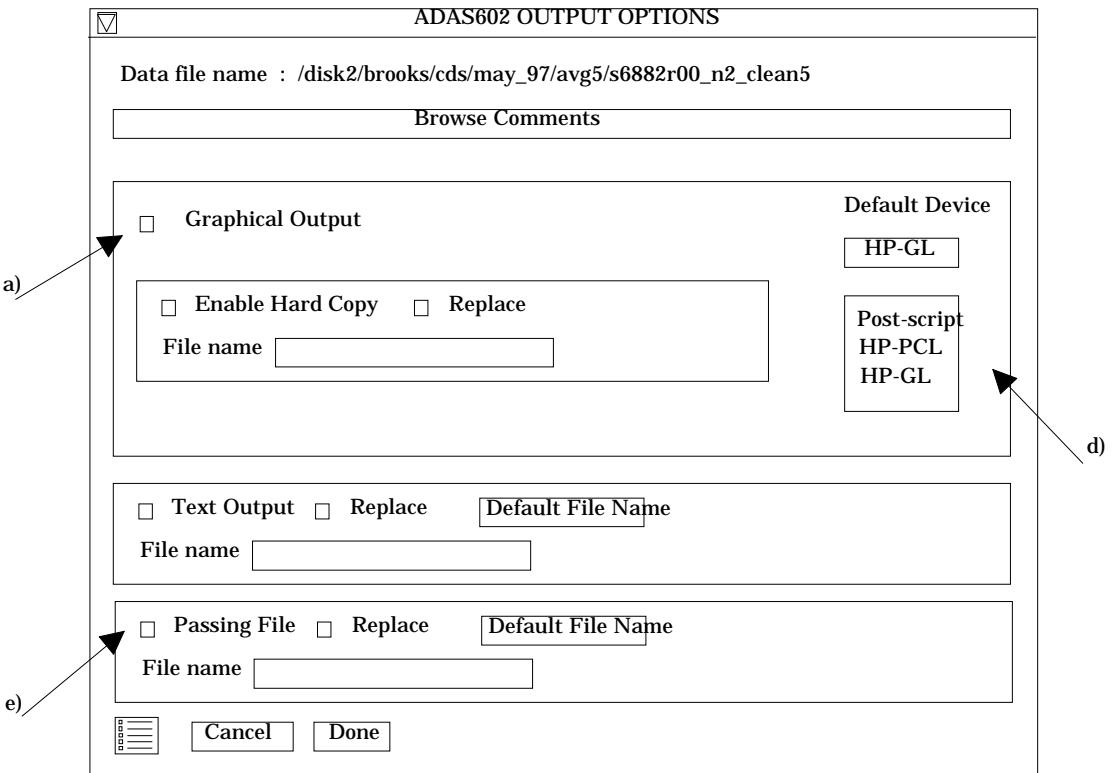


- 5.1.3. The Data root can be edited directly. Click the *Edit Path Name* button first to permit editing. Available sub-directories are shown in the large file display window b). Scroll bars appear if the number of entries exceed the file display window size.
- 5.1.4. Click on a name to select it. The selected name appears in the smaller selection window c) 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.

- 5.1.5. Clicking on the *Browse Comments* button displays the information header associated with the selected datafile.
- 5.1.6. A second data set may be selected at d), e) and f). Such a data set must be in the form of a processed output data from ADAS602. Its purpose is to provide initial selection values for analysing the new data set. This facility is important for repetitive analysis of data from the same spectral region where the same set of lines is being picked out. Note that the default pathway is to the *.../adas/pass* directory in this case. Note also that if a processed file is selected **it will be used** to fit the new data.
- 5.1.7. Once a primary data file is selected, the buttons at the bottom of the main window become active.
- 5.1.8. Clicking the *Done* button moves you forward to the next window. Clicking the *Cancel* button takes you back to the previous window
  
