

# Comments on ENDF/B-VII deficiencies

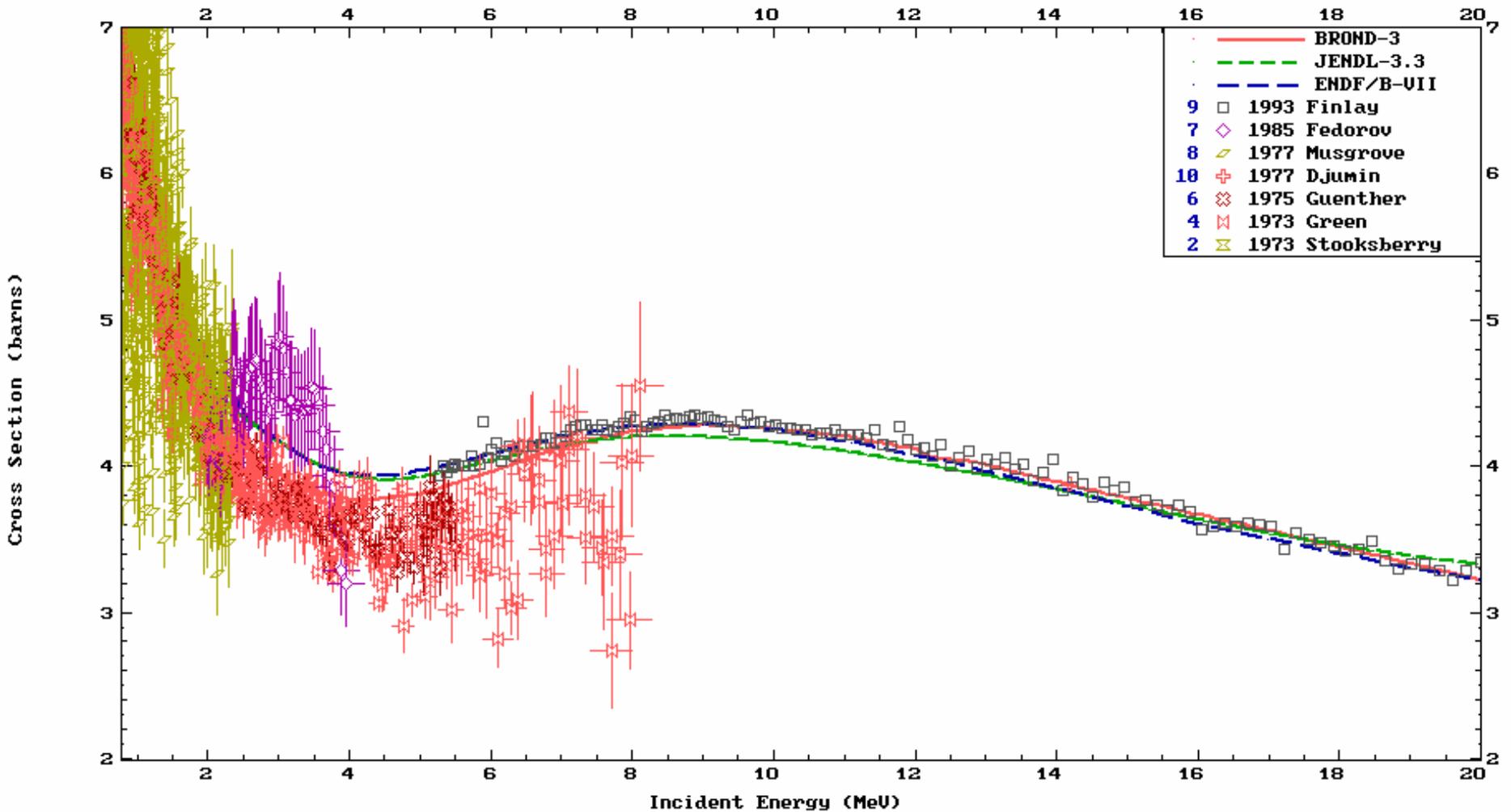
A.V.Ignatyuk

*Institute for Physics and Power Engineering, Obninsk*

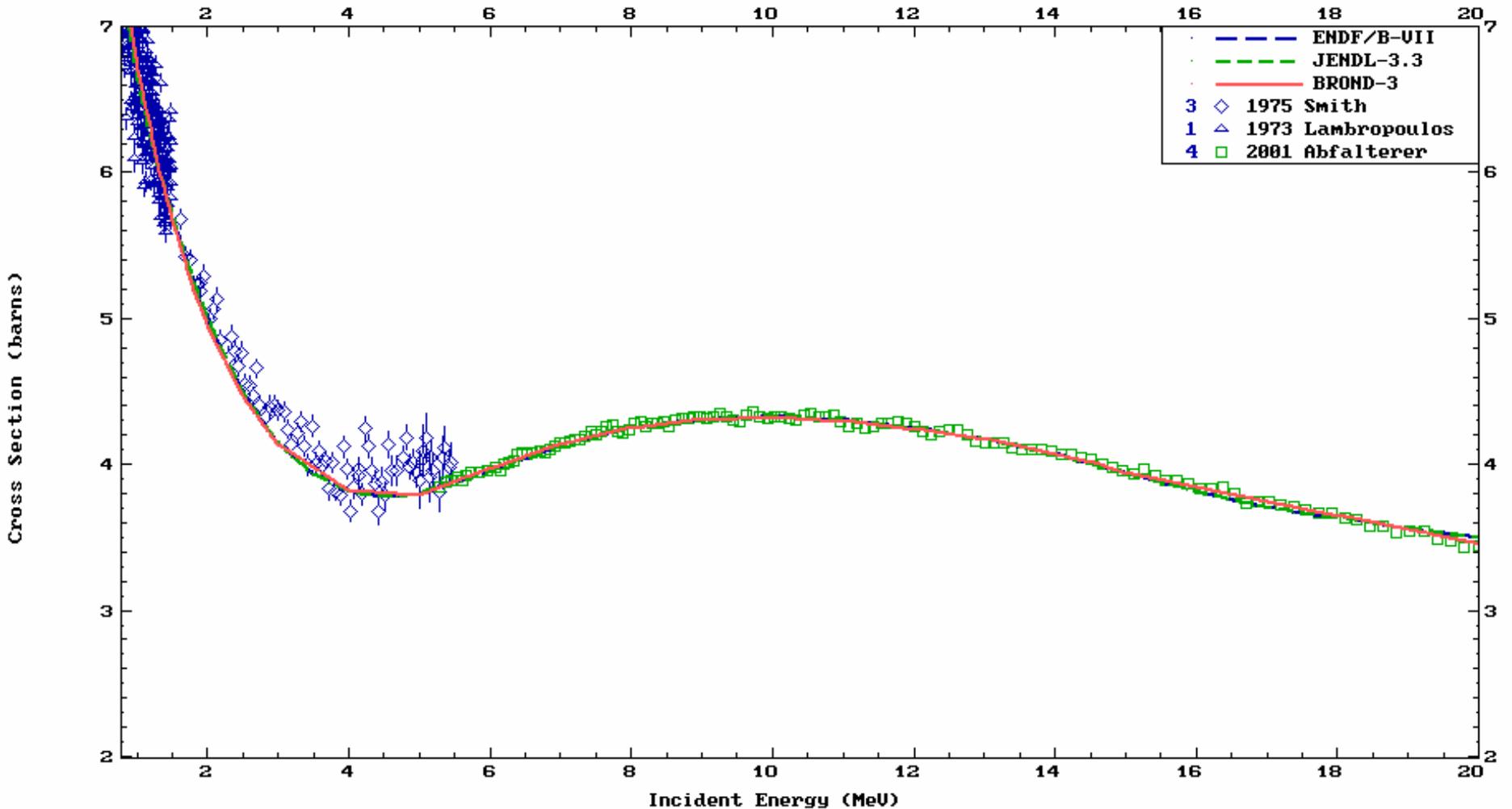
- Deficiencies of the inelastic scattering evaluations;
- Capture cross-section corrections for RRR ;
- Missing of resolved resonances;
- Deficiencies of minor actinide evaluations;
- Conclusions

