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Nuclear Data Newsletter

https://nds.iaea.org/

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Contents

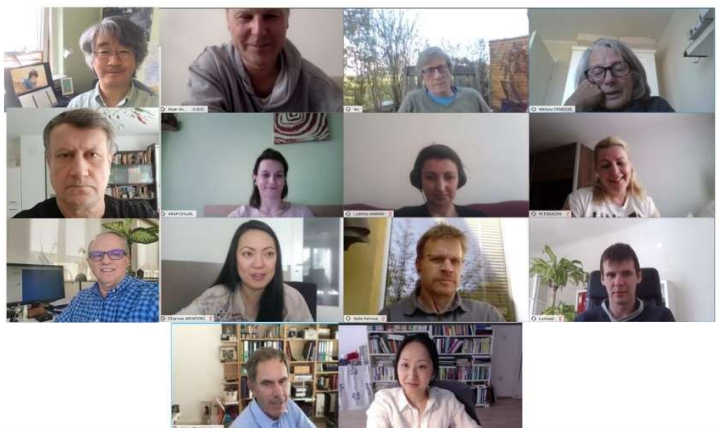
From the Section Head

Greetings!
I think you will agree that we had a very unexpected first half year of 2020. I sincerely hope that you managed to get through this (hopefully last) phase of COVID-19 without too many dramatic consequences.
You will also not be surprised to see that this Newsletter is rather short, and that sadly the larger part of it is filled with obituaries: we received sad news from different corners of the nuclear data world.

In the first half year of 2020, Friday March 13 was the last normal working day at the IAEA. The following day the IAEA offices were closed, and we were starting this unprecedented phase of "Working at home" for several months. I am quite certain that you as nuclear scientists were already used to doing that, but this time it was different: all we had was our computer and the internet, no real professional-social interaction. On 15 May, after a lockdown of 9 weeks IAEA reopened, gradually allowing employees to enter the building again, and on 1 July the situation was back to "normal", at least in terms of the IAEA personnel.

The only meeting held in 2020 so far was from our Atomic and Molecular Unit which was a Consultants' Meeting on the Development and Implementation of a Database of DFT Calculations of Defects in Nuclear Materials. Most of the nuclear data meetings happen to be scheduled in the second half of the year.
The only nuclear data meetings which had to be postponed to 2021 are the NRDC meeting including the 50 years celebration of EXFOR, and the INDC meeting.
At the time of this writing, it is not entirely clear what will happen with the meetings for the rest of 2020. There are general IAEA guidelines which we need to follow, taking into account the organizational problems with time zones when holding (large) meetings partly or entirely via video connection. Our meeting participants will be informed as the information becomes available.

I do not exactly know what the second half of the year brings for the Nuclear Data Section, and obviously we all would want to go back to "really normal". All I can do now is wish you all the best for the rest of the year!



Nuclear Data Section working from home

Computer Codes, Data Libraries and Web News

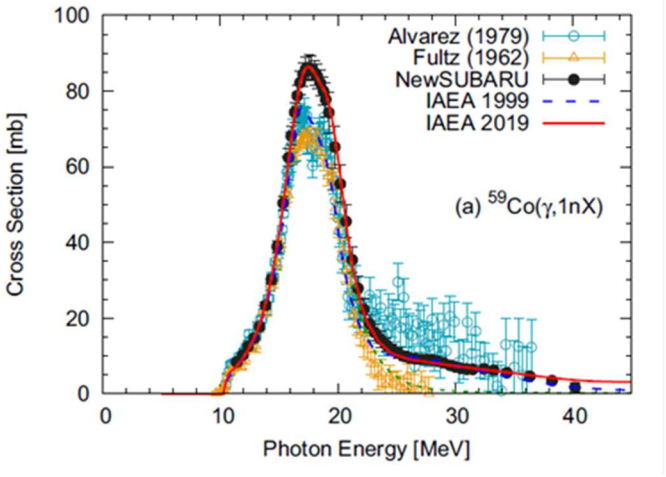
IAEA PD2019: A New IAEA Evaluated Photonuclear Library

