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Nuclear Data Newsletter

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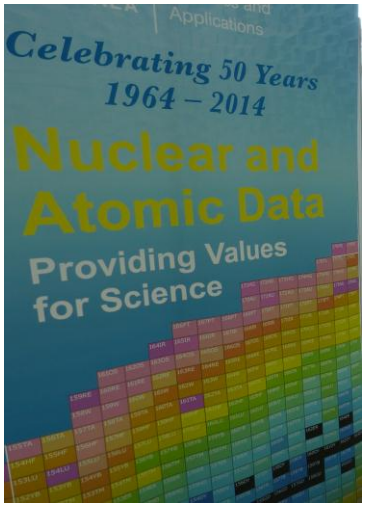
Contents

From the Section Head

On 2nd June we celebrated the anniversary of 50 years of NDS's existence. It was a pleasure to welcome back so many old friends, and we heard excellent presentations by Alan Nichols, Hans Lemmel, Doug Muir and Pavel Obložinský. There was a collection of photographs and computer equipment covering the past five decades and it was very obvious what really significant advances have been made by our colleagues over the years. If you are interested in some of the stories then the 'News' link on the NDS web page (https://www-nds.iaea.org/) provides further details. To try and capture the spirit of this really interesting event we include some photographs here. For those who attended and contributed so much I want to express my thanks and look forward to something similar when we have performed some more years of work.

DDG-NA Daud Mohamad and DIR-NAPC Meera Venkatesh at the start of the 50th anniversary meeting

Considerable interest in the historical display



The mission of the Section - Providing Values for Science

In the week that followed, the 30th INDC meeting was held where we reviewed the recent work and heard excellent advice about our plans for the next biennium. INDC also reached the milestone of thirty meetings stretching back to the founding of the Section. With eight new members, INDC is in a sense beginning a new phase of its work.

As you can see in the newsletter there have been many meetings held showing the wide scope of the work we do. The results of an internal evaluation of the Section's work proved its value and provided evidence that what we do is really appreciated by users in all Member States.

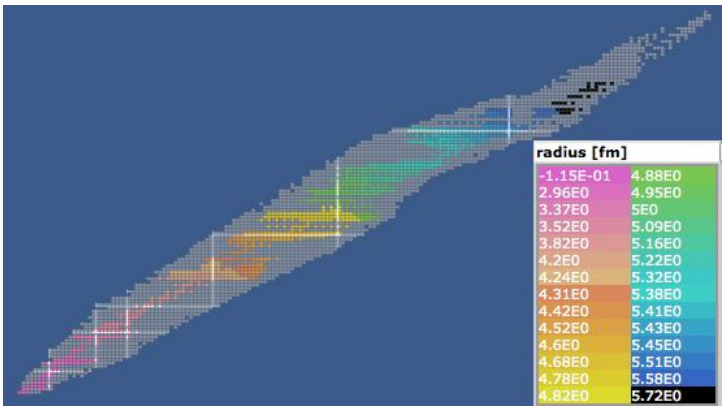
Robin A. Forrest

DDG-NE Alexander Bychkov and Section Head Robin Forrest at the start of the 50th anniversary meeting

Computer Codes and Data Libraries – News

Nuclear Charge Radii

A web-page dedicated to experimental nuclear charge radii data was added to NDS web site.
Determination of radii from optical isotope shifts is a field of physics that has experienced a strong push forward in recent years due to the development of new highly sensitive methods of laser spectroscopy investigations and the availability of intense radioactive beams at accelerators, hence the need to update the last dataset from 2011.
The work of I. Angeli and K. Marinova covers an extended range of isotopes and elements (909 isotopes of 92 elements from H to Cm) and has recently been published in Atomic Data and Nuclear Data Tables 99 (2013) 69-95.
The obtained data are not a simple compilation of individual measurements, but constitute a self-consistent set of *rms* R-values giving a global survey of nuclear charge radii over the whole nuclide chart. The Nuclear Charge Radii page can be accessed under http://www-nds.iaea.org/radii/.
Data are also displayed on Livechart
https://www-nds.iaea.org/livechart



Release of version 1.05 of the dosimetry cross sections database IRDFF for reactor and fusion applications up to energy 60 MeV.

