WPEC sub-group proposal
(H. Harada (JAEA) and P. Schillebeeckx (IRMM))

Title

Improving nuclear data accuracy of ^{241}Am and ^{237}Np capture cross sections

Justification for a Subgroup

The experts of SG-31 reviewed state-of-the-art experimental techniques for nuclear data measurements and the current status of nuclear data covariance evaluations for important nuclear data, which were identified by SG-26 for developing innovative nuclear reactor systems. It was shown that at present there is still a serious gap between required accuracy and current accuracy. Bridging this gap represents a major challenge for all file projects. Therefore, there is an incentive to organize an international collaborative framework to improve the accuracy of evaluated data. Under this framework, all of the relevant forefront knowledge and techniques of energy dependent cross section measurements, spectrum averaged experiments, nuclear data and associated covariance evaluations could be suitably integrated. In order to test the concept and assess the effectiveness of such a framework, the proposed SG focuses on two specific examples, i.e. the thermal and fast neutron capture cross sections of ^{237}Np and ^{241}Am. For these cross sections, which are of interest to nuclear waste managements, lessons have been learned from past programmes, experimental data using state-of-the-art techniques are available and also new experimental programs are going on in different countries, under different file projects.

Subgroup Monitor(s)

P. Schillebeeckx (JEFF)

Subgroup Coordinator

H. Harada (JENDL)

Subgroup Participants[1]

* Experts on Differential Data
P. Schillebeeckx (IRMM), F. Gunsing (CEA), D. Cano-Ott (CIEMAT), J. Hori (Kyoto Univ.), T. Katabuchi (Tokyo Tech.), A. Kimura (JAEA), J. L. Ullmann (LANL), A. Carlson (NIST)
* Experts on Spectrum Averaged Data
G. Palmiotti (Idaho), M. Rossbach (Julich), A. Letourneau, G. Noguere, C. Riffard (CEA), T. Belgya (KFKI), T. Sano (Kyoto Univ.), S. Nakamura, K. Okumura (JAEA), G. Žerovnik (Jozef Stefan Institute)
* Experts on Nuclear Structure Data
F. Kondev (ANL), A. Sonzogni (BNL), P. Leconte (or D. Bernard) (CEA), H. Iimura, H. Harada (JAEA)

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[1] Tentative names only… The data projects will have to identify appropriate participants, which will have to check with their own institution the time that they can devote to this activity.

* Experts on Evaluation and Covariances
O. Iwamoto, JAEA (JENDL); *** (JEFF), M. Herman, S. Hoblit, BNL (ENDF), N. Otsuka, IAEA, E. Dupont, OECD/NEA, *+++

Definition of the project and proposed activities

In order to design an international framework to improve the accuracy of evaluated data, all of the forefront knowledge of energy dependent cross section measurements, spectrum averaged experiments, relevant nuclear structure data, and evaluations are invested on two hot specific examples, i.e. the capture cross sections of ^{237}Np and ^{241}Am for thermal and fast neutrons.

First, current evaluations are quantitatively assessed on these quantities. Second, the forefront knowledge on differential measurements is assessed, and the quantities are recommended based on the assessment. Third, the same is done using the forefront knowledge on spectrum averaged measurements. Fourth, the forefront knowledge on nuclear structure data measurements is assessed, and the relevant structure data are recommended.

As the next step, the cross sections and covariance are updated by integrating all of the above assessments. Based on these experiences, a suitable international framework is recommended for accuracy improvement of nuclear data.

In the SG, following items will be assessed;
1) *Assessment of cross sections and covariance evaluations*
2) *Assessment of cross sections by differential methods*
3) *Assessment of cross sections by spectrum averaged methods*
4) *Assessment of nuclear structure data related to capture cross sections*
5) *Update of the cross sections and covariance based on integrating the assessments*
6) *Recommendation of best practices, methods and an international framework for accuracy improvement of nuclear data*

SG activities will be conducted in liaison with the NSC Expert Group on Integral Experiments for Minor Actinide Management.

Relevance to Evaluated Data Files

Recommendations for developing higher accuracy Evaluated Data Files

Time-Schedule and Deliverables:

- *July, 2014, Starting the SG activities*
- *May, 2015, Meeting of four teams on item 1, 2, 3, and 4.*
- *July, 2015, Written Reports on assessment items 1, 2, 3, and 4.*
- *December, 2015, Written reports on updated cross sections and covariance by each team.*
- *May, 2016, Meeting of all teams for items 5 and 6.*
- *December, 2016, Final Report of SG*
- *Total* (2.5 years)