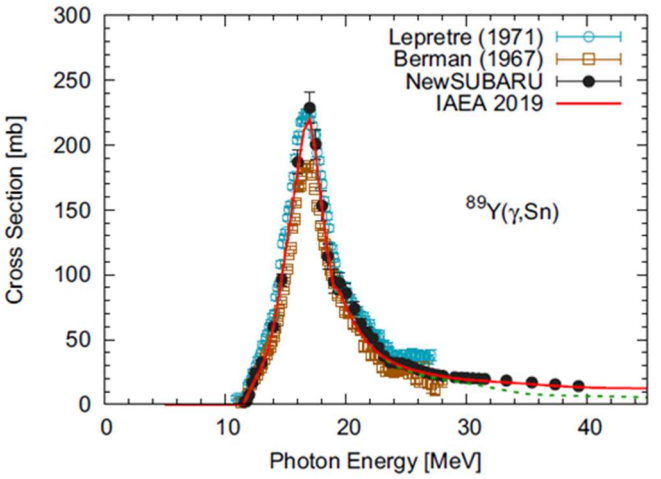
https://www-nds.iaea.org/photonuclear/

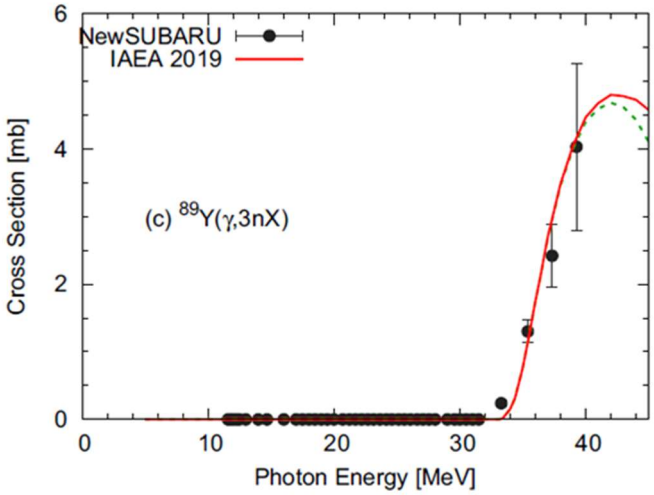
Photo-induced reaction cross section data are of importance for a variety of current or emerging applications, such as radiation shielding design and radiation transport analyses, calculations of absorbed dose in the human body during radiotherapy, physics and technology of fission reactors (influence of photoreactions on neutron balance) and fusion reactors (plasma diagnostics and shielding), activation analyses, safeguards and inspection technologies, nuclear waste transmutation, medical isotope production and astrophysical applications.

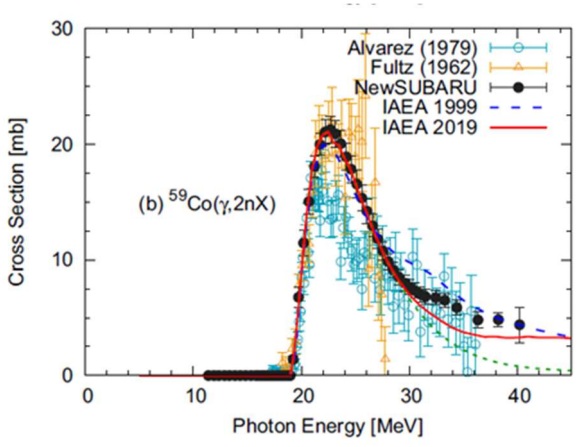
A new IAEA Evaluated Photonuclear Library IAEA-PD2019 was released and is documented in T. Kawano et al. Nuclear Data Sheets 163 (2020) 109–162. The new library includes 188 new evaluations produced by the IAEA Coordinated Research Project evaluators, and one evaluation was taken from the JENDL/PD-2016 library, while 20 evaluations were retained from the previous 1999 IAEA Photonuclear Data Library (IAEA-PD1999). In most of the cases, the photon energy goes up to 200 MeV. Extensive experimental measurements were also undertaken under the project which was of great help for new evaluations. A total of 55 nuclides are new in this library reflecting the progress in measurements but also the developing data needs. We made recommendations to the user community in cases where the experimental data are discrepant, and the assessments disagree. In addition, in the absence of experimental data, we present model predictions for photo-induced reaction cross section on nuclides of potential interest to medical radioisotope production.

The file format description, format corrections, and processing are explained in the report "Processing of the Evaluated Photonuclear Data Library (IAEA-PD2019)" IAEA-NDS-0232 which is in preparation.









Release of CENDL-3.2

The latest version of the Chinese Evaluated Nuclear Data Library, CENDL-3.2, has been released.
This is primarily the output of domestic cooperation coordinated by the Chinese Nuclear Data Centre (CNDC) but can also be regarded as a product of international collaborations, especially under the multi-lateral framework of IAEA.
In this update, CENDL-3.2 has enlarged the number of materials to 272, out of which 58 are brand new evaluations, 76 are partly revised and the remaining 138 are inherited from the previous version. As a noteworthy difference with the previous version, CENDL has now included covariance information for 70 fission product nuclei. Based on benchmarking test results, CENDL-3.2 shows a satisfactory performance and rational predictions for U5 and Pu systems. Any feedback from international testing is very welcome.

