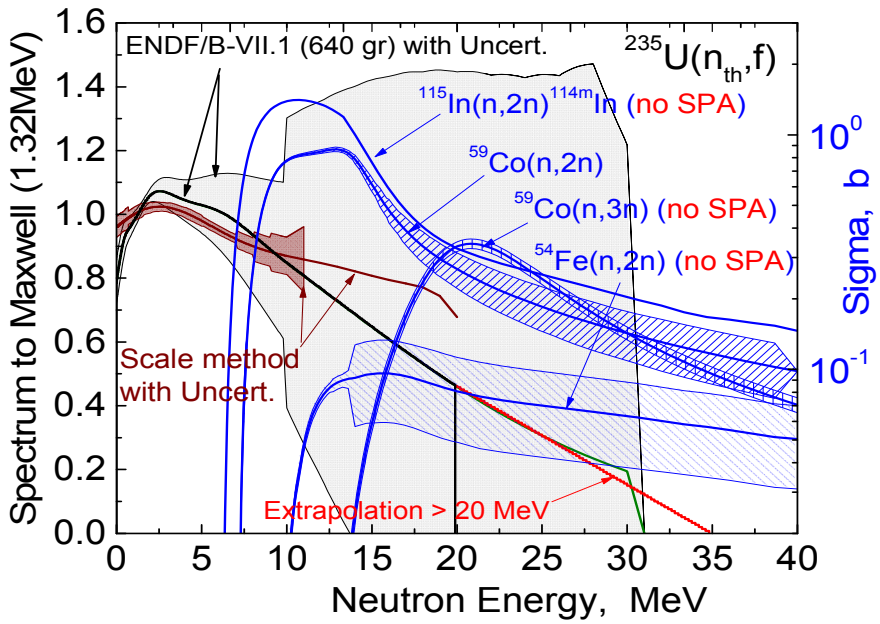
Date Aug 2013 - Sep 2014

Comparison of the U-235(nth,f) spectrum averaged cross sections calculated by MCNP5 and RR_UNC employing IRDFF v.1-03

Large differences (> 4%) for the high threshold reactions are caused by the different representation of 235U(nth,f) spectrum above 20 MeV in the Monte Carlo (extrapolated above 20 MeV) and RR_UNC (cut out at 20 MeV) calculations

Such comparison just helps to see which reactions are sensitive to the 235U(nth,f) neutrons with energies above 20 MeV



NN	Isotope	MAT	ZAID	MT (ACE file)	Reaction	Energy (E50%) and Spectrum Averaged Cross Sections (SPA)					Ratio MCNP5/ RR_UNC
						E(50%) MeV	MCNP5(>20MeV) b	Stat.Un	Stat.Un. %	E(50%) MeV	RR_UNC(<20MeV) mb	
1	6-Li-6	325	3006	105	(n,α)		3.2293E-01	0.00010	0.010	0.679	3.2318E+02	0.999
2	4-B-00	500	5000	102	(n,γ)		8.1676E-06	0.00010	0.010	0.408	8.1645E-03	1.000
3				103	(n,p)		2.0315E-03	0.00010	0.010	2.951	2.0314E+00	1.000
4				106	(n,He3)		1.4845E-12	0.00020	0.020	19.231	1.0091E-15	1471132.692
5				107	(n,xα)		8.9067E-02	0.00010	0.010	0.920	8.9053E+01	1.000
6	4-B-10	525	5010	107	(n,xα)		4.1259E-01	0.00010	0.010	0.919	4.4730E+02	0.922
7				800	(n,α0)		1.8444E-01	0.00010	0.010	1.839	1.8673E+02	0.988
8				801	(n,α1)		2.2815E-01	0.00010	0.010	0.449	2.6057E+02	0.876
9	9-F-19	925	9019	16	(n,2n)		6.9941E-06	0.00010	0.010	13.761	6.9532E-03	1.006
10	11-Na-23	1125	11023	16	(n,2n)		3.2503E-06	0.00010	0.010	15.181	3.1924E-03	1.018
11				102	(n,γ)		2.7110E-04	0.00030	0.030	0.962	2.7107E-01	1.000
12	12-Mg-24	1225	12024	103	(n,p)		1.5013E-03	0.00010	0.010	8.103	1.5012E+00	1.000
13	13-Al-27	1325	13027	103	(n,p)		3.9553E-03	0.00010	0.010	5.715	3.9557E+00	1.000
14				107	(n,xα)		7.0728E-04	0.00010	0.010	8.433	7.0726E-01	1.000
15	15-P-31	1525	15031	103	(n,p)		2.8360E-02	0.00010	0.010	3.824	2.8361E+01	1.000
16	16-S-32	1625	16032	103	(n,p)		6.8171E-02	0.00010	0.010	3.969	6.8172E+01	1.000
17	21-Sc-45	2125	21045	102	(n,γ)		4.9123E-03	0.00010	0.010	0.591	4.9116E+00	1.000
18	22-Ti-46	2225	22046	16	(n,2n)		4.3809E-06	0.00010	0.010	15.810	4.2503E-03	1.031
19				103	(n,p)		1.1424E-02	0.00010	0.010	5.888	1.1426E+01	1.000
20	22-Ti-47	2228	22047	103	(n,p)		1.8137E-02	0.00010	0.010	3.646	1.8137E+01	1.000