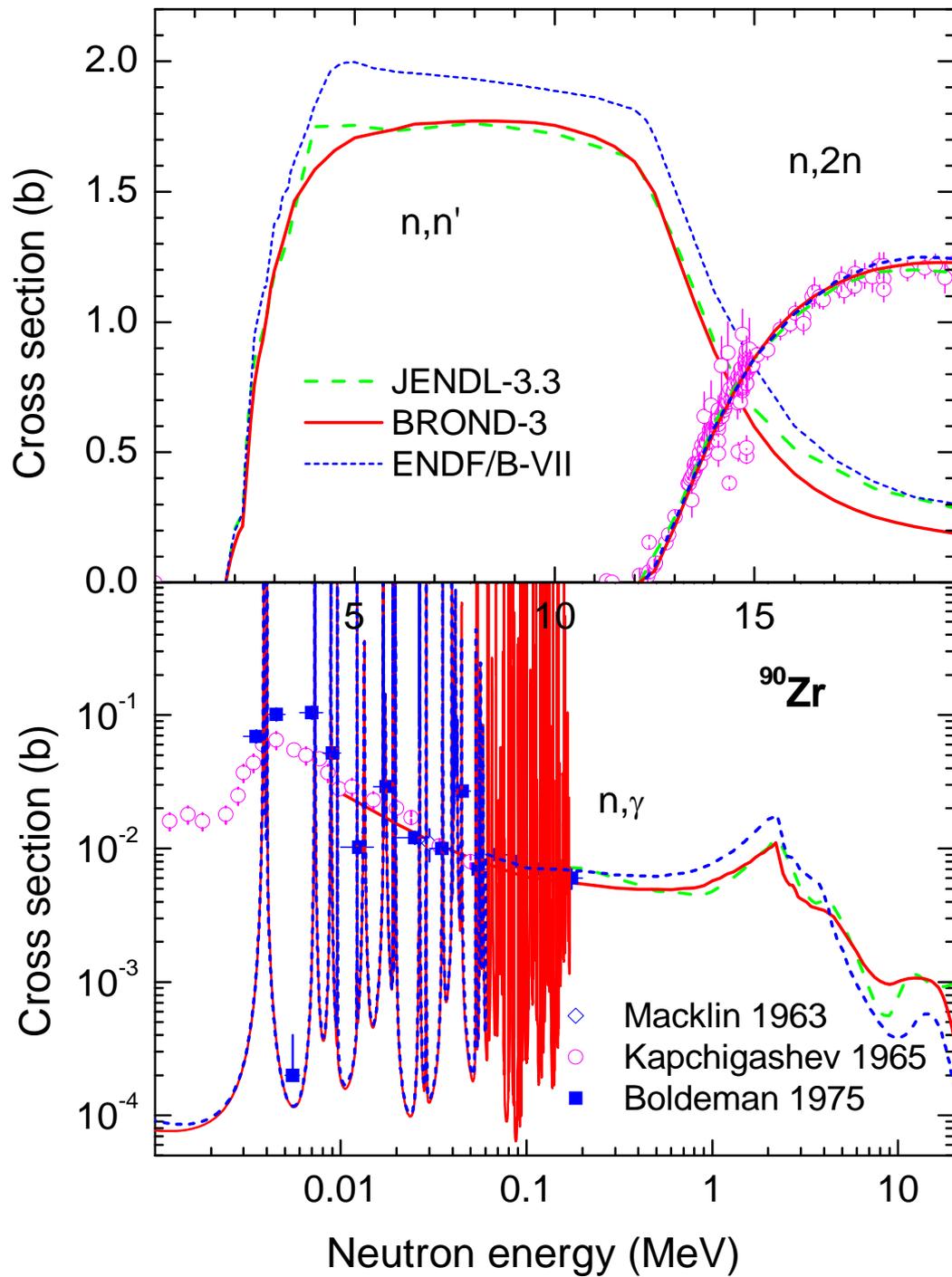


# Evaluations of the total neutron cross sections for Zr-90 compared with experimental data

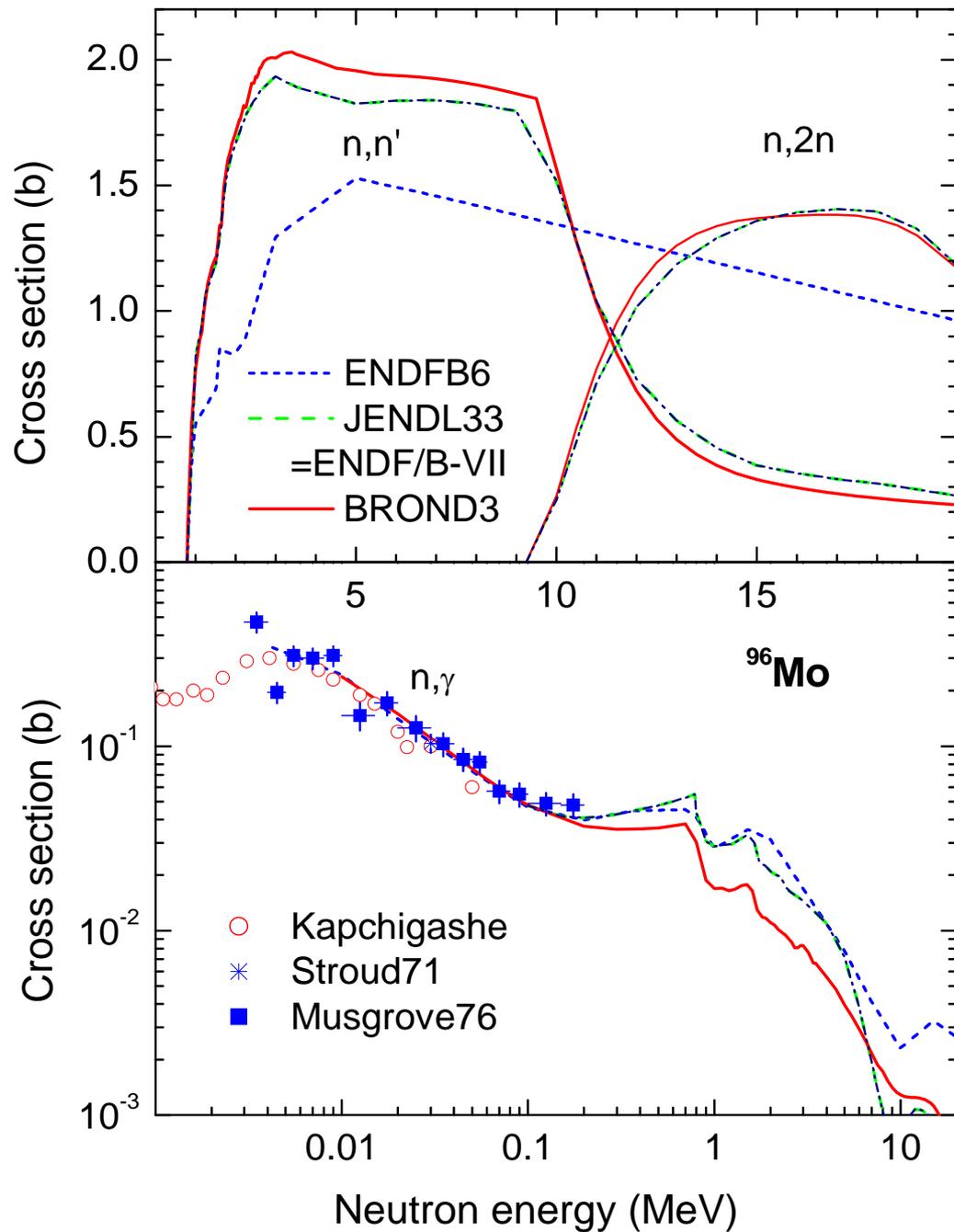


# Evaluations of the total neutron cross sections for Mo-96 compared with experimental data

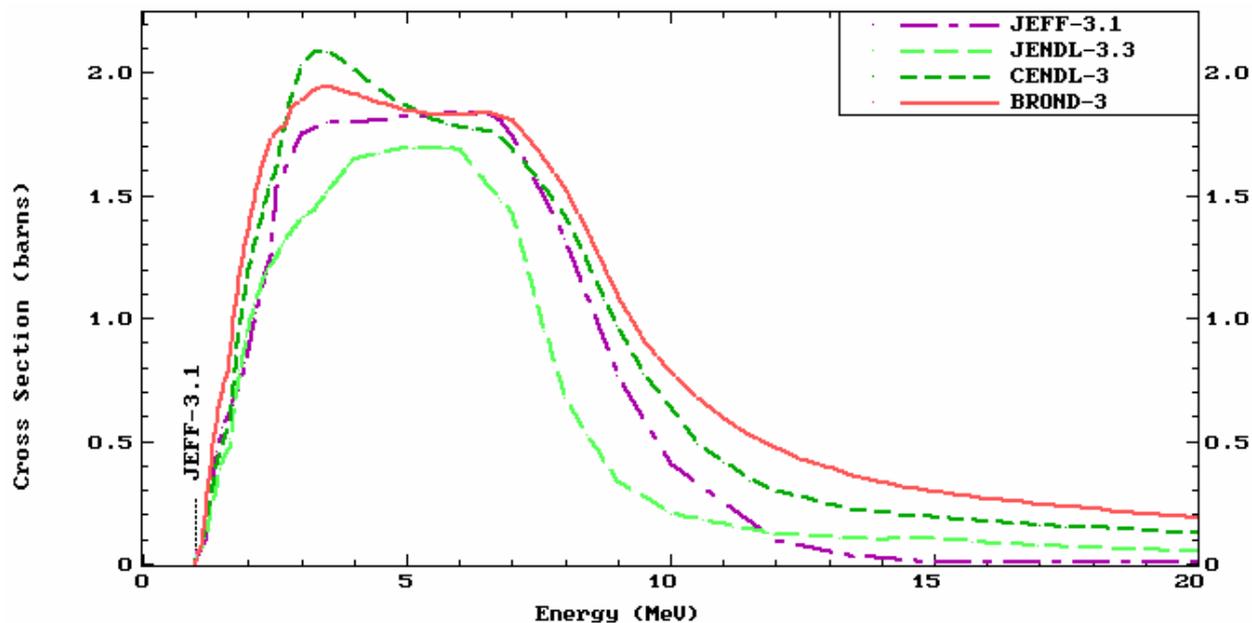
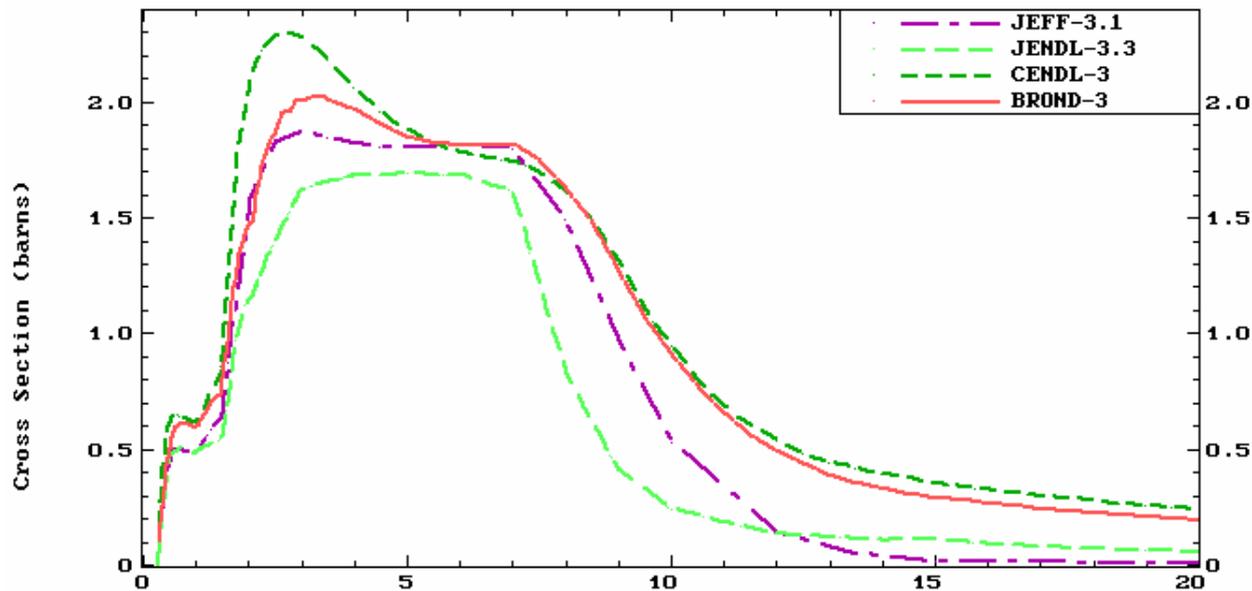




