

Table VIII B.2. Formats for annotated PARAmeter file for treatment of the unresolved resonance region

Card set	Line No.	Description															
1	1,2,...	Alphanumeric title, as many lines as desired. Printed but otherwise ignored.															
	Last	---- (First four characters must be hyphens [minus signs]; this ends the title. Other characters on this line are printed but ignored.)															
2	1,2,...	Key word = Value. Possible keywords here are <table><tr><th><u>Key word</u></th><th><u>Meaning</u></th><th><u>Default</u></th></tr><tr><td>ITerations</td><td>number of iterations</td><td>3</td></tr><tr><td>TOLerance</td><td>fitting tolerance</td><td>0.005</td></tr><tr><td>RADius</td><td>radius in F</td><td>1.23 AW^{1/3}+0.8</td></tr><tr><td>AW (atomic weight)</td><td>mass in amu</td><td>(no default)</td></tr></table> Only the letters in capitals are required; the values may be in any format.	<u>Key word</u>	<u>Meaning</u>	<u>Default</u>	ITerations	number of iterations	3	TOLerance	fitting tolerance	0.005	RADius	radius in F	1.23 AW ^{1/3} +0.8	AW (atomic weight)	mass in amu	(no default)
	<u>Key word</u>	<u>Meaning</u>	<u>Default</u>														
ITerations	number of iterations	3															
TOLerance	fitting tolerance	0.005															
RADius	radius in F	1.23 AW ^{1/3} +0.8															
AW (atomic weight)	mass in amu	(no default)															
	Last	(blank)															
3	0	“----” An optional line of minus signs may be inserted; this line will be ignored by the code.															
	1	“ELASTic and inelastic states”. Only the first four characters are necessary, others are optional. Units of excitation energy are eV unless specified anywhere on this line (after the first four characters) as “in eV”, “in keV”, or “in MeV”.															
	2,3,...	Center-of-mass excitation energy, spin, and parity for the <i>n</i> th target level (beginning with ground state). Format must be 3F10 (ten characters per number, three numbers on a line, decimal points must be included).															
	Last	(blank)															
4	0	“----” Optional.															
	1,2,...	Key word = Value. Possible key words here are <table><tr><th><u>Key word</u></th><th><u>Meaning</u></th><th><u>Default</u></th></tr><tr><td>BINDing energy</td><td>neutron binding energy (MeV)</td><td>(none)</td></tr><tr><td>PAIring energy</td><td>pairing energy (MeV)</td><td>(none)</td></tr></table> Only the letters in capitals are required; the values may be in any format. To override the default units, insert a phrase “in eV”, “in keV”, or “in MeV” after the key word and before the equal sign. Examples: Binding Energy (in eV) = 6536000. Pairing energy in eV = 1610000.	<u>Key word</u>	<u>Meaning</u>	<u>Default</u>	BINDing energy	neutron binding energy (MeV)	(none)	PAIring energy	pairing energy (MeV)	(none)						
	<u>Key word</u>	<u>Meaning</u>	<u>Default</u>														
	BINDing energy	neutron binding energy (MeV)	(none)														
PAIring energy	pairing energy (MeV)	(none)															
	Last	(blank)															

Table VIII B.2 (continued)

Card set	Line No.	Description
5	0	“----” optional
	1	“STREng del_s distnt del_d gamma width del_g bethed” (Only first three characters are necessary. This line indicates that strength functions, distant-level parameters, etc., are coming next.)
	2	Strength function S_c , uncertainty, distant-level parameter R_c^∞ , uncertainty, radiation width $\langle \Gamma_\gamma \rangle$ in eV, uncertainty, mean level spacing D in eV for $l = 0$. F10 formats.
	3	Strength function, uncertainty, distant-level parameter, uncertainty, radiation width in eV, uncertainty, for $l = 1$
	4	Strength function, uncertainty, distant-level parameter, uncertainty, radiation width in eV, uncertainty, for $l = 2$
	5,6,...	As above, for higher l values as needed
6	Last	(blank)
	0	“----” optional line
	1	“FISSion width fnu ethr wthr del_fission width” (Only first three characters are necessary. This line indicates that fission parameters are coming next.)
	2	For the lowest J value for $l = 0$, Average fission width $\langle \Gamma_f \rangle$ (eV) Degree of freedom ν_f for fission width distribution Hill-Wheeler threshold energy E_{HW} Hill-Wheeler threshold width W_{HW} Uncertainty on the average fission width J, l The first line contains the lowest J value associated with $l = 0$. Formats are F10 for everything except the l -value, which is I5 (i.e., the right-most column is # 65). Inclusion of J and l in the input file is optional but recommended.
	3,4,...	Repeat line 2 for each possible value of J for $l = 0$.

