



Al-Farabi KAZAKH NATIONAL
UNIVERSITY

Introduction to the Central Asian Nuclear Reaction Database

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CANRDB focus

Creation of the Nuclear Reaction Database is an important and demanding task for Kazakhstan and Central Asia.

There are many nuclear research centers and institutions in the Central Asia region such as

National Nuclear Center of the Republic of Kazakhstan,

Institute of Nuclear Physics RK,

Institute of Nuclear Physics under Academy of Sciences of Uzbekistan, etc.

Professional training in nuclear physics is offered in all national universities of Kazakhstan.

The specialists are additionally trained both in Kazakhstan and in large international centers such as JINR.



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Institute of Nuclear Physics , near Almaty, Kazakhstan

Isochronous cyclotron (<http://www.inp.kz>)

Isochronous cyclotron U-150 allows to accelerate protons (6 - 30 MeV), deuterons (12.5 - 25 MeV), alpha -particles (25 - 50 MeV), He^{3+2} (18.6 - 61.8 MeV) varying final energy.

Accelerating system consists of two duants of 180° . HF-generator frequency can vary in the range 8.5 to 19 MHz at voltage between the duants up to 160 kV.

There is the possibility to work both with internal and external beams. The internal target assures heat removal up to 15 kW what allows to use beams of high intensity (current for 30 MeV protons comprises 500 μA).



**Eurasian National University n.a. L.N.Gumilyov,
Astana, Kazakhstan**

Interdisciplinary Research Complex on the basis of heavy-ion
accelerator DC-60



The one of the main components of cyclotron is source of multi-charge of heavy ions on basis of electron-cyclotron resonance (ECR). It can work as a heavy ion injector in cyclotron for generating ion beams with high energy as well as on autonomous regime ensuring the experiments on beams with low energy.

Institute of Nuclear Physics of Academy of Sciences of Uzbekistan

[\(http://www.inp.uz\)](http://www.inp.uz)

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Ulugbek, Tashkent 100214
Republic of Uzbekistan
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Research Nuclear Reactor WWR with power 2 MW
of the Institute put into operation in 10 Sep. 1959.
U-150-II - cyclotron classic type



Reactor is used for carrying out researches on nuclear physics, radiation physics, radiation material science, activation analysis, irradiation of minerals, also for radionuclide production.

CANRDB focus

**CANRDB has been established at al-Farabi KNU in Almaty
It was launched in 2013.**

Our main tasks are deeper cooperation with international nuclear database network, gaining more experience and development of CANRDB resources.

Our partner nuclear physicists from Uzbekistan take part in CANRDB.

For many years, Central Asia is a resource base for uranium mining; it is a land of numerous military and technological nuclear tests in the past.

Kazakhstan, Uzbekistan and Kyrgyzstan run activities on deactivation and monitoring of the impacted territories.

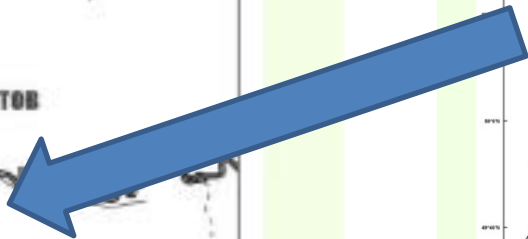


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Всего за период с 1949 года по 1989 год на полигоне произведено 456 ядерных испытаний (616 ядерных взрывов) общей мощностью 17,7 Мт, что эквивалентно около 1000 бомб, сброшенных на Хиросиму и Нагасаки

