



Status Report of MSU Data Center

for the period of Nov 2022 – Apr 2024

Jun Chen

25th NSDD Meeting, 15-19 April 2024

IAEA Headquarters, Vienna



MICHIGAN STATE
UNIVERSITY



U.S. DEPARTMENT OF
ENERGY

Office of
Science

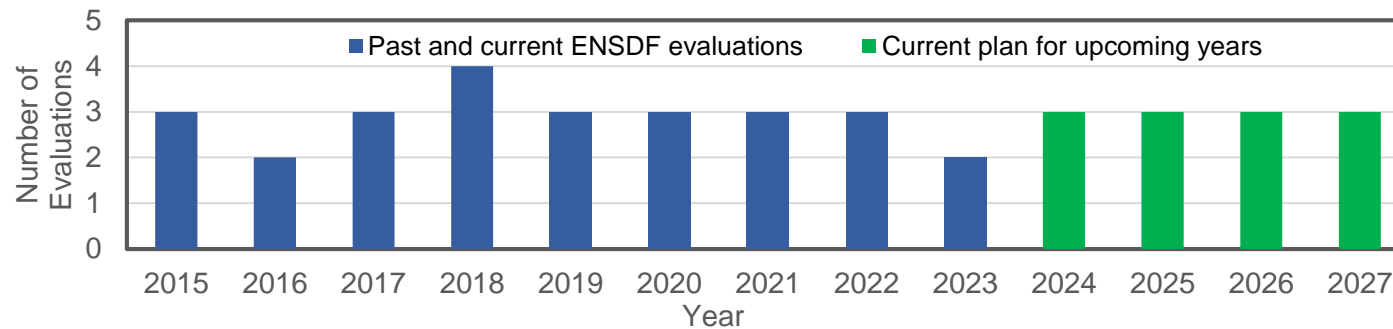
Overview

- Grant status (independently funded by US DOE since 2017):
 - Current grant period: 15 December 2022 to 14 December 2027
 - Grant is released annually
- Data personnel (since 2017, 1.0 FTE)
 - Jun Chen (PI, 1.0 FTE)
 - Ongoing expansion of FRIB nuclear data program (1 staff+1 trainee proposed)
- Major Responsibilities:
 - ENSDF evaluation: A=31-44, 60-80 (except 62,67-70); currently 30 mass chains in total
 - XUNDL compilation including data check for PRC and EPJA manuscripts
 - Development and modernization of ENSDF codes
 - Data support to FRIB users via the FRIENDS project



ENSDF evaluation at FRIB

- Current MSU/FRIB responsibilities (30 mass chains): A=31-44, 60-80 except 62,67-70
 - A=74-80 transferred from McMaster to MSU after last NSDD meeting
 - Ongoing (FY24): A=80 (previously planed with Balraj), A=65
- Also work on other mass chains (mostly in collaboration with Balraj Singh from McMaster center)
 - Completed: A=48, 50, 85, 98, 100, 123, 138, 149, 165, 167, 190, 194, since 2014, (also 64, 71, 73, 76 with Balraj)
 - Ongoing (FY24): A=151 (previously planed with Balraj)
- Current goal settings: 2-3 mass-chains per year (1.0 FTE)



Number of ENSDF evaluations each year at MSU, including collaboration work (1-2 per year) with Balraj Singh till 2024

Total 5-6 mass chains/year if proposals for additional data persons are awarded starting from FY25

Completed in FY23

Mass	#Nuclides	#Datasets	#Lines	#Levels	#Gammas	Evaluators	<i>status</i>
A=33	11	85	12,768	547	521	J. Chen, B.Singh	<i>Post-review</i>
A=63	13	86	16,897	1,032	1,500	J. Chen	<i>Post-review</i>



Data Review and XUNDL Compilation at FRIB

- Completed in the report period (11/2022-4/2024):
 - » XUNDL compilations: 63 datasets from 45 papers
 - » Data reviews: 17 PRC+1 EPJA manuscripts (total 26 datasets)
- Training MSU students for XUNDL compilation (since 2018)
 - » Since 2018, 1-2 top undergraduates from Honors College of MSU have been recruited and trained each year (except 2021)
 - » A total of **65** datasets from **44** papers have been compiled by the students
 - » Beginning 10/2023, two new students Rylie DuBois and Hang Su have already completed compiling 18 papers (10 and 8), supported by course credits of Honors Research Seminars and MSU Professorial Assistantship (PA), respectively



