KNDC Progress Report

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Organization

Chief of Center
Dr. Lee Young-Ouk

Admin
Ms. Lee kyung-Jin

Atomic/ Molecule

Dr. Rhee Yong-Joo
(Neutron source by laser fusion)

Dr. Kwon Duck-Hee
(Atomic energy structure)

Dr. Lee Won-Ouk
(Atomic energy structure)

Nuclear Data Evaluation

Dr. Cho Young-Sik
(Resonance)

Mr. Kim Hyeong Il
(Evaluation)

Dr. Mun Myong-Hwan
(Evaluation)

Processing/ Validation

Mr. Gil Choong-Sup
(Library processing)

Dr. Kim Do Heon
(Library validation)

Dr. Yoo Jaegwon
(Structure data)

Mr. Lee Jong Hwa
(Structure data)

Application

Mr. Lee Cheol Woo
(ITER, Accelerator shielding analysis)

Dr. Kim Jong Woon
(Transport code development)

Dr. Yang Sung-chul
(Accelerator shielding analysis)

Mr. Lee Eu-Jung
(Collimator design)

Measurement

Dr. Song, Tae-Yung
(Measurement)

Dr. Kim Jong Woon
(Constructing neutron TOF facility)

Dr. Yang Sung-chul
(Measurement, EXFOR)

Introduction

➢ **KNDC**

- 1 director, 11 permanent staffs (2 in evaluation, 2 in measurement, 2 in atomic and molecular data, 3 in processing and validation, 2 in applications), 2 postdoctoral researchers, 2 students and 1 secretary.

- Perform the measurement, evaluation, processing and validation of nuclear data which are requested by the various fields.

- Mission of KAERI/NDC is disseminating outcomes of international network as well as promoting domestic nuclear data activities and related applications.

Introduction

➢ International Collaboration

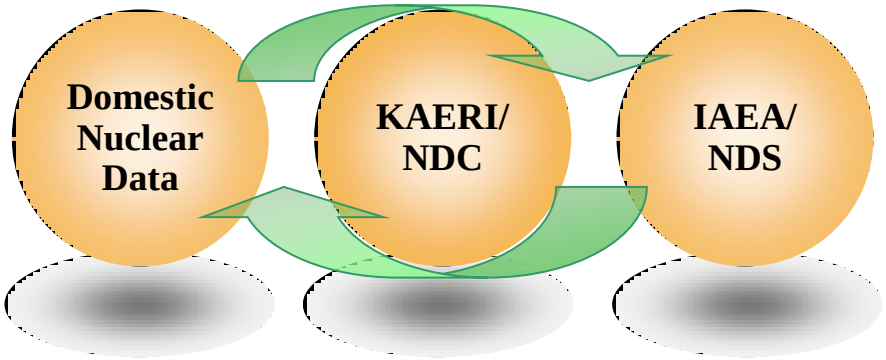
- Compilation of nuclear data into EXFOR under the guidance of IAEA/NDS
- Participating in the JEFF and WPEC subgroup of NEA
- Evaluation of nuclear data for Fe-56 with BNL
- Measurement of neutron capture for U-238 with EC-JRC-IRMM
- Heavy ion experiment at HIMAC with Kyushu Univ.

EXFOR Activity

- **Compilation responsibility**

Neutron data and CPND from Korea (coordinated by NDS)

The beginning of EXFOR-DB from 2009



EXFOR Activity

➢ Status

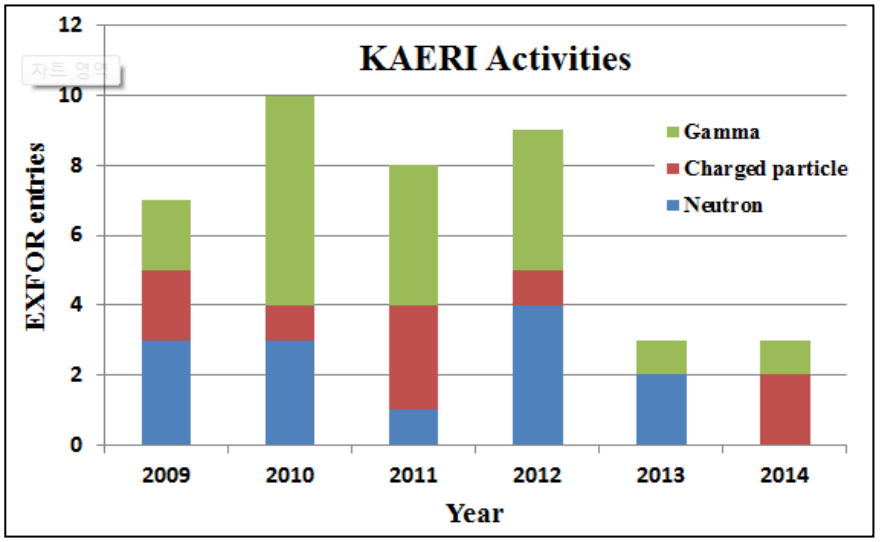
EXFOR Compilation Progress (since NRDC2014 meeting)

