Korea Nuclear Data Center
Progress Report for 2024-2025

Do Heon KIM & Sung-Chul YANG

Korea Nuclear Data Center
Korea Atomic Energy Research Institute

June 17 – 20, 2025
NRDC 2025, Universidad Politecnica de Madrid, Madrid, Spain

KNDC-Progress Report

CONTENTS

01 Introduction

KNDC

- Established in 1997 to start research on nuclear data in Korea (formerly, 'Nuclear Data Evaluation Lab.')
- Joined the International Network of NRDC in 2000

Main tasks

- **Evaluation** and method development for nuclear reaction data
- Establishment of **processing and validation** system of nuclear reaction/covariance data
- **Measurement** of nuclear reaction data and establishment of measurement facility
- Production and validation of **atomic/molecular** collision data

01 Introduction

Staff

- 15 staff members: 7 regular staffs, 3 post-retirement researchers, 2 post-doctoral researchers, and 3 Ph.D. students

Korea Nuclear Data Center
(Head: D.H. Kim)

Evaluation	Measurement	Processing/ Validation	Atomic/ Molecular
Y.-S. Cho	S.C. Yang	D.H. Kim	D.-H. Kwon
H.I. Kim	Y.-O. Lee	J.H. Lee	K.-B. Chai
	➡ T.-Y. Song	C.-S. Gil	H.W. Shin
	D.H. Moon	H.L. Hyun	D.W. Kim
			S. Patwal

