

Computational overview of ADAS

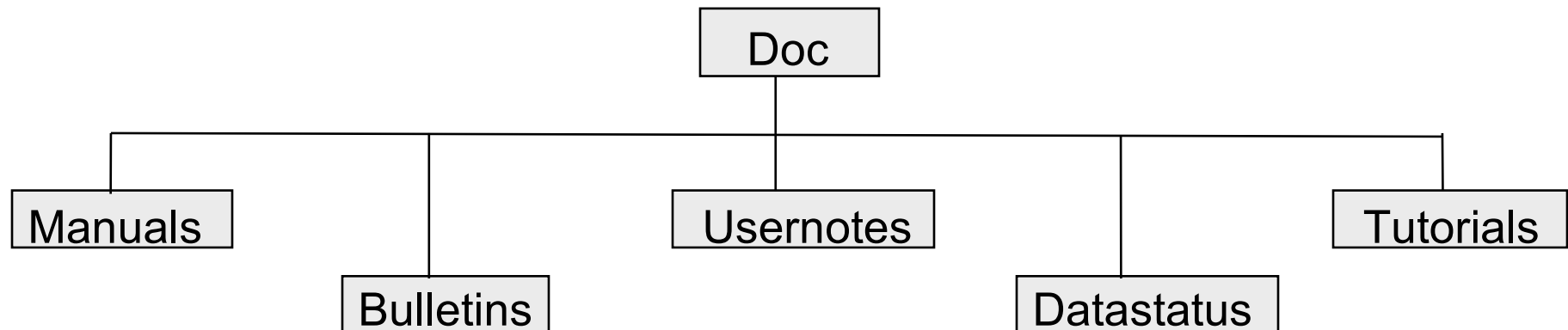
- Introduction
 - » Supported systems and language details
 - » Overall organization
- Initial setup of ADAS
 - » Establishing the local IDL/ADAS environment
 - » Standard user space organization and setup
- Some components of ADAS
 - » The code part of ADAS
 - » The database and adf numbers
 - » The documentation
- Learning to use ADAS online
 - » ADAS501
 - » using common widgets

ADAS

- The interactive user interface
 - » ADAS series
- The fundamental and derived databases
 - » ADAS data formats
- The application interface
 - » Large ADAS FORTRAN and IDL subroutine libraries
 - » Small C, MATLAB and PERL libraries
- Offline-ADAS
- Documentation

Documentation

- Documentation is accessible on the world-wide-web
 - » <http://www.adas.ac.uk>
 - » Also present on all local ADAS work-stations
 - » `/<path>/adas/doc/`
- The main user manual - ver 2.5.6 - is in
 - » `/<path>/adas/doc/manual/`



ADAS series

Interactive codes are grouped in series. Currently ~ 85 codes.

- Atomic data entry and verification
- Population processing
- Charge exchange processing
- Recombination, ionisation processing
- General interrogation programs
- Data analysis and spectral fitting
- Creating and using dielectronic data
- Structure and excitation calculations

ADAS code disposition

- The codes and sub-routines (>1000) are organised hierarchically and maintained under SCCS in

```
» /<path>/adas/idl          /adaslib
                           /adas1xx      /adaslib
                                           /adas101
                                           ...
                           /adas2xx      /adaslib
                                           /adas201
                                           ...
      /fortran              /adaslib
                           /adas1xx      /adaslib
                                           /adas101
                                           ...
```

- Source IDL code is open, but FORTRAN code is restricted. FORTRAN shared object module libraries are available to user codes.

```
» /<path>/adas/lib /libadaslib.a
                  /libadas1xx.a
                  ...
```

Database

- Fundamental and derived data. Currently ~ 6 Gbyte.
- The various classes of ADAS data have precisely specified organisation called ADAS data formats or 'ADFs' for short (eg. *ADF14*). There are ~ 56 different classes.
- Some key ADF's for fusion application
 - » *ADF04* : specific ion data
 - » *ADF11* : coll.-rad. ionis. & recom. coefficients.
 - » *ADF13* : ionisation per photon ratios
 - » *ADF15* : emissivity coefficients
 - » *ADF40* : envelope feature photon emiss. coefficients.

