

# NDPCI Progress report: Nuclear Data Activities in India 2016-2017



On behalf of NDPCI  
Lalremruata Bawitlung  
Department of Physics  
Mizoram University  
Aizawl-796004, India



Map not to Scale

Copyright © 2012 www.mapsofindia.com

This map is updated as on September 26, 2012

NRDC-2017, IAEA's Headquarters, Vienna 23 to 26<sup>th</sup> May 2017.

# CONTENTS

I. Conference organized(NDPCI Specific)

II. EXFOR Compilation activities

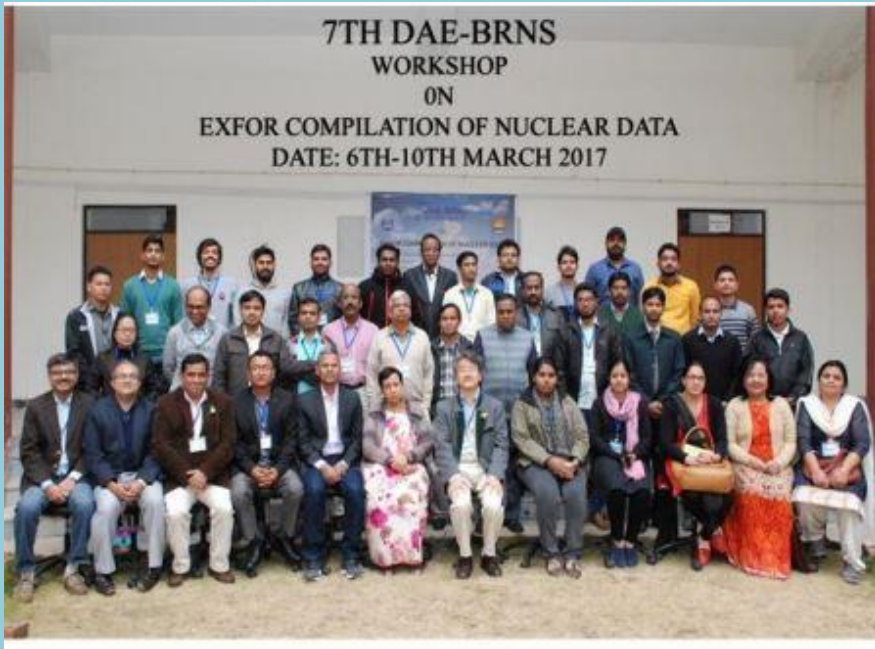
III. Other developments(Nuclear Data  
Measurements, Softwares, EXFOR-I)

# I. Conference organized

1. Nuclear Reaction and Applications, BARC, 2-12<sup>th</sup> November 2016
2. 7<sup>th</sup> DAE-BRNS Workshop on Compilation of Experimental Nuclear Reaction Data(EXFOR-2017), NEHU, Shillong, India 6-10<sup>th</sup> March 2017
3. Error Propagation in Nuclear Reaction Data Measurement (EPNRDM-2017), Mizoram University, Aizawl, 13-14<sup>th</sup> March 2017.

## EXFOR-2017

7TH DAE-BRNS  
WORKSHOP  
ON  
EXFOR COMPILATION OF NUCLEAR DATA  
DATE: 6TH-10TH MARCH 2017



## EPNRDM-2017

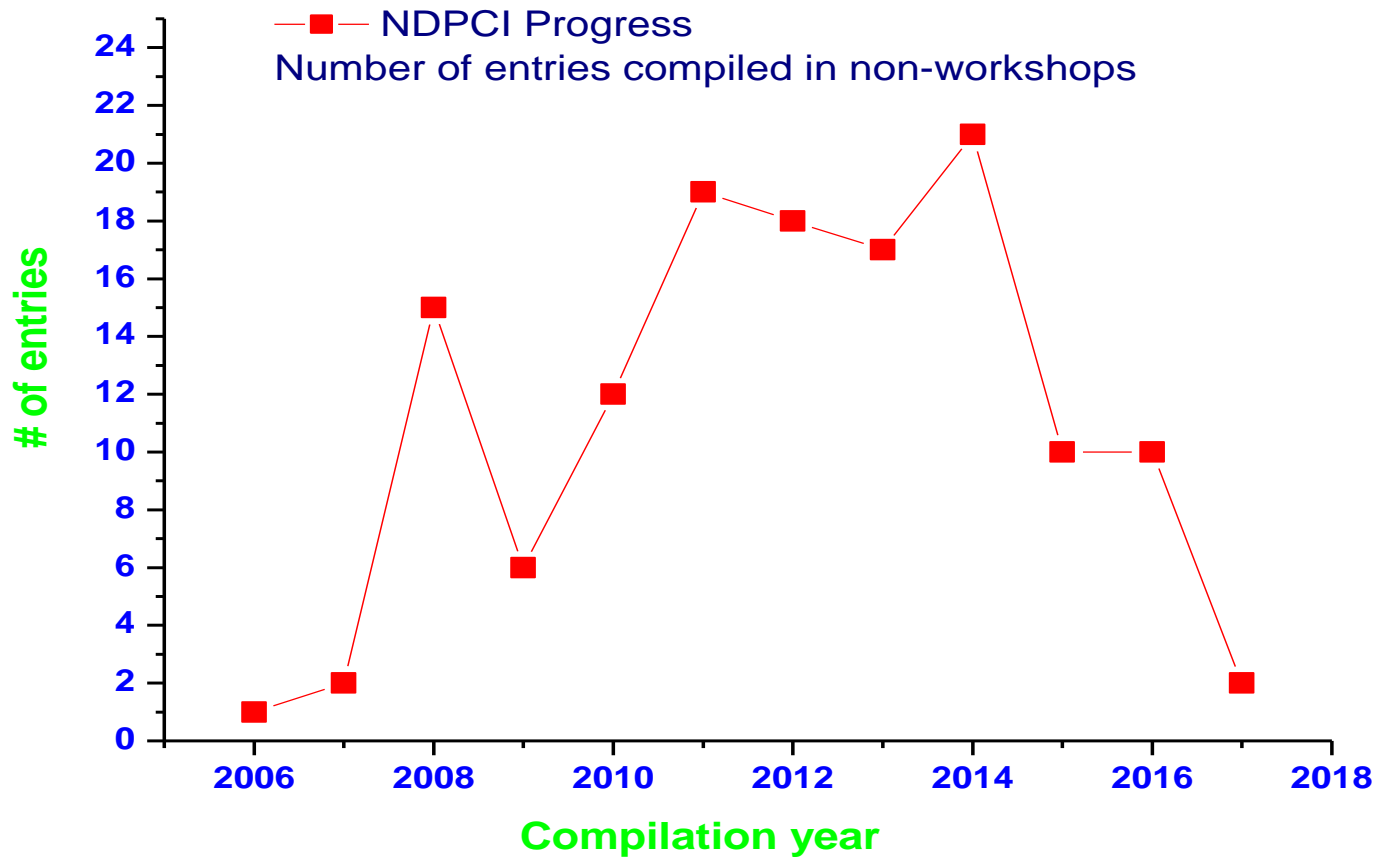


*NRDC-2017, IAEA's Headquarters, Vienna 23 to 26<sup>th</sup> May 2017.*

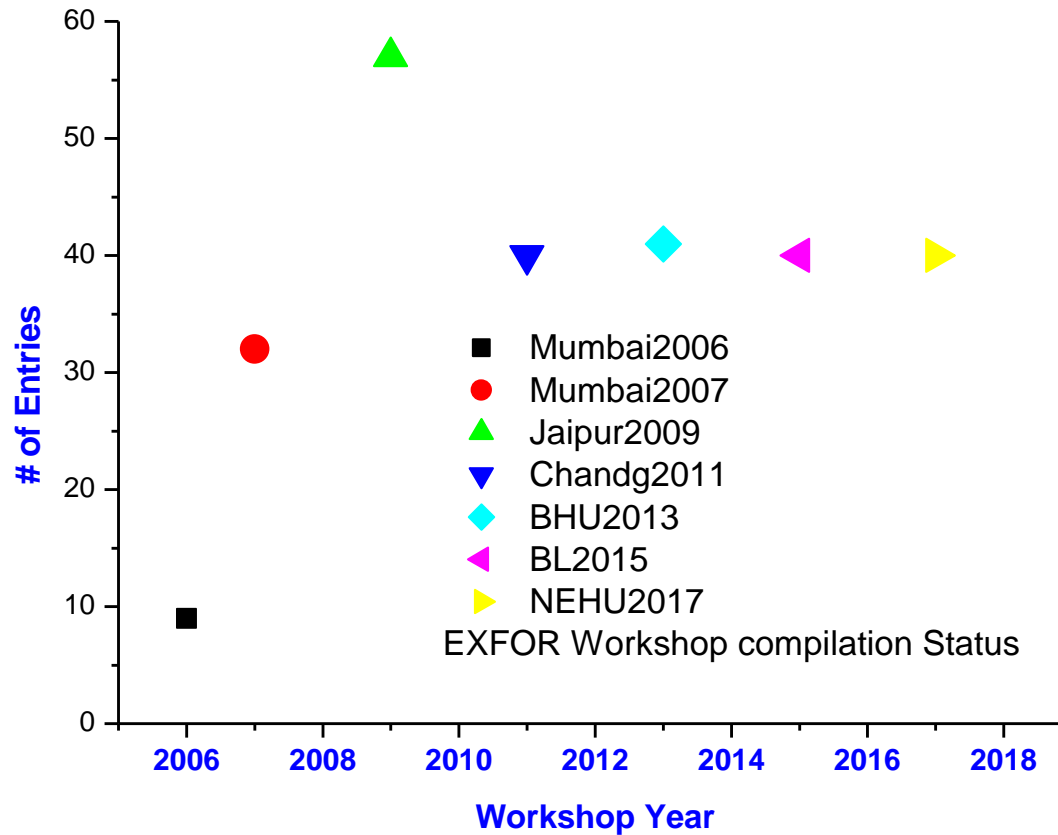
*The Fourth DAE-BRNS Theme Meeting on  
Generation and use of Covariance Matrices in the  
Applications of Nuclear Data\**

