OAK RIDGE National Laboratory

AMPX Support for GNDS-2.1

J. D. McDonnell, J. Brown,
C. W. Chapman, D. Wiarda

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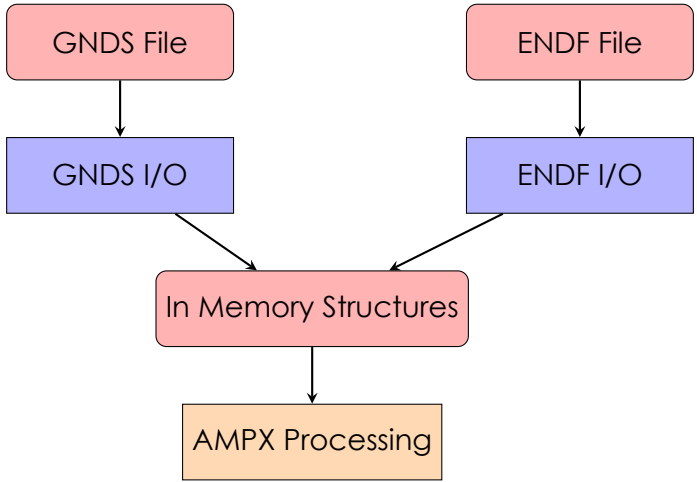
Outline

- Review of AMPX strategy for GNDS
- Summary of point data comparison
- Summary of covariance data comparison
- Preview of SAMMY GNDS I/O and other development

GNDS AND ENDF I/O IN AMPX



Updates for GNDS-2.1

- GNDS “low level access” libraries were generated via the Python scripts available at `https://code.ornl.gov/RNSD/gnds`
  - Those scripts read the GNDS format specification and produce C++ classes
- Changes for the "tags" to locate resonance, covariance, and TSL data were implemented

These changes are in development and in need of quality assurance review before release

Test of GNDS-2.1 Support

The ENDF/B-VIII.1 library was released in both ENDF-6 and GNDS-2.1 formats.

`https://www.nndc.bnl.gov/endf-releases/`

For a thorough test, we have processed the point data and covariance data for the ENDF/B-VIII.1 library in both formats.

Test of GNDS-2.1 Support: Point Data

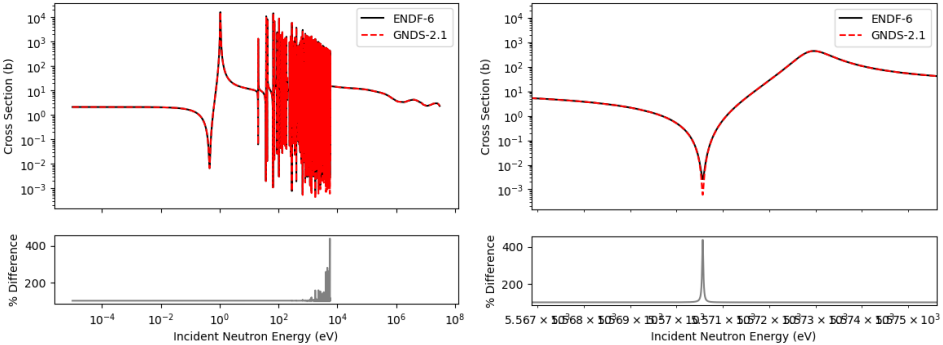
The AMPX module `polident` was used to process the point data in both formats. Subsequently, the AMPX utility `tab1compare` was used to summarize the differences.

All nuclides but four exhibited percent differences of less than 1%.

Nuclide	MT	Max % Diff.
^{240}Pu	2	337.909
^{86}Kr	2	1.65938
^{22}Na	102	1.61529
^{197}Au	2	1.00727
^{22}Na	2	0.940279

Test of GNDS-2.1 Support: Point Data

The ^{240}Pu case is naturally alarming. Investigation reveals the difference is rather isolated:



Test of GNDS-2.1 Support: Covariance Data

Likewise, we used `puff_iv` to process the covariances in each format, and used `covcomp` to compare each resulting multigroup covariance file.

Of the 266 covariance files that we processed:

- 187 produced identical covariances
- 32 exhibited differences above the comparison threshold
- 47 encountered an error
  - One common source of error seems to be the handling of cross-nuclide covariances
  - Otherwise, we are continuing to investigate this and make appropriate corrections

CONTINUING EFFORT

- Completing support and similar comparison for the kinematic data
- I/O interoperability between AMPX and SAMMY
  - We have an active development branch of SAMMY that can write resonance parameters in GNDS format
- In-development C++ implementation of ExSite's capability to read and summarize evaluation contents for the creation of templates
  - This strategy allows using the common library of I/O routines, as opposed to reimplementing GNDS I/O in Java

CONCLUSION

- AMPX can be built from the open source repo: `https://code.ornl.gov/scale/code/scale-public`
- AMPX support for the GNDS library continues. Public repo for GNDS compatibility layer: `https://code.ornl.gov/scale/code/external/gnds`
- GNDS support is being tested via the GNDS version of ENDF/B-VIII.1
- Sharing of I/O routines between AMPX and SAMMY will support using SAMMY to produce evaluations in the GNDS format

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