NEANDC-205-"U"
3rd October 1985.

ORGANISATION FOR ECONOMIC COOPERATION AND DEVELOPMENT

NUCLEAR ENERGY AGENCY NUCLEAR DATA COMMITTEE (NEANDC)

Specialists' Meeting on the Use of the Optical Model
for the Calculation of Neutron Cross Sections below 20 MeV

(13th to 15th November 1985 at OECD Headquarters, Paris)

FINAL CIRCULAR

Scope of the Meeting

This meeting is recommended by the NEANDC (Nuclear Energy Agency Nuclear Data Committee) as a follow-up to a previous specialists' meeting held in Paris (November 1981) on "Fast Neutron Scattering on Actinide Nuclei". The proceedings of the 1981 meeting were published as a report under the reference "NEANDC-158U, OECD, Paris 1982".

In this second meeting, it is intended to assess in a broader way the current status of the practical aspects of the optical model. The aspects which are to be considered include essentially the use of this model for calculating cross sections for neutron-induced reactions of interest in the nuclear energy field. The neutron energy ranges from 0 to 20 MeV, this upper limit being adopted for most evaluated nuclear data files used in the nuclear energy programs. Nuclei with mass numbers greater than A = 20 only will be considered with particular emphasis on nuclei present in structural materials, fission products and actinides.

Other applications such as reactions induced by particles different from nucleons (for example: alpha particles, heavy ions, etc...) will be discarded.

Date and location

This meeting is scheduled for three full days (13th to 15th November 1985) at OECD Headquarters (19 rue de Franqueville, Paris 16). A detailed map of Paris around this district is enclosed, together with a list of some hotels in the area.

Organisation

The meeting will be organised by the Nuclear Energy Agency of the OECD. The NEA Secretariat can provide some help to the participants for the organisation of their trip.

The scientific programme is placed under the responsibility of a programme committee composed of:

A. Michaudon (Chairman), J. Salvy (Vice-Chairman),
F. Dietrich, P. Hodgson, A.B. Smith.

Programme

The meeting is planned to last three full days from Wednesday, 13th November at 9.00 h. to Friday, 15th November at 17.00 h. It is expected that the participants will attend the whole meeting since the conclusions and recommendations will be made at the end. Taking into account transportation time between Paris and the airports (Roissy or Orly), it means that the participants should plan to leave Paris at 20.00 h. on Friday, 15th November at the earliest.

The programme is given in Appendix 1.

All Review Papers will be presented in the first part of the meeting. Each talk is scheduled to last either 50 minutes or 25 minutes, followed by a discussion of respectively 10 or 5 minutes at the most. The written versions of the papers, not exceeing 10 pages, are expected by the end of October. Copy of the correspondence should be sent for information to the Programme Committee Chairman and Vice-Chairman and NEA Data Bank.

Contributed papers of 10 to 15 minutes each may be presented on Friday, 15th November during a two-hour session. Those who plan to make such a presentation are kindly requested to send the title and an abstract of their talks to the Programme Committee Chairman, Vice-Chairman and NEA Data Bank before 20th October and the full paper of 5 pages maximum by the end of October.

Detailed discussions of Tools used in neutron cross-section calculations, and Specific optical-model parameterisations will take place during the two workshops which will be held simultaneously in two separate rooms. These rooms will be equipped with projection facilities (transparencies and slides).

Chairpersons of the various sessions will be appointed in due time.

Languages

The working languages of the meeting will be English and French. Simultaneous interpretation in these languages will be provided at the meeting (except during the Workshops). Papers must be written in one or the other of the working languages; however, the abstract immediately preceding each paper must be written in English.

Participation

It is planned to have a maximum number of about 45 participants including scientists from non-OECD countries. Nominations to attend must be channelled through the NEANDC members in your country, or for non-OECD countries, through the Nuclear Data Section of IAEA, Vienna, Austria. All participants are kindly requested to fill in the form (Appendix 2) and return it as soon as possible to C. Nordborg and J. Salvy.

