



**The effect of Interpolation Scheme
Choice on Critical Assembly Flux
Spectra.**

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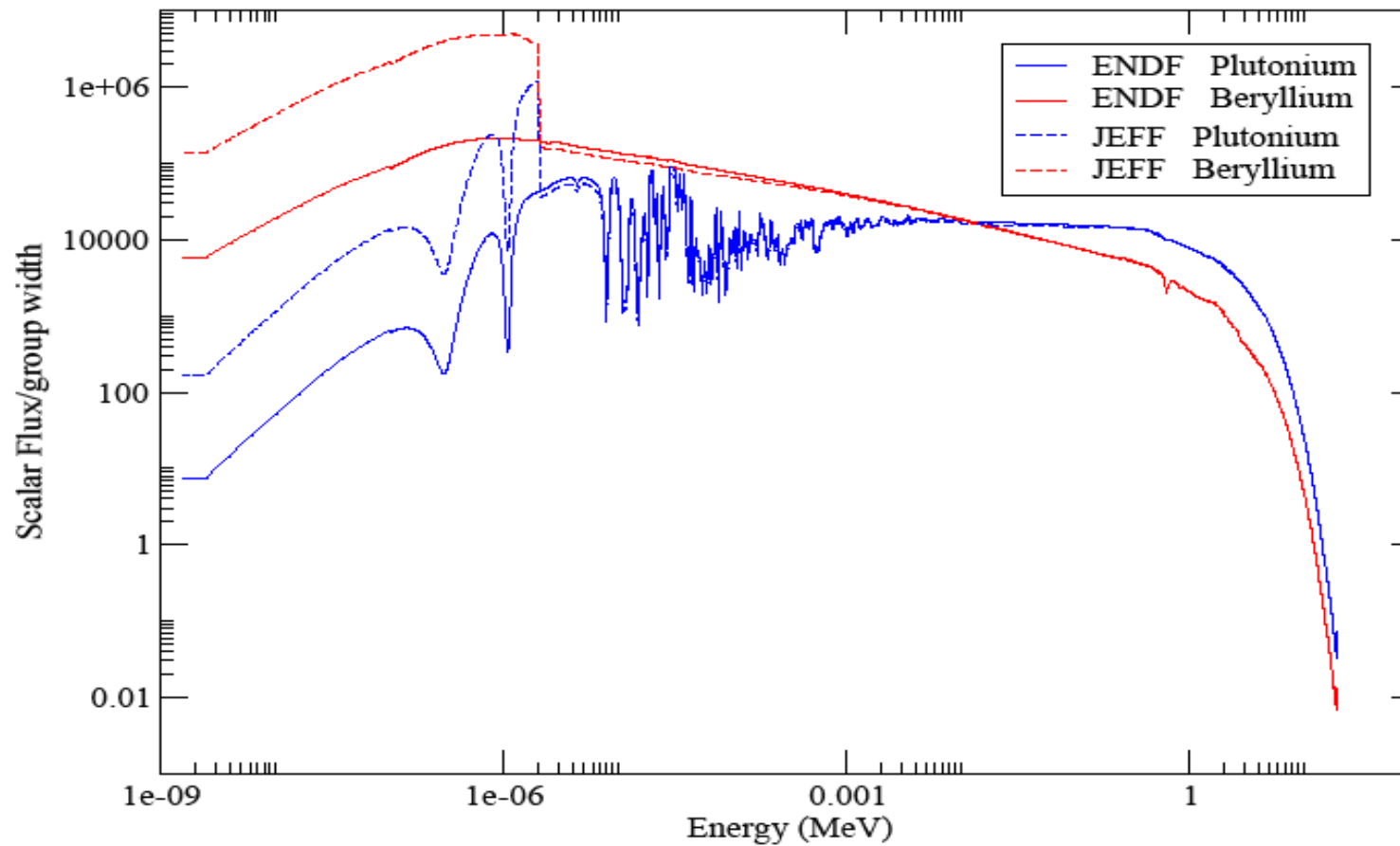
BACKGROUND

- JEFF/DOC 1254 C.Dean Discussed the use of Unit Base interpolation for group data.
- JEFF/DOC 1254 was produced as a result of anomalous data in secondary energy distributions of fission and scattering reactions.
- Discovered during analysis of flux spectra for a benchmarking exercise using JEFF3.1 and ENDF/B-VII.
- Observed as large increases in low energy flux spectra
- Similar effect reported by Sublet et al. at JEFF Nov 2007.