*December 09-13, 2017*

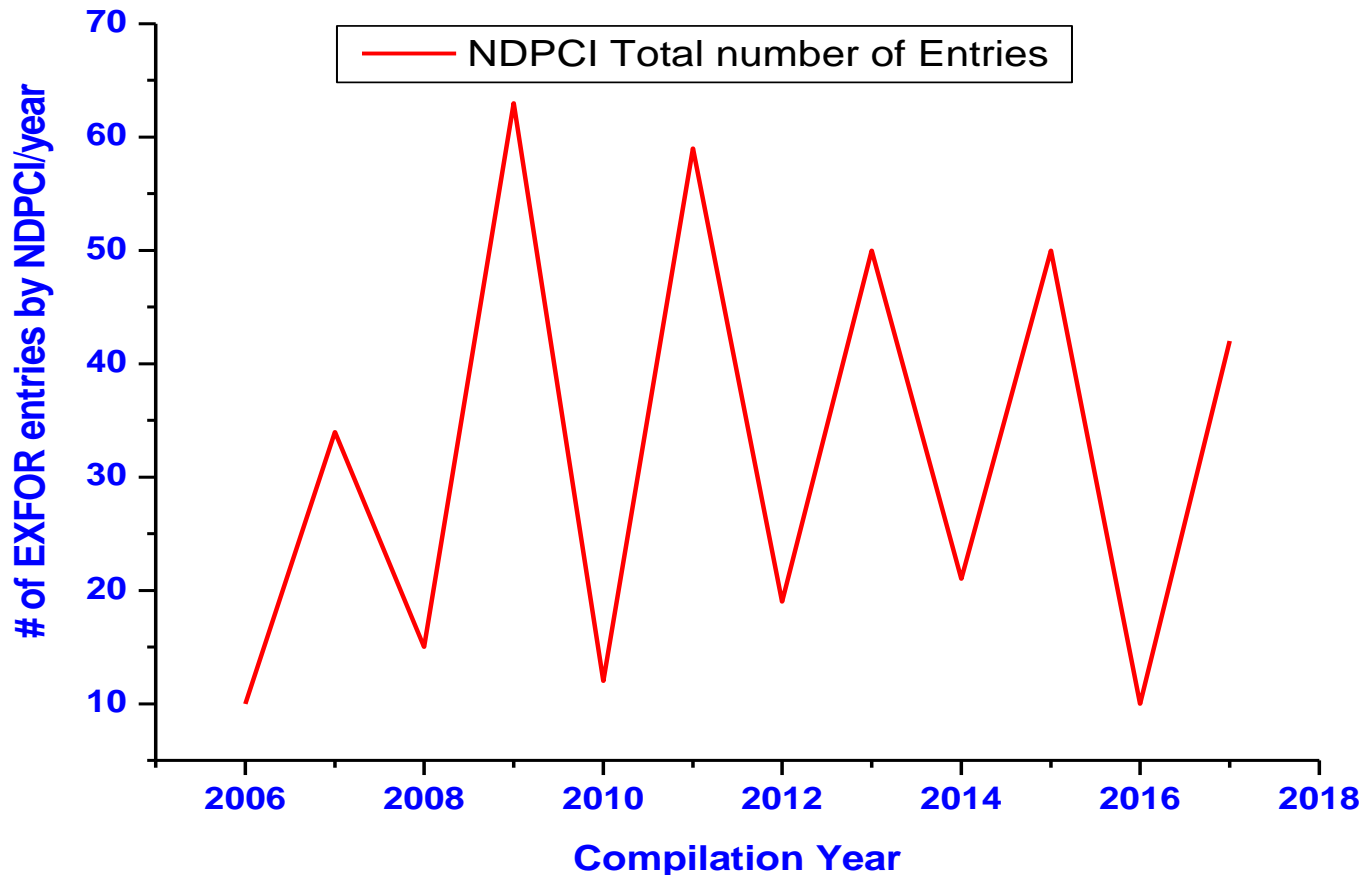
# Total number of entries for non workshop/regular activity since 2006



# Total number of entries for workshop since 2006



Total number of entries since 2006 = 385 including 2017 workshop which is 1.7% of entries in EXFOR database





During 2016-2017, NDPCI submitted **52** entries to NDS

From Regular compilation activity = 23%

Charged particle induced = **34** Entries

Neutron induced reactions = **18** Entries

From EXFOR workshop = 77 %

About 90% entries are recent publications.

All new articles published till 2016 are completed, few old articles from Vidya's scanning remains

# III. Other developments(Nuclear Data Measurements, Softwares, EXFOR-I)

## III. 1. Nuclear Data Measurements

### Neutron Induced Cross section Measurement:

En(MeV)	Reaction	Facility	Source	Group
0.5 – 2 MeV	$^{70}\text{Zn}(n,g)^{71}\text{Zn}^m$	FOTIA, BARC	$^7\text{Li}(p,n)^7\text{Be}$	MZU
2 - 15 MeV	$^{232}\text{Th}(n,g)^{233}\text{Th}$ $^{232}\text{Th}(n,2n)^{231}\text{Th}$ $^{238}\text{U}(n,g)^{239}\text{U}$ $^{238}\text{U}(n,2n)^{237}\text{U}$	CCW, BARC	D-D, D-T	BARC
6 – 13 MeV	92-U-238(N,F)ELEM/MASS,CUM,FY 92-U-238(N,F)MASS,CHN,FY 92-U-238(N,F),SEC,AP,LF 92-U-238(N,F),SEC,AP,HF	14 UD Pelletron	$^7\text{Li}(p,n)^7\text{Be}$	BARC
Thermal	56-BA-138(N,G)56-BA-139,,SIG 56-BA-138(N,G)56-BA-139,,RI 59-PR-141(N,G)59-PR-142,,SIG 59-PR-141(N,G)59-PR-142,,RI	Am-Be		Manipal Univ.
7 – 20 MeV	26-FE-55(N,X)1-H-1,,SIG	14 UD Pelletron	6Li beam	IPR/BARC
1 – 5 MeV	25-MN-55(N,G)25-MN-56,,SIG	14 UD Pelletron	$^7\text{Li}(p,n)^7\text{Be}$	MSU/BARC

# Charged particle and Heavy ion induced reactions

28-NI-64(3-LI-7,EL)28-NI-64,,DA,,RTH  
28-NI-64(3-LI-7,NON),,,SIG,,,DERIV  
78-PT-198(6-C-12,FUS),,,SIG,ER

13-AL-27(D,HE3)12-MG-26,PAR,DA

28-NI-64(3-LI-7,2N)31-GA-69,IND,SIG  
28-NI-64(3-LI-7,3N)31-GA-68,,SIG  
28-NI-64(3-LI-7,3N)31-GA-68,,SIG  
28-NI-64(3-LI-7,X)30-ZN-69,IND,SIG  
28-NI-64(3-LI-7,X)30-ZN-68,IND,SIG  
41-NB-93(3-LI-7,EL)41-NB-93,,DA  
41-NB-93(3-LI-7,X)3-LI-7,PAR,DA  
41-NB-93(3-LI-7,X+T)2-HE-4,,DA,T+A  
41-NB-93(3-LI-7,X)3-LI-6,PAR,DA  
41-NB-93(3-LI-7,X)4-BE-8,PAR,DA  
41-NB-93(3-LI-7,X)2-HE-4,,SIG  
41-NB-93(3-LI-7,X)4-BE-8,PAR,SIG  
41-NB-93(3-LI-7,X)3-LI-6,PAR,DA  
41-NB-93(3-LI-7,X)3-LI-7,PAR,DA

41-NB-93(3-LI-7,5N)44-RU-95,,SIG  
41-NB-93(3-LI-7,X)43-TC-96,,SIG  
41-NB-93(3-LI-7,X)43-TC-95,CUM?,SIG  
41-NB-93(3-LI-7,X)42-MO-93-M,,SIG

6-C-12(6-C-12,X)3-LI-6,,DA  
6-C-12(6-C-12,X)3-LI-7,,DA  
6-C-12(6-C-12,X)4-BE-7,,DA  
6-C-12(6-C-12,X)4-BE-9,,DA  
6-C-12(6-C-13,X)3-LI-6,,DA  
6-C-12(6-C-13,X)3-LI-7,,DA  
6-C-12(6-C-13,X)4-BE-7,,DA  
50-SN-112(3-LI-6,X)3-LI-6,PAR,DA  
50-SN-112(3-LI-6,X+D)2-HE-4,,DA,D+A  
50-SN-112(3-LI-6,EL)50-SN-112,,DA,,RTH  
50-SN-112(3-LI-6,X)3-LI-5,,DA  
50-SN-112(3-LI-6,X)4-BE-8,,DA  
50-SN-112(3-LI-6,X)2-HE-4,,SIG  
50-SN-112(3-LI-6,X)3-LI-6,PAR,SIG  
50-SN-112(3-LI-6,X+D)2-HE-4,,SIG  
50-SN-112(3-LI-6,X)3-LI-5,,SIG  
50-SN-112(3-LI-6,X)4-BE-8,,SIG

## Charged particle and Heavy ion induced reactions continued ->

28-NI-58(6-C-12,X)ELEM/MASS,,DA  
28-NI-58(6-C-12,X)4-BE-8,PAR,DA  
26-FE-56(6-C-12,X)ELEM/MASS,,DA  
26-FE-56(6-C-12,X)4-BE-8,PAR,DA  
28-NI-58(6-C-12,EL)28-NI-58,,DA,,RTH  
28-NI-58(6-C-12,NON),,SIG,,,DERIV

70-YB-174(8-O-16,FUS),,SIG,ER  
70-YB-176(8-O-16,FUS),,SIG,ER

65-TB-159(9-F-19,4N)74-W-174,,SIG  
65-TB-159(9-F-19,5N)74-W-173,,SIG  
65-TB-159(9-F-19,6N)74-W-172,,SIG  
65-TB-159(9-F-19,X)73-TA-173,IND,SIG

69-TM-169(14-SI-28.F),,DA,FF,RSD  
70-YB-176(14-SI-28,F),,DA,FF,RSD  
71-LU-175(14-SI-28,F),,DA,FF,RSD

72-HF-180(14-SI-28,F),,DA,FF,RSD  
73-TA-181(14-SI-28,F),,DA,FF,RSD  
74-W-182(14-SI-28,F),,DA,FF,RSD  
69-TM-169(14-SI-28.F),,SIG  
70-YB-176(14-SI-28,F),,SIG  
71-LU-175(14-SI-28,F),,SIG  
72-HF-180(14-SI-28,F),,SIG  
73-TA-181(14-SI-28,F),,SIG  
74-W-182(14-SI-28,F),,SIG

65-TB-159(8-O-16,2N)73-TA-173..SIG  
65-TB-159(8-O-16,X)72-HF-173,(CUM),SIG  
65-TB-159(8-O-16,3N)73-TA-172,,SIG  
69-TM-169(8-O-16,2N)77-IR-183,,SIG  
90-TH-232(5-B-10,SCT)90-TH-  
232,PAR,DA,,RTH  
90-TH-232(5-B-11,SCT)90-TH-  
232,PAR,DA,,RTH  
90-TH-232(5-B-10,NON),,SIG,,,DERIV  
90-TH-232(5-B-11,NON),,SIG,,,DERIV

