Nuclear Data Newsletter

News from the Nuclear Data Section

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Robin Forrest (SH-NDS) meeting with Meera Venkatesh (DIR-NAPC)

From the Section Head

In the previous, 50th issue of the ND Newsletter, we reflected on the course nuclear data has taken since the first issue of the Newsletter in 1979. So, it now seems appropriate in this 51st issue to turn attention to what should be expected of nuclear data in the future, and the foreseen role of the IAEA-NDS in the coming years.

Advancing forms of nuclear power generation, evolving atomic and nuclear-based analytical techniques, as well as the evolution of radiotherapy and radioisotope production for nuclear medicine, all require credible data in order that the desired results in these areas can be achieved. As the IAEA is a multinational organization, NDS is able to harness worldwide expertise in nuclear data to produce the standards and data for nuclear fission and fusion reactors, medical and analytical applications. As we move into the second decade of this century, notwithstanding the recent disaster in Japan, an increase in the use of fission reactors for power generation is predicted, together with research reactors, as well as significantly more fusion research and development of much longer-term technologies.

As a consequence, the programme of NDS work within the 2012 – 2013 biennium has been directed towards a wide range of topics: improving the current dosimetry library, extending the Ion Beam Analysis database to include PIGE data, extending medical databases, improving understanding of the fission neutron spectra and understanding the behaviour of materials such as tungsten and beryllium in fusion devices. Coordinated Research Projects (CRPs) relative to these areas are being set

continued on page 2

Computer Codes and Data Libraries

Databases and libraries are available for download or on CD-ROM/DVD cost-free on request

EXFOR-CINDA Database and Retrieval System, December 2010:

- Integrated CINDA and EXFOR
- Advanced interactive search
- Help based on dictionaries
- Interactive graphics with ZVView
- Does not need installation, can run from CD-ROM
- Works with local and remote Databases
- CINDA extended by charged particle and photonuclear reactions
- EXFOR and CINDA as MS-Access databases

EndVer/GUI and EXFOR-CINDA package, March 2011:

An integrated software package for comparison of evaluated nuclear data files with experimental data from the EXFOR database (also contains interactive plotting).

Features:

- EndVer with Graphic User Interface
- Integrated EndVer - PrePro-2010 - EXFOR
- PostScript graphics with PlotC4
- Plotting ENDF Files with EXFOR: MF4 (DA), MF5 (DE), MF6 (DAE), MF3+33 (SIG + uncertainty)
- Interactive graphics with ZVView
- Full EXFOR and CINDA databases
- Test version for Macintosh

ROSFOND-2010:

Updated Russian library of evaluated neutron data: important neutron data for advanced nuclear reactors issued in 2010 by IPPE, Obninsk, Russian Federation.
http://www.ippe.ru/podr/abbn/libr/rosfond.php

JENDL-4.0:

Released May 2010 from JAEA Nuclear Data Center: a general purpose neutron-induced reaction data library, 10^{-5} eV to 20 MeV reaction data for 406 targets.
http://wwwndc.jaea.go.jp/jendl/j40/j40.html

JANIS-3.2:

Released June 2010 from NEA Data Bank: Java-based nuclear information software with a display program designed to facilitate the visualisation and manipulation of nuclear data. Some new functionalities of this version are: display of evaluated covariances matrices (MF33); support for additional NJOY covariance formats: COVFILS (ERRORR) and BOXER (COVR).
http://www.nea.fr/janis/

EMPIRE v. 3.0:

A new version of the EMPIRE system of codes for nuclear reaction calculations was released in January 2010; the current version is available at:
https://ndclx4.bnl.gov/gf/project/empire/

A comprehensive paper describing the release was published in Nuclear Data Sheets 108 (2007) 2655–2715.

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up, or have just started, in order to achieve the specific objectives consistent with the programme of work (http://www-naweb.iaea.org/napc/nd/crps/crp_desc.asp gives a general description of the CRP mechanism).

The IAEA is in the process of moving to an Agency-wide Information System for Programme Support (AIPS) to replace many of the its information systems with a single, standard platform, eventually replacing the over sixty different systems currently in use. Once initial problems have been overcome, the efficiencies gained through these enhanced administrative programs will include simplified access to information, with different parts of the IAEA being able to collaborate more effectively.

As nuclear data professionals we often forget that most people have little knowledge of the subject. In order to improve the awareness of this important topic within the IAEA itself, NDS was invited to present a lecture in January, open to all in the IAEA, introducing the important role that nuclear data plays in underpinning many modern technologies. This was received enthusiastically and marks the start of an effort to popularise our subject.

NDS, is part of the Division of Physical and Chemical Sciences (NAPC), and we would like to welcome Dr. Meera Venkatesh who has taken over the reins as Director-NAPC from Dr. Natesan Ramamoorthy. However, it is with sadness we say goodbye to Rama who as Director over the last seven years has given so much support and guidance to the Section; we wish him all the best in his new role back in his home country of India.

Robin Forrest

Data Library News

If there is any Database News you would like to have mentioned in future issues of the Nuclear Data Newsletter send details to services@iaeand.iaea.org

IBANDL:

A new CD version of IBANDL has been developed. The number of files in the library has increased from 1393 to 1875. The following new features developed in the web version of IBANDL during the last period were added to the CD version:

- plotting of error bars according to the 2nd and 4th columns of the R33 files;
- selection of a range of interest in the plots (zoom);
- selection of a type of retrieved data.

The SigmaCalc calculator was updated by including new evaluated cross sections for the elastic scattering of alphas from nitrogen, fluorine and neon.

