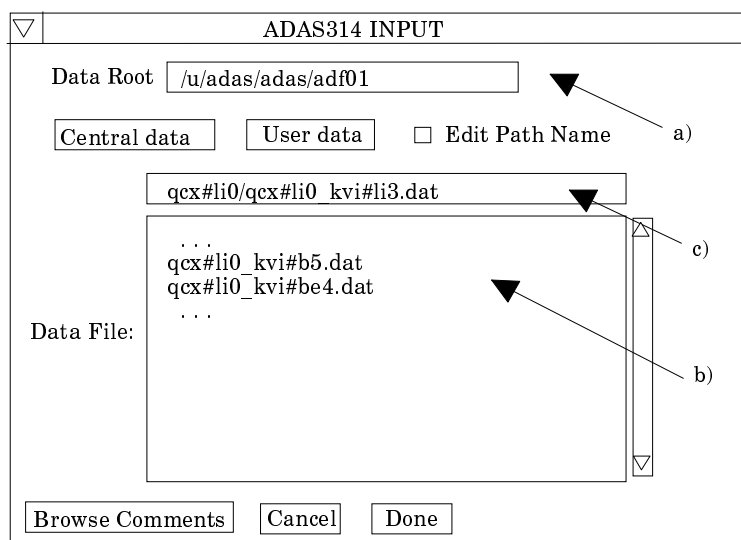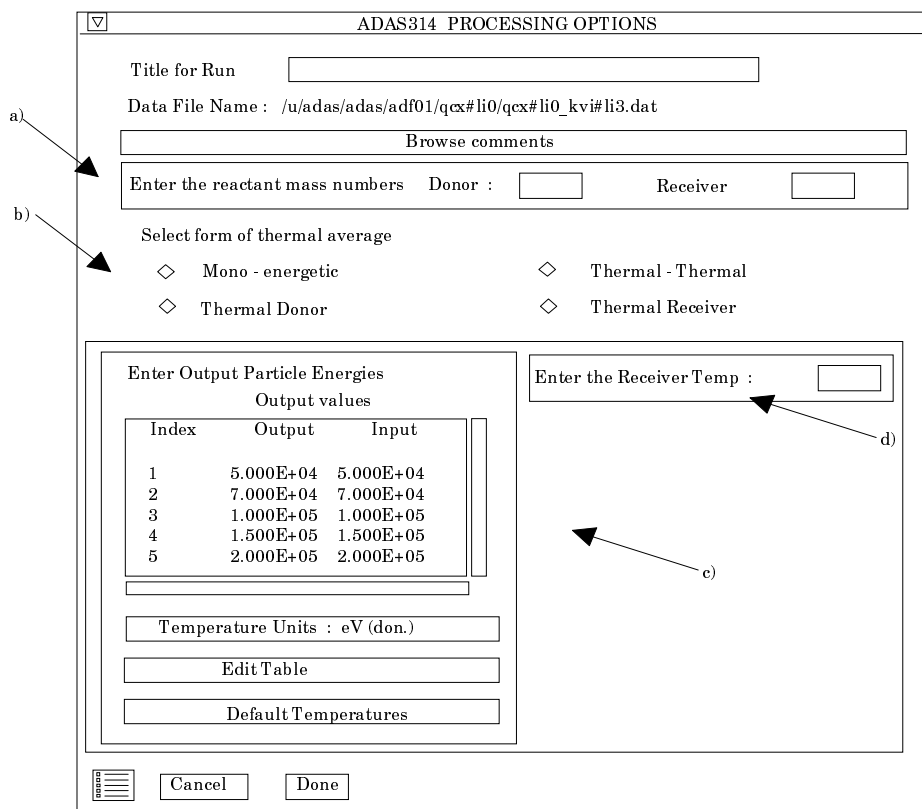In this release there are two new codes, ADAS314 and ADAS603. ADAS603 is a spectral fitting code developed by Ricky Martin from the Zeeman pattern work at Jeulich by John Hey and Manfren Korten and guided by them. It should be viewed as in the nature of a 'beta' version. We are seeking reactions to the general style since a number of other special feature fitting programs of series 6 are planned and we would like them to have the same look and feel. Also, such codes which use experimental spectral data directly, need front end tuning to the forms of the datastream from particular spectrometers and experiments and then later need tuning with real instrument functions. We are looking for feedback and suggestions on this too. A very large amount of new data is provided in this release. The bulk of them are data associated with neutral helium beam stopping and emission. They are very comprehensive generalised collisional-radiative data and are the fruit of Harvey Anderson's studies. In the next release, planned for March 1999, two new codes will be added to series 3 which allow the direct calculation of these data and help in their exploitation. Some intermediate data stemming from the special work groups is also included although the main data flow into the ADAS database will be during 1999. I remind you that we have three ADAS work groups in action at this. The present data new data comes from the Neutral helium beam Project with Susie Menhart and Harvey Anderson. The GCR Project includes Herbert Jentschke, Ralph Dux, David Brooks, Jim Lang and Martin O'Mullane and is targetted on full generalised collisional-radiative data for nitrogen, oxygen and neon which will effectively complete our light atom studies at the highest quality levels. The DR Project, driven by Nigel Badnell, includes Dima Verner, Martin O'Mullane, Mitch Pindzola, Tom Gorczyca, Don Griffin and Dario Mitnik and is preparing comprehensive intermediate coupling dielectronic recombination data for heavier elements. This will be of immediate use for astrophysics and prepares the way for our attack on generalised collisional radiative modelling of heavy species. Special bulletins are produced by these work groups and I have added the current ones to the present bulletin circulation list to keep you all informed.

