

# New PFNS and/or nu-bar evaluations for $^{232-238}\text{U}$ and $^{240-242}\text{Pu}$

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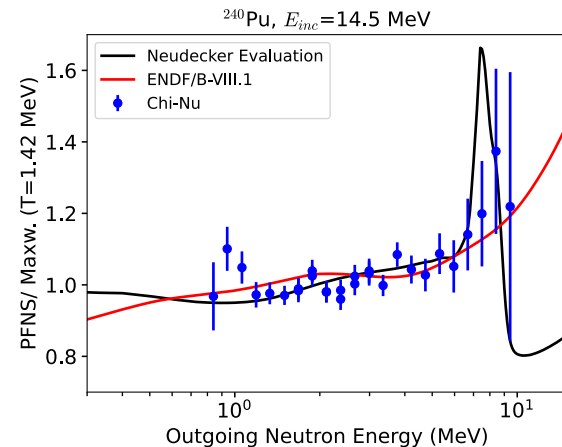
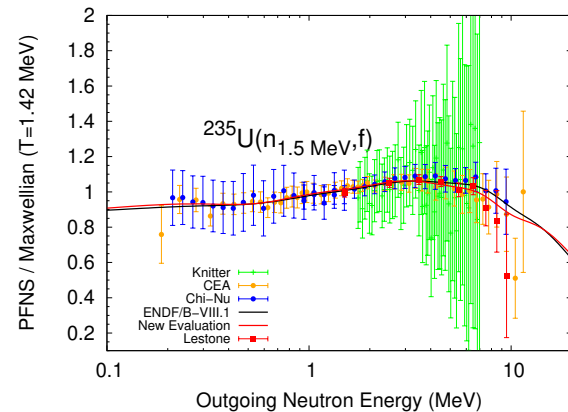
# New $^{233,235,238}\text{U}$ and $^{240}\text{Pu}$ PFNS evaluation leverage new CEA/ Chi-Nu experiments, improve theory & give better cov.

## Current evaluation deficiencies

- New diff. exp: New Chi-Nu  $^{238}\text{U}$  PFNS, CEA  $^{235}\text{U}$  PFNS hint at softer PFNS,  $^{240}\text{Pu}$  PFNS from Chi-Nu are the first ever reasonable data!
- New integral exp: PFNS RRR in the Planet critical assembly will inform the high-  $E_{\text{out}}$  tail for  $^{235}\text{U}$ .
- New modeling: pre-equilibrium missing in VIII1  $^{233}\text{U}$ ,  $^{240}\text{Pu}$  PFNS, ..
- Impact: A. Trkov highlighted at ND2025 that new  $^{233}\text{U}$  PFNS could help with issues in  $^{233}\text{U}$  crits; new  $^{235}\text{U}$  PFNS drops mean energy by 10 keV;  $^{240}\text{Pu}$  PFNS increases Dirty Jezebel  $k_{\text{eff}}$  by 41 pcm.

## Time frame

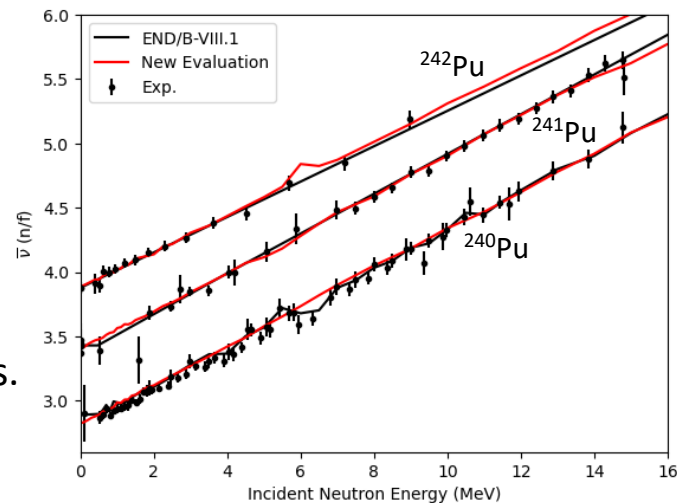
- Cross-collaborations: CEA, Chi-Nu, INDEN, PFUNS.
- $^{238}\text{U}$  released to beta1,  $^{235}\text{U}$  and  $^{240}\text{Pu}$  PFNS can be released.
- $^{233}\text{U}$  PFNS Chi-Nu data needs to be measured, then +1 year for evaluation.



# New minor U and Pu isotope nu-bar evaluations factor in detailed experimental UQ and consistent theory.

## Current evaluation deficiencies

- Scope: Re-evaluation of  $^{240-242}\text{Pu}$  and  $^{232-238}\text{U}$  nu-bars.
- Issues in VIII.1: sparse grid, unexpected structures ( $^{240}\text{Pu}$ ,  $^{233,237}\text{U}$ )
- Diff. exp: CEA  $^{240}\text{Pu}$  and  $^{235,238}\text{U}$  nu-bars will come, discrepancies in historical data should be studied with ML and detailed exp. UQ.
- New integral exp: High Pu-240 Jupiter benchmark.
- New modeling: consistent CGMF modeling to cover many isotopes.
- Impact: Dirty Jezebel  $k_{\text{eff}}$  rises by up to 25 pcm.



## Time frame

- Cross-collaborations: CEA, INDEN, ORNL.
- $^{240-242}\text{Pu}$  can be released. Might update with CEA nu-bar.
- $^{233-238}\text{U}$  nu-bar depend on CEA release schedule; the earliest fall CSEWG 2026.



Assembly	PMF001v2s	PMF002
VIII.1	0.99936(7)	1.00075(8)
+ $^{240}\text{Pu}$ nu-bar	0.99944 (7)	1.00093(7)
+ $^{241}\text{Pu}$ nu-bar	0.99937 (8)	1.00100(8)
+ $^{242}\text{Pu}$ nu-bar	-	1.00076(8)

*Thank you for your attention!*



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