

WPEC sub-group proposal

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Title

Improving nuclear data accuracy

**A first step toward an international framework
to facilitate collaborations for improvement of
nuclear data accuracy**

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. Therefore, **it is recommended to organize an international framework to improve the accuracy of evaluated data**. To design the framework, **all of the forefront knowledge and techniques of energy dependent cross section measurements, integral experiments, nuclear data and associated covariance evaluations are suitably integrated**. In order **to 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 a most hot issue related to nuclear waste managements, experimental data using state-of-the-art techniques are available and also new experimental programs are going on.

Subgroup Participants

Subgroup Monitor(s)

P. Schillebeeckx (JEFF)

Subgroup Coordinator

H. Harada (JENDL)

**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 Integral 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), Ž. Gašper (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)*

** Experts on Evaluation and Covariances*

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

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.

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, integral 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 integral 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;

Assessment of cross sections and covariance evaluations

Assessment of cross sections by differential methods

Assessment of cross sections by integral methods

Assessment of nuclear structure data related to capture cross sections

Update of the cross sections and covariance based on integrating the assessments

Recommendation of best practices, methods and an international framework for accuracy improvement of nuclear data

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)