

Ambiguity in coding the covariances of emission spectra in MF35 of ENDF-6 files

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October 2007

Status of the ENDF-6 Manual

The unnumbered equation in Section 35.2 on page 35.3 defines the covariances of the energy-distributions of emitted particles as the covariances of the probability density distribution. This is the form in which various laws in MF5 are defined, including the option giving the data in tabular form.

In Section 35.3 that follows, the constraint is elaborated that the probability density distribution must be normalized to one. The need to specify the absolute covariances is a natural consequence of this requirement, but it is also stated, that the sum of any row or column of the covariance matrix must be zero. This is only true in general if the covariances are given on the energy-bin probabilities (i.e. the covariances of the probabilities that particles appear in a certain energy bin). The difference between the two definitions is that elements of the matrix are scaled by the corresponding bin-widths. The equation suggesting the corrective action on checking the summation condition is also affected.

Status of the data and the codes

The spontaneous fission spectrum covariances of ^{252}Cf of the Mannhart were adopted for ENDF/B-VII (unchanged from ENDF/B-VI) and follow the recommendations outlined in the procedures in Section 35.3.

Actinide evaluations in JENDL-3.3 follow the definition implied by the first equation in Section 35.2 on page 35.2.

The ERRORJ code that can process MF35 data follows the conventions adopted in the JENDL-3.3 files. The status of ERRORJ is important because of the intentions to incorporate it in full as a module of the official NJOY distribution.

Question

Which of the two options is to be adopted:

- Change ERRORJ, Section 35.2 of the ENDF manual and recommend changes to the JENDL-3.3 files for $^{233,235,238}\text{U}$ and $^{239,240}\text{Pu}$, or
- Change the ENDF/B-VII ^{252}Cf evaluation and Section 35.3 of the ENDF manual.