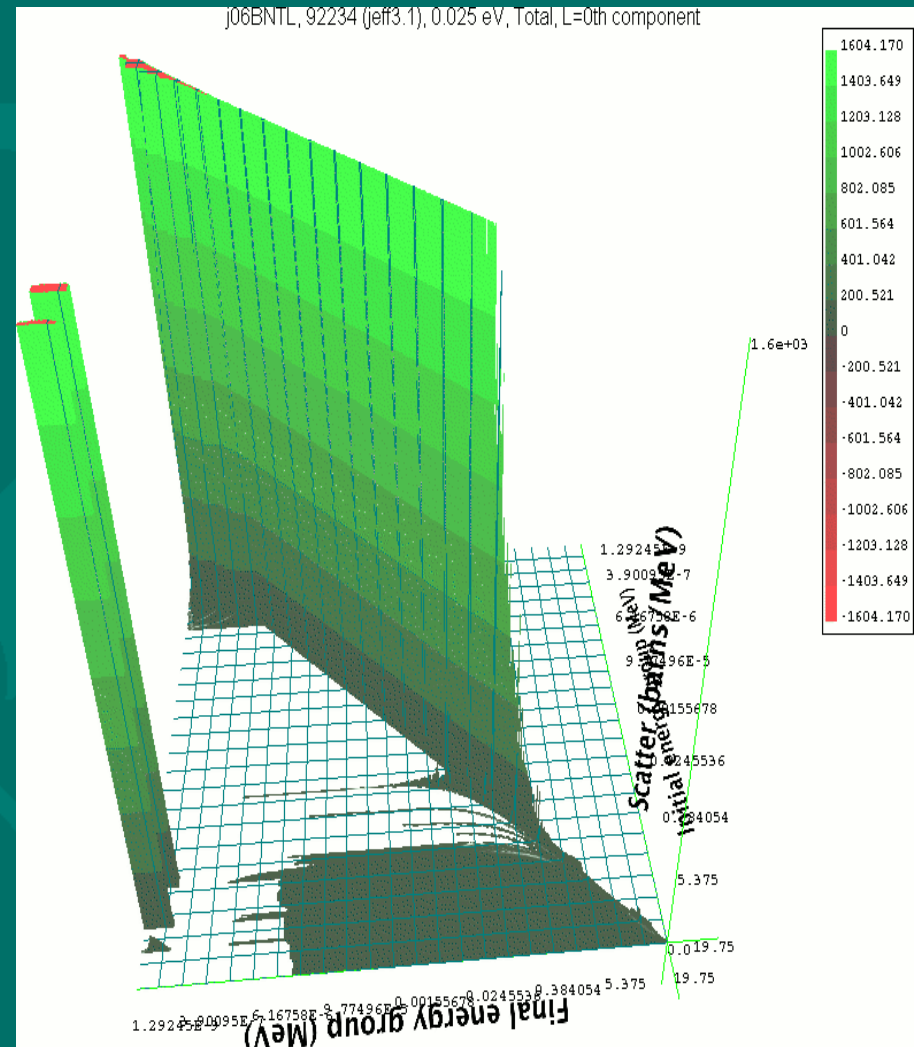
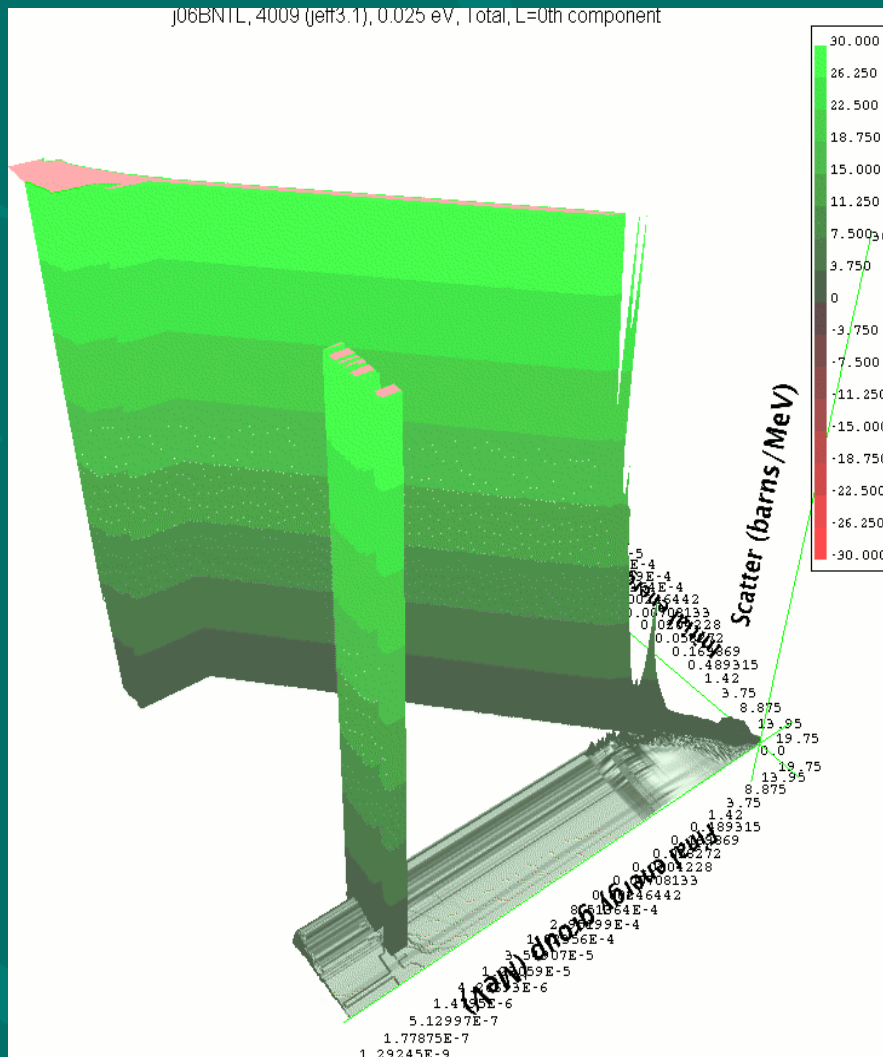
Enhanced flux at low energies for Be reflected system.