ADAS data disposition

- The data are organised by data format and maintained under CVS in
 - » `<path>/adas/adas`
 - `/adf01`
 - `<sub-dir1>`
 - `<sub-dir2>`
 - ...
 - `<sub-dir1>`
 - `<sub-dir2>`
 - ...
- Sub-directory naming is not standardised but
 - » All final data sets have the extension `.dat`
 - » Year numbers are frequently used. In ADAS directories, year numbers mark the introduction of a method. It does not necessarily mean year of calculation.
 - » Preferred data is often distinguished by the name `adas`. Initials may be used to identify a particular data compiler.
 - » All data sets must have a final comment block identifying at minimum the producer, date and updates

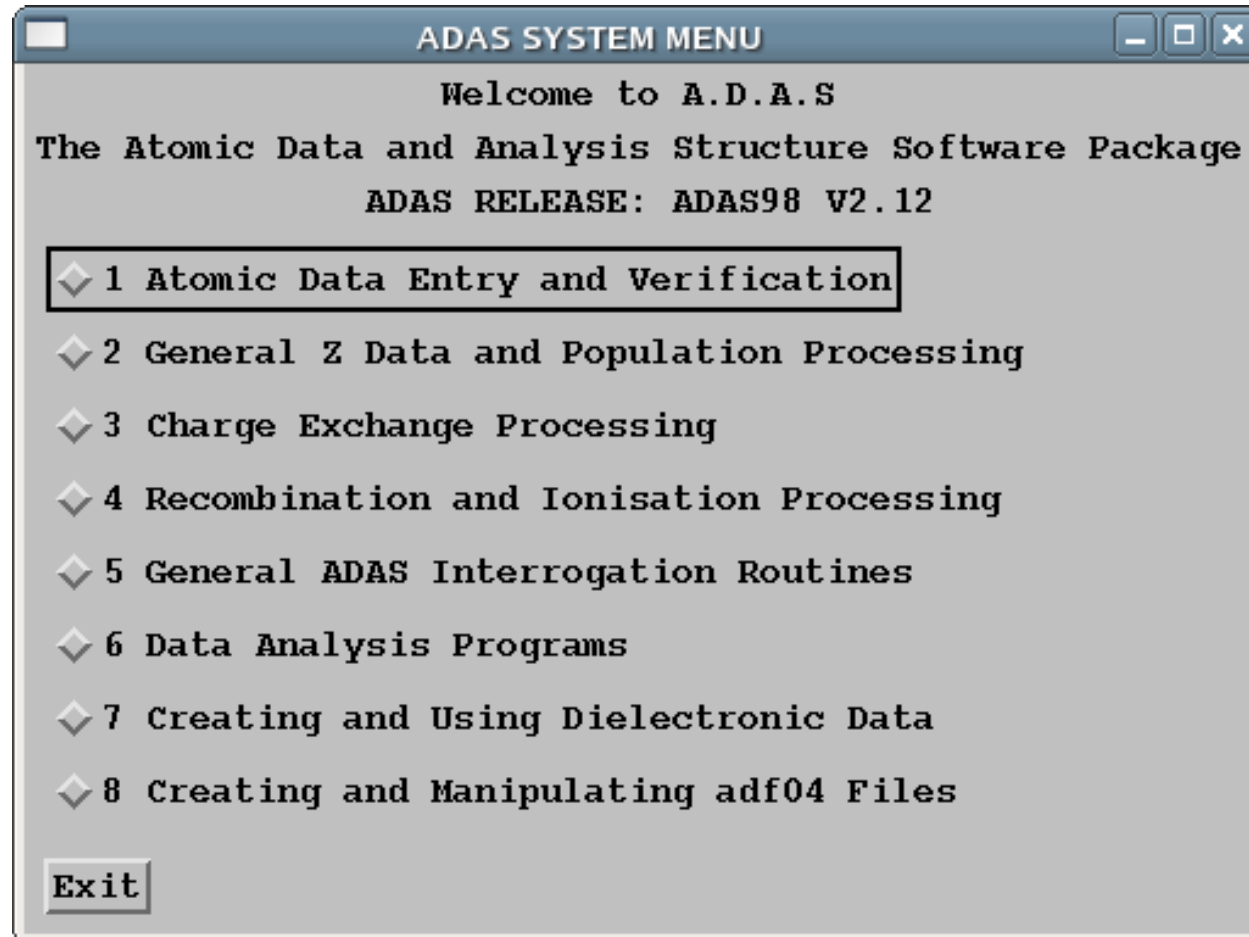
The interactive ADAS user

- An ADAS user requires a UID on a work- station with access to the ADAS and IDL servers.
- ADAS expects a number of directories to be present in the user file space, including
 - » The 'defaults' directory which remembers the settings and values from the previous use of each code
 /<path>/<UID>/adas/defaults
 - » The 'pass' directory to which ADAS created data sets are routed
 /<path>/<UID>/adas/pass
- A start-up script is available to set pathways, environments and directories required by the ADAS user.
- It is helpful to maintain data sets in structures matching central ADAS as
 /<path>/<UID>/adas/adf01/.../