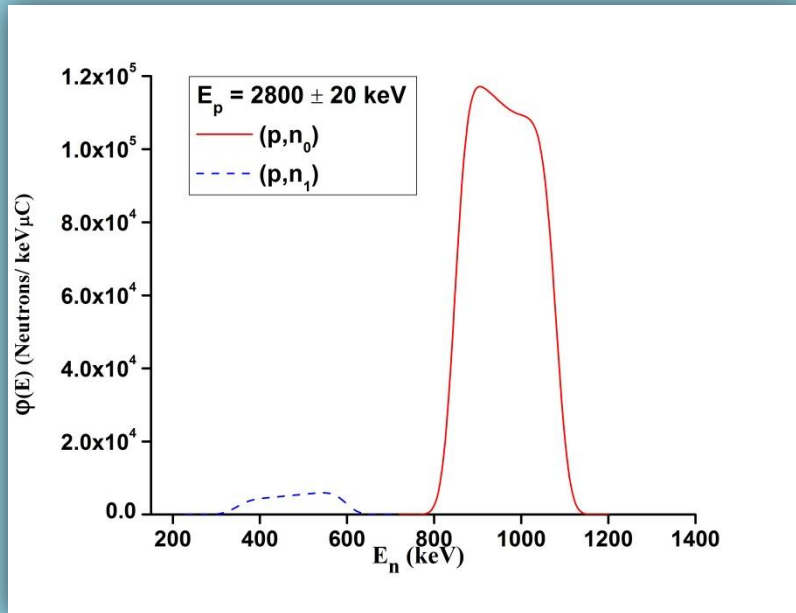
## III. 2. Software Developments- EPEN

${}^7\text{Li}(p,n){}^7\text{Be}$  neutron spectrum code(EPEN) from threshold to 4 MeV have been developed in collaboration with NDS, IAEA.

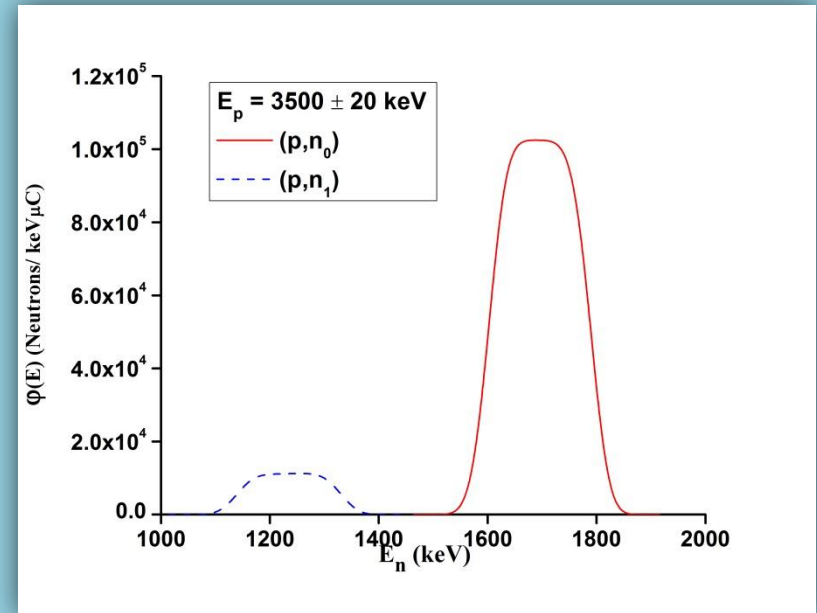
In India, the FOTIA(Folded Tandem Ion Accelerator) and 14 UD Pelletron Facility at TIFR, Mumbai are the facility used for performing neutron induced cross section measurement using  ${}^7\text{Li}(p,n){}^7\text{Be}$  as neutron source.

However, due to the continuous beam structure and low flux, ToF technique can not be employed for neutron energy-flux spectrum for data reduction procedure. Experimentalist therefore has to rely on simulated neutron spectra.

# EPEN neutron energy spectrum at $E_p = 2800 \pm 20$ keV and $3500 \pm 20$ keV



$$\langle E_{p,n0} \rangle = 0.96 \text{ MeV}$$

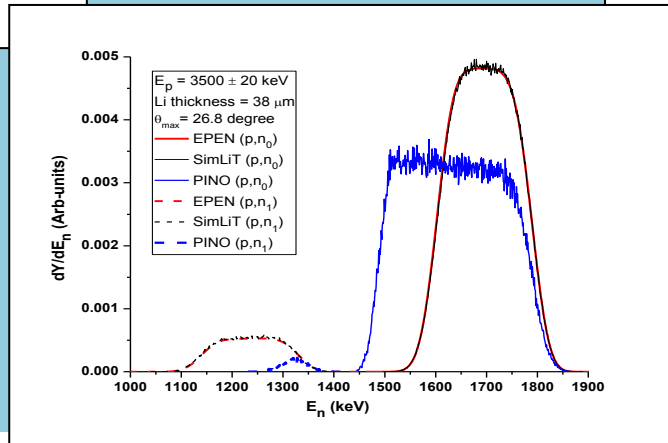
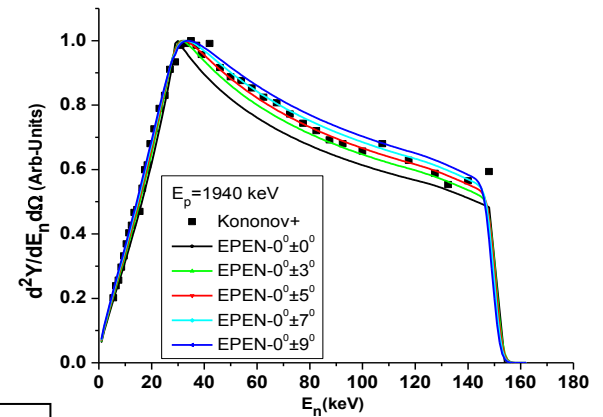
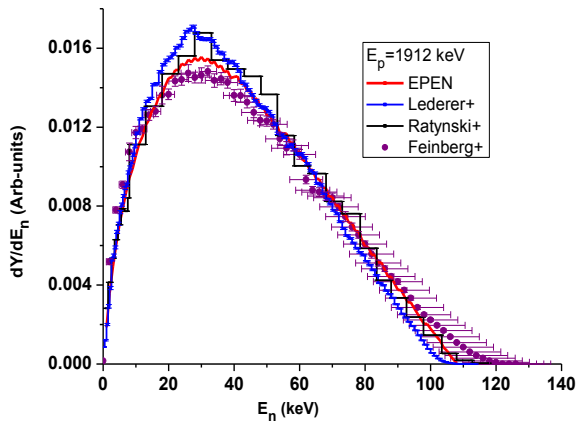


$$\langle E_{p,n1} \rangle = 1.69 \text{ MeV}$$

Such neutron spectra are utilized for experimental data analysis and for background neutron simulations using Monte Carlo codes

# Validation

EPEN  
reproduces  
experimental  
spectra well



NUCLEAR SCIENCE AND ENGINEERING  
© American Nuclear Society  
DOI: <http://dx.doi.org/10.1080/00295639.2017.1291053>



## Thick and Thin Target ${}^7\text{Li}(p,n){}^7\text{Be}$ Neutron Spectra Below the Three-Body Breakup Reaction Threshold

Rebecca Pachua<sup>a</sup>, B. Lalremruata<sup>a\*</sup>, N. Otuka<sup>b</sup>, L. R. Hlondo<sup>a</sup>, L. R. M. Punte<sup>a</sup>, and H. H. Thanga<sup>a</sup>

<sup>a</sup>Mizoram University, Department of Physics, Tanhril, Aizawl, Mizoram 796004, India

<sup>b</sup>International Atomic Energy Agency, Nuclear Data Section, Division of Physical and Chemical Sciences, Department of Nuclear Sciences and Applications, Wien A-1400, Austria

Received September 2, 2016  
Accepted for Publication January 13, 2017

**Abstract** — Recently, we measured the  ${}^{70}\text{Zn}(n,\gamma){}^{71}\text{Zn}^m$  activation cross sections using the  ${}^7\text{Li}(p,n){}^7\text{Be}$  neutron source for  $2.0\text{ MeV} < E_p < 3.7\text{ MeV}$ . Since the time-of-flight and multiple foil activation techniques

PHYSICAL REVIEW C **95**, 024619 (2017)

## Measurements of neutron capture cross sections on $^{70}\text{Zn}$ at 0.96 and 1.69 MeV

L. R. M. Punte,<sup>1</sup> B. Lalremruata,<sup>1,\*</sup> N. Otuka,<sup>2</sup> S. V. Suryanarayana,<sup>4</sup> Y. Iwamoto,<sup>3</sup> Rebecca Pachuau,<sup>1</sup> B. Satheesh,<sup>1</sup>  
H. H. Thanga,<sup>1</sup> L. S. Danu,<sup>4</sup> V. V. Desai,<sup>4</sup> L. R. Hlondo,<sup>1</sup> S. Kailas,<sup>4</sup> S. Ganesan,<sup>5</sup> B. K. Nayak,<sup>4</sup> and A. Saxena<sup>4</sup>

<sup>1</sup>*Department of Physics, Mizoram University, Tanhril-796004, Aizawl, India*

<sup>2</sup>*Nuclear Data Section, Division of Physical and Chemical Sciences, Department of Nuclear Science and Application,  
International Atomic Energy Agency, A-1400 Wien, Austria*

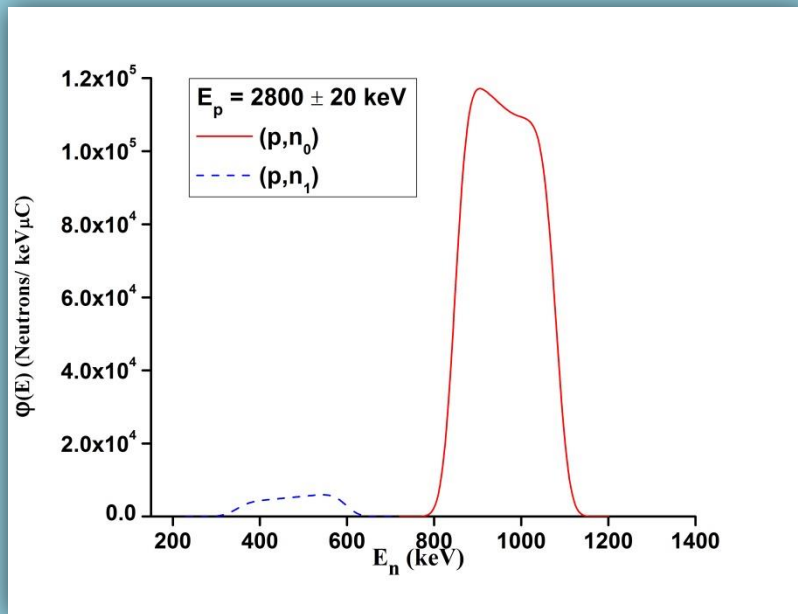
<sup>3</sup>*Japan Atomic Energy Agency, Tokai-mura, Naka-gun, Ibaraki 319-1195, Japan*