PREPRO:

An ENDF/B pre-processing code package originally developed by the IAEA is available in a new version, PREPRO-2010. This code converts ENDF/B-6 formatted data libraries to pointwise format files.
http://www-nds.iaea.org/ndspub/endf/prepro/

TENDL-2010:

TENDL-2010 is a complete calculated data library prepared by the TALYS model code. Data are available for incident n,p,d,t, α and He-3 up to 200 MeV. The library is not an evaluation but consistently includes all quantities of interest including covariances in ENDF/B-6 format. The data can be viewed with the ZVView system.
http://www-nds.iaea.org/ndspub/download-endf/TENDL-2010

EAF-2010:

New version of the European Activation File covering 816 targets. Neutron-induced data up to 60 MeV. Available for download as an ENDF/B-6 formatted file. The data can be viewed with the ZVView system.
http://www-nds.iaea.org/ndspub/download-endf/EAF-2010/

ENDF archive:

Collection of old and recent data libraries for downloading (42 libraries) in ENDF formats.
http://www-nds.iaea.org/ndspub/download-endf/

ENDF collection on DVD-ROM:

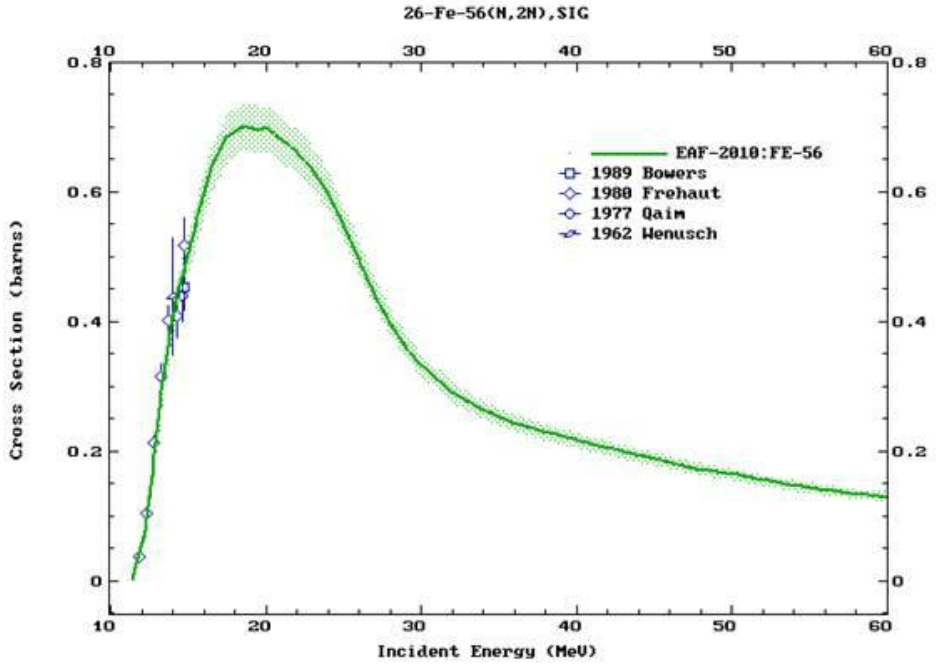
25 evaluated data libraries for nuclear applications in original and pointwise formats:

- BROND-2.2 - USSR evaluated neutron data library, issued in 1992.
- CENDL-2 -Chinese evaluated neutron data library, issued in 1991.
- CENDL-3.1 - Chinese evaluated neutron data library, issued in 2009.
- EAF-2010 - European Activation File (816 materials/ 60MeV), UK (2010).
- ENDF-B-VI.8 - US Evaluated Nuclear Data Library, issued in 1990 (Release 8, 2001).
- ENDF-B-VII.0 - US Evaluated Nuclear Data Library, issued in 2006.
- ENDF-HE-VI - ENDF/B High energy library.
- FENDL-2.1 - Fusion Evaluated Nuclear Data Library, 2004.
- IAEA-Medical - Charged-particle cross section data for medical radioisotope production, 2001-2010.
- IAEA-STD - Neutron Cross Section Standards, issued in 2006.
- IAEA-Therapeutic - IAEA-Medical (therapeutical radioisotopes production, 2009).
- INDL-TSL - IAEA Nuclear Data Library/Thermal Scattering Law, 2006.
- IRDF-2002 - IRDF-2002 Decay data + Dosimetry cross sections in pointwise ENDF-6.
- IRDF-2002-G - IRDF-2002 Dosimetry cross sections in groupwise ENDF-6 format.
- JEFF-3.1-A - JEFF-3.1/Activation, pointwise, 293K.
- JEFF-3.1.1 - Evaluated nuclear data library of OECD Nuclear Energy Agency, 2005 (release 2009).
- JENDL-3.3 - Japanese evaluated nuclear data library, 2002.
- JENDL-4.0- Japanese evaluated nuclear data library, 2010.
- JENDL-HE-2007 - Japanese High Energy File, 2007.
- MENDL-2 - Neutron data library for nuclear activation and transmutation (Russia, 1995).
- MENDL-2P - Proton reaction data library for nuclear activation (Russia, 1998).
- MINKSACT - Minsk Actinides Library (Maslov *et al*.).
- PADF-2007 - Proton Activation Data File, Germany, 2007.
- ROSFOND-2010 - Russian neutron library, 686 materials (Russia, 2010).
- RRDF98 - Russian Reactor Dosimetry File, Obninsk-IPPE (Russia, 1998).

Further computer codes and data libraries available: http://www-nds.iaea.org/cd-catalog.html

Web-ZVView

Web-ZVView is an on-line interactive plotting application, which can be used independently from traditional IAEA nuclear databases and services (see plot of ^{56}Fe(n,2n) cross section from EAF-2010 library with uncertainties). **Users can plot their own data** as well as the data available from external web-archives. All operations are performed on the server side, i.e. there is no need for any software installation on the user's computer. A variety of plotting operations includes 3-D animation.



Input to Web-ZVView:

- User data (copy-paste, upload file)
- ZVD files (e.g. stored from EXFOR-ENDF system)
- Data from ENDF archives (web-link to remote servers)
- One and two dimensional arrays (includes covariance data)
- Column, non-structured and ENDF data (MF3+MF33)

Output formats:

- GIF, EPS
- HTML-Tables, ZVD
- Text (columns, triangle)
- EXFOR style for covariance data
- ENDF style (MF33 Section, LB5)
- Input for Fortran (+ reading Fortran code)

http://www-nds.iaea.org/exfor/myplot.htm

Nuclear Data Center
Japan Atomic Energy Agency

WWW Chart of the Nuclides 2010

The 2010 version of the JAEA chart of the nuclides, *Chart of the Nuclides 2010*, contains the experimentally measured half-life values reported until 2008. One of the prominent features of the chart is the inclusion of the theoretically estimated beta-decay half-life values for nuclides not yet synthesized. If the alpha-decay and spontaneous fission partial half-lives are comparable to the beta-decay half-life, their values are also included with distinguishing symbols.

