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Comparison between EMPIRE and TENDL

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Comparison between EMPIRE and TENDL

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Abstract

This note is a review of the proposed TENDL-2015 additions to the ENDF/B-VIII.0 library and additions/modifications that would be needed to be made to the library to make these additions usable.

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8.77	^{155}Dy (EMPIRE only)	165			
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8.84	^{175}Yb	179			
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8.87	^{185}W	185			
8.88	^{186m}Re	187			
8.89	^{185}Os	189			
8.90	^{191}Os	191			
8.91	^{192}Ir	193			
8.92	^{194m}Ir	195			
8.93	^{193}Pt	197			
8.94	^{197}Hg (EMPIRE only)	199			
8.95	^{197m}Hg (EMPIRE only)	201			
8.96	^{203}Hg	203			
8.97	^{204}Tl	205			
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8.99	^{210m}Bi	209			
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1 Introduction

At the May 2017 mini-CSEWG meeting held at Los Alamos National Laboratory, D. Rochman (PSI, Switzerland), A. Koning (IAEA) and J.-C. Sublet (NNL, UK) offered roughly 50 TENDL-2015 evaluations for inclusion in the upcoming ENDF/B-VIII.0 release [1]. It was noted that ENDF/B-VIII already contains some short/long-lived isotopes (mainly coming from JENDL). The proposed 48 short/long-lived isotopes and 3 stables (Ne) from TENDL-2015 (not in ENDF/B-VIII, not in JENDL) would not affect criticality benchmarks. See Figure 1.

The Cross Section Evaluation Working Group (CSEWG) decided to review these evaluations and determine whether they are adequate for ENDF use. The review was tasked to BNL owing to their access to the EMPIRE [2] reaction code and the ADVANCE quality assurance system [3].

The main criterion for including these isotopes was that each one has a half-life ≥ 1 day. After consultation with the Nuclear Wallet Cards [4], it was determined that the authors of [1] had overlooked several isotopes with half-life ≥ 1 day. Furthermore, many of the isotopes considered for addition are more than one unit off stability, leaving gaps between isotopes. These gaps prevent modeling the creation of the added isotopes through successive neutron capture. Given this, it was necessary to extend the number of isotopes under consideration.

In this brief report, we first summarize both the TALYS calculations that led to the TENDL-2015 isotopes and the EMPIRE generated evaluations for comparison. In this discussion, we detail some of the file assembly issues encountered. Following this, we summarize some of the physics differences between the sets of evaluations. Before concluding with the list of recommendations in Table 1, we summarize the results of validation with the ADVANCE quality assurance system. This report ends with plots of all relevant cross sections of all the evaluations under consideration.

2 TALYS Calculations

All TALYS calculations for the present TENDL-2015 evaluations were performed up to 200 MeV, in

default mode. The thermal (n,γ) cross section was adjusted to match data (if available) or systematics. If no RRR measurements were available, a set of statistical resonances in the RRR were generated, consistent with the TALYS fast range calculation.

2.1 TENDL formatting problems

Two problems with the TENDL formatting were noted:

- For the excited-target scattering TENDL normally cuts the “super inelastic” cross section off abruptly at lower energies, even though those correspond to zero-threshold processes.
- Sometimes the total inelastic is “jaggy”, but it may be OK.

3 EMPIRE Calculations

A default input for EMPIRE was adopted as basis for the calculations, consisting of EGSM level densities, MLO gamma strength functions and levels from RIPL-3, width-fluctuation correction up to 3 MeV. Direct-reaction mechanism described through couple channels, except for reactions with excited targets in incident channel in which case a spherical model is assumed. For both situations, the optical-model potential adopted was the one of Koning-Delaroche. For excited-target scattering, whenever there were levels of unknown spin between the ground and isomer states, a random choice was made among the recommended values to allow population. Preequilibrium calculated through PCROSS, with mean free path of 1.5fm. Unknown fission barriers for even or odd number of neutrons were assumed to be the same as the ones for the next neighbouring nucleus with known barriers and even or odd number of neutrons, respectively, and same atomic mass.

3.1 EMPIRE calculation issues

Since EMPIRE does not automatically create many resonances, the fast region calculations must be extended to very low incident energies in order to compute the average cross sections. In many cases, the lower cut-off needs to be adjusted.

Figure 1: Summary of evaluations proposed for inclusion in ENDF/B-VIII from TENDL-2015.

4 ENDF-6 format problems

Superelastic Q-value in the ENDF-6 format is unclear so therefore ENDF, TENDL and EMPIRE each do it differently.

5 Physics differences

There are several physics differences between the EMPIRE based evaluations and those in TENDL-2015. We summarize them here:

- Since EMPIRE does proper deformed coupled-channel calculations, it obtains better and more reliable cross sections for the well-deformed rare-earth nuclei.
- Both codes make different choices of levels to couple in coupled-channel calculations.
- The resonance treatment from TENDL leads to more realistic-looking resonance region. However, such resonances are actually experimentally unknown and may give the wrong impression that they correspond to actual resonances and that we know something we don't actually know.
- The resonances from TENDL are extrapolated from fast region and therefore are 3 to 4 orders of magnitude too high.
- TENDL gets the 1 mb capture cross section at 14 MeV always right while the EMPIRE preliminary calculations have not yet been tuned to get this right.

6 Validation

ADVANCE is the ENDF/B library continuous integration system. ADVANCE automatically runs each changed evaluation through a battery of tests include the NNDC checking codes and attempts to process the files with FUDGE, PREPRO and NJOY2016. Additionally ADVANCE generates overview plots and comparisons of integral metrics with data in EXFOR, Kadonis and the Atlas. Each

file considered in this project was sent through the ADVANCE tests and summarized in Table 1.

7 Conclusion

Recommended evaluations were uploaded to the ENDF/B-VIII project Aug. 2017.