<sup>4</sup>*Nuclear Physics Division, BARC, Mumbai-40085, India*

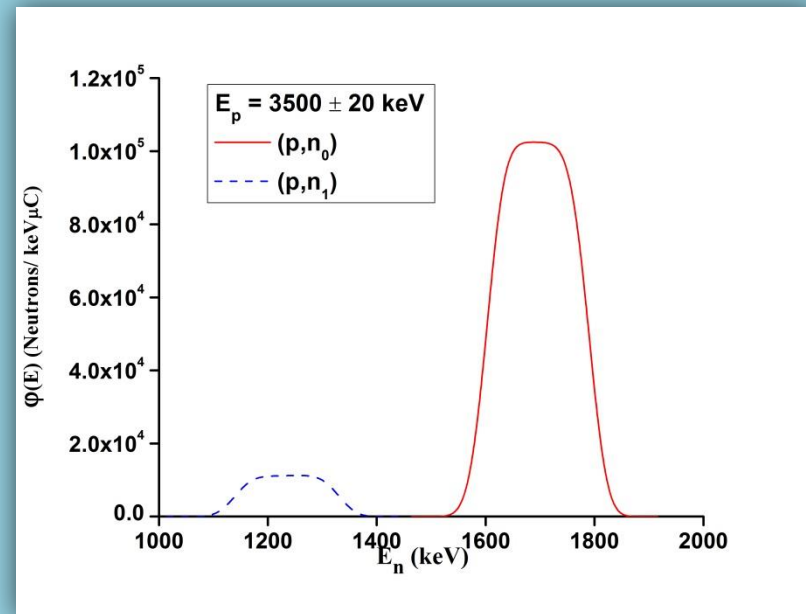
<sup>5</sup>*Reactor Physics Design Division, BARC, Mumbai-40085, India*

(Received 24 November 2016; revised manuscript received 10 January 2017; published 28 February 2017)





$$\langle E_{p,n0} \rangle = 0.96 \text{ MeV}$$



$$\langle E_{p,n1} \rangle = 1.69 \text{ MeV}$$

PHYSICAL REVIEW C 95, 024619 (2017)

## Measurements of neutron capture cross sections on $^{70}\text{Zn}$ at 0.96 and 1.69 MeV

L. R. M. Punte,<sup>1</sup> B. Lalremruata,<sup>1,\*</sup> N. Otuka,<sup>2</sup> S. V. Suryanarayana,<sup>4</sup> Y. Iwamoto,<sup>3</sup> Rebecca Pachuau,<sup>1</sup> B. Satheesh,<sup>1</sup> H. H. Thanga,<sup>1</sup> L. S. Danu,<sup>4</sup> V. V. Desai,<sup>4</sup> L. R. Hlondo,<sup>1</sup> S. Kailas,<sup>4</sup> S. Ganesan,<sup>5</sup> B. K. Nayak,<sup>4</sup> and A. Saxena<sup>4</sup>

<sup>1</sup>Department of Physics, Mizoram University, Tanhril-796004, Aizawl, India

<sup>2</sup>Nuclear Data Section, Division of Physical and Chemical Sciences, Department of Nuclear Science and Application, International Atomic Energy Agency, A-1400 Wien, Austria

<sup>3</sup>Japan Atomic Energy Agency, Tokai-mura, Naka-gun, Ibaraki 319-1195, Japan

<sup>4</sup>Nuclear Physics Division, BARC, Mumbai-40085, India

<sup>5</sup>Reactor Physics Design Division, BARC, Mumbai-40085, India

(Received 24 November 2016; revised manuscript received 10 January 2017; published 28 February 2017)

## III. 2. Software Developments- EXFOR-I

### **“EXFOR-I” Editor**

Being developed and tested by Abhijit Bhattacharyya

- Nuclear Data Physics Centre (NDPCI)
  - Bhabha Atomic Research Centre
    - Mumbai
    - INDIA

- EXFOR-I is an Indian initiative like Russian and Japanese.
- EXFOR-I is platform independent, offline, simple and minimalist software.
- EXFOR-I automates simple jobs.
- EXFOR-I provides handles for CHEX and JANIS checker besides it's own simple checker.
- EXFOR-I will provide live hints for possible error during compilation.
- EXFOR-I uses IAEA dictionaries without any further modification for the code resulting in easy update

# EXFOR-I (Launch)

The screenshot displays a Linux desktop environment. On the left, a terminal window titled "Terminal - vega on Aditya: /home/vega/distribution" shows the following output:

```
Aditya-> ll
total 448
drwxr-xr-x 4 vega users 4096 May 3 10:21 checker/
drwxr-xr-x 2 vega users 4096 May 3 10:21 CSS/
drwxr-xr-x 2 vega users 4096 May 3 10:25 dict/
drwxr-xr-x 2 vega users 4096 May 3 10:26 EXFOR_Compiled_Files/
-rw-r--r-- 1 vega users 3425 May 3 10:21 EXFOR-I.html
-rw-r--r-- 1 vega users 411777 May 3 10:21 EXFOR-I.jar
-rw-r--r-- 1 vega users 831 May 3 10:21 EXFOR-I.jnlp
drwxr-xr-x 2 vega users 4096 May 3 10:21 IAEA_CODES/
-rw-r--r-- 1 vega users 2199 May 4 15:23 logFile.txt
-rw-r--r-- 1 vega users 805 May 3 10:21 root.png
-rwxr-xr-x 1 vega users 34 May 3 10:21 runEXFOR.exe*
drwxr-xr-x 2 vega users 4096 May 3 10:21 web-files/
Aditya->
Aditya->
Aditya-> java -jar ./EXFOR-I.jar
```

On the right, an application window titled "EXFOR-I :: INDIAN EXFOR :: Tool by Dr. Abhijit Bhattacharyya, (NPD :: NDPCI), BARC, Mumbai, INDIA" is open. The window contains a table with the following header:

Check	Order	Entry Num	Set	Entry Date	Set
No content in table					

The desktop environment includes a taskbar at the bottom with various application icons and a system tray showing the time as 3:24:13 PM (Kolkata) on Thursday 4 May 2017.

# EXFOR-I (Launch)

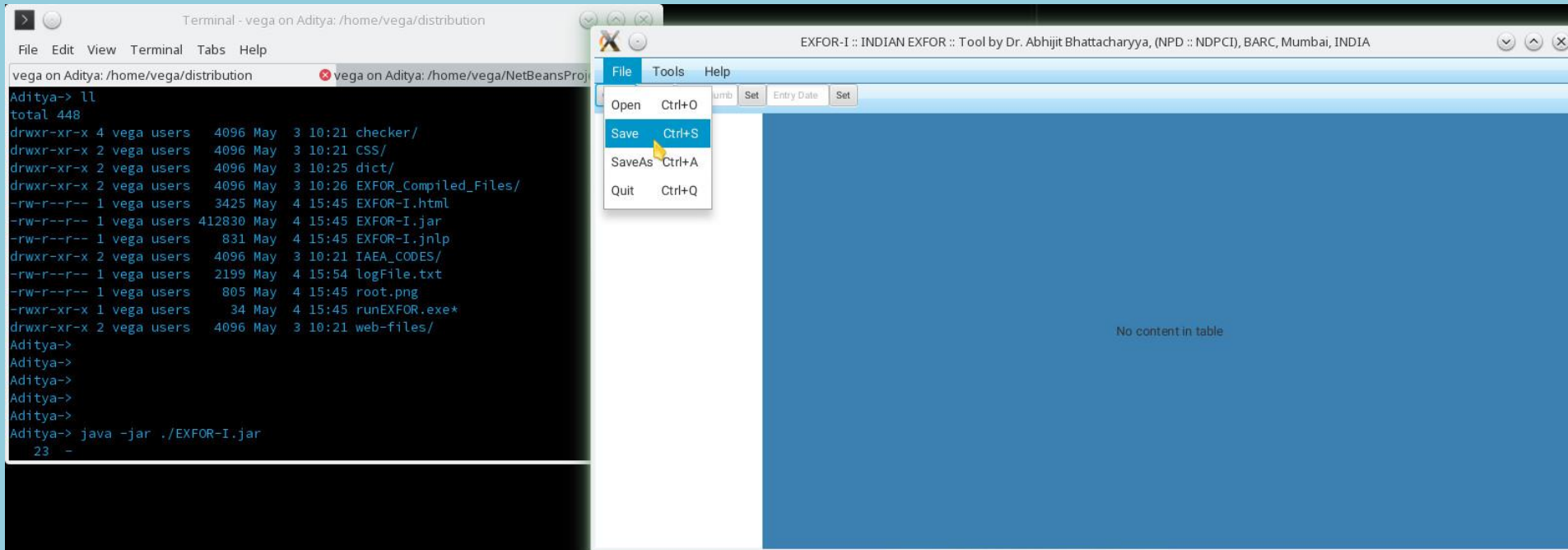
The image shows a desktop environment with two windows. The left window is a terminal titled 'Terminal - vega on Aditya: /home/vega/distribution'. It displays the output of the 'ls' command, listing files and directories including EXFOR-I.html, EXFOR-I.jar, EXFOR-I.jnlp, IAEA\_CODES/, logFile.txt, root.png, runEXFOR.exe\*, and web-files/. Below the listing, the command 'java -jar ./EXFOR-I.jar' is entered. The right window is a web browser titled 'EXFOR-I :: INDIAN EXFOR :: Tool by Dr. Abhijit Bhattacharyya, (NPD :: NDPCI), BARC, Mumbai, INDIA'. The browser's content area is blue and displays the message 'No content in table'. The system tray at the bottom shows the time as 3:24:13 PM (Kolkata) on Thursday 4 May 2017.

EXFOR-I could be launched by clicking the "jar" file  
or  
by "java -jar EXFOR-I.jar" from the command prompt.

