<u>**Memo CP-D/152**</u>

4 August 1986

To: Distribution

From: H.D. Lemmel and Wang Dahai

Subject: Gamma spectra again

With this memo we introduce to the other centers a new NDS staff member. *)

In a Chinese work to be transmitted with the next TRANS tape we found gamma-spectra data, normalized and given in mb in the form of production cross-sections for specific gamma-lines.

Such data had not been foreseen in the LEXFOR entry on <u>Gamma-Spectra</u> of which we submit a proposed new version.

(Note that in the NNDC LEXFOR entry on this topic the headings E-MIN and E-MAX for continuous spectra were incorrect. The partial radiation widths have little relation to this topic and were omitted from the proposed new LEXFOR entry.)

Clearance: J.J. Schmidt

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*) Dr. Wang Dahai comes from the Institute of Atomic Energy in Beijing and was there the Head of the Experimental Physics Division.

Proposed LEXFOR entry

Gamma Spectra

The REACTION coding of gamma spectra was inconsistent in old EXFOR entries.
When the quantity code SPC was introduced it was used as an abbreviation for
DE,G,REL, but thereafter clear definitions for gamma spectra quantities had
not been introduced.

In 1984 the following conventions were approved:

1. Continuous spectra for unresolved gammas

Data coded as DE,G (or DE, see below) should have the unit MB/MEV (or another
unit in the same dimension) to be consistent with similar data such as DE,N.
Consequently, DE,G would apply to a continuous spectrum of unresolved gammas,
where the gamma-energy is a variable coded under the column-heading E.

Examples of REACTION codes: (Z-S-A(N,INL)Z-S-A,,DE,G)
                                  (Z-S-A(N,G)Z-S-A',,DE)
                                  (Z-S-A(N,X)O-G-O,,DE)

Note that in the latter two cases the "particle-designator" G is redundant
and, therefore, omitted.

2. Intensities of gamma lines

a. Data coded as SPC should have the unit GAM/100N. This would apply to
spectra of discrete gamma-lines whose energy-values are coded under the
column-heading E.   Examples of REACTION codes: (Z-S-A(N,INL)Z-S-A,,SPC)
                                                  (Z-S-A(N,X)O-G-O,,SPC).

The code SPC always refers to gammas so that no particle designator is given.

b. Data coded as PAR,SIG: The intensity of gamma lines can be normalized and
given in the unit MB as partical cross sections for the production of the
gamma-lines whose energy-values are coded under the heading E.   Examples of
REACTION codes: (Z-S-A(N,G)Z-S-A',PAR,SIG,G)
                  (Z-S-A(N,X)O-G-O,PAR,SIG)

Note that in the first case the particle-designator G must be given.   Other-
wise "PAR" would refer to excited levels and not to gamma-lines.

c. Relative data.   The intensities of gamma lines are often given in per-cent
relative to the intensity of the strongest gamma-line.   Such data are coded as
...,,SPC,,REL) with the units NO-DIM or ARB-UNITS.

Note that the unit PER-CENT must not be used in this case, as explained in
LEXFOR under Units.

The two REACTION codes

     (Z-S-A(N,G)Z-S-A',,SPC,,REL)
     (Z-S-A(N,G)Z-S-A',PAR,SIG,G,REL)

are equivalent.   Consequently, the latter code must not be used.

Note: Instead of coding the energies of gamma-lines under the column
        heading E, it would be nicer to code them under a specific REACTION
        string such as

            (28-NI-58(N,P)27-CO-58,,E,G)

        in analogy to the coding of neutron-resonance energies. However,
        such a proposal had not found the approval of the co-operating data
        centers.

Priority of compilation:

        Although the systematic compilation of neutron capture gamma spectra
        had been requested in various scientific meetings, the data centers
        did not have sufficient manpower for this task. Therefore,
        gamma-spectra data in EXFOR cannot be expected to have a satisfactory
        degree of completeness.