Visits of facilities around Paris (Saclay, Bruyères-le-Châtel, etc.) can be arranged upon request on Tuesday, 12th November. In order to enter the C.E. Bruyères-le-Châtel, non-French participants should fill in a form (Appendix 3) and return it to J. Salvy by the end of October.

Proceedings

OECD plans to issue Proceedings of the meeting. The Proceedings will include:

- the text of the invited papers. Their presentation should conform to the instructions given. The authors are also asked to supply the organisers with the final version of their text, in a form ready for camera reproduction, at the meeting.

- the conclusions and recommendations.

- the texts of contributed papers if the authors so wish. In such a case, the authors are asked to come to the meeting with their contribution, presented in the same manner as for the invited papers but with a length limited to five pages at the most.

  Sheets of paper for typing the texts will be mailed by OECD upon request. Typing instructions are given in Appendix 4.

APPENDIX 1

ORGANISATION FOR ECONOMIC COOPERATION AND DEVELOPMENT

NUCLEAR ENERGY AGENCY NUCLEAR DATA COMMITTEE (NEANDC)

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PROGRAMME

Wednesday, 13th November

Morning - I - Fundamental Aspects of the Optical Model

(With emphasis on the consequences for the calculation of neutron cross-sections below 20 MeV)

9.00

1. Definitions, calculations and limitations of the optical model potential (1 h)
   C. MAHAUX (Liege)

2. Microscopic calculations of the imaginary part of the optical model potential (30 mn)
   F. OSTERFELD (Juelich)

3. Microscopic calculations of the neutron optical model potential from a realistic nucleon-nucleon interaction (30 mn)
   H.V. von GERAMB (Hamburg)

4. Energy dependence of the shape of the optical model potential (30 mn)
   R.W. FINLAY (Ohio University)

5. Charge symmetry breaking in the nuclear mean field from a comparison between neutron and proton scattering (30 mn)
   S.M. AUSTIN (Michigan State University)

Afternoon - II - Conventional Models and Calculational Tools

1. Coupled-channel formalism and ECIS code (30 mn)
   J. RAYNAL (Saclay)

2. Optical model and statistical processes (30 mn)
   H.M. HOFMANN (Erlangen)

3. International nuclear model codes comparisons (30 mn)
   P. NAGEL and E. SARTORI (NEA Data Bank, Saclay)

4. Sensitivity of calculated cross sections on the optical model parameters (30 mn)
O. BERSILLON (Bruyères-le-Châtel)

5. Analysis of cross-sections of neutron-induced reactions from 1 to 20 MeV (30 mn)
P.E. HODGSON (Oxford)

Thursday, 14th November

Morning - III - Parameterization of the Optical Model

9.00 1. Global and local parameterizations (1 h.)
P.G. YOUNG (Los Alamos)

2. Optical Potentials for Neutrons and Protons (30 mn)
L.F. HANSEN (Lawrence Livermore)

3. Nuclear data needed for optical model calculations (sub-session organised by A.B. SMITH (Argonne))

3.1 - Resolved-resonance region (30 mn)
C.H. JOHNSON (ORNL)

3.2 - Unresolved-resonance region (30 mn)
F. FROEHNER (Karlsruhe)

3.3 - Fast neutron cross sections (30 mn)
A.B. SMITH (Argonne)

4. Statistical and dynamic aspects of nuclear matter distributions: microscopic calculations and experimental data (30 mn)
M. GIROD (Bruyères-le-Châtel)

Afternoon 5. Use of results from microscopic methods in optical model calculations (30 mn)
CH. LAGRANGE (Bruyères-le-Châtel)

IV - Calculations of Neutron-induced Cross-sections with Special Emphasis on the Role of the Optical Model (selected examples)