This update includes 3 new reactions ^{28}Si(n,p)^{28}Al, ^{29}Si(n,x)^{28}Al, ^{113}In(n,γ)^{114m}In and update of ^{31}P(n,p)^{31}Si reaction cross sections.
Numerical data in the various formats and documentations are available on:
https://www-nds.iaea.org/IRDFF/ and https://www-nds.iaea.org/IRDFFtest/.

EPICS2014: Electron Photon Interaction Cross Sections (Version 2014)

EPICS2014 is the Electron Photon Interaction Cross Section library collection that provides the atomic data needed to perform coupled Electron-Photon transport calculations, to produce accurate macroscopic results, such as energy deposition and dose. Atomic data are provided for elements Z = 1 to 100 over the energy range 10 eV to 100 GeV. Nuclear data such as photo-nuclear and data for compounds are not included. EPICS includes four libraries: the Electron Data Library (EEDL), Evaluated Photon Data Library (EPDL), Evaluated Atomic Data Library (EADL) and Excitation Data Library (EXDL). All four are given in the Extended ENDL format (ENDLX). The first three are also given in the ENDF-6 format (the format for the Excitation Data is not defined in ENDF-6).
The report is available on-line as IAEA-NDS-0218.

NDS Meeting Reports

Third Research Coordination Meeting (RCM) on Particle-Induced Gamma-ray Emission (PIGE) spectroscopy, Vienna, Austria, 7-11 April 2014

Scientific Secretary: Paraskevi Dimitriou,
11 participants and IAEA staff

Participants of the 3rd RCM on Particle-Induced Gamma-ray Emission (PIGE) spectroscopy

At the 3rd RCM on Development of a Reference Database for Particle-Induced Gamma ray Emission (PIGE) Spectroscopy eleven participants from ten countries got together to review their work. They agreed that all the measured data had to be submitted to IBANDL by the end of 2014, including data from the literature. The final version of ERYA code for PIGE bulk analysis was distributed to participants for extensive testing. The contents of the final technical document were discussed, specific chapters and sections assigned to the participants and deadlines set. Furthermore, nuclear data needs related to the implementation of the PIGE technique were discussed, leading to a number of recommendations. The summary report of the meeting is available as INDC(NDS)-0664. During this 3rd RCM, a joint session with the Physics Section's Consultancy Meeting on Improving the Quality of Analytical Data Measured by Ion Beams (7-10 April 2014) was held to discuss issues of common interest. At this joint session the IAEA staff presented the activities of the Nuclear Data and Physics Sections related to Ion Beam Analysis. The new capabilities of the IBANDL interface were demonstrated in detail and were appreciated by all the participants. A status report of the Coordinated Research Project (CRP) on PIGE was given together with a presentation related to how uncertainties on the data affect PIGE analysis. A summary of the nuclear data needs as assessed by the Physics Section's Consultants was presented along with some aspects related to assigning uncertainties to evaluated data and benchmarking. The presentations given at this session can be found at: https://www-nds.iaea.org/pige/index_3rcm.html.

19th Meeting of the Subcommittee on Atomic and Molecular Data of the International Fusion Research Council (IFRC), Vienna, Austria, 28–29 April 2014

Scientific Secretary: Bastiaan Braams,
11 participants and IAEA staff

Participants of the 19th Subcommittee Meeting on Atomic and Molecular Data of IFRC

At the 19th Meeting of the Subcommittee on Atomic and Molecular Data of the International Fusion Research Council (IFRC), activities of the NDS Atomic and Molecular Data Unit for the period 2012–2013 were reviewed and recommendations were made for continuing activities in 2014–2015, and for possible new projects in the 2016-2017 budget cycle. In particular, the Subcommittee judged as the highest priority for new Coordinated Research Projects (CRPs) one on plasma interaction with reduced activation steel surfaces, and beyond that one on charge transfer processes in relation to neutral beams. They encouraged continued activity on data evaluation with special attention to the issue of uncertainties in calculated data and for code comparisons. The summary report of the meeting is available as INDC(NDS)-0667.