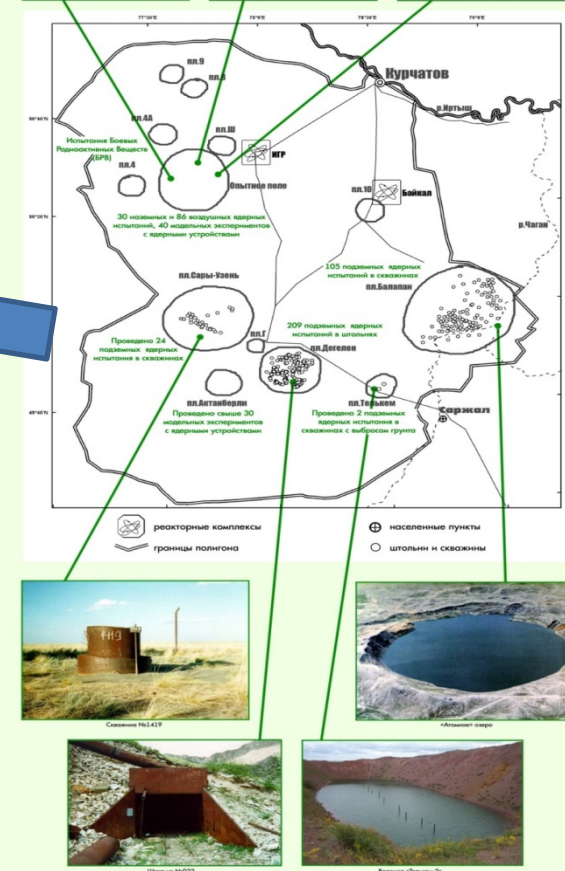
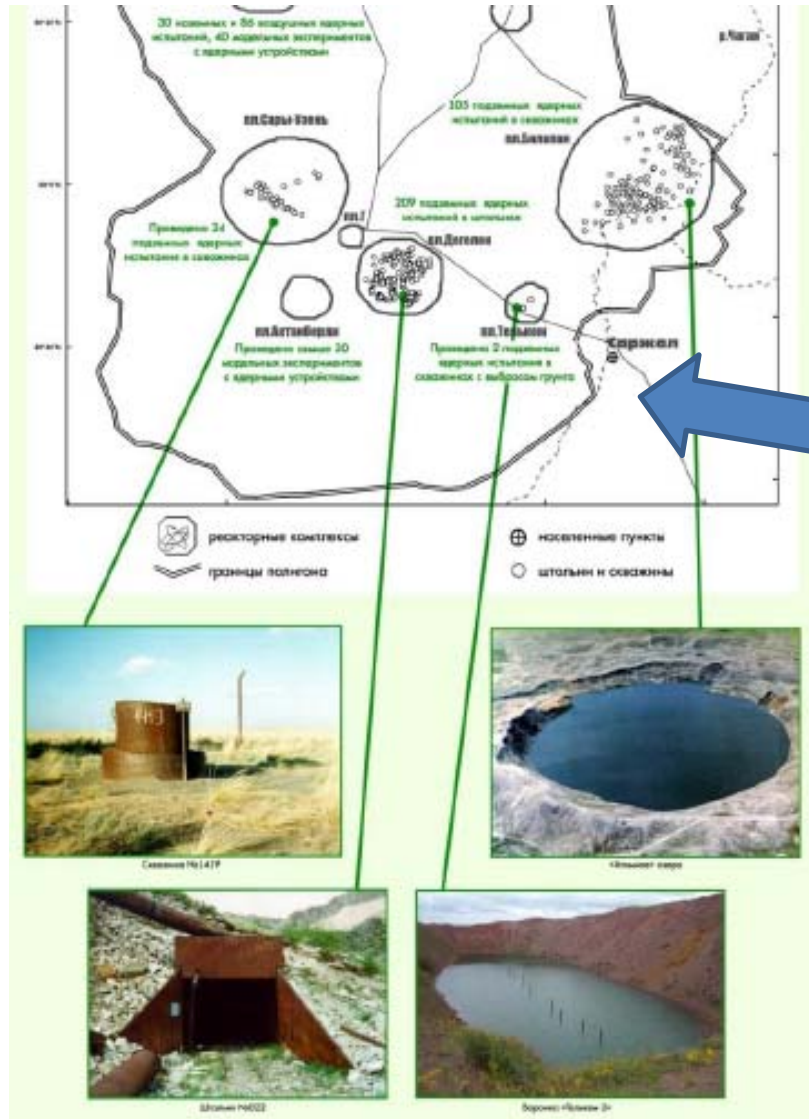
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**НАЦИОНАЛЬНЫЙ ЯДЕРНЫЙ ЦЕНТР
РЕСПУБЛИКИ КАЗАХСТАН**

ИНФОРМАЦИЯ О СИП НА МОМЕНТ ЕГО ЗАКРЫТИЯ

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CANRDB focus

One of the new directions for CANRDB is compilation of the database on radio-ecological conditions of these territories. National Company “Kazatomprom” also has specialized departments and services to monitor uranium mining sites. There is a Nuclear Society of Kazakhstan actively contributing into nuclear safety assurance activities in the region. At the beginning of CANRDB it is important for us to create and improve the educational component of the Database. CANRDB would therefore foster preparation of specialists in nuclear physics.