**Recent evaluations of the neutron cross sections for Zr-90 compared with experimental data**

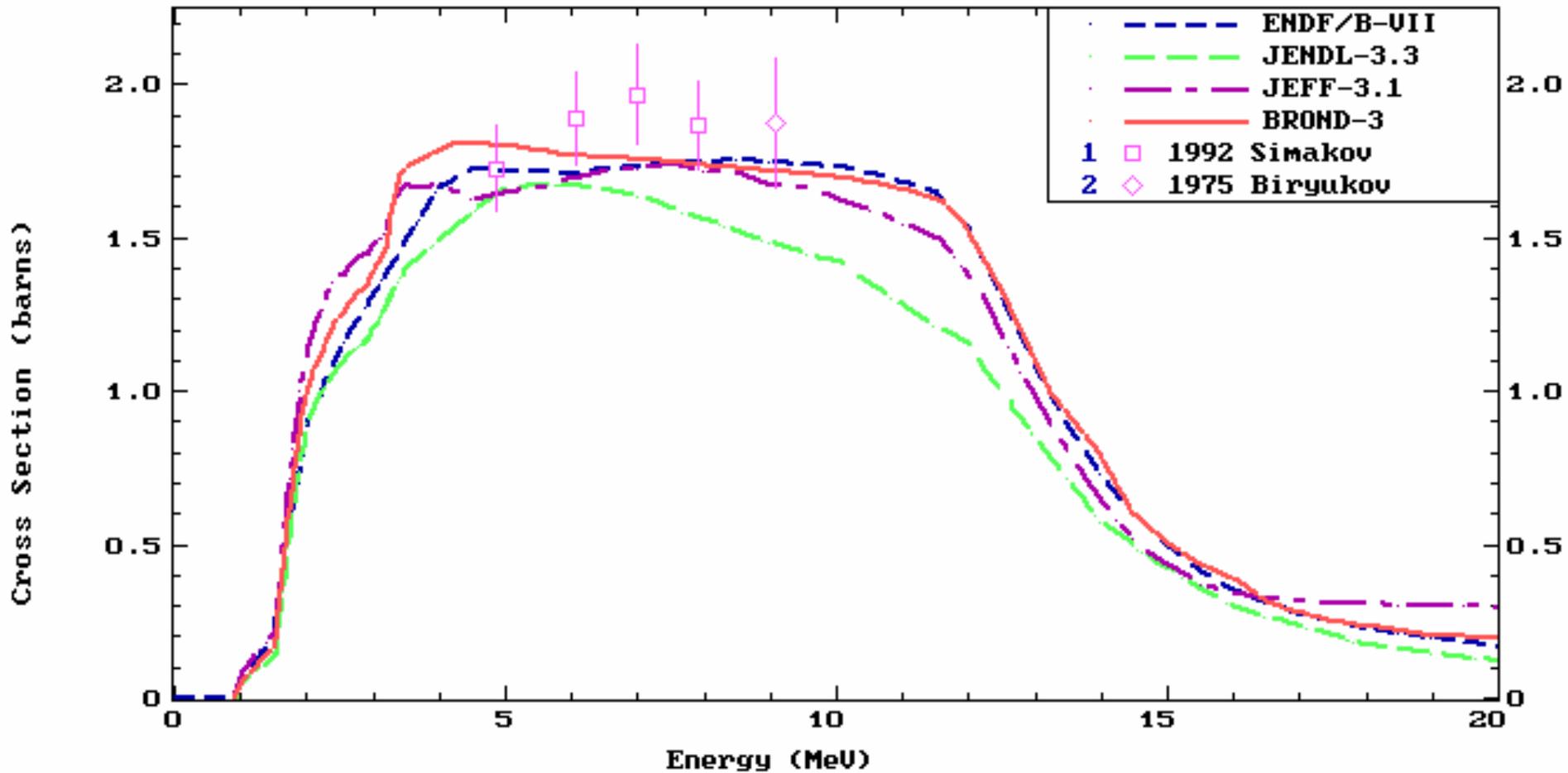


**Recent evaluations of the neutron cross sections for Mo-96 compared with experimental data**



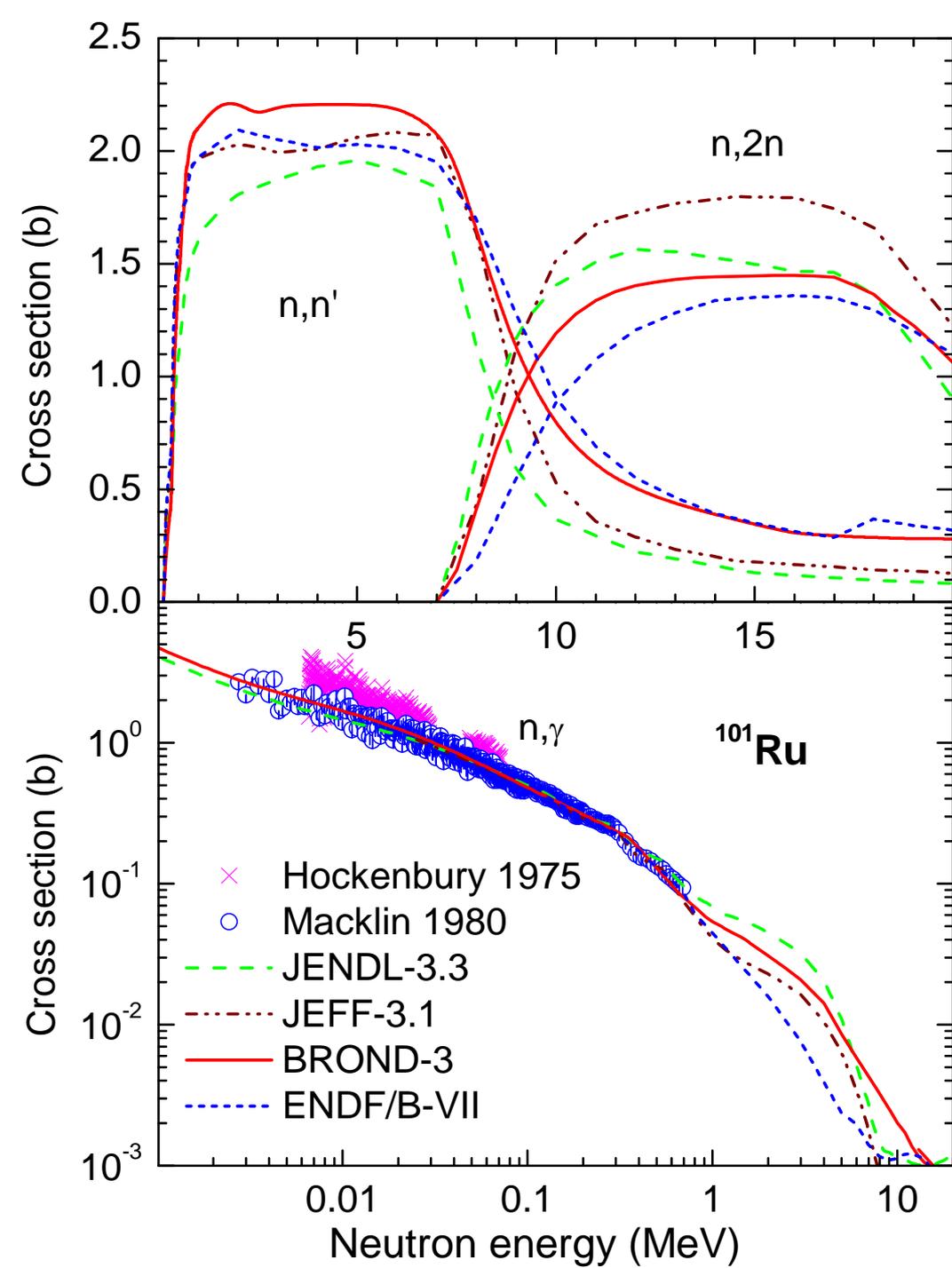
**Recent evaluations of the inelastic scattering cross sections for  $^{93}\text{Zr}$  (upper plot) and  $^{96}\text{Zr}$  (below). JENDL-3.3 evaluations adopted in ENDF/B-VII for these isotopes.**

