PFGS for ENDF/B-VIII

Removes 1.09 MeV discontinuity in representations. Now:

- all production gamma processes represented explicitly to 30 MeV (benefiting from IAEA Empire (U) and LANL CoH (Pu) calculational capabilities

- Fission gammas explicitly represented for all incident energies

- Additional benefit of not having a double-counting error in MCNP simulations when fission event-generator is used!

Uses PFGS spectrum assessed at thermal, and carries over to high energies

- benefits from recent data taken at Geel and LANL (235U and Pu) and 238U from France

- informed by CFGM model simulations too

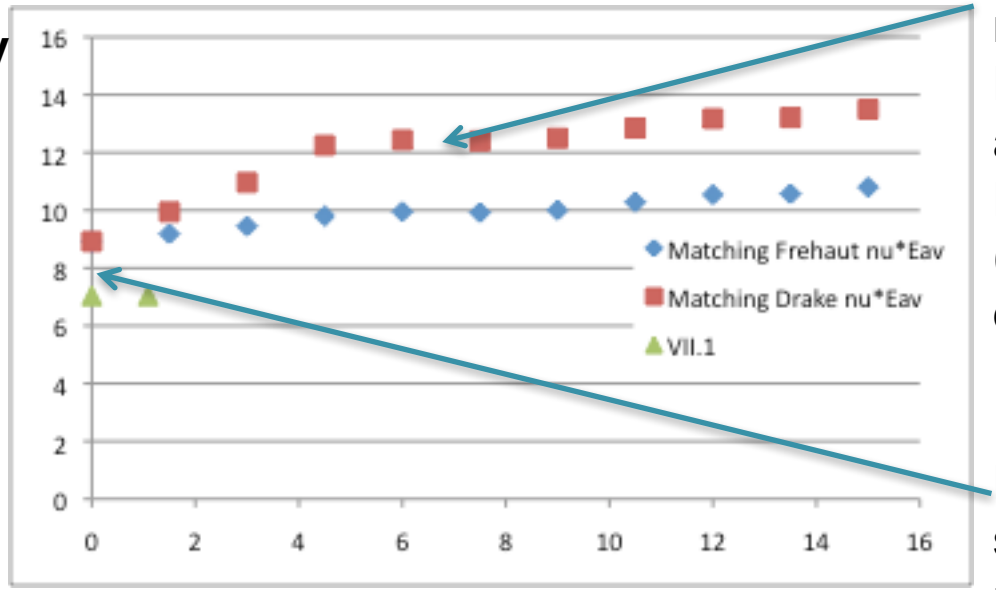
Notable issues to consider, though:

- large VII.0 low-energy (<200 keV) spectrum (from calcs) results in much higher multiplicities. [extra gammas at very low energies]. Defensible?

- our study has revealed discrepancies between Drake LANL data (that informed ENDF g-production transport) & Frehaut/Fort data (used previously in MT 458)

Example of PFGS issue, 235U gamma multiplicity

Multiplicity

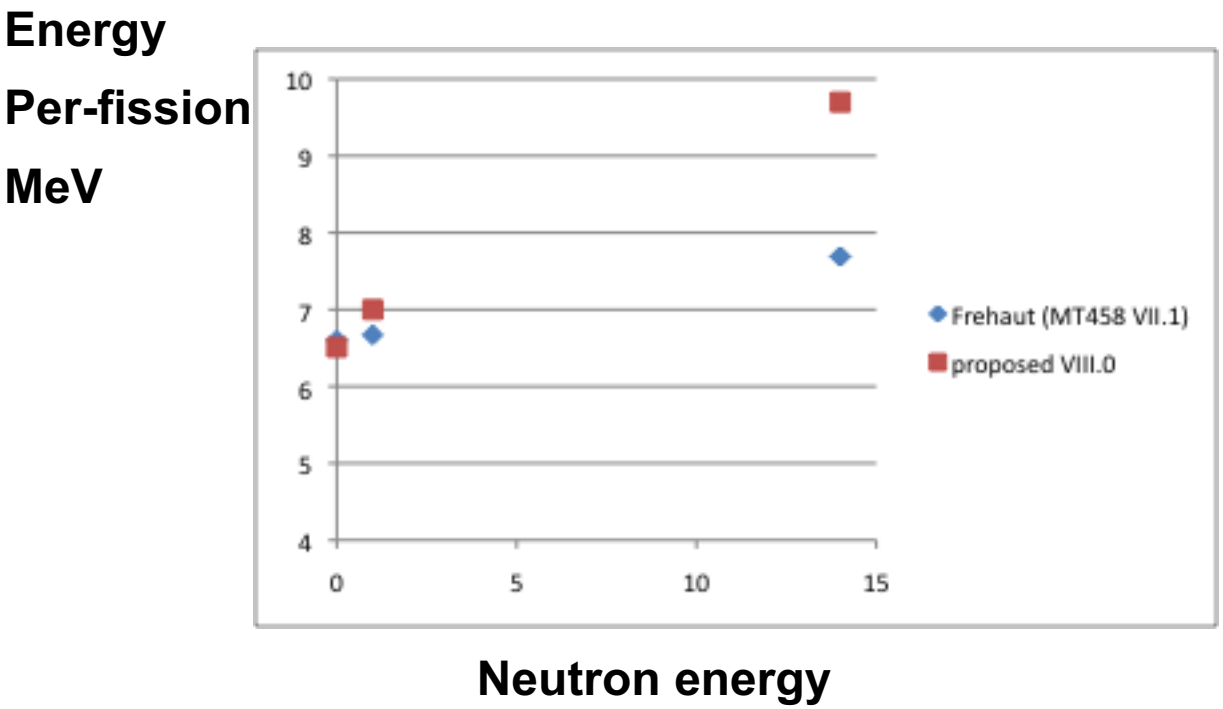


Neutron energy

Higher - we are intentionally matching Drake, not Frehaut. Drake LANL exp.looks good, and was previous matched in ENDF/B-VII.1 transport file. (Important for gamma-ray diagnostics)

Higher because normalized spectrum now has more photons below 200 keV, so fewer above 200 keV, implying need for higher nubar, to still match data >200 keV

Example of PFGS issue, 235U gamma energy per fission



Even though proposed VIII.0 is much higher @ 14 MeV than Frehaut , ENDF/B-VII transport file actually was similar to the proposed red points (though did not represent fission explicitly above 1.09).

In VIII.0, we can now make the photon production and MT458 consistent. Implication will be to increase energy per fission by ~ 2 MeV at 14 MeV.