References

- [1] D. Rochman, A.J. Koning. and J.C. Sublet, "Proposal of 51 isotopes for ENDF/B-VIII", Mini CSWEG meeting, May 4-5, 2017, presented by R. Capote.
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- [3] ADVANCE <http://www.nndc.bnl.gov/endl/b7.dev/qa/index.html>
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Table 1: This table summarizes the evaluations and recommends actions. The recommendation column vales are: Empire - accept Empire; $\leq$ EMPIRE - accept Empire after rerun; TENDL - accept TENDL; The Atlas column values are: T - thermal capture; xR - x resonances available; RI - resonance integral; IG - gamma integral

Z	sym	A	m	iso	source	$T_{1/2}$	Fast cut-off (MeV)	Action	Atlas	Recommendation	Comments	ADVANCE comments on EMPIRE version	ADVANCE comments on TENDL version	Further comments
4	Be	8		Be8	missing	5.57 eV 25		S	none		No one cares	SKIP	SKIP	
10	Ne	20	0	Ne20	TENDL	stable		T	Full set	TENDL (convenience)	EMPIRE capture suspiciously high, other fast similar; EMPIRE fast should start 1 MeV	STAN, FUDGE, NJOY Failures	OK	
10	Ne	21	0	Ne21	TENDL	stable		T	Full set	TENDL (convenience)	EMPIRE capture suspiciously high, other fast similar; EMPIRE fast should start 1 MeV	OK	OK	
10	Ne	22	0	Ne22	TENDL	stable		T	Full set	TENDL (convenience)	EMPIRE capture suspiciously high, other fast similar; EMPIRE fast should start 1 MeV	STAN, FUDGE, NJOY Failures	OK	
13	Al	26	1	Al26m1	TENDL	6.3460 s 8	0.1 MeV	E	none	$\leq$ Empire, cap & 14 MeV	Fast region equivalent; TENDL RRR better; TENDL cuts off (n,incl) low energy part too soon	Isomeric confusion	Isomeric confusion	
14	Si	31		Si31	missing	157.36 m 26	0.1 MeV	E	T=73(6) mb	$\leq$ Empire		OK	MISSING	
14	Si	32	0	Si32	TENDL	153 y 19	1 MeV	E	T<0.5 mb	$\leq$ Empire	EMPIRE capture considerably higher, other fast comparable; EMPIRE fast should start 1 MeV	OK	OK	
16	S	35	0	S35	TENDL	87.37 d 4	0.1 MeV	E	none	$\leq$ Empire	EMPIRE capture considerably higher, other fast comparable; EMPIRE fast should start 0.1 MeV	OK	Missing distribution	
17	Cl	36	0	Cl36	TENDL	3.01e+5 y 2	0.01 MeV	E	T<10 b, 8R	$\leq$ Empire	Fast region about equivalent; TENDL RRR suspicious (thermal region too high)	OK	Missing distribution	
18	Ar	37	0	Ar37	TENDL	35.04 d 4		T	Full set (4R)	TENDL (convenience)	Fast region equivalent, TENDL RRR better	OK	Missing distribution	
18	Ar	39		Ar39	missing	269 y 3	0.1 MeV	E	T=600(300) b	$\leq$ Empire	Should have been on TENDL list	OK	MISSING	
18	Ar	41	0	Ar41	TENDL	109.61 m 4		T	T=0.5(0.1) b	TENDL	Fast region equivalent; TENDL RRR better; EMPIRE has inelastic "horn"	OK	Missing distribution	

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Z	sym	A	m	iso	source	$T_{1/2}$	Fast cut-off (MeV)	Action	Atlas	Recommendation	Comments	ADVANCE comments on EMPIRE version	ADVANCE comments on TENDL version	Further comments
20	Ca	41		Ca41	missing	9.94e4 y 15	0.1 MeV	E	T=4 b	$\leq$ Empire	Should have been on TENDL list	OK	MISSING	
20	Ca	45	0	Ca45	TENDL	162.61 d 9		T	T=15 b	TENDL	Fast region equivalent, TENDL RRR better but Empire could be adjusted (0.1 MeV); EMPIRE has inelastic "horn"	OK	Missing distribution	
20	Ca	47	0	Ca47	TENDL	4.536 d 3		T	none	TENDL (convenience)	TENDL has more collectivity in fast inelastic; TENDL RRR better though EMPIRE could be adjusted	OK	Missing distribution	
23	V	49	0	V49	TENDL	330 d 15	0.01 MeV	E	none	$\leq$ Empire	Fast region equivalent, TENDL RRR better but Empire can be adjusted (0.01 MeV);	OK	Missing distribution	
24	Cr	51	0	Cr51	TENDL	27.7025 d 24		T	none	TENDL (convenience)	Fast region equivalent, TENDL RRR better but Empire could be adjusted (0.01 MeV)	OK	Missing distribution	
25	Mn	54	0	Mn54	TENDL	312.20 d 20		T	T=38 b, IG=17 b	TENDL (convenience)	Fast region about equivalent but TENDL inelastic irregular	Points out of order	Missing distribution	
26	Fe	55	0	Fe55	TENDL	2.744 y 9		T	none	TENDL (convenience)	Fast region equivalent, TENDL RRR better but Empire could be adjusted (0.01 MeV)	OK	OK	
28	Ni	63	0	Ni63	TENDL	101.2 y 15	0.1 MeV	E	T=24.3(3.0) b	$\leq$ Empire, (cap. & 14 MeV?)	Fast region equivalent, TENDL RRR better but Empire can be adjusted (0.1 MeV)	OK	Missing distribution	
29	Cu	64		Cu64	missing	12.701 h 2	0.01 MeV	E	T=270(170) b	$\leq$ Empire		OK	MISSING	
30	Zn	69		Zn69	missing	56.4 m 9	0.01 MeV	E	none	$\leq$ Empire		OK	MISSING	
31	Ga	70		Ga70	missing	21.14 m 3	OK	E	none	Empire		OK	MISSING	
32	Ge	71	0	Ge71	TENDL	11.43 d 3		E	none	Empire	Fast region equivalent, TENDL RRR better	OK	NJOY took 15 hrs; Missing distribution	
32	Ge	75		Ge75	missing	82.78 m 4	OK	E	none	Empire		OK	MISSING	

