AMPX Status 2024

AMPX Team

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AMPX Development for 2024 and ENDF/B-VIII.1

- Focus on Thermal Neutron Scattering Library
- AMPX Development Highlights
- 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

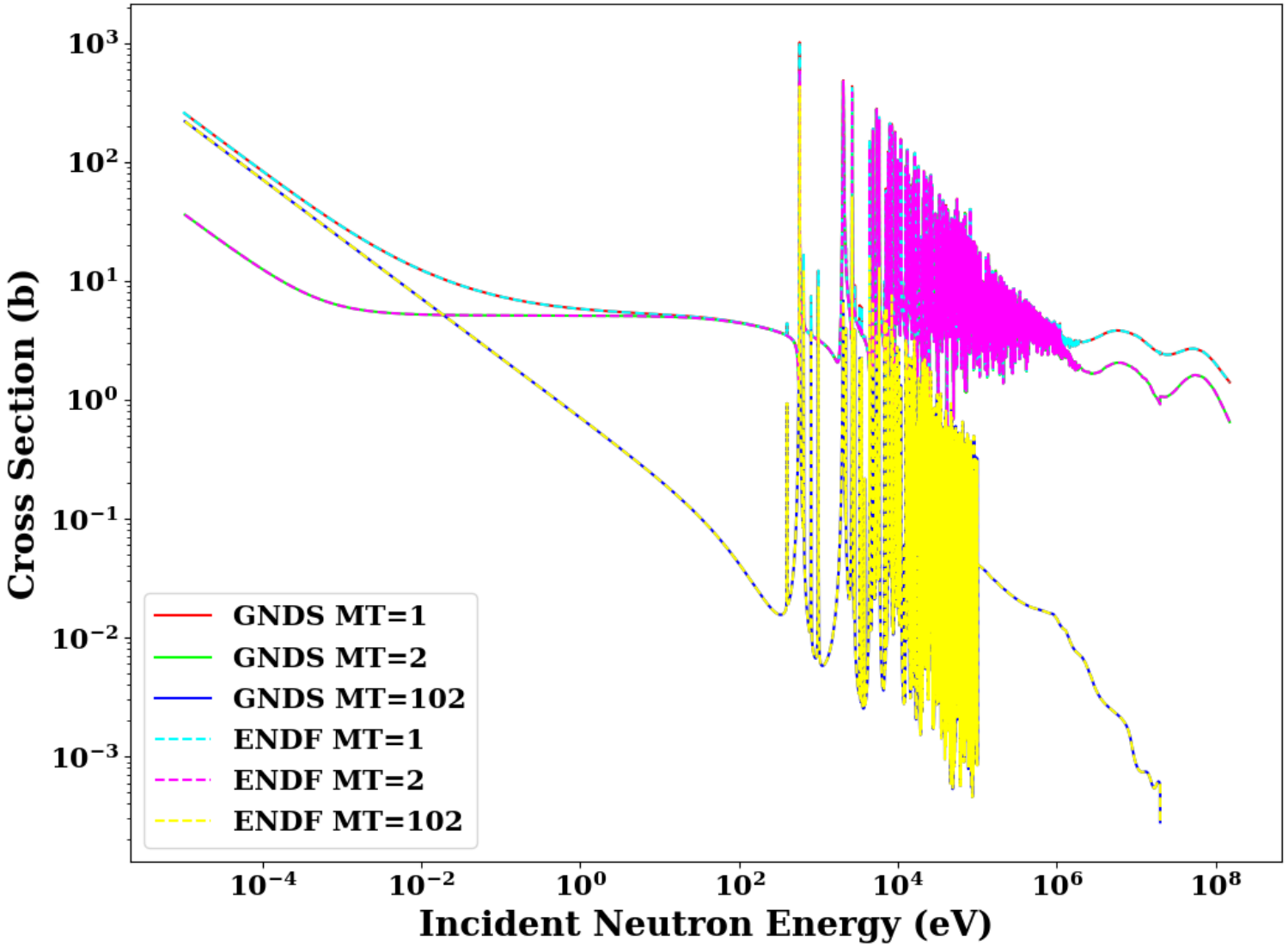
TSL Files: Storage of Simple Bragg Edge Tables

- 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.
  - 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, in which ENDF/B-VIII.1 was released (alongside an ENDF-6 version)
  - 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
  - Update pending review
- *** Successfully processed point data and covariance data for the GNDS version of ENDF/B-VIII.1, without encountering issues.

