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Title: Validation of ENDF/B-VIII.0 β 5 with Pu, 235U and 238U LLNL Pulsed Spheres

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Validation of ENDF/B-VIII.0β5 with Pu, ^{235}U and ^{238}U LLNL Pulsed Spheres

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CSEWG November 6, 2017

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LLNL Pulsed Spheres are:

- A series of pulsed sphere measurements for materials of H_2O to ^{239}Pu designed for testing of transport codes and nuclear data, e.g., C. Wong et al., UCRL-51144 (1972).
- 14-MeV neutron beam brought to the center of sphere.

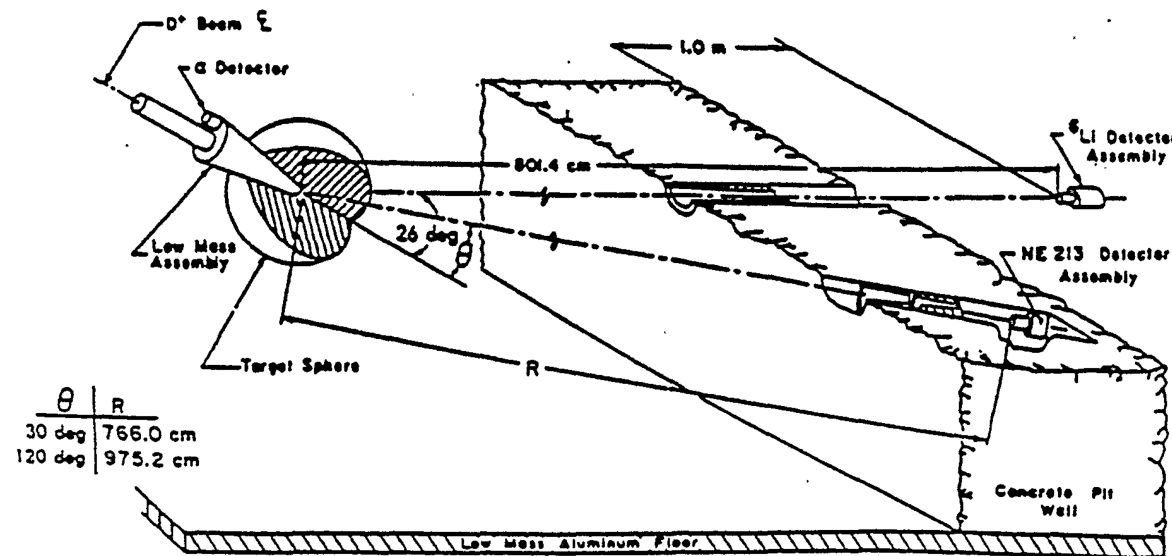


Fig. from LA-UR-96-2143

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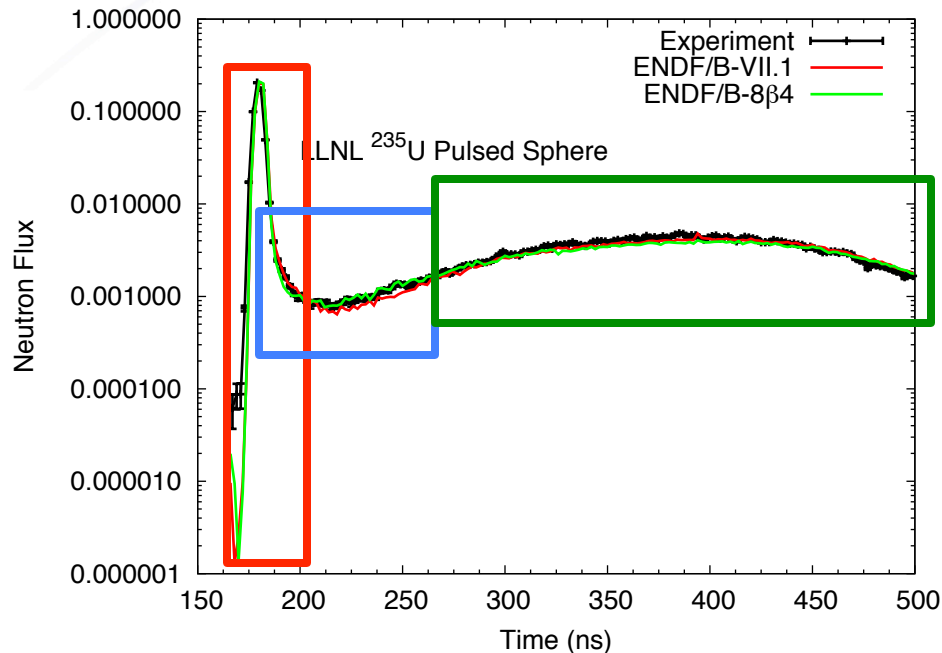
LLNL Pulsed Spheres:

