IAEA
International Atomic Energy Agency

Nuclear Data Newsletter

http://www-nds.iaea.org/

ISSN 0257-6376

No. 59, May 2015

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From the Section Head

This is the last time I address the readers of the ND Newsletter, as I will be leaving the Agency after six years of service at the end of June 2015.

The Nuclear Data Section (NDS) is in the business of nuclear data for applications which is generally not very high profile. Achievements are not ground-breaking events of wide appeal, but rather the essential background work that contributes to the advancement of applications in a wide range of fields. Typically, these achievements result from Coordinated Research Projects (CRPs) and Development projects such as the FENDL-3.0 library, available as both general purpose and activation files for several incident particles; RIPL-3 which provides the input parameters for model calculations; the dosimetry library IRDFF which has been extended to make it relevant for fusion as well as fission and a new interface and tools for the IBANDL library for Ion Beam Analysis.

In my time as Section Head of the Nuclear Data Section many changes have taken place, particularly with the coming and going of staff. The development of the EXFOR database has already been running at a very high level for some time and now, given the long term appointment of Naohiko Otsuka, the scientific secretary of the Network of Nuclear Reaction Data Centres (NRDC) which coordinates this database, I am confident in its future growth.

As a result of security issues in 2013, the NDS severs for the nuclear and atomic websites were moved to the cloud. Faced with substantial problems in the beginning, this arrangement now works very well. With the current 'high availability' configuration we are able to offer an essentially 100% availability in a very secure fashion. The mirror sites operated in India and China are working well, and with NDS software also available on the US site this basically means a worldwide coverage of the tools and data supplied by NDS.



Staff of the IAEA Nuclear Data Section (March 2015)

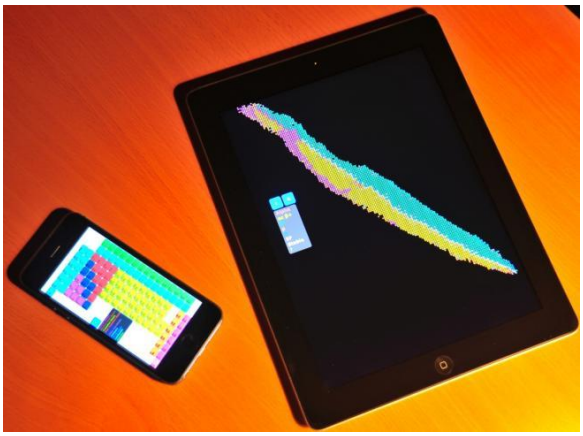
The planning and subsequent assessment of the biennial work programs is a major task; the program has seen limited growth due to budget limitations; however, the very successful internal evaluation of the Section's work resulted in a recommendation for increased funding. It appears that there will be a modest increase in 2016-2017, which will allow the implementation of some new directions of work that have been envisaged.

I want to thank all those who, over the last six years, as members of the International Nuclear Data Committee (INDC) and the Subcommittee on Atomic and Molecular Data for Fusion of the International Fusion Research Council (IFRC A+M subcommittee), helped to steer the Section's work program and all participants in our many projects and meetings who, in turn, contributed to this work program taking shape. It has been gratifying to work with all of you and, in particular, the excellent staff of the Section. I wish you all the very best as you continue with the important and fundamental work of the Nuclear Data Section.

Robin A. Forrest

BREAKING NEWS: *Mr Arjan Koning will follow Robin Forrest as Section Head of NDS*

Computer Codes and Data Libraries – News



The Isotope Browser on Apple Devices

In December 2014 the Nuclear Data Section published the Isotope Browser on iTunes App Store. Like the Android version, the app gives properties of more than 4 000 nuclides and isomers. A Chart of Nuclides, with zooming and tapping enabled, and a Periodic Table of Elements are included to allow easy selection and navigation. Filter criteria on half-life, decay mode, radiation type and energy can be selected. Summary data are presented in a scrolling list, with a details page for each nuclide containing web links to the data sources and further information such as level and decay schema. The filtered nuclides can be visualised on the Chart of Nuclides.

Data are taken from the most recent and reliable sources, and optimal search-and-retrieve performance is achieved with an embedded database, meaning that no network connection is required.