# Experimental data for the Y-89(n,inl) reaction in comparison with evaluations

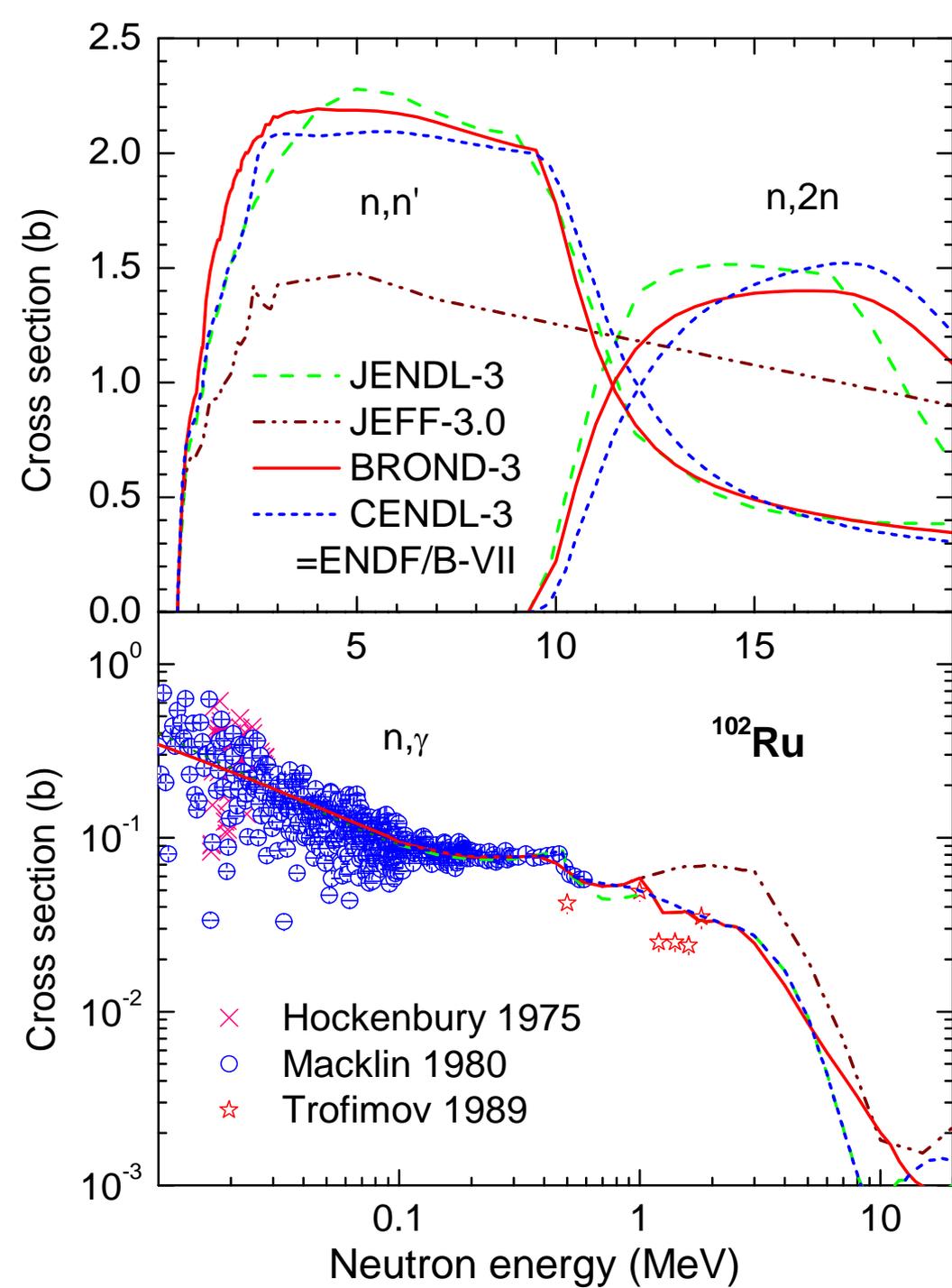


# One-group neutron-capture cross sections in accordance with their contribution to the lumped capture cross section

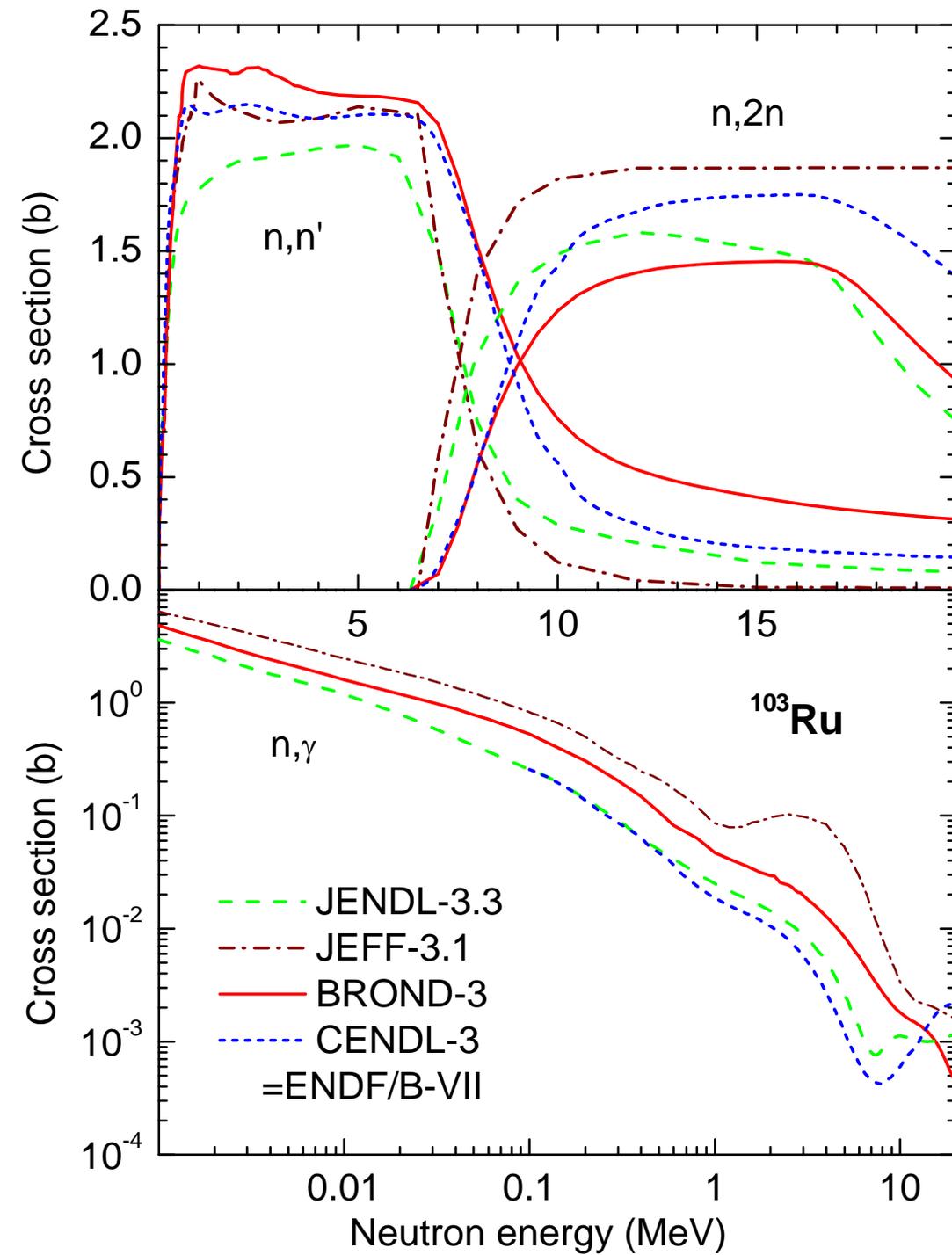
Nuclid	Cross section*Yield (Pu239)			
	FOND-2.2	ENDF/B-VI.7	JEFF-3.0	JENDL-3.2
44-Ru-101	0.04813	0.04820	0.04560	0.04813
46-Pd-105	0.04765	0.04453	0.04581	0.04765
43-Tc- 99	0.03271	0.03621	0.03271	0.03532
45-Rh-103	0.03264	0.03523	0.03231	0.03264
46-Pd-107	0.03258	0.03112	0.03307	0.03258
55-Cs-133	0.03156	0.03273	0.03273	0.03156
62-Sm-149	0.02935	0.02873	0.02873	0.02935
61-Pm-147	0.02144	0.02401	0.02514	0.02144
42-Mo- 97	0.01817	0.01669	0.01817	0.01817
55-Cs-135	0.01717	0.01688	0.01792	0.01717
<b>CS_top50</b>	<b>0.52682</b>	<b>0.52528</b>	<b>0.53227</b>	<b>0.52938</b>
<b>CS_total</b>	<b>0.55080</b>	<b>0.55240</b>	<b>0.55940</b>	<b>0.55270</b>
<b>Ratio 50/tot, %</b>	<b>95.6</b>	<b>95.1</b>	<b>95.2</b>	<b>95.8</b>



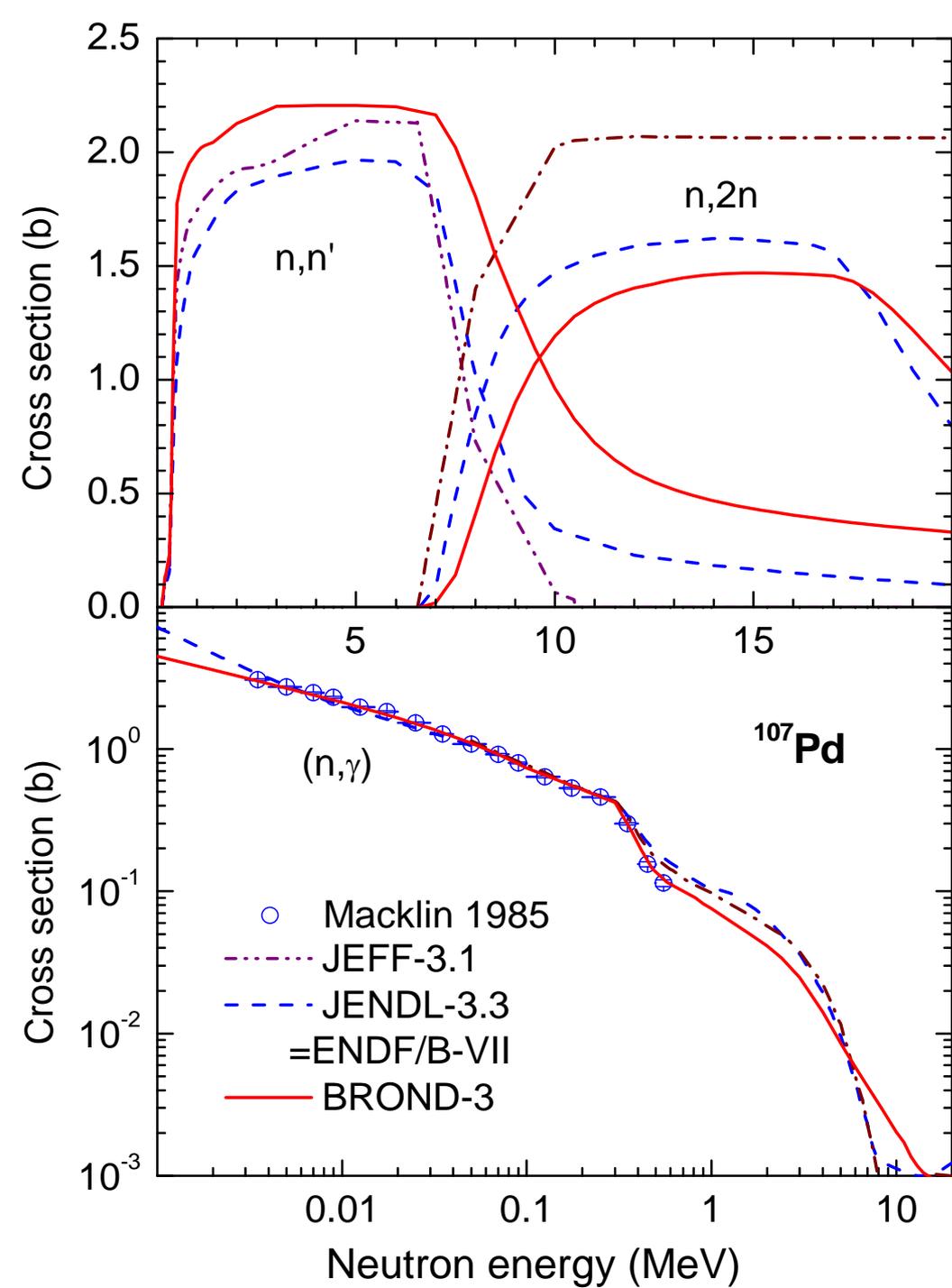
**Recent evaluations of the neutron cross sections for Ru-101 compared with experimental data**



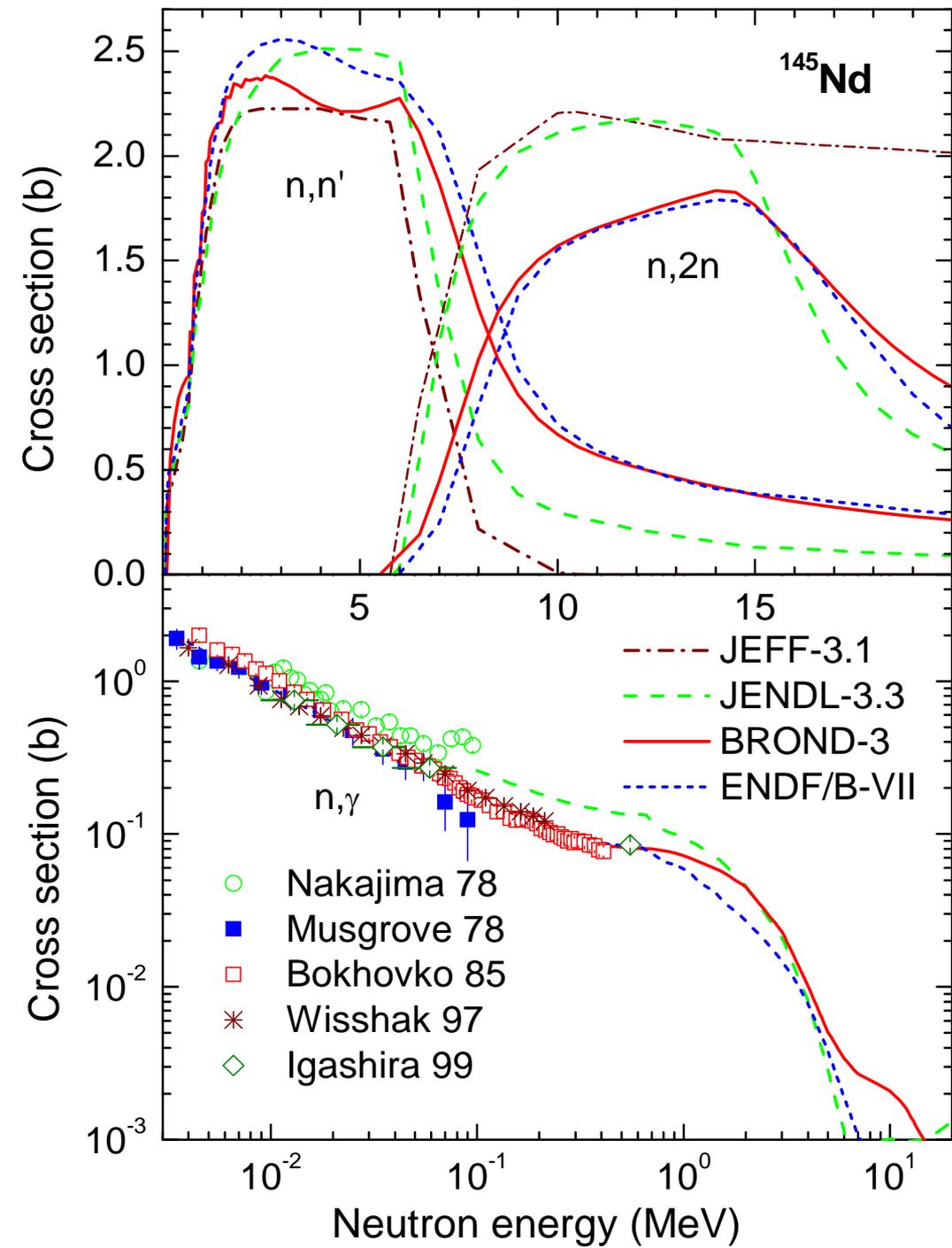
**Recent evaluations of the neutron cross sections for Ru-102 compared with experimental data**