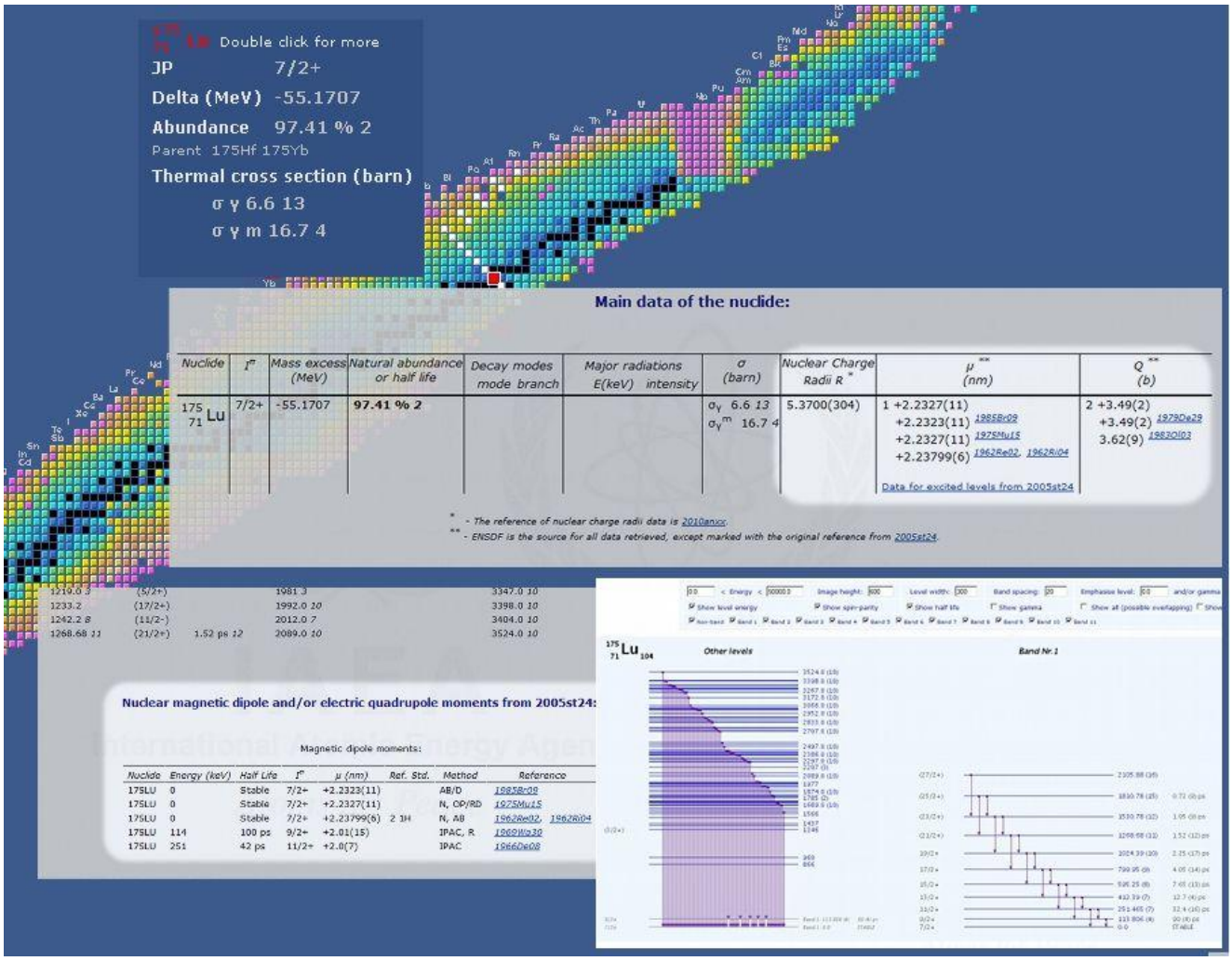
The fundamental physical constants are taken from 2006 CODATA Recommendations. Most of the data are revised from the chart of the nuclides 2004 which uses 1998 CODATA Recommendations. The neutron capture cross section for neutrons with a velocity of 2200 m/s is tabulated using the newly published JENDL-4.0 (Japanese Evaluated Nuclear Data Library).

The handy A4 size chart is ideal for ready reference. It is also available on the JAEA Nuclear Data Center web site.
http://wwwndc.jaea.go.jp/CN10/index.html

courtesy of Jun-ichi Katakura, JAEA-NDC

LiveChart of the Nuclides

In a continuous effort to make nuclear data available to Member States, the Nuclear Data Section has created a number of computer applications that facilitate access to data and allow for the easy retrieval of meaningful information. One such product is LiveChart.



LiveChart is available at: http://www-nds.iaea.org/livechart/

LiveChart is an interactive chart of the nuclides – nuclear structure and decay properties of all known nuclides are presented through a user-friendly graphical interface. The chart can easily be used by an expert or a novice, having both Advanced and Basic versions. Most of the accessible data are taken from the Evaluated Nuclear Structure Data File (ENSDF), which is the most authoritative and up-to-date database in this area. In addition, other data of interest, e.g. thermal neutron cross sections, nuclear moments and radii, etc., are also displayed by LiveChart.

LiveChart is an on-going project and is actively being developed and continuously updated. For example, the plotting capabilities have recently been improved and new data have been added, i.e. I. Angeli and K.P. Marinova Nuclear Charge Radii-2010 and N.J. Stone's Table of nuclear magnetic and dipole and quadrupole moments, January 2011.

In the Figure the nuclide ^{175}Lu has been selected, and the properties of its ground state are displayed in one table. In the other table the magnetic and electric nuclear moments are displayed for ground state and excited states. The figure also shows the interactive plot of excited nuclear levels, the user can customize the scale and graph properties, print and export the final plot.