02 Measurement Facility

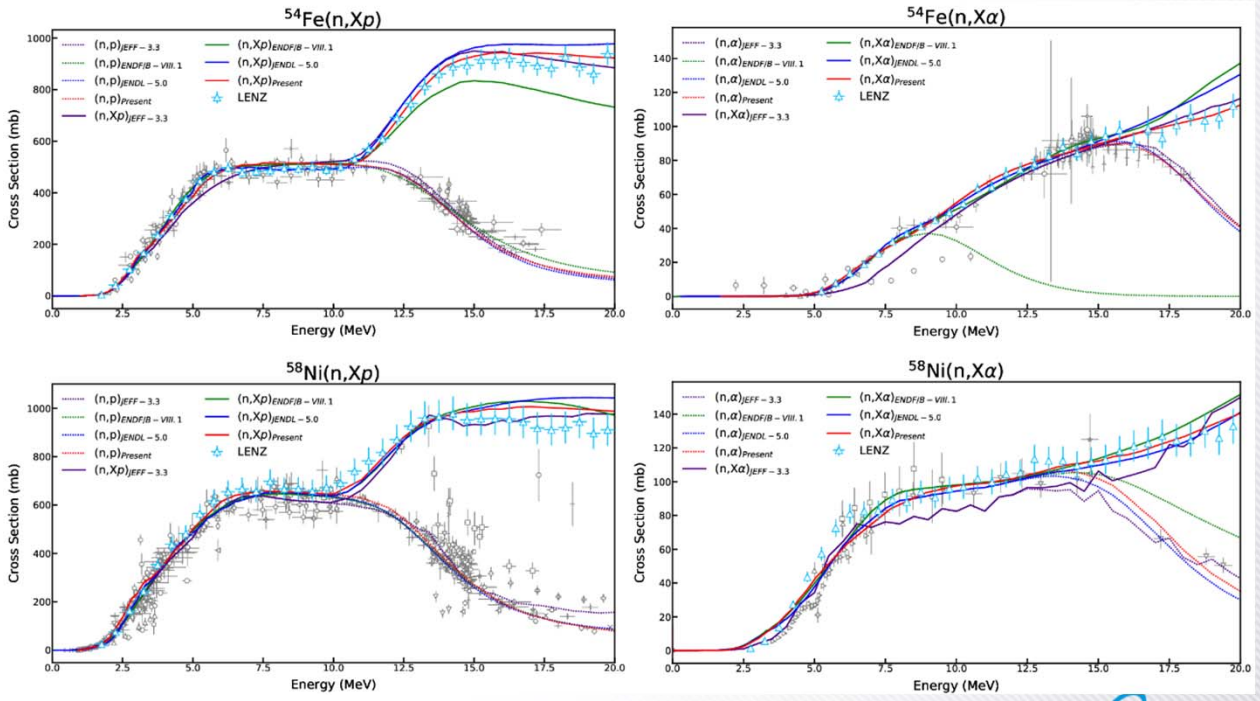
Existing facilities

Facility	Characteristics	Measurements
Cyclotron (KIRAMS)	• p : 20- 50 MeV / 40 μA • d : 10- 25 MeV / 20 μA • α : 20- 50 MeV / 1 μA	• Proton activation cross section
Proton Linear Accelerator (KOMAC, KAERI)	• p : 20 & 100 MeV (linac)	• Proton activation cross section
Cyclotron (ARTI, KAERI)	• p : 30 MeV / 100 μA	• Neutron activation cross section
Heavy-Ion Accelerator (NDPS/RAON, IBS)	• Cyclotron (70 MeV proton) • SC linac (H ~ U, 200 MeV/u(U)) • SC linac (d (49 MeV/u), p (83 MeV))	• Installed all components in 2021 • Performance tests in 2024 • Partial beam service since 2025 (neutron production test using Ar and O ion beams)

03 Nuclear Data Activity

Neutron-induced charged particle data

- A total of 53 evaluated files through a collaborative project with LANL were adopted into ENDF/B-VIII.1 in 2024.
- More accurate interpretation of angular distributions and energy spectra for secondary charged particles, such as (n,p), (n,a), (n,d), (n,t), and (n,^{3}He)
- New evaluations of production cross sections for (n,Xp) and (n,Xa) are continuing with newly measured data from LANL as well as EXFOR.

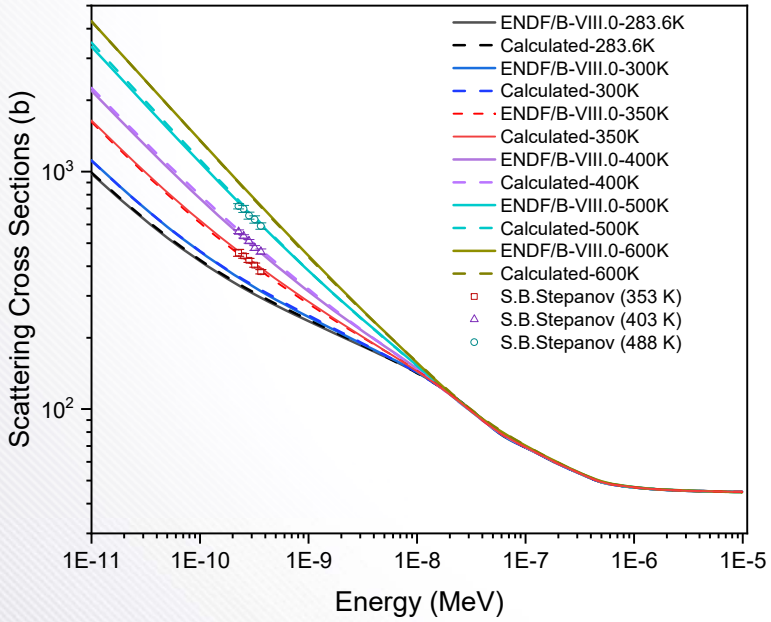


Production cross sections of proton and alpha induced by neutron on ^{54}Fe and ^{58}Ni

