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Memo CP-C/259

DATE: November 17, 1999
TO: Distribution
FROM: V. McLane
SUBJECT: Redundancies in EXFOR (and reference to Memo CP-A/98)

At the last full NRDC meeting (1998) I brought up the question of redundancies in EXFOR coding. It was decided that CAJaD would submit a proposal to the Technical Meeting (see Action A63). Due, I think, to a misunderstanding of what was meant by redundancies, this was not done. Therefore, I would like to open the discussion again. One of the codes proposed in Memo CP-A/98 is affected by the outcome of this discussion: 'IND/PAR,PY'.

Independent versus cumulative

Before 1976, in EXFOR a cross section was assumed to be independent if no other indication is given. In 1976, KaChPaG proposed the use of the branch code IND and (for reasons not clear to me) it was accepted.

Undefined reaction channels

Similarly, it was the case that a reaction for which the reaction channel is undefined was coded using the process code X in sub-field 3. Again, for charged-particle cross sections, the branch code UND was proposed, and (again for reasons not clear to me) it was accepted. The use of undefined was coupled to the number of protons and neutrons being given in sub-field 3. This led to the introduction of the variable number of emitted nucleons formalism in order to be able to use the variable nucleus formalism for multiple reaction products.

Experimental data code

For charged-particle data the code EXP was introduced for REACTION sub-field 9 as a positive indication that the data is experimental.

Result

The result of this duality has resulted in the same reaction being stored in the system with different codes for different references. Users may be confused by the differing REACTION codes, and may think there is some difference in the quantities that are presented in different ways.

Proposals

The following are proposed for future use, that is, older entries need not be updated unless they are retransmitted. The dictionaries would be updated to mark the codes no longer used as obsolete.

1. Eliminate the use of the code IND in REACTION sub-field 5, except for use with fission yields where independent yield has traditionally been used in the literature. That is to say, in general, cross sections are not referred to as independent, but fission yields are. Cumulative cross sections will continue to use the branch code, *e.g.* CUM. Similarly, if the compiler is unsure about whether a cross section is independent, the branch code (CUM) may be used.
2. Eliminate the use of the code UND in REACTION sub-field 5. The branch code (DEF) may still be used when a reaction is given as (...xn+yp), and the compiler is unsure whether the reaction channel is defined.
3. Eliminate the use of a variable number of emitted nucleons, that is, the process codes XN and YP and the data headings N-OUT and P-OUT.¹
4. Eliminate the use of the code EXP in REACTION sub-field 9.

There are other redundancies which are a matter of code use rather than code definition. These are better discussed separately.

¹This has seldom been used much in practice.

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