# EXFOR-I (File Menu options)

The screenshot displays a Linux desktop environment with two windows open. On the left is a terminal window titled "Terminal - vega on Aditya: /home/vega/distribution". The terminal shows the output of a 'll' command, listing files and directories with their permissions, owners, sizes, and dates. The files listed include 'checker/', 'CSS/', 'dict/', 'EXFOR\_Compiled\_Files/', 'EXFOR-I.html', 'EXFOR-I.jar', 'EXFOR-I.jnlp', 'IAEA\_CODES/', 'logFile.txt', 'root.png', 'runEXFOR.exe\*', and 'web-files/'. The terminal prompt is 'Aditya->' and the last command entered is 'java -jar ./EXFOR-I.jar'. On the right is a web browser window titled "EXFOR-I :: INDIAN EXFOR :: Tool by Dr. Abhijit Bhattacharyya, (NPD :: NDPCI), BARC, Mumbai, INDIA". The browser's address bar shows the URL 'http://vega.on Aditya: /home/vega/NetBeansProj...'. The browser's menu bar includes 'File', 'Tools', and 'Help'. The 'File' menu is open, showing options: 'Open Ctrl+O', 'Save Ctrl+S', 'SaveAs Ctrl+A', and 'Quit Ctrl+Q'. The main content area of the browser is blue and contains the text 'No content in table'. The desktop environment includes a taskbar at the bottom with various application icons and a system tray showing the time '3:58:34 PM (Kolkata)' and the date 'Thursday 4 May 2017'.

# EXFOR-I (File Menu options)



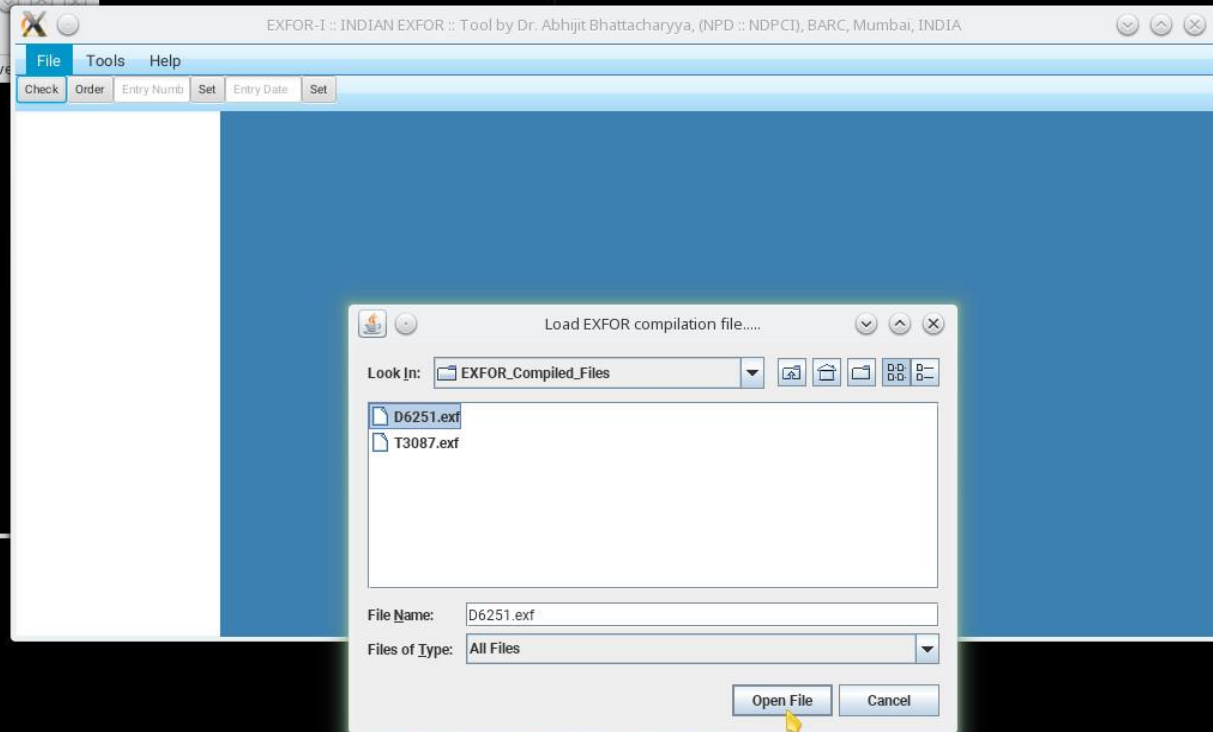
An old file can be opened from “File menu.

Also file in edit can be saved from “File” menu.



# EXFOR-I (File open dialog)

```
Terminal - vega on Aditya: /home/vega/distribution
File Edit View Terminal Tabs Help
vega on Aditya: /home/vega/di... x vega on Aditya: /home/vega/N... x vega on Aditya: /home/vega/...
Aditya-> ll
total 444
drwxr-xr-x 4 vega users 4096 May 3 10:21 checker/
drwxr-xr-x 2 vega users 4096 May 3 10:21 CSS/
drwxr-xr-x 2 vega users 4096 May 3 10:25 dict/
drwxr-xr-x 2 vega users 4096 May 4 16:50 EXFOR_Compiled_Files/
-rw-r--r-- 1 vega users 3425 May 4 15:45 EXFOR-I.html
-rw-r--r-- 1 vega users 412830 May 4 15:45 EXFOR-I.jar
-rw-r--r-- 1 vega users 831 May 4 15:45 EXFOR-I.jnlp
drwxr-xr-x 2 vega users 4096 May 3 10:21 IAEA_CODES/
-rw-r--r-- 1 vega users 0 May 4 15:57 logFile.txt
-rw-r--r-- 1 vega users 805 May 4 15:45 root.png
-rwxr-xr-x 1 vega users 34 May 4 15:45 runEXFOR.exe*
drwxr-xr-x 2 vega users 4096 May 3 10:21 web-files/
Aditya-> █
```





# EXFOR-I (File open dialog)

The image shows a Linux desktop environment. On the left, a terminal window displays the output of a 'ls' command in the directory /home/vega/distribution. The output lists various files and directories with their permissions, owners, sizes, and dates. On the right, the EXFOR-I application is open, showing a 'Load EXFOR compilation file....' dialog box. The dialog box is set to the directory 'EXFOR\_Compiled\_Files' and shows two files: 'D6251.exf' and 'T3087.exf'. The 'File Name' field is set to 'D6251.exf' and the 'Files of Type' is set to 'All Files'. The 'Open File' button is highlighted with a mouse cursor.

```
Aditya-> ll
total 444
drwxr-xr-x 4 vega users 4096 May 3 10:21 checker/
drwxr-xr-x 2 vega users 4096 May 3 10:21 CSS/
drwxr-xr-x 2 vega users 4096 May 3 10:25 dict/
drwxr-xr-x 2 vega users 4096 May 4 16:50 EXFOR_Compiled_Files/
-rw-r--r-- 1 vega users 3425 May 4 15:45 EXFOR-I.html
-rw-r--r-- 1 vega users 412830 May 4 15:45 EXFOR-I.jar
-rw-r--r-- 1 vega users 831 May 4 15:45 EXFOR-I.jnlp
drwxr-xr-x 2 vega users 4096 May 3 10:21 IAEA_CODES/
-rw-r--r-- 1 vega users 0 May 4 15:57 logFile.txt
-rw-r--r-- 1 vega users 805 May 4 15:45 root.png
-rwxr-xr-x 1 vega users 34 May 4 15:45 runEXFOR.exe*
drwxr-xr-x 2 vega users 4096 May 3 10:21 web-files/
Aditya->
```

“File -> OPEN” opens a dialog box showing EXFOR files. The directory can be changed while this directory is default for loading and saving so that all EXFOR files may be available in one single directory.

# EXFOR-I (Loaded file ordered)

The image shows a Linux desktop environment with a terminal window on the left and the EXFOR-I application window on the right.

**Terminal Window:** Shows the output of the `ll` command, listing files and directories in the `/home/vega/distribution` directory. The files include `checker/`, `CSS/`, `dict/`, `EXFOR_Compiled_Files/`, `EXFOR-I.html`, `EXFOR-I.jar`, `EXFOR-I.jnlp`, `IAEA_CODES/`, `logFile.txt`, `root.png`, `runEXFOR.exe*`, and `web-files/`. The terminal also shows the command `java -jar ./EXFOR-I.jar &` being executed.

**EXFOR-I Application Window:** The title bar reads "EXFOR-I :: INDIAN EXFOR :: Tool by Dr. Abhijit Bhattacharyya, (NPD :: NDPCI), BARC, Mumbai, INDIA". The interface includes a menu bar (File, Tools, Help) and a toolbar with buttons for "Check", "Order", "Entry Num", "Set", and "20170224". The main area is divided into a tree view on the left and a data table on the right.

**Tree View (Left):**

- ENTRY D6251
  - SUBENT D6251001
    - BIB
      - SUBENT
      - BIB
      - TITLE
      - AUTHOR
      - INSTITUTE
      - REFERENCE
      - FACILITY
      - SAMPLE
      - INC-SOURCE
      - DETECTOR
      - ADD-RES
      - STATUS
      - HISTORY
      - ENDBIB
      - NOCOMMON
      - ENDSUBENT
      - ENDBIB
      - ENDSUBENT
    - SUBENT D6251002
      - BIB
      - SUBENT
      - BIB

**Data Table (Right):**

ENTRY	D6251	20170224	D62510000001
SUBENT	D6251001	20170505	D625100100001
BIB	11	25	D625100100002
TITLE	Measurement of the excitation functions in alpha-induced reactions on 93-Nb from threshold energy to 39.5 Mev.		D625100100003
AUTHOR	(Muhammad Shahid, Kwangsoo Kim, Guinyun Kim, Muhammad Zaman, Muhammad Nadeem, Haladhara Naik, Mansoureh Tatar, R Guin, S K Das)		D625100100006
INSTITUTE	(3INDFEC)		D625100100009
REFERENCE	(J, KPS, 67, 1474, 2015)		D625100100010
FACILITY	(CYCLO, 3INDFEC)		D625100100011
SAMPLE	Nb (99%) foil of 17.5 um thick and Natural Cu (>99%) foil of 10 um thick are stacked to make 8 sets of Nb-Cu. In one experiment Nb-Cu is followed by Nb-Nb while in the other Al foil of 25 um is followed by Nb-Cu stack.		D625100100012
INC-SOURCE	1	(ATOMI) Alpha beam (~10 mm dia / 120 nA / 45 mins)	D625100100017
	2	(ATOMI) Alpha beam (~10 mm dia / 60 nA / 90 mins)	D625100100018
DETECTOR	(HPGE, SPEC) An n-type coaxial HPGe spectrometer with FWHM of 1.9 keV at 1332.5 keV gamma ray photopeak of Co-60 coupled to a PC based 4096 channel analyzer having Gamma Vision 5.0 software.		D625100100019
ADD-RES	(COMP) Experimental results compared with theoretical values obtained from TENDL-2013 library based on computer code TALYS 1.6		D625100100023
STATUS	(TABLE) Table 2 of J, KPS, 67, 1474, 2015		D625100100026
HISTORY	(20170224C) Abhijit+BL		D625100100027

