

# Energy-dependent Bias between ENDF/B-VII.1 and ENDF/B-VIII.0 for LCT Benchmarks

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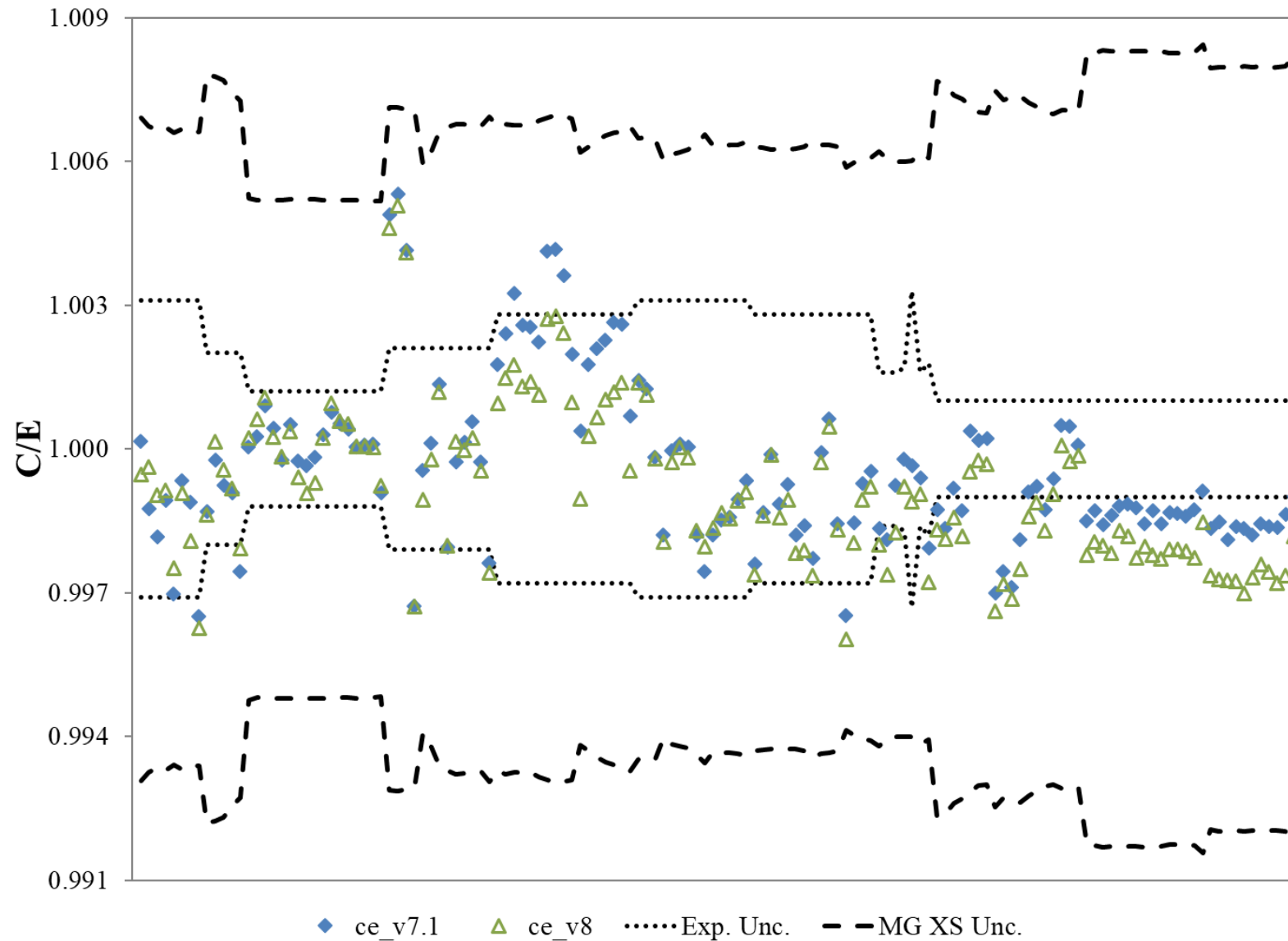
# Purpose

- Present the process I went through to identify an energy-dependent bias in LCT benchmarks in the ORNL VALID suite
  - Sometimes people ask me how I find these things, and this one has a clear process
- I do not believe specific, in-depth knowledge of the benchmarks is required
  - It sure is helpful though