ADAS314   The code converts state selective charge exchange cross-sections of ADAS data format *adf01,* for capture to form one electron ions, to averaged cross-sections over reactant distribution functions. There are a number of choices depending on whether the donor and/or receiver are mono-energetic or have Maxwellian speed distributions. The averaged data is returned in the same format as the original *adf01* file. Extreme care must be used in interpreting results using such a datafile in other ADAS series 3 programs.
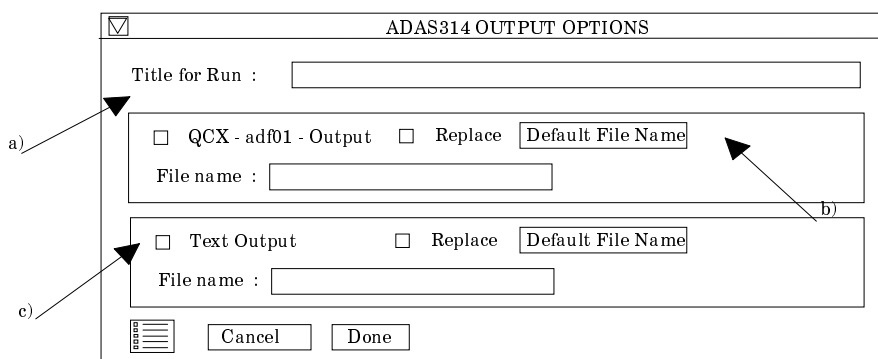
1.1.   The **file selection window** has the appearance shown below

      1.1.1.   Data root a) shows the full pathway to the appropriate data subdirectories of type *adf01*. 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.

      1.1.2.   The Data root can be edited directly. Click the *Edit Path Name* button first to permit editing.

      1.1.3.   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.

      1.1.4.   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*.

      1.1.5.   Once a data file is selected, the set of buttons at the bottom of the main window become active.

      1.1.6.   Clicking on the *Browse Comments* button displays any information stored with the selected datafile.

```
┌─┬──────────────────────────────────────────────────────────┐
│▽│                      ADAS314 INPUT                        │
├─┴──────────────────────────────────────────────────────────┤
│                                                             │
│   Data Root │ /u/adas/adas/adf01        │        ▼          │
│                                                             │
│   ┌──────────────┐   ┌──────────────┐   □ Edit Path Name  a)│
│   │ Central data │   │  User data   │                       │
│   └──────────────┘   └──────────────┘                       │
│                                                             │
│              │ qcx#li0/qcx#li0_kvi#li3.dat      ▼ │          │
│              ┌─────────────────────────────────────┐△       │
│              │  . . .                              ││       │
│              │  qcx#li0_kvi#b5.dat                 ││     c) │
│              │  qcx#li0_kvi#be4.dat       ▼        ││       │
│   Data File: │  . . .                              ││       │
│              │                                     ││     b) │
│              │                                     ││       │
│              │                                     ││       │
│              │                                     │▽       │
│              └─────────────────────────────────────┘        │
│   ┌────────────────┐  ┌────────┐  ┌──────┐                  │
│   │Browse Comments │  │ Cancel │  │ Done │                  │
│   └────────────────┘  └────────┘  └──────┘                  │
└─────────────────────────────────────────────────────────────┘
```

1.1.7.   Clicking the *Done* button moves you forward to the next window. Clicking the *Cancel* button takes you back to the previous window

1.2.   The **processing options window** has the appearance shown below.

1.2.1.   An arbitrary title may be given for the case being processed. For information the full pathway to the dataset being interrogated is also shown. The button *Browse comments* allows display of the information field section at the foot of the selected dataset, if it exists, in the usual manner.

1.2.2.   At a), enter the mass numbers of the donor and receiver reactants. These are used for conversions between energies and speeds.

1.2.3.   At b), the choice of particular form of averaging is made. There are four choices.

(i) mono-energetic - one collision partner static, other mono-energetic. The code essentially alters the energy range of the adf01 file tabulation. The effective cross-section, rate coefficient/moving partner speed is delivered as a function of moving partner energy in eV/amu.

(ii) thermal donor - monoenergetic receiver. A donor/receiver sub-widget entry box appears at d), receiver energy to be specified as a 'temp' in sub-widget in eV, donor thermal with energies entered in a table using Table Editor. The effective cross-section, rate coefficient/donor mean speed is delivered as a function of donor energy in eV/amu.

(iii) thermal receiver - monoenergetic donor. A donor/receiver sub-widget entry box appears at d), donor energy to be specified as a 'temp' in sub-widget in eV, receiver thermal with energies entered in a table using Table Editor. The effective cross-section, rate coefficient/receiver mean speed is delivered as a function of receiver energy in eV/amu.