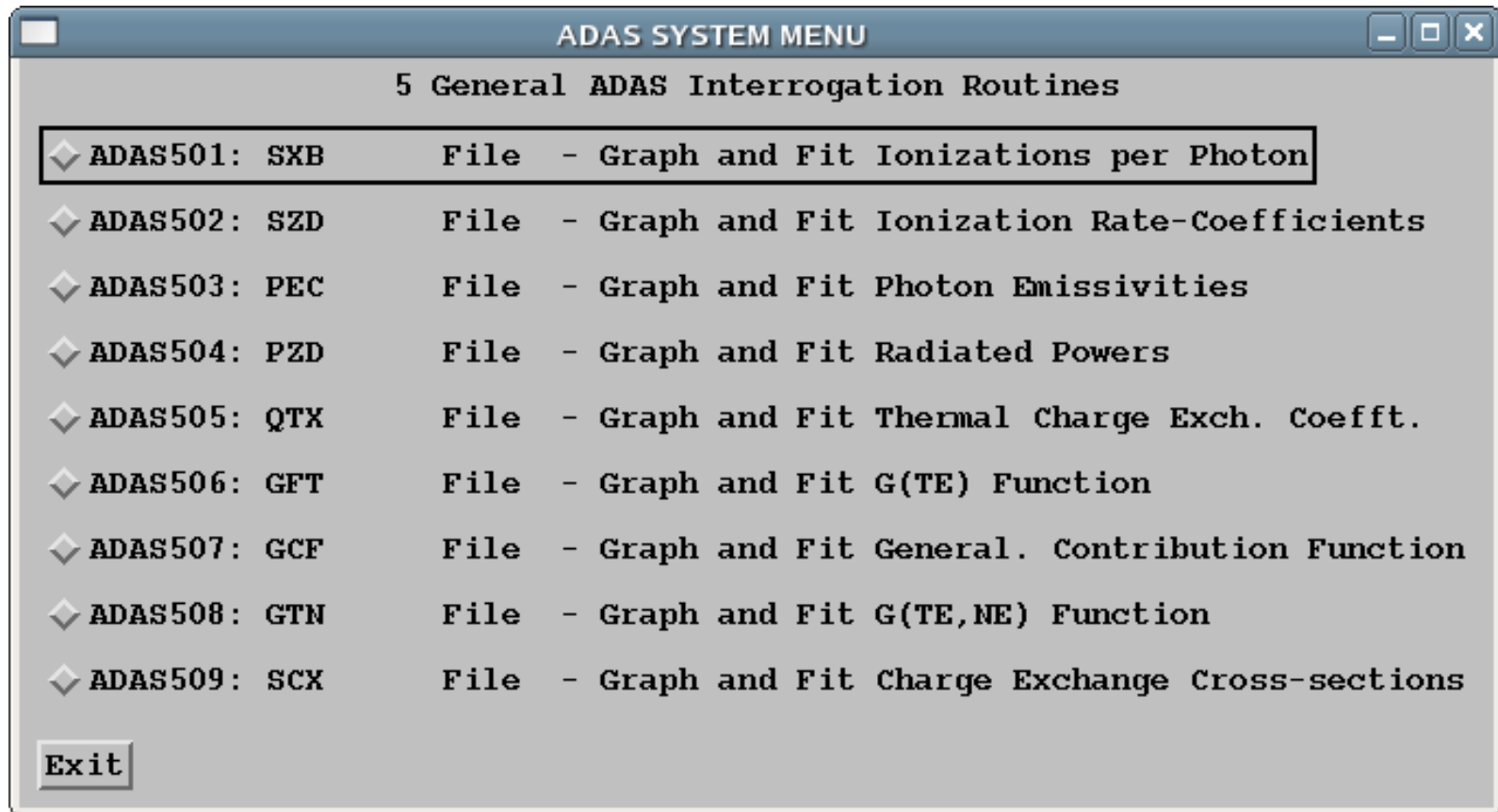
ADAS on-line

- Move to your *'/pass'* directory.
- Initiate ADAS on a unix workstation or a linux personal computer by typing *'adas'*.
- An interactive session begins starting with program selection from menus
- Each program interacts with the user via a variety of screens, normally including *'input'*, *'processing'* and *'output'* screens.

ADAS main menu



ADAS series 5 menu



ADAS501 - a typical interrogation code

- Datasets of class ADF13 contain ionisation per photon ratios (SXB data) as a function of T_e and N_e .
- The code ADAS501 interrogates ADF13 data sets at a temperature/density model of your choice.
- ADAS501 has a standard sequential three screen structure, namely *file selection*, *processing options* & *output options* screens

ADAS501 (contd.)

- File selection
 - » The path to central ADAS data of the correct class (*ADF13*) is selected by button press.
 - » A display screen shows available files which are selected by clicking on them.
 - » Files have the *.dat* extension otherwise they are directories.
 - » *Done* means go to next screen, *Cancel* means return to the previous screen.
 - » On many screens there is a small icon button along side *Cancel* allowing *Exit and Return to Menu*.