Table VIII B.2 (continued)

Card set	Line No.	Description						
6, cont.	5,6,...	<p>Repeat lines 2–4 for each possible value of J for $l = 1, 2, \dots$. For a given spin J and parity (even or odd l), only one set of values is actually used for $\langle \Gamma_f \rangle$ and the other parameters. Nevertheless, all J and l must be included in this list. Only the values associated with the lowest l value will be used for the calculations; the other values will be ignored.</p> <p>For example, the ground state of ^{235}U is $7/2^-$. For $l = 0$, $J^\pi = 3^-, 4^-$. For $l = 1$, $J^\pi = 2^+, 3^+, 4^+, 5^+$. For $l = 2$, $J^\pi = 1^-, 2^-, 3^-, 4^-, 5^-, 6^-$. The 3^- and 4^- values used in the calculations will be those given for $l = 0$. The values given for $J^\pi = 3^-$ and 4^- with $l = 2$ will be ignored.</p>						
	Last	(blank)						
7	0	“----” optional line						
	1	<p>Key word = Value. Only one possible keyword is permitted here:</p> <table> <tr> <th><u>Key word</u></th><th><u>Meaning</u></th><th><u>Default</u></th></tr> <tr> <td>ENERgy maximum</td><td>maximum energy in this region (eV)</td><td>(none)</td></tr> </table> <p>Only the letters in capitals are required; the values may be in any format.</p> <p>To override the units, insert a phrase “in eV”, “in keV”, or “in MeV” after the key word and before the equal sign.</p> <p>Example: Energy maximum in MeV = 0.15</p>	<u>Key word</u>	<u>Meaning</u>	<u>Default</u>	ENERgy maximum	maximum energy in this region (eV)	(none)
<u>Key word</u>	<u>Meaning</u>	<u>Default</u>						
ENERgy maximum	maximum energy in this region (eV)	(none)						
4–7	all	Repeat card sets 4–7, once for each energy region, as many times as needed. Alternatively, repeat only line 1 of card set 7, in which case the starting parameter values are assumed to be identical to those in the previous energy region.						
8		In either case, end with a line saying “END of resonance parameter description”.						

Table VIII B.2 (continued)

Card set	Line No.	Description
9	0	“----” optional line
	1	Type of cross-section data (TOTAL, CAPTURE, FISSION, or INELASTIC). Card set 9 will be omitted from this file if the command “EXPERIMENTAL DATA ARE in separate files” appears in the INPUT file.
	2	Uncertainties are RELATIVE or ABSOLUTE. (Only “RELA” or “ABSO” is needed.)
	3	Energy (eV), cross section (barn), uncertainty (barn if ABSOLUTE, dimensionless if RELATIVE) for first data point. Norm and unc (a and Δa) for this data set. Format is 3F10.
	4,5,...	Energy, cross section, uncertainty (Note: if RELATIVE, then need specify only for first data point, rest are assumed to be the same.)
	Last	(blank)
9x	all	Repeat card set 9 as many times as needed, in any order
10	0	“----” optional line
	1	“NORMALIZATION”. [Card set 10 may be present only if INPUT file specifies “experimental data are in separate files”.]
	2	Type of cross section, normalization parameters a , Δa , b , Δb , c , Δc , where the normalization for this data set is given by $norm = a + b E^c$
	3,4,...	Repeat once for each data set. Note that normalizations must appear in the same order in which the data sets appear. SAMMY will check to be sure the data types are consistent.
	Last	(blank)
10a	0	“----” optional line
	1	“EARLIER normalization”. [Card set 10a, an alternative to card set 10, is to be used only if an earlier SAMMY run has produced a covariance file.]
	2	N1, N2, ... Nlast, in [40I2] format. Here N1 is the ordering of the first data set for this run, as it appeared in previous SAMMY runs; see test case tr145 for illustrative examples.
	Last	(blank)

Table VIII B.2 (continued)

Card set	Line No.	Description						
11	0	“----” optional line						
	1	“DIRECT Inelastic contribution”, <i>or</i> “DIRECT Capture contribution”. Note that eight characters (rather than the usual four) are required here.						
	2	Energy = value, Sigma = value. Both key words (and both values) must be on the same line.						
		<table><tr><th><u>Key word</u></th><th><u>Meaning</u></th></tr><tr><td>Energy</td><td>Energy in (eV)</td></tr><tr><td>Sigma</td><td>Direct inelastic cross section (b) at that energy</td></tr></table> <p>To use different units on energy, insert a phrase “in eV”, “in keV”, or “in MeV” after the key word “Energy”.</p>	<u>Key word</u>	<u>Meaning</u>	Energy	Energy in (eV)	Sigma	Direct inelastic cross section (b) at that energy
	<u>Key word</u>	<u>Meaning</u>						
Energy	Energy in (eV)							
Sigma	Direct inelastic cross section (b) at that energy							
3,4,... etc.	Repeat line 2 as many times as required. Note that card set 11 may be omitted if the contribution of the direct inelastic cross section is negligible or unknown.							