**Recent evaluations of the neutron cross sections for Ru-103 compared with experimental data**

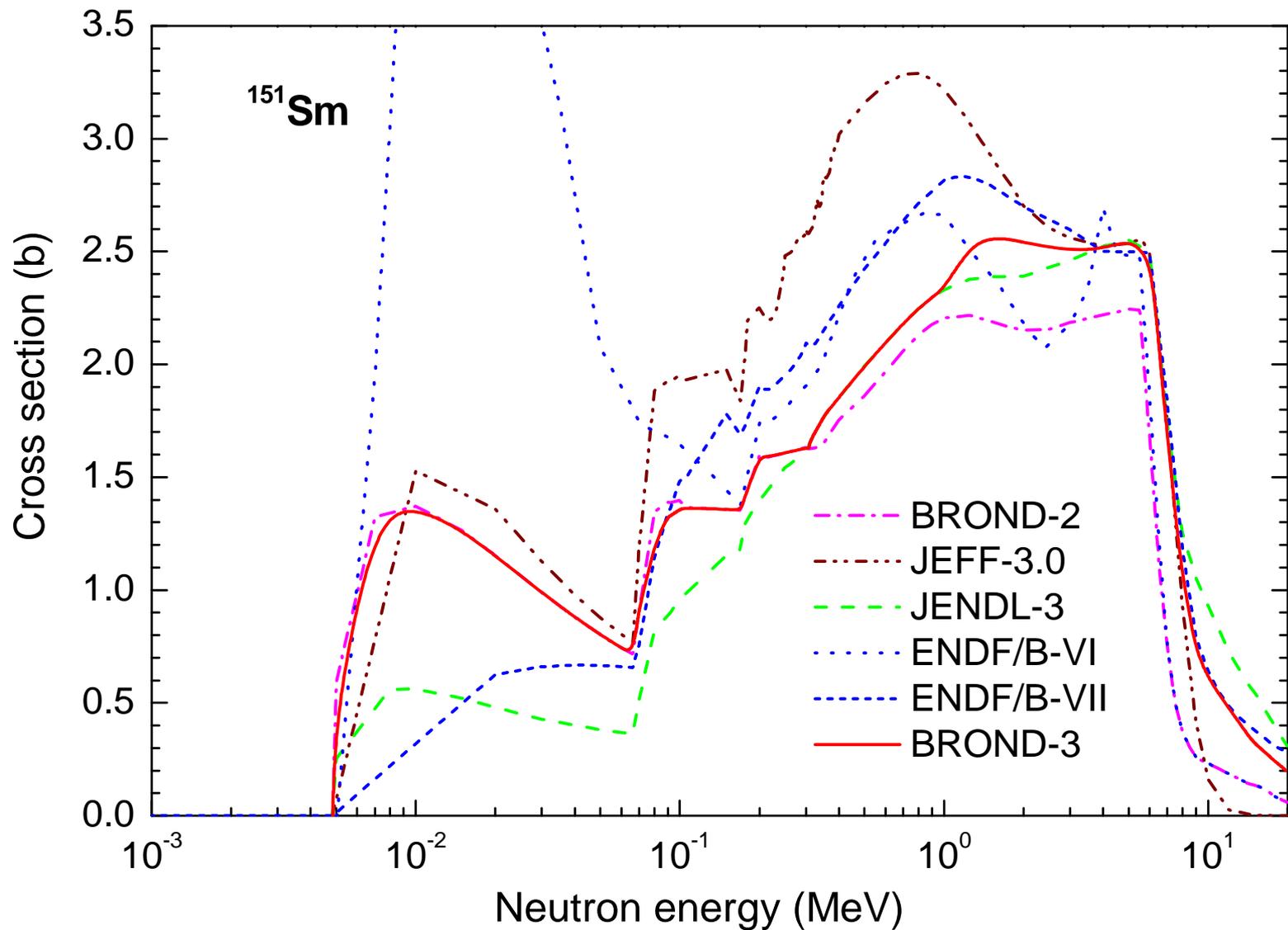


**Recent evaluations of the neutron cross sections for Pd-107 compared with experimental data**

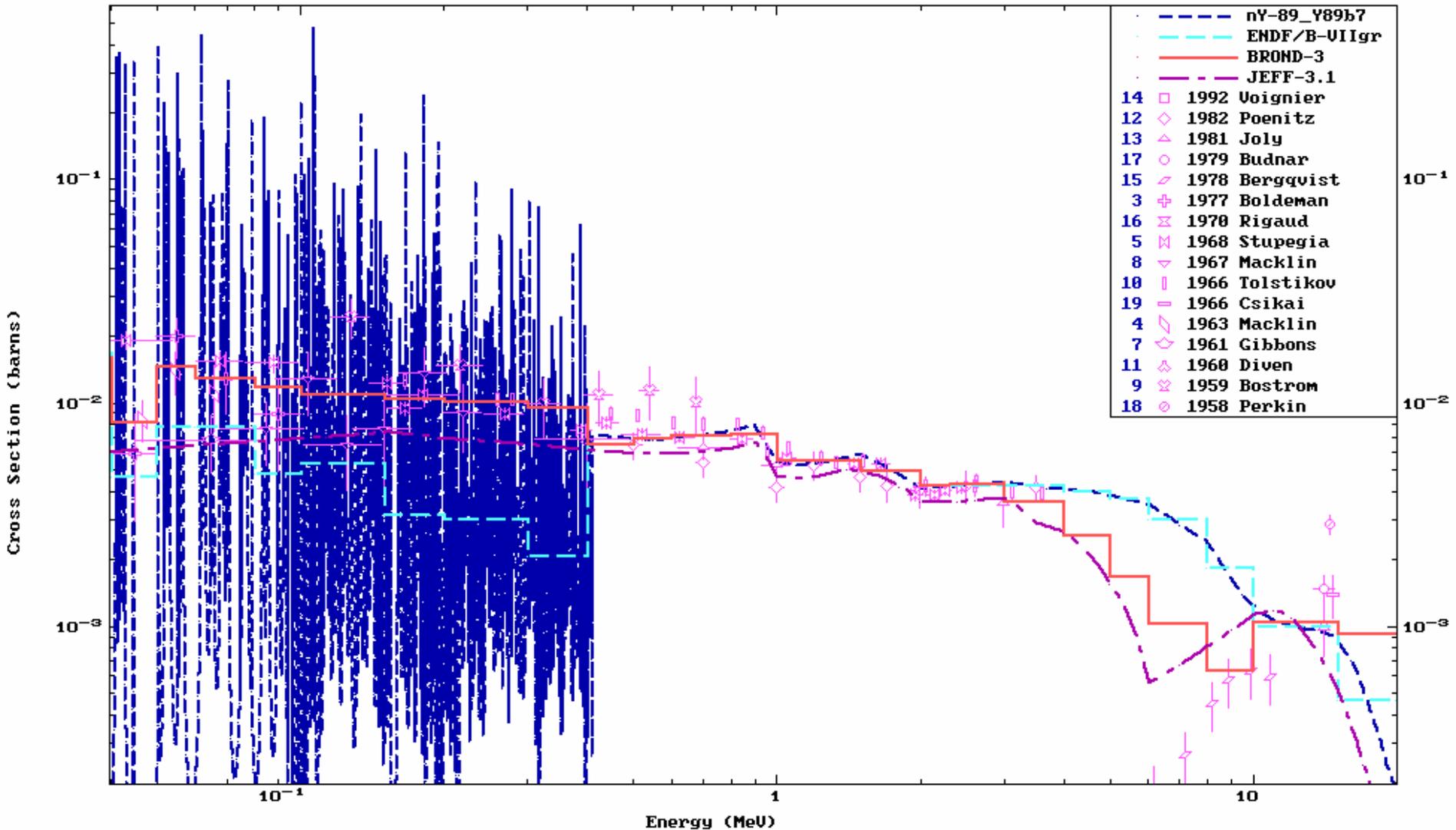


**Recent evaluations of the neutron cross sections for Nd-145 compared with experimental data**

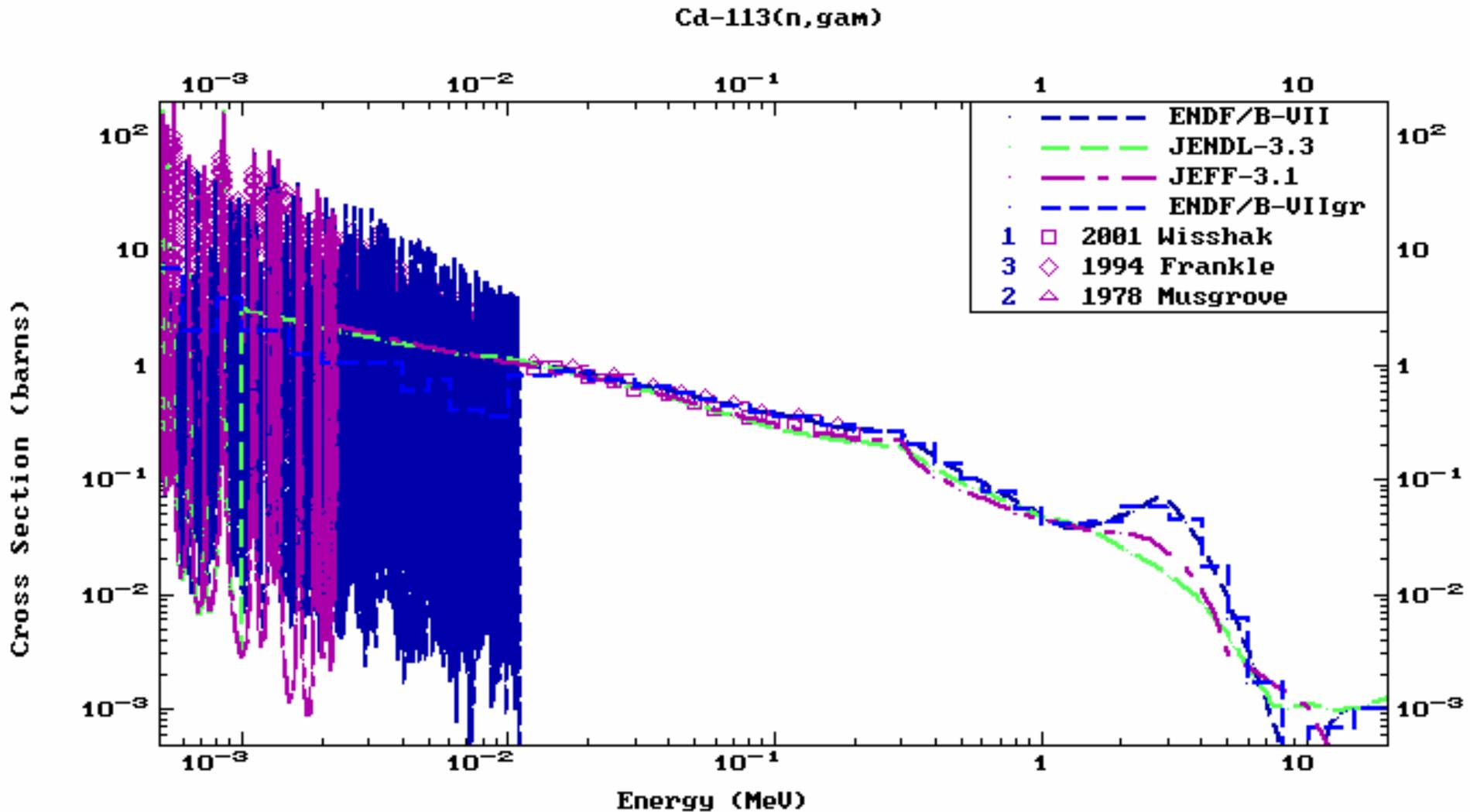
# Inelastic scattering cross section evaluations for Sm-151 at the near-threshold energies

