Data and Code Testing with KENO
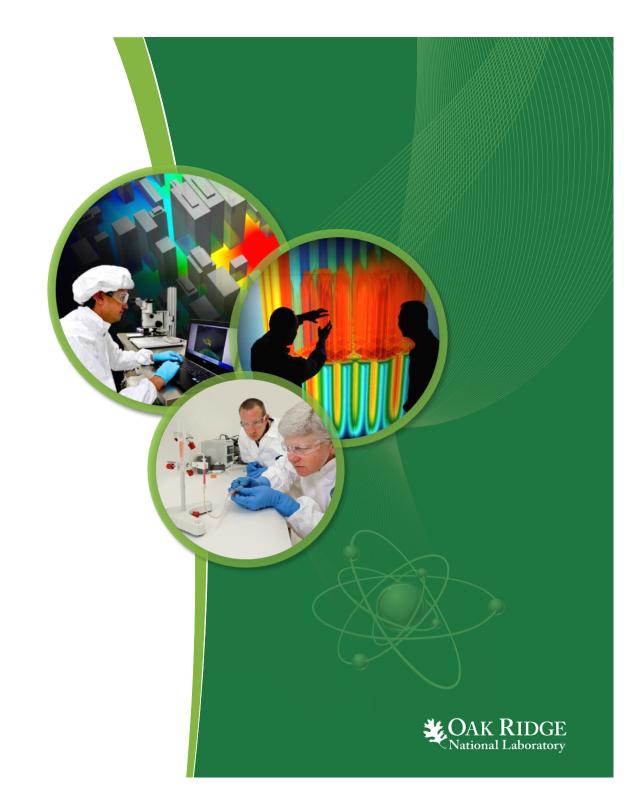
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NCSP Technical Program Review
March 27–28, 2018
Oak Ridge National Laboratory

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Outline

- Purposes of code and data testing

- Example of data testing

- Example of code testing

- Example of evaluation testing

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Purposes of code and data testing

- Three areas are examined in code and data testing with critical benchmark experiments
  1. Nuclear data testing
  2. Code testing
  3. Evaluation testing – least obvious

- We will look at a brief example of each from work performed last year

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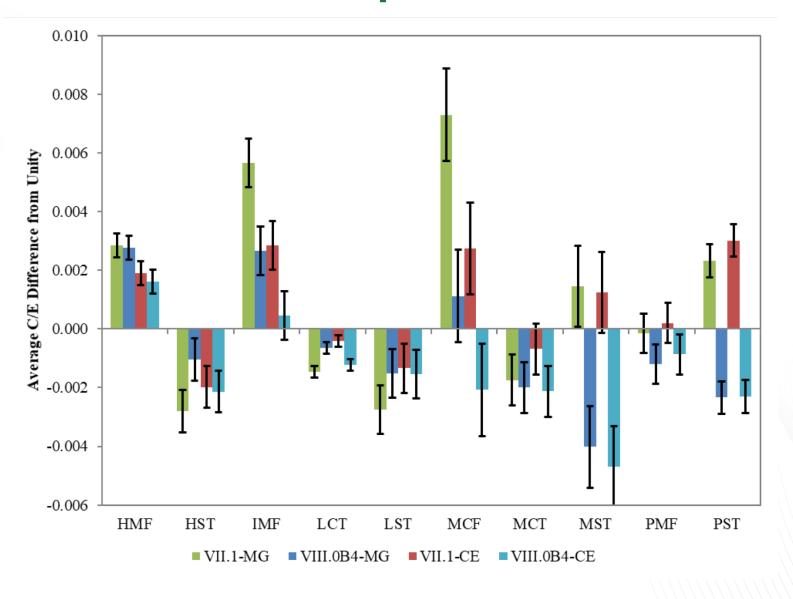National Laboratory

Nuclear data testing

- One of the two obvious purposes: testing the data

- Running a suite of critical experiments with a new data set allows examination of differences caused by new evaluations

  – Experiments do not have to be great benchmarks since the *difference* is the key result

- Several ENDF/B-VIII beta releases were tested in FY17

  – Andrew Holcomb presented Beta 4 testing at NCSD in Carlsbad and is also presenting that next (after lunch)

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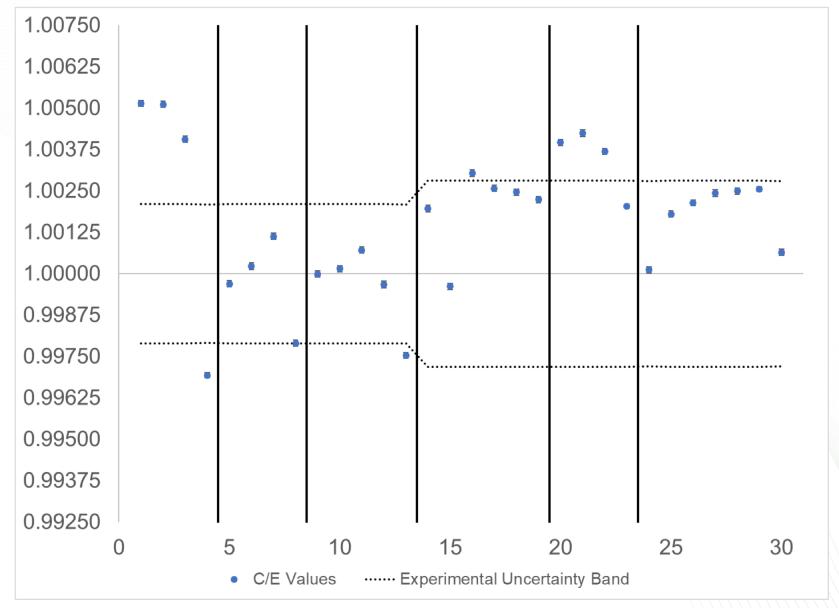# ENDF/B-VII.1 vs ENDF/B-VIII.β4

