

## FUDGE Software Abstract

1a. Software Acronym:

FUDGE

1b. Short Title:

FUDGE: For Updating Data and Generating Evaluations

2. Developer Name(s) and Affiliation:

Bret Beck, Caleb Mattoon (LLNL) and David Brown (Brookhaven National Lab)

3. Software Completion Date:

12-2015

4. Brief Description:

Fudge provides (Python based) tools to:

- Store and modify nuclear data.
- Convert ENDF-6 formatted nuclear data [1] into Generalized Nuclear Data (GND) structure [2].
- Convert LLNL's ENDL formatted nuclear data [3] into GND.
- Plot data from GND files.
- Check for physics problems in GND files.
- Process nuclear data for use by Monte Carlo and/or deterministic codes. Fudge contains hooks for the future addition of nuclear data processing routines.

The Fudge release includes samples of published ENDF-6 formatted data that can be converted to the new GND format.

This software is the next release in a series of releases that began with GND version 0.1 [2].

5. Method of Solution:

Reads ENDF-6 file or an ENDL file, and parses it into python classes, then writes the data out into the new GND structure in the XML language.

6. Computer(s) for which software is written:

Unix, Mac, PC.

7. Operating System:

Unix, MacOSX, and Windows.

8. Programming Language(s) Used:

Python, C/C++ and HDF5.

9. Software Limitations:

N/A

10. Unique Features of the Software:

Converts popularly available nuclear databases into a common, modern structure. FUDGE is currently the only code able to handle the new GND nuclear data format.

11. Related and Auxiliary Software:

FETE [4-5], PREPRO [6] and HDF5 [7].

12. Other Programming or Operating Information or Restrictions:

To convert an XML file into HDF5 requires the external software package HDF5 [6].

13. Hardware Requirements:

No significant CPU or memory requirements.

14. Time Requirements:

No significant time required for reading individual physics reactions.

15. References:

1. <http://www.nndc.bnl.gov/nndcscr/documents/endl/endl201>
2. C.M. Mattoon, B.R. Beck, N.R. Patel, N.C. Summers, G.W. Hedstrom and D.A. Brown, "Generalized Nuclear Data: a New Structure (with Supporting Infrastructure) for Handling Nuclear Data" Nuclear Data Sheets, Volume 113, Issue 12, December 2012.
3. B. Beck, G.W. Hedstrom, T.S. Hill, A.A. Marchetti, D.P. McNabb, "ASCII format specifications for the Evaluated Nuclear Data Libraries (ENDL)", LLNL Report number UCRL-TM-218475
4. Brown, D., and Hedstrom, G., "User's Guide to fete - From Endf/B-VI To ENDL", LLNL Report number UCRL-SM-218496 (2006).
5. "Translated ENDF formatted data at LLNL," LLNL Report number UCRL-MI-223442, UCRL-TR-222551.
6. <http://www.nds.iaea.org/ndspub/endl/prepro/>
7. <http://www.hdfgroup.org/HDF5>