The **Isotope Browser** for Apple can be found at: https://itunes.apple.com
If you want the Android version: https://play.google.com/store/apps

LARELKIN

Is a two-body relativistic kinematics code. The recently updated version (see LARELKIN) uses the input masses from Atomic Mass Evaluation 2012.

STAYSL PNNL

Is a set of tools for working with the measured neutron activation rates to determine the neutron flux spectrum. The new beta version of software is based on the neutron cross sections in IRDFF V1.05 and extends to 60 MeV (IRDF Codes). The verification and validation process for this new version has not yet been completed. Consequently, the prior version based on the International Reactor Dosimetry File (IRDFF-2002) to 20 MeV is provided for users requiring fully verified and validated software for their applications.

NDS Meeting Reports

(TM = Technical Meeting, RCM = Research Coordination Meeting, CM = Consultants' Meeting, WS = Workshop, CRP = Coordinated Research Project)

Technical Meeting on Current Status of Neutron Standards

1-5 December 2014, Vienna, Austria
Scientific Secretary: R. Capote Noy
13 participants and IAEA staff



Participants of the TM on Current Status of Neutron Standards

The meeting was convened to bring together experts from the neutron standards community with the aim to review on-going experimental work, to discuss new experimental data to be included in the GMA code and R-matrix Standards database and to release a preliminary version of the Standards (STD), which will demonstrate the trends of the new evaluation. This is a second Technical Meeting within this project, after the one held in July 2013 (see INDC(NDS)-0641). It is a logical extension of the IAEA Data Development project that has been running since 2008 to update the GMA database and STD experimental database. In addition to the existing Neutron Standards (see Neutron Standards), the new evaluation should include the extension of the energy range of the standard for the ^{197}Au(n,γ) cross section below 100 keV (as an important standard for capture cross section measurements for astrophysical applications), improving of the cross sections which are not used as the standards but are included in the

combined fit of the standards and are important for reactor applications – the ^{238}U(n,γ) cross section between 10 and 100 keV, and the ^{238}U fission cross section between 0.5 MeV and 2 MeV. The other important reference cross sections and spectra which will be evaluated are the prompt gamma-production cross sections for neutrons in the energy range from thermal to 15 MeV, the ^{252}Cf spontaneous fission neutron spectrum, the ^{235}U(n_{th},f) prompt fission neutron spectrum and the high energy reference cross sections for the ^{235}U(n,f), ^{238}U(n,f), ^{209}Bi(n,f) and ^{nat}Pb(n,f) reactions for the neutron energy range 30-1000 MeV. The final release of the standards and reference cross sections and spectra should be completed in summer 2016. Presentations given at the meeting are available from (see TM Neutron Standards) and the details of the meeting will be given in the report INDC(NDS)-0677 (in preparation).

Second Research Coordination Meeting on Nuclear Data for Charged-particle Monitor Reactions and Medical Isotope Production

8-12 December 2014, Vienna, Austria

Scientific Secretary: R. Capote Noy

17 participants and IAEA staff



Participants of the 2nd RCM on Nuclear Data for Charged-particle Monitor Reactions and Medical Isotope Production

The 2nd RCM was convened to review on-going CRP activities, coordinate joint work, and define a detailed program of work of the CRP for the final two years. Participants re-assessed and reviewed their on-going commitments and progress with respect to specific cross-section and decay data agreed at the previous RCM. Debate focused on cross-section studies for a reasonably wide range of targets and projectiles, along with the relevant recommended decay data for specific radionuclides. Individual presentations and discussions are described in the Summary report of the meeting (see INDC(NDS)-0675) , along with tables summarizing the progress, current status and plans to ensure completion of the various individual work programmes. Presentations given at the meeting are available (see 2nd RCM CHARPAR).

