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Information

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Memo CP-B/11

25.5.1977

Subject: Multiple Reaction Products

References: CP-B/9, CP-D/27

Since Memo CP-D/27 has crossed with our proposal on the same subject (cf. CP-B/9), we refer to the formalism proposed there and restrict ourselves here to point to some details which are in our opinion better regarded in our proposal.

1. We again repeat our objection to have spallation and fission as the only processes codable in this new formalism. It should be a concept to treat reactions with multiple endproducts in general and not a coding for spallation and fission and this should be stated clearly.
2. The codes ELEM and MASS in SF4 without giving Z, A or an explicit number has the disadvantage that part of information is lost, at least for the REACTION entry and consequently for a future index, and must be entered elsewhere (e.g. under COMMON).
3. The proposed link between DATA-lines containing Z and/or A values and the respective DECAY-DATA entry takes not into account that links between DATA-lines and other BIB-keywords like PART-DET, DETECTOR, METHOD, which do not contain retrievable Z and A values, may be necessary. Furthermore, if an endproduct has been identified via its daughter activity, the Z and A values coded under DECAY-DATA do not fit to those specified in the DATA-table. Therefore, the introduction of the "BIBFLAG" as proposed in CP-B/9 seems more advantageous.
4. The definition and coding of the "Reaction Product" is in our opinion not completely unambiguous. Firstly, it should be clearly stated in which cases the heaviest reaction product must be given in SF4 and in which cases a

lighter one (or even gamma-rays). Taking this into account, the definition of the reaction product could be given as follows:

"In general, the heaviest of several identified reaction products is coded as "Reaction Product" resp. "Residual Nucleus" in SF4. This is valid also in cases where only one of two products has been measured, but the other can be deduced unambiguously (e.g. the residual nucleus of a (p,n) reaction where the neutrons have been measured).

In cases where only one reaction product is unequivocal, this must be given in SF4, even when it is a light particle or gamma-ray (e.g. Be-7 production from a specific target-projectile-combination without knowledge on further emitted particles and the residual nucleus). In these cases, SF3 must contain either the code X or a process code."

Furthermore, it is hard to see, how one could clearly specify a process "spallation" if the endproducts are undefined (case c). This holds also for other reaction types (direct reactions compound nuclear reactions etc., for which process codes should be introduced, cf. CP-B/9). Only fission or processes like ABS, TOT, NON may be reasonably identified without knowledge of specific reaction products.

In case of undefined reaction products it would be clearer to have an explicit code (like our proposed PROD) than a blank field which is likely to be misinterpreted or even to result from a mistake of the compiler.

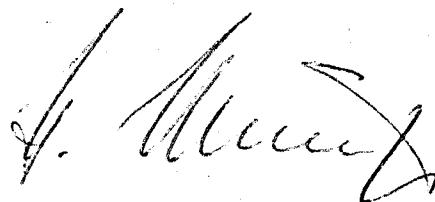
5. The re-introduction of the heading ISOMER would not be necessary if the "BIBFLAG"-concept were used (which is in our opinion needed anyway, see item 3. above), because this gives an unambiguous link to the respective DECAY-DATA entry where the considered isomer is defined.
6. Two minor important comments regard
 - again the nice definition of fission (e.g. all compound nuclear reactions with outgoing particles heavier than ${}^6\text{Li}$ or even elastic scattering would be fission !)
 - the entries under DECAY-DATA, where the last item should be "abundance of the radiation measured" (and not "of the decay").

7. Regarding the two notes on usage of the "variable product nuclei" -formalism for CPND we would like to state again that we are very interested in introducing such a formalism. If the programs will be available within a reasonable time, we will adopt the concept in an agreed form immediately.

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