Updates to the n+^{63,65}Cu Angular Distributions

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INTRODUCTION

- This work updates neutron reactions on ^{63,65}Cu
- Motivation: To correct deficiencies in benchmark performance since critical assembly configurations use Cu as reflector
- Adjusts the angular distribution data to improve benchmark performance
- Validation against copper-sensitive ICSBEP benchmarks is ongoing

SHIELDING BENCHMARKS

The ENDF/B-VIII.0 evaluation was found to perform poorly in the Rez shielding benchmark above 4 MeV.

INDEN has resolved this by adopting JENDL data above 4 MeV (R. Capote, *private communication*)

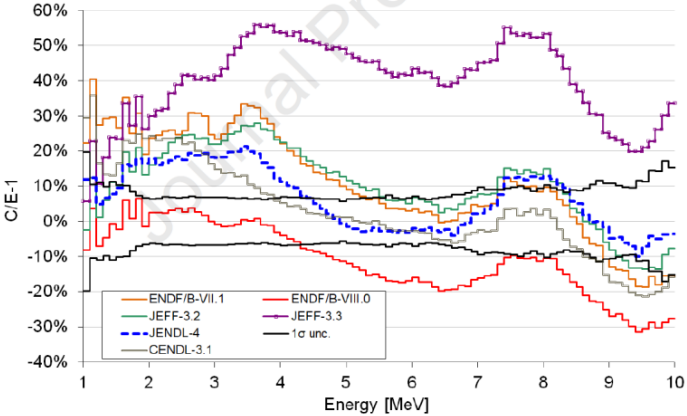

Figure 7: Neutron leakage spectra comparison for different libraries.

ANGULAR DISTRIBUTIONS

- This work endeavors to clarify the role of the copper angular distributions for the performance of the copper-reflected benchmarks.
- The work of Shaw et al suggested *reverting* the ^{65}Cu File 4 to that of ENDF/B-VII.1.
- Transitioning smoothly between RRR and high energy treatments appears to be the path forward.

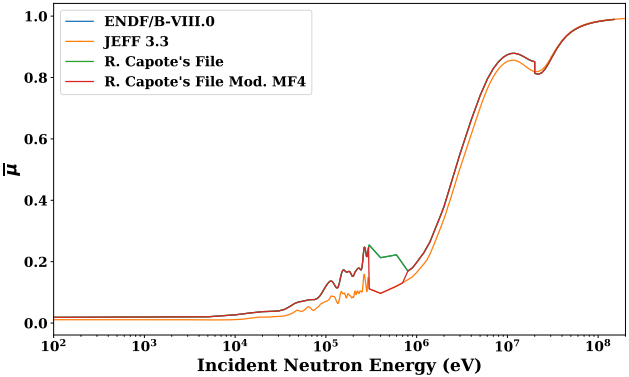

Figure 1: $\overline{\mu}$ for ^{63}Cu

BENCHMARK PERFORMANCE - PRELIMINARY

The ^{63}Cu drives the reactivity high if $\overline{\mu}$ is too low (purple triangles). The ENDF/B-VIII.0 angular distribution for ^{63}Cu is the better starting point.

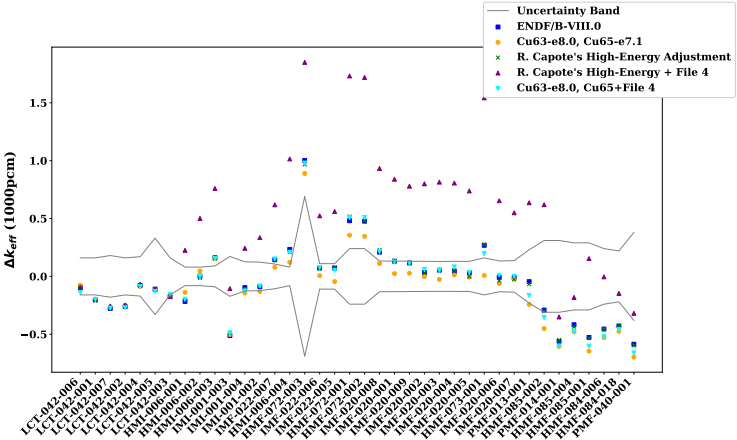

Figure 2: Performance of copper-sensitive ICSBEP benchmarks

CONCLUSIONS

- As expected, the performance of the benchmark suite is very sensitive to changes in the angular distribution data.
- The quasi-differential measurements performed by Blain et al at RPI provide a valuable constraint. Furthermore, ENDF/B-VIII.0 disagrees with their measurements consistently at 300 keV (the transition between RRR and high energy).
- The next step is to conservatively adjust the Legendre coefficients near 300 keV, validating performance against both critical benchmarks and the RPI quasi-differential measurements.

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