MEMO CP-A/124

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To: **Distribution**
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Subject: **Modification of Dictionary 8 and Dictionary 27**
(Action A10 of last Technical Meeting)

The development experimental technique permits accelerate practically any nucleus. Now our science has possibility to accelerate radioactive projectiles and I believe, that irradiation radioactive targets by radioactive beams will be possible after some time. Consequently we will must add numerous corrections in 27-th Dictionary constantly. To exclude the corrections I propose to refuse from 27-th Dictionary and to modify 8-th Dictionary.

Let us see Columns 12-26 of the 27-th dictionary. My remarks for Manual page are shown by red color.

Columns 12-26 have the following structure:

Column 12 (*Parenthesis*

13-23 Each column contains either a flag or blank:

13 used for REACTION SF1 (SF2□0)

Any nuclide can be used as target in suitable accelerator. Therefore the label is not needed.

1 indicates validity,

x indicates a warning for unusual use.

14 used for REACTION SF2.

Any nuclide can be used as beam in suitable accelerator. Therefore the label is not needed too.

2 indicates validity.

15 used for REACTION SF3, REACTION SF4, REACTION SF7, plus other keywords which allow nuclide codes[8].

Z code is needed only. Subfields SF3 and SF4 can contain any nuclide

3 indicates validity,

v virtual (not yet found)

z indicates validity except for those cases where the particle codes are used instead of the corresponding nuclide codes[1].

16 used for REACTION SF1 (SF2=0).

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[1] DECAY-DATA, DECAY-MON, EN-SEC, EMS-SEC, HALF-LIFE, MOM-SEC, PART-DET, RAD-DET

As I understand SF2=0 means radioactive decay. Consequently, any unstable nuclide must have the label.
But 27-th dictionary has the label for little number of radioactive nuclides and some stable ones (N-15 and O-17, for example). If a label in 23-th column is absent, then radioactive decay is possible. Therefore the label is not needed too.

4 indicates validity.

17 used to indicate a fission product

If SF3=F, then SF4 is fission product. Therefore the label is not needed too.

F indicates validity.

(18-21 are presently unused)

22 used for CINDA

Is it needed for EXFOR?

C indicates validity,

T indicates validity for theoretical work only.

23 used to indicate a stable isotope. It is needed

S indicates stability.

24-25 isomer field:

The conception of “isomer” was extended in last years. I met isomers with half-life some nanoseconds in literature. Similar isomers can exist in any nuclide practically. Therefore the label is not needed too.

either blank, indicating that the nuclide has no isomeric states

or a number, right justified, indicating the maximum number of metastable states (*i.e.*, number of isomeric states not including the ground state).

or A, indicating one or more short-lived isomers (<1 sec.), but no long-lived isomers.

26) *parenthesis*

Conclusion: Only Z and S labels are needed now.

Therefore I would like to propose to use 8-th dictionary with a little modification only. Let us see one example. Today we have in 8-th Dictionary:

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55-CS      (Cesium)
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We can modify the record:

55-CS (Cesium) [S134, 112-151]

S134 means that 55-CS-134 is stable.

Cesium isotopes with mass 112-151 are known.

Second example:

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1-H       (Hydrogen)
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The record must be modified as

1-H (Hydrogen) [SZ1,SZ2,Z3,1-3].

SZ1 means that 1-H-1 is stable and P must be used in SF2 and SF3. Z3 means that tritium is radioactive nuclide and T must be used in SF2,SF3

Proposed modification of 8-th Dictionary will permit exclude 27-th Dictionary and numerous corrections of it.

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