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The OECD Nuclear Energy Agency's Working Groups on Nuclear Data

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Abstract

The OECD Nuclear Energy Agency (NEA) has established two international Working Groups on Nuclear Data related issues. One is the Working Party on International Evaluation Co-operation (WPEC), which comprises members from the major nuclear data evaluation projects in the world. The main goal of WPEC is to exchange information about on-going activities and to co-operate on solving common outstanding data problems, with the long term goal of having converging evaluated data libraries. The second Group is the Working Party on international nuclear data Measurement Activities (WPMA). This Working Party brings together representatives from different experimental facilities with the goal to co-ordinate the measurement programmes at these institutes in relation to the data needs expressed in the NEA High Priority Nuclear Data Request List. The two Working Parties hold adjacent yearly meeting.

1. Background

In the second half of the 1980's it became evident that resources for nuclear data work was declining to a point where national and some regional projects had difficulties in pursuing their programme of work. This was partly due to the retirement of the 'first' generation of nuclear physicists and the lack of younger scientists in the field of nuclear data. This problem was extensively discussed in the two NEA scientific committees at the time, the NEA Nuclear Data Committee (NEANDC) and the NEA Committee of Reactor Physics (NEACRP). Both came to the conclusion that increased international collaboration would be the most efficient way to tackle the acute resource problem, but that

individual countries had to take measures to stimulate younger scientists to enter the nuclear data field in order to stabilise the long term situation.

The NEANDC and NEACRP jointly set up the Working Party on International Evaluation Co-operation (WPEC) in 1990 to bring together the major evaluation projects in the NEA member countries. These projects were the Evaluated Nuclear Data File (ENDF) in USA, the Japanese Evaluated Nuclear Data File (JENDL) in Japan, and the Joint Evaluated File (JEF) co-ordinated by the NEA Data Bank together with the European Fusion File (EFF) sponsored by the European Community.

The need for experimental nuclear data to support evaluation efforts is evident and one of the first sub-groups to be set up by the WPEC was one on nuclear data measurement activities. This group soon became of such an importance that it was transformed into a separate Working Party on international nuclear data Measurement Activities (WPMA).

2. Working Party on International Evaluation Co-operation (WPEC)

Membership

At the start up in 1990, the WPEC comprised the three evaluation projects mentioned above (ENDF, JENDL, and JEF/EFF), and with a representative from the IAEA Nuclear Data Section (NDS) as observer. After a few years, it was decided to include the IAEA observer as member of the group and to invite also the Russian and Chinese evaluation projects BROND and CENDL respectively to participate in the work. The IAEA supports the Russian and Chinese participation in the Working Group.

Working Methods

The WPEC consists of four members from each of ENDF, JENDL and JEF/EFF, one member from each of IAEA, BROND and CENDL, and one member from the NEA. This group has an overall responsibility for the project and it decides on which common problems to tackle. The WPEC establishes subgroups to perform this work. Each subgroup is chaired by a co-ordinator and has a member of WPEC assigned to monitor progress. The subgroups work mainly via E-mail whereas the WPEC meets once a year to review the status of the different evaluation projects and take stock of progress in the different subgroups.

WPEC Subgroups

A full list of subgroup can be found in Annex 1. Many of the earlier subgroups have completed or are about to complete their work. Five reports have been published and another four are in print. It is expected that six of the

on-going subgroups will conclude and publish their work in 1999.

Many of the subgroups have been working on nuclear data problems relevant to existing reactor programmes. However, WPEC was early on also interested in newer concepts, such as hybrid systems, and established subgroups on items such as "Minor actinide data" (subgroup 8) and "Intermediate energy nuclear data evaluations" (subgroup 13). Also the subgroup on "Nuclear model validation" (subgroup 12) has performed work related to the modelling and calculation of intermediate energy nuclear data.

Among the on-going or newly established subgroups there is one of direct relevance to transmutation applications, namely the subgroup on "Processing and validation of intermediate energy evaluated data libraries" (subgroup 22). Other subgroups cover "Data validation methods" mainly on data adjustment techniques in reactor physics applications, "Thorium benchmarks" for four fast critical assemblies containing Thorium plates, and "Fission Product Cross-Sections for Thermal Reactors" which is a follow-up to a similar study on fast reactor systems.

Two of the subgroups (at the bottom of the list in Annex 1) on "Formats and processing of evaluated data" and on the "High priority nuclear data request list" are somewhat different to the others, as they are considered as longer-term subgroups.

3. Working Party on International Nuclear Data Measurement Activities (WPMA)

Membership

The Working Party on International Nuclear Data Measurement Activities was established in 1994 with the goal to improve the collaboration between the remaining nuclear data measurement facilities. Although WPMA has a well-established membership of representatives from active experimental

facilities, it is less strict about participation in annual meetings compared to WPEC. This has been done on purpose to bring in as many active groups as possible into the co-operation, considering the rapidly diminishing number of experimental establishments available.

The following laboratories are presently represented in WPMA:

- In Europe:
 - CEA France, IRMM Geel, KFA Jülich Germany, PTB Germany, Uppsala Univ.
- In Japan
 - JAERI Tokai-Mura, Tohoku Univ.
- In Russia
 - JINR-FLNP Dubna, IPPE Obninsk
- In USA
 - ANL, LANL, NIST, Ohio Univ., RPI, Univ. of Lowell

Working Methods

The working methods of WPMA are similar to those of the WPEC due to the fact that WPMA was born out of a WPEC subgroup. At annual meetings, the WPMA reviews on-going and planned experimental activities in laboratories and also progress in subgroups, set up to tackle specific issues.