Code testing

- Careful (critical) examination of results leads to more insights on code performance
  - More than just validation!

- Examining trends in experiment series helps us understand what—if anything—is varying in the experiments that might indicate a bias in the data or bias in the code

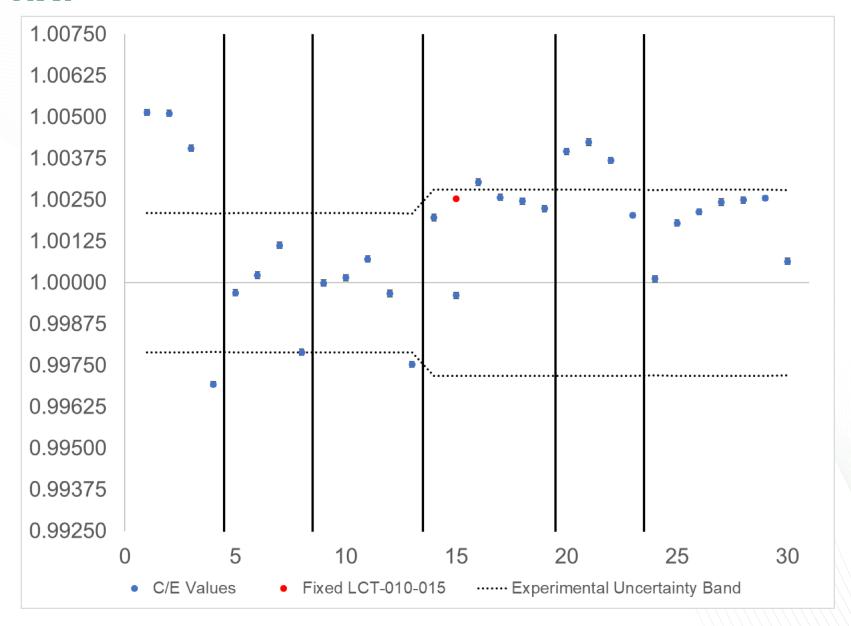- Codes and data are good enough now to allow for spotting errors in models

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Original results for LCT-010 with ENDF/B-VII.1 library

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After the fix!
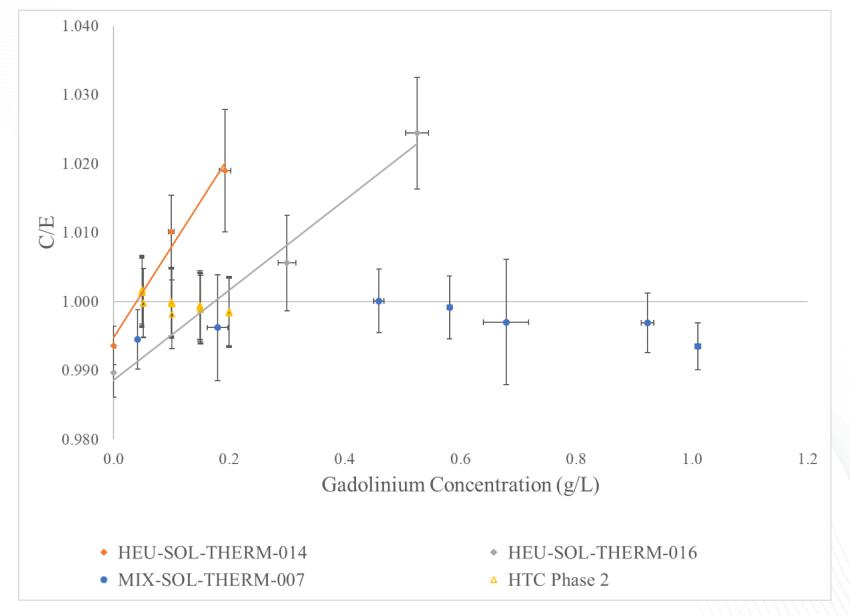
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Last, but not least: evaluation testing

- Not all evaluations in the ICSBEP Handbook are perfect

- The code and data testing generally rely on these evaluations, but some contain errors

- Comparing results from different evaluations can shed light on data problems, code problems, and/or evaluation problems

- Soluble gadolinium is an example of this last one
  - Much discussion about HST-014 through HST-019 is already ongoing in the international data community
  - Most of these thoughts will be presented at the June ANS Meeting (Philadelphia)

- In a nutshell: the bias apparent in HST-014 & -016 is probably not real

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C/E ratios for HST-014, HST-016, MST-007, HTC Phase 2

That's it – any questions?

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