Your feedback is always welcomed, email: services@iaeand.iaea.org

NDS Meeting Reports

Meeting reports, when finalised, available at http://www-nds.iaea.org/reports-new/indc-reports/indc-nds/

Workshop on Nuclear Structure and Decay Data (NSDD): Theory and Evaluation
ICTP Trieste, Italy, October 11 – 15, 2010

Organised and co-directed by Daniel Abriola and Jagdish K. Tuli
Lecturers: Balraj Singh, Eddie Browne-Moreno, Alejandro Sonzogni, Piet Van Isacker
Workshop assistant: Kira Nathani; 19 participants from 14 countries

The sixth in a series of workshops since 2002 on nuclear structure and decay data, held under the auspices of the IAEA Nuclear Data Section at the International Centre for Theoretical Physics, Trieste, this one-week workshop constituted a further unique opportunity for scientists to gain up-to-date training on the evaluation of nuclear structure and decay data, as developed to produce the Evaluated Nuclear Structure Data (ENSDF) and *Nuclear Data Sheets* for use and adoption by the nuclear physics community, see ND Newsletter no. 46, p.8 http://www-pub.iaea.org/MTCD/publications/PDF/Newsletters/ND-NL-46.pdf.

The 19 participants, predominantly from developing countries, all of whom had already gained an advanced degree in nuclear physics or related subjects, as well as possessing several years of professional experience in nuclear physics related to nuclear structure and decay data, received extensive coaching, which included hands-on exercises:

- Theory of nuclear models;
- Bibliographic databases and Web resources;
- ENSDF formatting;
- Analysis programs;
- Radioactive decays;
- Nuclear reactions;
- Adopted levels.

All the students were highly motivated and eager to learn, and at the end of the workshop both lecturers and students felt the week had been not only extremely informative but also enjoyable.

Consultants Meeting on Neutron Cross Section Standards: Extending and Updating
Vienna, October 13 – 15, 2010

Scientific Secretary: Roberto Capote Noy, 9 participants and NDS staff



Participants of the CM on Neutron Cross Section Standards: Extending and Updating

The purpose of this three-day meeting was to review the status of the actions which had been agreed upon at the previous meeting held October 13 – 15, 2008 (link to report of 2008 meeting http://www-nds.iaea.org/reports-new/indc-reports/indc-nds/indc-nds-0540.pdf) and to set future goals for the work.

With the primary objective of developing/maintaining the IAEA data set of international neutron cross section standards, discussion focused on:

- Results of new measurements for standards cross sections;
- Critique of standards evaluation;
- Measurements and evaluation of ^{235}U(n,f) prompt thermal fission neutron spectrum;
- Measurements and evaluation of ^{197}Au(n,γ) cross section;
- Progress in measurements and evaluation of gamma production cross sections, which can be recommended as reference cross sections;
- Discussions of various problems related to standard and reference cross sections evaluation (e.g. smoothing) and actions needed to complete the work.

Presentations at the meeting are available at http://www-nds.iaea.org/standards/CM2010

A series of conclusions, recommendations and actions were approved with the goal for these to be achieved by 2012, namely:

- Revised evaluation of the traditional standards with inclusion of all new experimental data;
- Evaluated ^{197}Au(n,γ) cross section data in the energy range 3 – 200 keV which can be used as a reference cross section in the measurements of capture cross sections for other nuclei in astrophysical applications;
- Reference gamma production cross sections for inelastic neutron scattering by ^{56}Fe, ^{52}Cr, ^{48}Ti and the ^{48}Ti (n,2n) reaction;
- Results of smoothing procedures and their application for cross sections and spectra.

A summary report of the meeting is available at
http://www-nds.iaea.org/reports-new/indc-reports/indc-nds/indc-nds-0583.pdf

3rd Research Coordination Meeting (RCM) on Minor Actinide Neutron Reaction Data (MANREAD)
Vienna, October 19 – 22, 2010

Scientific Secretary: Naohiko Otsuka, 14 participants and NDS staff



Participants of the 3rd RCM on Minor Actinide Neutron Reaction Data (MANREAD)

The main purpose of the meeting was to review the status of this experimental data assessment initiative and decide on the structure of the final technical report. The major objectives of the project are the critical evaluation, uncertainty assessment and production of neutron cross section data for an agreed set of minor actinide isotopes, which include ^{237}Np, minor U and Pu isotopes, major Am isotopes, and all relevant Cm isotopes.

The existing and new data obtained in this CRP were discussed in detail. For the final CRP report the organisation of the data for each isotope and reaction was agreed, as well as the time schedule for participants' work.

A full summary of the presentations and discussions which took place during the meeting are reported in INDC(NDS)-0585 (http://www-nds.iaea.org/reports-new/indc-reports/indc-nds/indc-nds-0585.pdf); an outline for the final technical report is also provided.

ICTP-IAEA Workshop on Nuclear Data for Science and Technology: Analytical Applications
Trieste, Italy, November 8 – 12, 2010

Directors: Mark A. Kellett, Daniel Abriola; Local Organizer: Luciano Bertocchi;
Lecturers: Menno Blaauw, Radojko Jacimovic, Alex Gurbich, Mike Kokkoris
23 participants from 18 countries



Participants and lecturers of ICTP-IAEA Workshop on
Nuclear Data for Science and Technology: Analytical Applications

This one-week workshop covered the physics and nuclear data behind two of the main analytical techniques in use today, namely, neutron activation analysis (NAA) and ion beam analysis (IBA).

The primary aim of the workshop was to introduce the scientists and students to the nuclear data and experimental methodologies of the NAA and IBA analytical techniques, with emphasis on their practical application. The topics covered included:

- Experimental techniques in NAA and IBA (RBS and PIGE);
- Analysis software use;
- Nuclear data requirements for analytical science: NAA and IBA;
- Available nuclear data for IBA analysis – the IBANDL database;
- On-line retrieval of nuclear data;
- Nuclear data compilation and dissemination.

A series of lectures were delivered each morning, with dedicated practical computer sessions each afternoon. The workshop enabled participating physicists to better understand and appreciate the full potential and weaknesses of these techniques and to improve their knowledge and ability to fully utilize them. The overall opinion of the participants was that they had thoroughly enjoyed the workshop and learnt much about the two analytical applications: NAA and IBA.

Technical Meeting on XML Schema for Atoms, Molecules and Solids (XSAMS)
Vienna, November 17 – 19, 2010

Scientific Secretary: Bas Braams, 10 participants and NDS staff

A Technical Meeting on XML Schema for Atoms, Molecules and Solids (XSAMS) was held at IAEA Headquarters 17–19 November 2010 in order to review implementations of the Schema and to discuss further developments. XSAMS is intended to provide a uniform way of data communication across many different atomic and molecular databases, for fusion, astrochemistry and other applications. Since its initial release (version 0.1) in September 2009, pilot implementation of XSAMS has started on many of the databases that belong to the Virtual Atomic and Molecular Data Centre (VAMDC), an EU Framework 7 project. Thus, the meeting in November was a good time to review the schema.

