Atomic data entry and verification

Specific data entry and verification programs are provided for electron impact excitation cross-sections, electron impact excitation rate coefficients, total zero density radiative recombination coefficients, total zero density dielectronic recombination coefficients, electron impact ionisation cross-sections, electron impact ionisation rate coefficients and total and state selective charge exchange recombination coefficients for bare nuclei. They constitute program series ADAS1 for which a schematic is shown in figure 2.0. The first objective of each program are to allow flexible entry of data by accepting various equivalent forms of the data and various units popular in the literature. Then it is sought to validate tentatively the data in two alternative ways (i) by providing a comparative (ratio) plot of the data to an adjustable expected approximate form for the data (ii) by using the Burgess/Tully C-plot. The latter is currently defined only for electron impact excitation. The former method provides also approximate form fit parameters. The comparative figure can be manipulated by graph editor. Data alteration and insertion of extra data are possible. This can help to stabilise gross oscillations in splines and tie down extrapolation but must be done with caution. The codes convert and plot the data as required by the standard archive data storage of ADAS and provide a graphical and tabular record of the input and output data evaluation.

The ADAS data formats for which the ADAS1 series programs prepare data are indicated in figure 2.0. The programs do not directly fill database files. The values must be edited in by hand. The record of the data comparison and verification may be stored on sequential indexed computer files called archive files. There is no central archiving of this form in ADAS. It is a matter for the user. A cross-section may be selected from an archive file for reworking.

The theory, user interactive information required, an illustration and special notes are provided for each program in the following sections.

Figure 2.0.

e- excit. xsect. fit archive ARCH101	e- excit. rate. fit archive ARCH102	DR. recom. coefft fit archive ARCH103	RR recom. coefft. fit archive ARCH104	e- ionis. xsect. fit archive ARCH105	e- ionis. rate fit archive ARCH106	CX xsect. fit archive ARCH107

ADAS101 electron impact excit. xsect. graphing	ADAS102 electron impact excit. rate graphing	ADAS103 dielectronic recom. rate coeff. graphing	ADAS104 radiative recom. rate coeff. graphing	ADAS105 electron impact ionis. xsect. graphing	ADAS106 electron impact ionis. rate graphing	ADAS107 state sel. CX xsect. graphing

specific ion file ADF04	general z excit. file ADF05	general z ionis./ recom. file ADF06	zero density ionis. file ADF07	state selective CX file ADF01