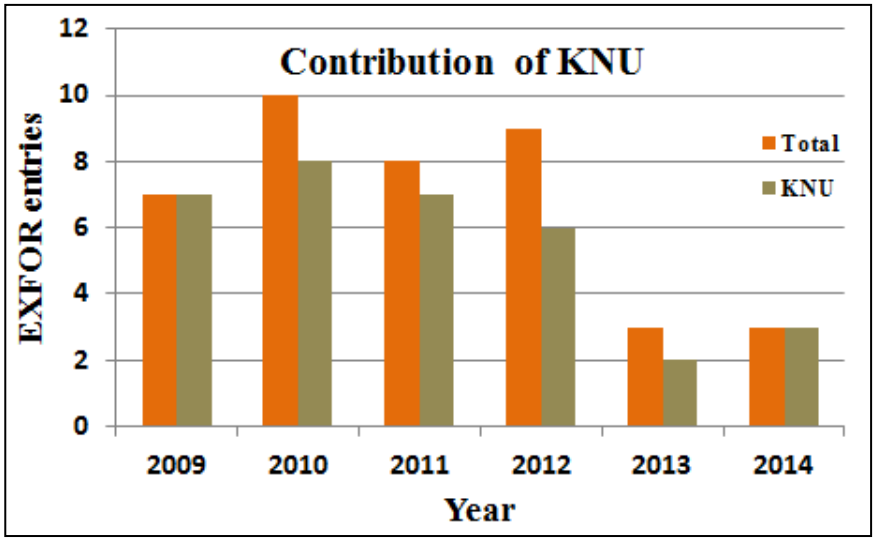
#	TRANS	ENTRY	SUBJECT	STATUS	Author	Facility
1	G031	G3111	Gamma	EXFOR	H. Naik et al. (BARC)	PAL
2	D095	D7006	Charged particle	EXFOR	M. Shahid et al. (KNU)	KIRAMS
3	D096	D7007	Charged particle	EXFOR	K.S. Kim et al. (KNU)	KIRAMS
4	D097	D7008	Charged particle	PRELIM	T.Y. Song et al. (KAERI)	KIRAMS
5	D098	D7009	Charged particle	PRELIM	H. Naik et al. (BARC)	KIRAMS
6		D7010	Charged particle	Reserved	H. Naik et al. (BARC)	KIRAMS
7		G3112	Gamma	Reserved	H. Naik et al. (BARC)	PAL

Currently, 23 articles are a reserved status.

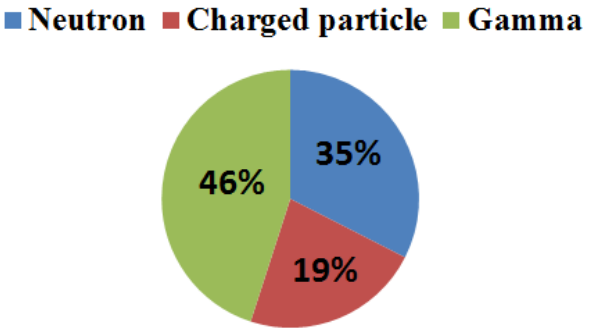
J,EPJ/A – 1
J,JRN – 9
J,KPS – 4
J. NDS – 2
J, NIM/B – 6
J. PPRC – 1

