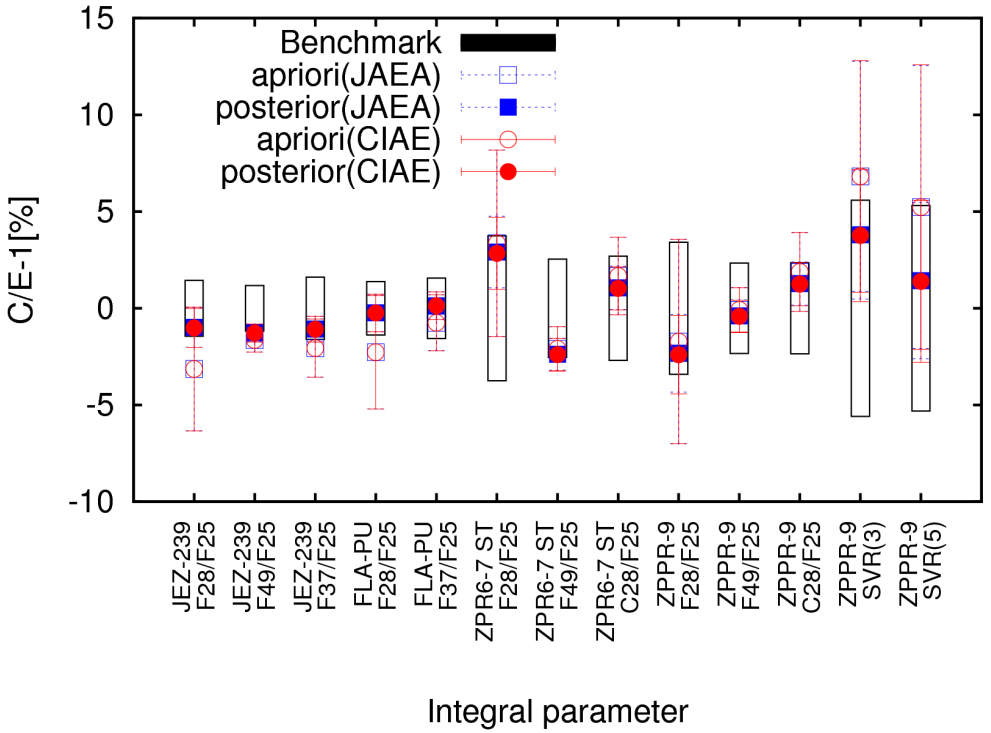
# A Stress Test on $^{235}$U(n, f) in adjustment with HCI and HMI benchmarks

*Haicheng* WU[1,*], *Yincan* QIN[1], *Massimo* Salvatores[2]
[1]China Nuclear Data Center, China Institute of Atomic Energy,
[2]Idaho National Laboratory, USA

CHINA NUCLEAR DATA CENTER

# 1. Background

- ✓ **NEA WPEC/SG26**
  - *"Combined use of* should be pursued nuclear data for Gen-
- ✓ **SG33:**"Method and iss experiments and covari
- ✓ **SG39: "**Methods and nuclear and covarianc nuclear data files"