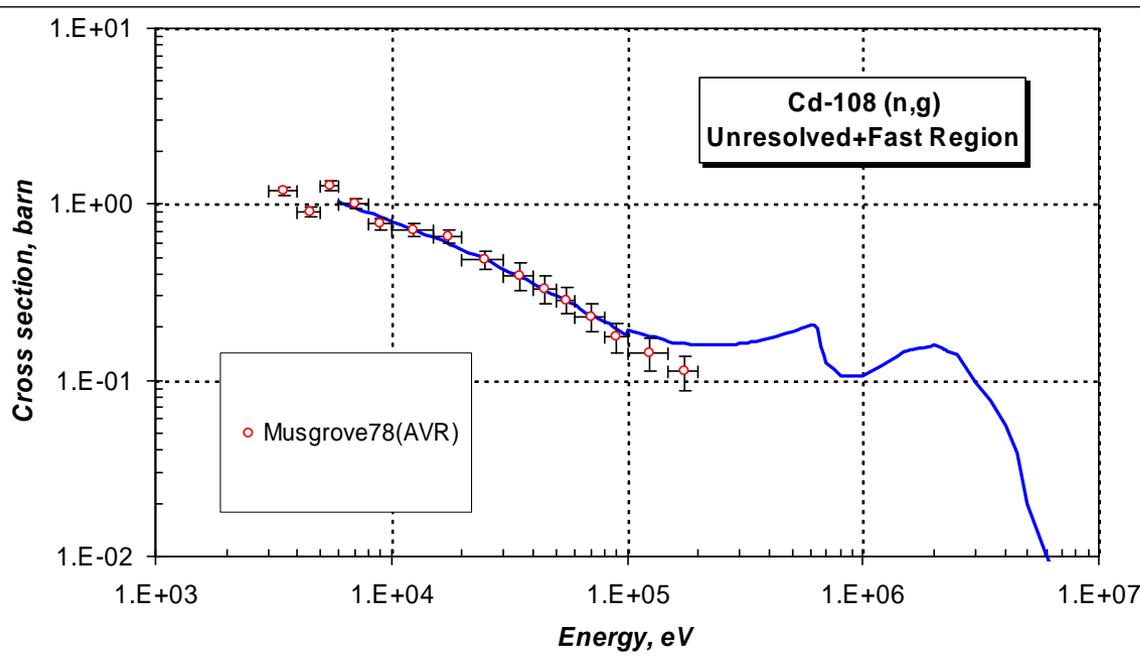
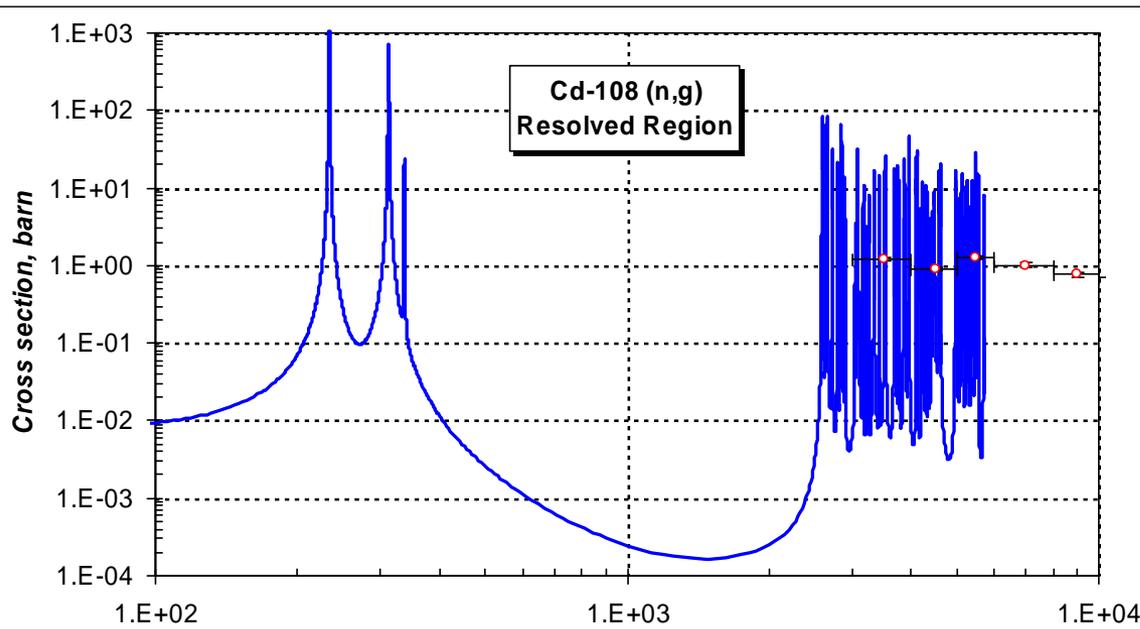


# Experimental data for the Y-89(n,gam) reaction in comparison with evaluations



# Recent evaluations of the neutron capture cross sections for Cd-113 compared with experimental data



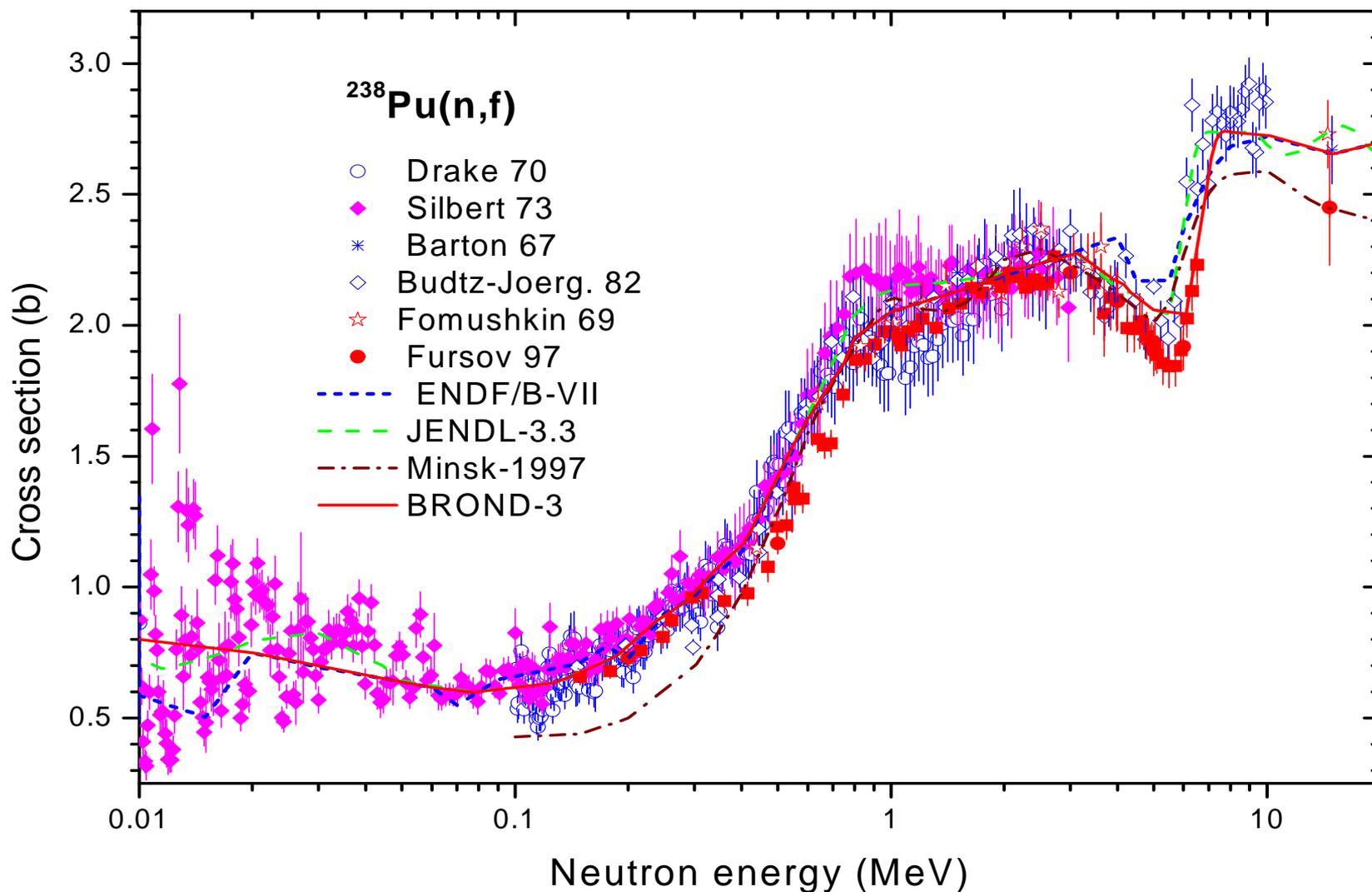


The ENDF/ B-VII evaluation of the neutron capture cross section for Cd-108 compared with the experimental data ( $D_0=120\pm 30$  eV). A similar gap of resonances is available for the Cd-106 evaluations too.