(iv) thermal thermal - Donor and receiver thermal at the same temperature with temperatures entered in a table using Table Editor. The effective cross-section, rate coefficient/donor mean speed is delivered as a function of donor energy in eV/amu.

1.2.4.   At c), the temperatures/energies (the request title alters according to the selection at b)) at which you wish the output data are chosen. Table editor is available to enter this data and default temperatures (equal to the energies in the *adf01* file) may be chosen by button click as usual.   Note that temperatures can be specified in terms of donor temperature (eV), receiver temperature(eV) or eV/amu. This scaling operates independently of the type of averaging selected.

1.2.5.   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.

```
┌─────────────────────────────────────────────────────────────────────────┐
│ ▽                    ADAS314  PROCESSING OPTIONS                          │
│                                                                           │
│        Title for Run     [                                        ]       │
│                                                                           │
│        Data File Name :  /u/adas/adas/adf01/qcx#li0/qcx#li0_kvi#li3.dat   │
│ a)                                                                        │
│        ┌──────────────────── Browse comments ────────────────────┐        │
│        Enter the reactant mass numbers   Donor :  [      ]    Receiver [  ]│
│ b)                                                                        │
│        Select form of thermal average                                     │
│            ◇    Mono - energetic          ◇    Thermal - Thermal          │
│            ◇    Thermal Donor             ◇    Thermal Receiver           │
│                                                                           │
│     ┌──────────────────────────┐    ┌──────────────────────────────┐     │
│     │ Enter Output Particle Energies │  Enter the Receiver Temp : [    ]│  │
│     │        Output values       │                              d)      │
│     │   Index    Output    Input │                                      │
│     │     1     5.000E+04  5.000E+04│                                    │
│     │     2     7.000E+04  7.000E+04│                                    │
│     │     3     1.000E+05  1.000E+05│            c)                      │
│     │     4     1.500E+05  1.500E+05│                                    │
│     │     5     2.000E+05  2.000E+05│                                    │
│     │                                                                    │
│     │   Temperature Units :  eV (don.)                                   │
│     │           Edit Table                                               │
│     │        Default Temperatures                                        │
│     └──────────────────────────┘                                         │
│     ▤   [ Cancel ]   [ Done ]                                             │
└─────────────────────────────────────────────────────────────────────────┘
```

1.3. The **output options window** is shown below. There is no graphical output possibility but in addition to the usual text file, an output data file is always produced.

    1.3.1. The data output file at b) is of *adf01* format. It is usually sent to the pass directory as *adas314_adf01.pass* for checking and re-naming later. This is the default file name.

    1.3.2. At c) output of the tabular record of the interrogation may be enabled. This is usually called *paper.txt* and it is created in the directory from which ADAS was launched.

```
┌─────────────────────────────────────────────────────────────────────────┐
│ ▽                     ADAS314 OUTPUT OPTIONS                              │
│                                                                           │
│        Title for Run :  [                                          ]      │
│                                                                           │
│ a)     ┌───────────────────────────────────────────────────────────┐     │
│        │ □  QCX - adf01 - Output    □  Replace  [Default File Name] │     │
│        │ File name :  [                              ]              b)│     │
│        └───────────────────────────────────────────────────────────┘     │
│                                                                           │
│        ┌───────────────────────────────────────────────────────────┐     │
│        │ □  Text Output            □  Replace  [Default File Name]  │     │
│ c)     │ File name :  [                              ]               │     │
│        └───────────────────────────────────────────────────────────┘     │
│        ▤   [ Cancel ]   [ Done ]                                          │
└─────────────────────────────────────────────────────────────────────────┘
```

    1.3.3. 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. *Done* and *Cancel* take you back to the previous screen.

2. **ADAS603** The code fits multi-Gaussian line profiles, a background and optionally one detailed Zeeman/Paschen-Back feature primitive to an observed spectral segment. It uses a maximum likelihood method together with statistical analysis to calculate the integrated counts under the features along with their estimated standard errors and 95% confidence limits of the fitting parameters. The Zeeman/Paschen-Back feature may be resolved into the separate π and σ components. The multi-Gaussian fitting part of the code is due to Jim Lang and David Brooks and operates in a similar manner to ADAS602. The Zeeman/Paschen-Back code (originally called 'xPaschen') is due to John Hey and Manfred Korten and has been integrated

by Ricky Martin as an ADAS code with an IDL user interface. It has been designed to interface easily with SOHO satellite, JET Joint Undertaking and KFA-Juelich data organisations although a simple interface is also provided. A stand alone, IDL interfaced, version of xPaschen may be requested from the originating authors John Hey and Manfred Korten.