ADAS501 input

The screenshot shows a dialog box titled "ADAS 501 INPUT" with the following elements:

- Data Root:** A text field containing the path `/home/summers/adas_dev/adas/adf13/`. An annotation "click to use central ADAS data" points to this field.
- Buttons:** "Central Data", "User Data", and "Edit Path Name" (with an unchecked checkbox). An annotation "click to edit pathway" points to the "Edit Path Name" checkbox.
- Data File:** A list of files with `..` at the top. The file `sxb96#c_pjr#c3.dat` is selected and highlighted. An annotation "selected file for processing" points to this file. The label "Data File" is positioned to the left of the list.
- File List:** A list of files including `sxb96#c_bnd#c5.dat`, `sxb96#c_pjr#c0.dat`, `sxb96#c_pjr#c1.dat`, `sxb96#c_pjr#c2.dat`, `sxb96#c_pjr#c3.dat`, `sxb96#c_pjr#c4.dat`, `sxb96#c_pjr#c5.dat`, `sxb96#c_pju#c0.dat`, `sxb96#c_pju#c1.dat`, `sxb96#c_pju#c2.dat`, `sxb96#c_pju#c3.dat`, `sxb96#c_pju#c4.dat`, `sxb96#c_pju#c5.dat`, and `sxb96#c_vsr#c0.dat`. An annotation "ADF13 data file list" points to this list.
- Bottom Buttons:** "Browse Comments", "Cancel", and "Done". An annotation "browse comments from selected data set" points to the "Browse Comments" button.