During the meeting and in immediate follow-up a number of minor errors were corrected (release 0.1.1 in December 2010). Two more substantial areas of difficulty were discussed at the meeting: the representation of the plasma environment and its effect on spectral line shapes and the very complicated general treatment of molecular states and transitions. These issues are of great concern to VAMDC and their treatment in the next release of XSAMS (now tentatively version 1.0 in July 2011) are to be settled after further experience with the VAMDC implementations.

3rd Research Coordination Meeting (RCM) on Heavy Charged-Particle Interaction Data for Radiotherapy
Heidelberg, Germany, November 22 – 26, 2010

Scientific Secretary: Roberto Capote, 12 participants



Participants of the 3rd RCM on Heavy Charged-Particle Interaction Data for Radiotherapy

Following the 1st RCM, held in November 2007, and the 2nd held in June 2009, this 3rd and final RCM of the CRP on Heavy Charged-Particle Interaction Data for Radiotherapy reviewed all the work that had been undertaken within the CRP and discussed a draft of the final technical report. Compilations and evaluations of proton and carbon interaction data of relevant energies for radiotherapy were discussed. New experimental results of production cross sections, energy spectra and angular distribution of light fragments produced in the collision of a ^{12}C beam (62 MeV/nucleon) on ^{12}C were presented by M.C. Morone at the meeting.

The participants considered that they had succeeded in achieving the overall objective of the CRP to improve the quality of the heavy charged-particle interaction data relevant to proton and carbon ion radiotherapy. Specifically, a comprehensive and critical review of the experimental information on charged-particle data interaction relevant to radiotherapy will be made available, together with recommended nuclear data parameterizations which can be processed and used by Monte Carlo code developers and users worldwide.

1st Research Coordination Meeting (RCM) on
Spectroscopic and Collisional Data for Tungsten from 1 eV to 20 keV
Vienna, December 13 – 15, 2010

Scientific Secretary: Bas Braams, 16 participants and NDS staff

Tungsten (symbol W) is the leading candidate for use as wall material in the regions of high heat and particle flux in ITER and fusion power plants, with beryllium a possibility for regions of lower heat and particle load. ITER is scheduled to start operation with a W-Be-C wall for a brief initial campaign before switching to W-Be or W alone for the main D-D and D-T experimental programme. In support of ITER and looking ahead to a fusion power plant the Asdex-Upgrade tokamak in Garching, Germany, now operates with an all-W wall, and at the Joint European Torus (JET) in the UK a full ITER-like mixed W-Be-C wall is being installed. Smaller-scale experiments involving tungsten tiles are carried out on other tokamaks.

In support of the experimental work in fusion laboratories and of the ITER project the Nuclear Data Section initiated a new CRP to generate fundamental experimental and calculated data for radiative and collisional atomic processes involving tungsten ions interacting with plasma. The output of the CRP will support the interpretation of spectroscopic



Participants of the 1st RCM on Spectroscopic and Collisional Data for Tungsten from 1 eV to 20 keV

measurements on current and future fusion experiments, the modelling of tungsten in fusion plasma, and the design and optimization of fusion reactor experiments.

At the 1st RCM of this CRP, participants presented their research, which spans theory and experiment from spectroscopy to electronic and ionic collision processes. Data needs were identified and a plan of work was drawn up to enhance the knowledge base for properties of tungsten in plasma.

Consultants Meeting to Review Benchmarking of Nuclear Data for the Th/U Fuel Cycle
Vienna, December 20 – 22, 2010

Scientific Secretary: Roberto Capote Noy, 4 participants

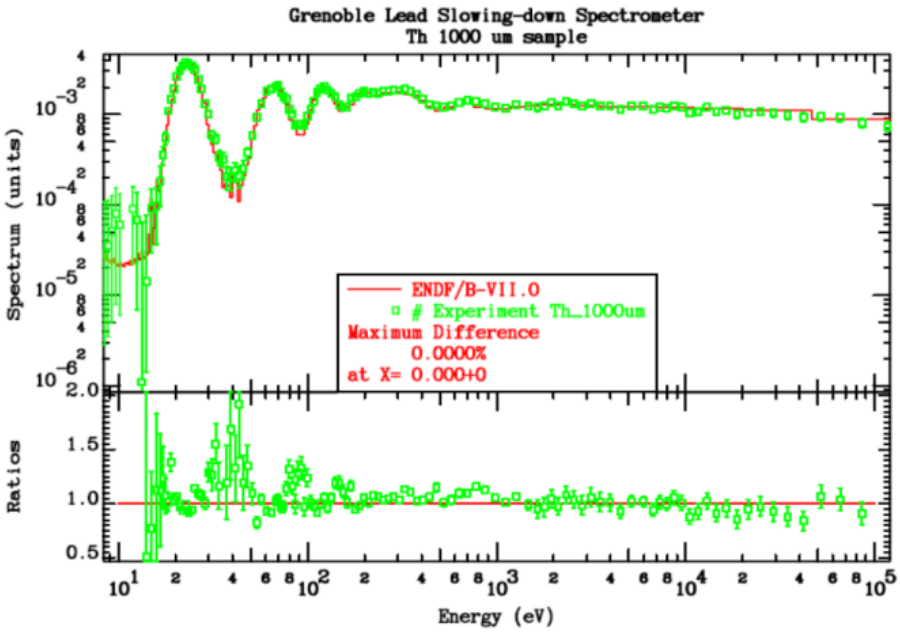


Participants of the CM to Review Benchmarking of Nuclear Data for the Th/U Fuel Cycle

An IAEA CRP on Nuclear Data for the Th-U Fuel Cycle was completed in 2005 (STI/PUB/1435 technical report at http://www-pub.iaea.org/MTCD/publications/PDF/Pub1435_web.pdf

The CRP activities resulted in new evaluated nuclear data files for ^{232}Th and ^{231,233}Pa (later adopted in the ENDF/B-VII.0 library) and improvements to existing evaluations for ^{232,233,234,236}U. The purpose of this three-day consultants meeting was to review ^{232}Th and ^{233}U benchmark performance and recommend possible improvements to existing evaluations.