EXFOR Activity





Projectile



KNU's data

- **83%** contribution of produced EXFOR

Facilities of Korea

➢ Existing facilities

Facility	Characteristics	Measurements
Electron linear accelerator (PAL)	• 100 MeV, 2.5 GeV linacs • Neutron production by 100 MeV linac • γ production by 100 MeV and 2.5 GeV linacs	• Total cross section • (n,γ) by neutron activation method • Isomeric yield ratio • Photo fission
Cyclotron (KIRAMS)	• p : 20- 50 MeV / 40 μA • d : 10- 25 MeV / 20 μA • α : 20- 50 MeV / 1 μA	• Activation cross section
Proton linear accelerator (KOMAC)	• 20 & 100 MeV linac	• Activation cross section

➢ Planned facilities

Facility	Characteristics	Status
Electron linear accelerator (KAERI)	• 17 MeV SC linac • Neutron production	• Accelerator is available • Conceptual design of TOF facility is completed
Heavy-ion accelerator (IBS)	• Cyclotron (70 MeV proton) • SC Linac (H – U, 200 MeV/u(U)) • SC linac-1 (d (53 MeV), p (70 MeV)	• Accelerator will be available in 2017 • Planning for data measurements

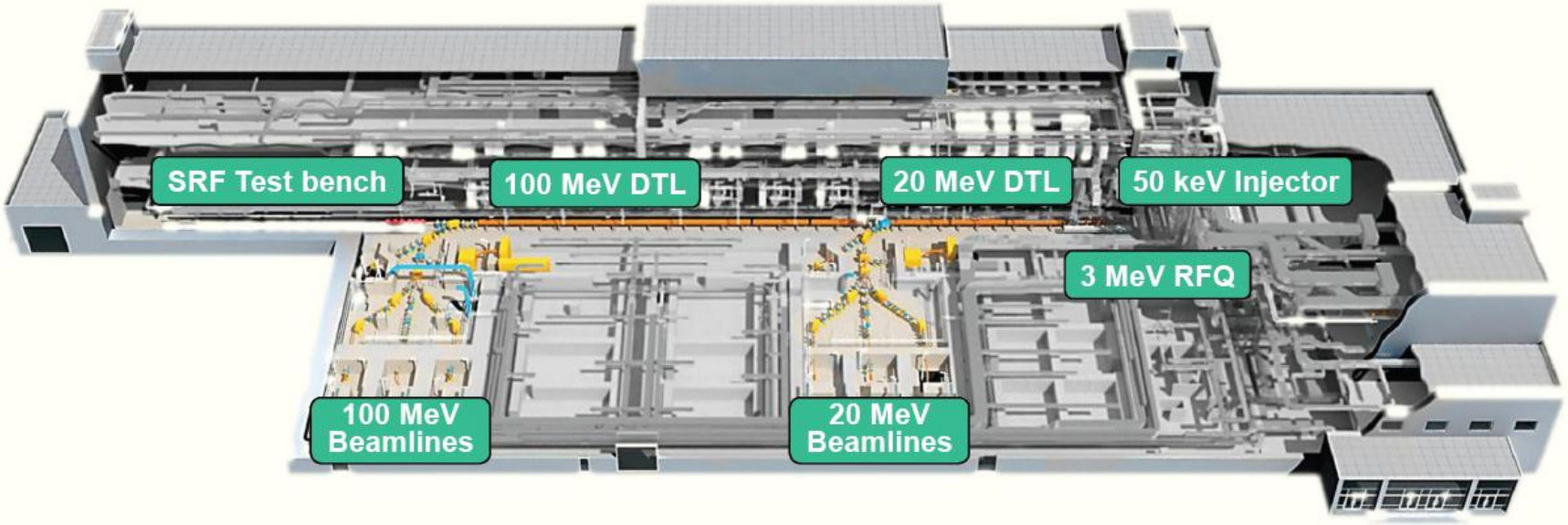
Facilities of Korea

➢ KOMAC (Gyeongju)

Features of the 100MeV linac

- 50 keV Injector (Ion source + LEBT)
- 3 MeV RFQ (4-vane type)
- 20 & 100 MeV DTL
- RF Frequency : 350 MHz
- Beam Extractions at 20 or 100 MeV
- 5 Beamlines for 20 MeV & 100 MeV