Consultants' Meeting on Total Absorption Gamma-ray Spectroscopy for Decay Heat Calculations and Other Applications

15-17 December 2014, Vienna, Austria

Scientific Secretary: Paraskevi Dimitriou

8 participants and IAEA staff



Participants of the CM on Total Absorption Gamma-ray Spectroscopy for Decay Heat Calculations and Other Applications

The Consultants' Meeting was held from 15 to 17 December 2014 at the IAEA Headquarters in Vienna. Participants assessed and reviewed plans and progress from 2005/06 and 2009 to identify and determine those radionuclides that merit measurement of their Total Absorption Gamma-ray Spectra (TAGS) in order to assist in the determination of the decay heat and antineutrino spectral emissions from power reactor systems. This debate follows on from similar exercises undertaken by WPEC Subgroup 25 of the OECD Nuclear Energy Agency (OECD-NEA) Working Party on International Evaluation Cooperation of the Nuclear Science Committee in 2005/06 and a previous IAEA consultants' meeting in 2009. Various highly-relevant TAGS studies were undertaken from 2006/07 onwards based on the recommendations of WPEC Subgroup 25. A further re-assessment of the request list formulated in 2005/06 and adjusted in 2009 was undertaken by participants. Debate focused on fission- and fusion-based decay-heat needs and the monitoring of antineutrino spectra to assist in non-invasive safeguards. Agreement was reached in re-defining and extending fission-reactor decay-heat and antineutrino spectral requirements for TAGS measurements as a tabulated list.

Decennial IAEA Technical Meeting on Atomic, Molecular and Plasma-material Interaction Data for Fusion Science and Technology

15-19 December 2014, Daejeon, Korea

Scientific secretaries: B.J. Braams, H.-K. Chung, IAEA
Local organizers: J.-S. Yoon, M.-Y. Song, NFRI, Korea
68 participants



Participants of the TM on Atomic, Molecular and Plasma-material Interaction Data for Fusion Science and Technology

Following previous instances, 1976 at Culham Laboratory, UK, 1980 in Fontenay-aux-Roses, France, 1992 in Cadarache, France, and 2002 at the Jülich Research Centre, Germany, the Atomic and Molecular (A+M) Data Unit once again convened this Technical Meeting on Atomic, Molecular and Plasma-Material Interaction (A+M+PMI) Data for Fusion Science and Technology. The meeting was hosted and generously supported by the Republic of Korea through the National Fusion Research Institute (NFRI). Participants included modellers and experimentalists from fusion energy laboratories and researchers from atomic and molecular physics. The 36 talks and 12 posters spanned the field of A+M+PMI data production and use in fusion energy research. In two discussion sessions the priorities for A+M+PMI data research were reviewed. The meeting report INDC(NDS)-0679 is in preparation.

Second Research Coordination Meeting on Testing and Improving the International Reactor Dosimetry and Fusion File (IRDFF)

16-20 March 2015, IAEA, Vienna, Austria

Scientific Secretary: Stanislav Simakov
16 participants and IAEA staff



Participants of the 2nd RCM on Testing and Improving the IAEA International Reactor Dosimetry and Fusion File (IRDFF)

The 2nd RCM of the Coordinated Research Project on the Testing and Improving of IRDFF (see 2nd RCM IRDFF) was held at the IAEA, Vienna, 16 to 20 March 2015. Attendees presented their individual research contributions to the Coordinated Research Project (CRP), summarised results and elaborated consolidated recommendations and actions for implementation for the next period until the 3rd RCM which is scheduled to take place at the beginning of 2017. In the Meeting it was also considered to carry out new exercises on the verification of the neutron spectrum adjustment codes. Individual contributions to and joint decisions taken during this meeting will be available in the Meeting Summary Report INDC(NDS)-0682 (in preparation) .

Joint ICTP-IAEA Advanced School and Workshop on Modern Methods in Plasma Spectroscopy

16-27 March 2015, Trieste, Italy
Directors: H.K. Chung, B.J. Braams, IAEA
Yu. Ralchenko, NIST, USA
Local Organizer: J. Niemela, ICTP
26 Lecturers and Invited Speakers
35 Participants



Participants of the Joint ICTP-IAEA Advanced School and Workshop on Modern Methods in Plasma Spectroscopy

The Atomic and Molecular (A+M) Data Unit organized this Advanced School and Workshop held at ICTP in Miramare, Trieste, Italy, from 16 to 27 March 2015. The Advanced School in the first week provided tutorials on experimental and theoretical plasma spectroscopy including two afternoons of computer training for four important codes in the field of atomic data and modelling. The participants, by application, were young researchers at about post-doc level working in the field of radiative processes of atomic ions in fusion, astrophysical and industrial plasma or warm and hot dense matter who already had a good background in theoretical plasma spectroscopy. The participants presented their own work in a poster session. The Workshop in the second week was largely filled by invitation and provided opportunities for participants to present their work, discuss current needs in plasma diagnostics, and motivate further developments. The school was quite unique; there are several regular schools on plasma physics but we do not know of a similar school on plasma spectroscopy. The school and also the workshop were highly appreciated. Report INDC(NDS)-0685 is in preparation.