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Z	sym	A	m	iso	source	$T_{1/2}$	Fast cut-off (MeV)	Action	Atlas	Recommendation	Comments	ADVANCE comments on EMPIRE version	ADVANCE comments on TENDL version	Further comments
34	Se	75	0	Se75	TENDL	119.78 d 5		T	none	TENDL (conv-nience)	EMPIRE fast has more collectivity; TENDL RRR better	Elas. xs <0	Missing distribution	
34	Se	81		Se81	missing	18.45 m 12	OK	E	none	Empire		OK	MISSING	
35	Br	80		Br80	missing	17.68 m 2	0.0001 MeV	E	none	$\leq$ Empire		OK	MISSING	
36	Kr	79		Kr79	missing	35.04 h 10	0.0001 MeV	E	none	$\leq$ Empire		OK	MISSING	
36	Kr	81	0	Kr81	TENDL	2.29e+5 y 11		T	none	TENDL (conv-nience)	TO BE SOLVED - TENDL and Empire differ in interpretation of MT=4 to the ground state (elastic!)	Elas. xs <0	Missing distribution	
38	Sr	85		Sr85	missing	64.849 d 7	0.0001 MeV	E	none	$\leq$ Empire	Should have been on TENDL list	OK	MISSING	
42	Mo	93	0	Mo93	TENDL	4.0e+3 y 8		T	none	TENDL (conv-nience)	TO BE SOLVED - TENDL and Empire differ in interpretation of MT=4 to the ground state (elastic!)	OK	Missing distribution	
43	Tc	98	0	Tc98	TENDL	4.2e+6 y 3		T	T=0.93(0.2) b	TENDL (conv-nience)	Fast region about equivalent, TENDL RRR better	OK	Missing distribution	
44	Ru	97	0	Ru97	TENDL	2.83 d 23	OK	T	none	TENDL (conv-nience)	Fast region about equivalent but EMPIRE has more collectivity in 2nd inelastic; TENDL RRR looks better but not much	Elas. xs <0	Missing distribution	
45	Rh	104		Rh104	missing	6.114 m 9	0.0001 MeV	E	T=800(100) b	$\leq$ Empire		OK	MISSING	
46	Pd	103	0	Pd103	TENDL	16.991 d 19	0.0001 MeV	E	none	$\leq$ Empire	Fast region differs in collectivity, EMPIRE MT=4 smoother; EMPIRE fast down to 100 eV	OK	Missing distribution	
46	Pd	109		Pd109	missing	13.7012 h 24	0.0001 MeV	E	none	$\leq$ Empire		OK	MISSING	
47	Ag	108		Ag108	missing	2.382 m 11		E3			Plots missing	OK	MISSING	
47	Ag	112		Ag112	missing	?	0.00001 MeV	E	none	$\leq$ Empire	Only here to complete network up to Ag118m1	OK	MISSING	

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Z	sym	A	m	iso	source	$T_{1/2}$	Fast cut-off (MeV)	Action	Atlas	Recommendation	Comments	ADVANCE comments on EMPIRE version	ADVANCE comments on TENDL version	Further comments
47	Ag	113		Ag113	missing	?	0.0001 MeV	E	none	$\leq$ Empire	Only here to complete network up to Ag118m1	OK	MISSING	
47	Ag	114		Ag114	missing	?	0.0001 MeV	E	none	$\leq$ Empire	Only here to complete network up to Ag118m1	OK	MISSING	
47	Ag	115		Ag115	missing	?	0.0001 MeV	E	none	$\leq$ Empire	Only here to complete network up to Ag118m1	OK	MISSING	
47	Ag	116		Ag116	missing	?	0.0001 MeV	E	none	$\leq$ Empire	Only here to complete network up to Ag118m1	OK	MISSING	
47	Ag	117		Ag117	missing	?	0.0001 MeV	E	none	$\leq$ Empire	Only here to complete network up to Ag118m1	OK	MISSING	
47	Ag	118	1	Ag118m1	TENDL	3.76 s 15	0.00001 MeV	E	none	$\leq$ Empire	Why is this one in the TENDL list? Fast region equivalent; TENDL RRR better; TENDL cuts off (n,inel) low energy part too soon	Isomeric confusion	Isomeric confusion	
48	Cd	107		Cd107	missing	6.50 h 2	0.0001 MeV	E	none	$\leq$ Empire		OK	MISSING	
48	Cd	109	0	Cd109	TENDL	461.4 d 12		T	T=700(100) b	TENDL (convenience)	TENDL has different collectivity in fast inelastic; TENDL RRR better though EMPIRE could be adjusted	Elas. xs <0	Missing distribution	
49	In	114		In114	missing	71.9 s 1	0.0001 MeV	E	none	$\leq$ Empire		OK	MISSING	
50	Sn	121	1	Sn121m1	TENDL	43.9 y 5	0.0001 MeV	E	none	$\leq$ Empire, (cap & 14 MeV?)	Fast region equivalent; TENDL RRR better; TENDL cuts off (n,inel) low energy part too soon	Isomeric confusion	Isomeric confusion; Missing distribution	
51	Sb	122		Sb122	missing	2.7238 d 2	0.0001 MeV	E	none	$\leq$ Empire	Should have been on TENDL list	OK	MISSING	
52	Te	121		Te121	missing	19.17 d 4	0.0001 MeV	E	none	$\leq$ Empire	Should have been on TENDL list	OK	MISSING	
52	Te	121	1	Te121m1	missing	?	0.0001 MeV	E	none	$\leq$ Empire	Should have been on TENDL list	Level not found	MISSING	FUDGE Bug
52	Te	131		Te131	missing	25.0 m 1	OK	E	none	Empire		OK	MISSING	FUDGE Bug
52	Te	131	1	Te131m1	missing	?	OK	E	none	Empire		Level not found	MISSING	FUDGE Bug
53	I	128		I128	missing	24.99 m 2	0.0001 MeV	E	none	$\leq$ Empire		OK	MISSING	
53	I	132		I132	missing	2.295 h 13	0.0001 MeV	E	none	$\leq$ Empire		OK	MISSING	
53	I	132	1	I132m1	missing	?	0.0001 MeV	E	none	$\leq$ Empire		Isomeric confusion	MISSING	