- 5.2. The **processing options window** has the appearance shown below
  - 5.2.1. The spectrum (counts vs pixel number) is displayed at a) and a title for the hard copy of the graph may be entered at b).
  - 5.2.2. In general, one wishes to select only a segment of the spectrum for fitting and to adjust the y-scale. This is done by entering appropriate values at c). Note that the entries have effect immediately so the graph can be adjusted rapidly to requirements. Line fitting choices are made at the right side of the screen. At d) select the number of line features you wish to fit to the spectrum. A maximum of ten is allowed. At e), select the exposure time if the data are in counts. Omit this if they are in counts/sec.
  - 5.2.3. It is possible to constrain the position of any of the line features in the fitting procedure. To do so, click the *Fix Line Positions* button at f) and enter the pixel positions at which you wish the features locked. It need not be all of the features.
  - 5.2.4. A facility is also present to attach a name to a line feature which is helpful for known lines. These names are carried through to the output data structure. Click the *Identify Lines* button at g) and enter the names in the appropriate fields below.
  - 5.2.5. Control of line widths is provided at h). Select first of all whether you wish the line widths to be permitted to vary from the initial values during the fitting or not. If not is selected, a common line width must be entered. Then chose if you wish all the lines to have the same ( but varying) width or if each line width can vary separately.
  - 5.2.6. At i) select the form of background shape you wish to allow. Note that if you prepare the data with no background then the fitting to no background is allowed by deactivating the *Background Options* button
  - 5.2.7. The way the experimental pixel count data is weighted during the fit optimisation may be chosen at j). The *Weighted Fit* button weights a count with the square root of the count. The *Equal Weighted Fit* button imposes the same weight on the data at each pixel position.
  - 5.2.8.



- 5.2.9. If there are multiple spectra in the input data set, then the fitting procedure can be made to cycle automatically through each data set in turn using the initial settings from the first fit. Activate the *Automatic Cycling* button at k)
- 5.2.10. Finally click the button ‘Go’ at l) to initiate the fitting process. The displayed graph changes at this point to histogram mode. The mouse cursor position on the graph screen becomes meaningful and the left and right mouse buttons active. Advisory information of the action currently expected is given above the graph depending on the processing options chosen. In general one clicks to mark the peak, left half width position and right half width position for each feature in turn. A small square marks each selected position. Finally one marks the lowest and highest levels of the background. Clicking the right button can restart the process from the beginning. After completing the required marking, the fitting optimisation takes place. The figure is redisplayed with the fitted Gaussians and background superimposed in dotted outline.
- 5.2.11. At the base of the window, the icon for *Exit to Menu* is present. This quits the program and returns you to the ADAS series 6 menu. Remember that *Done* takes you forward to the next screen while *Cancel* takes you back to the previous screen.
- 5.3. The **output options window** appearance is shown below
- 5.3.1. As in the previous window, the full pathway to the file being analysed is shown for information. Also the *Browse comments* button is available.
- 5.3.2. A graph hard copy is available by activation of the *Graphical Output* button a). The File name box then becomes editable. If the output graphic file already exists and the *Replace* button has not been activated, a ‘pop-up’ window issues a warning.



- 5.3.3. A choice of output graph plotting devices is given in the Device list window at d). Clicking on the required device selects it. It appears in the selection window above the Device list window.
- 5.3.4. The *Text Output* button activates writing to a text output file. The file name may be entered in the editable File name box when *Text Output* is on. The default file name ‘paper.txt’ may be set by pressing the button *Default file name*. A ‘pop-up’ window issues a warning if the file already exists and the *Replace* button has not been activated.
- 5.3.5. At e) output of the processing and analysis may be saved by clicking the *Passing File* button. The *Default file name* sends the output file to your *../adas/pass* directory as *adas602.pass*. Note that the output file is an IDL SAVE file structured in the manner described in section 5.1.1.2. Note that defaults are updated after each run.
- 5.3.6. At the base of the window, the icon for *Exit to Menu* is present. This quits the program and returns you to the ADAS series 6 menu. Remember that *Done* takes you forward to the next screen while *Cancel* takes you back to the previous screen.
6. **ADF01** There is a large body of new data in this class stemming from the work by Ronnie Hoekstra, Fritz Bliek and Ron Olson.
- 6.1. State selective charge transfer data to light nuclei from lithium(2s0) beam donors  
 $.../adf01/qcx\#li0/qcx\#li0\_kvi\#<ion>$   
 with  $<ion>$  equal to *he2,be4,b5,c6,n7* and *ne10*. These data are calculations in the CTMC approximation. Note that these new data and assessments indicate that there are errors in some other tabulations of lithium donor charge exchange data (especially, IAEA data report, 1993; Schweinzer et al., 1994)
- 6.2. State selective charge transfer data to light nuclei from hydrogen (n=2) beam donors  
 $.../adf01/qcx\#h0/qcx\#h0\_en2\#<ion>$   
 with  $<ion>$  equal to *he2,li3,be4,b5* and *c6*. These data are calculations in the CTMC approximation.
7. **ADF04** There are some new datasets and some corrections