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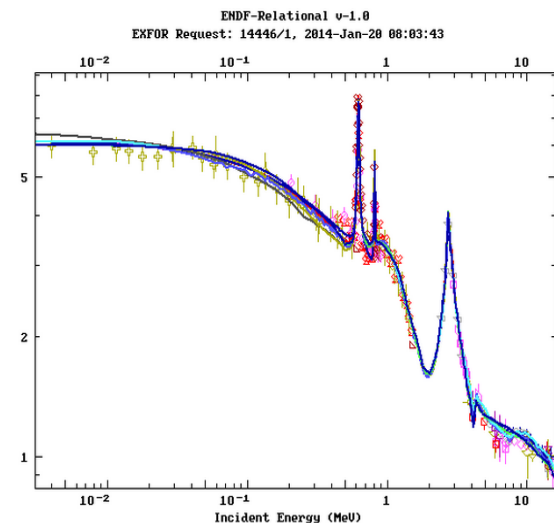


CANRDB focus

Educational component of CANRDB will be available in three languages – English, Kazakh and Russian. Our colleagues in Uzbekistan would run their segment in Uzbek language.

We are now completing materials and data in the divisions:

- **mass and structure of nuclei**
- **isotopic abundance of atomic nuclei**
- **reactions characteristics and reaction sections**
- **half life periods, etc.**



CANRDB focus

These data are needed for further development not only of nuclear physics and nuclear power production, but for new directions such as:

- astrophysics
- nuclear medicine and others.

54.16

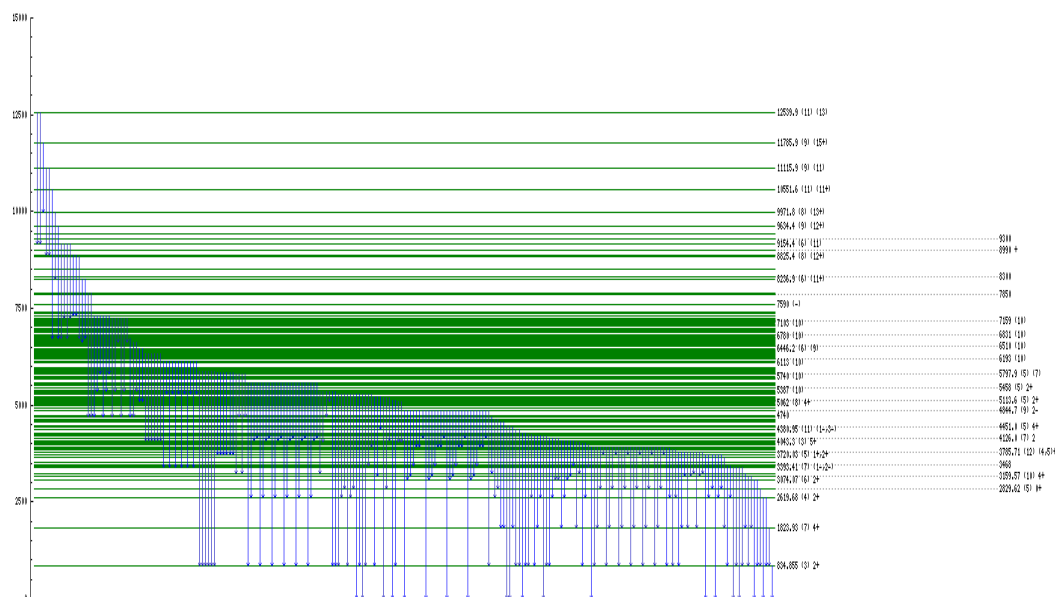
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Z=24 A=54

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138 levels

245 transitions



CANRDB focus

In Central Asia nuclear data are needed for:

- nuclear physics research
- nuclear astrophysics
- medicine (materials and methods)
- safety assurance at developing of nuclear power production
- nuclear waste management
- radio-ecological protection (rehabilitation of contaminated sites and other activities)
- development and utilization of nuclear-physical methods in geology, construction and other applications

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CANRDB и EXFOR

CANRDB team is actively developing its international ties (Hokkaido university, MSU, JINR and others)

Interaction with IAEA and international database network is an important part of CANRDB.

Our junior scientists (MS students) has gained good experience with EXFOR (EXchange FORmat).



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EXFOR



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CANRDB и EXFOR

Our junior scientist Nurzhat Kenjebayev will separately present in details on this important and useful work.

We have been collecting data of nuclear research by Kazakhstani scientists for more than a year.

We did library search in the Republic, worked with archives of research centers and institutes.