Technical Meeting (TM) on the International Network of Nuclear Reaction Data Centres (NRDC), Smolenice, Slovakia, 6–9 May 2014

Scientific Secretary: N. Otsuka,
17 participants and IAEA staff

Participants of the IAEA TM of International Network on Nuclear Reaction Data Centres

Thirteen cooperating data centres from China, Hungary, India, Japan, the Republic of Korea, Russian Federation, Ukraine, USA, OECD NEA and IAEA were represented at the meeting. Main topics of the present meeting were the NRDC protocol, EXFOR transmission statistics, EXFOR coverage and quality control, revision of coding rules and manuals, EXFOR/CINDA dictionaries as well as improved tools for compilation and dissemination. It was reported that the Nuclear Structure and Nuclear Reaction Data Centre (CAJaD) of the Kurchatov Institute (Moscow, Russia) had been closed in 2013. CAJaD has been very active in the compilation of charged-particle induced reaction data since the 1970s. The Center of Nuclear Physics Data (CNPD) of the All Russian Scientific Research Institute of Experimental Physics (Sarov, Russia) will take over their responsibility which is compilation of charged-particle induced reaction data measured in former USSR countries (except for Ukraine). A new group formed at the Kazakh National University (Almaty) presented their wish to contribute to the EXFOR library by compilation of experimental data measured in Uzbekistan and Kazakhstan. This proposal was welcomed by all centres and agreed to start on a trial basis. Compilation of experimental data corrected or derived by other than the experimentalists was discussed and a clear policy formulated. A summary report of the meeting is available as INDC(NDS)-0631. The Network also published a summary of its EXFOR compilation activity: N. Otsuka et al., Nucl. Data Sheets 120(2014)272.

30th Meeting of the International Nuclear Data Committee (INDC), Vienna, Austria, 3–6 June 2014

Scientific Secretary: Robin Forrest,
25 participants and IAEA staff

Participants of the 30th INDC Meeting

This 30th meeting of the IAEA International Nuclear Data Committee coincided with the 50th anniversary of the Nuclear Data Section, which was celebrated at a special function at the IAEA Headquarters the day before the meeting. D. Mohamad, Deputy Director General of the Nuclear Sciences and Applications Department, and M. Venkatesh, Director of the Physical and Chemical Sciences Division welcomed the participants. Both noted that the importance of continuously improving nuclear data for different applications is well recognized both by the Agency and by specialists involved in practical applications of nuclear technology. The Committee reviewed the Nuclear Data Section activities over the period 2012-2013, current activities, and plans for 2015-2017. The 2012-2013 activities were summarized in a report prepared by NDS for the INDC (INDC(NDS)-0662). Then the Committee collected nuclear data needs from INDC members, and solicited their recommendations on actions for addressing those needs, in collaboration with the OECD/WPEC whenever appropriate. These future activities were discussed in two separate working groups: (i) WG1 on Nuclear Data Development, which formulated suggestions for Coordinated Research Projects (CRPs) and Data Development Projects (DDPs), and (ii) WG2 on Data Dissemination, International Coordination, and Training (WG2), which was charged with the review of NDS services and specific training initiatives. The Committee endorsed NDS plans for new Coordinated Research Projects (CRPs) on updating RIPL, with particular emphasis on fission parameters, and compilation and evaluation of Gamma-ray data. The importance of training was again recognized and the section was urged to continue with courses and workshops at ICTP which are considered to be especially relevant for developing countries. The

coordination of international activities through the NSDD and NRDC networks was seen as a vital part of the NDS work.

Technical Meeting (TM) on Improvement of Analysis Codes for NSDD evaluations, Vienna, Austria, 10-13 June 2014

Scientific Secretary: Paraskevi Dimitriou,
6 participants and IAEA staff

Participants of the TM on Improvement on Analysis Codes for NSDD evaluations

A new Data Development Project was initiated by NDS to address the problems of updating and maintaining the analysis and utility codes used by the evaluators of the network of Nuclear Structure and Decay Data in mass chain evaluations (ENSDF). This Technical Meeting was convened to define the goals and methodology of this project. Participants reviewed all the analysis and checking codes thoroughly and produced a priority list of codes that need to be modified and/or re-written. The nature of the improvements that need to be made were discussed in depth, responsible persons were identified and tasks were assigned with deadlines. Intermediate progress reports would be made at the next USNDP and NSDD meetings, however, a comprehensive review of the project and update of priorities will be the subject of a follow-up meeting to be held in Vienna, in Autumn 2015. The summary report of the meeting is available as INDC(NDS)-0665.

