

DOE Workshop on Nuclear Physics and Related Computational Science R&D for Advanced Fuel Cycles

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**Nuclear Data Working Group
Processing Codes Development (NJOY)**

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Processing Codes Development (NJOY)

- LANL's NJOY code is the primary processing program to create multigroup and continuous energy cross section files from ENDF formatted evaluated nuclear data.
- NJOY99 has been available through the Oak Ridge Code Center, RSICC, for many years (code package PSR-480).
 - Subsequent updates are available from LANL.
 - Updates through 112 are currently available at <http://t2.lanl.gov/codes/njoy99/index.html>.
 - Further updates have been created during ENDF/B-VII β _ testing.
 - Preliminary updates through 125 are available at <http://www.nndc.bnl.gov/exfor2/4web/upn125.txt>
 - Portions of the ENDF/B-VII β 2 neutron cross section library have been processed at LANL, BNL, Bettis, KAPL and in Europe (Petten, IAEA).
- LANL expects to release a new version of NJOY this year.

Processing Codes Development (NJOY)

- NJOY updates have focused on continuous energy Monte Carlo library creation for many years.
 - Use the “reconr”, “broadr”, “purr”, “heatr”, “thermr” and “acer” modules to create ACE continuous energy cross section files.
 - The entire ENDF/B-VII β 2 library (393 neutron cross section files) can be processed on a modern PC in a couple of days.
 - However, with a variety of input options, additional review is needed to verify valid program execution for the User’s end application.
 - Use the “groupr” module to create multigroup cross section files.
 - User specified group structure and weighting functions are allowed.
 - Common energy group structures & weighting functions are present.
 - Development of accurate multi-group cross sections for unique reactor designs remains a challenging technical problem.

Processing Codes Development (NJOY)

- Future Developments
 - Always remain compatible with current and past ENDF formats.
 - Covariance processing capability is limited.
 - Will resume development work this Fall.
 - ERRORJ integration into NJOY.
 - Allow use of unit base transformation with File 5 secondary energy distributions.
 - Eliminate distortion in current algorithm caused when multiple $f(E)=0$ data points are present.
 - Investigate expanded processing capability for resolved resonance region elastic scattering angular distribution data.
 - In principal, can calculation energy dependent elastic scattering angular distributions from Reich-Moore resonance parameters.

Processing Codes Development (NJOY)

- Conclusion
 - LANL's NJOY code has been the primary processing code for ENDF formatted evaluated data files for many years.
 - LANL will continue to support this tool and expand its capabilities so that it remains the premier tool for processing ENDF formatted files.