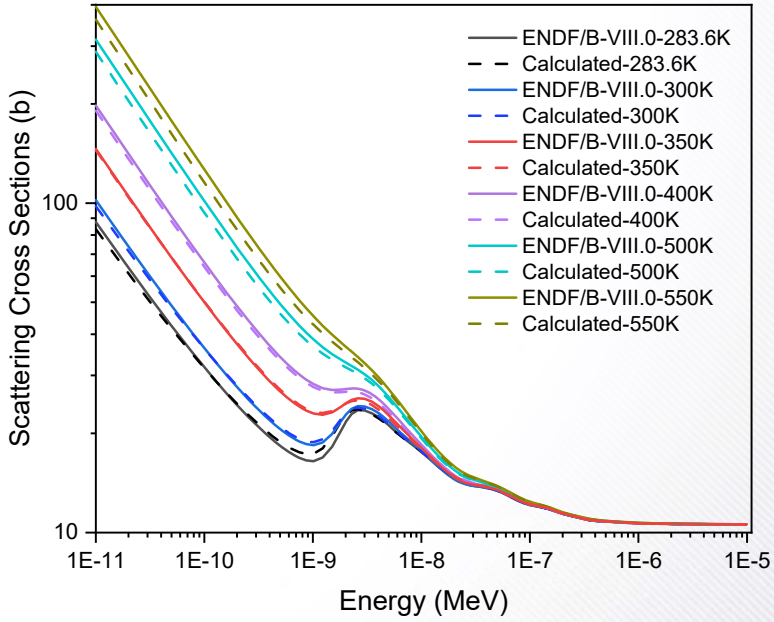
03 Nuclear Data Activity

TSL data

- To support R&D of advanced nuclear reactors in Korea
- Improvement of temperature-dependent TSL data of H_2O and D_2O
  - ✓ GROMACS MD simulations using TIP4P/2005f water model
  - ✓ Comparable to ENDF/B-VIII.0 by adjusting diffusion constants used in NJOY/LEAPR



Scattering Cross Sections of H_2O

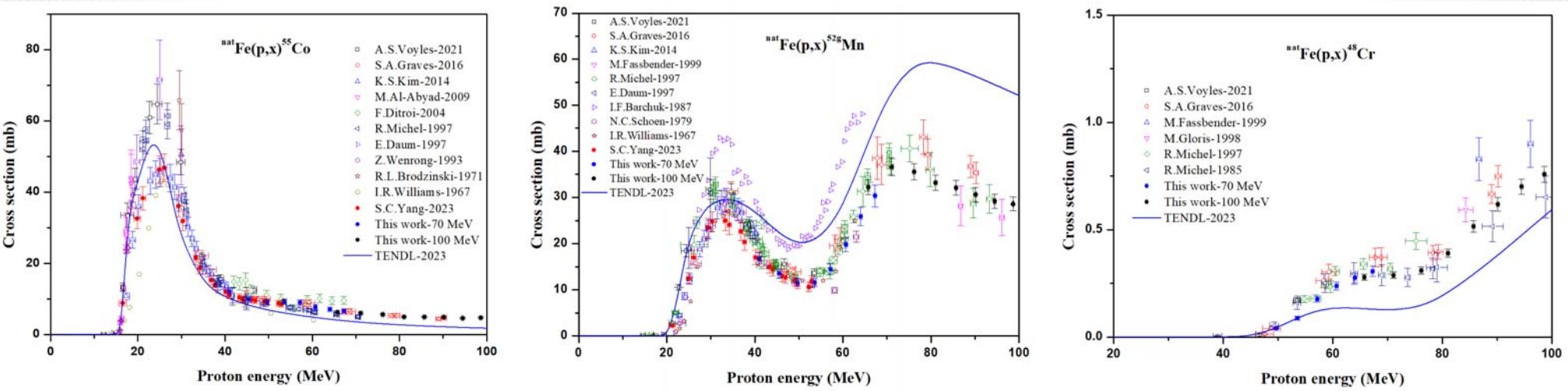


Scattering Cross Sections of D_2O

03 Nuclear Data Activity

Proton induced C.S. data measurement

- Measurement of production cross sections in proton induced reactions on ^{nat}Fe
- 100 MeV at KOMAC facility
- Cross section data for 9 radionuclides ($^{55,56,57}Co$, ^{52g}Fe, $^{52g,54}Mn$, $^{48,51}Cr$, ^{48}V)
- Presentation at ND2025 conference



03 Nuclear Data Activity

Event

- 12th Korea-Japan Joint Summer School on Accelerator and Beam Science, Nuclear Data, Radiation Engineering and Reactor Physics
  - ✓ August 26 ~ 30, 2025 (Aomori, Japan)
  - ✓ Hosted by Atomic Energy Society of Japan (AESJ) and supported on the Korean side by KOMAC and KNDC of KAERI

04 EXFOR Activity

Responsibility

- Begin in 2009
- Compile nuclear reaction data in Korea under the guidance of IAEA/NDS
- Measurement data induced by neutron, charged particle, and photon

