STATUS REPORT OF NUCLEAR DATA ACTIVITIES AT OAK RIDGE NATIONAL LABORATORY

1. Members

The Nuclear Data Group consists of Michael Smith (Group Leader for Experimental Astrophysics & Nuclear Data Program), Caroline Nesaraja (ENSDF evaluator), Murray Martin (ENSDF evaluator and consultant), Larry Zhang (nuclear astrophysics data)

2. Activities

i) Nuclear Structure Data

ENSDF

This activity consists of mass chain evaluations, and our responsibility is in the actinide region A=241-249. Currently the literature cut-off dates for mass chains A=241-249 are listed below:

Mass Chains and Literature cut-off dates from ENSDF database

241 C.D. Nesaraja. NDS 130, 183 (2015) (Lit cut-off Sept. 2015)
242 Y. A. Akovali. NDS 96, 177 (2002) (Lit cut-off Sept. 2001)
243 C.D. Nesaraja & E.A. McCutchan. NDS 121, 695 (2014) (Lit cut-off Sept. 2013)
244 C.D. Nesaraja. NDS 146, 387 (2017) (Lit cut-off August 2017)
245 E. Browne & J.K. Tuli . NDS 112,447 (2011) (Lit cut-off June 2010)
246 E. Browne & J.K. Tuli. NDS 112,1833 (2011) (Lit cut off Jan. 2011)
247 C.D. Nesaraja. NDS 125, 395 (2015) (Lit cut-off March 2014)
248 M.J. Martin. NDS 122, 377 (2014) (Lit cut-off Sept. 2014)
249 K. Abusaleem. NDS 112, 2129 (2011) (Lit cut-off Dec. 2010)

Since the last NSDD meeting in 2017, three mass chains have been evaluated and are in their various stage of evaluation process as shown below.

Mass Chain	Evaluator	#Nuclides	Status
137	Nesaraja	16	Submitted
244	Nesaraja	9	Published
242	Martin	9	Post Review

Both Murray Martin and Caroline Nesaraja are also reviewing mass chains as requested by the National Nuclear Data Center. Since the last NSDD meeting, several mass chains have been reviewed: A=76, 197, 217 (Nesaraja), and A=126 (Martin)

XUNDL

This effort involves the critical compilation of nuclear structure data from most current publications and the preparation of and insertion into the XUNDL database. Frequent communications with authors of papers are often required to resolve inconsistencies in data and to obtain addition details of the measurements and data.

The ORNL effort in XUNDL compilations began in May 2013 when Balraj Singh visited ORNL to recruit Caroline Nesaraja for this work, with our first compilations in FY2014. Due to a request from the new XUNDL manager in April 2016 for ORNL to either stop this effort entirely or reduce our XUNDL effort, the number of papers compiled by ORNL have decreased since FY2017. As of FY2019, ORNL has opted to stop but will compile any paper as requested by NNDC.

ii) Nuclear Astrophysics Data

The astrophysics data research is closely coupled with our program of measurements of reactions with unstable and stable nuclei. Our current emphasis is on determining the uncertainty of reactions important for the rapid proton capture process in nova explosions. These will be the focus of measurements at FRIB, but many of the critical reactions have not been examined. We are currently surveying the literature for information on these reactions and will then performed streamlined assessments of proton-capture cross section uncertainties as needed.

iii) Other Nuclear Data Activities:

Murray Martin:

Lectured at the Joint ICTP-IAEA Workshop on Nuclear Structure and Decay Data at the International Center for Theoretical Physics in Trieste, Italy from Oct. 15-26, 2018. Trained several students in the evaluation procedures and formats involved in the production of the Evaluated Nuclear Structure Data File (ENSDF)

3. Future Activities

Future mass chains will be evaluated within the range A=241-249 the range assigned to ORNL, as well as others assigned by USNDP/ NNDC.