

AMPX

AMPX Team:

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SUMMARY

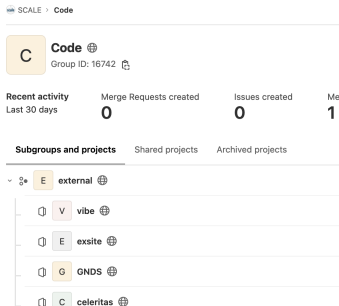
- AMPX is now available as open source!
- Overview about ENDF and GNDS reading in AMPX
- Thermal Scattering Law Updates
- CE and MG Data Libraries for SCALE 6.3.0 and SCALE 7.0.0
- Photonuclear Sublibrary Processing Capability

OPEN SOURCE AVAILABILITY

An open source subset of SCALE, including AMPX, is available at <https://code.ornl.gov/scale/code/scale-public>.

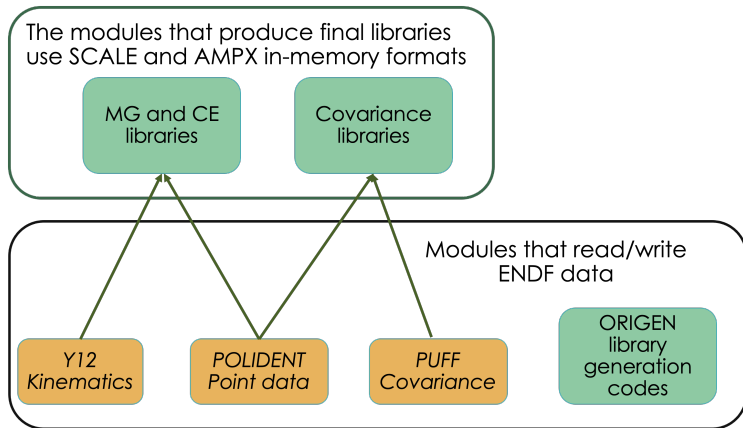
All components of AMPX can be built and utilized.

The AMPX GUI, ExSite, may be found at <https://code.ornl.gov/scale/code/external/exsite>.



open-source SCALE is being released as a beta release, and is subject to change.

OVERVIEW OF GNDS SUPPORT IN AMPX



The processing codes use AMPX's in-memory structures, which are in turn populated by "wrappers" that directly access the ENDF or GNDS formatted files.

OVERVIEW OF GNDS SUPPORT IN AMPX

- Several low-level access classes are used to access the GNDS files.
- Code has been updated to work with the GNDS-2.0 branch in the NEA GNDS gitlab
- The GNDS low-level access classes are available at <https://code.ornl.gov/scale/code/external/gnds>
 - The branch that supports GNDS-2.0 is available at:
<https://code.ornl.gov/scale/code/external/gnds/-/tree/GNDS-2.0>

THERMAL SCATTERING LAW

- Improved angular gridding algorithm and more robust Short Collision Time subroutine under review for inclusion in future AMPX release
 - More accurate processing of moderators at cryogenic temperatures
- Implementation of the proposed mixed elastic scattering format underway. The strategies under investigation include:
 - Combining elastic and inelastic incoherent functions into same MT
 - Adding separate MT for incoherent elastic

SCALE 6.3 DATA

- ENDF/B-VII.1
 - Corrected probability tables for subset of evaluations
 - New coupled MG libraries, xn252g47v7.1 and xn56g19v7.1
 - New Sodium-cooled Fast Reactor (SFR) MG library (302 groups)
 - New general-purpose MG library (1597 groups)
 - Covariance data in 56 groups
 - 56 group perturbation libraries for SAMPLER
- ENDF/B-VIII.0
 - 252 (thermal), 302 (SFR), and 1597 (generic) group MG libraries
 - New coupled MG libraries, xn200n47g and xn28n19g
 - CE library now distributed in HDF5 format
 - Covariance data in 56 groups
 - 56 group perturbation libraries for SAMPLER

SCALE 7.0.0 AMPX Multigroup Library Development

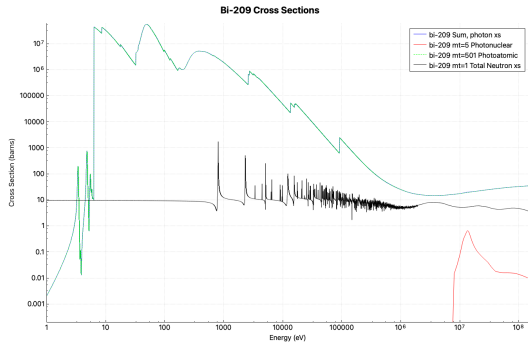
- AMPX multigroup libraries
 - SCALE 6.3.0 reactor physics: 56-, 252-, 302-, and 1597-groups
 - VERA MPACT 51- and 60-group libraries
- Energy group optimization
 - 5 eV \rightarrow 10 eV thermal cutoff energy
 - New 258-group structure for HTGR
 - New 61-group structure, a subset of the 258-group structure

PHOTONUCLEAR SUBLIBRARY PROCESSING CAPABILITY

- The National Nuclear Security Administration (NNSA) and an industry partner, Niowave, have sponsored the introduction of photonuclear physics in SCALE as a step towards using SCALE to model an accelerator-driven subcritical reactor for isotope production.
- Photoneutron production and photofission are major sources of neutron multiplication in accelerator-driven systems.
- AMPX modules have been updated to enable the processing of the ENDF photonuclear sublibrary for use in SCALE CE and MG transport.
- The SCALE CE photonuclear sublibrary is undergoing validation; the SCALE MG photonuclear sublibrary is under preparation.

PHOTONUCLEAR SUBLIBRARY PROCESSING CAPABILITY

For example, the ^{209}Bi photonuclear cross section is compared to the photoatomic and total neutron cross sections.



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>
- AMPX development continues to support updated thermal scattering law libraries.
- The MG library group structures have been established for SCALE 7.0.0.
- The capability to process the photonuclear sublibrary has been introduced.

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