# EXFOR-I (Loaded file ordered)

Loaded file has been ordered

```
Terminal - vega on Aditya: /home/vega/distribution
File Edit View Terminal Tabs Help
Aditya-> ll
total 444
drwxr-xr-x 4 vega users 4096 May 3 10:21 checker/
drwxr-xr-x 2 vega users 4096 May 3 10:21 CSS/
drwxr-xr-x 2 vega users 4096 May 3 10:25 dict/
drwxr-xr-x 2 vega users 4096 May 4 16:50 EXFOR_Compiled_Files/
-rw-r--r-- 1 vega users 3425 May 5 11:42 EXFOR-I.html
-rw-r--r-- 1 vega users 412965 May 5 11:42 EXFOR-I.jar
-rw-r--r-- 1 vega users 831 May 5 11:42 EXFOR-I.jnlp
drwxr-xr-x 2 vega users 4096 May 3 10:21 IAEA_CODES/
-rw-r--r-- 1 vega users 0 May 5 11:42 logFile.txt
-rw-r--r-- 1 vega users 805 May 5 11:42 root.png
-rwxr-xr-x 1 vega users 34 May 5 11:42 runEXFOR.exe*
drwxr-xr-x 2 vega users 4096 May 3 10:21 web-files/
Aditya->
Aditya->
Aditya->
Aditya->
Aditya-> java -jar ./EXFOR-I.jar &
```

EXFOR-I :: INDIAN EXFOR-I by Dr. Abhijit Bhattacharyya, (NPD :: NDPCI), BARC, Mumbai, INDIA

File Tools Help

Check Order Entry Numbr Set 20170224 Set

ENTRY	D6251	20170224	D62510000001
SUBENT	D6251001	20170505	D625100100001
BIB	11	25	D625100100002
TITLE	Measurement of the excitation functions in alpha-induced reactions on 93-Nb from threshold energy to 39.5 MeV.		D625100100003
AUTHOR	(Muhammad Shahid, Kwangsoo Kim, Guinyun Kim, Muhammad Zaman, Muhammad Nadeem, Haladhara Naik, Mansoureh Tatar, R Guin, S K Das)		D625100100004
INSTITUTE	(3INDVEC)		D625100100005
REFERENCE	(J, KPS, 67, 1474, 2015)		D625100100006
FACILITY	(CYCLO, 3INDVEC)		D625100100007
SAMPLE	Nb (99%) foil of 17.5 um thick and Natural Cu (>99%) foil of 10 um thick are stacked to make 8 sets of Nb-Cu. In one experiment Nb-Cu is followed by Nb-Nb-Nb while in the other Al foil of 25 um is followed by Nb-Cu stack.		D625100100008
INC-SOURCE	1	(ATOMI) Alpha beam (~10 mm dia / 120 nA / 45 mins)	D625100100009
	2	(ATOMI) Alpha beam (~10 mm dia / 60 nA / 90 mins)	D625100100010
DETECTOR	(HPGE, SPEC) An n-type coaxial HPGe spectrometer with FWHM of 1.9 keV at 1332.5 keV gamma ray photopeak of Co-60 coupled to a PC based 4096 channel analyzer having Gamma Vision 5.0 software.		D625100100011
ADD-RES	(COMP) Experimental results compared with theoretical values obtained from TENDL-2013 library based on computer code TALYS 1.6		D625100100012
STATUS	(TABLE) Table 2 of J, KPS, 67, 1474, 2015		D625100100013
HISTORY	(20170224C) Abhijit+BL		D625100100014

# EXFOR-I (Type entry number to create new EXFOR file)

```
Terminal - vega on Aditya: /home/vega/distribution
File Edit View Terminal Tabs Help
Aditya-> ll
total 444
drwxr-xr-x 4 vega users 4096 May 3 10:21 checker/
drwxr-xr-x 2 vega users 4096 May 3 10:21 CSS/
drwxr-xr-x 2 vega users 4096 May 3 10:25 dict/
drwxr-xr-x 2 vega users 4096 May 5 11:50 EXFOR_Compiled_File
-rw-r--r-- 1 vega users 3425 May 5 11:42 EXFOR-I.html
-rw-r--r-- 1 vega users 412965 May 5 11:42 EXFOR-I.jar
-rw-r--r-- 1 vega users 831 May 5 11:42 EXFOR-I.jnlp
drwxr-xr-x 2 vega users 4096 May 3 10:21 IAEA_CODES/
-rw-r--r-- 1 vega users 0 May 5 12:24 logfile.txt
-rw-r--r-- 1 vega users 805 May 5 11:42 root.png
-rwxr-xr-x 1 vega users 34 May 5 11:42 runEXFOR.exe*
drwxr-xr-x 2 vega users 4096 May 3 10:21 web-files/
Aditya->
Aditya->
Aditya->
Aditya-> java -jar EXFOR-I.jar &
```

The screenshot shows the EXFOR-I application window titled "EXFOR-I :: INDIAN EXFOR :: Tool by Dr. Abhijit Bhattacharyya, (NPD :: NDPCI), BARC, Mumbai, INDIA". The window has a menu bar with "File", "Tools", and "Help". Below the menu bar, there are several buttons: "Check", "Order", "D12345", "Set", "Entry Date", and "Set". The main area of the application is a large blue rectangle with the text "No content in table" centered. A small dialog box is overlaid on the application, titled "Warning !!!..y Number...", with an information icon and the text "ENTRY Number WRONG Format". The dialog box has an "OK" button and a mouse cursor pointing at it.

# EXFOR-I (Type entry number to create new EXFOR file)

Enter the ENTRY NUMBER in BOX

The screenshot shows a terminal window on the left and the EXFOR-I application window on the right. The terminal displays the output of a 'ls' command and the execution of 'java -jar EXFOR-I.jar &'. The EXFOR-I application window has a menu bar with 'File', 'Tools', and 'Help'. Below the menu bar are buttons for 'Check', 'Order', 'Set', 'Entry Date', and 'Set'. A red arrow points from the text box above to the 'Order' button. A dialog box is open in the center of the application window with the title 'Warning!!!y Number...' and the message 'ENTRY Number WRONG Format'. The dialog box has an 'OK' button. The background of the application window is blue and contains the text 'No content in table'.

# EXFOR-I (Type entry number to create new EXFOR file)

Enter the ENTRY NUMBER in BOX

Click SET

The image shows a terminal window on the left and the EXFOR-I application window on the right. The terminal window displays the following output:

```
Aditya-> ll
total 444
drwxr-xr-x 4 vega users 4096 May 3 10:21 checker/
drwxr-xr-x 2 vega users 4096 May 3 10:21 CSS/
drwxr-xr-x 2 vega users 4096 May 3 10:25 dict/
drwxr-xr-x 2 vega users 4096 May 5 11:50 EXFOR_Compiled_File
-rw-r--r-- 1 vega users 3425 May 5 11:42 EXFOR-I.html
-rw-r--r-- 1 vega users 412965 May 5 11:42 EXFOR-I.jar
-rw-r--r-- 1 vega users 831 May 5 11:42 EXFOR-I.jnlp
drwxr-xr-x 2 vega users 4096 May 3 10:21 IAEA_CODES/
-rw-r--r-- 1 vega users 0 May 5 12:24 logFile.txt
-rw-r--r-- 1 vega users 805 May 5 11:42 root.png
-rwxr-xr-x 1 vega users 34 May 5 11:42 runEXFOR.exe*
drwxr-xr-x 2 vega users 4096 May 3 10:21 web-files/
Aditya->
Aditya->
Aditya->
Aditya-> java -jar EXFOR-I.jar 8
```

The EXFOR-I application window shows a menu bar with 'File', 'Tools', and 'Help'. Below the menu bar, there are buttons for 'Check', 'Order', '012345', 'Set', 'Entry Date', and 'Set'. A warning dialog box is displayed in the center of the application window with the following text:

Warning !!!...y Number...  
ENTRY Number WRONG Format  
OK

# EXFOR-I (Type entry number to create new EXFOR file)

Enter the ENTRY NUMBER in BOX

Click SET

System DATE would be set automatically

```
Terminal - vega on Aditya: /home/vega/distribution
File Edit View Terminal Tabs Help
Aditya-> ll
total 444
drwxr-xr-x 4 vega users 4096 May 3 10:21 checker/
drwxr-xr-x 2 vega users 4096 May 3 10:21 CSS/
drwxr-xr-x 2 vega users 4096 May 3 10:25 dict/
drwxr-xr-x 2 vega users 4096 May 5 11:50 EXFOR_Compiled_File
-rw-r--r-- 1 vega users 3425 May 5 11:42 EXFOR-I.html
-rw-r--r-- 1 vega users 412965 May 5 11:42 EXFOR-I.jar
-rw-r--r-- 1 vega users 831 May 5 11:42 EXFOR-I.jnlp
drwxr-xr-x 2 vega users 4096 May 3 10:21 IAEA_CODES/
-rw-r--r-- 1 vega users 0 May 5 12:24 logFile.txt
-rw-r--r-- 1 vega users 805 May 5 11:42 root.png
-rwxr-xr-x 1 vega users 34 May 5 11:42 runEXFOR.exe*
drwxr-xr-x 2 vega users 4096 May 3 10:21 web-files/
Aditya->
Aditya->
Aditya->
Aditya-> java -jar EXFOR-I.jar &
```

The screenshot shows the EXFOR-I application window titled "EXFOR-I :: INDIAN EXFOR :: Terminal :: Abhijit Bhattacharyya, (NPD :: NDPCI), BARC, Mumbai, INDIA". The window has a menu bar with "File", "Tools", and "Help". Below the menu bar are buttons for "Check", "Order", "2345", "Set", "Entry", and "Set". A warning dialog box is displayed in the center of the window with the following text:

Warning !!!...y Number...  
ENTRY Number WRONG Format  
OK

The background of the application window is blue and contains the text "No content in table".

# EXFOR-I (Right-Click shows headers to be added)

The screenshot displays the EXFOR-I software interface. On the left, a terminal window shows the execution of the EXFOR-I application. The main window displays a data table with a context menu open over the 'HISTOR' entry, showing options to add headers like 'Title', 'Author', 'Institute', etc.

