

### Nuclear Data @ IAEA/Nuclear Data Section

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### International Atomic Energy Agency

≻~″ AEA



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

Total of 170 Member States

Total budget of 1Billion USD

### Working at the IAEA



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#### Employment

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The IAEA offers challenging assignments in a stimulating multicultural workplace. It has around 2,500 staff members from over 100 countries with expertise in a variety of scientific, technical, managerial and professional disciplines. Most staff members work at the Agency's headquarters in Vienna, Austria.

Current Vacancies

Apply for Internships

### International Atomic Energy Agency: Departments/Divisions



Nuclear Applications



The Department of Nuclear Sciences and Applications helps countries use nuclear and isotopic techniques to promote sustainable development objectives in agriculture, human health, water resource management, marine environment and industrial applications. Read more →

#### Nuclear Energy



The Department of Nuclear Energy fosters the efficient and safe use of nuclear power by supporting nuclear programmes around the world, catalyzing innovation and building capability in energy planning, analysis, and nuclear information and knowledge. Read more →

Safety & Security



The Department of Nuclear Safety and Security works to provide a strong, sustainable and visible global nuclear safety and security framework, protecting people and the environment from the harmful effects of ionizing radiation. Read more →

Safeguards



The Department of Safeguards carries out the duties and responsibilities of the IAEA as the world's nuclear inspectorate, performing anindispensable role in global efforts to stop the spread of nuclear weapons. Read more →

#### **Technical Cooperation**



Cooperation helps countries to improve their scientific and technological capabilities in the peaceful applications of nuclear technology, thus contributing to sustainable development. Read more →



# Division of Physical and Chemical Sciences

#### Division of Physical and Chemical Sciences

- Physics Section
- Radioisotope Products and Radiation rechnology Section
   Nuclear Data Section
   Isotope Hydrology Section

The Division assists Member States with capacity-building, research and development in the nuclear sciences and supports them in using nuclear methods for a variety of practical industrial applications. It supports needs-based development efforts through coordinated research projects and provides assistance on scientific and technical aspects of IAEA technical cooperation projects.

#### **Events**

22 – 27 Oct 2018 Ahmedabad, India 27th IAEA Fusion Energy Conference (FEC 2018)

#### 28 - 30 Nov 2018

#### Vienna, Austria

Ministerial Conference on Nuclear Science and Technology: Addressing Current and Emerging Development Challenges



# To develop and disseminate nuclear data



#### Basic Sciences: experiment + theory





JYFLTRAP Penning trap









Applications:

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









How?

Network coordination

Coordinated Research Projects

Training



Meetings

### **Coordinated Research Projects**



- CRP on Nuclear Data for Charged-particle Monitor Reactions and Medical Isotope Production: https://www-nds.iaea.org/medportal/
- CRP on Testing and Improving the International Reactor Dosimetry and Fusion File (IRDFF) : https://www-nds.iaea.org/IRDFFtest/
- ONGOING: CRP on Photonuclear Data and Photon Strength Functions http://www-nds.iaea.org/CRPphotonuclear/









NDS role

Network coordination

Support (technical, projects, partial financial)

Training: ICTP-IAEA, Advanced IAEA

Meetings

### **NSDD** website

Members Alejandro Sonzogni (BNL) Elizabeth McCutchan (BNL) Ashok K. Jain (IIT-	INTERNATIONAL NETWORK OF NUCLEAR STRUCTURE AND DECAY DATA EVALUATORS (NSDD)	NSDD Network     What is NSDD?     Status of NSDD network     List of NSDD network     institutes and contacts
Roorkee) Dong Yang (Univ. Jilin) Hideki Jimura (1464)	Scientific Secretary: Paraskevi Demetriou	☆ Evaluation Tools
John Kelley (TUNL) Tibor Kibedi (ANU)	What is the NSDD network? Find out here.	(V. Zerkin) ENSDF Manual
Lee Bernstein (LBNL) Ivan Mitropolsky (PNPI) Balraj Singh (McMaster)	23rd Technical Meeting of the NSDD network	ENSDF Procedures Guidelines for ENSDF half-life evaluations Specialized Workshop fo
Janos Timar (ATOMKI) Michael Smith (ORNL) Ge Zhigang (CNDC)	The 23rd Technical Meeting of the NSDD network will be held on 1-5 April 2019, at the IAEA Headquarters in Vienna. More information about the meeting will be sent out to members of the NSDD network in due course.	ENSDF Codes Improvement of ENSDF
Alexandru Negret (IFIN- HH) Jun Chen (MSU)		∧ NSDD Meetings     22nd Meeting 2017
Arjan Koning (IAEA)	Improvement of Analysis Codes for NSDD evaluations Progress in the development of new analysis codes and editors for NSDD evaluations as well as improvements in existing codes and further needs will be	21st Meeting 2015 20th Meeting 2013
Advisors Jagdish K. Tuli	discussed at the Technical Meeting on Improvement of Analysis Codes for NSDD Evaluations, 3-7 December 2018, IAEA, Vienna.	19th Meeting 2011 18th Meeting 2009
Timothy Johnson Shamsuzzoha Basunia	and discuss the recommendations of the 22nd NSDD meeting held in 2017.	16th Meeting 2005 15th Meeting 2003
Richard Firestone Coral M. Baglin Edgardo Browne-Moreno	Joint ICTP-IAEA Workshop on Nuclear Structure and Decay Data: Theory, Experiment and Evaluation	14th Meeting 2000
Murray J. Martin Caroline D. Nesaraja	The next ICTP-IAEA Workshop will be held from 15 to 26 October 2018, at the ICTP, Miramare, Trieste. The workshop poster can be downloaded here.	NSDD: Theory and Evaluation ICTP-IAEA 2016
Mike Thoennessen	Directors: P. Dimitriou (IAEA), E.A. Miccutchan (BNL), Local Organiser: C. TUNIZ (ICTP).	ICTP-IAEA 2014 ICTP-IAEA 2012