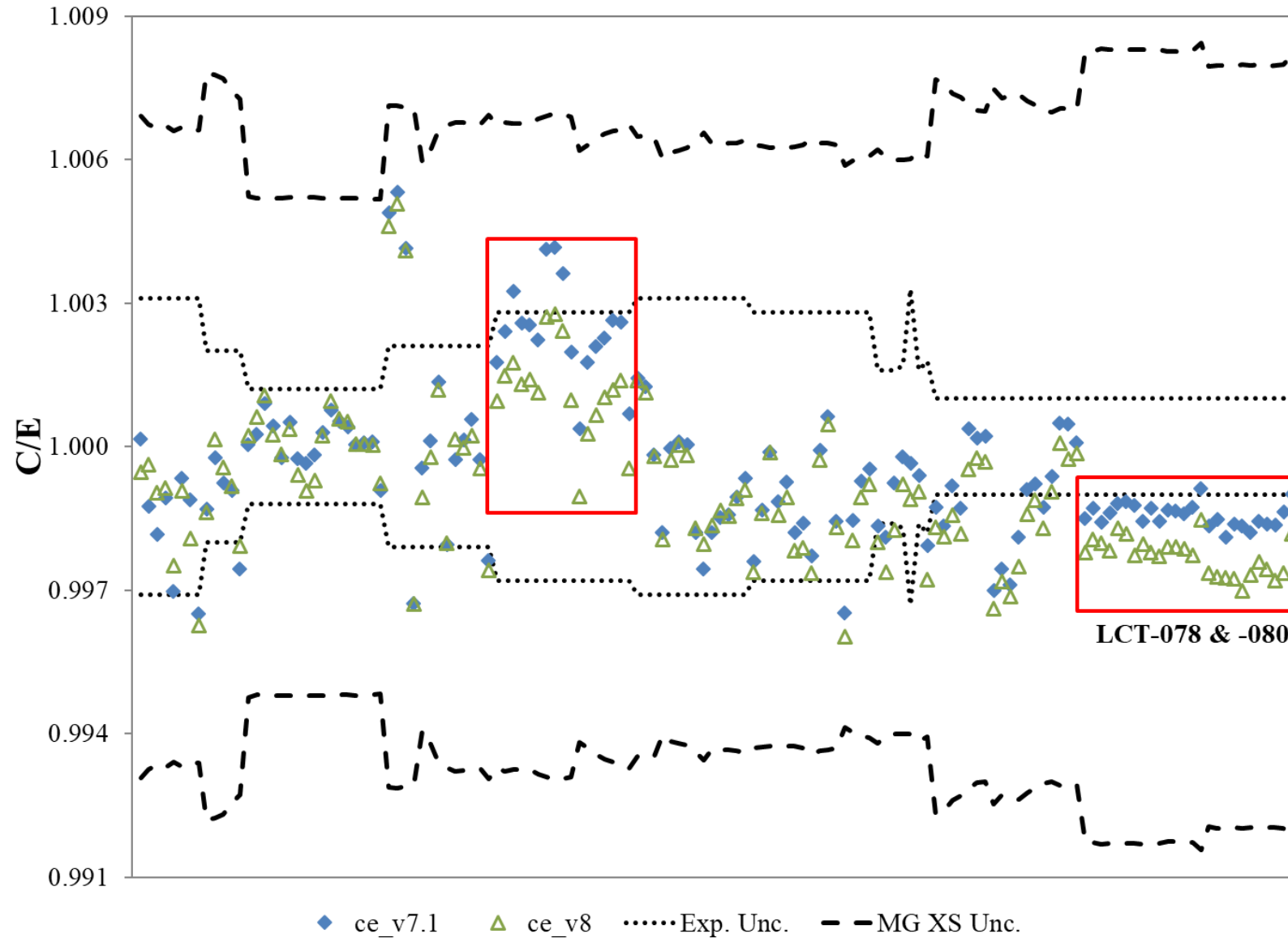
# Steps to find the bias

- Start with C/E plot for all 140 LCT experiments for both ENDF/B-VII.1 and ENDF/B-VIII
  - CE only
- Note variation in differences
- Identify shared trait for some cases
- Plot C/E versus EALF
- Plot *change* in C/E versus EALF