CENDL-3.2 is now available from various sources. The original release can be obtained from
http://www.nuclear.csdb.cn/CENDL-3.2/n-CENDL-3.2.zip

At NDS, CENDL3.2 is added to our ENDF database collection https://www-nds.iaea.org/endf/
and to our ENDF Archive:
https://www-nds.iaea.org/public/download-endf/CENDL-3.2/.

TENDL-2019 Pointwise2020

Users of nuclear data for applied calculations are maybe already aware of the ENDF/B-VIII data library in pointwise format available at https://www-nds.iaea.org/point/, processed using the PREPRO code suite.
This is now also provided for TENDL-2019 from
https://www-nds.iaea.org/Pointwise2020/.
This work represents the processing results for a subset of n-TENDL-2019 s30, including nuclear data only for incident neutrons, for 630 target nuclides, Z=1-100, Hydrogen to Fermium, including as target some 28 m (1st) isomeric states. This subset is the union of all targets for n-induced that exist in the currently available traditional libraries: JEFF-3.3, JENDL-4, CENDL-3.2 and ENDF/B-VIII.0. It would be fair to say that the technological processes behind TENDL are better equipped to model targets above Z=12 (Magnesium) whilst especially for fissile targets, it cannot yet achieve the quality required for the traditional applications. This is why not all evaluations are yet independent as the 24 following files are taken from ENDF/B-VIII.0: 1,2,3H, 3,4He, 6,7Li, 10,11B, 7,9Be, 12,13C, 14,15N, 16,17,18O, 19F, 232Th, 233,235,238U and 239Pu, mainly, but not only, to conserve fission reactor criticality estimates. It also means that in contrast to the 606 original TENDL-2019 s30 files, the 24 targets above are represented in a more restricted format.

AMD Unit Website

In March, the Atomic and Molecular Data Unit formally released its new website, **https://amdis.iaea.org/**. This service provides a more modern interface that works better with mobile devices, is integrated with a database backend for managing events, news, meetings and projects, and is easier to maintain. It also features a database of institutions, conferences and databases of relevance to fusion energy research called Clerval: **https://amdis.iaea.org/clerval/**. The web address **www-amdis.iaea.org** is still in operation, and hosts legacy resources and information.

Web addresses

The Nuclear Data Section web site can be now accessed using a simpler address:

nds.iaea.org

which is easier to type on mobile devices. The traditional web address **www-nds.iaea.org** is of course still valid, and any bookmark or link already existent will continue to work.

NDS Staff Items

We welcome **Charisse Monfero** who joined the Nuclear Data Section on 1 March 2020 as Team Assistant of the Nuclear Data Services Unit.
Prior to this position, Charisse worked as a Project Assistant in UNIDO from 2015 to 2018 and from November 2018 until February 2020 as a Team Assistant in NAPC-Physics Section. Charisse studied Business Administration in Europa-Wirtschaftsschulen.

NDS Meeting Reports

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

Consultants' Meeting on the Development and Implementation of a Database of DFT Calculations of Defects in Nuclear Materials

13-17 January 2020, Vienna, Austria
Scientific Secretary: C. Hill
4 participants and IAEA staff

The Atomic and Molecular Data Unit hosted a visit from two experts in the modelling of radiation damage in nuclear materials, Mihai Cosmin Mărinică and Alexandra Goryaeva, from the CEA Saclay Nuclear Research Centre, France. Over the course of the week they worked with Unit staff to design and implement the data model for a new database, DefectDB, for DFT calculations of radiation-induced defects. This resource will ultimately link to the existing CascadesDB of molecular dynamics simulations of collisional cascades in fusion materials and expose an API for retrieval and storage of data by collaborating institutions, including those within the upcoming, H2020 EURATOM project ENTENTE (European Database for Multiscale Modelling of Radiation Damage) project. The prototype database is available at https://db-amdis.org/defectdb/.

Selected Charts, Reports and Documents

INDC(AUS)-0022 Corrections for Neutron Source Cross Section Data Measured by Proton-Recoil Counter Telescopes in the Presence of Water-Spray Cooling of the Source, prepared by M. Drosg, May 2020.

INDC(EUR)-0036 Results of Time-of-Flight Transmission Measurements for ^{nat}Ag at a 10m Station of Gelina, prepared by L. Salamon, et al., March 2020.

INDC(EUR)-0035 Neutron Inelastic Scattering Cross Sections on ^{16}O and ^{28}Si, prepared by M. Boromiza, et al., February 2020.