Test of ENDF/GNDS Processing: Point Data



Test of ENDF/GNDS Processing: Covariance Data

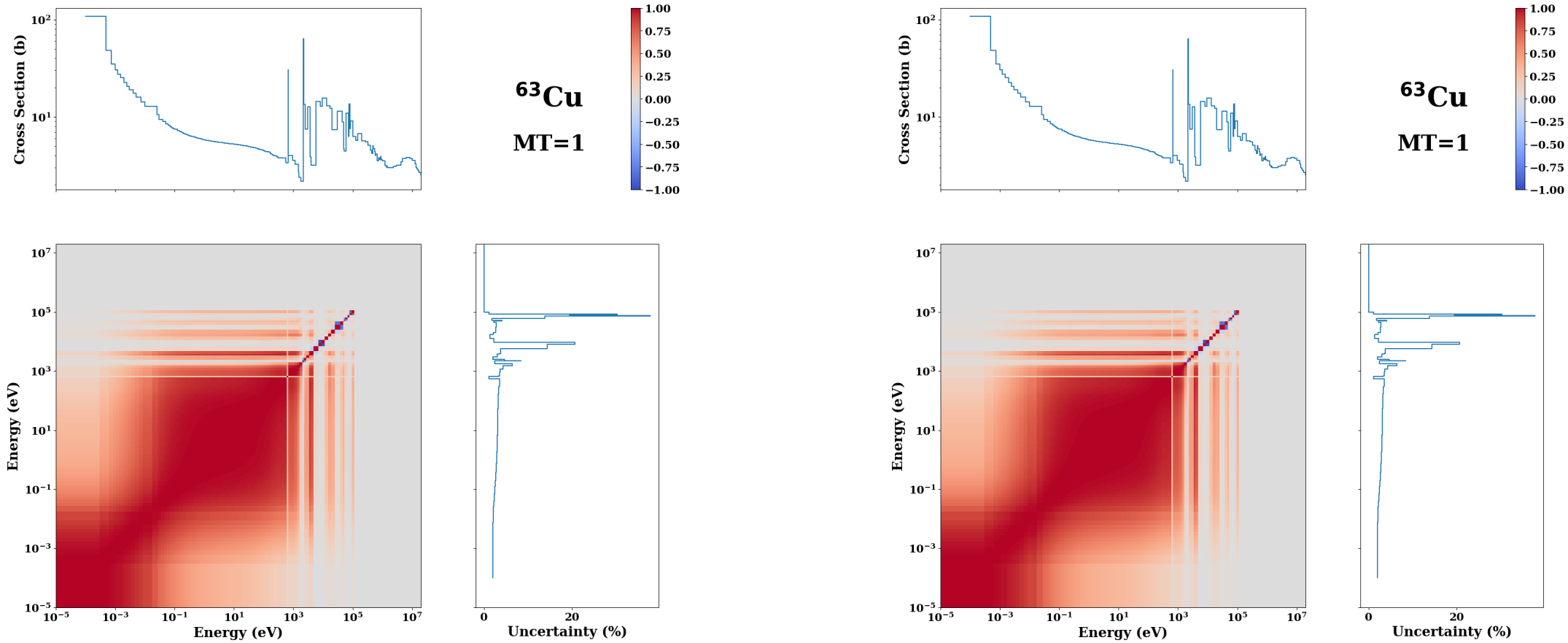


Figure 2: ^{63}Cu covariance: ENDF (left), GNDS (right)

Continuing Effort for GNDS-2.1 Support

- Sharing of code between AMPX and SAMMY
  - Using AMPX code for ENDF format I/O in SAMMY under development
  - GNDS format I/O will immediately follow
- Finalization of GNDS-2.0 support and testing
  - Special attention to kinematics data, TNSLs
- Reimplementation of ExSite's "ENDF Listing" functions
  - Strategy: C++ command line utility that can read evaluation files, producing the XML listing.
  - ExSite will then call that utility when gathering evaluation files

AMPX Development Highlights: Miscellaneous

- Small fixes needed to accommodate processing of ORIGEN reaction resources from JEFF-3.3 and TENDL-2021.
  - ORIGEN reaction resource utility (prilosec) now only writes multigroup libraries in the BOFF format
  - Corrected handling of MT=18 in pre-actinides in radionuclide production files
- Sunsetting of "legacy" sequences for CE library processing (jamaican and platinum), embracing of modernized sequences
  - Under final SQA testing
- Update of ExSite templates to facilitate CE workflow with the new sequences and new options available

Preparation of Libraries for SCALE 7.0.0: CE

- In the current SCALE CE format, the CE libraries would be a burden to ship
- 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

Preparation of Libraries for SCALE 7.0.0: MG

- ENDF/B-VIII.1 MG transport libraries in the 258-group and 61-group structures are under preparation
  - Each library has a 10 eV thermal cutoff
  - Validation plan being prepared
- ORIGEN reaction resource libraries prepared in 258-group and 61-group structures
  - JEFF 3.3 activation library
  - TENDL2017
  - TENDL2021

Conclusions

- AMPX development addresses new features, especially those introduced in the Thermal Neutron Scattering Libraries
- GNDS-2.1 format support ongoing
- ENDF/B-VIII.1 CE and MG libraries for SCALE 7.0.0

AMPX available at

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

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