Output Energy (MeV)	20	100
Max. Peak Beam Current (mA)	1 ~ 20	1 ~ 20
Max. Beam Duty (%)	24	8
Avg. Beam Current (mA)	0.1 ~ 4.8	0.1 ~ 1.6
Pulse Length (ms)	0.05 ~ 2	**0.05 ~ 1.33**
Max. Repetition Rate (Hz)	120	60
Max. Avg. Beam Power (kW)	96	160

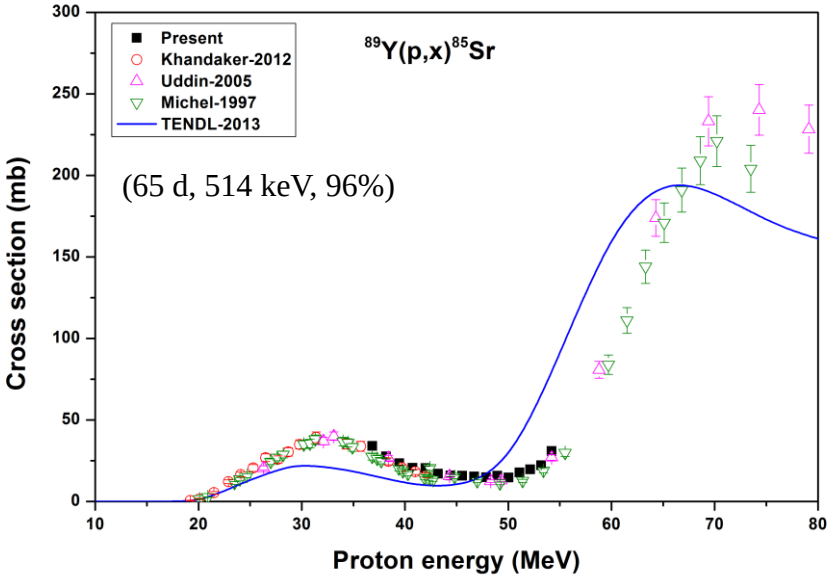


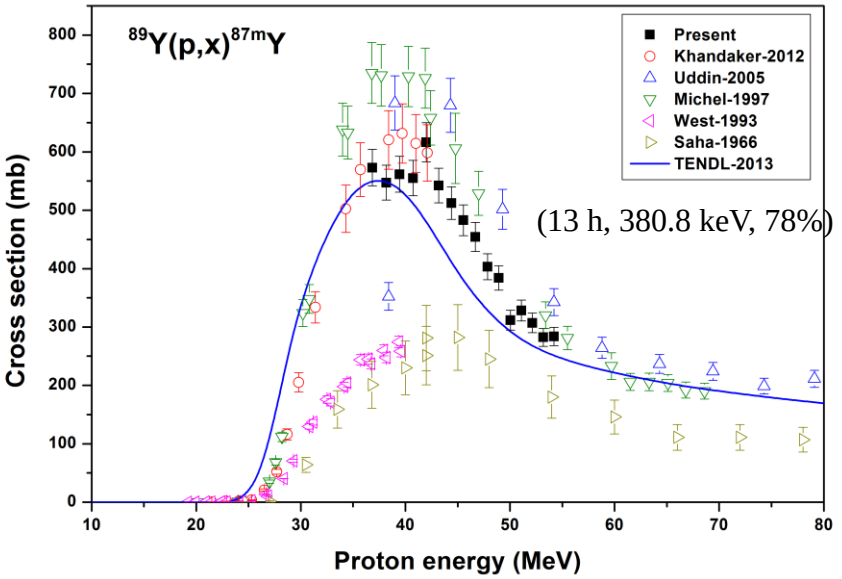
Facilities of Korea

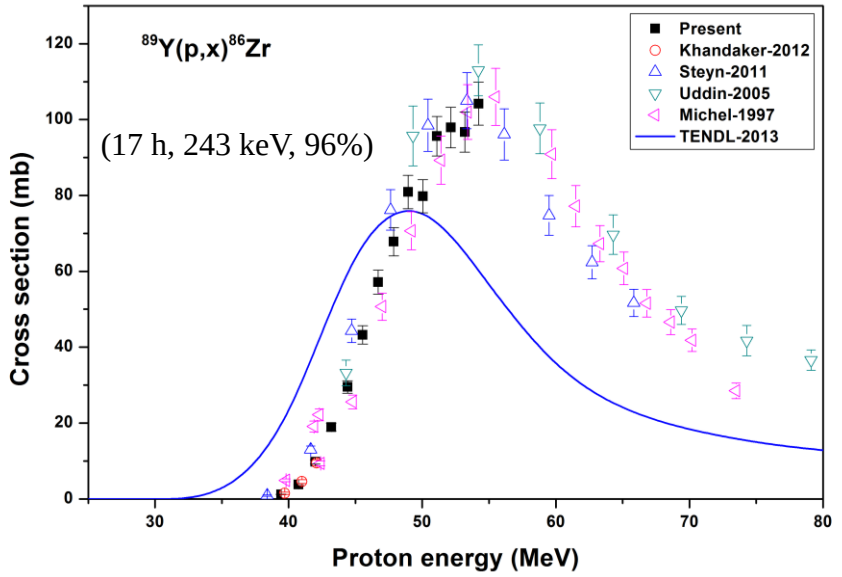
➢ Cross –section in the Y(p,x) reaction

- 57 MeV proton at KOMAC
- Data production of 11 nuclides