Compilation status

- Number of entries in EXFOR: 2
- Compiled and transmitted: 5
- Checking tool: www.jcprg.org/exfor/tool

04 EXFOR Activity

Status

No.	TRANS	ENTRY	SUBENTRIES	SUBJECT	STATUS
1	3213	30857	2	Neutron	EXFOR
2	D143	D7044	9	Proton	EXFOR
3		30856	4	Neutron	Compiled
4		D7045	11	Proton	Compiled
5		D7046	7	Proton	Compiled
6		30858	3	Neutron	Compiled
7		G3139	2	Gamma	Compiled

D7044 Entry

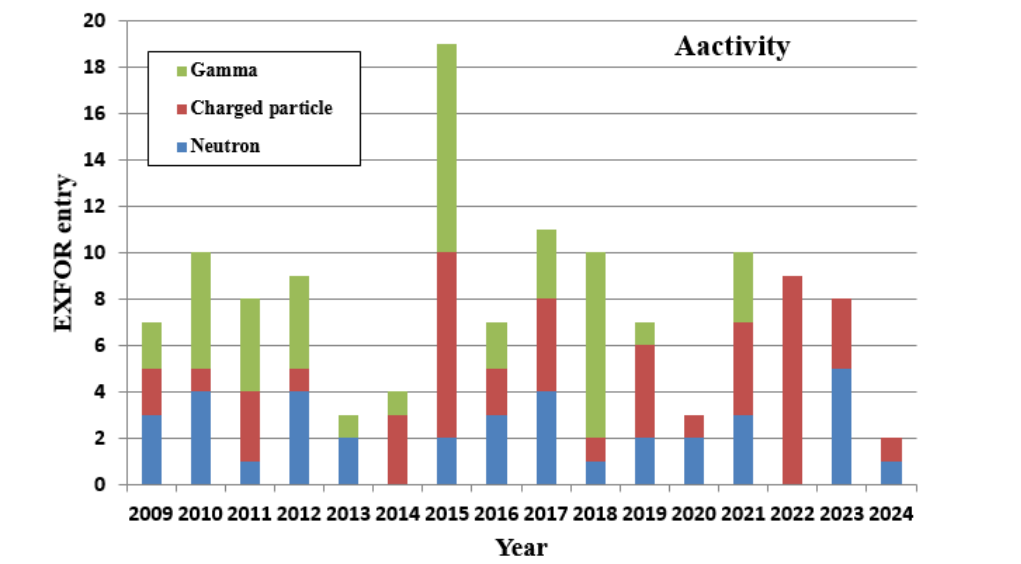
- Article: Production cross sections of radionuclides in the proton induced reaction on Fe
- Journal: Nuclear Engineering and Technology (NET,56,1796,2024)
- Article Allocation List registration (?)

04 EXFOR Activity

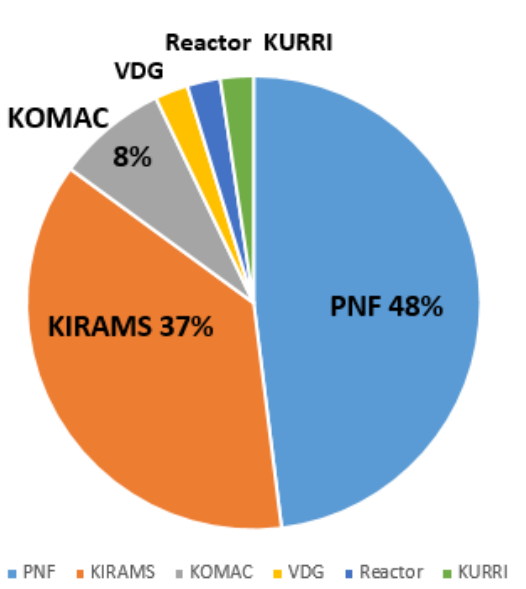
EXFOR DB

- KNDC contributions to EXFOR
  - ✓ As of 2025, 127 entries have been produced.
  - ✓ Compilation rate: ~7.9 entries per year

- Incident particle



- Experimental facility



THANK YOU!

Acknowledgement
This work was supported by the KAERI Institutional Program (Project No. 524560-25).