

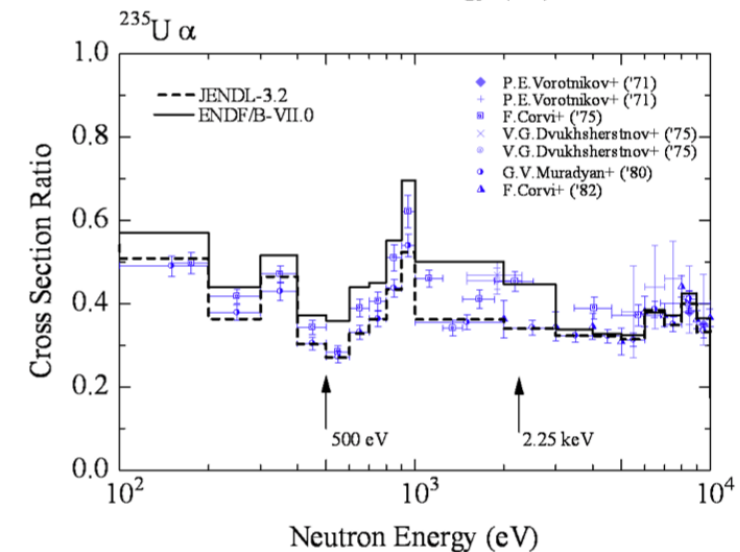
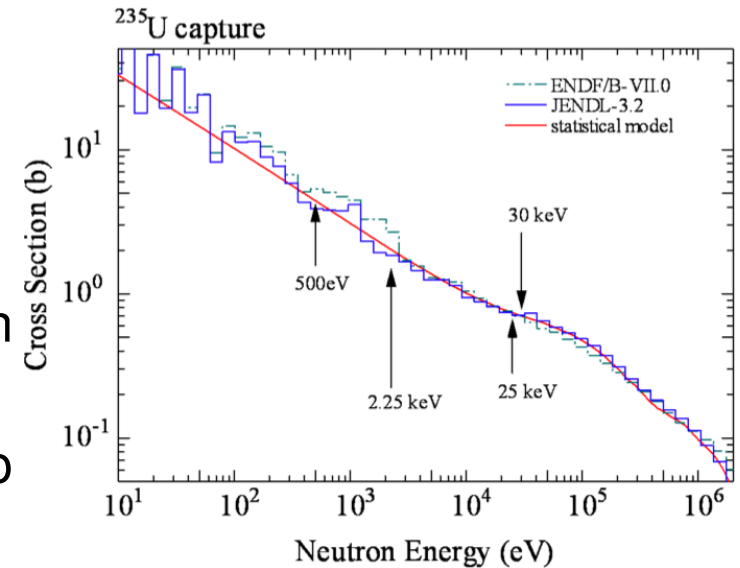
WPEC / Subgroup 29

U-235 capture cross section in the keV to MeV energy region

T. Kawano
Los Alamos National Laboratory
on behalf of O. Iwamoto (JAEA)

Problems reported regarding U-235 capture cross section

- Fast-neutron critical experiments using U fuel
 - BFS (IPPE) underestimation of sodium voided reactivity
 - FCA (JAEA) large dependence of reactivity on neutron spectrum hardness
 - ZPPR-18A control rod worth, large sensitivity to U-235 capture (?)
- Capture cross section of U235 in keV region
 - All evaluations adopt ORNL resonance parameters
 - The upper limit is 2.25 keV (Cf. 500 eV in JENDL-3.2)
 - Large differences are seen from 500eV to 2.25 keV between JENDL-3.2 and 3.3



Observation

- ENDF/B-VII.0 capture cross section is much larger than JENDL-3.2 (old ORNL evaluation) and a statistical model calculation in the energy range of 100eV – 3keV.
- Cross section adjustment indicates that capture cross section in resonance range is overestimated.
- Decrease in the capture cross section mitigates the C/E dependence on spectrum hardness, but still gives **unacceptable high C/E values**.
- There may exist **other energy region** which also contributes to k_{eff} .

Suggestion for the WPEC

- The problems in U-235 capture are recognized, but how much we need to modify the cross section is still uncertain.
- New capture cross section measurements in the keV region helps to improve the accuracy of the resonance parameters.
 - high-resolution capture cross section, with 100-meter flight path
 - capture-to-fission ratio (α measurements) essential

(digest version by Kawano)