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Z	sym	A	m	iso	source	$T_{1/2}$	Fast cut-off (MeV)	Action	Atlas	Recommendation	Comments	ADVANCE comments on EMPIRE version	ADVANCE comments on TENDL version	Further comments
53	I	133		I133	missing	20.83 h	OK	E	none	Empire		OK	MISSING	
53	I	134		I134	missing	52.5 m	OK	E	none	Empire		OK	MISSING	
54	Xe	125		Xe125	missing	16.9 h	0.00001 MeV	E		$\leq$ Empire		OK	MISSING	
54	Xe	127		Xe127	missing	36.346 d	0.0001 MeV	E		$\leq$ Empire	Should have been on TENDL list	OK	MISSING	
56	Ba	131		Ba131	missing	11.50 d	0.0001 MeV	E	none	$\leq$ Empire	Should have been on TENDL list	OK	MISSING	
56	Ba	139		Ba139	missing	83.06 m	OK	E	T=6.2(1.6) b	Empire		OK	MISSING	
58	Ce	137		Ce137	missing	9.0 h	0.00005 MeV	E	none	$\leq$ Empire		OK	MISSING	
58	Ce	137	1	Ce137m1	missing	?	0.00005 MeV	E	none	$\leq$ Empire		Level not found	MISSING	FUDGE Bug
60	Nd	149		Nd149	missing	1.728 h	0.00005 MeV	E	none	$\leq$ Empire		OK	MISSING	
61	Pm	143	0	Pm143	TENDL	265 d	7	T	none	TENDL	Fast region about equivalent but TENDL has more collectivity in inelastic, TENDL RRR better	Elas. xs <0	Missing distribution	
61	Pm	144	0	Pm144	TENDL	363 d	14	T	none	TENDL (convenience)	Fast region about equivalent but TENDL inelastic irregular, TENDL RRR better	Elas. xs <0	Missing distribution	
61	Pm	145	0	Pm145	TENDL	17.7 y	4	T	none	TENDL (convenience)	Fast region about equivalent but TENDL has more collectivity in inelastic, TENDL RRR better	Level not found	Missing distribution	FUDGE Bug
61	Pm	146	0	Pm146	TENDL	5.53 y	5	E	T=8400(1680) b	$\leq$ Empire, (cap & 14 MeV?)	Fast regions differs, EMPIRE looks more realistic, TENDL RRR seems far too high; EMPIRE fast down to 10 eV	OK	Missing distribution	
61	Pm	150		Pm150	missing	2.698 h	0.00001 MeV	E	none	$\leq$ Empire		OK	MISSING	
62	Sm	145	0	Sm145	TENDL	340 d	3	T	T=280(21) b; IR=600(90) b	TENDL (convenience)	Fast region about equivalent, TENDL RRR better	Elas. xs <0	Missing distribution	
62	Sm	146		Sm146	missing	10.3e+7 y	5	E	none	Empire	Should have been on TENDL list	OK	MISSING	

Table 1: This table summarizes the evaluations and recommends actions. The recommendation column vales are: Empire - accept Empire; $\leq$ EMPIRE - accept Empire after rerun; TENDL - accept TENDL; The Atlas column values are: T - thermal capture; xR - x resonances available; RI - resonance integral; IG - gamma integral

Z	sym	A	m	iso	source	$T_{1/2}$	Fast cut-off (MeV)	Action	Atlas	Recommendation	Comments	ADVANCE comments on EMPIRE version	ADVANCE comments on TENDL version	Further comments
64	Gd	159		Gd159	missing	18.479 h 4	0.0001 MeV	E	none	$\leq$ Empire		OK	MISSING	
65	Tb	158	0	Tb158	TENDL	180 y 11	0.00001 MeV	E	none	$\leq$ Empire, (cap & 14 MeV?)	EMPIRE superior (rare earth effect); EMPIRE fast down to 10 eV	OK	Missing distribution	
65	Tb	161	0	Tb161	TENDL	6.89 d 2	0.0001 MeV	E	none	$\leq$ Empire, (cap & 14 MeV?)	EMPIRE superior (rare earth effect); EMPIRE fast down to 100eV	OK	Missing distribution	
66	Dy	155		Dy155	missing	9.9 h 2	0.00001 MeV	E	none	$\leq$ Empire		OK	MISSING	
66	Dy	157		Dy157	missing	8.14 h 4	0.000001 MeV	E	none	$\leq$ Empire		OK	MISSING	
68	Er	163		Er163	missing	75.0 m 4	0.00001 MeV	E	none	$\leq$ Empire		OK	MISSING	
68	Er	165		Er165	missing	10.36 h 4	0.00001 MeV	E	none	$\leq$ Empire		OK	MISSING	
68	Er	169	0	Er169	TENDL	9.392 d 18	0.0001 MeV	E	none	$\leq$ Empire, (cap & 14 MeV?)	EMPIRE superior (rare earth effect); EMPIRE fast down to 100 eV	OK	Missing distribution	
69	Tm	171	0	Tm171	TENDL	1.92 y 1	0.0001 MeV	E	T=60-190 ?, 4R	$\leq$ Empire, (cap & 14 MeV?)	EMPIRE superior (rare earth effect); EMPIRE fast down to 100 eV	OK	Missing distribution	
70	Yb	169		Yb169	missing	32.018 d 5	0.00001 MeV	E	Full set	$\leq$ Empire	Should have been on TENDL list	OK	MISSING	
70	Yb	175	0	Yb175	TENDL	4.185 d 1	0.0001 MeV	E	none	$\leq$ Empire, (cap & 14 MeV?)	EMPIRE superior (rare earth effect); EMPIRE fast down to 100 eV	OK	MISSING	
72	Hf	175		Hf175	missing	70 d 2	0.00001 MeV	E	none	$\leq$ Empire	Should have been on TENDL list	OK	MISSING	
74	W	181	0	W181	TENDL	121.2 d 2	0.00001 MeV	E	none	$\leq$ Empire, (cap & 14 MeV?)	EMPIRE has more collectivity, MT=4 looks more physical, 'rare-earth effect' observed; EMPIRE fast down to 10 eV	OK	Missing distribution	
74	W	185		W185	missing	75.1 d 3	0.0001 MeV	E3	Full set	$\leq$ Empire	Should have been on TENDL list	OK	MISSING	
75	Re	186	1	Re186m1	TENDL	2.0e+5 y	0.00001 MeV	E	none	$\leq$ Empire, (cap & 14 MeV?)	TENDL has problem with cutting inelastics, EMPIRE is superior but needs caution with extending fast to lower energies	Isomeric confusion	Isomeric confusion	