INDC(NDS)-0813 Summary report of the Consultants' Meeting on Hydrogen Permeation in Fusion-relevant Materials, prepared by K. Heinola, May 2020.

INDC(NDS)-0812 Classification of Processes in Plasma Physics, Version 2.0, April 2020, prepared by C. Hill et al., June 2020.

INDC(NDS)-0811 Investigation of the Effects of Probability Density Function Kurtosis on Evaluated Data Results, prepared by D.L. Smith, D. Neudecker and R. Capote Noy, May 2020.

INDC(NDS)-0810 Evaluation of Thermal Neutron Capture Gamma Spectra, prepared by R. Capote and A. Trkov, May 2020.

INDC(NDS)-0809 Experimental Investigation of the Properties of Scission Neutrons in Thermal-Neutron Induced Fission of ^{233}U and ^{235}U, prepared by A.S. Vorobyev and O.A. Shcherbakov, February 2020.

INDC(NDS)-0808 Scission Neutrons from Thermal Neutron Induced Fission of ^{239}Pu and Spontaneous Fission of ^{252}Cf, prepared by A.S. Vorobyev and O.A. Shcherbakov, February 2020.

INDC(NDS)-0807 Scission Neutrons in Spontaneous and Neutron-Induced Fission: Effect on Prompt Fission Neutron Spectra, prepared by R.C. Haight, February 2020.

Available cost-free on request only for **teachers and scientists from developing countries:**

Chart of the Nuclides 2014 JAEA Nuclear Data Centre.

Karlsruher Nuklidkarte *Wall chart of the nuclides and folding chart with booklet, 10th edition (2018).*

In Memoriam

Evans Vaughan Hayward

We regret to inform you that Evans Hayward died at her home in Chevy Chase, Maryland of heart disease on 2 March 2020.
Evans was an international leader in photonuclear physics using beams of electrons, positrons and neutrons from high-energy accelerators to probe nuclear structure.
As a woman in times where there were only few women physicists she excelled in her field and was recognized for her hard work. Her extraordinary accomplishments could not have gone unrecognized and were greatly valued. She was a natural leader and travelled all over the world to participate in experiments at high-energy accelerators and to lecture at academic institutions.
She succeeded in making the photonuclear reactions library available in many laboratories, currently at the Moscow State University Institute of Nuclear Physics Centre for Photonuclear Experiments Data, the National Nuclear Data Center at Brookhaven National Laboratory, and at the IAEA Nuclear Data Section in Vienna, Austria, she made a number of measurements of photonuclear cross sections to contribute to the database.
Her engagement and success in so many fields, her readiness to learn even after she retired reaffirm what an extraordinary person and scientist she was.

Margarete Mattes

We regret to inform you that Mrs Mattes suddenly passed away on 2 April 2020. She will be remembered especially for her work on thermal neutron scattering data for JEFF. For almost 30 years she participated in the JEFF meetings and has contributed a substantial amount of work to improving and validating this Joint Evaluated Fission-Fusion file. Margarete contributed to improvement and validation of the Joint Evaluated Fission-Fusion file. She produced data libraries needed for deterministic, Monte Carlo and hybrid methods and was considered as one of the best experts of her time in nuclear data in Germany.
Her professionalism, high quality work, kindness and friendliness will always be appreciated and remembered.

Prof. Massimo Salvatores

With great sadness we learned of Prof. Salvatores passing away on 27 March 2020.
He will be greatly missed in the Reactor Physics and Nuclear Science community in particular for being a driving force behind it for more than 35 years.
He was one of the co-founders of the NEA Data Bank, JEF nuclear data file project, as well as one of the main drivers in the creation of the NSC Working Party on International Nuclear Data Evaluation Co-operation (WPEC).
He contributed to the field of nuclear physics also by educating and training young scientists. Even after his retirement he continued research activities on nuclear data, sensitivity and uncertainty analysis, on innovative data assimilation techniques and on advanced simulation and experimental validation. He contributed many important inputs to the international High Priority Request List, a valuable guide for the nuclear data community. He will be remembered not only for his outstanding achievements but also for his personal dedication to nuclear reactor physics and related science.

Michael (Mick) Moxon

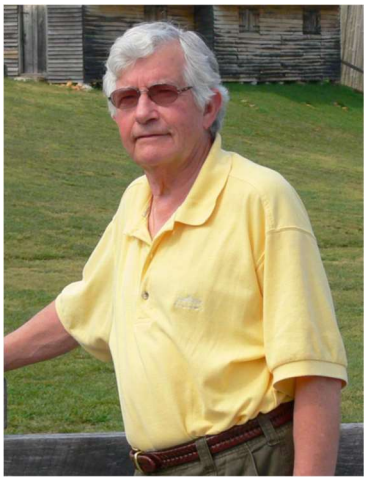
We were deeply saddened to have learned that Michael Moxon passed away on 12 May 2020.