21				10005	(n,x)Sc46		7.8597E-06	0.00010	0.010	14.565	7.7292E-03	1.017
22	22-Ti-48	2231	22048	103	(n,p)		3.0166E-04	0.00010	0.010	8.064	3.0165E-01	1.000
23				10005	(n,x)Sc47		1.6517E-06	0.00010	0.010	15.450	1.5761E-03	1.048
24	22-Ti-49	2234	22049	10005	(n,x)Sc48		1.0007E-06	0.00010	0.010	15.556	9.5566E-04	1.047
25	23-V-51	2328	23051	107	(n,xα)		2.3946E-05	0.00010	0.010	9.633	2.3938E-02	1.000
26	24-Cr-52	2431	24052	16	(n,2n)		3.9092E-05	0.00010	0.010	14.482	3.8755E-02	1.009
27	25-Mn-55	2525	25055	16	(n,2n)		1.9501E-04	0.00010	0.010	12.885	1.9459E-01	1.002
28				102	(n,γ)		2.8197E-03	0.00010	0.010	0.771	2.8192E+00	1.000
29	26-Fe-54	2625	26054	16	(n,2n)		1.2203E-06	0.00010	0.010	16.271	1.1716E-03	1.042
30				103	(n,p)		7.8249E-02	0.00010	0.010	4.303	7.8253E+01	1.000
31				107	(n,xα)		8.4198E-04	0.00010	0.010	7.199	8.4202E-01	1.000
32	26-Fe-56	2631	26056	103	(n,p)		1.0941E-03	0.00010	0.010	7.349	1.0941E+00	1.000
33	26-Fe-58	2637	26058	102	(n,γ)		2.0227E-03	0.00020	0.020	0.740	2.0221E+00	1.000

NN	Isotope	MAT	ZAID	MT (ACE file)	Reaction	Energy (E50%) and Spectrum Averaged Cross Sections (SPA)					Ratio
						E(50%) MeV	MCNP5(>20MeV) b	Stat.Un	Stat.Un. %	E(50%) MeV	RR_UNC(<20MeV) mb	MCNP5/ RR_UNC
34	**27-Co-59**	2725	27059	16	(n,2n)		**1.9105E-04**	0.00010	0.010	12.876	**1.9066E-01**	**1.002**
35				17	**(n,3n)**		**1.9282E-08**	0.00010	0.010	**19.828**	**8.0755E-07**	**23.877**
36				102	(n,γ)		**4.9083E-03**	0.00010	0.010	0.914	**4.9073E+00**	**1.000**
37				103	(n,p)		**1.4162E-03**	0.00010	0.010	5.727	**1.4163E+00**	**1.000**
38				107	(n,xα)		**1.5692E-04**	0.00010	0.010	8.091	**1.5692E-01**	**1.000**
39	**28-Ni-58**	27825	28058	16	(n,2n)		**3.3697E-06**	0.00010	0.010	14.735	**3.3260E-03**	**1.013**
40				103	(n,p)		**1.0737E-01**	0.00010	0.010	4.057	**1.0737E+02**	**1.000**
41	**28-Ni-60**	2831	28060	103	(n,p)		**2.1725E-03**	0.00010	0.010	6.817	**2.1727E+00**	**1.000**
42	**29-Cu-63**	2925	29063	16	(n,2n)		**8.6714E-05**	0.00010	0.010	13.599	**8.6343E-02**	**1.004**
43				102	(n,γ)		**1.0476E-02**	0.00010	0.010	0.968	**1.0473E+01**	**1.000**
44				107	(n,xα)		**5.3050E-04**	0.00010	0.010	7.019	**5.3054E-01**	**1.000**
45	**29-Cu-65**	2931	29065	16	(n,2n)		**3.1837E-04**	0.00010	0.010	12.459	**3.1794E-01**	**1.001**