Second Research Coordination Meeting on Reference Database for Beta-delayed Neutron Emission Evaluation

23-27 March 2015, Vienna, Austria
Scientific Secretary: Paraskevi Dimitriou
20 Participants and IAEA staff

The 2nd RCM was held at the IAEA, Vienna, 23 to 27 March 2015. Twenty participants from ten countries reviewed the current status with respect to measured, compiled and evaluated delayed neutron data, systematic approaches and theoretical models, as well as integral data obtained from summation calculations using state-of-the-art data libraries of fission product yields and delayed-neutron emission probabilities and half-lives. A preliminary version of the microscopic database for nuclei with Z=2-28 was presented and the format of the macroscopic database was presented and agreed upon. The work plan of the participants was reviewed and revised to ensure that the objectives of the Coordinated Research Project (CRP) are accomplished in time. Report INDC(NDS)-0683 is in preparation.



Participants of the 2nd RCM on Reference Database for Beta-delayed Neutron Emission Evaluation

Joint ICTP-IAEA Workshop on Nuclear Data for Neutron Dosimetry and Analytical Methods by Applying Research Reactors

20-24 April 2015, Trieste, Italy
Scientific Secretary: Andrej Trkov, Danas Ridikas, IAEA
Local Organizer: Claudio Tuniz
30 Participants

The Abdus Salam International Centre for Theoretical Physics (ICTP) in cooperation with the IAEA, organised the Workshop on Nuclear Data for Neutron Dosimetry and Analytical Methods by Applying Research Reactors, at the ICTP in Trieste from 20 to 24 April 2015.



Participants of the Joint ICTP-IAEA Workshop on Nuclear Data for Neutron Dosimetry and Analytical Methods by Applying Research Reactors

The objective of the Workshop was to present the theoretical background of neutron dosimetry and activation analysis and the current status of nuclear data for different variants of the techniques, identify open issues and lay foundations for possible activities carried out under the auspices of the Agency to remedy the deficiencies. In the process, scientists and engineers from both developing and developed countries received introductory training on the use of neutron activation methods through practical exercises. Out of 73 applicants, 30 from 21 different countries attended the workshop. Given the relatively large number of applicants, it was possible to select a fairly homogeneous group who showed great interest in the subject, reflected in numerous questions to the lecturers. An opportunity was also given to a few volunteers to prepare seminars about their work. The workshop was highly effective and reached its objectives.

Technical Meeting of the International Network of Nuclear Reaction Data Centres (NRDC)

21-23 April 2015, Vienna, Austria
Scientific Secretary: Naohiko Otsuka
16 Participants and IAEA staff

Twelve cooperating data centres from China, Hungary, India, Japan, the Republic of Korea, Russia, Ukraine, USA, the OECD Nuclear Energy Agency (NEA) and IAEA were represented at the meeting. The main topics of this meeting were the various statistics on EXFOR compilation, EXFOR/CINDA manuals and dictionary, EXFOR compilation needs, EXFOR quality control, the EXFOR coding rules as well as tools for compilation and dissemination. The progress in compilation of experimental data for various applications (e.g., neutron-source reactions, radioisotope productions, ion-beam analysis) as well as basic sciences (e.g., astronuclear physics) was reviewed. Results of checking EXFOR completeness for fission neutron multiplicities and their distribution for safeguard applications were also reported. Boris Pritychenko (NNDC) had obtained DVDs recording time-of-flight spectra measured at ORELA for F, Al, Si, Cl, Ti, Fe, Mn, Cr, Ni, K, Sn, Nd and U (including data of J. Harvey and R. Spencer) for EXFOR compilation in collaboration with Klaus Guber and Michael Dunn from Oak Ridge National Laboratory (ORNL). Oscar Cabellos (NEA DB) reported that A. Koning (NRG Petten) had performed an in-depth review of all threshold reaction cross sections by a statistical approach, and concluded that most of the experimental data have been compiled correctly in EXFOR (See more details in NEA/DB/DOC(2014)3). Viktor Zerkin (NDS) presented a calculation of data for inverse reactions on the EXFOR web retrieval system as well as inverse kinematics on the IBANDL web interface. A summary report of the meeting will be published as INDC(NDS)-0686. All progress reports, working papers and slides are available on the NRDC web page (see NRDC2015).