ADAS501 (contd.)

- Processing options
 - » First select the spectrum line required.
 - » Then the choice of temperature and density pairs must be entered.
 - » The 'Table Editor' widget is activated by button press to allow this.
 - » Using the editor takes a little practice.
 - » An advanced graphical method for Te/Ne pair selection may be used

ADAS501 Processing

ADAS501 PROCESSING OPTIONS

Title for Run

Data File Name: /home/summers/adas_dev/adas/adf13/sxb96#c/sxb96#c_pjr#c3.dat

Polynomial Fitting

Fit Polynomial value % :

Select data Block

INDEX	Wavelength	Ion Source	Processing Code	Metastable Index
14	1549.1 A	ls#c3	ADAS208	1
12	1133.2 A	ls#c3	ADAS208	1
13	1106.6 A	ls#c3	ADAS208	1
14	1549.1 A	ls#c3	ADAS208	1
15	312.4 A	ls#c3	ADAS208	1

Temperature & Density Values

INDEX	Temperature		Density	
	Output	Input	Output	Input
1	6.890E-01	6.890E-01	4.920E+13	1.640E+05
2	9.650E-01	9.650E-01	4.920E+13	1.640E+06
3	1.380E+00	1.380E+00	4.920E+13	1.640E+07
4	2.070E+00	2.070E+00	4.920E+13	1.640E+08

Temperature Units: eV Density Units : cm⁻³

your title to appear on graphs & tables

selected data set

make polynomial fit to data

select line for analysis

enter Te/Ne pairs for output

set default output values

edit table

ADAS501 (contd.)

- Output options
 - » Graphical display is of SXB as a function of temperature at temp/density pairs.
 - » Graphical hard copy and a listing summary of the extracted and fitted data are available.
 - » Automatic or explicit scaling may be chosen.
 - » The displayed graph can be adjusted and/or retained by further controls.
 - » Retain and Adjust require a little practice.

ADAS501 Output

ADAS501 OUTPUT OPTIONS

Data File Name: /home/summers/adas_dev/adas/adf13/sxb96#c/sxb96#c_pjr#c3.dat

Browse Comments

Graphical Output

Graph Title:

Select Device

Explicit Scaling

X-min: X-max:

Y-min: Y-max:

Enable Hard Copy Replace

File Name:

Text Output Replace

File Name:

provide graphical output

allow graphical hard copy

graphical output file coding

tabular output of results

ADAS501 Graph

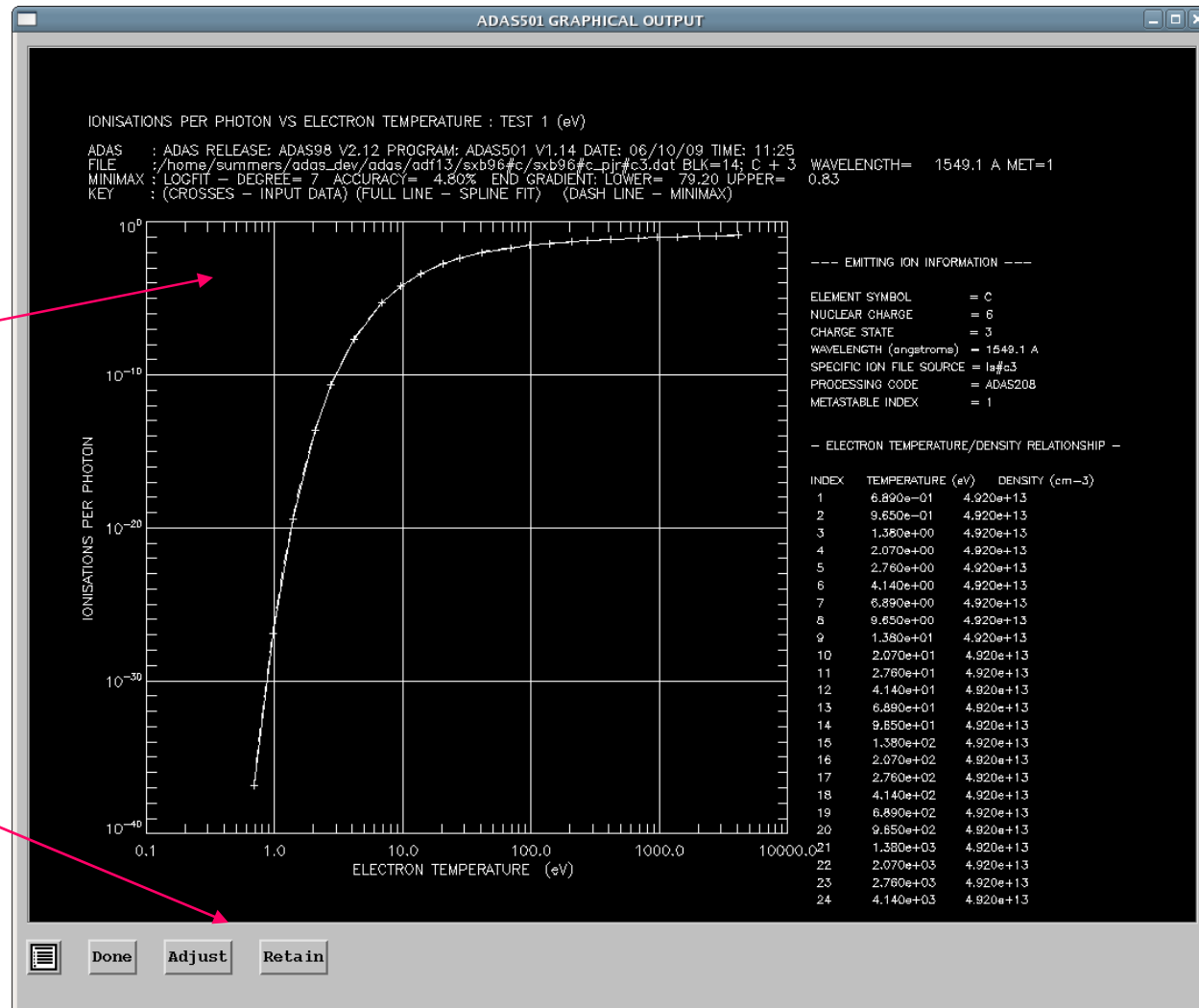


Table editor

ADAS Table Editor

Temperature & Density Values

INDEX	Output	Input	Output	Input
1	<i>6.890E-01</i>	6.890E-01	4.920E+13	1.640E+05
2	<i>9.650E-01</i>	9.650E-01	4.920E+13	1.640E+06
3	<i>1.380E+00</i>	1.380E+00	4.920E+13	1.640E+07
4	<i>2.070E+00</i>	2.070E+00	4.920E+13	1.640E+08
5	<i>2.760E+00</i>	2.760E+00	4.920E+13	1.640E+09
6	<i>4.140E+00</i>	4.140E+00	4.920E+13	1.640E+10
7	<i>6.890E+00</i>	6.890E+00	4.920E+13	4.920E+10
8	<i>9.650E+00</i>	9.650E+00	4.920E+13	1.640E+11
9	<i>1.380E+01</i>	1.380E+01	4.920E+13	4.920E+11
10	<i>2.070E+01</i>	2.070E+01	4.920E+13	1.640E+12

◇ Default ◇ Delete ◇ Remove ◇ Insert ◇ Copy ◇ Paste

Row_skip Column_skip Scroll up Scroll down

Temperature Units

Kelvin eV Reduced

Cancel Done

editable values are italic

values from source data file

editor controls

alter units - affects inputs