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

    2.1.1.   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:

        2.1.1.1.   The form *Standard* comprises a single array and a 'header' defined as follows

spectrum :	*dblarr()*
header :	*structure*

            spectrum   contains the spectral counts as a function of pixel position. The array length must be <=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 a structure is a structure with any number of tags with the following mandatory:

header.nsize :	*0*	*header.wavemin:*	*0.0*
header.wavemax:	*0.0*		

with

nsize	number of pixels in spectrum array
wavemin	wavelength for first pixel in Angstrom
wavemax	wavelength for last pixel in Angstrom

        2.1.1.2.   The form *Processed* is that of the output structure from ADAS603 itself. This form allows re-entry of output data for re-analysis. The input file contains a structure *lstr* defined as:

lstr.b0 :	*0.0*	*lstr.eseb0:*	*0.0*
lstr.eclb0 :	*0.0*	*lstr.b1:*	*0.0*
lstr.eseb1 :	*0.0*	*lstr.eclb1:*	*0.0*
lstr.b2 :	*0.0*	*lstr.eseb2:*	*0.0*
lstr.eclb2 :	*0.0*	*lstr.w:*	*dblarr(10)*
lstr.esewl :	*0.0*	*lstr.eclwl*	*0.0*
lstr.xo :	*dblarr(10)*	*lstr.esexo:*	*dblarr(10)*
lstr.eclxo :	*dblarr(10)*	*lstr.h:*	*dblarr(10)*
lstr.eseh :	*dblarr(10)*	*lstr.eclh:*	*dblarr(10)*
lstr.esewv :	*dblarr(10)*	*lstr.eclwv:*	*dblarr(10)*
lstr.flux :	*dblarr(10)*	*lstr.esef:*	*dblarr(10)*
lstr.eclf :	*dblarr(10)*	*lstr.getfit:*	*intarr(6)*
lstr.exptime :	*0.0*	*lstr.info:*	*0*
lstr.header :	*' '*	*lstr.xmin:*	*0*
lstr.xmax :	*0*	*lstr.x:*	*indgen()*
lstr.y :	*dblarr()*	*lstr.ya:*	*dblarr()*
lstr.nsize :	*0.0*	*lstr.numline:*	*0*
lstr.nfxl :	*0*	*lstr.bchl:*	*0.0*
lstr.bchr :	*0.0*	*lstr.lineid:*	*strarr(10)*
------------------	------------------	------------------	------------------
lstr.getxp :	*intarr(4)*	*lstr.bxp:*	*0.0*
lstr.esebxp :	*0.0*	*lstr.eclbxp :*	*0.0*
lstr.phxp:	*0.0*	*lstr.esephxp :*	*0.0*
lstr.eclphxp :	*0.0*	*lstr.cxp :0.0*	

lstr.esecxp :	*0.0*	*lstr.eclcxp :*	*0.0*
lstr.txp:	*0.0*	*lstr.esetxp :*	*0.0*
lstr.ecltxp :	*0.0*	*lstr.featid :*	*0.0d0*
lstr.featstr :	*' '*	*lstr.angxp :*	*0.0d0*
lstr.gamma :	*0.0d0*	*lstr.pol :*	*0.0d0*
lstr.wlength :	*fltarr(125)*	*lstr.feature :*	*fltarr(125)*

The variables and their meanings up to the dashed line are as for ADAS602. The additional variables for ADAS603 are as follow:

getxp	options selcted for xPaschen (see code)
bxp	fitted magnetic field strength
esebxp	estimated standard error in *bxp*
eclbxp	estimated 95% confidence limit in *bxp*
phxp	fitted peak height
esephxp	estimated standard error in *phxp*
eclphxp	estimated 95% confidence limit in *phxp*
cxp	fitted centroid shift
esecxp	estimated standard error in *cxp*
eclcxp	estimated 95% confidence limit in *cxp*
txp:	fitted ion temperature for xPaschen feature (eV)
esetxp	estimated standard error in *txp*
ecltxp	estimated 95% confidence limit in *txp*
featid	index number of special feature in catalogue.
featstr	description of special feature in catalogue
angxp:	specified observation angle
gamma:	line broadening parameter (-1.0, Doppler; 1.0 Lorentzian 1; 2.0, Lorentzian 2
pol:	polarisation case selector
wlength:	x-axis values (pixel nos.) of fitted feature envelope
feature:	fitted feature envelope

2.1.1.3. The form *Other* is not yet implemented and we are open to suggestions for it (eg. an ascii tabulated version of *lstr* as *spectrum/header*?)

2.1.2. Data root b) shows the full pathway to the appropriate data sub-directories. Click the *Central Data* button to insert the default central ADAS pathway to */../adas/adas/arch603*. Note that there are only some sample data in this sub-directory 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 ADAS603.

2.1.3. 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.

2.1.4. 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 data-files are presented for selection.

2.1.5. Clicking on the *Browse Comments* button displays the information header associated with the selected data-set.

2.1.6. 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 ADAS603. 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.

2.1.7. Once a primary data file is selected, the buttons at the bottom of the main window become active.

2.1.8. Clicking the *Done* button moves you forward to the next window. Clicking the *Cancel* button takes you back to the previous window

2.2.   The **processing options window** has the appearance shown below

2.2.1. The spectrum (counts Vs pixel number and wavelength) is displayed at a) and a title for the hard copy of the graph may be entered at b).

2.2.2. 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 pixel values at c) in the X-min, X-max, Y-min and Y-max boxes. Note that the entries in ADAS603 take effect after the return key, unlike ADAS602 which takes immediate effect.