The Grenoble lead-slowing-down experiment is an interesting low-resolution measurement that probes the energy range from about 0.1 eV to approximately 10 keV. This experiment is an excellent benchmark of the ^{232}Th capture data. Comparison between measurements and the IAEA evaluation (ENDF-B/VII.0) is shown in the figure (p.11). Within the limits of experimental uncertainties, no obvious deficiencies of the ^{232}Th data can be seen.



Available nuclear data evaluations for $^{230\text{-}232}$Th, ^{231,233}Pa and ^{232,233,234}U were reviewed including ROSFOND-2010, CENDL 3.1, JENDL-4, JEFF 3.1.1, MINSK-ACT, and ENDF/B-VII.0 libraries. Benchmark results for ^{232}Th and ^{233}U of available evaluations were also discussed. An INDC (NDS) report (0586) is in preparation and will contain a summary of the technical discussions and identified deficiencies.

NDS meetings which were held in April 2011, namely, TM on Coordination of the International Network of Nuclear Structure and Decay Data Evaluators, CM on Status of Data Needs for Neutron Activation Analysis, CM on EXFOR, will be fully reported in the next issue (no. 52) of the ND Newsletter.

In Memoriam



Richard (Dick) Meyer, Chairman of the International Nuclear Data Committee (INDC) from 1995 to 2000, died suddenly on Sunday, 26 December 2010 in Falmouth, Mass., U.S.A. He was 77. Following graduation from the University of Illinois in 1963, and two years in the US Army, Dick worked at the Lawrence Livermore National Laboratory (LLNL) in the Nuclear Chemistry Division until 1989 when he left to work at the US DoE. Dick was a highly respected nuclear structure specialist and prodigious gamma-ray spectroscopist who did a great deal to ensure the continuation of support for nuclear data activities. His efforts as Chairman of the INDC were greatly appreciated and the present existence of the IAEA Nuclear Data Section owes much to his support as during his INDC Chairmanship he argued successively against those who believed all was already known about nuclear data, so why continue?



Harm (Harry) Wienke was an NDS staff member from October 1991 to December 1998. Born in 1948, a Dutch national, he had a MSc (Doctoral) in Nuclear Physics from the State University, Gröningen and a PhD in Nuclear Physics from the Free University, Amsterdam. Harry's work in NDS as a Nuclear Physicist involved him in EXFOR compilation and the development of EMPIRE. He was actively collaborating with the EMPIRE team on cross section calculations based on a deformation-dependent Tamura-Udagawa-Lenske multistep direct model. His last publication can be retrieved at http://link.aps.org/doi/10.1103/PhysRevC.78.064611. We lost an excellent collaborator.

Some Forthcoming NDS Events in 2011



The IAEA is organizing a Workshop on **Monte Carlo Radiation Transport and Associated Data Needs for Medical Applications** to be held at the International Centre for Theoretical Physics (ICTP) in Trieste from October 17-28, 2011. Monte Carlo techniques will dominate the field of radiation dosimetry and benchmark dose calculations in radiotherapy for many years to come.

Further information on the Workshop is available at http://www-nds.iaea.org/MC2011

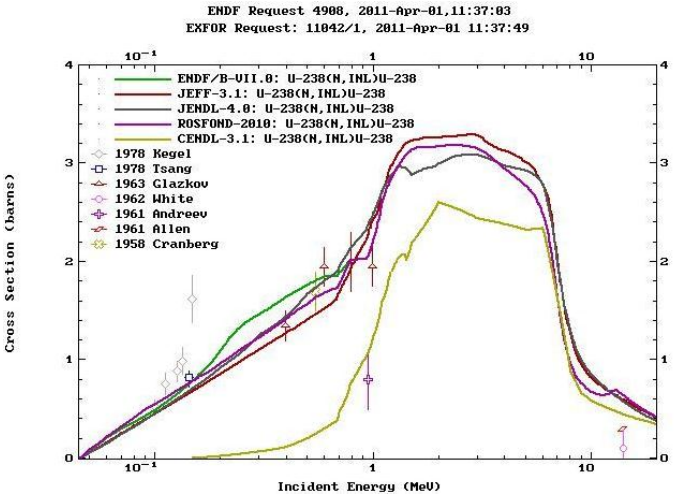
CM on Improvements in charged-particle monitor reactions and nuclear data for medical isotope production, June 21-24, 2011, IAEA HQ, Vienna.
A four-day CM will give support to the initiation of a new IAEA CRP. Participants will be asked to define the scope and deliverables of the CRP, and to consider and agree in detail on an appropriate work programme.

TM on Intermediate-term nuclear data needs for medical applications: cross sections and decay data
August 22-26, 2011, IAEA HQ, Vienna.
A one-week IAEA TM is proposed to provide the impetus towards improving the quantification of nuclear data for medical applications on a five to six year timescale beyond 2012. This exercise will also include definition of the scope and deliverables of all resulting recommended programmes of work. This initiative follows on naturally from earlier CRPs dedicated to improving the decay and reaction nuclear data for radionuclide production of radionuclides.

Advisory group meeting on Long-term needs for nuclear data development, November 2-4, 2011, IAEA HQ, Vienna.
The main objective of the meeting will be to develop a vision of the work needed over the next decade (2011-2021) on the measurement, calculation and evaluation of nuclear data for existing and emerging applications. The discussions will focus especially on data improvement activities that could be addressed or coordinated by the IAEA.

TM on Inelastic scattering and capture cross section data of major actinides in the fast neutron region, September 6-9, 2011, IAEA HQ, Vienna.

The main goal of the meeting is to review available evaluations and recommend improvements to solve existing discrepancies. New experimental data and recent developments in theoretical modelling will be considered. The meeting will also provide a good opportunity to assess the quality of existing covariance data for inelastic and capture reaction data. Observed discrepancies among different evaluations of neutron inelastic scattering on ^{238}U are shown in the figure below:



Coordinated Research Projects

IAEA Coordinated Research Projects (CRPs) are a valuable mechanism for stimulating research in IAEA Member States of relevance to the IAEA programmes. Details of the CRPs of the Nuclear Data Section, both active and recently completed, can be found at: http://www-naweb.iaea.org/napc/nd/crps.asp

NDS is starting a new CRP on **Atomic and Molecular Data for State-Resolved Modelling of Hydrogen and Helium and their Isotopes in Fusion Plasma**. Hydrogen and helium are the lightest elements in the periodic table and the primary constituents of fusion plasma. In the near-wall region the plasma is relatively cold and dense. Hydrogen molecules are formed on the walls and under some conditions also by volume recombination, and the plasma may even transition to a neutral gas. Therefore, processes involving neutral atoms, molecules and molecular ions are important.