Table 1: This table summarizes the evaluations and recommends actions. The recommendation column vales are: Empire - accept Empire; $\leq$ EMPIRE - accept Empire after rerun; TENDL - accept TENDL; The Atlas column values are: T - thermal capture; xR - x resonances available; RI - resonance integral; IG - gamma integral

Z	sym	A	m	iso	source	$T_{1/2}$	Fast cut-off (MeV)	Action	Atlas	Recommendation	Comments	ADVANCE comments on EMPIRE version	ADVANCE comments on TENDL version	Further comments
76	Os	185	0	Os185	TENDL	93.6 d 5	0.0001 MeV	E	none	$\leq$ Empire, (cap. & 14 MeV?)	EMPIRE superior (rare earth effect); EMPIRE fast down to 100 eV	OK	NJOY took 4.15 hrs; Missing distribution	
76	Os	191	0	Os191	TENDL	15.4 d 1		T	T=383(54) b	TENDL	TO BE SOLVED - TENDL and Empire differ in interpretation of MT=4 to the ground state (elastic!)	Elas. xs <0	Missing distribution	
77	Ir	192	0	Ir192	TENDL	73.829 d 11		T	Full set (11R)	TENDL	Fast. region differ, TENDL RRR better; it would be difficult to fix RRR with EMPIRE	Elas. xs <0	Missing distribution	
77	Ir	194	1	Ir194m1	TENDL	19.28 h 13	0.00001 MeV	E	T=1570(290) b	$\leq$ Empire	TENDL has problem with cutting inelastics, EMPIRE is superior but needs caution with extending fast to lower energies	Isomeric confusion	Isomeric confusion; Missing distribution	
78	Pt	193	0	Pt193	TENDL	50 y 6		T	none	TENDL (convenience)	TO BE SOLVED - TENDL and Empire differ in interpretation of MT=4 to the ground state (elastic!); fast differs	Elas. xs <0	Missing distribution	
78	Pt	193	0	Pt193	TENDL	50 y 6					see above	MISSING		
78	Pt	193	0	Pt193	TENDL	50 y 6					see above	MISSING		
80	Hg	197		Hg197	missing	64.14 h 5	0.0001 MeV	E	none	$\leq$ Empire		OK	MISSING	
80	Hg	197	1	Hg197m1	missing		0.0001 MeV	E	none	$\leq$ Empire		Level not found	MISSING	FUDGE Bug
80	Hg	203	0	Hg203	TENDL	46.594 d 12		T	none	TENDL (convenience)	Fast. region equivalent, TENDL RRR better	OK	Missing distribution	
81	Tl	204	0	Tl204	TENDL	3.783 y 12		T	T=21.6(2.0) b, 2R	TENDL (convenience)	Fast region about equivalent, TENDL RRR looks better for total at thermal	OK	Missing distribution	
82	Pb	205	0	Pb205	TENDL	1.73e+7 y 7		T	none	TENDL (convenience)	Fast region about equivalent but TENDL has more collectivity in inelastic, TENDL RRR better for total	OK	Missing distribution	

Table 1: This table summarizes the evaluations and recommends actions. The recommendation column vales are: Empire - accept Empire; $\leq$ EMPIRE - accept Empire after rerun; TENDL - accept TENDL; The Atlas column values are: T - thermal capture; xR - x resonances available; RI - resonance integral; IG - gamma integral

Z	sym	A	m	iso	source	$T_{1/2}$	Fast cut-off (MeV)	Action	Atlas	Recommendation	Comments	ADVANCE comments on EMPIRE version	ADVANCE comments on TENDL version	Further comments
83	Bi	210	1	Bi210m1	TENDL	3.04e+6 y 6	OK	E	T=54(5) mb, RI=0.2(0.03) b	Empire	Fast region equivalent; TENDL RRR better (but not obviously!); TENDL cuts off (n,inel) low energy part too soon	Isomeric confusion	Isomeric confusion; Missing distribution	
84	Po	208	0	Po208	TENDL	2.898 y 2		T	none	TENDL (convenience)	Fast region equivalent, TENDL RRR looks better for total but EMPIRE RRR could be better for capture	Level not found	Missing distribution	FUDGE Bug
84	Po	209	0	Po209	TENDL	124 y 3	OK	E	none	Empire, cap & 14 MeV	TENDL has more collectivity in inelastic, TENDL RRR looks odd - EMPIRE seems to be better	OK	Missing distribution	
84	Po	210	0	Po210	TENDL	138.376 d 2		T	T<30 mb	TENDL	TENDL has more collectivity in fast inelastic; TENDL RRR better	Points out of order	Missing distribution	
94	Pu	245		Pu245	missing	10.5 h 1	0.00001 MeV	E	T=150(30) b	$\leq$ Empire		NJOY Failure	MISSING	NJOY Bug
98	Cf	247		Cf247	missing	3.11 h 3	0.00001 MeV	E	none	$\leq$ Empire	Saw-type total inelastic; missing plots for individual inelastics	NJOY Failure	MISSING	NJOY Bug

8 Plots

8.1 ^8Be (EMPIRE only)

Figure 2: Cross-section comparison for $^8\text{Be}(\text{n},\text{total})$ reaction.