2.2.3. There are two parts to the theoretical spectrum, a conventional set of ordinary line features and a Zeeman/Paschen-Back feature primitive for an identified multiplet. The initial conditions for the two parts are set up in turn by activating the appropriate button at f). These are exclusive buttons and the associated sub-widget is displayed immediately below the buttons. The choice shown in the main figure is the xPaschen sub-widget. The conventional line fitting sub-widget is shown separately in a later figure.

2.2.4. **Specifying the xPaschen feature primitive**:

2.2.4.1. The magnetic field effects have been calculated for a large number of multiplets and archived for selection. The available choice may be scrolled through in the multiplet selection widget at h) Click on a multiplet to select it. The selected multiplet is shown in the window at g).

6
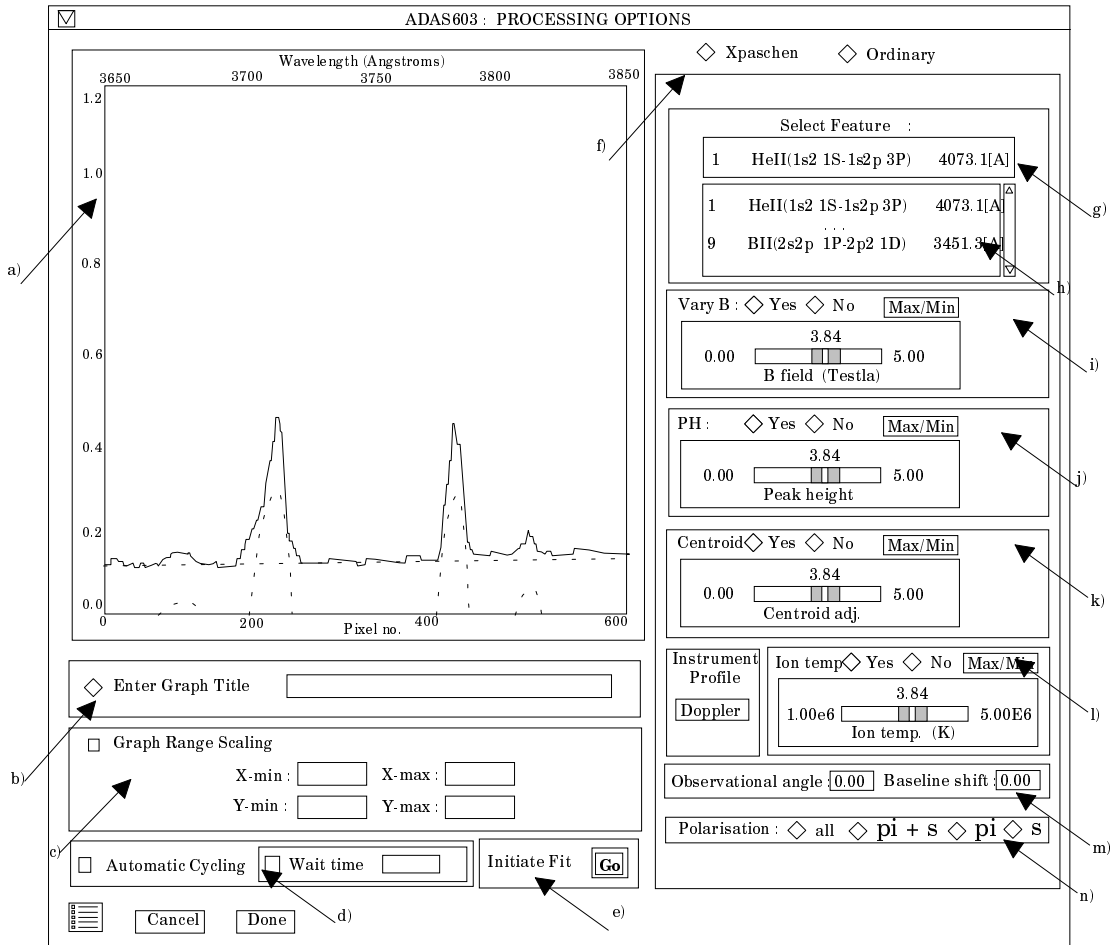
2.2.4.2. A standard sub-widget pattern has been prepared for adjustment of parameters of the xPaschen feature and is used at i), j), k), and l). Each parameter is controlled by a slider. The limits for the slider parameter are shown at the ends of the slider and the current value is shown above the slider. The limits can be altered by clicking the *Max/Min* button. A pop-up appears as shown below. Type in the new settings and then click *Done*. Note also that the slider value can also be set. Returning to the parameter subwidget, the buttons *Yes* and *No* allow the parameter to be treated as variable when the automatic fitting procedure is initiated (Yes) or locked at the slider setting (No).

2.2.4.3. Parameters under slider control for stting of initial conditions are the magnetic flux density (B), the overall feature peak height (PH), the centroid shift of the overall feature (centroid) and the Doppler ion temperature (Ion temp).

2.2.4.4. At the moment the values for centroid shift and the maximum and minimum are a % of the displayed window - not pixel numbers. This to rduce the inconvenience of having to change the slider scales when switching between *Graph Range Scaling* and the default. This should probably be discussed furthur.

