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Memo CP-D/621

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To: Distribution
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Subject: Updated of LEXFOR “General Quantity Modifiers”
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Below is a proposed update of LEXFOR entry for “General Quantity Modifiers”. Main revisions are 1) prohibition of any combination from A, FCT, REL, RAW and MSC, 2) Order of general quantity modifier in SF8, 3) Change in definition of RAW. Dictionary update is also proposed (usage of ARB-UNITS).

General Quantity Modifiers

The general quantity modifiers (REACTION SF8) are flagged with ‘GENQ’ in Dictionary 34 and are listed in the beginning of Archive and TRANS dictionary 236. They can be added to any quantity without requiring an entry in Dictionary 236. Some of them require clarification:

1. **A modifier:** used when a **measurement** is made on a target of natural isotopic abundance and the reaction **that** produces the reaction product specified is known, but the data have not been corrected for the natural abundance of the target nuclide. The modifier (**A**) is used if the compiler is uncertain whether the data have been corrected for natural abundance of the target nuclide.

2. **FCT modifier:** used when the data has been multiplied by a defined factor not containing another quantity (*e.g.*, an arithmetic factor or a branching ratio). Explanatory free text is compulsory. If the factor contains another quantity, the appropriate reaction combination is to be used. ~~except in the case of a ratio of the same quantities (see REL modifier).~~

The modifier FCT must not be used for factors for which specific codes have been introduced (such as isotopic abundance; see item 1, above) (See **Products**).

3. **REL modifier:** used in the case of shape normalized data, that is, data proportional to the quantity given; the normalization factor is unknown. The data unit ARB-UNITS (arbitrary units) should be used. The REL modifier always needs explanation in free text **even if authors state only that the data are given in “arbitrary units”**.

An explicit ratio defined under the REACTION keyword does not require the modifier REL and will usually have the units NO-DIM. (See **Ratios**).

The modifier REL must not be used for factors for which specific codes have been introduced (such as isotopic abundance, branching ratio; see item 1 and 2, above).

4. **RAW modifier**: used for raw (e.g. raw gamma spectra) or uncorrected data (e.g. data not corrected for background, efficiency). Compilers must **determine** whether appropriate corrections are made for the data (especially for transmission and reaction yield). The data unit `ARB-UNITS` is used when data are not normalized. ~~such as reaction yields, raw gamma spectra, etc.~~

~~The modifier RAW must not be used for data for which specific codes have been introduced, e.g., for transmission data. (See Raw Data).~~

5. **MSC modifier**: used for unusual data types, indicating that the exact definition of the quantity is given in free text following the `REACTION` code. This modifier should be used with discretion because the data will not be fully machine-retrievable. The data unit `ARB-UNITS` is used when data are not normalized.

Notes on A, FCT, REL, RAW and MSC

- a. Only one modifier of A, FCT, REL, RAW or MSC may be coded in SF8. If there are two or more applicable modifiers, the widest modifier ($A < FCT < REL < RAW < MSC$) is used.

Example

,DA,,MSC for nuclear interaction part of $d\sigma/d\Omega$ in arbitrary unit

,DE,,RAW for uncorrected neutron spectrum in arbitrary unit

,TRN,,RYL/RAW for uncorrected reaction yield

- b. If a data set contains several subsets or "curves", distinguished by different values of a certain parameter (e.g. incident energy, angle, level energy) and all given in arbitrary units (`ARB-UNITS`), they may be combined in one subentry only when they have a common normalization factor to an absolute value. The same applies to multiple reactions when they are all given in `ARB-UNITS`. In case of doubt, the data should go into separate subentries.
- c. When the data unit `ARB-UNITS` is used, the subentry must contain two or more data points.
- d. The data unit is always `ARB-UNITS` when the modifier `REL` is applied. The modifiers `RAW` and `MSC` may be used with `ARB-UNITS` or absolute data unit (e.g. MB).

6. **AV modifier**: used for data measured as a function of energy or angle and averaged over a given energy interval or angular range.

7. **Spectrum average modifiers**: used for data measured over a broad incident energy spectrum. For such data one of the spectrum modifiers are used `BRA`, `BRS`, `EPI`, `FIS`, `FST`, `MXW`, and `SPA`; see **Spectrum Average** for details. The spectrum average modifier must be coded before other general quantity modifiers.

Example

,FY,,MXW/REL for Maxwellian averaged fission yield in arbitrary unit

~~8. **TT modifier** used for data averaged over energies through a thick target, see **Thick/Thin Target Yields**.~~

Dictionary 25 (Data Units)

ARB-UNITS

arbitrary units

To be combined with the REL, RAW or MSC modifiers in the REACTION.

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