

Center of Nuclear Physics Data

Status report to the NRDC Meeting, May 23-26, 2017

IAEA, Vienna

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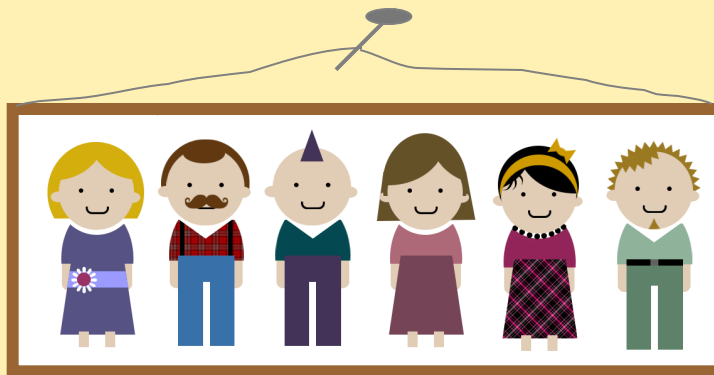
Russia, 607188, Sarov, Nizhnij Novgorod region, pr. Mira, 37

CNPD – the 20-th Anniversary

Date of birth – August 11, 1997

Place of birth – All-Russian Research Institute of Experimental Physics,
Institute of Nuclear and Radiation Physics

Total staff – 6 professionals_



Main CNPD activities:

- providing by nuclear constants the scientific and technical developments of the institute;
- compilation of experimental data into the international data base Exfor;
- data evaluation;
- development of software for data processing;
- development of specialized data bases.

EXFOR compilation

TRANS.F062

TRANS.F063

TRANS.F064

TRANS.A085

TRANS.A086

TRANS.A087

38 new entries

84 revised entries

Experimental Nuclear Reaction Data (EXFOR)
Database Version of 2017-04-03
Software Version of 2017-04-26

News

- 2016/12 **New**. Web-ZV View plots: affine transformations (PS/EPS) [how-to], distortion picture using 2D-calibration [how-to]
- 2016/11 Plotting without grouping by reaction-codes (+ calculating CS ratios between diff. datasets on the fly) [example]
- 2016/11 Plotting cross section coded with SF8=DAM (CS divided by atomic mass of target) [example] #Adv.plot using CS
- 2016/11 Recalculation of angular distributions to inverse kinematics (when converting EXFOR→R33) [example]

The EXFOR library contains an extensive compilation of experimental nuclear reaction data. Neutron reactions have been compiled systematically since the discovery of the neutron, while charged particle and photon reactions have been covered less extensively. The library contains data from **21574** experiments (see [statistics](#) and recent updates).
EXFOR Reference Paper: Nucl. Data Sheets 120(2014)272 EXFOR Mirror-sites

Search: Go

Examples of requests: [1](#) [2](#) [3](#) [4](#) [5](#) [6](#) [7](#) ...

Request

Target Li-6 ?

Reaction D,A ?

Quantity CS ?

Product ?

Energy from to eV ?

Author(s) ?

Publication year ?

Last modified ?

Accession # P* ?

Extended
 Keywords
 Expert

Go to: [\[upload your data\]](#)

Options

- Exclude superseded data
- No reaction combinations (ratios,...)
- Exclude evaluated data
- Enhanced search of Products
- Retrieve listing only
- Disable Prompt-Help

Sort by: reaction publication
View: basic extended

Ranges (Z,A)

Reaction Sub-Fields

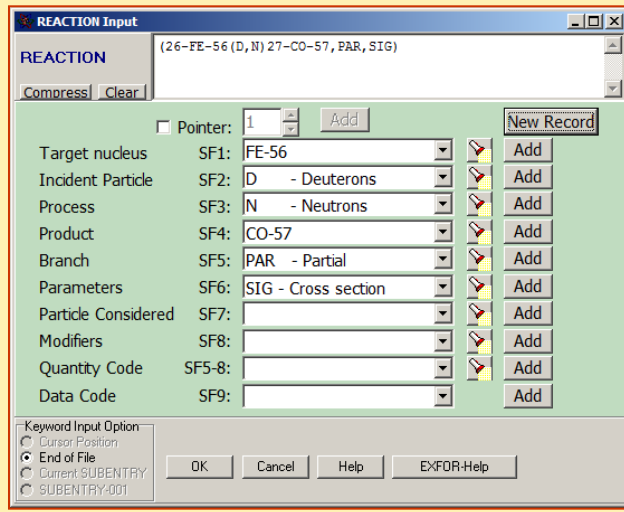
Feedback and User's Input

Clone Request:

Software

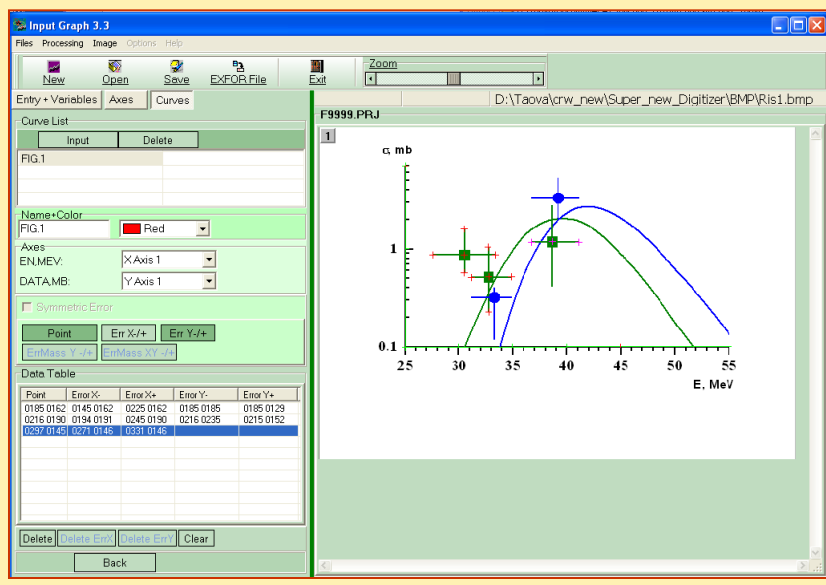
- EXFOR-Editor

Input of Reaction

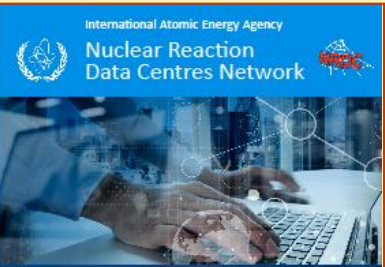


- InpGraph

Asymmetric error



Exfor Booklet



EXFOR: THE LIBRARY ITSELF

NRDC WEB EXFOR RETRIEVAL SYSTEM:

IAEA, NDS
<http://www.nds-iaea.org/exfor/>
 USA, NNDC
<http://www.nndc.bnl.gov/exfor/>
 India, BARC
<http://www.nds.indcentre.org.in/exfor/>
 China CNDC
<http://www.nds.ciae.ac.cn/exfor/>
 Russia, Atomstandart
<http://www.nds.atomstandard.ru/exfor/>

OTHER WEB EXFOR RETRIEVAL SYSTEMS:

<http://www.oecd-nea.org/janisweb/search/exfor/>;
<http://www.jcprg.org/exfor/>;
<http://spes.jaea.go.jp/>; <http://cdfe.sinp.msu.ru/exfor/>.

EXFOR:

- THE FORMAT
- THE LIBRARY ITSELF
- THE INFORMATION SYSTEM

13-AL-27 (G, P), 12-MG-26, DA/DE
 92-U-235 (N, F) ELEM/MASS,CUM,FY, FIS

FOR: THE LIBRARY ITSELF

- stores the experimental nuclear reaction data on interactions of neutrons (≤ 1 GeV), light charged particles ($A \leq 12$) photons.
- stores numeric data, bibliographic information and experimental information about the data, the source of the data and history. Up to May 2016 EXFOR included 21 257 descriptions of experiments, data on 184 685 nuclear reactions, 13 626 107 total number of data points.
- stores integral and partial cross sections (excitation functions, spectrum averaged data, ratios, etc.), differential cross sections (angular distributions, Legendre coefficients, secondary particle spectra, double-differential cross sections, polarization data, etc.), resonance parameters, fission product yields, fission quantities, product yields, thick target yields, reaction rates, resonance integrals, etc.
- is the basis for the majority of the evaluated nuclear application libraries.

EXFOR: THE INFORMATION SYSTEM

- EXFOR is the effective retrieval and processing system. NRDC EXFOR Web Service (common NDS-NNDC project) is <http://www.nds-iaea.org/exfor/>. Such criteria of search as target, reaction, quantities, products, energies, information about experiment, bibliographic reference, text-patterns and keywords are provided. Autonomous CD version of the EXFOR Library with retrieval system is regularly issued by NDS.
- EXFOR retrieval system offers the original format (X4) and several end-user formats for different needs. The "interpreted" formats (X4+, X42, X4XML) give the user explanations of the internal codes and abbreviations, provide access to experimental data in formats appropriate for users. The "computational" formats (C4, CS, CSM) deliver data from EXFOR to users in format simple for software development.
- EXFOR processing system displays data on graphs in static and interactive plots with option for uploading of users' data for comparison with the possibilities of drug-and-drop zoom, lin/log scaling, copy/paste data between systems, output to: PS, PDF, animated GIF, HTML, ENDF6, Fortran data, etc.
- EXFOR processing system provides the following services: on-line re-calculations of cross sections: inverse reactions and, inverse kinematics for angular distributions, automatic re-normalization, user's corrections, experts' corrections, constructing a covariance matrix from EXFOR uncertainties, etc.