IAEA-ITAMP Technical Meeting (TM) on Uncertainty Assessment for Theoretical Atomic and Molecular Scattering Data, Cambridge, MA, USA, 7–9 July 2014

Scientific Secretary: H.K. Chung
25 participants and IAEA staff

Participants of the IAEA-ITAMP TM on Uncertainty Assessment for Theoretical Atomic and Molecular Scattering Data

Twenty five participants from 10 Member States and one from the IAEA attended the three-day meeting hosted by the Institute of Theoretical Atomic, Molecular and Optical Physics (ITAMP). The meeting brought together a number of experts working on electron collisions with atoms, ions, and molecules, heavy-particle collisions, and electronic structure of atoms and molecules in order to come up with reasonable uncertainty estimates for calculations using the various methods of collision physics. This meeting was highly successful in obtaining inputs for a technical document that outlines the guidelines for critically assessing theoretical atomic and molecular data and motivating theoretical physicists in the atomic and molecular collisions community to investigate the uncertainties of their theoretical method. The meeting report is available as INDC(NDS)-0669.

2nd Research Coordination Meeting (RCM) on Data for Erosion and Tritium Retention in Beryllium Plasma-Facing Materials, Vienna, Austria, 18–19 August 2014

Scientific Secretary: Bastiaan Braams,
6 participants and IAEA staff

The Coordinated Research Project (CRP) on beryllium surfaces has the objective to provide quantitative predictions and uncertainties for erosion and tritium retention in beryllium exposed to fusion plasma. Beryllium is to be used as the main wall material in ITER and is also used on the JET tokamak. Beryllium is toxic and it is difficult to do laboratory experiments that involve plasma

exposure or other procedures that damage the material; therefore there is still quite a large uncertainty about plasma-material interaction properties. At the present 2nd RCM of this CRP participants reported on their experimental and modelling studies of plasma-material interaction with beryllium and they assessed the main areas of uncertainty that are to be addressed in the remaining 1-2 years of the project. The meeting report is in preparation and will be available as INDC(NDS)-0670.

Participants of the 2nd RCM on Data for Erosion and Tritium Retention in Beryllium Plasma-Facing Materials

Consultants' Meeting (CM) on Plasma-material Interaction with Steel Surfaces, Vienna, Austria, 20 August 2014

Scientific Secretary: Bastiaan Braams,
7 participants and IAEA staff

Participants of CM on Plasma-material Interaction with Steel Surfaces

This Consultancy Meeting immediately followed the Beryllium RCM (see above) and the meetings shared most of their participants. Some kind of reduced activation ferritic martensitic (RAFM) or other reduce activation steel is regarded as a plausible alternative to tungsten for the main wall of a fusion reactor, away from the region of highest heat load, primarily because such steel is less affected by radiation damage than is tungsten. The Consultancy Meeting provided advice about experiments and computations to understand erosion and tritium retention in steels. Interesting questions include the expected change in surface composition due to preferential removal of light constituents of the steel. The main outcome of the Consultancy Meeting is that the NDS Atomic and Molecular Unit will proceed with plans for a new Coordinated Research Project (CRP) on "Plasma-wall interaction with reduced-activation steel surfaces in fusion devices" foreseen to start in the first half of 2015. The meeting report is available as INDC(NDS)-0671.

5th AASPP Workshop on Asian Nuclear Reaction Database Development, Bhabha Atomic Research Centre, Mumbai, India 22-24 Sept 2014

Participants of the 5th AASPP Workshop

This workshop, the fifth in the series, was organized by the Nuclear Data Physics Centre of India in cooperation with the IAEA and the Board of Research in Nuclear Sciences, Department of Atomic Energy.

Over seventy participants took part in the workshop representing India, Japan, Republic of Korea, Vietnam, Kazakhstan, Uzbekistan, Mongolia and a representative from the IAEA. The workshop covered an overview of nuclear data activities in different countries and covered the topics related to experiments performed using various facilities, the upcoming and existing accelerators and experimental facilities, EXFOR compilation activities, reactor sensitivity studies to nuclear data, criticality benchmarking studies, requirement of nuclear power reactors, theoretical calculations using various codes, and covariances in nuclear data. About thirty five talks were delivered and, in the concluding session, future collaboration among countries was discussed. There was a general consensus that the present series of workshops involving Asian countries should be continued.