Figure 3: Cross-section comparison for $^8\text{Be}(\text{n},\text{elastic})$ reaction.

Figure 4: Cross-section comparison for $^8\text{Be}(\text{n},2\text{n})$ reaction.

Figure 5: Cross-section comparison for $^8\text{Be}(\text{n},\text{g})$ reaction.

Figure 6: Cross-section comparison for $^8\text{Be}(\text{n},\text{inel})$ reaction.

Figure 7: Cross-section comparison for $^8\text{Be}(\text{n},\text{n}'_1)$ reaction.

Figure 8: Cross-section comparison for $^8\text{Be}(\text{n},\text{n}'_2)$ reaction.

Figure 9: Cross-section comparison for $^8\text{Be}(\text{n},\text{n}'_3)$ reaction.

8.2 ^{20}Ne

Figure 10: Cross-section comparison for $^{20}\text{Ne}(n,\text{total})$ reaction.

Figure 11: Cross-section comparison for $^{20}\text{Ne}(n,\text{elastic})$ reaction.

Figure 12: Cross-section comparison for $^{20}\text{Ne}(n,2n)$ reaction.

Figure 13: Cross-section comparison for $^{20}\text{Ne}(n,g)$ reaction.

Figure 14: Cross-section comparison for $^{20}\text{Ne}(n,\text{incl})$ reaction.

Figure 15: Cross-section comparison for $^{20}\text{Ne}(n,n'_1)$ reaction.

Figure 16: Cross-section comparison for $^{20}\text{Ne}(n,n'_2)$ reaction.

Figure 17: Cross-section comparison for $^{20}\text{Ne}(n,n'_3)$ reaction.

8.3 ^{21}Ne

Figure 18: Cross-section comparison for $^{21}\text{Ne}(n,\text{total})$ reaction.

Figure 19: Cross-section comparison for $^{21}\text{Ne}(n,\text{elastic})$ reaction.

Figure 20: Cross-section comparison for $^{21}\text{Ne}(n,2n)$ reaction.

Figure 21: Cross-section comparison for $^{21}\text{Ne}(n,g)$ reaction.

Figure 22: Cross-section comparison for $^{21}\text{Ne}(n,\text{incl})$ reaction.

Figure 23: Cross-section comparison for $^{21}\text{Ne}(n,n'_1)$ reaction.

Figure 24: Cross-section comparison for $^{21}\text{Ne}(n,n'_2)$ reaction.

Figure 25: Cross-section comparison for $^{21}\text{Ne}(n,n'_3)$ reaction.

8.4 ^{22}Ne

Figure 26: Cross-section comparison for $^{22}\text{Ne}(\text{n},\text{total})$ reaction.

Figure 27: Cross-section comparison for $^{22}\text{Ne}(\text{n},\text{elastic})$ reaction.

Figure 28: Cross-section comparison for $^{22}\text{Ne}(\text{n},2\text{n})$ reaction.

Figure 29: Cross-section comparison for $^{22}\text{Ne}(\text{n},\text{g})$ reaction.

Figure 30: Cross-section comparison for $^{22}\text{Ne}(\text{n},\text{incl})$ reaction.

Figure 31: Cross-section comparison for $^{22}\text{Ne}(n,n'_1)$ reaction.

Figure 32: Cross-section comparison for $^{22}\text{Ne}(n,n'_2)$ reaction.

Figure 33: Cross-section comparison for $^{22}\text{Ne}(n,n'_3)$ reaction.

8.5 ^{26m}Al

Figure 34: Cross-section comparison for $^{26m}\text{Al}(\text{n},\text{total})$ reaction.

Figure 35: Cross-section comparison for $^{26m}\text{Al}(\text{n},\text{elastic})$ reaction.

Figure 36: Cross-section comparison for $^{26m}\text{Al}(\text{n},2\text{n})$ reaction.

Figure 37: Cross-section comparison for $^{26m}\text{Al}(\text{n},\text{g})$ reaction.

Figure 38: Cross-section comparison for $^{26m}\text{Al}(\text{n},\text{inel})$ reaction.

Figure 39: Cross-section comparison for $^{026m}\text{Al}(n,n'_1)$ reaction.

Figure 40: Cross-section comparison for $^{026m}\text{Al}(n,n'_2)$ reaction.

Figure 41: Cross-section comparison for $^{026m}\text{Al}(n,n'_3)$ reaction.

8.6 ^{31}Si (EMPIRE only)

Figure 42: Cross-section comparison for $^{31}\text{Si}(\text{n},\text{total})$ reaction.

Figure 43: Cross-section comparison for $^{31}\text{Si}(\text{n},\text{elastic})$ reaction.

Figure 44: Cross-section comparison for $^{31}\text{Si}(\text{n},2\text{n})$ reaction.

Figure 45: Cross-section comparison for $^{31}\text{Si}(\text{n},\text{g})$ reaction.

Figure 46: Cross-section comparison for $^{31}\text{Si}(\text{n},\text{inel})$ reaction.

Figure 47: Cross-section comparison for $^{31}\text{Si}(n,n'_1)$ reaction.

