AMPX Developments in 2024

AMPX Team

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

BK Jeon, K. S. Kim, D. Wiarda

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AMPX Development for 2024

The priority for AMPX development for FY2024 has been to support processing the ENDF/B-VIII.1 library.

- Development to Support Thermal Neutron Scattering Library
- GNDS-2.1 Support and AMPX Maintenance
- Transport libraries for SCALE 7.0.0

TSL Files: Mixed Elastic Scattering

- AMPX development to process files with mixed elastic scattering into SCALE MG and CE formats
  - This capability is implemented and undergoing SQA review
- Coordination with transport code developers to utilize these data is ongoing

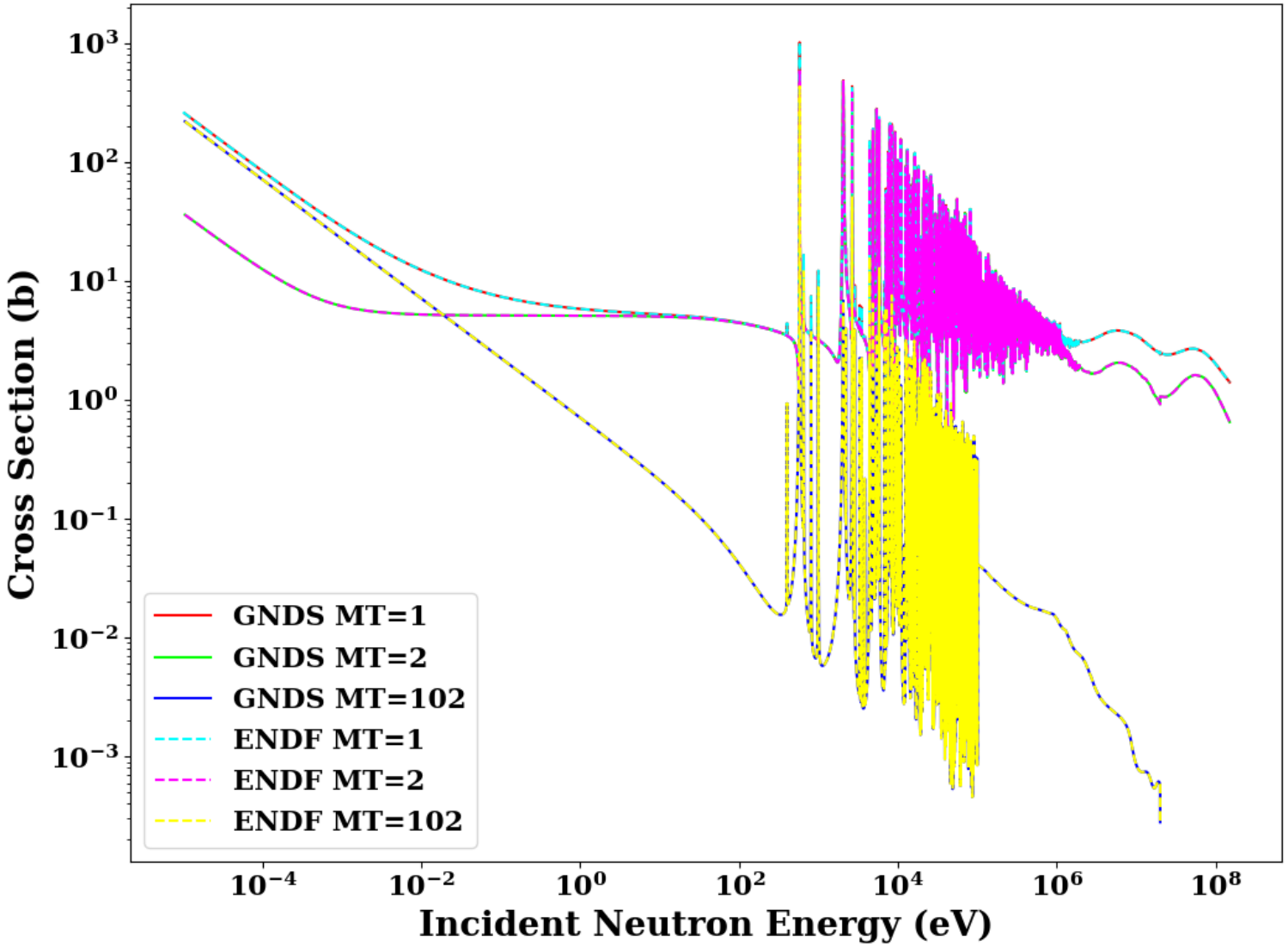
TSL Files: Storage of Simple Bragg Edge Tables

- New format for SCALE CE libraries now accommodates a table of Bragg edge energies, instead of full double differential representation. This allows a significant reduction in the CE library size and is especially helpful for ENDF/B-VIII.1.
  - Estimated to reduce CE library size by 20 – 40 %
- "On-the-fly" sampling of Bragg edge tables during transport has been implemented by the SCALE team and is undergoing SQA testing.