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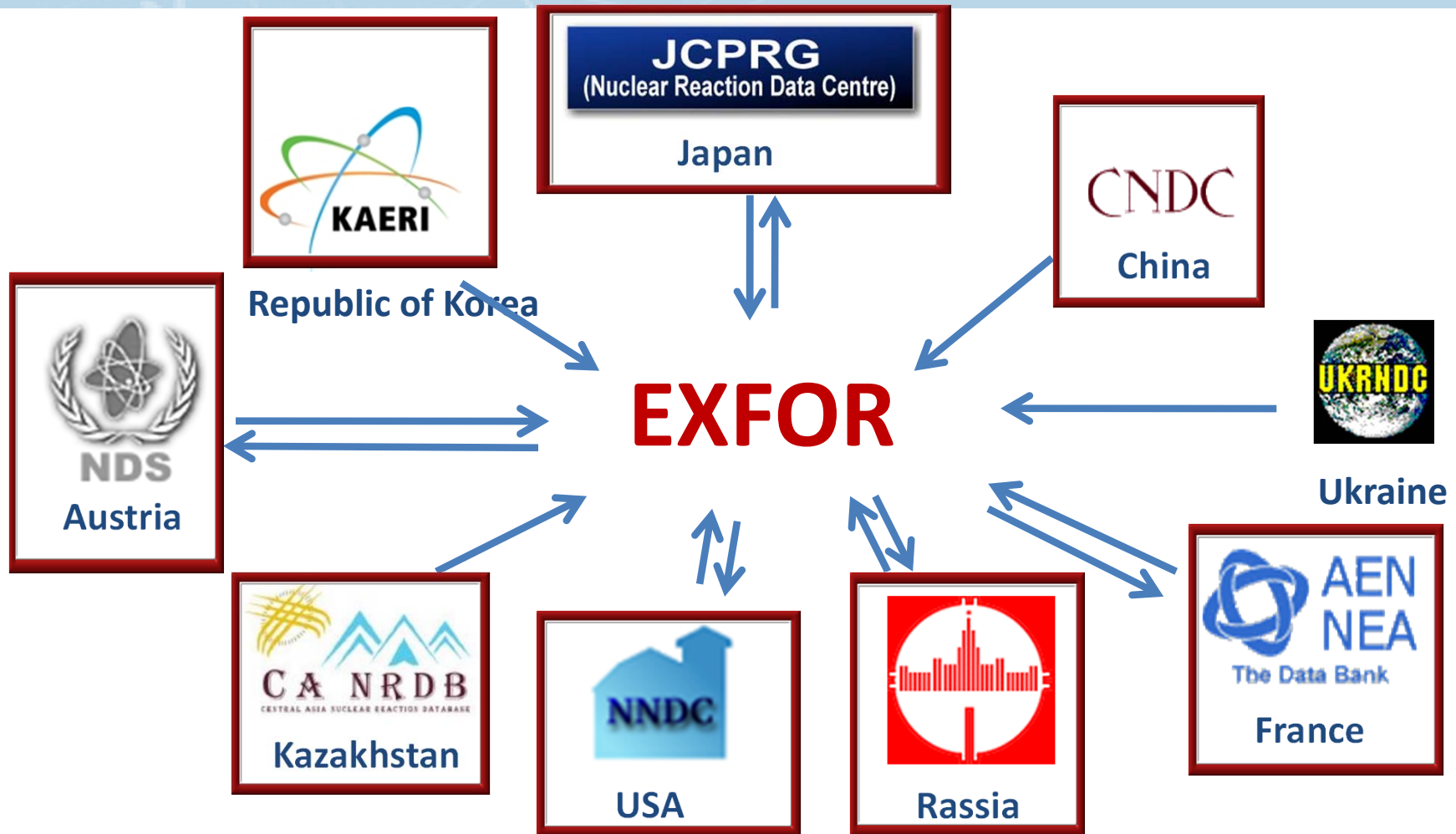
EXFOR



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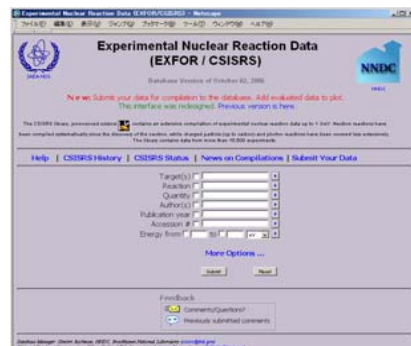


International Nuclear Reaction Data Center Network (NRDC)