  (^{86,88,89}Zr, ^{86,87m,87g,88}Y, ^{83,85}Sr, ^{83,84}Rb)
- Monitor: ^{nat}Cu(p,x)^{62}Zn (9.19 h, 596.5 keV, 26%)
- Flux: 6.78×10^{9}/cm^{2}·s

❖ Khandaker (KNU) – KIRAMS (45 MeV)





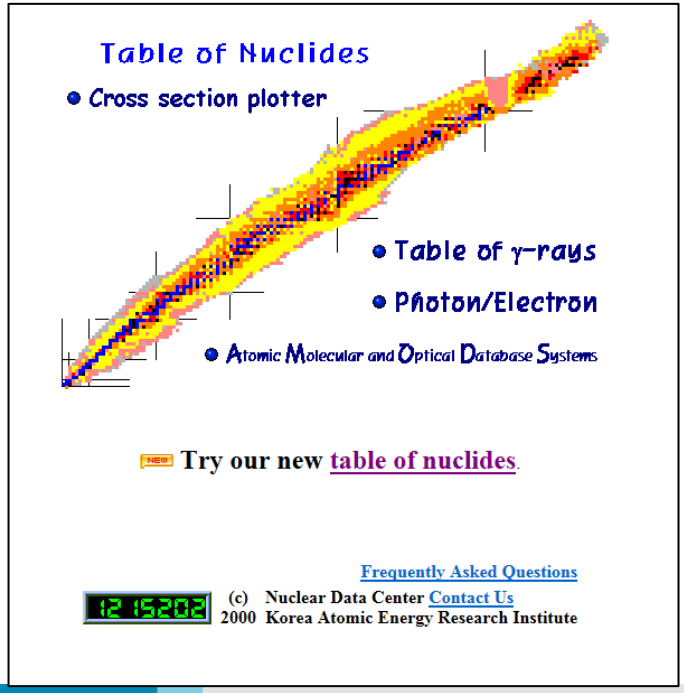


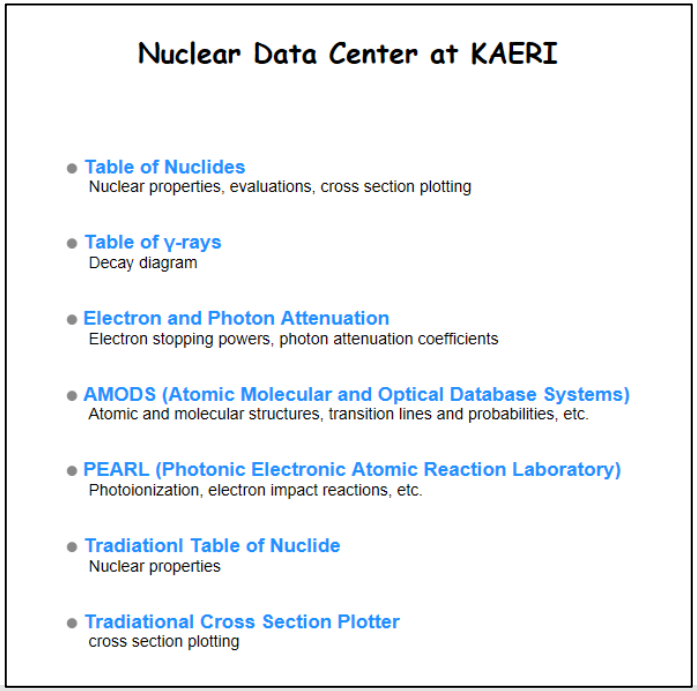
Reconstruction of Website

- **KNDC website** (http://atom.kaeri.re.kr)

  - The aim of this update is to pack more information on one page reducing the need to search across multiple locations.