Joint IAEA-ICTP Workshop on Nuclear Reaction Data for Nuclear Power Applications, Trieste, Italy, 22-26 September, 2014

Director: Roberto Capote, IAEA;
Local Organizer: C. Tuniz; 30 participants

The Workshop continues a series of ICTP Workshops covering nuclear data for power applications going back to the 70's. It was held for one week. The Workshop was intended to train scientists and engineers from both developing and developed countries in modern nuclear reaction theory, nuclear data production and validation, and data use, with particular emphasis on applications in nuclear reactor physics, design and safety. Participants gained an overview of modern computer codes relevant to these topics, and were introduced to the online retrieval of nuclear data. The Workshop was attended by twenty-two students, representing twelve Member States. A total of seven lecturers, including three IAEA NDS staff participated. All students were invited to give brief oral presentations. All lecture notes are available at http://indico.ictp.it/event/a13220.

Participants of the IAEA-ICTP Workshop on Nuclear Reaction Data for Nuclear Power Applications

The 16th International Workshop on Radiative Properties of Hot Dense Matter, Vienna, Austria, 29 Sept – 3 Oct 2014

appr. 100 participants

The 16th International Workshop on Radiative Properties of Hot Dense Matter was held in cooperation with the IAEA Atomic and Molecular Data Unit. The purpose of the meeting was to bring together a relatively small, international group of leading researchers in radiative transfer, line shapes, dense plasma spectroscopy, non-LTE population kinetics, opacity studies and plasma processes, to identify current problems in these fields and directions for future research. Specific topics included dense plasma absorption and emission spectroscopy, radiation heating, opacities, spectral line shapes, dense plasma effects and the breakdown of the isolated atom picture, non-equilibrium atomic kinetics and radiation transfer, and detailed X-ray spectra simulation. Experiments using high-intensity short-pulse lasers and z-pinch type discharges to generate and diagnose hot dense matter, VUV- and X-FEL experiments, warm dense matter studies, and, importantly high-energy laser–related experiments, were discussed in the meeting. Conference proceedings will be published in the Elsevier Journal *High Energy Density Physics*.

3rd RCM on Spectroscopic and Collisional Data for Tungsten from 1 eV to 20 keV, Vienna, Austria, 6 – 8 Oct 2014

Scientific Secretary: Bastiaan Braams,
16 participants and IAEA staff.

Participants of the 3rd RCM on Spectroscopic and Collisional Data for Tungsten

The 3rd and final RCM of the CRP on Spectroscopic and Collisional Data for Tungsten from 1 eV to 20 keV took place at IAEA in Vienna from 6 to 8 October 2014. Tungsten is used as a wall material in fusion experiments and because of its high nuclear charge (atomic number 74) it is a complicated system and it radiates strongly as a plasma impurity. Therefore, it is important to know the atomic properties of tungsten under conditions ranging from the cold temperature ($\simeq$ eV) of near-wall plasma to the $\simeq$ 20 keV electron temperature expected in the plasma core. Processes of interest are excitation and ionization by electron, photon, and proton impact, auto-ionization, radiative de-excitation and recombination, dielectronic recombination, and charge exchange. Data include cross sections, spectroscopic signatures (line radiation), and integrated power loss. These processes and data have been studied in the course of the CRP using plasma devices,

beams and trapped ions and using atomic structure and scattering calculations. The final report of this Coordinated Research Project (CRP) is to appear in 2015 as a special issue of the journal *Atoms, MDPI*.