AMPX Development Highlights: GNDS-2.1 Support

- AMPX needed updates to accommodate the GNDS-2.1 format
  - Changes to the "tags" for locating resonance data
  - Changes to the "tags" for locating covariance data
- GNDS "low level access" libraries available via https://code.ornl.gov/RNSD/gnds
- *** Successfully processed point data and covariance data for the GNDS version of ENDF/B-VIII.1, without encountering issues.
- Next steps:
  - More testing, especially of kinematics/TSL support
  - I/O interoperability with SAMMY

Test of ENDF/GNDS Processing: Point Data



Test of ENDF/GNDS Processing: Covariance Data

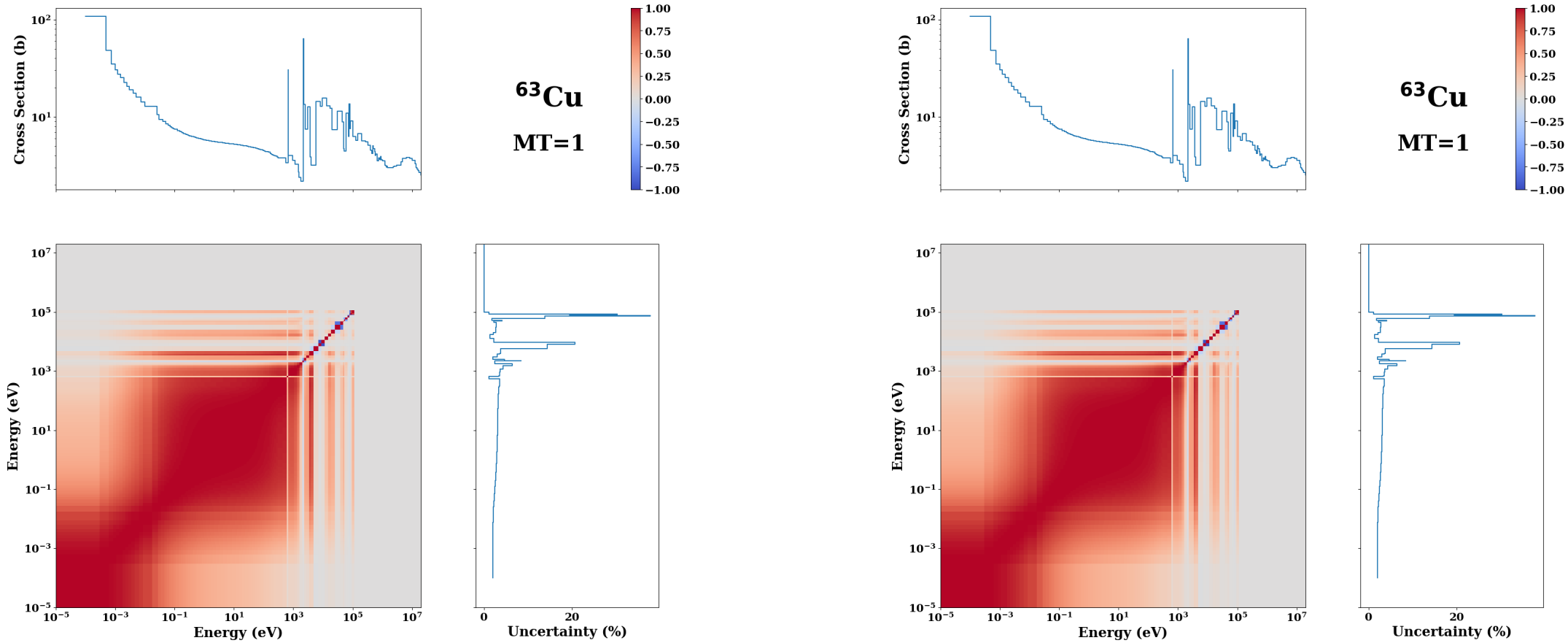


Figure 2: ^{63}Cu covariance: ENDF (left), GNDS (right)

AMPX Development Highlights: Miscellaneous

- Small fixes needed to accommodate processing of ORIGEN reaction resources from JEFF-3.3 and TENDL-2021.
- Sunsetting of "legacy" sequences for CE library processing (jamaican and platinum), embracing of modernized sequences
  - Under final SQA testing
  - Accommodates writing CE libraries directly in the modern HDF5 format, without the need to convert from the "legacy" CE format
- Update of ExSite templates to facilitate CE workflow with the new sequences and new options available

Preparation of Libraries for SCALE 7.0.0

- In the current SCALE CE format, the ENDF/B-VIII.1 CE libraries would be a burden to ship ("lots of DVDs")
- This will be mitigated by storing Bragg edge tables, as well as taking advantage of soft linking of duplicate data that the HDF5 format allows.
- The SCALE team is considering a "curation" of the TSL files to ship with SCALE 7.0.0
  - Everything in ENDF/B-VIII.1 will be processed by AMPX
  - All files will be made available in the public data repository, even if not shipped with SCALE 7.0.0

https://code.ornl.gov/scale/data/db-public

Conclusions

- AMPX development addresses new features introduced for ENDF/B-VIII.1, especially those introduced in the Thermal Neutron Scattering Libraries
- AMPX maintenance continues GNDS-2.1 format support and embraces modernized code development for CE libraries

AMPX available at

https://code.ornl.gov/scale/code/scale-public

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