1. Structural materials (30 mn)
Speaker to be defined

2. Fission products (30 mn)
H. GRUPPELAAR (Petten)

3. Actinides (30 mn)
J. SALVY (Bruyères-le-Châtel)

4. Fast neutron scattering from soft nuclei: coupled-channel formalism and illustrations (30 mn)
J.P. DELAROCHE (Bruyères-le-Châtel)

Friday, 15th November

9.00 V - Contributed Papers (2 h.)

VI - Workshops

11.00 1. Tools used in neutron cross-section calculations
Moderator: F.S. DIETRICH (Livermore)

2. Specific optical model parameterizations for the calculation of

- Structural materials
- Fission products
- Actinides

Moderator: J. RAPAPORT (Ohio University)

16.00 VII - Conference Summary

By the Moderators of the two Workshops (1 h).

APPENDIX 2

ORGANISATION FOR ECONOMIC COOPERATION AND DEVELOPMENT

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for the Calculation of Neutron Cross Sections below 20 MeV
(13th to 15th November 1985 at OECD Headquarters, Paris)

PARTICIPANT REGISTRATION FORM

To be sent, before 15 October 1985, after official nomination to NEA Secretariat by national delegates to NEANDC, one copy each to :

Dr. C. Nordborg
NEA Data Bank
91191 Gif-sur-Yvette CEDEX
France

Mr. J. Salvy
Service Physique Nucléaire
Centre d'Etudes de Bruyères-le-Châtel
B.P. 561
92542 Montrouge CEDEX, France

Family name.....

Forename(s).....

Title or function.....
(Ms, Mr, Dr, Prof.)

Institute, organisation or company (full address).....

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Telephone.....Telex.....Telegrams.....

Address for correspondence (if different from above).....

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Telephone.....Telex.....Telegrams.....

Do you wish to contribute a paper?.....

Title of contribution and authors.....

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APPENDIX 3

C.E.A.
Service de Physique Nucléaire
Centre d'Etudes de Bruyères-le-Châtel
B.P. No. 561
92542 Montrouge Cedex - France
Tel: 490 92 80, poste/extension 47 19

DEMANDE D'ENTREE
(à remplir par les visiteurs étrangers)

APPLICATION FORM
(to be filled in by foreign visitors and sent to J. Salvy)

NOM
Family name

PRENOM
First name

NATIONALITE
Nationality

DATE ET LIEU DE NAISSANCE
Date and Place of Birth

PROFESSION
Profession

NOM ET ADRESSE DE L'EMPLOYEUR HABITUEL
Name and Address of Permanent Employer

NOM ET ADDRESS DE L'EMPLOYER EN FRANCE (le cas echeant)
Name and Address of Employer in France (if any)

ADRESSE PERSONNELLE
Home Address

ADRESSE EN FRANCE (le cas echeant)
Address in France (if possible)

DATE ET DUREE DE LA VISITE
Date and Duration of the Visit

DATE et SIGNATURE

N.B. Il est demandé aux visiteurs étrangers de se munir de leur passeport (ou à defait de leur carte d'identité) avant de se présenter a l'éntrée du Centre (Service de Physique Nucléaire).

N.B. Foreign visitors are kindly requested to bring their passports (or, if not, their identity cards) when entering the Center (Service de Physique Nucléaire).

APPENDIX 4

INSTRUCTIONS TO AUTHORS OF PAPERS

Authors are requested to respect the deadlines given in the circular and to follow the instructions for typing their papers.

1. Master copy

Authors are requested to bring the master copy of their paper in a form ready for camera reproduction to the meeting.

2. Typing Instructions

The size of the letters in the text and tables should be large enough to be easily readable after a 20% reduction in size.

The text should be typed on an electric typewriter with a carbon ribbon, on the sheets supplied by the Secretariat (see the attached model). The texts will be reproduced directly by a photographic process.

3. Cover Page

Only the title, names and abstract of the paper should be set out on this page.

The title should be typed in capital letters starting 2.5 cms. from the top of the frame, followed by the initials and names of authors, and then by the name of the organisation or institute where the work was carried out, town and country.