Participants of the TM of the International Network of Nuclear Reaction Data Centres (NRDC)

21st Technical Meeting of the Nuclear Structure and Decay Data (NSDD) Network

20-24 April 2015, Vienna, Austria
Scientific Secretary: Paraskevi Dimitriou
36 Participants and IAEA staff

Representatives of 13 NSDD Data Centers (Australia, Canada, France, Hungary, India, Japan, Kuwait, USA) along with active evaluators and experts on horizontal evaluations gathered to review organizational issues and discuss policies and procedures used in ENSDF evaluations, maintenance of analysis codes, quality and currency of the Evaluated Nuclear Structure Data File (ENSDF) as well as training and dissemination. Two new Data Centers (IFIN-HH, Romania; MSU, USA) joined the

network and a proposal from RIKEN (Japan) to contribute to the effort by compiling and eventually evaluating data was endorsed.



Participants of the TM of the Nuclear Structure and Decay Data (NSDD) Network

Guidelines for ground-state and isomer half-life evaluation prepared by A. Nichols (UK) and B. Singh (CA) were discussed and adopted. In addition, several new proposals for ENSDF presented at the meeting were adopted, such as proposals for including absolute gamma-ray emission probabilities and atomic radiation energies and emission probabilities in decay data sets, as well as a proposal to include horizontal evaluations of beta-delayed neutron emission probabilities and half-lives of the precursors (produced by the CRP on Beta-delayed Neutron Emission (see CRP Beta Delayl)), B(E2) strengths to the 1st 2+ state, recommended Quadrupole Moments (see INDC(NDS)-0650) in the adopted data sets. A summary report of the meeting will be published as INDC(NDS)-0687. All the presentations are available on the NSDD web page (see NSDD2015)

Specialized IAEA Workshop on Nuclear Structure and Decay Data (NSDD) Evaluation

27-30 April 2015, Vienna, Austria

Scientific Secretary: Paraskevi Dimitriou

18 Participants and IAEA staff

An informal ‘re-fresher’ workshop for active Evaluated Nuclear Structure Data File (ENSDF) evaluators was held immediately after the NSDD meeting. The Guidelines for ENSDF Evaluators, recently revised by Murray Martin (ORNL, USA) and the ENSDF General Policies as listed in the Nuclear Data Sheets, were reviewed and updated. Both documents will become available on the IAEA NSDD and BNL NNDC web pages soon. Evaluators discussed policies on spin, parity and multipolarity assignments, as well as other technical issues that are observed in reviews. They also had the opportunity to discuss problems they encounter frequently in their evaluation work such as normalization of decay schemes, discrepant data or data without uncertainties among others. The workshop was informal, combining presentations and discussions and highlighting ‘best practices’. A summary report of the workshop will be published as INDC(NDS)-688. All the presentations and documents discussed at the workshop are available on the web page (see NSDD WS 2015)



Participants of the WS on Nuclear Structure and Decay Data (NSDD) Evaluation

Announcements

New Projects

The Committee on Coordinated Research Activities (CCRA) has approved a new Coordinated Research Project (CRP) on Plasma-wall Interaction with Reduced-activation Steel Surfaces in Fusion Devices. The CRP is concerned with issues of erosion and tritium retention in the first wall of fusion devices. Various materials are used in present experiments and are being considered for a reactor, notably graphite, tungsten, beryllium, steel and certain liquid metals. The best studied materials are graphite and tungsten, which have been used extensively on present experiments, while beryllium is used on the JET tokamak and is also foreseen as the main wall material for ITER. However, no material is ideal in all respects. Graphite absorbs hydrogen (tritium) too easily, beryllium has a high erosion rate and cannot be used in regions of highest heat load, and the liquid metal technology is not yet adequately developed. A combination of low activation steel and tungsten in different regions could be the most attractive choice for a fusion reactor.