- Extensively for ENDF/B-VI data testing see, e.g., R.D. Mosteller, S.C. Frankle and P.G. Young, LA-UR-96-2143.
- for ENDF/B-VII.0 to now, emphasis on $^{235,238}\text{U}$, ^{239}Pu
- **we use the benchmarks recommended by S. Frankle:
Pu: 0.7 mfp, 26 deg; ^{235}U : 0.7 mfp, 26 deg; ^{238}U : 2.8 mfp, 26 deg**
- recent study by Kaiba et al., IAEA INDC Report INDC(NDS)-0742 (2017) highlighted that the concrete surrounding the beamline impacts spectrum significantly, while the accuracy of the path length and detector angle negligibly impacts results.

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Slide 3

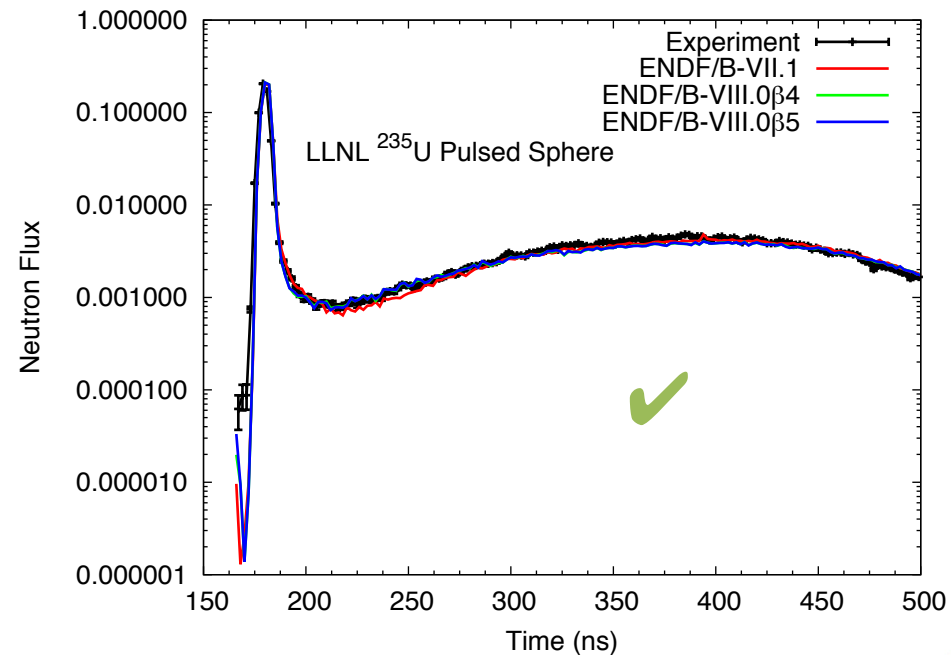
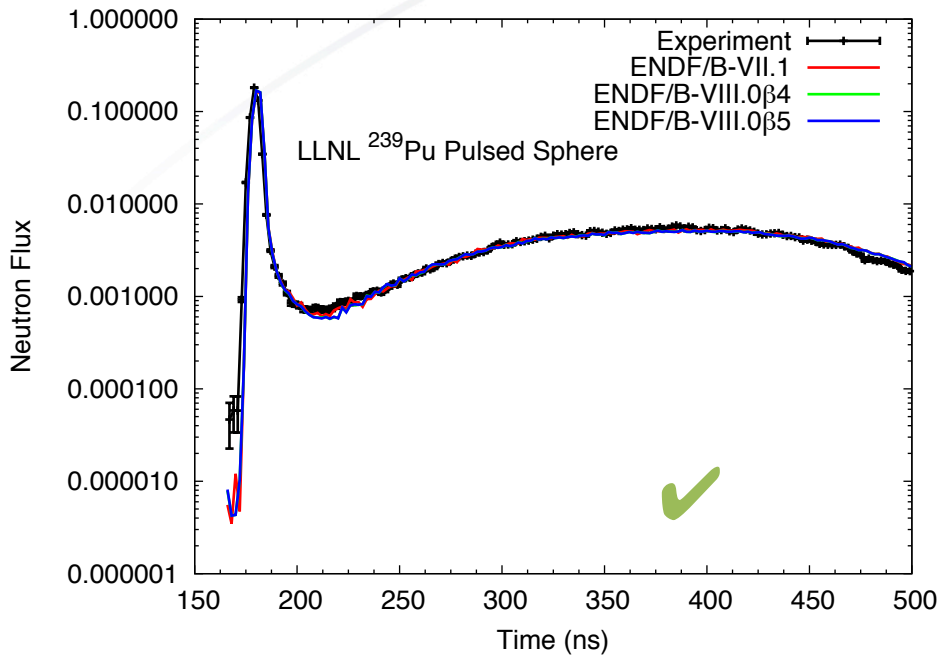
Pu, ^{235}U and ^{238}U LLNL Pulsed Spheres can be used to benchmark:



- 14-MeV elastic scattering
- (n,xn) cross sections
- Fission observables
- Most collisions in $^{235,238}\text{U}$, ^{239}Pu

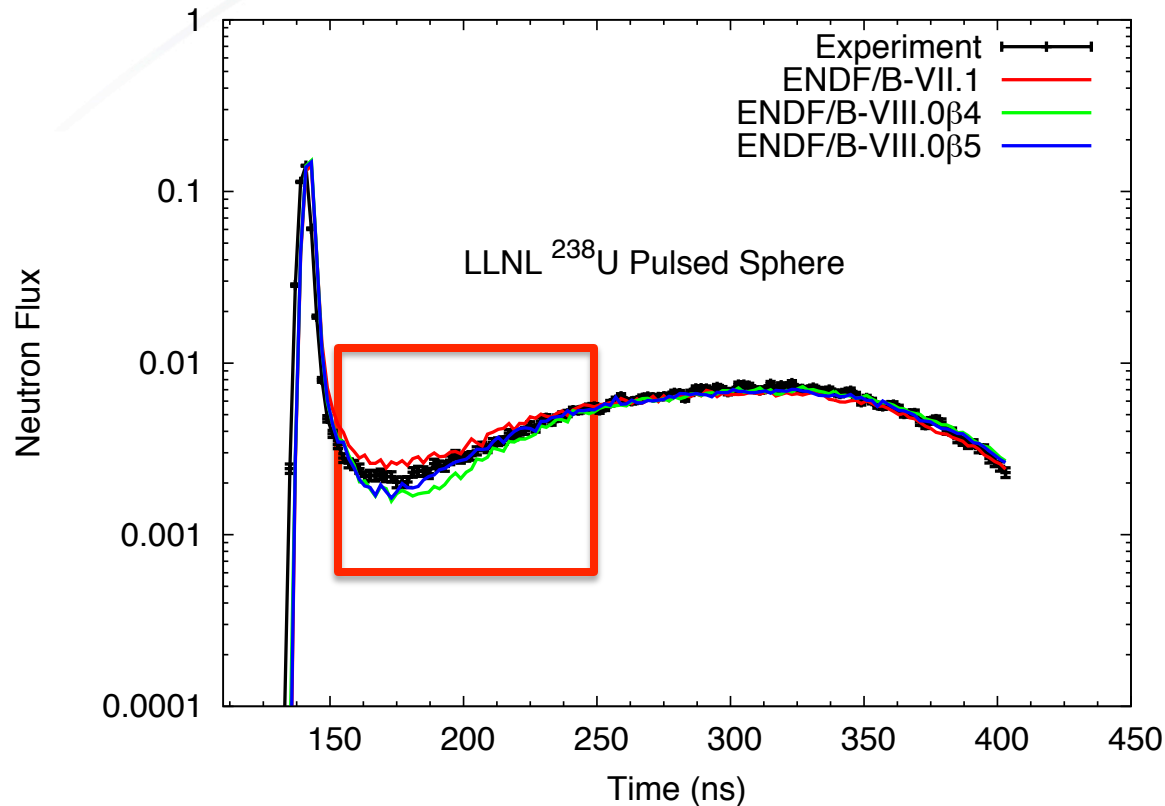
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Simulated Pu and ^{235}U LLNL Pulsed Spheres with VII.1 & VIII.0 β 4 & VIII.0 β 5 ok.



