WP 2003-17

Differential number of (prompt) neutrons

There is now agreement that the differential number of (prompt) neutrons, i.e. the probability of the emission of "n" (prompt) neutrons in one fission event, is to be coded as

(…,F),PR,NU/DN)
with units NO-DIM.

Note that this agreement requires a change of the relevant LEXFOR entry.
The same coding, except for PR in SF5, would also apply for the differential number of (all) fission neutrons, or of delayed neutrons, if such data will come up for compilation.

Nuclear Data Section
International Atomic Energy Agency
P.O.Box 100, A-1400 Vienna, Austria

Memo CP-D/358

Date: 10 March 2003
To: Distribution
From: O. Schwerer

Subject: **Differential number of (prompt) neutrons**
(Probability of the emission of "n" prompt neutrons in one fission event)

Reference: Subentry 41056.003 (TRANS 4127 and again PRELIM.4129)

On TRANS 4127, the quantity "Probability of the emission of "n" prompt neutrons in one fission event" was coded

(1) (0,F+XN),PR,NU,,REL

Except for the code REL in SF8, this is the coding given in LEXFOR (page N.1) for this quantity.

However, after a suggestion from V. McLane by e-mail, this subentry was retransmitted in PRELIM 4129, replacing the above coding by

(2) (0,F),PR,DN,,REL

I have the following notes on this:

- Coding (1) is still the correct one according to LEXFOR. No change has been proposed so far.
- Since this quantity is so closely related to NUbar, I find the current (old) solution not so bad.

- The code DN for SF6 was introduced for "cross section differential with number of outgoing neutrons" and is, so far, used only as SIG/DN. Reactions with SF6 = "DN" only are not yet defined.
- I appreciate however that, since we changed the units of NUbar from NO-DIM to PRT/FIS, a change is necessary.
- I propose therefore the following coding for the Probability of the emission of "n" prompt neutrons in one fission event:

(3) (…,F),PR,NU/DN)
without REL in SF8, with units NO-DIM.

This would need the following changes in dictionaries and LEXFOR:

Dictionary 32 (Modification):

DN differential with number of outgoing neutrons (to be combined with SIG or NU)

Dictionary 36 (Additions):

,NU/DN Probability of the emission of "n" neutrons in one fission event
PR,NU/DN Probability of the emission of "n" prompt neutrons in one fission event

LEXFOR:

Update page N.1 accordingly, i.e. under "Neutron yield", in paragraph REACTION coding, replace
(…….(N,F+XN),,NU) by
(…….(N,F),,NU/DN)

Distribution:

oblozinsky@bnl.gov
vml@bnl.gov
nordborg@nea.fr
kellett@nea.fr
manokhin@ippe.obninsk.ru
maev@ippe.obninsk.ru
may@obninsk.ru
feliks@polyn.kiae.su
chukreev@polyn.kiae.su
dunaeva@expd.vniief.ru
taova@expd.vniief.ru
varlamov@depni.sinp.msu.ru
chiba@earth.sgu.ac.jp
kato@nucl.sci.hokudai.ac.jp
oba@nrdf.meme.hokudai.ac.jp
yxzhuang@iris.ciae.ac.cn
gezg@iris.ciae.ac.cn
cndc@mipsa.ciae.ac.cn
tarkanyi@atomki.hu
s.takacs@atomki.hu
hasegawa@ndc.tokai.jaeri.go.jp
vlasov@kinr.kiev.ua
kaltchenko@kinr.kiev.ua
ogritzay@kinr.kiev.ua
jhchang@kaeri.re.kr
ohtsuka@nucl.sci.hokudai.ac.jp
m.wirtz@iaea.org
m.lammer@iaea.org
v.pronyaev@iaea.org
schwerer
zerkin