The problem to be addressed by the new CRP is that not enough is known about plasma interaction, erosion and tritium retention in steels, especially in low activation steel alloys after prolonged exposure to the fusion plasma and fusion radiation environment. The plasma-wall interaction processes include sputtering by hydrogen, helium and plasma impurities, trapping of hydrogen (H, D, T) in surfaces exposed to plasma, transport of hydrogen in the steel and means to extract trapped tritium. These processes are all influenced by radiation damage and therefore the effect of radiation on the steel microstructure is also of concern for the CRP. Specific objectives include:

* To perform investigations and assemble information about the characterization of microstructure of steel surfaces exposed to fusion neutrons and energetic plasma particles.

* To perform investigations and assemble information about the relation between steel microstructure after irradiation and plasma-material interaction properties for erosion, tritium retention and tritium migration.

* To perform investigations and assemble information about ways to mitigate tritium penetration and tritium retention in steel surfaces and to extract trapped tritium.

* To synthesize new information and provide best expert estimates and uncertainties for plasma-material interaction properties (especially tritium retention and tritium transport) for steel surfaces in a fusion reactor environment.

The CRP will bring together experimentalists from fusion research institutes and from laboratory plasma-material interaction experiments and theorists involved in applied studies of plasma and neutron interaction with steels. The first Research Coordination Meeting (RCM) of this new CRP is planned for the Fall of 2015. For ongoing information about the Steel Surfaces CRP and other CRPs of the Atomic and Molecular Data Unit please see the Unit's CRP webpage: https://www-amdis.iaea.org/CRP/

Forthcoming Events

(TM = Technical Meeting, RCM = Research Coordination Meeting, CM = Consultants' Meeting)

TM on Benchmarking Experiments for Ion Beam Analysis, 26-29 May 2015, IAEA, Vienna. To define the methodology to be applied in benchmarking experiments for validation of nuclear reaction cross sections relevant for Ion Beam Analysis. To propose the validation procedure, recommend a list of priority experiments, and discuss data dissemination.

CM on Uncertainty Assessment for Molecular Data, 22-23 June 2015, IAEA, Vienna. The meeting is intended to provide guidelines for uncertainty assessment of calculated cross section data for electron-ion collisions, electron-molecule collisions and heavy particle collisions.

CM on Inelastic Scattering Data of Major Actinides, 22-23 June 2015, IAEA, Vienna. Sensitivity analyses for advanced reactor systems show that target uncertainties for inelastic scattering on major actinides ^{235,238}U, and ^{239}Pu have to be very tight. A new CM meeting on the subject will be held as a follow-up of the 2011 meeting (see INDC(NDS)-0597). The meeting is linked to the nuclear data communities activities within the NEA/WPEC SG-40 (CIELO collaboration).

2nd RCM on Primary Radiation Damage Cross Section, 29 June – 2 July 2015, IAEA, Vienna. The purpose of the meeting is to summarize the results obtained by participants since the 1st RCM held in Nov 2013 and agree the further consolidated efforts on evaluation and experimental validation of the basic radiation damage nuclear and material data.

CM on Evaluation and Uncertainty Assessment for Be, C, Ne Atomic Data, 13-15 July 2015, IAEA, Vienna. The main meeting objective is to produce an evaluated and recommended data set for Be atomic collisional cross-sections and rate coefficients by experts in electron collision physics. Participants will work together to determine uncertainties of calculated atomic data for Be, C and Ne as well.

TM of the International Atomic and Molecular Code Centre Network on Simulation of Plasma-Material Interaction Experiments, 29-31 July 2015, IAEA, Vienna. TM of International Code Centre Network brings code developers in the field of atomic, molecular and plasma-material interaction physics together to discuss various aspects of codes used by the fusion

community. The specific objective of this TM is to discuss the Uncertainty Quantification of code results used to understand Plasma-Material Interaction.