**Terminal Output:**

```
Aditya-> ll
total 444
drwxr-xr-x 4 vega users 4096 May 3 10:21 checker/
drwxr-xr-x 2 vega users 4096 May 3 10:21 CSS/
drwxr-xr-x 2 vega users 4096 May 3 10:25 dict/
drwxr-xr-x 2 vega users 4096 May 5 11:50 EXFOR_Compiled_Files
-rw-r--r-- 1 vega users 3425 May 5 11:42 EXFOR-I.html
-rw-r--r-- 1 vega users 412965 May 5 11:42 EXFOR-I.jar
-rw-r--r-- 1 vega users 831 May 5 11:42 EXFOR-I.jnlp
drwxr-xr-x 2 vega users 4096 May 3 10:21 IAEA_CODES/
-rw-r--r-- 1 vega users 0 May 5 12:24 logFile.txt
-rw-r--r-- 1 vega users 805 May 5 11:42 root.png
-rwxr-xr-x 1 vega users 34 May 5 11:42 runEXFOR.exe*
drwxr-xr-x 2 vega users 4096 May 3 10:21 web-files/
Aditya->
Aditya->
Aditya->
Aditya-> java -jar EXFOR-I.jar &
```

**EXFOR-I Data Table:**

ENTRY	D1234	20170505	
SUBENT	D1234001	20170505	1
BIB			1
HISTOR		(20170505)	1
ENDBIB			1
NOCOMM			1
ENDSUBENT			1
SUBENT	D1234		2
BIB			2
ENDBIB			2
NOCOMMON			2
ENDSUBENT			2
ENDENTRY			999

**Context Menu Options:** Edit Contents, Add Items, Title, Author, Institute, Reference, Facility, Sample, Detector, Method, Monitor, Monit-Ref, Inc-Source, Analysis, Status, Err-Analys, Addl-Result, Decay Data, Decay-Mon, Correction, Data, Flag, Comment, New SUBENTRY.



# EXFOR-I (Right-Click shows headers to be added)

Right click shows add/Edit sub menu while add shows headers

The screenshot displays the EXFOR-I software interface. On the left, a terminal window shows the output of a directory listing command. The main window shows a data table with columns for entry details and a context menu open over the table. The context menu includes options like 'Title', 'Author', 'Institute', etc.

```
Aditya-> ll
total 444
drwxr-xr-x 4 vega users 4096 May 3 10:21 checker/
drwxr-xr-x 2 vega users 4096 May 3 10:21 CSS/
drwxr-xr-x 2 vega users 4096 May 3 10:25 dict/
drwxr-xr-x 2 vega users 4096 May 5 11:50 EXFOR_Compiled_Files
-rw-r--r-- 1 vega users 3425 May 5 11:42 EXFOR-I.html
-rw-r--r-- 1 vega users 412965 May 5 11:42 EXFOR-I.jar
-rw-r--r-- 1 vega users 831 May 5 11:42 EXFOR-I.jnlp
drwxr-xr-x 2 vega users 4096 May 3 10:21 IAEA_CODES/
-rw-r--r-- 1 vega users 0 May 5 12:24 logFile.txt
-rw-r--r-- 1 vega users 805 May 5 11:42 root.png
-rwxr-xr-x 1 vega users 34 May 5 11:42 runEXFOR.exe*
drwxr-xr-x 2 vega users 4096 May 3 10:21 web-files/
Aditya->
Aditya->
Aditya->
Aditya-> java -jar EXFOR-I.jar &
```

ENTRY	D1234	20170505	
SUBENT	D1234001	20170505	1
ENDSUBENT			
SUBENT	D1234002		
ENDSUBENT			
SUBENT	D1234		2
BIB			2
ENDBIB			2
NOCOMMON			2
ENDSUBENT			2
ENDENTRY			999

- Title
- Author
- Institute
- Reference
- Facility
- Sample
- Detector
- Method
- Monitor
- Monit-Ref
- Inc-Source
- Analysis
- Status
- Err-Analys
- Add-Result
- Decay Data
- Decay-Mon
- Correction
- Data
- Flag
- Comment
- New SUBENTRY

# EXFOR-I (Right-Click shows headers to be added)

Right click shows add/Edit sub menu while add shows headers

Un-ordered entry shows SUBENT which would be ordered

The screenshot displays the EXFOR-I software interface. On the left, a terminal window shows the output of a 'll' command, listing files and their permissions. The main window shows a data table with columns for 'ENTRY', 'SUBENT', and 'BIB'. A context menu is open over the table, showing options like 'Edit Contents', 'Add Items', and 'Title'. A red arrow points from the 'Add/Edit sub menu' text to the context menu. Another red arrow points from the 'Un-ordered entry shows SUBENT which would be ordered' text to the 'SUBENT' column in the table.

ENTRY	D1234	20170505	
SUBENT	D1234001	20170505	1
BIB			1
ENDSUBENT			1
SUBENT	D1234002		1
ENDSUBENT			1
SUBENT	D1234		2
BIB			2
ENDBIB			2
NOCOMMON			2
ENDSUBENT			2
ENDENTRY			999

# EXFOR-I (Intelligent search)

The screenshot displays the EXFOR-I application interface. On the left, a terminal window shows the execution of a Java command: `Aditya-> java -jar EXFOR-I.jar &`. The main window shows a table with columns for 'Check', 'Order', 'D1234', 'Set', and '20170505'. The table contains hierarchical data for 'ENTRY D1234', including 'SUBENT D1234001' and 'SUBENT D1234002'. A '3indb' dialog box is open, titled 'Enter INSTITUTE', with a dropdown menu showing a list of institutions: '3INDBDA M.S. University of Baroda, Baroda', '3INDBHU Banaras Hindu Univ., Varanasi', '3INDBOM Bombay', and '3INDBOS Bose Institute, Kolkata'. The background table has a light blue highlight on the right side.

# EXFOR-I (Intelligent search)

Start typing keyword to narrow down. No need to scroll

The screenshot shows the EXFOR-I application interface. On the left is a terminal window with the following content:

```
Terminal - vega on Aditya: /home/vega/distribution
Aditya-> ll
total 444
drwxr-xr-x 4 vega users 4096 May 3 10:21 checker/
drwxr-xr-x 2 vega users 4096 May 3 10:21 CSS/
drwxr-xr-x 2 vega users 4096 May 3 10:25 dict/
drwxr-xr-x 2 vega users 4096 May 5 11:50 EXFOR_Compiled_File
-rw-r--r-- 1 vega users 3425 May 5 11:42 EXFOR-I.html
-rw-r--r-- 1 vega users 412965 May 5 11:42 EXFOR-I.3indb
-rw-r--r-- 1 vega users 831 May 5 11:42 EXFOR-I
drwxr-xr-x 2 vega users 4096 May 3 10:21 IAEA_CD
-rw-r--r-- 1 vega users 0 May 5 12:24 logFile
-rw-r--r-- 1 vega users 805 May 5 11:42 root.pr
-rwxr-xr-x 1 vega users 34 May 5 11:42 runEXFOR
drwxr-xr-x 2 vega users 4096 May 3 10:21 web-fil
Aditya->
Aditya->
Aditya->
Aditya-> java -jar EXFOR-I.jar &
```

The main application window, titled 'EXFOR-I :: INDIAN EXFOR :: Tool by Dr. Abhijit Bhattacharyya, (NPD :: NDPCI), BARC, Mumbai, INDIA', shows a hierarchical tree view on the left and a table of search results on the right. The tree view is expanded to show 'ENTRY D1234' with sub-entries 'SUBENT D1234001' and 'SUBENT D1234002'. The table on the right displays search results for '3indb' with columns for 'ENTRY', 'SUBENT', 'BIB', and 'HISTORY'. A search dialog box titled 'Enter INSTITUTE' is open, showing a list of institutions to select from:

- 3INDBDA M.S. University of Baroda, Baroda
- 3INDBHU Banaras Hindu Univ., Varanasi
- 3INDBOM Bombay
- 3INDBOS Bose Institute, Kolkata

# EXFOR-I (tools)

```
Terminal - vega on Aditya: /home/vega/distribution
File Edit View Terminal Tabs Help
Aditya-> ll
total 444
drwxr-xr-x 4 vega users 4096 May 3 10:21 checker/
drwxr-xr-x 2 vega users 4096 May 3 10:21 CSS/
drwxr-xr-x 2 vega users 4096 May 3 10:25 dict/
drwxr-xr-x 2 vega users 4096 May 4 16:50 EXFOR_Compiled_Files/
-rw-r--r-- 1 vega users 3425 May 5 11:42 EXFOR-I.html
-rw-r--r-- 1 vega users 412965 May 5 11:42 EXFOR-I.jar
-rw-r--r-- 1 vega users 831 May 5 11:42 EXFOR-I.jsp
drwxr-xr-x 2 vega users 4096 May 3 10:21 IAEA_CODES/
-rw-r--r-- 1 vega users 0 May 5 11:42 logFile.txt
-rw-r--r-- 1 vega users 805 May 5 11:42 root.png
-rwxr-xr-x 1 vega users 34 May 5 11:42 runEXFOR.exe*
drwxr-xr-x 2 vega users 4096 May 3 10:21 web-files/
Aditya->
Aditya->
Aditya->
Aditya->
Aditya-> java -jar ./EXFOR-I.jar &
```

EXFOR-I :: INDIAN EXFOR :: Tool by Dr. Abhijit Bhattacharyya, (NPD :: NDPCI), BARC, Mumbai, INDIA

File Tools Help

Check 24 Set

Process Ordering Ctrl+P  
ZCHEX Ctrl+Z  
JANIS Ctrl+J  
Builtin CHECKER Ctrl+C

▼ ENT  
▼ SUBENT  
▼ BIB

BIB  
TITLE  
AUTHOR  
INSTITUTE  
REFERENCE  
FACILITY  
SAMPLE  
INC-SOURCE  
DETECTOR  
ADD-RES  
STATUS  
HISTORY  
ENDBIB  
NOCOMMON  
ENDSUBENT  
ENDBIB  
ENDSUBENT  
▼ SUBENT D6251002  
▼ BIB  
SUBENT  
BIB