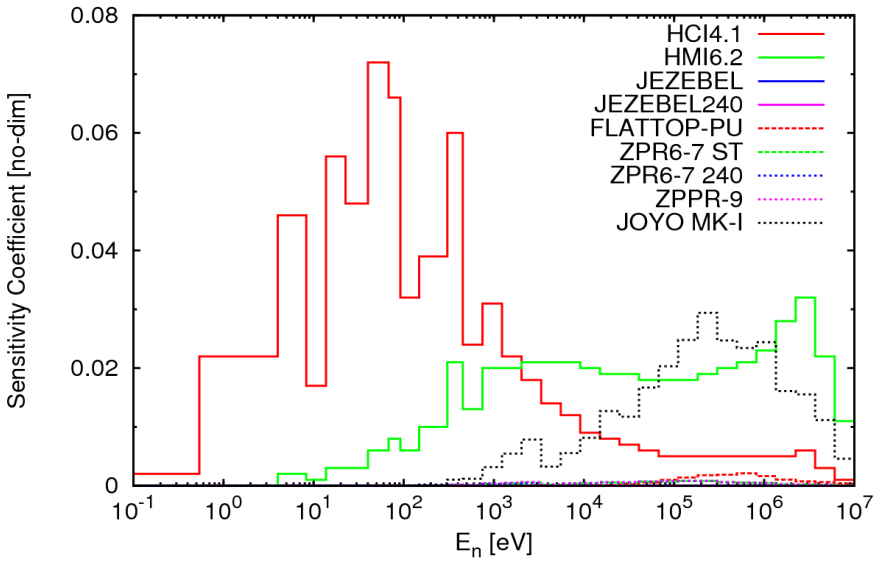



- In the SG33 benchmark exercises, some integral results after adjustment get worse, which was suspected to be caused by *compensation effects* in the adjustments.
- To prove this hypothesis and to understand how compensation errors occur, a stress test on $^{235}$U(n,f) C.S. with the critical benchmarks sensitive to $^{235}$U(n,f) C.S. in 1~10keV energy region was suggested.

# 2. Method and results

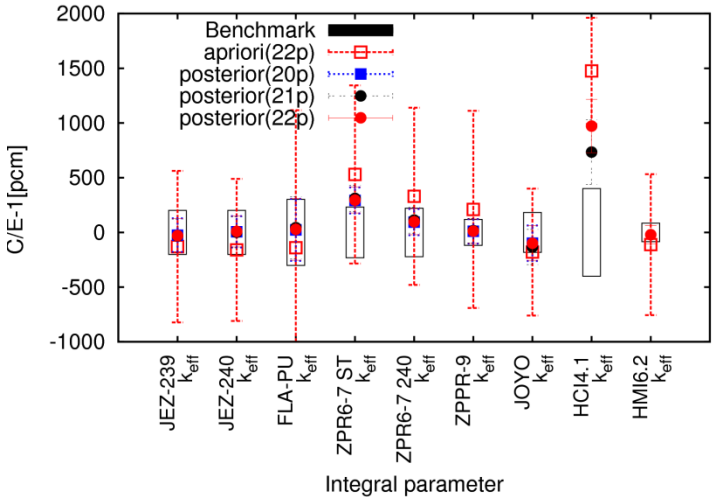
- Case A: SG33, 20 Par
- Case B: A + HCI4.1, 21 Par.
- Case C: B+ HMI6.2, 22 Par.

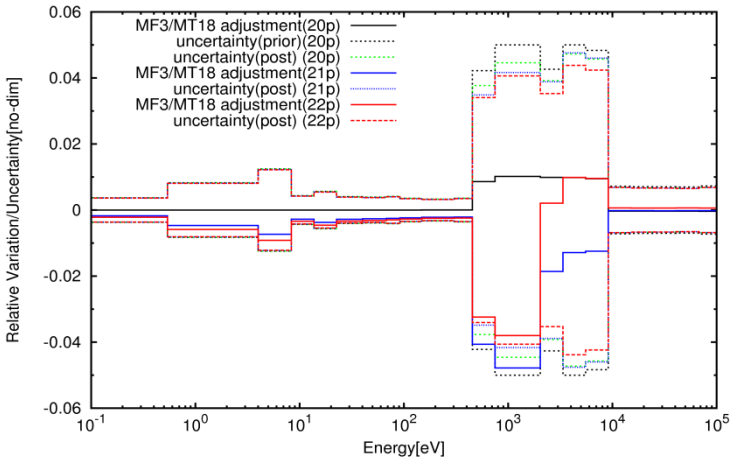
No $k_{eff}$ values in the Sg33 benchmarks is sensitive to $^{235}U(n,f)$ in several keV region.




The $k_{eff}$ values of HCI4.1 and HMI6.2 are sensitive to $^{235}U(n,f)$ C.S. in 1~10keV region.

Comparison of integral and differential data before and after adjustment



# 3. Conclusion

- **In nuclear data adjustment, missing essential constraints will lead to compensation errors.**
  - different constraint conditions will give different, even opposite posterior results both for integral and differential data.
  - Compensation effects are almost unavoidable in the adjustment of different isotopes and reactions, in different energy regions.
- **To avoid compensation error and make adjusted nuclear data for general purpose, we have to construct complete constraint conditions.**
  - which we don't have yet.
- **Even to obtain a special purposed library, input information has to be carefully prepared.**
  - such as the method developed by G. Palmiotti.

***Details are shown in P72, welcome you to discuss during coffee break!***