2nd RCM on Plasma-Wall Interaction with Irradiated Tungsten and Tungsten Alloys in Fusion Devices, 8-11 September 2015, Seoul, Korea. The meeting will review progress on theoretical and experimental studies of hydrogen retention and migration in tungsten after radiation damage in a fusion device and after surrogate irradiation by charged particle beams.

CM on Recommended Data for Atomic Processes of Tungsten Ions, 14-16 September 2015, KAERI, Korea. The CM is a follow-up meeting of the CRP on "Spectroscopic and Collisional Data for Tungsten from 1 eV to 20 keV" that ended last year. The objective of this CM is to evaluate and recommend rate coefficients of ionization and recombination processes of Tungsten ions.

CM on Compensating Effects due to Nuclear Reaction and Material Cross Correlations in the Simulations of Integral Benchmarks, 28 September – 1 October 2015, AEA, Vienna. The purpose of the meeting is to identify the most common compensating effects in reaction cross sections and cross-material correlations, to define a list of benchmarks that can be used to test specific sets of correlations and to standardise input files for MCNP for these benchmarks.

2nd TM on Improvement of Analysis Codes for Nuclear Structure and Decay Data Evaluations, 5-8 October 2015, IAEA, Vienna. To monitor progress made since the 1st meeting, review and validate the new codes, revise the urgent needs for codes, and recommend further actions to meet the goals of the project which is to improve the analysis codes used in NSDD evaluations.

Joint ICTP-IAEA School on Nuclear Data Measurements for Science and Applications in Collaboration with n_TOF/CERN, 19-30 October 2015, ICTP, Trieste. The school will introduce and deliver the most recent information on nuclear data measurements required both for fundamental research and various applications. The lectures will cover the experimental techniques to use neutron beams, instrumentation, data taking, analysis and theoretical interpretation. The "virtual experiments" to study nuclear data measurements and analysis methodologies will be exercised. More information, poster and application (before 8 August) on site (see ICTP smr 2741).

3rd RCM on Atomic and Molecular Data for Hydrogen and Helium in Fusion Plasma, Fall 2015, IAEA, Vienna. This is the final meeting of a CRP that is intended to lead to an isotopically complete and state-resolved (molecular vibrational state) database for processes of hydrogen and helium and their molecules and molecular ions in the edge plasma of fusion devices.

1st RCM on Plasma-Wall Interaction with Low-Activation Steel Surfaces in Fusion Devices, Fall 2015, IAEA, Vienna. Various kinds of reduced-activation steel are being considered as wall material for a fusion reactor. This is the first meeting of a CRP that will seek to quantify the erosion of steel surfaces due to exposure to plasma and to quantify the retention and transport properties of tritium in steel surfaces.

CM on Compilation of Thermal Neutron Scattering Data in EXFOR, 2-4 November 2015, IAEA, Vienna. The purpose of the meeting is to bring together experts working in the field of low energy neutron scattering measurements and evaluations. The processes that influence the angular and energy distributions of the scattered neutrons at sub and thermal neutron energies and their compilation in EXFOR will be discussed. The relationship between data compiled in EXFOR and quantities employed in the thermal scattering law evaluations will be reviewed in order to consider possibilities of inter-comparison between different ways of presentation.

In Memoriam

Samuel Hoblit



Samuel Hoblit of the Brookhaven National Laboratory's Nuclear Science and Technology Department died on March 16, 2015 at the age of 57. Hoblit arrived at Brookhaven in 1988 where he worked in various positions at the Physics Department for two decades. He left the Laboratory in 2007, but returned 2010 to the Nuclear Science and Technology Department as an associate physicist, where he worked at the National Nuclear Data Center (NNDC). In 2012 he was promoted to physicist. Hoblit's work in evaluating nuclear data was primarily in the area of covariances and uncertainty quantification. He was also an active developer of the EMPIRE modeling code for nuclear reactions, and participated in the December 2013 EMPIRE workshop organized by NDS and held at the IAEA HQ in Vienna. "Samuel Hoblit was not only a marvelous programmer – really the best programmer we ever had in the group – but also a very nice person, gentle and always ready to help", said NNDC Director Michal Herman.