Subgroups

The WPMA has presently two separate subgroups working on the "Inelastic scattering of ^{238}U " and on "Intermediate energy data". The first subgroup is coordinated by E. Wattecamps, IRMM Geel, Belgium, and is mainly concerned with inelastic cross sections and angular distributions below 5 MeV. The second subgroup on "Intermediate energy data", coordinated by N. Olsson, Uppsala, Sweden, was set-up during the 1997 WPMA meeting, but has not yet been fully established.

Newsletter

The WPMA issues an annual newsletter giving information on on-going and planned experiments at different laboratories.

Two issues have so far been published and a third one is being printed. Copies can be obtained from the NEA.

4. Joint WPEC / WPMA activities

A number of issues discussed in the Working Parties require expertise both from the measurement and the evaluation community. To tackle these issues in the most efficient way it has been agreed to set up joint WPEC/WPMA subgroup. Four such subgroups on "Fission Neutron Spectra", "Doppler Effects", "Nuclear Data Standards" and the "High priority request list" have been established.

The subgroup on "Fission Neutron Spectra" was started due to a noted discrepancy between microscopic and macroscopic data for the ^{235}U fission neutron spectrum, whereas the subgroup on "Doppler Effects" is a follow-up to a European Community project to measure, analyse and evaluate low energy resonances in U, UO_2 , UO_3 , NpO_2 , Hg_2Cl_2 , Ta at different temperatures.

Nuclear Data Standards

The subgroup on "Nuclear Data Standards" aims at revising the present standards released about 10 years ago, taking into account both new experimental and theoretical information. A four-year programme has been agreed. The first two years would essentially be devoted to completing the relevant on-going experimental programme. The next two years would then be devoted to the evaluation efforts.

High Priority Request List

The subgroup responsible for the "High priority nuclear data request list" is a joint WPEC and WPMA subgroup. It constitutes a natural meeting point for the two communities and at annual meetings of WPEC and WPMA there is always a common session devoted to this request list. The latest version (May-98) of the High Priority Request List has been considered too long and it was

agreed to simplify and reduce the list by clearly indicating the highest priority requests.

Apart from data request related to existing nuclear energy programmes, there are also two lists concerning intermediate energy data. Japan provided one list and the other was compiled by A. Koning. It is foreseen to review and merge the two intermediate energy nuclear data lists.

The list is directly available through the NEA Internet Web page (www.nea.fr). It is planned to provide scientists with a special

Web page where feedback on the list can be given directly on-line.

5. Complementary information

General information about the NEA, its programme of work and publications, can be found on the NEA Web site at: www.nea.fr. Requests for specific information or publications related to the NEA nuclear data activities can be addressed to: nordborg@nea.fr.

Annex I

Complete list of WPEC subgroups

	Topic	Co-ordinator	Status
1	^{52}Cr , ^{56}Fe & ^{58}Ni data	C.Y. Fu, USA	Published
2	Covariance files for Fe	H. Vonach, Austria	Published
3	Thermal actinide data	H. Tellier, France H. Weigmann, IRMM	Published
4	^{238}U capture and inelastic data	Y. Kanda, Japan	To be published in 1999
5	^{239}Pu fission cross-section	E. Fort, France	Published
6	Delayed Neutron Data	A. d'Angelo, Italy	To be published in 1999
7	Nuclear Data Standards	A. Carlson, USA	New subgroup (WPEC/WPMA)
8	Minor Actinide Data	T. Nakagawa, H. Takano, Japan	To be published in 1999
9	Fission Neutron Spectra	D. Madland, USA	New subgroup (WPEC/WPMA)
10	Fission Product Inelastic Scattering	M. Kawai, Japan	To be published in 1999
11	Resonance Region of ^{52}Cr , ^{56}Fe , and ^{58}Ni	F. Fröhner, Germany	To be published in 1999
12	Nuclear Model Validation	M. Chadwick, USA	In print
13	Intermediate Energy Nuclear Data Evaluation	A. Koning, Holland, T. Fukahori, Japan	In print
14	Thorium benchmarks	A. Ignatyuk, Russia	Starting up
15	Self-shielding treatment in the unresolved resonance region	F. Fröhner, Germany	Published
16	Nuclear Level Densities for ^{52}Cr , ^{56}Fe and ^{58}Ni	C.Y. Fu, USA	In print
17	Fission Product Cross -Sections for Fast Reactors	H. Gruppelaar, Holland	In print
18	Epithermal capture of ^{235}U	C. Lubitz, USA	To be published in 1999
19	Data validation methods	E. Fort, France	Starting up
20	Doppler Effects	P. Ribon, IRMM	New subgroup (WPEC/WPMA)
21	Fission Product Cross-Sections for Thermal Reactors	N.T. Gulliford, UK	New subgroup
22	Processing and validation of intermediate energy evaluated data libraries	A. Koning, Holland	New subgroup
B	Formats and Processing	USA	On-going
C	High Priority Request List	R. McKnight, USA, F. Storrer, France	On-going (WPEC/WPMA)