

Nuclear Data Section, International Atomic Energy Agency

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International Atomic Energy Agency





The world's centre for cooperation in the nuclear field, it seeks to promote the safe, secure and peaceful use of nuclear technologies.

Total of 174 Member States

Budget based on membership contributions

Promoting and supporting safe, secure and peaceful application of nuclear technologies





Promoting Nuclear Sciences and Applications for humanity and the planet



Assists member states in the use of nuclear and isotopic techniques science to meet their development objectives in areas of human health, food production, water management and environmental protection.

UN 2030 Agenda for Sustainable Development



Department of Nuclear Sciences

- Food and Agriculture
 - contribute to global food security and sustainable agricultural development worldwide
- > Human Health
 - support Member States' fight against cancer, cardiovascular diseases and malnutrition and other diseases using nuclear and nuclear-related techniques

Water Resources

- use isotope hydrology as an effective tool for water resources assessment and sustainable water management. Provide assistance on analytical services via its lsotope Hydrology Laboratory.
- Protection of the Marine and Terrestrial Environments
 - use nuclear and isotopic techniques to understand and strategies and tools for the environmental impacts of radionuclides, trace elements and organic contaminants, as well as climate change, habitat destruction and biodiversity loss.
- Physical and Chemical Sciences
 - assists Member States with capacity-building, research development in the nuclear sciences and supports them in using nuclear methods for a variety of practical industrial applications.



















Network coordination



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Coordinated Research Projects

Training



Meetings



Research laboratories



- Assist research on and development and practical use of atomic energy and its applications for peaceful purposes throughout the world
- Bring together research institutions from its developing and developed Member States to collaborate on research projects of common interest

Facts

ACTIVE: 197 CRPs

2015 – 2022: - initiated 90 Coordinated Research Projects

- signed about 1,800 research contracts and agreements,
- approved about 23 million euros payments to research institutes
- increased collaborating centres from 30 to over 60

Coordinated Research Projects - active



An Integrative Approach to Enhance Disease Resistance Against Fusarium Wilt (Foc TR4) in Banana – Phase II Coordinated Research Project | September 2022 | CRP Code: **D23033** | 2 - New - Collecting or Evaluating proposals

Assessing the Fate, and Environmental Impact of Plastics in Soil and Crop Ecosystems Using Isotopic Techniques Coordinated Research Project | September 2022 | CRP Code: D15021 | 2 - New - Collecting or Evaluating proposals

Total Energy Expenditure Across the Life Course in Low and Middle-Income Countries Coordinated Research Project | June 2022 | CRP Code: **E43037** | 2 - New - Collecting or Evaluating proposals

Understanding the Importance of Convective Rain Events and Tracing Their Impact on the Catchment with Isotopes Coordinated Research Project | June 2022 | CRP Code: F31007 | 2 - New - Collecting or Evaluating proposals

Development and Implementation of Cultural Heritage Preservation using Ionizing Radiation Technology Coordinated Research Project | June 2022 | CRP Code: **F22082** | 2 - New - Collecting or Evaluating proposals

Reproductive Biology of Male Aedes Mosquitoes for SIT Applications

Coordinated Research Project | June 2022 | CRP Code: D44005 | 2 - New - Collecting or Evaluating proposals

Nuclear Forensics Science to Bridge the Radiological Crime Scene to the Nuclear Forensics Laboratory Coordinated Research Project | June 2022 | CRP Code: **J02020** | 2 - New - Collecting or Evaluating proposals

The Potential of E-Learning Interventions for AI-assisted Contouring Skills in Radiotherapy Coordinated Research Project | May 2022 | CRP Code: **E33046** | 3 - Active - Ongoing

Organisational chart







Nuclear Data Section



To develop and disseminate nuclear data to all Member States

Basic Sciences: experiment + theory









JYFLTRAP Penning trap















Applications:

radiation shielding, medical dosimetry, reactor operation and safety, decommissioning, forensics, homeland security, cultural heritage, environmental monitoring







- libraries used in applications
- Documented to ensure traceability and reproducibility

Nuclear Data Services





Nuclear Data Services





Coordinated Research Projects



Updating Fission Yield Data for Applications Coordinated Research Project | August 2020 | CRP Code: F | 3 –Active - Ongoing

Recommended Input Parameter Library (RIPL) for Fission Cross Section Calculations

Coordinated Research Project | July 2015 | CRP Code: F41033 | 3 - Active - Ongoing

Updating the Photonuclear Data Library and Generating a Reference Database for Photon Strength Functions Coordinated Research Project | July 2015 | CRP Code: F41032 | 3 - Active - Ongoing

Testing and Improving the IAEA International Reactor Dosimetry and Fusion File (IRDFF) Coordinated Research Project | October 2012 | CRP Code: **F41031** | 3 - Active - Ongoing

Reference Database for Beta-Delayed Neutron Emission Evaluation Coordinated Research Project | September 2012 | CRP Code: F41030 | 3 - Active - Ongoing

International networks





EXFOR ENSDF

ENDF/B JEFF JENDL BROND

International Network of Nuclear Structure and Decay Data Evaluators





International Network of Nuclear Structure and Decay Data Evaluators

atomki.