Amani Ahnuar
2018-2019



Pranjal Dangwal
2019-2020



Dave Lempke
2019-2020
Current PhD student at FRIB



Luke Hixson
2022-2023
B.S. degree in <3y
Current DJEATC apprentice
(Electrician)



Rylie DuBois
2023-current
Freshman

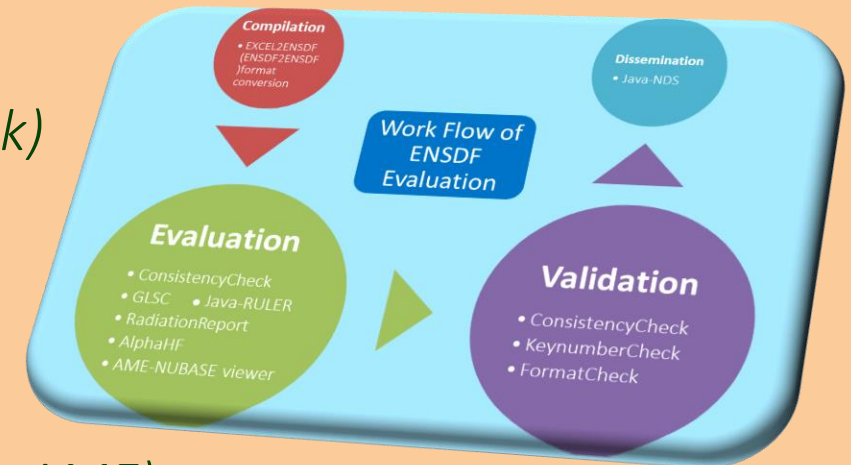


Hang Su
2023-current
Freshman

ENSDF code development and modernization at FRIB

To streamline and automate evaluation process, ensure evaluation quality and improve evaluation efficiency

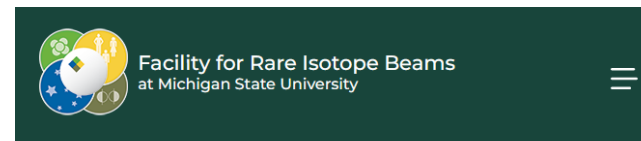
- *McMaster-MSU Java-NDS* (constantly improved)
- *ConsistencyCheck* **NEW feature** (add format and keynumber check)
- *KeynumberCheck* (included in *ConsistencyCheck*)
- *Java-RULER* **NEW improvement** (improved *B(XL)* calculator tool)
- *Excel2ENSDF* **NEW improvement** (improved operations on records)
- *AME-NUBASE viewer* **NEW improvement** (improved calculator tool using AME)
- *GLSC* (Gamma to Level Scheme Computation: *GTOL+GABS*) **NEW improvement** (output with new *E(level)*, %IB, %IG for decay)
- *RadiationReport* (*LOGFT+RADLIST*) **NEW feature** (added calculators for logft from feeding or vice-versa)
- *AlphaHF* (*ALPHAD+RadD*)
- *FormatCheck* **NEW** (same checking function is also included in *ConsistencyCheck*)



Other Data Activities at FRIB

- Data support to FRIB users and researchers in the FRIENDS framework since 2021
- Hands-on activities on nuclear data tools for 42 participants at the Exotic Beam Summer School 2023
- Evaluation of decay data of selected isotopes for the IAEA/CTBTO decay data project
- Work with Michael Thoennesen on the Nuclide Discovery Data project
 - » Convert and store all isotope discovery data including abstracts into a single JSON file
 - » Write a viewer/editor Java program to view and add/edit isotope discovery data
 - » Help fix errors/inconsistencies in the isotope discovery data
 - » Collaborate with NNDC for the discovery data to be incorporated into NuDat webpage (implemented by Donnie Mason)
 - » Build webpages to host and display the isotope discovery data (tables) and to provide customized search to users

The new FRIB webpages of the nuclide discovery project are officially online in March 2024: <https://frib.msu.edu/public/nuclides>



Discovery of Nuclides Project

At the core of each atom is the atomic nucleus (also called nuclide), which consists of neutrons and protons. The number of protons defines the

Search discoveries by:

Author	<input type="text"/>
Country	<input type="text"/>
Laboratory	<input type="text"/>
Element	<input type="text"/>
Year	<input type="text"/>
NSR keyno (?)	<input type="text"/>