- 7.1. Martin has generated further specific ion files for the low ionisation stages of nickel using his off-line Cowan/Born structure code. The additional data sets are  
 $./adf04/copmm\#28/copmm\#28\_LS\#<ion>.dat$   
with  $<ion>$ : ni1,..., ni14.
- 7.2. Martin has also generated a new data collection for helium in the same approximation, namely,  
 $./adf04/copmm\#2/copmm\#2\_ls\#he<charge>.dat$   
with  $<charge>$ : 0,1,2. Note that the last one is a dummy bare nucleus file required by ADAS407.
- 7.3. Mis-formatting was found in two further datasets, namely,  
 $./adf04/clike/clike_cfm96\#c.dat$   
and  
 $./adf04/blike/blike_cfm96\#c.dat$   
This arose in transfer from the JET IBM to the workstation
8. **ADF09**  
Martin has continued working on the state selective dielectronic recombination coefficients for all the ions elements up to neon. These are complex background calculations using Nigel's AUTOSTRUCTURE code and post-processor. The data is now complete and the new data sets appear under the 96 year number and Martin's initials by iso-electronic sequence as  
 $./adf09/mom96\#<seq>/mom96\#<seq>\_<ion>ls<nn'\>.dat$   
in the same manner as before.
9. **ADF11 A serious error** has come to light for the  
 $./adf11/plt89/plt89\#he.dat$   
data set. It is wildly wrong. Martin has recalculated from the *adf03* parameter sets. The faulty *adf11* files for helium have been deleted.
10. **ADF12** The new state selective charge exchange data of Ronnie Hoekstra, Fritz Bliek and Ron Olson described for *adf01* above have been processed into effective emission coefficients using the code ADAS309 as follow.
- 10.1. Effective emission coefficient data for light nuclei from lithium(2s0) beam donors  
 $./adf12/qef97\#li/qef97\#li\_kvi\#<ion>$   
with  $<ion>$  equal to *he2,be4,b5,c6,n7* and *ne10*.
  - 10.2. Effective emission coefficient data for light nuclei from hydrogen (n=2) beam donors  
 $./adf12/qef97\#h/qef97\#h_en2\#<ion>$   
with  $<ion>$  equal to *he2,li3,be4,b5* and *c6*.
11. **ADF21 & ADF22** The following data sets have been updated with extended comments.  
 $./adf26/bms97\#h/bms97\#h\_<ion>.dat$   
 $./adf26/bme97\#h/bme97\#h\_<ion>.dat$   
where  $<ion>$  denotes *h1, he2, li3, be4, b5, c6, n7, o8, f9, ne10*. Note that the uncertainties given are maximal based on the difference obtained with different source datasets in the ADAS310 calculations. We expect the actual error of our new results to be substantially less in general.
12. **ADF26** This is the new data format required by ADAS312. Harvey has created 1997 data sets of this type for neutral hydrogen beams on the light impurity ions. These are  
 $./adf26/bdn97\#h/bdn97\#h\_<ion>.dat$   
where  $<ion>$  denotes *h1, he2, li3, be4, b5, c6, n7, o8, f9, ne10*. Note the extension to include *li3* and *f9* as stopping species in the plasma. These datasets are simply the '*.pass1*' files from ADAS310 runs. A full specification of the *adf26* organisation and parameters is given in  
 $./adas/docs/manual/appxb-26.ps$

13. **Plans for ADAS508 & ADAS510**

- 13.1. The code ADAS508 which I originally intended for this release is not quite ready yet. Ricky has a little more work to do on it. It will be ready for the next release. Recall that there is a gap in the capabilities of ADAS in that the primary tabulations of G(Te) functions (*adf20*) have to be generated off-line. The code which does this was originally developed by Peter McWhirter at JET. Then Alessandro took it over, found the errors and made it more flexible. We have depended on Alessandro for running this code at suitable times to extend the G(Te) tabulations. However, now that the DEM code, ADAS601, is being used much more, with back checks etc. through the G(Te) functions to the specific ion files for problem lines, it will now be helpful to have this G(Te) generator on-line.
- 13.2. Martin and I are in the the initial design phase of a new code, ADAS510, to interrogate the primary state resolved dielectronic data of type *adf09*. The data collection of this type is now very large and comprehensive, so a dedicated interrogation code is overdue. It should be ready for the next release

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