Status report of NSCL/MSU data center
(May 2017 – April 2019)

by Jun Chen

For the 23rd Technical Meeting of the NSDD Network at IAEA
April 8-12, 2019

1. Overview of NSCL/MSU data center

The data center at NSCL/MSU became a member of the NSDD network at the 2015 IAEA NSDD meeting at Vienna and it plays a unique role as part of the FRIB/NSCL facilities. NSCL/MSU data center is currently responsible for the evaluation of fourteen mass chains (A = 31 – 44) with additional ones to be assigned, and it also compiles data for XUNDL data base, including data coming out from NSCL and FRIB in the future. In addition, it also helps develop and improve the analysis and utility tools used in data compilation and evaluation. NSCL/MSU data center has been independently funded by DOE since FY17.

Current personnel (since July 2017, 1 FTE):
    Hiro Iwasaki (Supervisor & NSCL/FRIB data committee member)
    Jun Chen (PI, 1 FTE)

Previous program manager and PI (November 2014 - July 2017):
    Michael Thoennessen (currently APS Editor in Chief)

2. ENSDF evaluations and XUNDL compilations

In addition to the primary responsibility of mass-chains A=31-44 for ENSDF data evaluation, NSCL/MSU data center also takes on additional mass chain, selected from the evaluation priority list made by NNDC and coordinated within the NSDD network.

To date, all mass chains in A=31-44 mass region are up-to-date according to the 10-year update cycle. Additional mass chains of A=50, 73, 98, 100 and 190 have be re-evaluated since 2018, in collaboration with B. Singh. Two more mass chains with B. Singh have been planned for this year. Evaluation of A=123 is ongoing.

For XUNDL compilations, a total of 198 datasets from 102 papers have been compiled since May 2017, including 101 datasets/54 papers in FY18, and 42 datasets/20 papers in FY19 so far. The goal is ~80 datasets/~50 papers a year.

Table 1: Status of mass chain evaluations at NSCL/MSU

Mass Chain	Year of last evaluation	Evaluator of last evaluation	Current status
31	2013	C. Ouellet and B. Singh	Up-to-date
32	2011	C. Ouellet and B. Singh	Up-to-date
33	2011	J. Chen and B. Singh	Up-to-date
34	2012	N. Nica and B. Singh	Up-to-date
35	2011	J. Chen, J. Cameron and B. Singh	Up-to-date
36	2011	N. Nica, J. Cameron and B. Singh	Up-to-date
37	2012	J. Cameron, J. Chen and B. Singh	Up-to-date
38	2017	J. Chen	Up-to-date
39	2017	J. Chen	Up-to-date
40	2015	J. Chen	Up-to-date
41	2015	C. D. Nesaraja and E. A. McCutchan	Up-to-date
42	2016	J. Chen and B. Singh	Up-to-date
43	2015	B. Singh and J. Chen	Up-to-date
44	2011	J. Chen, B. Singh and J. Cameron	Up-to-date
Additional mass chains			
50	2018	J. Chen and B. Singh	Post-review
73	2018	B. Singh and J. Chen	Post-review
98	2018	J. Chen and B. Singh	In-review
100	2018	B. Singh and J. Chen	Post-review
123	2019	J. Chen	Under-evaluation
138	2017	J. Chen	Up-to-date
190	2019	B. Singh and J. Chen	In-review

3. Code development and maintenance

The NSCL/MSU data center continues to take the lead in the code development and maintenance of some new Java programs all with graphical user interface (GUI), such as *McMaster-MSU-JAVA-NDS* for the production of Nuclear Data Sheets and the web-display of ENSDF and XUNDL databases, "*ConsistencyCheck*" for checking data consistency among ENSDF datasets, and so on. A list of the codes are given in the table below, and are available for downloading on the IAEA website.

Table 2: List of Java codes developed/maintained at NSCL/MSU

Name	Functions	Note	Last Update
ConsistencyCheck	check data consistency among ENSDF datasets, group levels and gammas, and average values from different datasets (with user selections), and more	considered as replacement of PANDORA; useful for preparing Adopted dataset	March 18, 2019
Excel2ENSDF	convert BETWEEN an Excel file (formatted data) and an ENSDF file; perform simple operations on column data in Excel, such as multiplying a factor or adding a constant (or both) to all values of a record, e.g., adding S(n) to E(n)	extensively used in XUNDL compilation and useful for extracting tabulated data from ENSDF	March 11, 2019
Java-RULER	calculate gamma-ray transition strengths in ENSDF file with proper error propagations of large/asymmetric uncertainties	solved a long-standing uncertainty calculating issue in the old FORTRAN code	February 5, 2019
KeynumberCheck	check all NSR key-numbers in ENSDF datasets for format errors, irrelevant or nonexistent key-numbers (mostly due to mistyping) by searching in an input list of key-numbers or in the NSR database directly.	useful to catch incorrect, irrelevant or non-existent key-numbers for the final check of an ENSDF evaluation	January 29, 2019
Java-NDS	generate LaTeX and PDF outputs from ENSDF file(s) for Nuclear Data Sheets and web-display of ENSDF and XUNDL databases on NNDC retrieval webpages	started at McMaster by Balraj and his students	February 8, 2019