Help needed towards a new ^{252}Cf(sf) nubar evaluation.

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Roberto asked me to re-evaluate the ^{252}Cf(sf) nu-bar unc. I ask for help to make it within the timeline and have someone counter-check my work. This is important!!

Outline:

- Why do we care?
- What does recent work tell us?
- What kind of help do I need from the standards committee?

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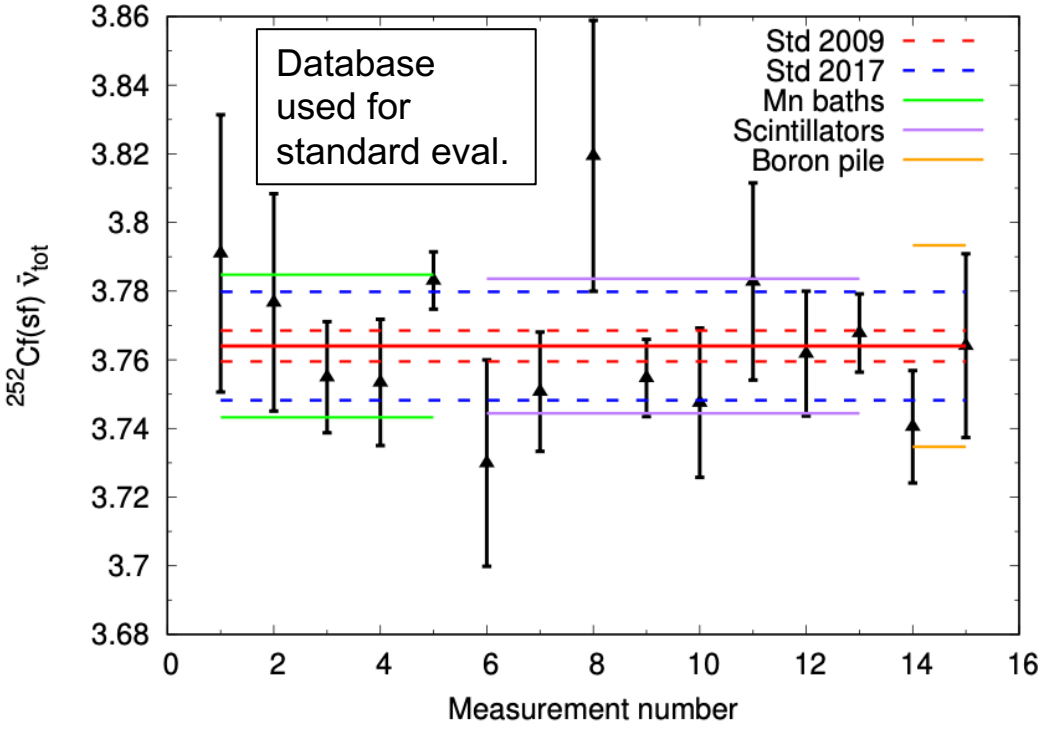
Why do we care?

Previous ^{252}Cf(sf) nu-bar standard uncertainty (2006) was 0.13%. Current unc. (2018) is 0.42%! That impacts applications.

The ^{252}Cf(sf) nu-bar uncertainty was increased due to USU (unrecognized sources of uncertainties) based on the spread of the data (see Carlson, NDS 148, 2018).

Impact:

- Nu-bar of other actinides are mostly measured as ratios to ^{252}Cf(sf) nu-bar!
- Example: ^{239}Pu nu-bar unc. forward-propagated to Jezebel went from 81 pcm to 241 pcm (see Chadwick, NDS 148, 2018).



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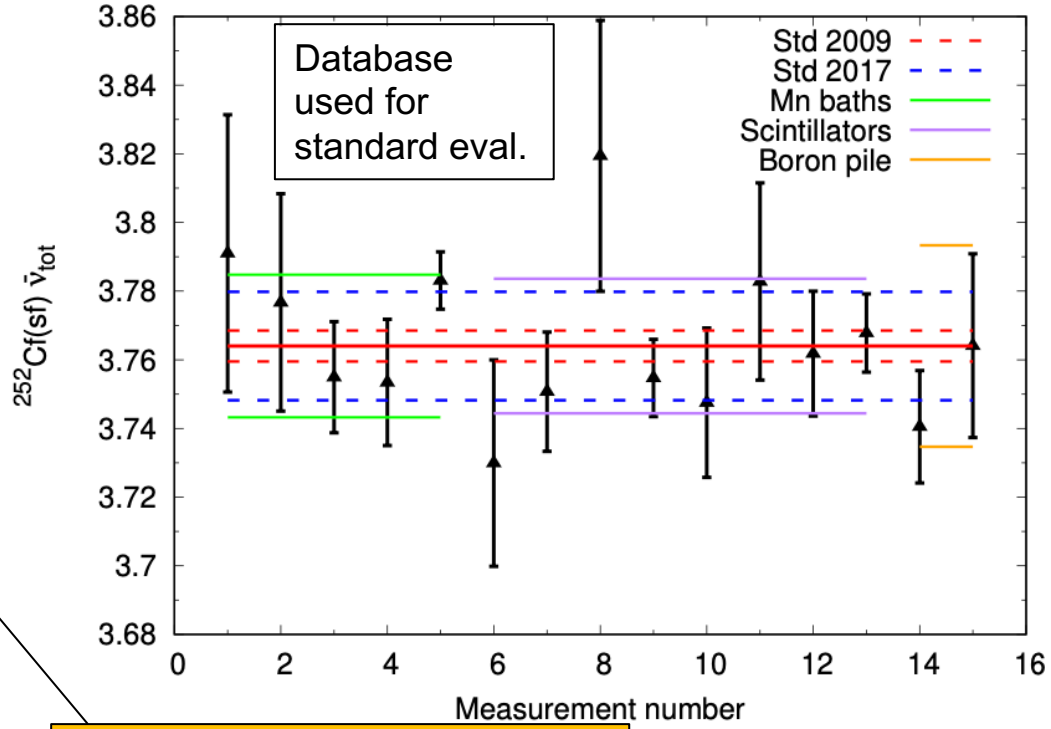

We better be sure that the uncertainty increase is realistic!