Mick was one the rare scientists who had knowledge of both experimental physics and nuclear reaction theory, exemplified by the development of the well-known Moxon-Rae detector and the resonance shape analysis code REFIT.

Moxon-Rae detectors were the first real implementation of the total energy principle in neutron capture cross section measurements. Only years later came the suggestion by Maier - Leibnitz to use weighting functions for a more linear response. His depth of knowledge and skills are reflected in the way that REFIT is structured, how experimental effects are accounted for and how he was able to weight datasets for his evaluations.

His passion about his work was also reflected in the way he shared his knowledge with young scientists, in particular in experimental aspects and interpretation of data. His dedication, eagerness to learn and help others will be greatly missed.

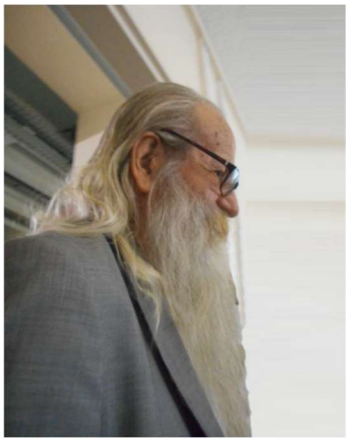
Hervé Derrien



We regret to inform you that we learned that Hervé Derrien passed away.

Throughout his carrier which started in 1975 as nuclear physicist at OECD Nuclear Energy Agency until his retirement from Oak Ridge National Laboratory, TN, USA in 2010 he was famous for his great knowledge and quality of work. His scientific achievements had major impact on the evaluated nuclear data libraries. The results of those achievements continue to be used worldwide. He will be remembered for his honesty and friendship.

Jacques Raynal



The sad news reached us that Jacques Raynal passed away.

He was one of the finest applied mathematicians specialised in particular in nuclear theories.

Among many of his activities was teaching on the use of his two codes DWBA/DWBB and ECIS at the Workshops on Applied Nuclear Theory and Nuclear Model Calculations for Nuclear Technology Applications, held at the International Centre of Theoretical Physics, Miramare, Trieste. His ECIS model is so unique and effective that it was included in other nuclear model codes handling a wider range of problems and is used throughout the world. He will be greatly missed.

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;
Website: http://www.nndc.bnl.gov/
Email: nndc@bnl.gov
For information regarding on-line services, contact: B. Pritychenko: pritychenko@bnl.gov
For information regarding general NNDC services, contact: Letty Krejci: lkrejci@bnl.gov

For services to customers in OECD/NEA Data Bank member countries:
NEA Data Bank, OECD Nuclear Energy Agency, 46, quai Alphonse Le Gallo
F-92100 Boulogne-Billancourt, France.
Tel. +33 1 4524 (plus extension); Fax +33 1 45241110;
Website: http://www.oecd-nea.org/databank/
Contact: M. Fleming, Tel.: +33 1 73 21 28 22, Email: michael.fleming@oecd-nea.org;.

For services to the customers from the former USSR:
Neutron data: Russia Nuclear Data Center, Centr Jadernykh Dannykh (CJD), Fiziko-Energeticheskij Institut, Ploschad Bondarenko,1,
249033 Obninsk, Kaluga Region, Russian Federation.
Tel. +7 08439-9-5803; Fax +7 08439-68235;
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;
Website: http://cdfe.sinp.msu.ru/
Contact: V.V. Varlamov, Email: varlamov@depni.sinp.msu.ru;.

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 10-6935-8119
Contact: Ge Zhigang, Email: gezg@ciae.ac.cn;

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 37831-6003, USA.
Tel. +1 865-574-6176; Fax +1 865-241-4046;
Email: pdc@ornl.gov

Computer codes of non-US origin to all countries (there may be release restrictions):
NEA Data Bank (see above)
Contact: A. Dufresne, Email: Alice.DUFRESNE@oecd.org, Tel.: +33 1 73 21 28 30

IAEA-NDS on-line services at Website https://nds.iaea.org/
Users in India, China, Russia and neighbouring countries may use
IAEA-NDS mirror websites:
http://www-nds.indcentre.org.in (India); http://www-nds.ciae.ac.cn/ (China); http://www-nds.atomstandard.ru/ (Russia).

Impressum

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