V.E. PSEUDO CROSS SECTIONS FOR TESTING

It is possible to generate a fictitious theoretical "cross section" that exhibits constant, linear, delta-function, or 1/*V* (inverse velocity) behavior. These pseudo cross sections are useful for testing the effect of resolution functions or Doppler broadening.

To invoke these functions, in the INPut file, in the location where you would normally provide the data type ("transmission", "capture", "differential elastic", etc.), give one of the following phrases:

```
CONSTANT
LINEAR
QUADRATIC
DIRAC
1/V
```

SAMMY will then calculate, instead of the Reich-Moore cross section, the following:

- a constant cross section [everywhere equal to 1]
- a linear-in-energy cross section [=1 at Emin, 2 at Emax, but see below]
- a quadratic-in-energy cross section [=1 at Emin, 2 at Emid=(Emin+Emax)/2, 1 at Emax]
- an approximation to the Dirac delta function [= 0 everywhere except 1 at Emid]
- a 1/*V* cross section [where $V = \sqrt{E}$ with *E* = Energy]

In the output plot file (SAMMY.ODF or SAMMY.PLT , as described in Section VII.C of this document), the pseudo cross section is stored in section 2 (which would normally contain the experimental data). Section 4 contains the "corrected" cross sections that have been Doppler or resolution broadened, normalized, or otherwise corrected as specified in the user's INPut and PARameter file.

Along with these pseudo cross sections, it is often useful to have SAMMY choose an energy grid according to certain well-defined specifications (such as uniform in energy or uniform in flight time). To invoke these options, include one of the following lines in the alphanumeric command section of the INPut file:

```
UNIFORM ENERGY GRID
UNIFORM VELOCITY GRId
UNIFORM TIME GRID
```

In the first case, the code will provide an "experimental" energy grid that is equally spaced in energy *E*. The default number of points in this grid is 1001, though you may overwrite this number by specifying NEPNTS in Columns 41 to 45 of line 2 of the INPut file.

For the uniform velocity grid, SAMMY uses 1001 points equally spaced in $V = \sqrt{E}$; for the uniform time grid there will be 1001 points equally spaced in $T = 1/\sqrt{E}$ (which is proportional to time of flight *t*). Again, NEPNTS can be specified if you wish a different number of points.

(Note that, for the SAMMY run, you must include a name for a data file, but the file does not need to exist; it will be ignored.)

When using a fictitious cross section with a uniform grid (in energy, velocity, or time), SAMMY assumes that you want the LINEAR or QUADRATIC or whatever cross section to be LINEAR or QUADRATIC , etc., in the variable in which the grid is given. That is, if you specify for a example a "UNIFORM TIME GRID" and ask for QUADRATIC cross section, it will be quadratic in the time variable (in $T = 1/V = 1/\sqrt{E}$).

See test case tr115 for examples of these features.

[CAVEAT: While using the DIRAC delta function option with only resolution broadening, the calculated curve in section 4 of the SAMMY.ODF or SAMMY.PLT file will closely resemble the resolution function. The user should, however, be aware that it is NOT the resolution function. If the resolution function has discontinuities (as, for example, a square function in time whose width changes abruptly at a certain energy between Emin and Emax), those discontinuities will manifest themselves as odd shapes in the calculated curve.]