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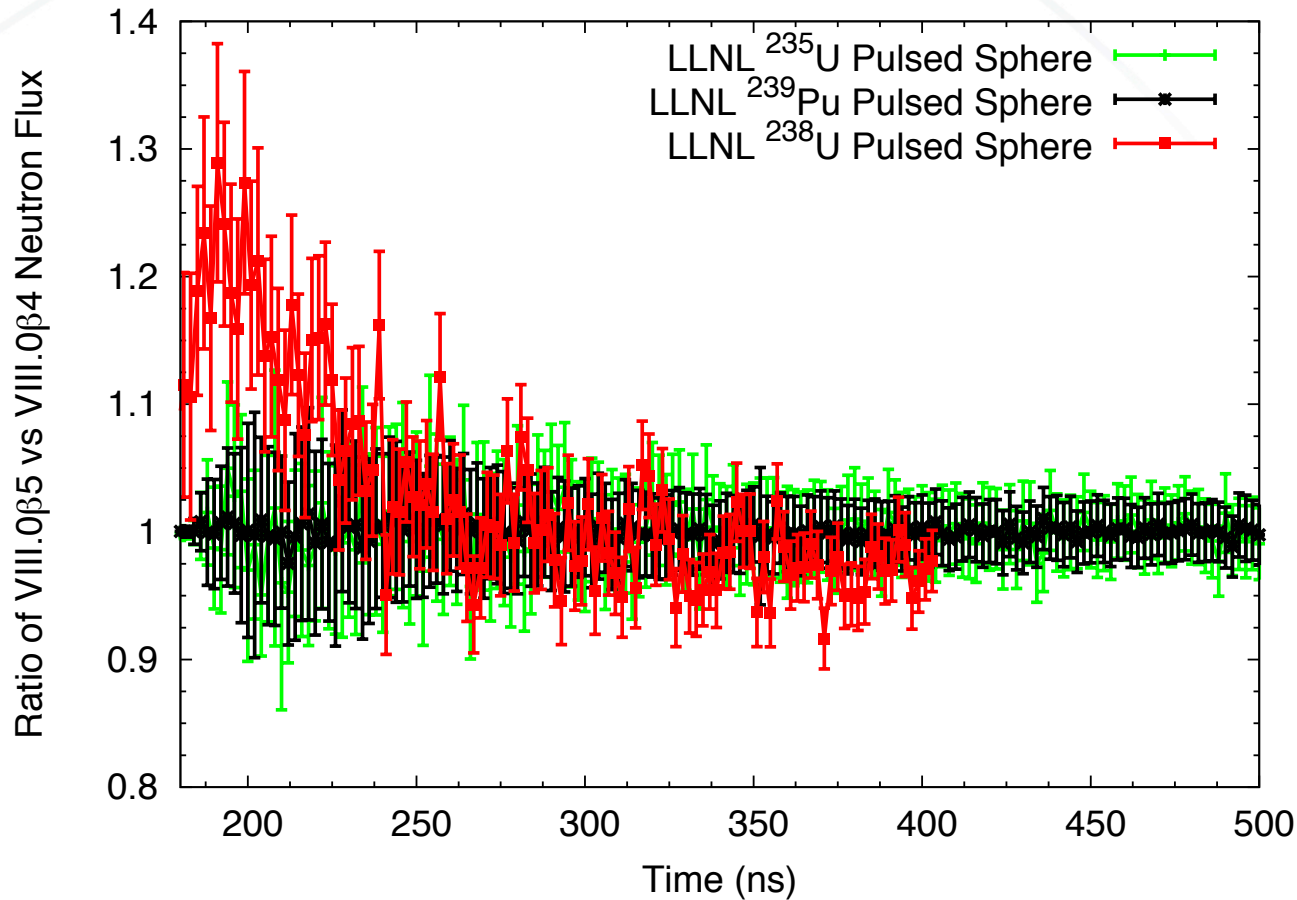
^{238}U LLNL Pulsed Spheres improved from VII.1 and VIII.0 β 4 to VIII.0 β 5



One change was integrating the more physical ^{238}U JENDL-4.0 PFNS from 8 MeV on.

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Summary: No harm done from VIII.0β4 to VIII.0β5 for Pu and ²³⁵U, improved for ²³⁸U



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