

II. B.1.c. Specifying individual reaction types

Early versions of SAMMY permitted users to specify “inelastic”, “fission”, and “reaction” data. However, the tacit assumption was that all the exit channels are relevant to the type of data being used. If, for example, three exit channels were specified as (1) inelastic, (2) first fission channel, and (3) second fission channel, then any calculation for “inelastic”, “fission”, or “reaction” data types would automatically include all three exit channels in the final state.

Hence, in early versions of SAMMY, true inelastic cross sections (for example) would be calculated only if all of the following conditions were met:

1. Either “inelastic”, “fission”, or “reaction” was specified as the data type in the INPut file, card set 8.
2. The exit channel description was appropriate for inelastic channels: The INPut file noted that penetrabilities were to be calculated (LPENT = 1 on line 2 of card set 10.1) and also provided a non-zero value for the excitation energy.
3. No fission channel (or other exit channel) was defined in the INPut file (and PARAmeter file).

Beginning with release M5 of the SAMMY code, it is now possible to include only a subset of the exit channels in the outgoing final state. The third condition in the list above is no longer necessary, but is replaced by another (less restrictive) condition:

3. Exit channels that are not inelastic have a flag (“1” in column 18 of line 2 of card set 10.1 or card set 10.2 of the INPut file), denoting that this channel does not contribute to the final state.

(Similar considerations hold, of course, for any other reaction type, not only for inelastic.)

With release 7.0.0 of the SAMMY code in 2006, a more intuitive input is possible. When channels are specified using either of the particle-pair options (see card set 4 or 4a of Table VIA.1), then the data type line (card set 8 of Table VIA.1) may be used to specify the name(s) of the particle pair(s) to be included in the final-state reaction. Specifically, beginning in the first column of card set 8, include the phrase

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FINAL-state particle pairs are
or
PAIRS in final state =
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(Only the first five characters are required, the others are optional.) Elsewhere on the same line, give the eight-character designation of the particle pair(s) to be included in the final-state reaction. Only channels involving those particle pairs will be included in the final state; any channels not involving those particle pairs will not be included. (Caution: The particle pair name must be *exactly* as it appears in the INPut file, including capitalization.)

The same two command lines may be used for angular distributions with specific final states, provided the phrase “ANGULAR distribution” is given later on the same line.

See test case tr159 for an example which includes three reactions, one being (n,α) and the other two inelastic (n,n') . Various options for input are given in this test case.

Run “k” of test case tr112 shows an example for the angular distribution of a reaction cross section.