2.2.4.5. Our plans for instrument profile and line shapes are not yet complete. Click on the Instrument Profile button to drop a selection menu. At the moment there are just three choices as shown below. Selecting *Doppler* makes the Ion temperature adjustment sub-widget active. Other selections force fixed line shapes. Our current philosophy is as follows. We wish the final optimised spectral fitting to deliver physical parameters for the feature fit. At the

moment, we see the line profile part delivering ion temperature. The menu item *Doppler* is a plasma interpretative name and selects a thermal Doppler line component profile with ion temperature the parameter. We assume that most relevant line shapes can be made as depending on at most two parameter. One of these parameters will normally be the ion temperature and it will be a search parameter, the other if it exists will be a fixed parameter (although possibly set by a pop-up). Such an approach will allow Voigt, double Doppler etc. 'No search parameter' cases will be allowed, such as Lorentz with again one or two (but fixed) parameters specifying them. We would like to keep names like *Doppler* when there is a plasma parameter involved and names like *Lorentz* or *Gaussian* for mathematical shape specification. We presume that we may well want to convolve the feature through an instrument function of some sort. We would like individual spectrometers of ADAS members to be selectable in the drop down menu. **We would be very grateful for feedback and active collaboration on setting up this part**

2.2.4.6. At m), enter the observation angle (degrees) relative to the magnetic field direction. This is not a variable parameter.

2.2.4.7. Also at m), specify a baseline on which the initail set up of the xPaschen feature is to be placed. This is a necessary aid for visually manoeuvring the xPashen feature to look like the observed spectral feature initially. It plays no further part in the susequent optimised automatic fit since baseline initial conditions are set with the ordinary lines.

2.2.4.8. In setting up the initial conditions, you can choose whether to display the whole theoretical multiplet or the component of a particular polarisation. Activate the appropriate button at n)
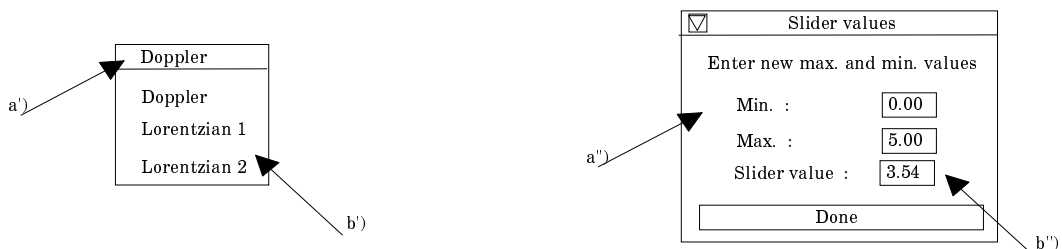
2.2.5. **Specifying ordinary features**:

2.2.5.1. At g') select the number of line features you wish to fit to the spectrum. A maximum of ten is allowed. At h'), select the exposure time if the data are in counts. Omit this if they are in counts/sec.

2.2.5.2. 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 i') and enter the pixel positions at which you wish the features locked. It need not be all of the features.

2.2.5.3. 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 j') and enter the names in the appropriate fields below.

2.2.5.4. Control of line widths is provided at k'). 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.

2.2.5.5. At l') 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

2.2.5.6. The way the experimental pixel count data is weighted during the fit optimisation may be chosen at m'). 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.

```
┌──────────────────────────────────────────────────┐
│  ┌────────────────────────────────────────────┐   │
│  │  Enter No. of Lines to Fit  :    [  4  ] ▼ │   │ ── g')
│  └────────────────────────────────────────────┘   │
│  ┌────────────────────────────────────────────┐   │
│  │ ◇  Enter Exposure Time      :   [      ] ▼ │   │ ── h')
│  └────────────────────────────────────────────┘   │
│  ┌────────────────────────────────────────────┐   │
│  │  ☐ Fix Line Positions     ☐ Identify Lines │   │ ── j')
│  │                                            │   │
│  │      1 : [      ]        6 : [      ]       │   │
│  │      2 : [      ]        7 : [      ]       │   │
│  │      3 : [      ]        8 : [      ]       │   │
│  │      4 : [      ]        9 : [      ]       │   │
│  │      5 : [      ]       10 : [      ]       │   │
│  │                                            │   │
│  └────────────────────────────────────────────┘   │
│  ┌────────────────────────────────────────────┐   │
│  │ Allow Variable Line Widths :   ◇ Yes ◇ No  │   │
│  │  ┌──────────────────────────────────────┐  │   │
│  │  │ Fit Different Widths :   ◇ Yes ◇ No  │  │   │ ── k')
│  │  └──────────────────────────────────────┘  │   │
│  └────────────────────────────────────────────┘   │
│  ┌────────────────────────────────────────────┐   │
│  │  ☐ Background Options                      │   │ ── l')
│  │  ┌──────────────────────────────────────┐  │   │
│  │  │ ☐ Constant  ☐ Linear  ☐ Quadratic   │  │   │
│  │  └──────────────────────────────────────┘  │   │
│  └────────────────────────────────────────────┘   │
│  ┌────────────────────────────────────────────┐   │
│  │ ◇ Weighted Fit   ◇ Equal Weighted Fit      │   │ ── m')
│  └────────────────────────────────────────────┘   │
└──────────────────────────────────────────────────┘
i')
```

2.2.5.7. 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 d). Note that a *Wait time* can be set if successive fits are displayed too rapidly for proper asessment. Finally click the button '*Go*' at e) 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. **Note at this stage, it is only the ordinary lines which are being marked**. Clicking the right button can restart the process from the beginning. After completing the required marking, the fitting optimisation takes place.