Figure 48: Cross-section comparison for $^{31}\text{Si}(n,n'_2)$ reaction.

Figure 49: Cross-section comparison for $^{31}\text{Si}(n,n'_3)$ reaction.

8.7 ^{32}Si

Figure 50: Cross-section comparison for $^{32}\text{Si}(n,\text{total})$ reaction.

Figure 51: Cross-section comparison for $^{32}\text{Si}(n,\text{elastic})$ reaction.

Figure 52: Cross-section comparison for $^{32}\text{Si}(n,2n)$ reaction.

Figure 53: Cross-section comparison for $^{32}\text{Si}(n,g)$ reaction.

Figure 54: Cross-section comparison for $^{32}\text{Si}(n,\text{inel})$ reaction.

Figure 55: Cross-section comparison for $^{032}\text{Si}(n,n'_1)$ reaction.

Figure 56: Cross-section comparison for $^{032}\text{Si}(n,n'_2)$ reaction.

Figure 57: Cross-section comparison for $^{032}\text{Si}(n,n'_3)$ reaction.

8.8 ^{35}S

Figure 58: Cross-section comparison for $^{35}\text{S}(\text{n},\text{total})$ reaction.

Figure 59: Cross-section comparison for $^{35}\text{S}(\text{n},\text{elastic})$ reaction.

Figure 60: Cross-section comparison for $^{35}\text{S}(\text{n},2\text{n})$ reaction.

Figure 61: Cross-section comparison for $^{35}\text{S}(\text{n},\text{g})$ reaction.

Figure 62: Cross-section comparison for $^{35}\text{S}(\text{n},\text{inel})$ reaction.

Figure 63: Cross-section comparison for $^{035}\text{S}(n,n'_1)$ reaction.

Figure 64: Cross-section comparison for $^{035}\text{S}(n,n'_2)$ reaction.

Figure 65: Cross-section comparison for $^{035}\text{S}(n,n'_3)$ reaction.

8.9 ^{36}Cl

Figure 66: Cross-section comparison for $^{36}\text{Cl}(n,\text{total})$ reaction.

Figure 67: Cross-section comparison for $^{36}\text{Cl}(n,\text{elastic})$ reaction.

Figure 68: Cross-section comparison for $^{36}\text{Cl}(n,2n)$ reaction.

Figure 69: Cross-section comparison for $^{36}\text{Cl}(n,g)$ reaction.

Figure 70: Cross-section comparison for $^{36}\text{Cl}(n,\text{incl})$ reaction.

Figure 71: Cross-section comparison for $^{36}\text{Cl}(n,n'_1)$ reaction.

Figure 72: Cross-section comparison for $^{36}\text{Cl}(n,n'_2)$ reaction.

Figure 73: Cross-section comparison for $^{36}\text{Cl}(n,n'_3)$ reaction.

8.10 ^{37}Ar

Figure 74: Cross-section comparison for $^{37}\text{Ar}(n,\text{total})$ reaction.

Figure 75: Cross-section comparison for $^{37}\text{Ar}(n,\text{elastic})$ reaction.

Figure 76: Cross-section comparison for $^{37}\text{Ar}(n,2n)$ reaction.

Figure 77: Cross-section comparison for $^{37}\text{Ar}(n,g)$ reaction.

Figure 78: Cross-section comparison for $^{37}\text{Ar}(n,\text{incl})$ reaction.

Figure 79: Cross-section comparison for $^{037}\text{Ar}(n,n'_1)$ reaction.

Figure 80: Cross-section comparison for $^{037}\text{Ar}(n,n'_2)$ reaction.

Figure 81: Cross-section comparison for $^{037}\text{Ar}(n,n'_3)$ reaction.

8.11 ^{39}Ar (EMPIRE only)

Figure 82: Cross-section comparison for $^{39}\text{Ar}(\text{n},\text{total})$ reaction.

Figure 83: Cross-section comparison for $^{39}\text{Ar}(\text{n},\text{elastic})$ reaction.

Figure 84: Cross-section comparison for $^{39}\text{Ar}(\text{n},2\text{n})$ reaction.

Figure 85: Cross-section comparison for $^{39}\text{Ar}(\text{n},\text{g})$ reaction.

Figure 86: Cross-section comparison for $^{39}\text{Ar}(\text{n},\text{incl})$ reaction.

Figure 87: Cross-section comparison for $^{39}\text{Ar}(n,n'_1)$ reaction.

Figure 88: Cross-section comparison for $^{39}\text{Ar}(n,n'_2)$ reaction.

Figure 89: Cross-section comparison for $^{39}\text{Ar}(n,n'_3)$ reaction.

8.12 ^{41}Ar

Figure 90: Cross-section comparison for $^{41}\text{Ar}(n,\text{total})$ reaction.

Figure 91: Cross-section comparison for $^{41}\text{Ar}(n,\text{elastic})$ reaction.

Figure 92: Cross-section comparison for $^{41}\text{Ar}(n,2n)$ reaction.

Figure 93: Cross-section comparison for $^{41}\text{Ar}(n,g)$ reaction.

Figure 94: Cross-section comparison for $^{41}\text{Ar}(n,\text{incl})$ reaction.

Figure 95: Cross-section comparison for $^{41}\text{Ar}(n,n'_1)$ reaction.

Figure 96: Cross-section comparison for $^{41}\text{Ar}(n,n'_2)$ reaction.

Figure 97: Cross-section comparison for $^{41}\text{Ar}(n,n'_3)$ reaction.

8.13 ^{41}Ca (EMPIRE only)

Figure 98: Cross-section comparison for $^{41}\text{Ca}(n,\text{total})$ reaction.

Figure 99: Cross-section comparison for $^{41}\text{Ca}(n,\text{elastic})$ reaction.

Figure 100: Cross-section comparison for $^{41}\text{Ca}(n,2n)$ reaction.