JAEA

China Institute of Atomic Energy







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17 NSDD centres

Evaluated Nuclear Structure Data File (ENSDF)



probabilities...

- Continuously updated
- Complete



ICTP-IAEA Training Workshops



Objectives of the ICTP-IAEA workshop

- Introduce nuclear structure and decay data databases
- Familiarize with ENSDF evaluation methodology
- Attract new evaluators

Topics

- > Experimental techniques
- Nuclear theory
- Evaluation methodologies and policies
- Formats and codes
- Statistical methods

♠ Workshops on NSDD: Theory and Evaluation
IAEA-ICTP 2018
IAEA-ICTP 2016
IAEA-ICTP 2014
IAEA-ICTP 2012
IAEA-ICTP 2010
IAEA-ICTP 2008
IAEA-ICTP 2006
IAEA-ICTP 2005
Workshop 2003-part 2
Workshop 2003-part 1

'Pilot' Workshop on Nuclear Structure and
Decay Data, Vienna, 18-22 November 2002
(Report: INDC(NDS)-439)



1st IAEA-ICTP Workshop on Nuclear Structure and Decay Data, 17-28 November 2003, Trieste, Italy





Compilation & evaluation at ICTP-IAEA workshops



- Mass chain evaluation: published in Nuclear Data Sheets
 - 2012: A=211, Nuclear Data Sheets 114, 661 (2013)
 - 2014: A=227, Nuclear Data Sheets 132, 257 (2016)
 - 2016: A=217, Nuclear Data Sheets 147, 382 (2018)
 - 2018: A=218, Nuclear Data Sheets 160, 405 (2019)
- XUNDL compilation
 - 2016, 2018: 40 XUNDL datasets were uploaded into XUNDL

10th Joint ICTP-IAEA Workshop on Nuclear Structure and Decay Data: Experiment, Theory and Evaluation, 3 – 14 October 2022, Trieste



Lecturers:

Navin Alahari (GANIL, France) Xavier Mougeot (LHNB-Saclay, France) Silvia Lenzi (U. Padova-INFN, Italy) Dario Vretenar (U. Zagreb, Croatia)

NSDD evaluators:

Shamsuzzoha Basunia (LBNL, USA) Jun Chen (FRIB/MSU, USA) Tibor Kibedi (ANU, Australia) Filip Kondev (ANL, USA) Elizabeth A. McCutchan (BNL, USA) (DIR) Gopal Mukherjee (VECC, India) Balraj Singh (McMaster U., Canada)

IAEA:

Paraskevi (Vivian) Dimitriou (DIR) Marco Verpelli



Scientific Programme

Lectures



Week 1: Exercises



- Data retrieval (Live Chart), Marco Verpelli
- Codes
- MyEnsdf Webtools

XUNDL compilation

- Coordinator: Balraj Singh (presentation)
- Split in groups of 2: 6 groups
- Compilation of 2 articles per group in XUNDL dataset
- Group supervisors: Filip Kondev, Gopal Mukherjee, Vivian Dimitriou





ENSDF evaluation

- Coordinator: Balraj Singh
- A=222: Ra-222, Rn-222, Th-222
- Split in groups
- Group supervisors: Shamsuzzoha Basunia, Jun Chen, Vivian Dimitriou

Workshop material



- Manuals and guidelines
- Codes
- Lectures from previous workshops
- XUNDL papers
- Mass chain A=222 material

Questionnaire



- Feedback from participants on
 - Organizational aspects
 - Scientific program, lectures, exercises
- Closing
 - Certificates
 - Questionnaire

Women at the IAEA



The International Atomic Energy Agency is committed to gender equality and to supporting the ability of all individuals, regardless of gender, to equally contribute to and benefit from its programmes and activities.

> "Gender equality and the empowerment of women lie at the heart of the Sustainable Development Goals and they are vital to fully realizing the rights and potential of everyone. These fundamental aims must also inform our work at the IAEA."

> - IAEA Director General, Rafael Mariano Grossi



empowering women in nuclear through targeted education and training, including its Marie Sklodowska-Curie fellowship programme.

Supporting more women in nuclear



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The Marie Sklodowska-Curie Fellowship Programme (MSCFP) aims to help increase the number of women in the nuclear field, supporting an inclusive workforce of both men and women who contribute to and drive global scientific and technological innovation.

The Programme aims to inspire and encourage young women to pursue a career in the nuclear field, by providing highly motivated female students with scholarships for Master's programmes and an opportunity to pursue an internship facilitated by the IAEA.

https://www.iaea.org/about/overview/gender-at-the-iaea/iaea-marie-sklodowska-curie-fellowships-programme



Enjoy the workshop!

Thank you!