2.2.6. The figure is finally redisplayed with the fitted ordinary line Gaussians, the background and the Zeeman/Paschen-Back multiplet superimposed in dotted outline. The fitting process may be slow depending on your workstation. We are working on this.

2.2.7. 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 6 menu. Remember that *Done* takes you forward to the next screen while *Cancel* takes you back to the previous screen.

2.3. The **output options window** appearance is shown below
2.3.1. As in the previous window, the full pathway to the file being analysed is shown for information. Also the *Browse comments* button is available.
2.3.2. 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.
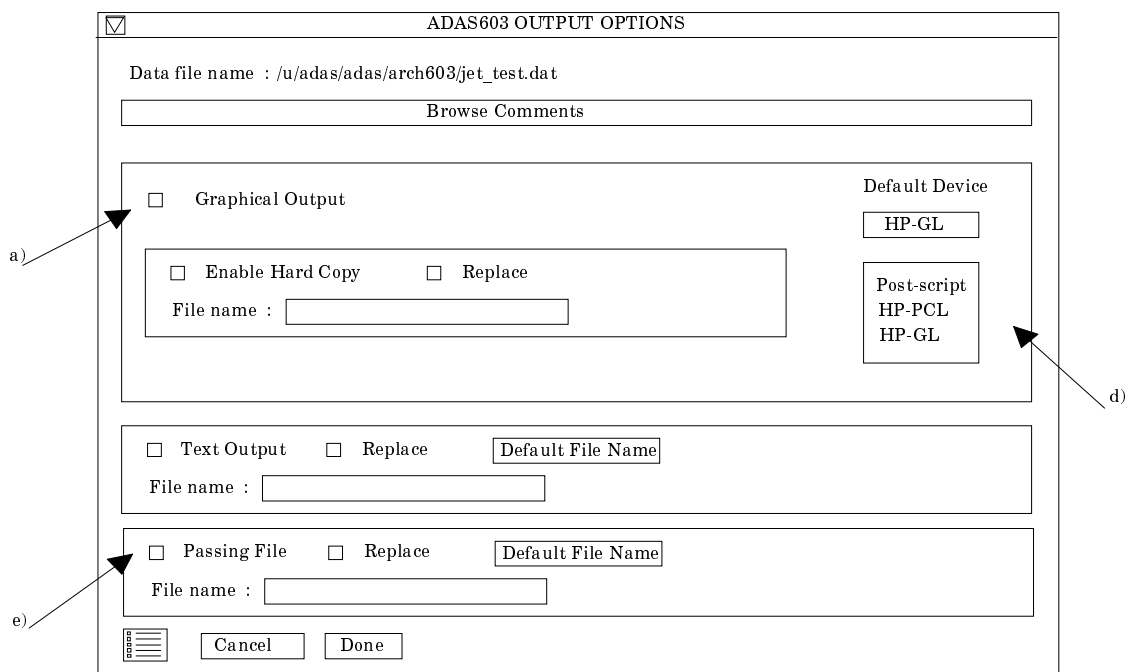
2.3.3. A choice of output graph plotting devices is given in the Device list window at d). Clicking on the required device selects it. It appears in the selection window above the Device list window.
2.3.4. The *Text Output* button activates writing to a text output file. The file name may be entered 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.
2.3.5. 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 *adas603.pass*. Note that the output file is an IDL SAVE file structured in the manner described in earlier. Note that defaults are updated after each run.
2.3.6. 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.

3. **ADF01** Charge exchange cross-section data for metastable helium donors to He^{+2} and C^{+6} has been added by the Groningen group as follows:

> /.../adas/adas/adf01/qcx#he0/qcx#he0_2s-t_kvi#he2.dat
> /.../adas/adas/adf01/qcx#he0/qcx#he0_2s-s_kvi#he2.dat
> /.../adas/adas/adf01/qcx#he0/qcx#he0_2s-t_kvi#he2.dat
> /.../adas/adas/adf01/qcx#he0/qcx#he0_2s-s_kvi#he2.dat

the code 2s-t denotes the 1s2s ^{3}S metastable donor and 2s-s denotes the 1s2s ^{1}S metastable donor. Additionally a file for H$^+$ impact excitation of ground state He^{+0}(1s^2 ^{1}S) has been added. This is not a usual (or quite correct) positioning for ion impact excitation data, but this data set is complete for nl sub-states and so has been prepared like a charge exchange cross-section file. It is

/.../adas/adas/adf01/qex#he0/qex#he0_1s-s_kvi#h1.dat

4. **ADF02** The reformatted helium data extended somewhat and used by Harvey for the helium beam studies has been positioned as

