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MEMORANDUM 4C-2/36

From: Hans Potters

Subject: LEXFOR entries; answer to Memo 4C-1/32 and to Memo 4C-4/19(20)

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Contents

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Distribution:

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General

In view of the errors which frequently occur on EXFOR tapes we propose some modifications to LEXFOR and to manual pages.

In setting up large compilation files the compiler must make distinct choices concerning terminology on vital items, neglecting the often confusing terminology of the author. Two examples: STANDARD absolute for which we propose a new LEXFOR entry, and error-resolution for which we would like to modify the existing LEXFOR entries.

Furthermore, we have a few remarks concerning Reference date and Memo 4C-1/32, new dictionary entries, the promised LEXFOR page on the RAW-modifier and a proposal to retransmit BIB-sections only.

Due to the typing of Committee meeting papers and CINDA manuals and to an illness of our secretary, these memos (35 to 39) have been delayed for some time. We therefore apologize for statements which might be superseded in the meantime by other 4C memos.

Proposed LEXFOR entry 'absolute measurements'

The compiler should be aware that a measurement is often called absolute, while flux measurements or determinations of detector efficiencies are carried out with the help of a certain neutron reaction. As a consequence, a change in the cross section value of this reaction (e.g. a more accurate measurement) will make a renormalization of the actual data set necessary.

The compiler should therefore restrict the term absolute only to those cases where he is sure that there are no "hidden" standards.

This entry can be a separate one or, alternatively, be added to the entry 'standard'.

Proposed changes to LEXFOR entries Errors and Resolution

Errors

Add at a) after the paragraph EN-ERR= :

'The terms resolution and error are often mixed up in literature. In general, for energies (EN and E) and ANGLE the resolutions are given and sometimes also the error, but (nearly) never the error only'.

Resolution

Add the same sentence after the second paragraph.

Proposed modifications to EXFOR manual, Page VIII.6

Replace the last sentence of the last point 'In cases where ...' by

'The year should always be present: the month should be present if known: whether the day is coded is left to the discretion of the compiler'.

Reason: This was the original spirit of our proposal. Journals appearing regularly, such as Nuclear Physics and Physics Review, should have the month in the date.

Answer to Memo 4C-1/32

Page 29, point 25 :

What is the difference? Would NNCSC extend the statement for all multireaction cross-section types? This is all right; but the sentence as such is true.

We agree inasmuch as we will not oblige the compiler for each reaction to look up thresholds in order to search for competing reactions. But we would like the compiler to correct obvious cases of authors using wrong terminology, e.g. 'Absorption' cross section of 79-AU-179 at thermal energies should be coded as NG and not as ABS. See also our remark concerning absolute measurements and error-resolution. If this is not done EXFOR will turn into a mess.

Page 30, point 34 :

We would like to draw attention to the fact that the so-called independent variable rules have already been violated by the new convention concerning, for example, Legendre polynomials in 'Two-dimensional' tables (page 32, point 38B): there is more than one independent variable.

Nevertheless, we can avoid all difficulties by dropping the heading WVE-LN and using EN with units ANGSTROM instead. This will be clear enough. Moreover, it has the advantage that it solves an ambiguity which arose when one represented outgoing energies in Angstroms (Tape 3009, Entry 30227). This will then be E in ANGSTROM. EN-MAX and EN-MIN can be given in free text in the BIB-section.

Two-dimensional tables

CCDN is prepared to receive and (in certain cases) send two- and more-dimensional tables. The independent variable fields should not be blank, and the corresponding heading should have a star in dictionary 24. The cases do not have to be restricted by data type.

This pertains to the proposal made at the last Four-Centre meeting and not to that made in memo 4C-1/33.

Changes and additions to dictionaries

Dictionary 5: add:

EPL * ✓ (Earth and Plan. Sc. Lett.) Earth and Planetary Science Letters. 2NED.

NT * ✓ (Nucl. Technol.) Nuclear Technology. 1USA.