ICSBEP/PU_MET_FAST_018 Critical Assembly

Flux spectra for Pu and Be Regions.



Secondary Energy Distributions for Be (LHS) and U234 (RHS) Scatter matrices.



Resolution

- C.Dean suggested strange fluxes are due to choice of interpolation scheme during NJOY processing.
- Data was reprocessed using Unit Base (INT=22) rather than Linear (INT=2).
- Investigation into effect of this change on flux spectra of several Fast Assemblies.
- GODIVA, JEZEBEL, FLATTOP PU and U5, and Be reflected system.

Calculations

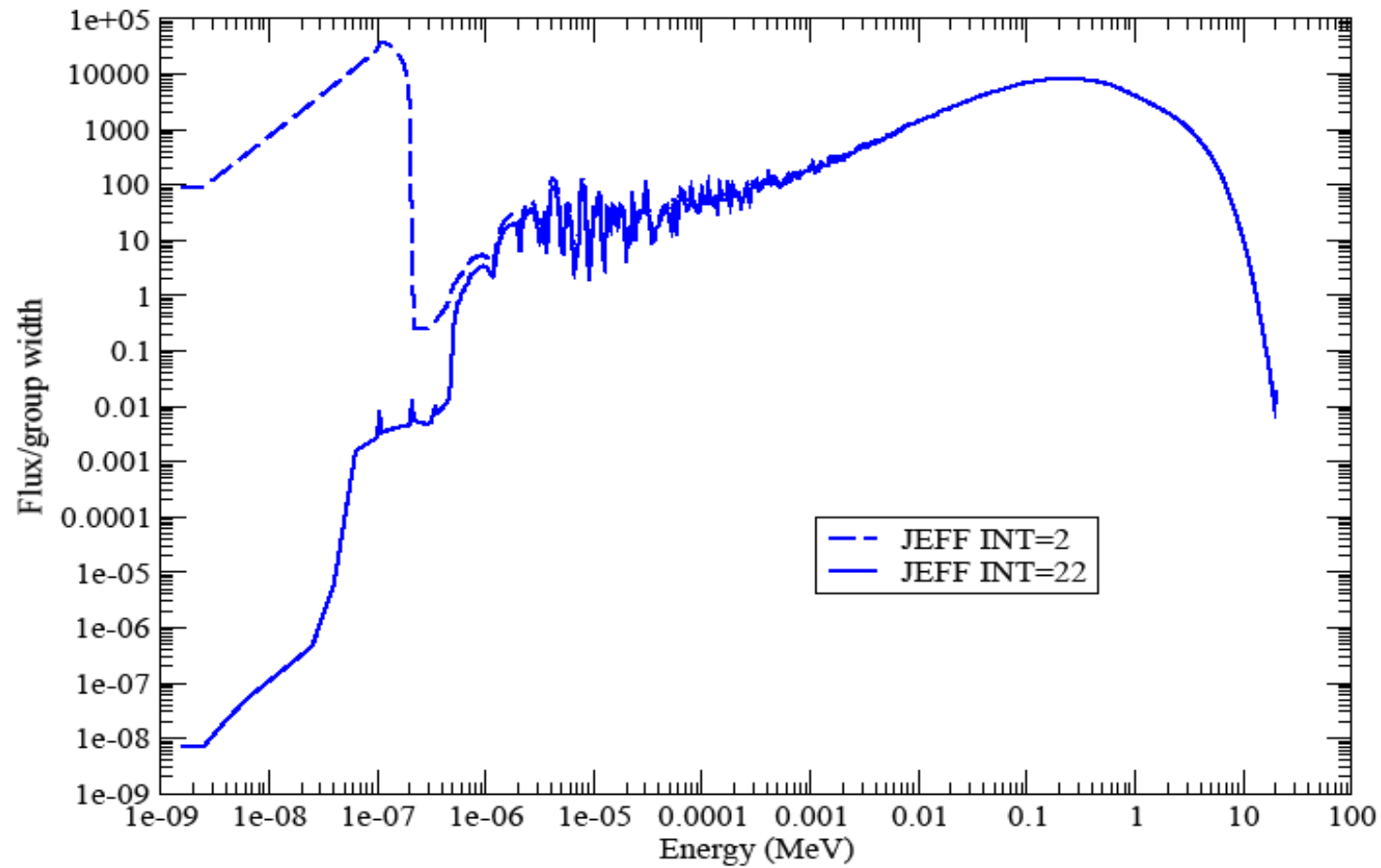
- 1D deterministic neutronics code.
- Sn Transport using JEFF 3.1 data with 460 energy groups.
- Data sets created by C. Dean and R Perry of Serco, using INT=2 and INT=22 option in NJOY.

	GODIVA	Flattop U5	Flattop Pu	JEZEBEL	PU_MET_FAST_018
	HEU	HEU + U	Pu + U	Pu	Pu + Be
EXP	1.00±0.001	1.00±0.0030	1.00±0.0030	1.00±0.002	1.00±0.0030
INT=2	0.9916803	0.9972095	1.0040685	1.0000987	0.9974808
INT=22	0.9915326	0.9970711	1.0041201	1.0001670	0.9976204
	-14.77 pcm	-13.84 pcm	5.16 pcm	6.83 pcm	13.96 pcm

Godiva

ICSBEP/HEU_MET_FAST_001 (GODIVA)