The primary output of the CRP will be an improved atomic and molecular database for hydrogen and helium. This is of special interest for diagnostics and control of the isotopic composition of plasma. Electronic processes do not vary much between isotopes, but molecular processes depend fully on species mass. In ITER or in a power plant the D/T ratio in the core plasma will be diagnosed primarily by nuclear means (neutron production associated with modulated beam injection of D or T), but in the edge region one will measure the intensity of spectral lines of D and T. The relation between the populations of neutral D and T and the populations of the plasma constituents D^+ and T^+ is complicated, and in the near-wall region, where the production of neutral atoms proceeds primarily through breakup of neutral molecules, the whole range of molecular processes studied in this CRP is of interest. The improved database will also be of interest for the simulation of neutral beam injection systems ranging from the generation and destruction of H^- negative ions in the injector box to the charge transfer and ionization processes of the neutral beam in the core plasma.

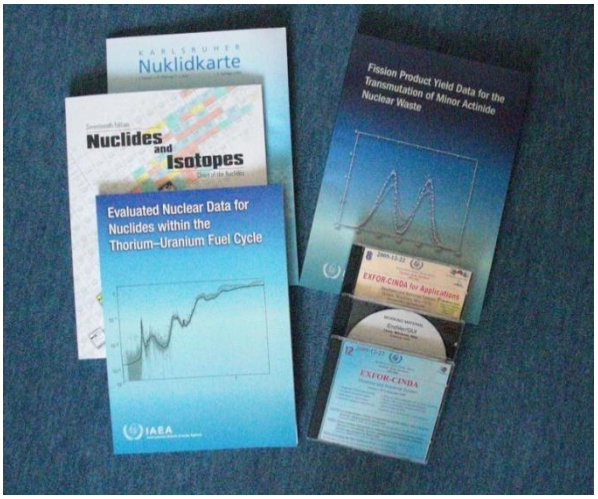
The new CRP is presently being set up and will bring together atomic physicists and plasma modellers. The CRP will produce new data, but a key task throughout the project will be comparison and critical evaluation of both existing and newly produced data.

Technical reports detailing the outcome of IAEA-CRPs can be accessed electronically on:
http://www-pub.iaea.org/MTCD/publications/

Hardcopies of IAEA reports can be purchased from the IAEA Sales and Promotion Unit.

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http://www.iaea.org/books

Selected Charts, Reports and Documents



Recent Releases:

All INDC series reports are available online:
http://www-nds.iaea.org./reports-new/indc-reports

INDC(NDS)-0585 Summary Report of the Third Research Coordination Meeting on Minor Actinide Nuclear Reaction Data (MANREAD), Vienna, 19-22 October 2010, prepared by F. Gunsing and N. Otsuka, December 2010.

INDC(NDS)-0584 Evaluation of Cross Section Data from Threshold to 40 MeV for some Neutron Reactions Important for Fusion Dosimetry Applications, by K.I. Zolotarev, November 2010.

INDC(NDS)-0583 Summary Report of an IAEA Consultants Meeting on International Neutron Cross Section Standards: Extending and Updating, Vienna, 13-15 October 2010, prepared by V. Pronyaev, A.D. Carlson, R. Capote Noy and A. Wallner, March 2011.

INDC(NDS)-0580 Summary Report of an IAEA Technical Meeting of the International Code Centres Network, Vienna, 27–28 September 2010, prepared by H.K. Chung, January 2011.

INDC(NDS)-0578 Summary Report of the Second Research Coordination Meeting on Characterization of Size, Composition and Origins of Dust in Fusion Devices, Vienna, 21-23 June 2010, prepared by B.J. Braams and C.H. Skinner, November 2010.

INDC(NDS)-0571 Summary Report of the First Research Coordination Meeting on Prompt Fission Neutron Spectrum of Major Actinides, Vienna, 6-9 April 2010, prepared by R. Capote Noy, December 2010.

INDC(NDS)-0575 Summary Report of an IAEA Consultants Meeting on Improvements and Extensions to IRDF, Vienna, 5-7 May 2010, prepared by M.A. Kellett and L.R. Greenwood, December 2010.

INDC(BLR)-021 Neutron Data Evaluation of ^{237}Np prepared by V.M. Maslov, V.G. Pronyaev, N.A. Tetereva, A.M. Kolesov, K.I. Zolotarev, T. Granier, F.-J. Hambsch, November 2010.

Nuclear Data Sheets *Special Issue on Nuclear Reaction Data*, Vol. 111, No. 12 (2010). Special Issue Editor: P. Obložinský, National Nuclear Data Center, Brookhaven National Laboratories (BNL), United States. Limited hard copies available on request.

AEN/NEA *Covariance Data in the Fast Neutron Region*, International Evaluation Co-operation, Volume 24, Nuclear Science 2011, Nuclear Energy Agency, OECD.

AEN/NEA *Quality Improvement of the EXFOR Database*, International Evaluation Co-operation, Volume 30, Nuclear Science 2011, Nuclear Energy Agency, OECD.

Chart of the Nuclides 2010 JAEA Nuclear Data Centre released an updated version of its Nuclide Chart in November 2010 (see page 4).

Also Available:

Nuclear Data Sheets *Special Issue on Nuclear Reaction Data*, Vol. 110, No. 12 (2009). Special Issue Editor: P. Obložinský, National Nuclear Data Center, Brookhaven National Laboratories (BNL), United States. Limited hard copies available on request.

Chart of the Nuclides *(Wall chart) prepared by Knolls Atomic Power Laboratory (KAPL) and distributed by Lockheed Martin (17th edition, revised 2009).* Available cost-free on request only for **teachers and scientists from developing countries.**

Chart of the Nuclides *(Book) prepared by Knolls Atomic Power Laboratory (KAPL) and distributed by Lockheed Martin (17th edition, revised 2009).* This book form of the Nuclides Chart is available cost-free on request only for **teachers and scientists from developing countries.**

Karlsruher Nuklidkarte *Wall chart of the nuclides from Karlsruhe, 7th edition (2006).* Available cost-free on request only for **teachers and scientists from developing countries**.

