Standard Decay Data Methodology

DDEP – strong focus on decay data for applied users

- Transition probabilities readable by applied users
- Atomic data
- Multipolarities, mixing ratios, levels mostly from ENSDF
- "Chemists" view for adopting E_γ, P_γ

ENSDF – strong focus on decay data in support of Adopted Levels, Gammas for nuclear physicists

- Transition probabilities require manipulations
- No atomic data
- E_γ, I_γ, not necessarily from Adopted Gammas

Neither effort has a written standard methodology

Recommendations: Best Decay Schemes

$T_{1/2}$: Average of "all" values is assumed to be discrepant
Establish minimum acceptable precision

Q-value: Always from Audi

Betas: Endpoints insufficient, present complete spectra
Non-unique spectra require measured spectra

$E_{\alpha,\gamma}$: Averages of the best measurements
Least-squares fit to the level scheme

$P_{x,\gamma}$: Normalization must take into account completeness
Least squares fit to the level scheme
Given explicitly in "per 100 decays", N≡1.0

ICC: BRICC

Atomic: All K-, L-,M-,… x-rays and Auger electrons

Genetic feeding to isomers: see 7th Edition of the TOI

Statistical quality of level scheme: χ^2/f for E_γ, P_γ

Specific activity, Dosimetry, ……

Recommendations: other decay schemes

Full disclosure: describe degree of completeness to reader

Statistical models: can be used to estimate completeness

Gross theory of β-decay doesn't work, research needed

Total Absorption Spectrometer (TAS) data:

Compile data at experimental resolution

Document analysis method, response function, …

Delayed particle emission

All data should be evaluated at once, not by mass chain

Evaluation of Decay Data

An authoritative decay database needs to be established independently of ENSDF Adopted Levels, Gammas. It should produce the following sub files.

- **Decay data for applications** – essentially DDEP isotopes
- **Neutron activation data** – from EGAF (LBNL)
- **Fission product decay data** – CARIBU, etc
- **Astrophysical decay rates** – with JINA

The USNDP should

- **Work with the DDEP** – take a leadership role
- **Publish decay data in NDS** – improved format presentation
- **Establish an expert decay data evaluation group**
- **Participate in decay research** – FRIB, CARIBU, ….

The significant body of ENSDF and DDEP data can be reorganized to get this effort started.