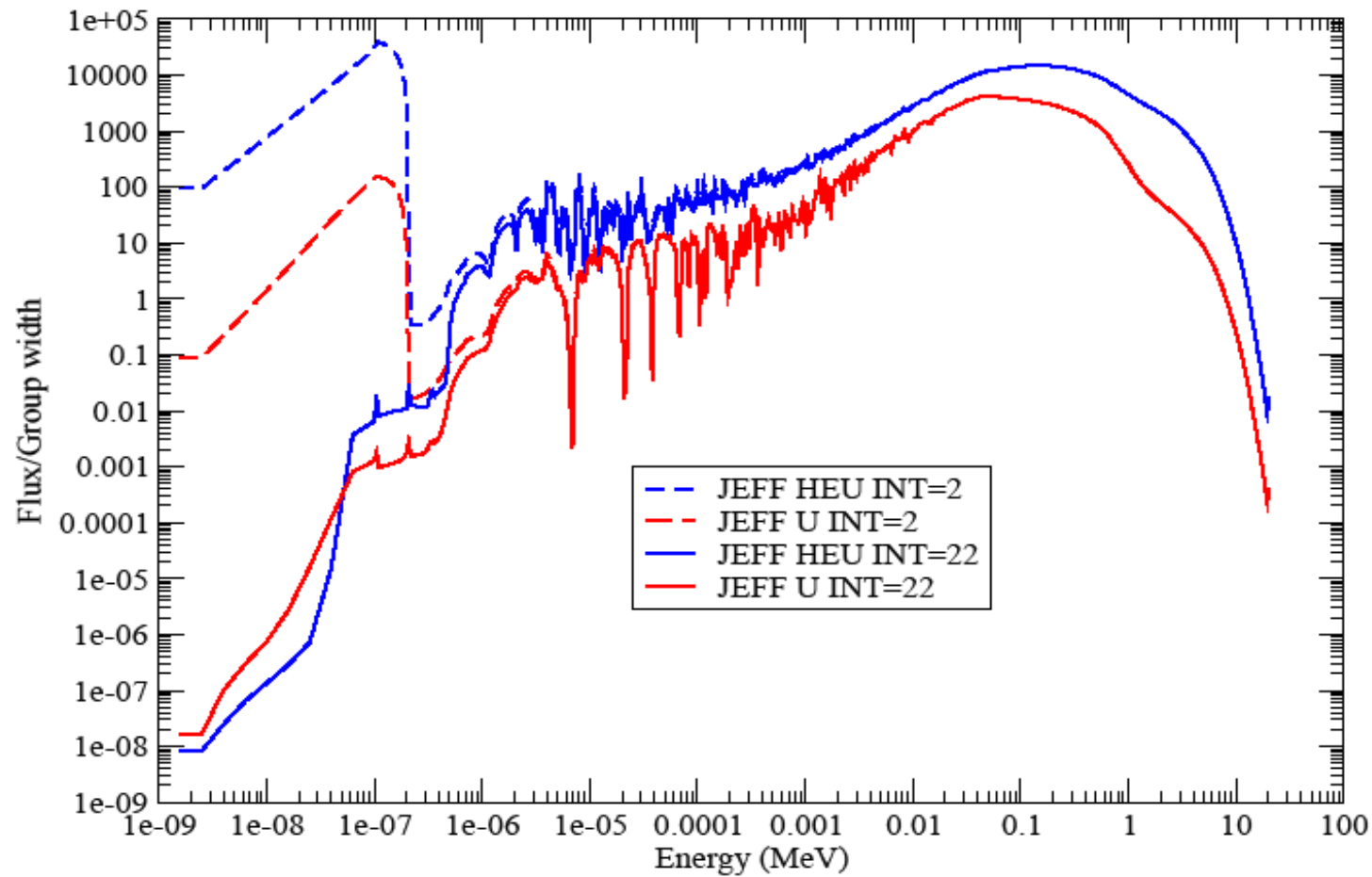
Spectra for HEU region



Flattop U5

ICSBEP/HEU_MET_FAST_028 (Flattop U5)

