Policy statement for inclusion of Resonance data in ENSDF

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- Proposed revisions were presented at NSDD meeting in March 2009; and proposed policy presented and discussed in detail at US-NDP in Nov 2009.

Current stated policy for ENSDF evaluations

Item #7, page ii) in general policies of NDS:

“Radiations from the decay of neutron and proton resonances are not presented. The energies and other level properties for bound levels deduced from resonance experiments are included. Primary as well as secondary γ’s following thermal-neutron capture are generally included.”

Revised policy Statement for inclusion of Resonance data in ENSDF

(Replacement of current item #7, p ii)

1. Charged-particle resonances

Reaction dataset: following quantities should be given:

a) Level excitation energies; absolute value, NOT e.g. S(p)+E(p)

b) The measured resonance energies in comment or re-labeled records.

c) Spins and parities, L-values.

d) Total level widths or $T_{1/2}$ and partial widths; the latter in data continuation records or comment records

e) Resonance strength in relabeled field or in comment record.

f) Cross sections and reaction Q values under comment records

g) Gamma-ray energies

h) Gamma-ray intensities or branching ratios

i) Gamma-ray multipolarities, mixing ratios, coefficients for angular distribution, correlation, polarization, etc. determined in that reaction.

1. Charged-particle resonances (cont.)

"Adopted" dataset: following quantities should be given

a) Level excitation energies
b) Spins and parities.
c) Total level widths or $T_{1/2}$
d) Partial level widths in data-continuation records or comment records
e) Gamma-ray energies
f) Gamma-ray branching ratios
g) Gamma-ray multipolarities and mixing ratios.
h) Reduced transition probabilities when applicable.

2. Neutron Resonances

Averaged-resonance capture (ARC) data (covered in current ENSDF policies)

Inclusion of neutron-resonance data (other than ARC data) in ENSDF is optional

However, contrary to common belief, neutron resonance data, even at low energies, seem relevant to astrophysical applications; see e.g. "high-lighted articles" from CERN's n_TOF facility: Several hundred resonances in Os nuclei below E(n)=8 keV.
186-Os: 22 - 4984 eV; 187-Os: 9 - 2994 eV; 188-Os: 38 - 7960 eV)

Neutron physics of the Re/Os clock. I. Measurement of the (*n*,*γ*) cross sections of ^{186,187,188}Os at the CERN n_TOF facility
M. Mosconi *et al.* (The n_TOF Collaboration) Published 15 July 2010; 015802. See accompanying *Physics* Synopsis

Neutron physics of the Re/Os clock. II. The (*n*,*n*′) cross section of ^{187}Os at 30 keV neutron energy M. Mosconi, M. Heil, F. Käppeler, R. Plag, and A. Mengoni Published 15 July 2010 , 015803. See accompanying *Physics* Synopsis

Neutron physics of the Re/Os clock. III. Resonance analyses and stellar (*n*,*γ*) cross sections of ^{186,187,188}Os K. Fujii *et al.* (The n_TOF Collaboration) Published 15 July 2010, 015804. See accompanying *Physics* Synopsis]

If n-resonance data are presented, follow the same policy as in charged-particle resonances.

Exceptions: for resonances in a narrow margin of energy, use S(n)+E(n) in level energy field in source dataset. Such values not to be given in "Adopted" dataset. S(n) in c.m. system.

Inclusion of primary gamma-ray data in "Adopted" dataset is optional.

Conclusion

Suggest that the revised policy statements should probably replace current #7 item under reactions and decays in the January 2011 issue of NDS; and a note sent to the NSDD members.