  - The newly designed table of nuclide allows the used to easily navigate through the nuclides.

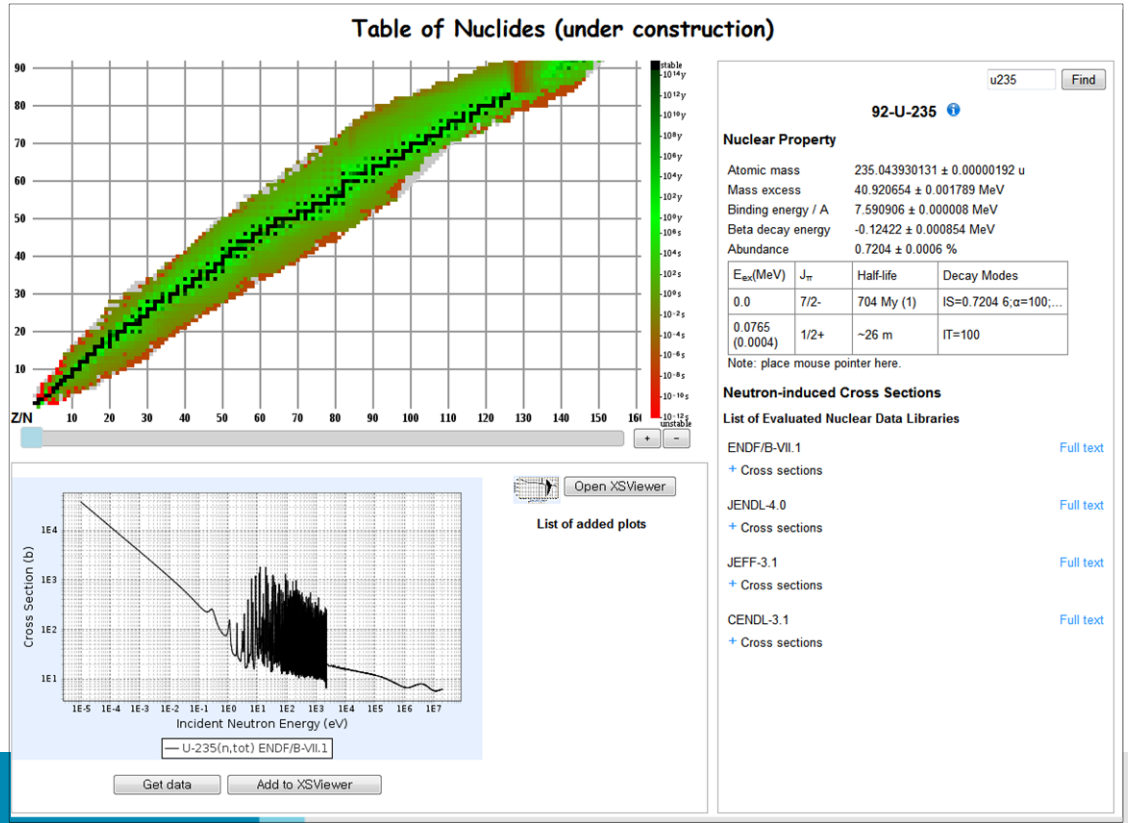




Reconstruction of Website

➢ Table of Nuclides

- Nuclear property and decay information including atomic mass, binding energy, half-life etc.
- Available nuclear data evaluations and EXFOR data
- Cross section plot for the evaluated and measured nuclear data



Continually being updated

Continually being updated

Conclusions

- **The organization and mission of KNDC was introduced.**
- **EXFOR progress in KNDC was introduced.**
  - **Compilation responsibility for domestic experiments**
  - **Since NRDC2014 meeting, EXFOR: 3, PRELIM: 2, Compiling: 2**
- **The contribution of Kyungpook National Univ.**
  - **A unique group of nuclear reaction experiment (83%)**
- **Introduction for the specifications of Korea's facilities**