This information should be followed by an abstract of about 10 lines in single spacing in English, with, if possible, a translation in French.

4. Paper

The text of the paper:

- should be typed in single spacing,
- should be typed at the top of a new page beginning within the frame and must in no case go beyond it horizontally or vertically.

The tables, figures, diagrams and photographs should be attached to the master copy, and bear the author's name on the back to avoid any risk of error. The pages of the master copy should be numbered in pencil in the bottom right hand corner.

5. Length of Papers

The paper should not exceed 10 pages, including abstract, tables, figures and references.

6. Tables

Tables should have a heading and be numbered consecutively with roman numerals (e.g. Table III) in the order they are referred to in the text. This information should be typed above the table.

7. Figures

Figures (diagrams, etc.) should bear a caption below the figure and should be numbered with Arabic numerals (e.g. Figure 4) in the order they are referred to in the text (see item 7.3). Maximum size 16 x 23 cms. In order to avoid errors, please write the author's name on the back of each figure.

7.1 Diagrams

Figures (diagrams, etc.) should bear a caption below the figure and should be numbered with Arabic numerals (e.g. Figure 4) in the order they are referred to in the text (see item 7.3). Maximum size 16 x 23 cms. In order to avoid errors, please write the author's name on the back of each figure.

7.2 Photographs

Photographs should be submitted only in exceptional circumstances and if they carry information not readily given in any other form. Contrasted prints on glossy white photographic paper are required.

7.3 Colour

No colour reproductions are possible.

8. Other editorial requirements

8.1 Symbols and abbreviations

Symbols and abbreviations should be explained when they first appear in the text.

The internationally accepted symbols of physics, chemistry and mathematics should be used (see the recommendations of the International Organization for Standardization and particularly recommendation R 31).

8.2 Mathematical symbols

Mathematical symbols should be written clearly, in manuscript if necessary, making a clear distinction between symbols likely to cause confusion.

8.3 Bibliographic references

Bibliographic references should be identified in the text by arabic numerals in square brackets [1] and the references should be set out fol-

lowing the text in the order they have been mentioned. They should contain a maximum of information; name and first name of author, title of article and periodical, or title of book, volume number, page number, date of publication or, in the case of books, name of the editor, place and date of publication (1).

8.4 Footnotes and cross-references

Footnotes to the text should be numbered consecutively throughout the paper (and not page by page); they have be set out at the bottom of the page on which they are mentioned(2).

References to footnotes set out in a table or diagram should be identified by a letter or asterisk and the footnote should be set out immediately below the table (see item 7).

Cross-referencing in the text must be by section numbering, not by reference to page numbers.

8.5 Sub-titles, paragraphs and sub-paragraphs

It would be preferable to use the same layout as in this document for sub-titles and paragraphs; numbering is only required in the case of cross-referencing.

The first line of each paragraph and short-listed items within a pragraph should be indented; the remainder of the text should be typed righ against the margin.

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(1) Examples of bibliographic references

Papers published in Conference Proceedings:

Johnson, A.B. : "Impacts of Reactor-induced Defects on Spent Fuel Storage", Proc. Seminar Storage of Spent Fuel, OECD, Paris, 1978, 235-253.

Articles published in newspapers or periodicals :

Durand, A. : "Engineering Storage of Radioactive Waste", Science, 201, 8431 (1978), 63-68.

(2) Layout for footnotes and cross-references.

First line for the text of paper

over page,
egin typing
ere →

TITLE OF PAPER TO BE TYPED IN THE CENTRE
IN CAPITAL LETTERS

2 spacings

Initials and name(s) of author(s) (in small letters)
Organisation " "
Town (Country) " "

5 spacings

ABSTRACT

Abstract in English (about 10 lines - single spacing)

5 spacings

RESUME

Translation of Abstract in French (optional)

The text of the paper should be typed in single spacing.

Never type outside the frame.

This text will be reduced ; so that it will remain legible after printing, the size of the characters should be about the same as those of this model.

55 Last line