**Nuclear Data Section**

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**Memo CP-D/1048**

**Date:** 25 May 2022

**To:** Distribution

**From:** N. Otsuka

**Subject: LEXFOR “Multiple Reaction Formalism”**

LEXFOR “Multiple Reaction Formalism” gives the following example as a legal use of the formalism:

**Multiple Reaction Formalism**

At present, the following classes of data may be coded using Multiple Reaction Formalism8 (compare EXFOR Formats Manual Chapter 6). In all cases, SF1 and SF2 of the REACTION string must be the same. See Example on following page.

…

4. Data measured simultaneously for the production of specific particles or nuclides where the author has assigned values to given reactions based on systematics or theoretical considerations.

***Examples:***

REACTION 1(…(P,2N)…)

 2(…(P,3N)…)

 3(…(P,4N)…)

REACTION 1(…(N,A)…)

 2(…(N,NA)…)

I think the underlined part is routinely forgotten by us.

**Example of legal use** (EXFOR A0068.064)

SUBENT A0068064 20210628

BIB 4 11

REACTION 1(24-CR-52(P,N)25-MN-52,,SIG,,,DERIV)

 2(24-CR-52(P,2N)25-MN-51,,SIG,,,DERIV)

 P(24-CR-52(P,X)24-CR-51,,SIG)

ANALYSIS Cr.section was derived by separation of the measured

 neutron spectra by using the statistical model with

 adjusted level density parameters of the

 Fermi gas model.

STATUS (TABLE) Tbl. II from Yad.Fiz.,39(1984)264

 (DEP,A0068009)

HISTORY (20200331T) SD: From A0271.003.

 (20210628A) SD: SF3=X -> N in REACTION (1) code.

ENDBIB 11

NOCOMMON 0 0

DATA 3 1

DATA 1DATA 2DATA P

MB MB MB

 431. 188. 352.

ENDDATA 3

ENDSUBENT 19



Fig.2 of B.V. Zhuravlev et al., Sov.J.Nucl.Phys.**39**(1984)164 shows these cross sections were derived by decomposition of the (p,xn) neutron spectrum, and we see a reason to compile the set of the cross sections in the multiple reaction formalism.

I would like to remind the condition when we can use the multiple reaction formalism, and propose the following revision of the example:

**Multiple Reaction Formalism**

…

4. Data measured simultaneously for the production of specific particles or nuclides where the author has assigned values to given reactions based on systematics or theoretical considerations.

***Example~~s~~:***

REACTION 1(24-CR-52(P,2N)25-MN-52,,SIG,,,DERIV)

 2(24-CR-52(P,3N)25-MN-51,,SIG,,,DERIV)

ANALYSIS Derived by decomposition of the measured (p,xn) spectra

 by using the statistical model

~~REACTION 1(…(N,A)…)~~

 ~~2(…(N,NA)…)~~

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