/.../adas/adas/adf02/sia#he/sia#he_j91#he.dat

5. **ADF04** The efforts of the GCR project working party has led to new preferred data for nitrogen, oxygen and neon (all ions). We have stated to put this in place and have simultaneously taken note of the difficulties of identifying the best *adf04* data. We are preparing new subdirectories of the form */adas#<element nuclear charge>* which contain the preferred data for each ion of the element. Such directories appear at the top of the sub-directory list on enter *adf04*. When a particular file is superceded, we shall place it back in the */<ion>like* sub-directories in the usual way so as to keep the historical record. Note therefore the new sub-directories (not all of which are fully filled yet)

/.../adas/adas/adf04/adas#1/
/.../adas/adas/adf04/adas#2/
/.../adas/adas/adf04/adas#6/
/.../adas/adas/adf04/adas#7/
/.../adas/adas/adf04/adas#8/
/.../adas/adas/adf04/adas#10/

Members are of LS-coupled (ls) or intermediate coupling (ic) form. We shall shortly be complete for both. Thus typical names are

/.../adas/adas/adf04/adas#7/cop98#7_ic#n2.dat
/.../adas/adas/adf04/adas#7/cop98#7_ls#n2.dat

6. **ADF08** New state selective radiative recombination data are also appearing from the GCR project work group for ions of nitrogen, oxygen and neon as

/.../adas/adas/adf08/rrc98#<isoelec. seq.>/...

such as

/.../adas/adas/adf08/rrc98#b/rrc98#b_n2ls.dat

7. **ADF12** Charge exchange effective emission data for metastable helium donors to He^{+2} and C^{+6} has been added by the Groningen group as follows:

/.../adas/adas/adf12/qef97#he/qef#he_2s-t_kvi#he2.dat
/.../adas/adas/adf12/qef97#he/qef#he_2s-s_kvi#he2.dat
/.../adas/adas/adf12/qef97#he/qef#he_2s-t_kvi#he2.dat
/.../adas/adas/adf12/qef97#he/qef#he_2s-s_kvi#he2.dat

the code 2s-t denotes the 1s2s ^{3}S metastable donor and 2s-s denotes the 1s2s ^{1}S metastable donor. One or two omissions of receiver elements for effective charge exchange emission coefficients for H(n=2) and Li donors have been added to the directories

/.../adas/adas/adf12/qef97#h/...
/.../adas/adas/adf12/qef97#li/...

respectively

8. **ADF18/a09_a04** An extensive series of cross-referencing files are being added from the GCR Project work group. We shall describe these in more detail for those interested in the project bulletins:

/.../adas/adas/adf18/a09_a04/drm96#<isoelec. seq>/...

9. **ADF18/a09_p204** An extensive series of cross-referencing files are being added from the GCR Project work group. We shall describe these in more detail for those interested in the project bulletins:

/.../adas/adas/adf18/a09_p204/drm96#<isoelec. seq>/...

10. **ADF21** Comprehensive data for helium beam stopping in the generalised collisional-radiative picture with 1s^2 ^{1}S, 1s2s ^{3}S and 1s2s ^{1}S metastables from Harvey Anderson's efforts for the Neutral helium beam Project have been put in place. These are extensive data and reference should be made to the */.../adas/docs/datastatus/adf_stat.ps* document for more detail. They are divided into data centred on fast beams and data centred on slow beams in directories:

/.../adas/adas/adf21/bms99#he_fast/
/.../adas/adas/adf21/bms99#he_slow/

Sub-directories separate into particular elements of the 3x3 collsional-radiative matrix and then to individual data sets for each plasma impurity (all stripped impurities from H^+ to Ne^{+10}) as for example

/.../adas/adas/adf21/bms99#he_fast/gcr11/gcr11#he_h1.dat

11.   **ADF22** Comprehensive data for helium beam emission in the generalised collisional-radiative picture with $1s^2$ ^1S, $1s2s$ ^3S and $1s2s$ ^1S metastables from Harvey Anderson's efforts for the Neutral helium beam Project have been put in place. These are extensive data and reference should be made to the */.../adas/docs/datastatus/adf_stat.ps* document for more detail. They are divided into data centred on fast beams and data centred on slow beams in directories:

/.../adas/adas/adf22/bme99#he_fast/
/.../adas/adas/adf22/bme99#he_slow/

Sub-directories separate into spectrum lines (in nanometers) and then down to individual data sets for each metastable acting as driver and each plasma impurity (all stripped impurities from H^+ to Ne^{+10}) as for example

/.../adas/adas/adf22/bme99#he_fast/nm318/nm318_m1f#he_h1.dat

12.   **ADF26** The complete population structures in the advanced bundle-nl model for the helium beam work above are archived in sub-directories as

/.../adas/adas/adf26/bnl99#he_fast/
/.../adas/adas/adf26/bnl99#he_slow/

with individual members for each single plasma impurity (all stripped impurities from H^+ to Ne^{+10}) as for example

/.../adas/adas/adf26/bnl99#he_fast/bnl99#he_h1.dat

13.   Note that the state of the database in broad terms is described and updated in

/.../adas/docs/datastatus/adf_stat.ps

H. P. Summers
20 Jan 1999