ENTRY	D6251	20170224	D62510000001
SUBENT	D6251001	20170505	D625100100001
BIB	11	25	D625100100002
TITLE	Measurement of the excitation functions in alpha-induced reactions on 93-Nb from threshold energy to 39.5 MeV.		D625100100003
AUTHOR	Muhammad Shahid,Kwangsoo Kim,Guinyun Kim, Muhammad Zaman,Muhammad Nadeem,Haladhara Naik, Mansoureh Tatar,i,R Guin,S K Das)		D625100100004
INSTITUTE	(3INDVEC)		D625100100005
REFERENCE	(J, KPS, 67, 1474, 2015)		D625100100006
FACILITY	(CYCLO,3INDVEC)		D625100100007
SAMPLE	Nb (99%) foil of 17.5 um thick and Natural Cu (>99%) foil of 10 um thick are stacked to make 8 sets of Nb-Cu. In one experiment Nb-Cu is followed by Nb-Nb-Nb while in the other Al foil of 25 um is followed by Nb-Cu stack.		D625100100008
INC-SOURCE	1	(ATOMI) Alpha beam (~10 mm dia / 120 nA / 45 mins)	D625100100009
	2	(ATOMI) Alpha beam (~10 mm dia / 60 nA / 90 mins)	D625100100010
DETECTOR	(HPGE,SPEC) An n-type coaxial HPGe spectrometer with FWHM of 1.9 keV at 1332.5 keV gamma ray photopeak of Co-60 coupled to a PC based 4096 channel analyzer having Gamma Vision 5.0 software.		D625100100011
ADD-RES	(COMP) Experimental results compared with theoretical values obtained from TENDL-2013 library based on computer code TALYS 1.6		D625100100012
STATUS	(TABLE) Table 2 of J, KPS, 67, 1474, 2015		D625100100013
HISTORY	(20170224C) Abhijit+BL		D625100100014

# EXFOR-I (tools)

Ordering, checking by CHEX, JANIS and by EXFOR-I CHECKER

```
Terminal - vega on Aditya: /home/vega/distribution
File Edit View Terminal Tabs Help
Aditya-> ll
total 444
drwxr-xr-x 4 vega users 4096 May 3 10:21 checker/
drwxr-xr-x 2 vega users 4096 May 3 10:21 CSS/
drwxr-xr-x 2 vega users 4096 May 3 10:25 dict/
drwxr-xr-x 2 vega users 4096 May 4 16:50 EXFOR_Compiled_Files/
-rw-r--r-- 1 vega users 3425 May 5 11:42 EXFOR-I.html
-rw-r--r-- 1 vega users 412965 May 5 11:42 EXFOR-I.jar
-rw-r--r-- 1 vega users 831 May 5 11:42 EXFOR-I.jnlp
drwxr-xr-x 2 vega users 4096 May 3 10:21 IAEA_CODES/
-rw-r--r-- 1 vega users 0 May 5 11:42 logFile.txt
-rw-r--r-- 1 vega users 805 May 5 11:42 root.png
-rwxr-xr-x 1 vega users 34 May 5 11:42 runEXFOR.exe*
drwxr-xr-x 2 vega users 4096 May 3 10:21 web-files/
Aditya->
Aditya->
Aditya->
Aditya->
Aditya-> java -jar ./EXFOR-I.jar &
```

EXFOR-I :: INDIAN EXFOR :: Tool by Dr. Abhijit Bhattacharyya, (NPD :: NDPCI), BARC, Mumbai, INDIA

File Tools Help

Check

Process Ordering Ctrl+O  
ZCHEX Ctrl+Z  
JANIS Ctrl+J  
Builtin CHECKER Ctrl+C

ENTRY	D6251	20170224	D62510000001
SUBENT	D6251001	20170505	D625100100001
BIB	11	25	D625100100002
TITLE	Measurement of the excitation functions in alpha-induced reactions on 93-Nb from threshold energy to 39.5 MeV.		D625100100003
AUTHOR	(Muhammad Shahid,Kwangsoo Kim,Guinyun Kim, Muhammad Zaman,Muhammad Nadeem,Haladhara Naik, Mansoureh Tatar, R Guin, S K Das)		D625100100004
INSTITUTE	(3INDVEC)		D625100100005
REFERENCE	(J, KPS, 67, 1474, 2015)		D625100100006
FACILITY	(CYCLO, 3INDVEC)		D625100100007
SAMPLE	Nb (99%) foil of 17.5 um thick and Natural Cu (>99%) foil of 10 um thick are stacked to make 8 sets of Nb-Cu. In one experiment Nb-Cu is followed by Nb-Nb-Nb while in the other Al foil of 25 um is followed by Nb-Cu stack.		D625100100008
INC-SOURCE	1	(ATOMI) Alpha beam (~10 mm dia / 120 nA / 45 mins)	D625100100009
INC-SOURCE	2	(ATOMI) Alpha beam (~10 mm dia / 60 nA / 90 mins)	D625100100010
DETECTOR	(HPGE,SPEC) An n-type coaxial HPGe spectrometer with FWHM of 1.9 keV at 1332.5 keV gamma ray photopeak of Co-60 coupled to a PC based 4096 channel analyzer having Gamma Vision 5.0 software.		D625100100011
ADD-RES	(COMP) Experimental results compared with theoretical values obtained from TENDL-2013 library based on computer code TALYS 1.6		D625100100012
STATUS	(TABLE) Table 2 of J, KPS, 67, 1474, 2015		D625100100013
HISTORY	(20170224C) Abhijit+BL		D625100100014

# EXFOR-I (CHEX dialog)

The screenshot displays the EXFOR-I software interface. On the left, a terminal window shows the execution of the EXFOR-I program. The main window displays a table of EXFOR entries, with a detailed view of entry D6251. A dialog box is open, showing the compilation process for entry D6251.

**Terminal Output:**

```
Aditya-> ll
total 444
drwxr-xr-x 4 vega users 4096 May  3 10:21 checker/
drwxr-xr-x 2 vega users 4096 May  3 10:21 CSS/
drwxr-xr-x 2 vega users 4096 May  3 10:25 dict/
drwxr-xr-x 2 vega users 4096 May  4 16:50 EXFOR_Compiled_Files/
-rw-r--r-- 1 vega users 3425 May  5 11:42 EXFOR-I.html
-rw-r--r-- 1 vega users 412965 May  5 11:42 EXFOR-I.jar
-rw-r--r-- 1 vega users 831 May  5 11:42 EXFOR-I.jnlp
drwxr-xr-x 2 vega users 4096 May  3 10:21 JAEA_CODES/
-rw-r--r-- 1 vega users 0 May  3 10:21 JAEA_CODES/
-rw-r--r-- 1 vega users 805 May  3 10:21 JAEA_CODES/
-rwxr-xr-x 1 vega users 34 May  3 10:21 JAEA_CODES/
drwxr-xr-x 2 vega users 4096 May  3 10:21 JAEA_CODES/
Aditya->
Aditya->
Aditya->
Aditya->
Aditya-> java -jar ./EXFOR-I.jar
```

**EXFOR-I: INDIAN EXFOR :: Tool by Dr. Abhijit Bhattacharyya, (NPD :: NDPCI), BARC, Mumbai, INDIA**

Check	Order	Entry Numbr	Set	20170224	Set
▼	ENTRY	D6251		20170224	
▼	SUBENT	D6251001			
▼	BIB				
	SUBENT				
	BIB				

**Compilation Dialog:**

```
...ENTRY: D6251
OK: Open Dict. 24:201505 UNIT= 43 L= 492: Data Headings
OK: Open Dict. 25:201505 UNIT= 44 L= 190: Data Units
First pass completed with no fatal errors

- Second pass checking -
OK: Open Dict. 213:201505 UNIT= 45 L= 136: Reaction Type with CINDA quant
...ENTRY: D6251
OK: Open Dict. 3:201505 UNIT= 46 L=1227: Institute Codes
OK: Open Dict. 5:201412 UNIT= 47 L= 489: Journal Codes
```

**Main Data Table:**

ENTRY	Order	Entry Numbr	Set	20170224	Set
ENTRY		D6251		20170224	
SUBENT		D6251001		20170505	
BIB		11		25	
TITLE					Measurement of the excitation functions in alpha-induced reactions on 93-Nb from threshold energy
HISTORY					(20170224C) Abhijit+BL

**EXFOR-I Entry Details:**

HISTORY (20170224C) Abhijit+BL

INC-SOURCE 1 (ATOMI) Alpha beam (~10 mm dia / 120 nA / 45 mins)

2 (ATOMI) Alpha beam (~10 mm dia / 60 nA / 90 mins)

DETECTOR (HPGE,SPEC) An n-type coaxial HPGe spectrometer with FWHM of 1.9 keV at 1332.5 keV gamma ray photopeak of Co-60 coupled to a PC based 4096 channel analyzer having Gamma Vision 5.0 software.

ADD-RES (COMP) Experimental results compared with theoretical values obtained from TENDL-2013 library based on computer code TALYS 1.6

STATUS (TABLE) Table 2 of J, KPS, 67, 1474, 2015

# EXFOR-I (own checker)

The screenshot displays a Linux desktop environment with the following components:

- Terminal Window:** Shows the directory listing of `/home/vega/distribution`. Files include `checker/`, `CSS/`, `dict/`, `EXFOR_Compiled_Files/`, and `EXFOR-I.html`.
- EXFOR-I Application:** A window titled "EXFOR-I :: INDIAN EXFOR :: Tool by Dr. Abhijit Bhattacharyya, (NPD :: NDPCI), BARC, Mumbai, INDIA". It shows a hierarchical tree view for entry D6251, including subentries D6251001 and D6251002, and a table of data points.
- Compilation Dialog:** A modal window titled "Compiling /home/vega/distribution/EXFOR\_Compiled\_Files/D6251.exf ...". It displays the following status messages:
 

```

      ENDSUBENT OK.
      SUBENT 6 OK.
      reaction must be enclosed within parenthesis.
      ENDSUBENT OK.
      ===== Obligatory Headers =====
      TITLE PRESENT.
      AUTHOR PRESENT.
      INSTITUTE PRESENT.
      REFERENCE PRESENT.
      FACILITY PRESENT.
      
```
- EXFOR-I Data Table:**

ENTRY	D6251	20170224	D625100000001
SUBENT	D6251001	20170505	D625100100001
BIB	11	25	D625100100002
			D625100100003
			D625100100004
			D625100100005
			D625100100006
			D625100100007
			D625100100008
			D625100100009
			D625100100010
			D625100100011
			D625100100012
			D625100100013
			D625100100014
			D625100100015
			D625100100016
			D625100100017
			D625100100018
			D625100100019
			D625100100020
			D625100100021
			D625100100022
			D625100100023
			D625100100024
			D625100100025
			D625100100026
			D625100100027



## EXFOR-I : I => India :: I => Intelligent Interface

- EXFOR-I: demands continuous input from users for continuous evolution in the line of user-friendliness, automated correction etc.
- EXFOR-I : *requests NDS to think on modification of grammars to implement proper English language grammar specially punctuation, spaces etc.*
- *Entries tested : 33087, D6191, D6196, D6199, D6211 and D6251.*

## **-: Acknowledgement :-**

**Naohiko Otsuka**

**Lalremruata Bawitlung**

**Alok Saxena**

**S Ganesan**



**THANK YOU  
FOR YOUR ATTENTION!!**