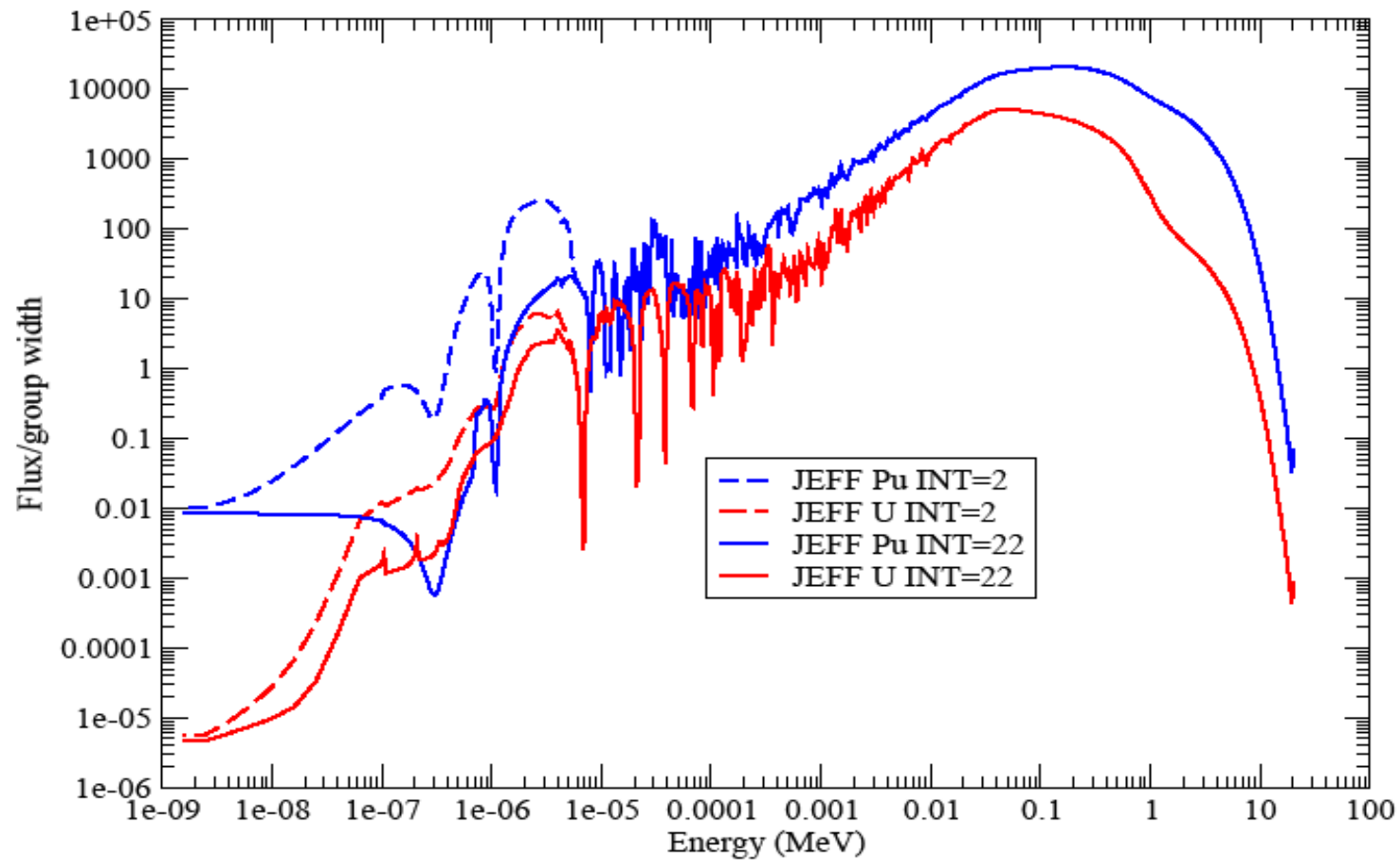
Spectra in HEU and U regions



Flattop Pu

ICSBEP/PU_MET_FAST_006 (Flattop Pu)