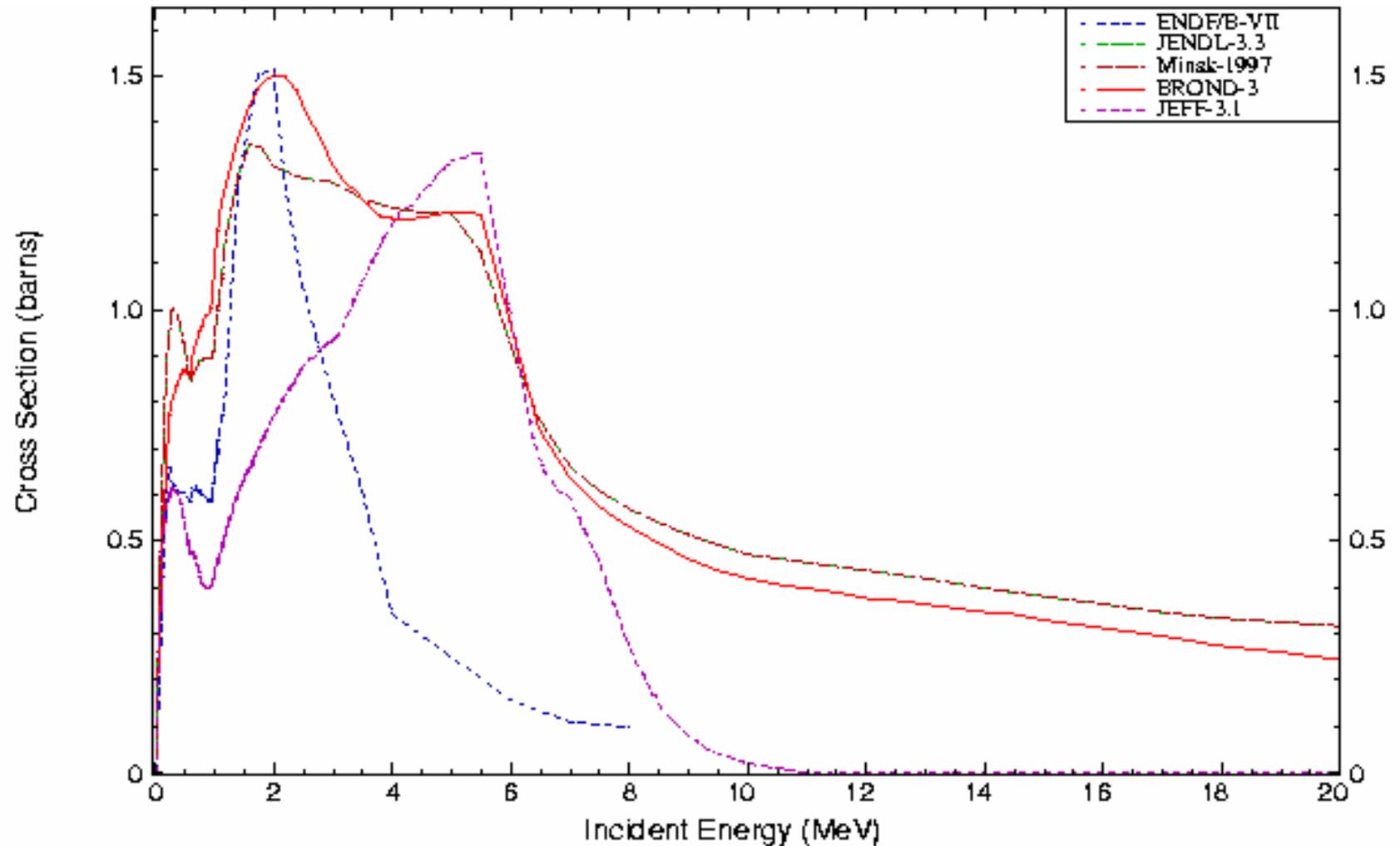
The above nuclides have very low priority. So, some shortcomings of their evaluations are negligible for most of practical applications. But for the special tasks they could be dangerous.



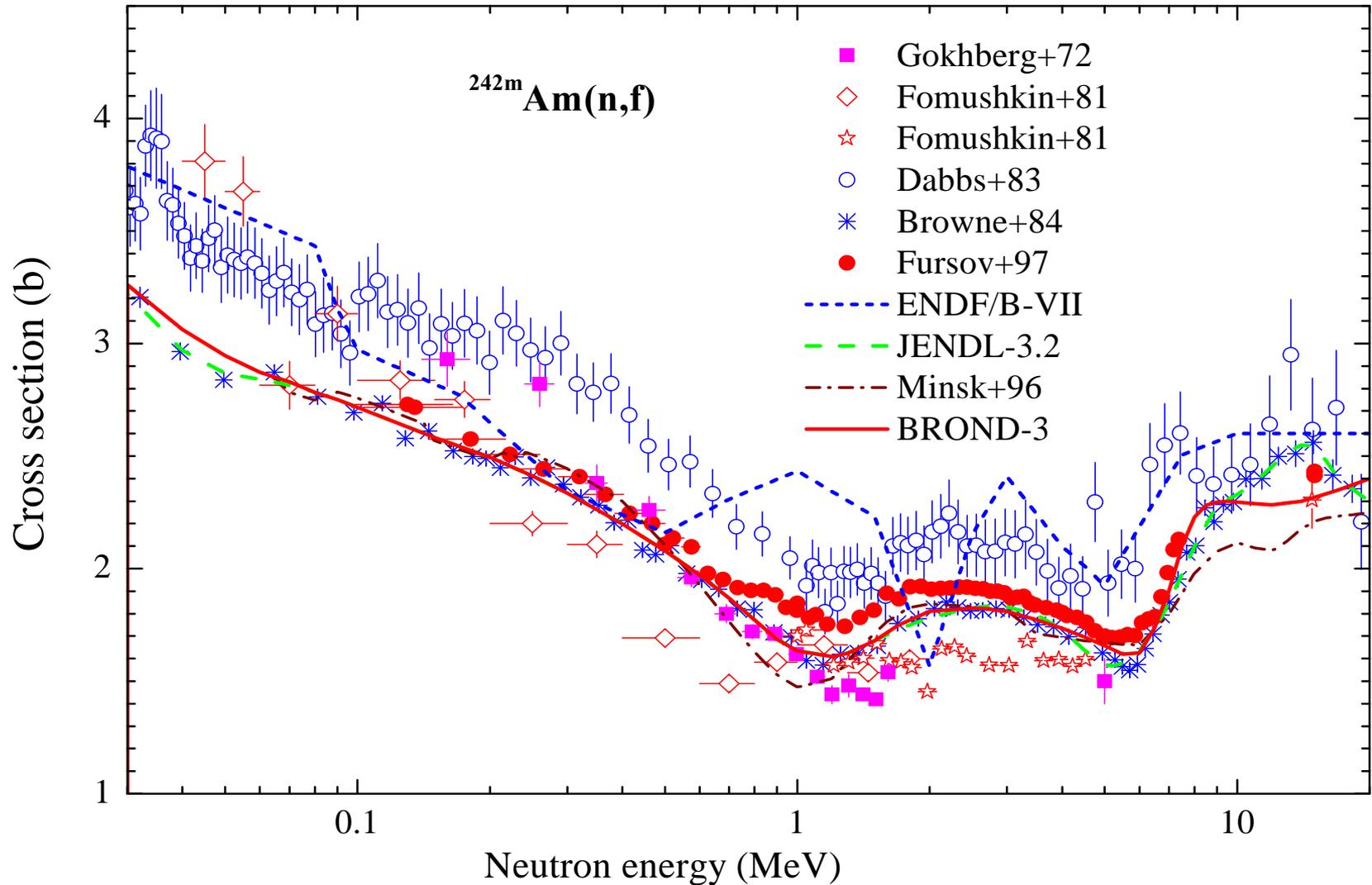
# Experimental data on the fission cross section for Pu-238 compared with various evaluations