# All LCT C/E values, CE E7.1 and E8



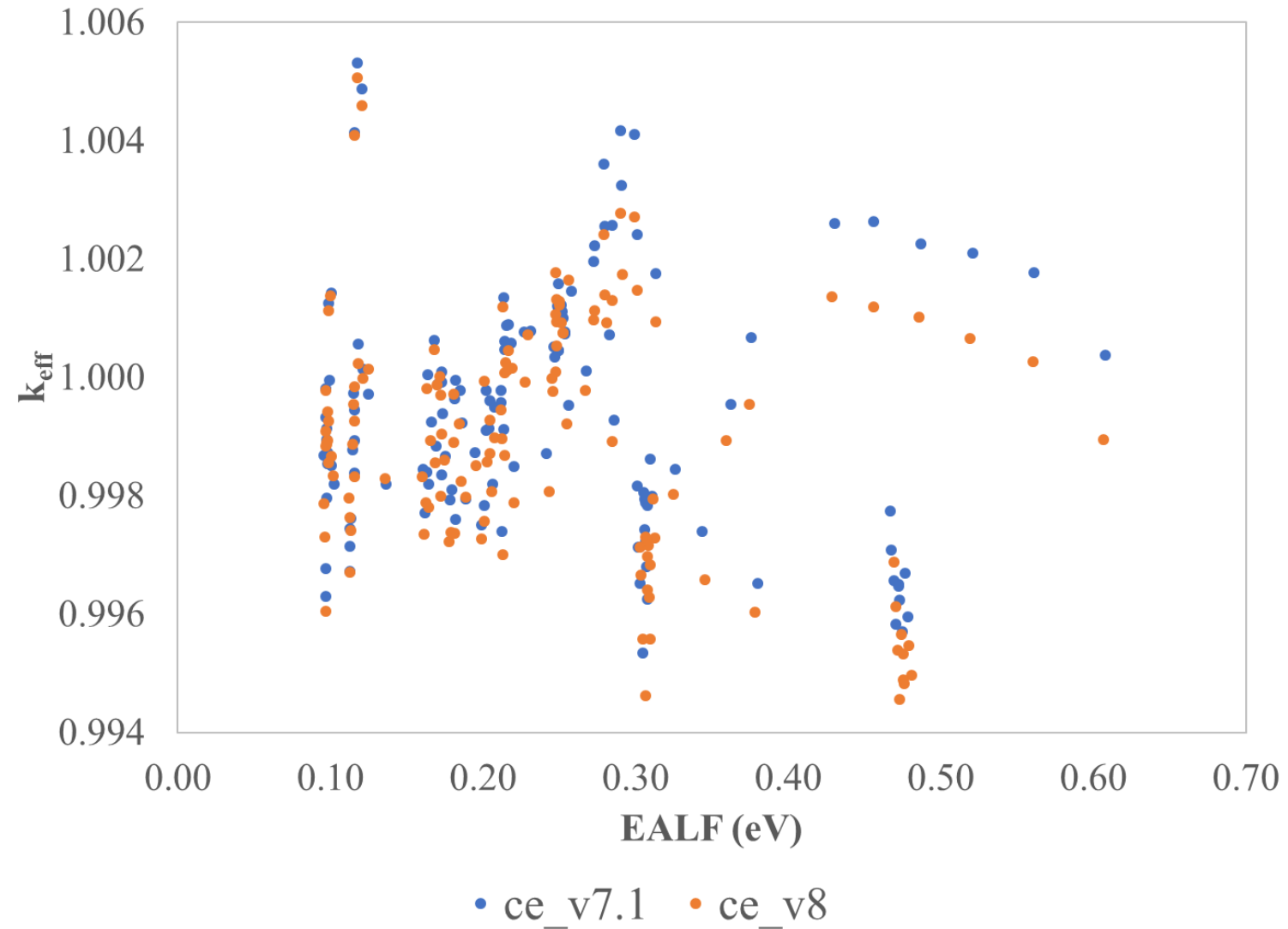
# Now with regions of interest...