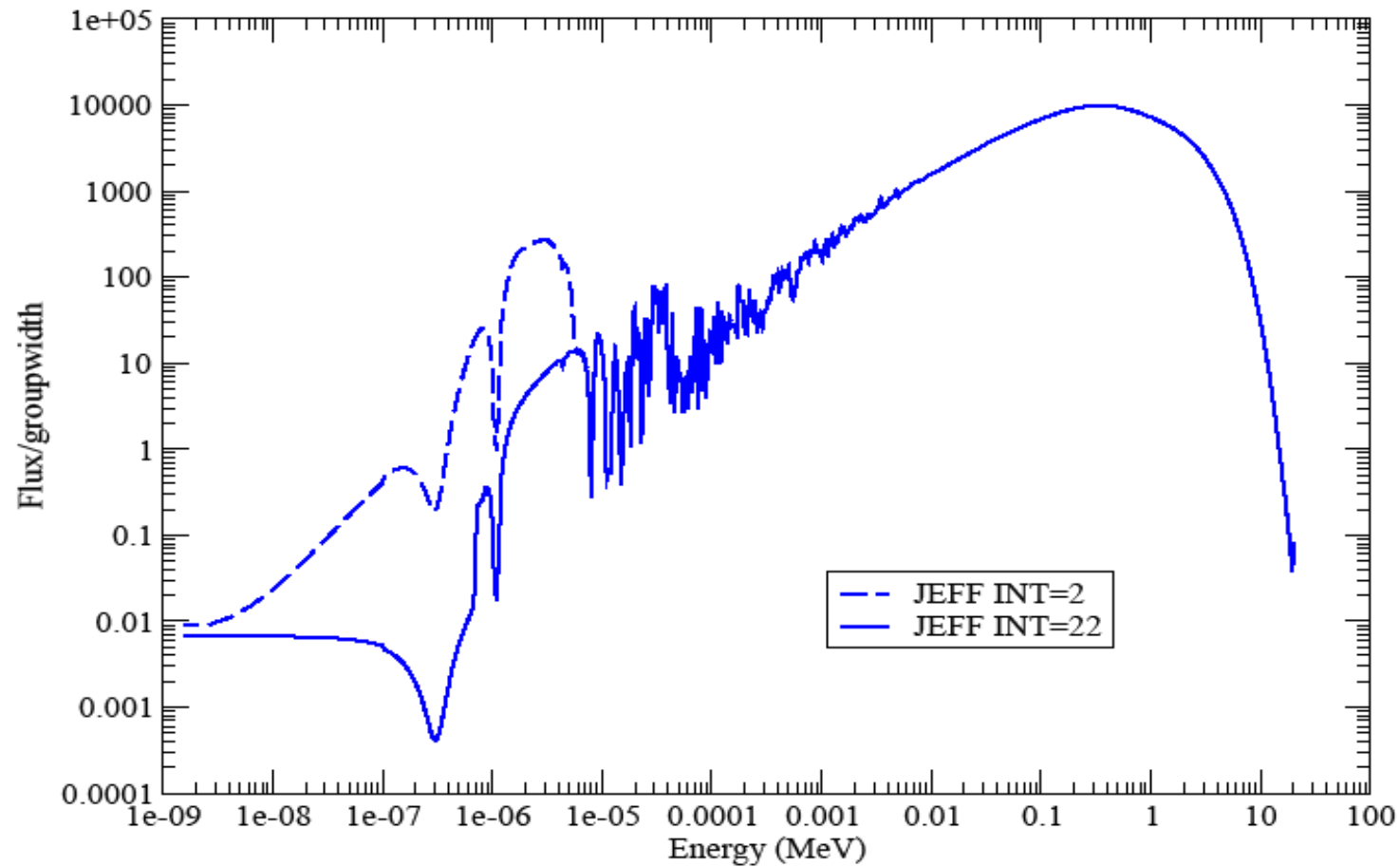
Spectra in Pu and U regions



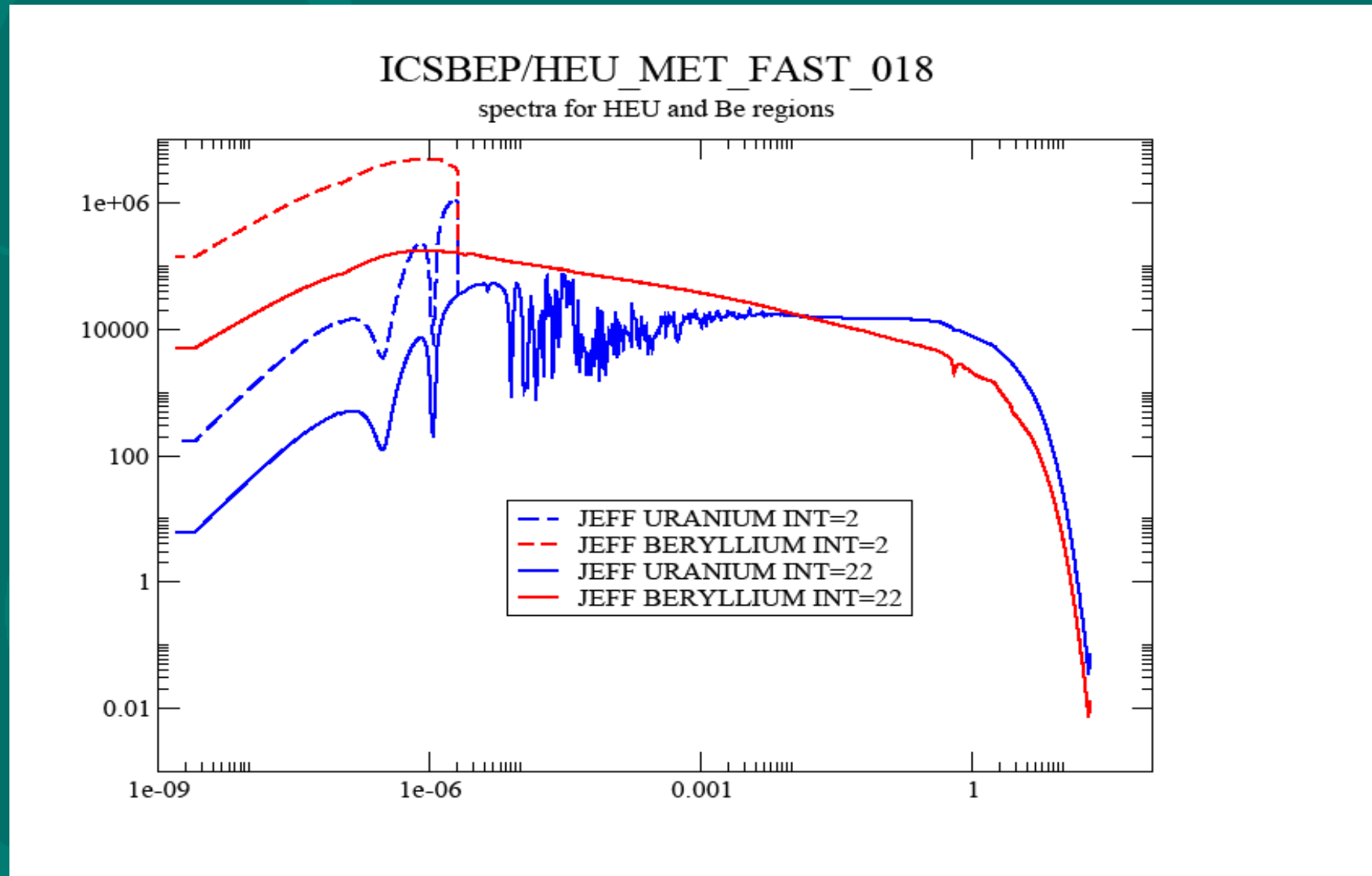
Jezebel

ICSBEP/PU_MET_FAST_001 (JEZEBEL)

Flux Spectra for Pu region



PU_MET_FAST_018 (Be reflector)



Conclusions

- Change of Interpolation scheme has removed spikes from secondary energy distributions.
- Increases in flux are removed from spectra when calculated using data where $INT=22$.
- Reinforces the recommendation in JEFF/DOC 1254 that group data should be processed in NJOY using unit base interpolation.