Selected Charts, Reports and Documents

IAEA-NDS-08 LARELKIN Two-body relativistic kinematics code (Version 1.00), prepared by M. Drosg, March 2008 (updated version with input masses from Atomic Mass Evaluation 2012).

IAEA-NDS-221 POINT 2015: ENDF/B-VII.1 Final Temperature Dependent Cross Section Library, prepared by D.E. Cullen, March 2015.

INDC(AUS)-0019 Evaluation of the Absolute Angle-Dependent Differential Neutron Production Cross Sections by the Reactions ^{3}H(p,n)^{3}He, ^{1}H(t,n)^{3}He, ^{2}H(d,n)^{3}He, ^{3}H(d,n)^{4}He, and ^{2}H(t,n)^{4}He and of the Cross Sections of Their Time-Reversed Counterparts up to 30 MeV and Beyond, prepared by M. Drosg, N. Otuka, January 2015.

INDC(SLO)-0002 Validation of IRDFF-v1.04 (&v1.05) Dosimetry Library using SINBAD Shielding Benchmark Experiments, prepared by I. Kodeli, February 2015.

INDC(NDS)-0669 Uncertainty Assessment for Theoretical Atomic and Molecular Scattering Data, Report of an IAEA-ITAMP Technical Meeting, 7-9 July 2014, Cambridge, MA, USA, H.-K. Chung, K. Bartschat, J. Tennyson, D.R. Schultz, October 2014.

INDC(NDS)-0671 Plasma-material Interaction with Steel Surfaces, Summary Report of a consultants' meeting, 20 Aug 2014, IAEA, Vienna, B.J. Braams, H.-K. Chung, K-M. Lim. September 2014.

INDC(NDS)-0672 Experimental Nuclear Reaction Data Base, Summary Report of the Workshop, 6-10 October 2014, IAEA,Vienna, prepared by V. Semkova, B. Pritychenko, December 2014.

INDC(NDS)-0673 Spectroscopic and Collisional Data for Tungsten from 1 eV to 20 KeV, Summary Report of the Third Research Coordination Meeting, 6-8 October 2014, IAEA, Vienna, prepared by H.-K. Chung, P. Beiersdorfer, B. Braams, December 2014.

INDC(NDS)-0674 Documentation for WIMSD-formatted libraries based on ENDF/B-VII.1 evaluated nuclear data files with extended actinide burn-up chains and cross section data up to 2000 K for fuel materials, prepared by D. López Aldama, November 2014.

INDC(NDS)-0675 Nuclear Data for Charged-particle Monitor Reactions and Medical Isotope Production Summary Report of the Second Research Coordination Meeting, 8 -12 December 2014, IAEA, Vienna, A.L. Nichols, F.M. Nortier, R. Capote Noy, April 2015.

INDC(NDS)-0676 Total Absorption Gamma-ray Spectroscopy for Decay Heat Calculations and Other Applications, Summary Report of a Consultants' Meeting, 15-17 December 2014, IAEA, Vienna, P. Dimitriou, A.L. Nichols, February 2015.

INDC(NDS)-0678 Prompt Fission Neutron Spectrum Evaluation Techniques, D.L. Smith, D. Neudecker, R. Capote Noy, February 2015.

INDC(NDS)-0681 ^{209}Bi and ^{nat}Pb Neutron Fission Cross Sections as New References and Extensions of the ^{235}U, ^{238}U and ^{239}Pu(n,f) standards up to 1 GeV, B Marcinkevicius, S. Simakov, V. Pronyaev, April 2015.

INDC(NDS)-0684 ENDF/B-VII.1 versus ENDF/B-VII.0 Comparison, D.E. Cullen, April 2015.

Also Available:

Chart of the Nuclides 2010 JAEA Nuclear Data Centre.

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.**

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

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Impressum

Nuclear Data Newsletter No. 59, May 2015

The Nuclear Data Newsletter is prepared by
the Division of Physical and Chemical Sciences,
Department of Nuclear Sciences and Applications

International Atomic Energy Agency
Vienna International Centre, PO Box 100, 1400 Vienna, Austria
Printed by the IAEA in Austria, May 2015

15-1817

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