Karlsruher Nuklidkarte *Desk chart of the Nuclides from Karlsruhe, 7th edition (2006).* Available cost-free on request only for **teachers and scientists from developing countries**.

Nuclear Wallet Cards 2005 7th Edition, by Jagdish K. Tuli, National Nuclear Data Center. These pocket size wallet cards are available as hard copy on request.

NOTE to Universities: earlier editions of KAPL and Karlsruhe Nuclides Charts, both as wall chart and in book form, are available cost free for student use (as long as supplies last).

Staff Items

For all NDS staff details: http://www-naweb.iaea.org/napc/nd/aboutus.asp



Marco Verpelli, who was Systems Analyst/Programmer in NDS from August 2003 to December 2009, rejoins NDS in the same position in May 2011. Marco will be involved in software development and updating of data libraries, files and codes for online access by users.

Changes relating to NDS



Daud Mohamad was appointed Deputy Director General for Nuclear Sciences and Applications (DDG-NA), effective 1 January 2011. He takes over this position from Werner Burkart who was DDG-NA from 2000 to 2010.

Information on Daud Mohamad's previous positions/education can be found on:
http://www-naweb.iaea.org/na/about-na/na-ddgs-corner.html



Alexander Bychkov was appointed Deputy Director General for Nuclear Energy (DDG-NE), effective 1 February 2011. He takes over this position from Yury Sokolov who was DDG-NE from 2003 to 2010.

Information on Alexander Bychkov's previous positions/education can be found on:
http://www.iaea.org/About/dg/bychkov_bio.html



Meera Venkatesh was appointed Director, Division of Physical and Chemical Sciences (DIR-NAPC), effective 15 April 2011. She takes over this position from Natesan Ramamoorthy who was DIR-NAPC from 2003 to 2011.

We would like to extend our best wishes to **Claes Nordborg** (NEA Databank) and **Jun-ichi Katakura** (JAEA-NDC) for a happy retirement, as well as our thanks to both for their interactive relationship with NDS over many, many years.

This Newsletter, as well as previous Issues, can be accessed electronically at:
http://www-pub.iaea.org/MTCD/publications/newsletter.asp?id=60

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Nuclear Data Services – Contact points

For services to customers in USA and Canada:
US National Nuclear Data Center, Bldg. 197D, Brookhaven National Laboratory, P.O. Box 5000,
Upton, NY 11973-5000, USA.
Tel. +1 631-344-2902; Fax +1 631-344-2806; Email: nndc@bnl.gov; Worldwide Web: http://www.nndc.bnl.gov/
For information regarding on-line services, contact: B. Pritychenko: pritychenko@bnl.gov
For information regarding general NNDC services, contact: M. Blennau: blennau@bnl.gov

For services to customers in OECD/NEA Data Bank member countries:
NEA Data Bank, OECD Nuclear Energy Agency, Le Seine Saint-Germain, 12 blvd des Iles,
F-92130 Issy-les-Moulineaux, France.
Tel. +33 1 4524 (plus extension); Fax +33 1 45241110;
Email: Emmeric.Dupont@oecd.org or db@nea.fr; Worldwide Web: http://www.oecd-nea.fr/databank/ contact: E. Dupont, ext. 1084.

For services to the customers from the former USSR:
Neutron data: Russia Nuclear Data Center, Centr Jadernykh Dannykh (CJD), Fiziko-Energeticheskij Institut, Ploschad Bondarenko,
249020 Obninsk, Kaluga Region, Russian Federation.
Tel. +7 08439-9-8982; Fax +7 095-230-2326;
Email: blokhin@ippe.obninsk.ru; Worldwide Web: www.ippe.obninsk.ru/podr/cjd/; contact: A.I. Blokhin.
Charged-particle data: Russia Nuclear Structure and Reaction Data Center (CAJAD), Kurchatov Institute,
Kurchatov Square 1, 123 182 Moscow, Russian Federation.
Tel. +7 095-196-9968; Fax +7 095-882-5804;
Email: sbabykina@polyn.kiae.su; contact: S. Babykina.
Photonuclear data: Centre for Photonuclear Experiments Data, Centr Dannykh Fotoyadernykh Eksperimentov (CDFE),
Skobeltsyn Institute of Nuclear Physics, Lomonosov Moscow State University, Leninskie Gory, 119 922 Moscow, Russian Federation.
Tel. +7 495-939-3483; Fax +7 495-939-0896;
Email: varlamov@depni.sinp.msu.ru or varlamov@depni.npi.msu.su; Worldwide Web: http://cdfe.sinp.msu.ru/; contact: V.V. Varlamov.

For services to customers in China:
China Nuclear Data Center, China Institute of Atomic Energy, P.O. Box 275(41), Beijing 102413, China.
Tel. +86 10-6935-7275; Fax +86 10-6935-7008; Email: gezg@iris.ciae.ac.cn; contact: Ge Zhigang.

Computer codes of US origin to all countries (there are charges and release restrictions):
Radiation Safety Information Computational Center (RSICC), Oak Ridge National Laboratory,
P.O. Box 2008, Oak Ridge, TN 37831-6362, USA.
Tel. +1 865-574-6176; Fax +1 865-574-6182;
Email: pdc@ornl.gov Worldwide Web: http://rsicc.ornl.gov/CustomerService.aspx

Computer codes of non-US origin to all countries (there may be release restrictions):
NEA Data Bank (see above)
Email: Juan.Galan@oecd.org; contact: J. Galan, ext. 1008.

IAEA Nuclear Data Section offers data centre services primarily to non-OECD countries
(except Russian Federation and China, see above). However, most products advertised in this Newsletter, specifically INDC reports,
IAEA-NDS-documents, etc., are provided upon request to customers in all countries.
IAEA-NDS on-line services at Worldwide Web: http://www-nds.iaea.org/
Users of countries in Latin America and the Caribbean may use
IAEA-NDS mirror at Worldwide Web: http://www-nds.ipen.br
Users in India and neighbouring countries may use
IAEA-NDS mirror at Worldwide Web: http://www-nds.indcentre.org.in

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