Workshop on the Experimental Nuclear Reaction Database, Vienna, Austria, 6 – 10 October 2014

Scientific Secretary: Valentina Semkova
11 participants and IAEA staff

Participants of the EXFOR Workshop

The workshop was organized to discuss various aspects of the EXFOR compilation process including compilation rules, different techniques for nuclear reaction data measurements; software developments, etc. At the beginning of the workshop, the conclusions and recommendations of the report NEA/DB/DOC(2014)3 "Statistical verification and validation of the EXFOR database: (n,n'), (n,2n), (n,p), (n,α) and other neutron-induced threshold reaction cross sections" were discussed. Presentations on charged-particle induced reaction cross sections, thick target yields, nuclear astrophysics data, TOF spectra in resolved resonance region, beta-delayed neutron emission data and photonuclear data measurements provided information on the experimental technique in order to improve the quality of the EXFOR compilations. The need to compile the neutron Kerma factors, status of Kerma factors in EXFOR data library and list of articles for compilation were discussed during the Workshop. The importance of defining the format (rules) for the compilation of neutron source spectra in EXFOR was emphasized and different proposals were discussed. Software developments related to EXFOR compilation, both stand-alone and on-line, were presented. In addition to discussions, several compilation and digitization exercises were carried out. The workshop was concluded with a list of recommendations which will be included in the Report INDC(NDS)-0672.

Joint ICTP-IAEA Conference on Models and Data for Plasma-Material Interaction in Fusion Devices, Trieste, Italy, 3-7 November 2014

Organizers: B.J. Braams, H.K. Chung
Local Organizer: S. Scandolo, 45 participants

The A+M Data Unit organized the Joint ICTP-IAEA Conference on Models and Data for Plasma-Material Interaction in Fusion Devices at ICTP in Trieste, 3-7 November 2014, bringing together researchers from fusion energy science and materials science. The conference was devoted to computational studies of plasma-material interaction processes and evolution of material microstructure, including effects of radiation damage and with special interest in hydrogen (tritium) trapping and transport in wall material. There were 48 participants and it appears that the meeting has started a trend: following the ICTP event an International Workshop on the same topic is now being organized with IAEA cooperation in Marseille in May, 2015.

Participants of the ICTP-IAEA Conference on Models and Data for Plasma-Material Interaction in Fusion Devices

Forthcoming Events

IAEA Technical Meeting on the Current Status of Neutron Standards, 1-5 December 2014, IAEA, Vienna. The purpose of the meeting is to review and take forward the work plan agreed to at the previous meeting in July 2013 to produce a new Neutron Standards Evaluation.

Second RCM on Nuclear Data for Charged-particle Monitor Reactions and Medical Isotope Production, 8-12 December 2014, IAEA, Vienna. The purpose of the meeting is to review the work undertaken by participants since the 1st RCM in 2012, and to agree on the remaining tasks to meet the established deadlines and achieve the proposed goals.

Consultant's Meeting on Total Absorption Gamma-ray Spectroscopy (TAGS), 15-17 December 2014, IAEA, Vienna. The purpose of the meeting is to review the current status of TAGS measurements, and re-assess the data needs for decay heat calculations and other applications.

IAEA Technical Meeting on Atomic, Molecular and Plasma-Material Interaction Data for Fusion Science and Technology, 15-19 December 2014, Daejeon, Republic of Korea, hosted by the National Fusion Research Institute (NFRI). The purpose of the meeting is to advance data-oriented research on atomic, molecular and plasma-material interaction processes and properties that are important for fusion plasma simulation, fusion plasma diagnostics and fusion energy technology.

Second RCM on Testing and Improving the International Reactor Dosimetry and Fusion File (IRDFF), 16-20 March 2015, IAEA, Vienna. The purpose of the meeting is to summarise the results obtained by participants since the 1st RCM in July 2013 and agree on the consolidated efforts on further evaluations and benchmarking of dosimetry cross sections for the IRDFF library.

IAEA Technical Meeting on the International Network of Nuclear Reaction Data Centres (NRDC), 21-23 April 2015, IAEA, Vienna. The purpose of meeting is to review and discuss EXFOR transmission statistics, EXFOR coverage and quality control, revision of coding rules and manuals, EXFOR/CINDA dictionaries as well as improved tools for compilation and dissemination.

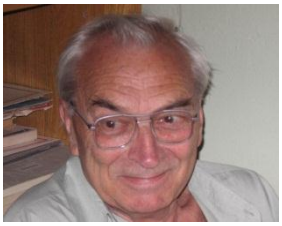
Second RCM on Primary Radiation Damage Cross Sections, 29 June-2 July 2015, IAEA, Vienna. The purpose of the meeting is to review the progress of the obligations undertaken by participants at the 1st RCM in November 2013 and to set the tasks for the next period.