46	**30-Zn-64**	3025	30064	103	(n,p)		**3.8898E-02**	0.00010	0.010	4.042	**3.8899E+01**	**1.000**
47	**30-Zn-67**	3034	30067	103	(n,p)		**9.7382E-04**	0.00010	0.010	4.434	**9.7383E-01**	**1.000**
48	**33-As-75**	3325	33075	16	(n,2n)		**2.9538E-04**	0.00010	0.010	12.702	**2.9486E-01**	**1.002**
49	**39-Y-89**	3925	39089	16	(n,2n)Y88		**1.4986E-04**	0.00010	0.010	13.689	**1.4922E-01**	**1.004**
50	**40-Zr-90**	4025	40090	16	(n,2n)Zr89		**8.9602E-05**	0.00010	0.010	14.199	**8.8972E-02**	**1.007**
51	**41-Nb-93**	4125	41093	102	(n,γ)Nb-94		**2.4509E-02**	0.00010	0.010	0.667	**2.4503E+01**	**1.000**
52				11004	(n,n')Nb-93m		**1.4348E-01**	0.00010	0.010	2.592	**1.4346E+02**	**1.000**
53				11016	(n,2n)Nb-92m		**4.3543E-04**	0.00010	0.010	11.142	**4.3526E-01**	**1.000**
54				10102	(n,γ)Nb-94g		**6.1208E-03**	0.00010	0.010	0.667	**6.1192E+00**	**1.000**
55				11102	(n,γ)Nb-94m		**0.0000E+00**	0.00000	0.000	0.667	**1.8384E+01**	**0.000**
56	**42-Mo-92**	4225	42092	11103	(n,p)Nb92m		**6.7329E-03**	0.00010	0.010	5.215	**6.7335E+00**	**1.000**
57	**45-Rh-103**	4525	45103	11004	(n,n')Rh103m		**7.1561E-01**	0.00010	0.010	2.282	**7.1551E+02**	**1.000**
58	**47-Ag-109**	4731	47109	12102	(n,γ)Ag109m		**9.4840E-03**	0.00010	0.010	0.750	**9.4818E+00**	**1.000**
59	**48-Cd-0**	4800	48000	102	(n,γ)		**6.2786E-02**	0.00010	0.010	1.004	**6.2772E+01**	**1.000**
60				103	(n,p)		**3.8155E-05**	0.00010	0.010	6.439	**3.8136E-02**	**1.000**
61				104	**(n,d)**		**1.5555E-07**	0.00010	0.010	**15.169**	**1.4820E-04**	**1.050**
62				105	**(n,α)**		**1.1451E-08**	0.00010	0.010	**15.931**	**9.7706E-06**	**1.172**
63				106	**(n,He3)**		**4.6747E-11**	0.00010	0.010	**18.650**	**7.1470E-09**	**6.541**
64				107	(n,xα)		**7.8817E-05**	0.00010	0.010	4.773	**7.8820E-02**	**1.000**
65	**49-In-113**	4925	49113	11004	(n,n')In113m		**1.5508E-01**	0.00010	0.010	2.650	**1.5507E+02**	**1.000**
66	**49-In-115**	4931	49115	102	(n,γ)In-115		**1.5643E-01**	0.00010	0.010	1.113	**1.5639E+02**	**1.000**
67				11004	(n,n')In-115m		**1.8723E-01**	0.00010	0.010	2.589	**1.8721E+02**	**1.000**
68				11016	(n,2n)In-114m		**8.6135E-04**	0.00010	0.010	11.600	**8.6079E-01**	**1.001**
69				10102	(n,γ)In-116g		**3.0164E-02**	0.00010	0.010	1.056	**3.0157E+01**	**1.000**