### Evaluated Nuclear Structure Data File (ENSDF)







The primary objective of the ICTP-hosted workshop was to familiarize nuclear physicists and engineers from both developed and developing countries with

- modern nuclear models;
- relevant experimental techniques;
- statistical analyses procedures to derive recommended data sets;
- evaluation methodologies for nuclear structure and decay data;
- international efforts to produce the Evaluated Nuclear Structure Data File (ENSDF)



☆ Workshops on NSDD: Theory and Evaluation

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 (INDC(NDS)-439)



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



### Workshop Program

- Participants are introduced to both the theory and measurement of nuclear structure data, statistical techniques, formats and procedures and the use of computer codes to evaluate decay data
- Detailed presentations are given by invited lecturers, along with computer exercises and workshop tasks



### Workshop exercises

- Database search
- Running computer codes
- Evaluating individual nuclides
- Since 2012: mass chain evaluation

A = 211 published in Nuclear Data Sheets 114, 661 (2013)

A = 227 published in Nuclear Data Sheets 132, (2016)

A = 217 published in Nuclear Data Sheets , (2018)

• New in 2016:

Compilation of XUNDL datasets (25)

Joint ICTP-IAEA Workshop on Nuclear Structure and Decay Data: Experiment, Theory and Evaluation, 15 -26 Oct. 2018, Trieste

- Lectures on experimental techniques, nuclear models, shell model practical (code)
- Hands-on exercises: XUNDL datasets, evaluation of mass chain A=218

#### Lecturers:

P. Regan (Surrey) P. Van Isacker (GANIL) S. Lenzi (LNL)

E. McCutchan (BNL) (DIR)

M. Martin (ORNL) F. Kondev (ANL) B. Singh (McMaster) T. Kibedi (ANU) S. Basunia (LBL)

IAEA:

M. Verpelli V. Zerkin P. Dimitriou (DIR) Joint ICTP-IAEA Workshop on Nuclear Structure and Decay Data: Theory, Experiment and Evaluation

#### 15 - 26 October 2018 Trieste, Italy

The workshop infroduces young and exhibitished nuclear scientists. In the exhibition of nuclear shuthers and decard status to perividing on overview of experimental and theoretical nuclear techniques and basic training in the evolution procedures and formals involved in the production of the Evolutied Nuclear Shuthers Data Ne. (NEDP).

#### Description: Topics

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#### How to apply:

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Deadline:

30 June 2018

Directors:

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Speakers:

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Definition (Restauritude Service)

Local Organizer:



# Participants of ICTP-IAEA (Workshop on NSDD, 15-26 Oct.

1Africa	Algeria	Algeria	KAIM Samra
2Africa	Tunisia	Tunisia	DERBALI Ezzeddine
3Asia	Bangladesh	Bangladesh	KOBRA Monira
4Asia	India	India	BALA Indu
5Asia	India	India	BONDYOPADHAYA Debasmita
6Asia	India	India	CHAKRABARTI Ritwika
7Asia	India	India	NANDI Soumen
8Asia	India	France	SINGH Abhilasha
9Asia	India	India	SINGH Papinder
10Asia	Japan	Japan	KOURA Hiroyuki
11Asia	Malaysia	Australia	TEE Bryan
13Europe	Romania	Romania	OLACEL Adina-Adriana
14Europe	Spain	Canada	CABALLERO FOLCH Roger
15Europe	Ukraine	Ukraine	CHEKHOVSKA Anastasiia
16Europe	Ukraine	Ukraine	KASPEROVYCH Dmytro
17Europe	United Kingdom	United Kingdom	CANAVAN Rhiann
18North America	USA	USA	GRINDER Mara

### Week 1: XUNDL

- Split in groups of 2: 9 groups
- Compilation of 1 article per group in XUNDL dataset
- Group supervisors: Filip Kondev (coordinator), Murray Martin, Tibor Kibedi

### ENSDF Exercise: Oct 22-26, 2018 Evaluation of nuclides of A=218 for ENSDF database.

Experimentally 11 nuclides of A=218 are known (Z=82-92, N=136-126). Current data in ENSDF/ NDS: January 2006 update (~13 years old). **Tasks:** addition of new papers, update for decay Q values in AME-2016, revision of internal conversion coefficients from BrIcc code, log *ft*, HF, etc. Pb-218, Bi-218, At-218, Pa-218, U-218: nuclear data available for only The ground states, and a high-spin isomer in U-218: already updated by Balraj Singh: see material on CD. Comments on draft welcome. Po-218, Rn-218: Libby McCutchan.

Ra-218	Murray Martin.
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Fr-218, Th-218: Balraj Singh.

Also relevant are data for  $\alpha$ -parents and daughters in A=222 and A=214 chains.

Each group of 3 participants to work on a nuclide. More details 2<sup>nd</sup> week. Please sign up. c/o; B. Singh

### Ultimate goals of workshop

- Outreach: make nuclear structure & decay data evaluation known to nuclear scientists (ENSDF and derivative databases (LiveChart, Nudat), NSR, analysis codes)
- Attract new evaluators maintain ENSDF expertise: this workshop is the first step



## Enjoy the workshop!

Thank you!

### International Atomic Energy Agency

- Safeguards
- Nuclear Energy
- Nuclear Safety
- Nuclear Applications



Nuclear Data Section Division of Physical and Chemical Sciences