# Comparison of the inelastic scattering cross section evaluations for Pu-238

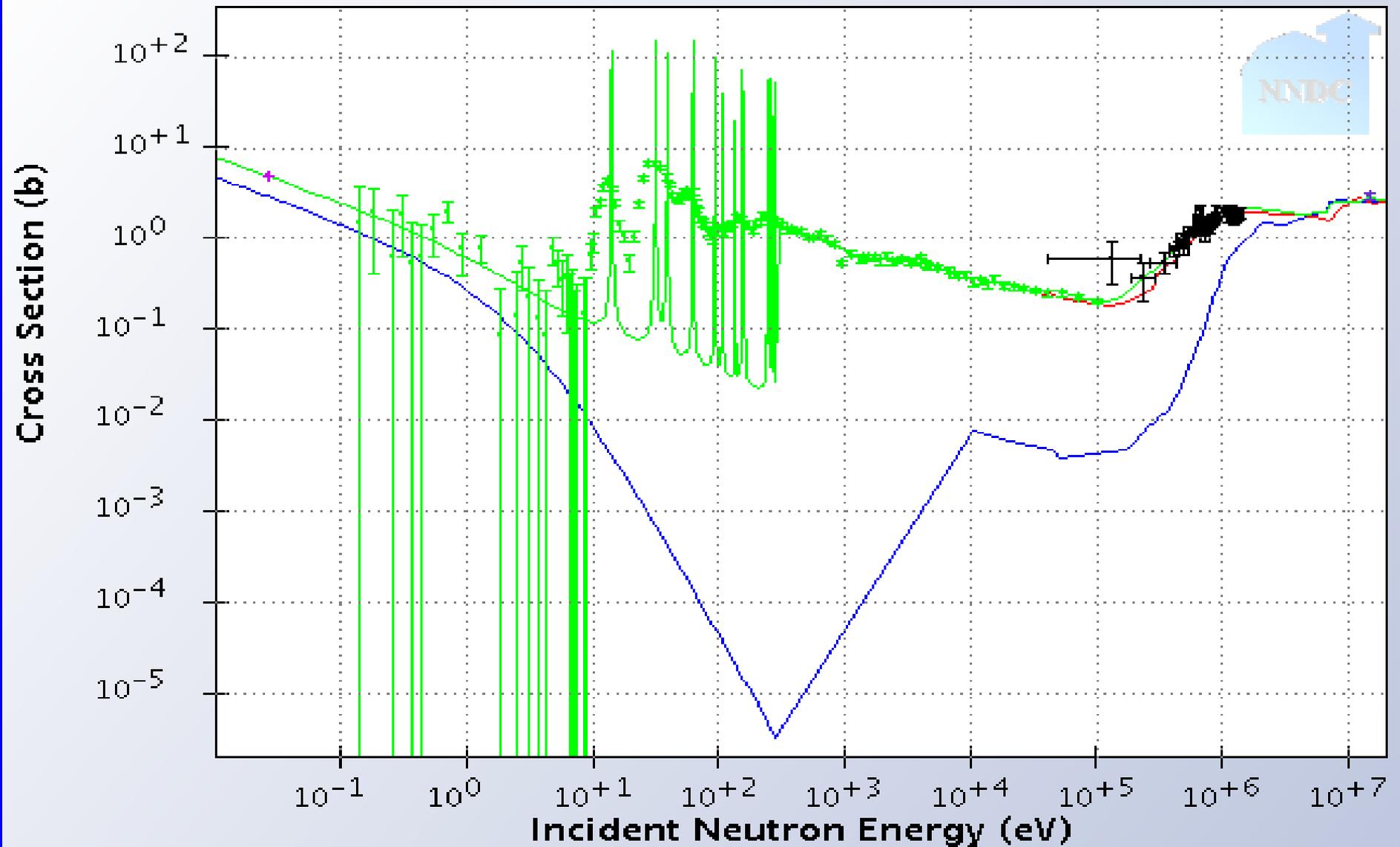


# Experimental data on the fission cross section for Am-242m compared with various evaluations

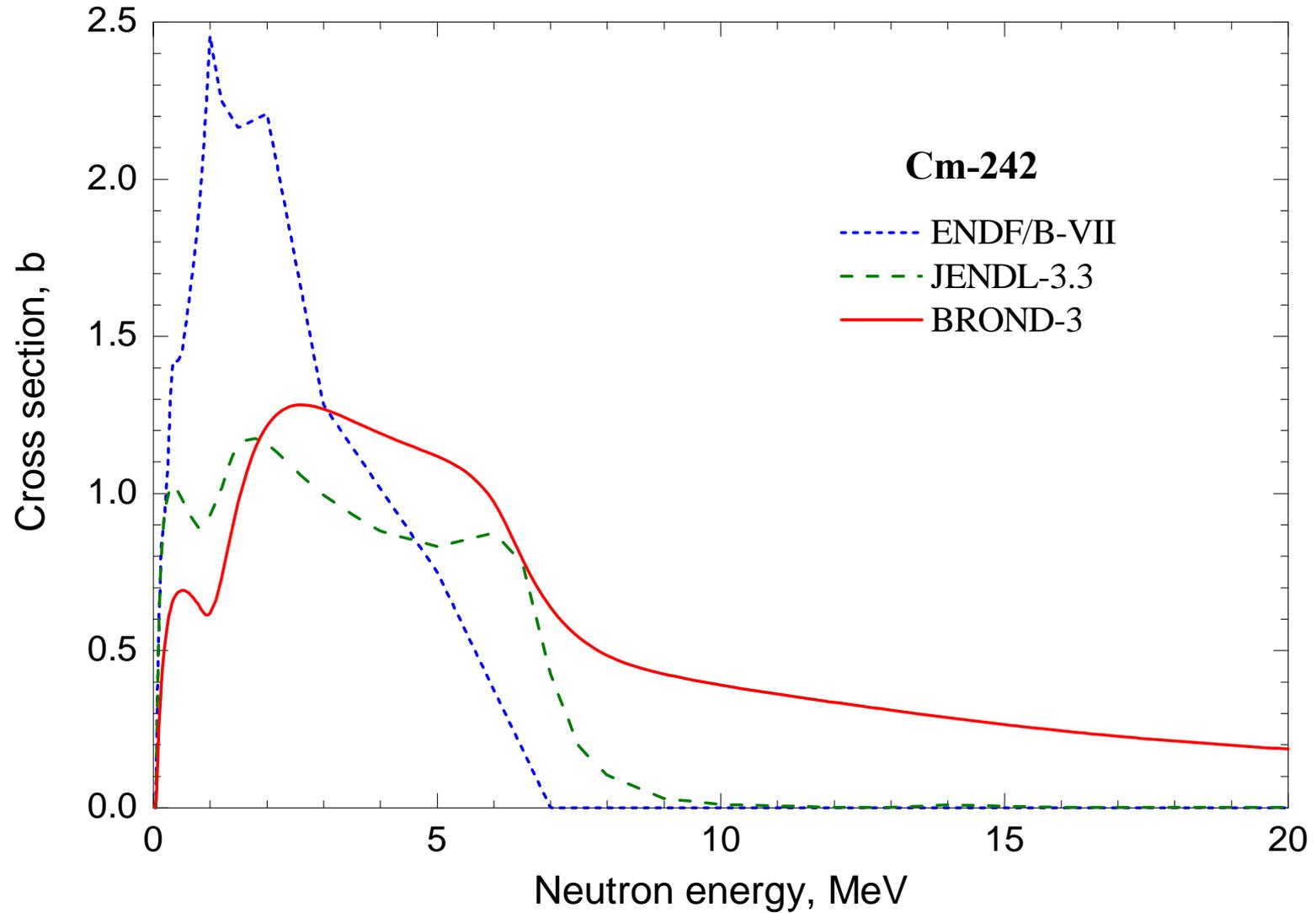


# Comparison of evaluations for Cm-242

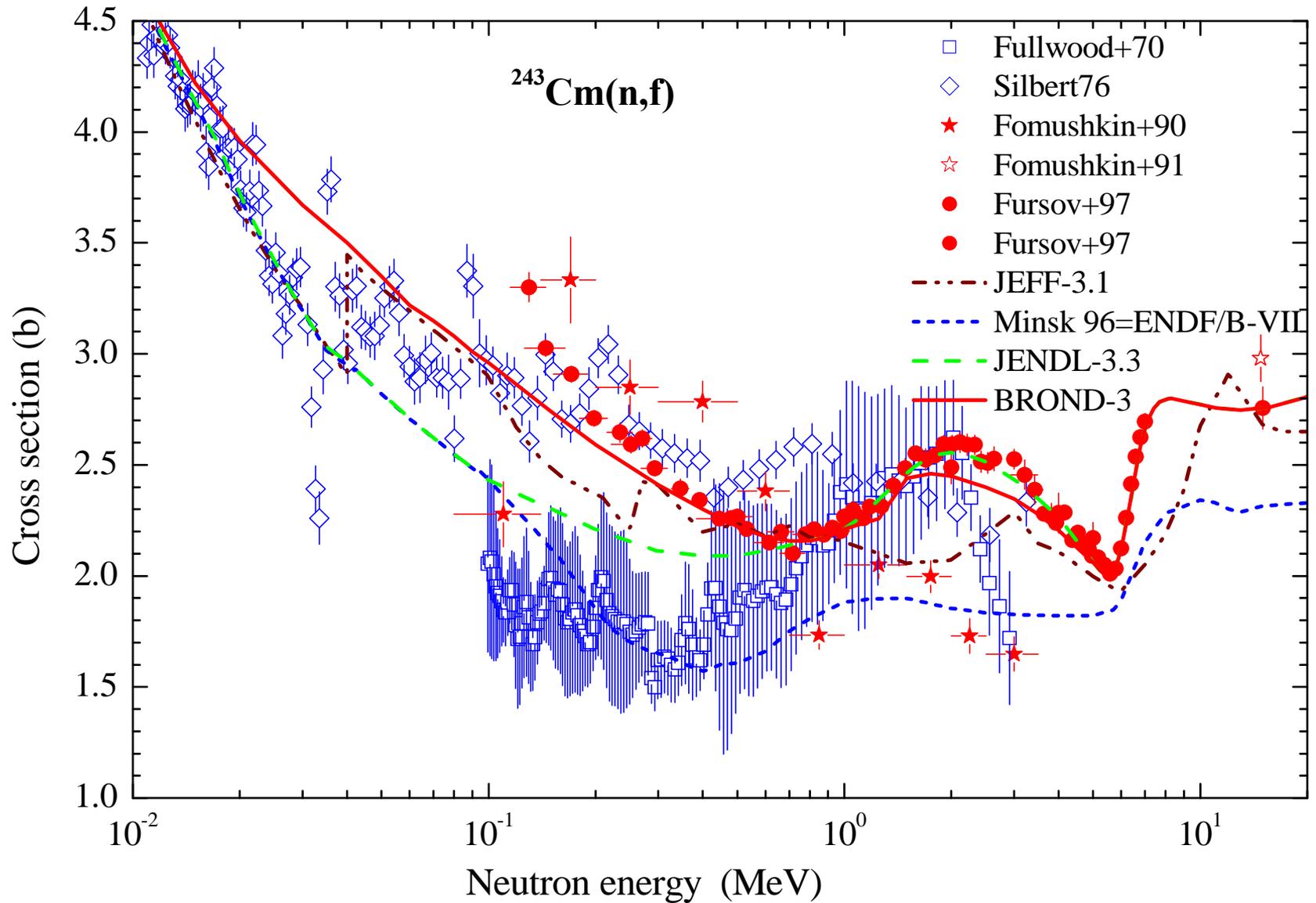
96-Cm-242(n,total fission)



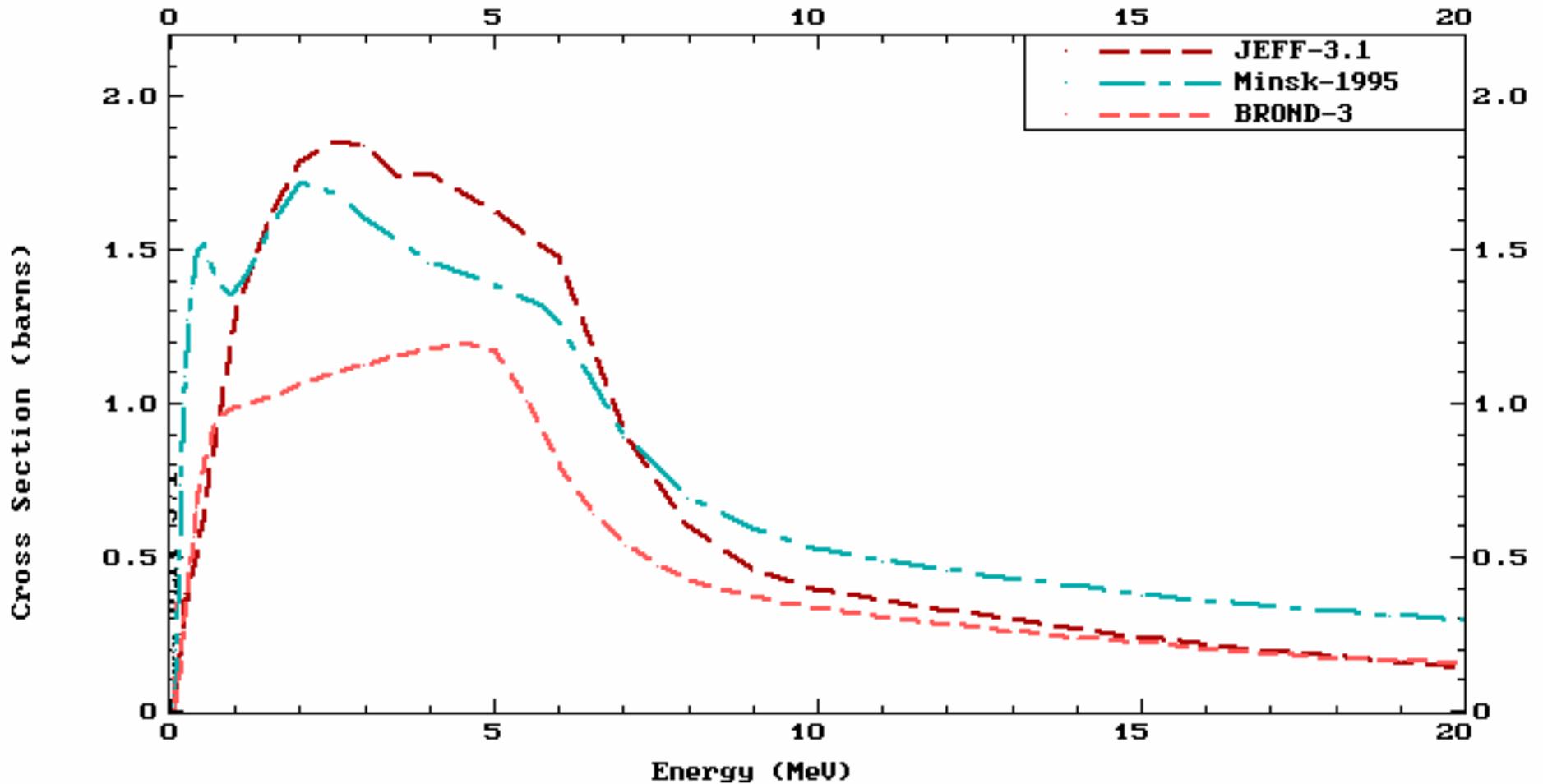
# Comparison of the inelastic scattering cross section evaluations for Cm-242



# Experimental data on the fission cross section for Cm-243 compared with various evaluations



# Comparison of the inelastic scattering cross section evaluations for Cm-243 (ENDF/B-VII=Minsk-1995)



# Conclusions

- The inelastic scattering and (n,2n) cross sections should be updated for the high-priority fission products evaluations which were accepted from JENDL-3.3 or JEFF-3.1 files;
- Capture cross-section evaluations should be corrected for some fission products on the missing of p-wave and d-wave resonances near the upper boundary of the resolved resonance region;
- For the main fissile nuclei there is a reasonable agreement between the uncertainties of recent evaluations for the fission cross-sections and the fission-neutron multiplicities;
- Some of the above recommendations were taken into account in the recent BROND-3 evaluations, but a more systematic analysis of remaining nuclides is still needed.