In Memoriam

Boris Ivanovich Fursov

Boris I. Fursov passed away on 1 September 2014 at the age of 69. B.I. Fursov was a nuclear physicist with over 50 years of experience. In 1968 he started his professional career as scientist at the Institute of Physics and Power Engineering (IPPE) in Obninsk where he was promoted to the position of Director of the IPPE Division which includes several experimental and theoretical laboratories as well as the Russian Nuclear Data Center. He carried out several unique and precise measurements of fission cross sections on actinides which still serve as the basis for the evaluated cross section files. He coordinated the creation of the Russian nuclear data library BROND-3. In addition, he initiated research in the field of nuclear membranes, neutron therapy and nuclear microanalysis at IPPE and their practical implementation. Representing the Russian Federation, B.I. Fursov had been a long standing member of the International Nuclear Data Committee (INDC), giving valuable advice to the IAEA Nuclear Data Section on nuclear data policy. He both participated in several IAEA projects and carried out contractual work which considerably contributed to the improvement of nuclear reaction data. The staff of the Nuclear Data Section express their sincere condolences.

Yuri Khazov



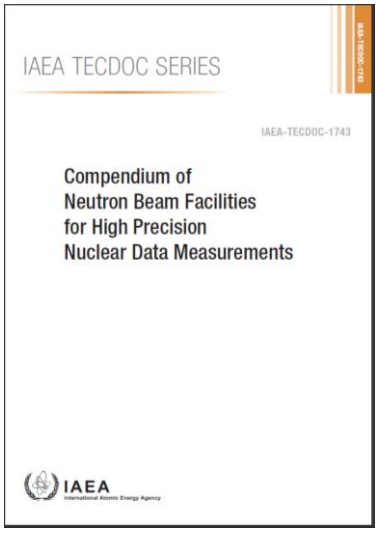
Yuri Khazov, 1932 – 2014, passed away on 30 June 2014 at the age of 82. Y. Khazov was a nuclear physicist with 58 years of experience. He was involved in experimental studies of nuclear isomerism, nuclear spectroscopy and doubly odd nuclei in collaboration with ILL, France and Technische Universität, München, Garching. He was an active nuclear structure and decay data evaluator and completed several mass chain evaluations in the mass region A=130-135 and 146. He actively participated in the organization of the NSDD meeting held in St. Petersburg in June 2007. We shall remember Yuri as an excellent nuclear structure specialist. Many colleagues profited from interacting with him. He will be greatly missed.

Selected Charts, Reports and Documents

All INDC series reports are available online:

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

Recent Releases:



IAEA-TECDOC-1743 - Compendium of Neutron Beam Facilities for High Precision Nuclear Data Measurements

This IAEA-TECDOC-1743 contains materials from the technical meeting "Use of Neutron Beams for High Precision Nuclear Data Measurements" organised by the Physics and Nuclear Data Sections of IAEA in Budapest, 10–14 December 2012. The Meeting gathered experts from 25 counties and 3 international organisations who operate modern accelerator and research reactor facilities for the measurement and validation of the nuclear data. The Report and authors' individual contributions are available on-line https://www-nds.iaea.org/publications/tecdocs/iaea-tecdoc-1743/ .

IAEA-NDS-0217 Program ENDF2C: Convert ENDF Data to Standard FORTRAN, C and C++ Format (Version 2014-1**)**, prepared by D.E. Cullen, April 2014.

IAEA-NDS-0218 EPICS2014: Electron Photon Interaction Cross Sections (Version 2014), prepared by D.E. Cullen, September 2014.

IAEA-NDS-0219 IBA-EVAL Charged-particle Cross-Section Library in ENDF-6 Format, prepared by A. Trkov, October 2014.

INDC(EUR)-0032 Results of time-of-flight neutron capture measurements of ^{176,177,178,179}Hf-enriched and ^{nat}Hf samples at 10 m, 30 m and 60 m stations of GELINA, prepared by T.C. Ware, C.J. Dean, A. Borella, S. Kopecky, A. Moens, P. Schillebeeckx, N. Janeva, M.C. Moxon, April 2014.