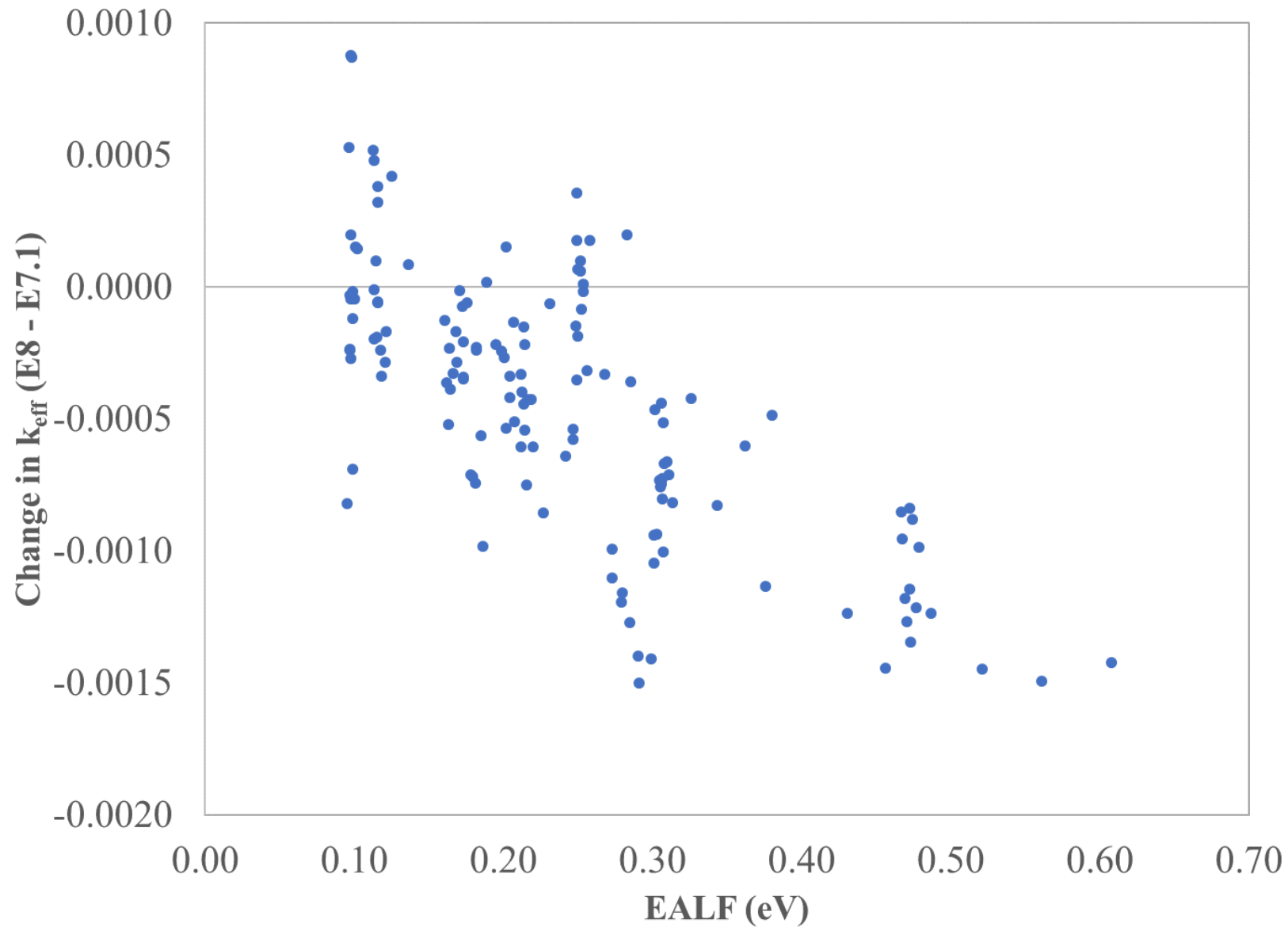
# So what's in that other box

- Turns out it's LCT-010 cases 14 through 30
- LCT-010 uses two different pitches
  - 2.54 cm for cases 1 – 13
  - 1.892 cm for cases 14 – 30
  - Well that's interesting...
- LCT-078 and -080 are also relatively tight pitch
- Dryer lattice → harder spectrum → bigger difference?

# All C/E values vs EALF



# Difference in $k_{\text{eff}}$ versus EALF





# A trend!

- There appears to be a fairly strong trend (as these things go) with larger magnitude bias with increasing neutron energy
- More negative is more wrong. The average for ENDF/B-VIII.0 is lower (larger magnitude negative bias) than ENDF/B-VII.1
- Initial investigations indicate several isotopes contribute to the bias
  - $^{235}\text{U}$ ,  $^{238}\text{U}$ , and  $^{16}\text{O}$  in different, sometimes canceling, changes
  - More information in the future when it is available and digested

# Questions?

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