

Some proposals on coding of characteristic energy of spectrum

(N. Otsuka, 2025-05-16, Memo CP-D/1138)

Proposal 1

It is sometimes not clear for me how to choose one from EN-MEAN and EN-DUMMY for a dataset measured under a broad neutron spectrum field. Here are their descriptions in Dictionary 24:

Heading	Expansion	Comment
EN-MEAN	Mean energy of incident projectile spectrum	Mean energy of incident projectile spectrum or of energy range. Explanation in free text is required.
EN-DUMMY	Dummy incident projectile energy, for broad spectrum	Used as the numerical equivalent of an incident particle spectrum when neither EN-MEAN nor KT apply. See also INC-SPECT. Quantity has modifier to specify spectrum.

I would like to confirm that (1) EN-MEAN is used when the energy is given by the authors or in a related reference (REL-REF) describing the same irradiation field, (2) otherwise EN-DUMMY is used.

Proposal 2

LEXFOR gives the EN-DUMMY values of

- 0.0005 eV for cold neutrons (if nothing else is specified by authors)
- 0.0253 eV for thermal Maxwellian and thermal reactor spectra
- 1.5 MeV for fission-neutron spectra (if nothing else is specified by authors)
- 4.5 MeV for decay α -Be neutron source

I would like to propose use of **400 keV** for the fast reactor neutrons (SF8=FST) if nothing else is specified by authors.

Proposal 3

I propose **0.5 eV** for Cd cut off energy if nothing else is specified by authors, namely EN-MIN=0.5 eV for resonance integral (,RI) and epi-cadmium fission yield (,FY,,EPI).

Remark

There can be two different definitions of the mean energy:

$$\langle E \rangle = \int dE E \varphi(E) / \int dE \varphi(E)$$

$$\langle E \rangle = \int dE E \sigma(E) \varphi(E) / \int dE \sigma(E) \varphi(E)$$

I think we do not have a rule about its choice.