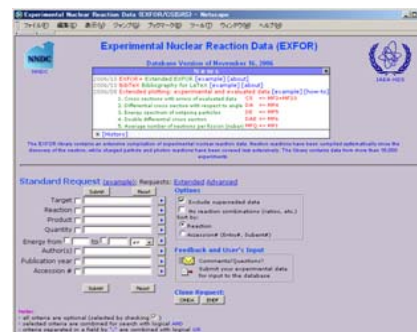


Compilation of articles in EXFOR

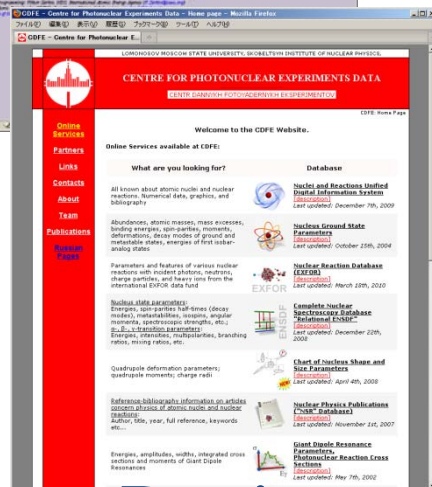
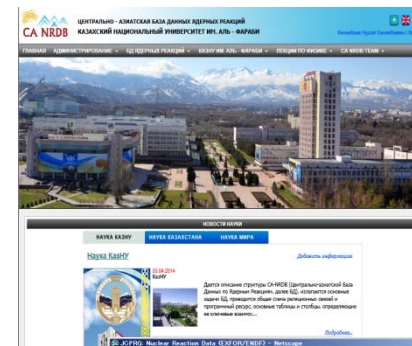
USA



Austria



CANRDB



Russia

France



Japan



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Main tasks for CANRDB interaction with IAEA and NRDC

- **Incorporation of experimental nuclear data (EXFOR)**
- **Organization of search engine for nuclear data**
- **Assurance of consistent data formatting**
- **Establishing of the data access system**
- **Analysis and assessment of nuclear data**

Main tasks for CANRDB interaction with IAEA and NRDC

IAEA Nuclear Data Service

https://www-nds.iaea.org/publications/indc_groups.php

Приложения Входящие - nurzat.k... Входящие - nurzat8... Освой программы... http://www.google.... Переводчик Google YouTube Nrdf a

Provided by the Nuclear Data Section

Relevant Links

- NDS Home
- Publications Home
- Conference Proceedings
- IAEA NDS series
- INDC series
- NDS staff publications
- Tecdoks

Documents from INDC series

INDC-ARG Argentina	INDC-FIN Finland	INDC-NOR Norway
INDC-AUL Australia	INDC-FR France	INDC-PAK Pakistan
INDC-AUS Austria	INDC-GDR GDR	INDC-POL Poland
INDC-BAN Bangladesh	INDC-GER Germany	INDC-PRT Portugal
INDC-BLG Belgium	INDC-GRC Greece	INDC-ROM Romania
INDC-BLR Belarus	INDC-HUN Hungary	INDC-SAF South Africa
INDC-BOL Bolivia	INDC-IAE IAEA	INDC-SEC Section
INDC-BUL Bulgaria	INDC-IND India	INDC-SLK Slovakia
INDC-BZL Brazil	INDC-INS Indonesia	INDC-SLN Slovenia
INDC-CAN Canada	INDC-IRN Iran (Islamic Republic of)	INDC-SPN Spain
INDC-CCP Russian Federation (USSR)	INDC-IRQ Iraq	INDC-SUD Sudan
INDC-CHL Chile	INDC-ISL Israel	INDC-SWD Sweden
INDC-CPR China	INDC-ITY Italy	INDC-SWT Switzerland
INDC-CSR Czechoslovakia	INDC-JPN Japan	INDC-TAI Taiwan
INDC-CUB Cuba	INDC-KAS Kazakhstan	INDC-TUK Turkey
INDC-CZR Czech Republic	INDC-KOR Korea (Republic of)	INDC-UK United Kingdom
INDC-DEN Denmark	INDC-KUW Kuwait	INDC-UKR Ukraine
INDC-EAN European Nuclear Energy Agency	INDC-MOR Morocco	INDC-UNI United Nations
INDC-EGY Egypt	INDC-NDS Nuclear Data Section	INDC-URU Uruguay
INDC-ENEA ENEA	INDC-NEA NEA	INDC-USA United States
INDC-EUR European Commission	INDC-NED Netherlands	INDC-VN Vietnam

CANRDB Main Tasks

CANRDB Main Tasks

- Incorporation of articles from Central Asia into EXFOR
 - Establishing of data access system (database, Internet, interfaces);
 - Nuclear physics educational materials (lectures, textbooks, literature, etc.)
- Close cooperation with IAEA

The website will host educational materials on nuclear physics for the users (lectures, textbooks, literature, etc.)



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Thank you for your attention !