INDC(CCP)-0455 Translation of Selected Papers Published in Neutron Constants and Parameters Issue 1-2, 2011-2012, translated by IAEA, August 2014.

INDC(CCP)-0457 Precision measurements of ^{252}Cf, ^{233}U, ^{235}U and ^{239}Pu prompt fission neutron spectra (PFNS) in the energy range 0.04 - 5 MeV, English translation (July 2014) of V.N. Nefedov, B.I. Starostov, A.A. Boytsov, "Neutron Physics", Kiev, 1983, Vol. 2, p. 285.

INDC(CCP)-0458 Precision measurements of ^{252}Cf, ^{233}U, ^{235}U and ^{239}Pu prompt fission neutron spectra (PFNS) in the energy range 2 – 11MeV, English translation (July 2014) of V.N. Nefedov, B.I. Starostov, A.A. Boytsov, "Neutron Physics", Kiev, 1983, Vol. 2, p. 290.

INDC(CCP)-0459 Relative measurements of ^{233}U+n_{th}, ^{235}U+n_{th} and ^{239}Pu+n_{th} prompt fission neutron spectra (PFNS) in the energy range 0.01 - 5, English translation (July 2014) of V.N. Nefedov, B.I. Starostov, A.A. Boytsov, "Neutron Physics", Kiev, 1983, Vol. 2, p. 294.

INDC(NDS)-0651 Summary Report of an IAEA Consultants' Meeting on XML Schema for Atoms, Molecules and Solids (XSAMS)**,** Vienna, Austria, 20–22 February 2012, prepared by B.J. Braams, December 2013.

INDC(NDS)-0656 ADS-HE: Evaluated Nuclear Data Library up to 1 GeV for ^{202}Hg, ^{208}Pb, ^{209}Bi, ^{232}Th, ^{235}U, ^{238}U, ^{237}Np, ^{239}Pu, ^{242}Am and ^{245}Cm, prepared by D. López Aldama, December 2013.

INDC(NDS)-0659 ENDF/X: An Extended ENDF format (Evolution, not Revolution), prepared by Dermott E. Cullen, April 2014.

INDC(NDS)-0660 Developments in the Ion Beam Analysis Nuclear Data Library (IBANDL), edited by P. Dimitriou, June 2014.

INDC(NDS)-0661 Summary Report of the Technical Meeting on International Network of Nuclear Reaction Data Centres, Smolenice, Slovakia, 6-9 May 2014, prepared by N. Otuka and E. Dupont, June 2014.

INDC(NDS)-0662 Report of the IAEA Nuclear Data Section to the International Nuclear Data Committee for the period January 2012 - December 2013, edited by R. Capote and R.A. Forrest, April 2014.

INDC(NDS)-0663 Standard Procedures for the IAEA Dust Database: Preparation, Measurements, and Upload**,** prepared by Suk-Ho Hong, January 2014.

INDC(NDS)-0664 Summary Report 3rd Research Coordination Meeting on Development of a Reference Database for Particle-Induced Gamma ray Emission (PIGE) Spectroscopy**,** Vienna, Austria, 7-11 April 2014, prepared by P. Dimitriou and A. Pedro de Jesus, May 2014.

INDC(NDS)-0665 Summary Report of an IAEA Technical Meeting on Improvement of Analysis codes for NSDD Evaluations**,** Vienna, Austria, 10-13 June 2014, prepared by P. Dimitriou and T. Kibedi, September 2014.

INDC(NDS)-0666 How Accurate Are Our Processed ENDF Cross Sections?, prepared by D.E. Cullen, May 2014.

INDC(NDS)-0667 Summary Report of an IAEA Technical Meeting on 19th Meeting of the IFRC Subcommittee on Atomic and Molecular Data for Fusion**,** Vienna, Austria, 28-29 April 2014, prepared by B.J. Braams, July 2014.

INDC(NDS)-0668 Evaluation excitation functions for ^{28}Si(n,p)^{28}Al, ^{31}P(n,p)^{31}Si, and ^{113}In(n,γ)^{114m}In reactions, prepared by K.I. Zolotarev, October 2014.

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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 (17. edition, revised 2009).* Available cost-free on request only for **teachers and scientists from developing countries.**

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

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