Workshop on Exfor Compilation, October 24-28, 2016 – Quick-Start Tutorials

EXFOR-EDITOR: QUICK-START TUTORIAL



STEP 1
Launch EXFOR-Editor 

STEP 2
Create new file and define its structure and content  

STEP 3
Enter or edit bibliography or Keywords/Bibliography 

STEP 4
Enter or edit experiment description: physics, related data, bookkeeping or Keywords/Physics, keywords/related data, keywords/Bookkeeping 

STEP 6
Enter or edit Common Section or Sections/COMMON 

STEP 5
Enter or edit data Reaction or Keywords/Data/Specification 

STEP 7
Enter or edit Data Section or Sections/DATA 


STEP 8
Process numeric data in Data Table Mode:

- Import or copy/Paste
- Calculations
- Sort
- Set Precision
- Check numeric data



STEP 9
Order lines of EXFOR file: use ZOrder or Processing/Order 

STEP 10
Check format and context of EXFOR-file: use ZCheck, Trans Checker or Processing/Check or Processing/Checker  

STEP 11
Save EXFOR file: or File/New/Save or File/New/Save as 

STEP 12
Enjoy and have a good day
ENTRY is ready



INPGRAPH: QUICK-START TUTORIAL



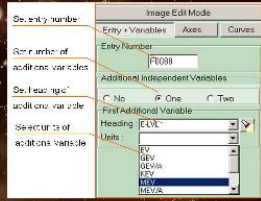
STEP 1
Launch InpGraph 

STEP 2
Load image:

- open file
- paste from clipboard
- capture screen area

STEP 3
Define Entry number and additional Independent variables.



Scanning of Journals

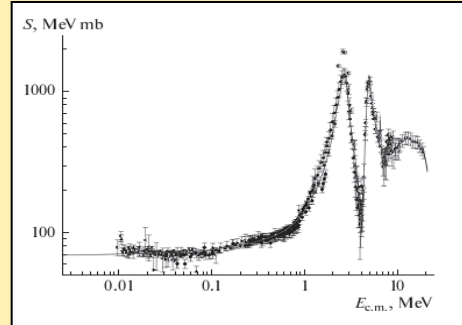
“Izvestiya Akademii Nauk”

“Yadernaya Fizika”

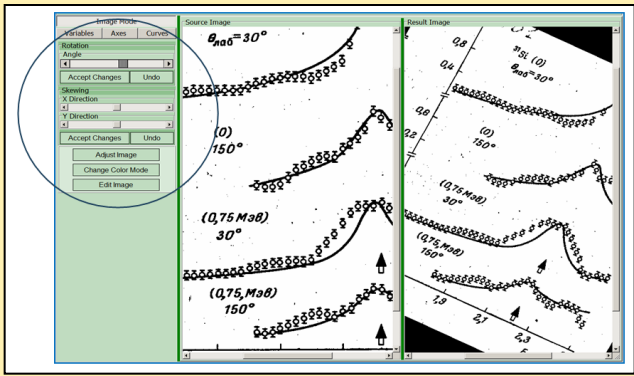
“European Physical Journal A”

International Conference on the Problem of Nuclear Spectroscopy and Structure of Atomic Nucleus “Nucleus-2016”, October 10-14, Sarov, 2016

1. S.M. Taova, S.M. Selyankina, L.N. Generalov, V.A. Zherebtsov, K.A. Lipenkova, L.V. Tulina. “Evaluated Integral Cross-Sections of the ${}^7\text{Li}(p,\alpha){}^4\text{He}$ Reaction”. Book of Abstracts. Conference “Nucleus-2016”, Sarov, October 10-14, p. 165.



2. G.N. Pikulina, S.M. Taova, S.V. Dunaeva, S.M. Selyankina. “Graphic Data Processing For Numeric Data Input Into The Exfor Library”. Book of Abstracts. Conference “Nucleus-2016”, Sarov, October 10-14, p. 163.



EXFOR Poster

(Naohiko's origin)

From Experiments to EXFOR users

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