70				12102	(n,γ)In-116m		**0.0000E+00**	0.00000	0.000	1.126	**1.2623E+02**	**0.000**
71	**53-I-127**	5325	53127	16	(n,2n)		**1.1324E-03**	0.00010	0.010	11.386	**1.1318E+00**	**1.000**
72	**57-La-139**	5728	57139	102	(n,γ)		**6.7162E-03**	0.00010	0.010	1.296	**6.7148E+00**	**1.000**
73	**59-Pr-141**	5925	59141	16	(n,2n)		**1.0437E-03**	0.00010	0.010	11.648	**1.0430E+00**	**1.001**
74	**64-Gd-0**	6400	64000	102	(n,γ)		**9.2764E-02**	0.00010	0.010	0.817	**9.2742E+01**	**1.000**
75	**69-Tm-169**	6925	69169	16	(n,2n)		**3.7436E-03**	0.00010	0.010	10.226	**3.7430E+00**	**1.000**
76				17	**(n,3n)**		**4.0682E-06**	0.00010	0.010	**17.905**	**3.3847E-03**	**1.202**
77	**73-Ta-181**	7328	73181	102	(n,γ)		**8.4484E-02**	0.00010	0.010	0.840	**8.4465E+01**	**1.000**
78	**74-W-186**	7443	74186	102	(n,γ)		**3.3295E-02**	0.00010	0.010	1.033	**3.3287E+01**	**1.000**
79	**79-Au-197**	7925	79197	16	(n,2n)		**3.2606E-03**	0.00010	0.010	10.343	**3.2600E+00**	**1.000**
80				102	(n,γ)		**7.5650E-02**	0.00010	0.010	0.745	**7.5635E+01**	**1.000**
81	**80-Hg-199**	8034	80199	11004	(n,n')Hg199m		**2.8558E-01**	0.00010	0.010	2.970	**2.8557E+02**	**1.000**
82	**82-Pb-204**	8225	82204	11004	(n,n')Pb204m		**1.7757E-02**	0.00010	0.010	4.863	**1.7759E+01**	**1.000**
83	**83-Bi-209**	8325	83209	17	**(n,3n)**		**5.4108E-06**	0.00010	0.010	**17.597**	**4.6094E-03**	**1.174**
84	**90-Th-232**	9040	90232	18	(n,f)		**7.5859E-02**	0.00010	0.010	2.860	**7.5856E+01**	**1.000**
85				102	(n,γ)		**9.3262E-02**	0.00010	0.010	0.920	**9.3238E+01**	**1.000**
86	**92-U-235**	9228	92235	18	(n,f)		**1.2226E+00**	0.00010	0.010	1.659	**1.2224E+03**	**1.000**
87				102	(n,γ)		**9.1664E-02**	0.00010	0.010	0.754	**9.1644E+01**	**1.000**
88	**92-U-238**	9237	92238	16	(n,2n)		**1.4711E-02**	0.00010	0.010	8.136	**1.4711E+01**	**1.000**
89				18	(n,f)		**3.0917E-01**	0.00010	0.010	2.668	**3.0915E+02**	**1.000**
90				102	(n,γ)		**6.9012E-02**	0.00010	0.010	0.929	**6.8994E+01**	**1.000**
91	**93-Np-237**	9346	93237	18	(n,f)		**1.3559E+00**	0.00010	0.010	1.984	**1.3557E+03**	**1.000**
92	**94-Pu-239**	9437	94239	18	(n,f)		**1.7957E+00**	0.00010	0.010	1.727	**1.7954E+03**	**1.000**
93	**95-Am-241**	9543	95241	18	(n,f)		**1.3873E+00**	0.00010	0.010	2.151	**1.3871E+03**	**1.000**