RRL * ✓ (Radiochem. Radioanal. Lett.). Radiochemical and Radioanalytical Letters. 2SWT.
Edited at Lausanne and Budapest.

Dictionary 6: add:

RCN- ✓ Reactor Cent. Nederland, Petten. Report. 2NEDRCN.

Dictionary 7: add:

RCS ✓ Radiochemical Studies, Vol. 2, The Fission Products. ?????, USA 1951.

70LVEG ✓ (ANS Nucl. Expl. Symp. Las Vegas, 1970) ANS Symposium on Engineering with Nuclear Explosives, Las Vegas, Nevada, 14-16 Jan., 1970, 2 volumes.

70MADR * ✓ (Chemistry Symp., IIT, Madras, 1970). Chemistry Symposium 1970, IIT, Madras, India, 25-28 Nov. 1970, Vol. 1.: Physico-chemical Methods in Structural Inorganic Chemistry, Vol. 2.: Radiation Technology and Applied Nuclear Chemistry.

70MARBG ✓ (7th Int. Conf. on Electromagn. Isotope Separation, Marburg, 1970). 7th International Conference on Electromagnetic Isotope Separators and the Techniques of their Applications, Marburg, Germany, 7-10 Sept. 1970.

* Photocopies of title pages added for NDS only.

Dictionary 12: add:

RNV	Non-1/V part.

Dictionary 14: add:

NG,RI,RNV	((N,Gamma), Resonance integral, non-1/V part). Needed for Report RCN-176.

LEXFOR entry RAW modifier

The RAW modifier is to be used for data which are not yet reduced to the final form but still contain for example detector efficiency, instrumental resolution and sample thickness effects. Two important cases encountered so far are:

(a) measured transmissions,

$$\langle e^{-n\bar{\sigma}_T} \rangle = 1 - n\langle\bar{\sigma}_T\rangle + \frac{1}{2} n^2 \langle\bar{\sigma}_T^2\rangle - + \ldots ;$$

(b) reaction yields,

$$\langle y_r \rangle = \langle (1-e^{-n\bar{\sigma}_T})\bar{\sigma}_r/\bar{\sigma}_T + \sum_{i=1}^{\infty} y_{r,i} \rangle ;$$

where $\langle \ldots \rangle$ denotes resolution broadening, n is the sample thickness in nuclei/barn, $\bar{\sigma}_T$ and $\bar{\sigma}_r$ are the Doppler-broadened, abundance-weighted total and partial reaction cross sections, respectively, and $y_{r,i}$ is the reaction yield from neutrons scattered i times before inducing the reaction of type r, e. g. fission, scattering or radiative capture.

Note that for thin samples ($n\bar{\sigma}_T << 1$) the following simple relations with the (broadened) cross sections exist:

$$-\frac{1}{n} \ell n \langle e^{-n\bar{\sigma}_T} \rangle \approx \langle\bar{\sigma}_T\rangle ,$$

$$\frac{1}{n} \langle y_r \rangle \approx \langle\bar{\sigma}_r\rangle .$$

If additional cases are encountered they must be included explicitly under this LEXFOR entry.

In any case, explanation in free text is required.

The STATUS should be given as (PRELM).

If possible, the data should be replaced by the corrected cross section data later on.

Proposal to retransmit BIB-sections only

In a case where only the BIB-section of a subwork is to be changed, the COMMON- and DATA-sections have to be replaced by NOCOMMON and NODATA respectively, with the letter 'N' (no change) in column 80 in order to distinguish from the cases where there actually are no data.

Answer to Memo 4C-4/19(20)

1. We agree with the content of the memo and would like to have the data.

2. The numbering of the memos is wrong. We have received the following from CJD :

   (a) Memo 4C-4/18, September 1972, concerning TRANS 4004;

   (b) Memo 4C-4/18, 5th December 1972, concerning TRANS 4005 (written in Vienna);

   (c) Memo 4C-4/19, 12th April 1973, concerning energy spectra of fission fragments.

   We have renumbered (b) 4C-4/19 and (c) 4C-4/20.