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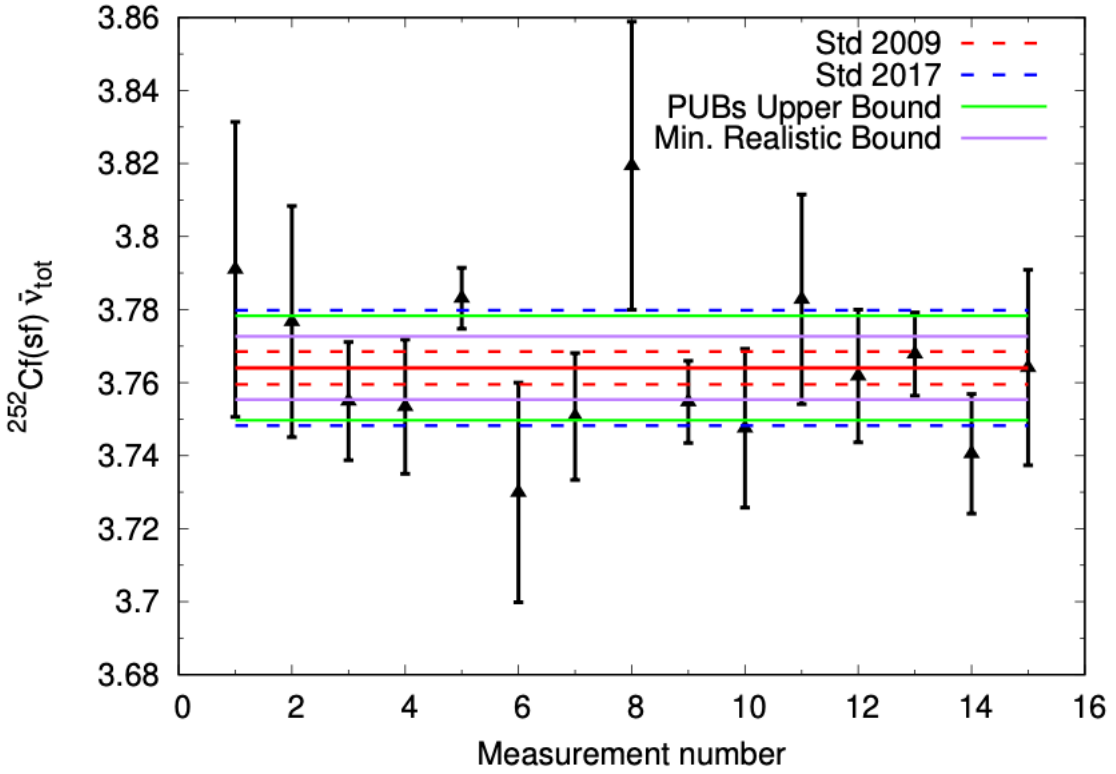
What does recent work tell us?

Recent work neither supports 0.13% nor 0.42% uncertainty. We clearly need some more work …

- Physical Uncertainty Boundary estimates (Capote, NDS 163, 2020) would suggest realistic uncertainties from 0.23-0.38%.
- Croft et al. (NIMA, 954, 2020) re-evaluated the ^{252}Cf(sf) nu-bar and got 14.3%. They raise the question how correlated some of the data are, and whether USU unc. hold up given Spencer and Smith individual unc. (0.2/ 0.3%)?



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What kind of help do I need from the standards committee?

I am asking for help as this is something we don't want to get wrong!

I need help for:

- Getting some of the papers.
- How to do some of the corrections for the data?
- Can we have a small committee:
  - Aim: to discuss all individual experiments that should go into the evaluation and the choices I make on uncertainties.
  - Who: Allan, Croft, Standards IAEA?, CEA experimentalists?
  - How often: every two months?
  - Logistics: can IAEA host online meetings?

Thank you for listening!

Abstract

This talk motivates why we need a new 252Cf(sf) nu-bar (uncertainty) evaluation and what help is needed to do so. The previous standard evaluation gave an uncertainty value of 0.13% while the current one gives a values of 0.42%. This increase of this standard uncertainty leads to increased major and minor actinide nu-bar uncertainties as most data are measured relative to the 252Cf(sf) nu-bar. Therefore, this increase in the standard impacts uncertainty bounds on applications down-stream distinctly. After the release of the newest standards, new work has shown that neither the 0.13% nor the 0.42% are likely realistic. We need a new uncertainty estimate with a completely new evaluation. Given the importance of this particular evaluation, I am asking here for help from the standards committee in reviewing the data to counter-check my uncertainty estimate, as we'd better be sure of the uncertainties we want to publish next.