Figure 101: Cross-section comparison for $^{41}\text{Ca}(n,g)$ reaction.

Figure 102: Cross-section comparison for $^{41}\text{Ca}(n,\text{incl})$ reaction.

Figure 103: Cross-section comparison for $^{41}\text{Ca}(n,n'_1)$ reaction.

Figure 104: Cross-section comparison for $^{41}\text{Ca}(n,n'_2)$ reaction.

Figure 105: Cross-section comparison for $^{41}\text{Ca}(n,n'_3)$ reaction.

8.14 ^{45}Ca

Figure 106: Cross-section comparison for $^{45}\text{Ca}(\text{n},\text{total})$ reaction.

Figure 107: Cross-section comparison for $^{45}\text{Ca}(\text{n},\text{elastic})$ reaction.

Figure 108: Cross-section comparison for $^{45}\text{Ca}(\text{n},2\text{n})$ reaction.

Figure 109: Cross-section comparison for $^{45}\text{Ca}(\text{n},\text{g})$ reaction.

Figure 110: Cross-section comparison for $^{45}\text{Ca}(\text{n},\text{incl})$ reaction.

Figure 111: Cross-section comparison for $^{45}\text{Ca}(n,n'_1)$ reaction.

Figure 112: Cross-section comparison for $^{45}\text{Ca}(n,n'_2)$ reaction.

Figure 113: Cross-section comparison for $^{45}\text{Ca}(n,n'_3)$ reaction.

8.15 ^{047}Ca

Figure 114: Cross-section comparison for $^{047}\text{Ca}(\text{n},\text{total})$ reaction.

Figure 115: Cross-section comparison for $^{047}\text{Ca}(\text{n},\text{elastic})$ reaction.

Figure 116: Cross-section comparison for $^{047}\text{Ca}(\text{n},2\text{n})$ reaction.

Figure 117: Cross-section comparison for $^{047}\text{Ca}(\text{n},\text{g})$ reaction.

Figure 118: Cross-section comparison for $^{047}\text{Ca}(\text{n},\text{incl})$ reaction.

Figure 119: Cross-section comparison for $^{47}\text{Ca}(n,n'_1)$ reaction.

Figure 120: Cross-section comparison for $^{47}\text{Ca}(n,n'_2)$ reaction.

Figure 121: Cross-section comparison for $^{47}\text{Ca}(n,n'_3)$ reaction.

8.16 ^{049}V

Figure 122: Cross-section comparison for $^{049}\text{V}(\text{n},\text{total})$ reaction.

Figure 123: Cross-section comparison for $^{049}\text{V}(\text{n},\text{elastic})$ reaction.

Figure 124: Cross-section comparison for $^{049}\text{V}(\text{n},2\text{n})$ reaction.

Figure 125: Cross-section comparison for $^{049}\text{V}(\text{n},\text{g})$ reaction.

Figure 126: Cross-section comparison for $^{049}\text{V}(\text{n},\text{incl})$ reaction.

Figure 127: Cross-section comparison for $^{49}\text{V}(n,n'_1)$ reaction.

Figure 128: Cross-section comparison for $^{49}\text{V}(n,n'_2)$ reaction.

Figure 129: Cross-section comparison for $^{49}\text{V}(n,n'_3)$ reaction.

8.17 ^{51}Cr

Figure 130: Cross-section comparison for $^{51}\text{Cr}(n,\text{total})$ reaction.

Figure 131: Cross-section comparison for $^{51}\text{Cr}(n,\text{elastic})$ reaction.

Figure 132: Cross-section comparison for $^{51}\text{Cr}(n,2n)$ reaction.

Figure 133: Cross-section comparison for $^{51}\text{Cr}(n,g)$ reaction.

Figure 134: Cross-section comparison for $^{51}\text{Cr}(n,\text{incl})$ reaction.

Figure 135: Cross-section comparison for $^{51}\text{Cr}(n,n'_1)$ reaction.

Figure 136: Cross-section comparison for $^{51}\text{Cr}(n,n'_2)$ reaction.

Figure 137: Cross-section comparison for $^{51}\text{Cr}(n,n'_3)$ reaction.

8.18 ^{54}Mn

Figure 138: Cross-section comparison for $^{54}\text{Mn}(n,\text{total})$ reaction.

Figure 139: Cross-section comparison for $^{54}\text{Mn}(n,\text{elastic})$ reaction.

Figure 140: Cross-section comparison for $^{54}\text{Mn}(n,2n)$ reaction.

Figure 141: Cross-section comparison for $^{54}\text{Mn}(n,g)$ reaction.

Figure 142: Cross-section comparison for $^{54}\text{Mn}(n,\text{inel})$ reaction.

Figure 143: Cross-section comparison for $^{054}\text{Mn}(n,n'_1)$ reaction.

Figure 144: Cross-section comparison for $^{054}\text{Mn}(n,n'_2)$ reaction.

Figure 145: Cross-section comparison for $^{054}\text{Mn}(n,n'_3)$ reaction.

8.19 ^{55}Fe

Figure 146: Cross-section comparison for $^{55}\text{Fe}(n,\text{total})$ reaction.

Figure 147: Cross-section comparison for $^{55}\text{Fe}(n,\text{elastic})$ reaction.

Figure 148: Cross-section comparison for $^{55}\text{Fe}(n,2n)$ reaction.

Figure 149: Cross-section comparison for $^{55}\text{Fe}(n,g)$ reaction.

Figure 150: Cross-section comparison for $^{55}\text{Fe}(n,\text{incl})$ reaction.

Figure 151: Cross-section comparison for $^{55}\text{Fe}(n,n'_1)$ reaction.

Figure 152: Cross-section comparison for $^{55}\text{Fe}(n,n'_2)$ reaction.

Figure 153: Cross-section comparison for $^{55}\text{Fe}(n,n'_3)$ reaction.

8.20 ^{63}Ni

Figure 154: Cross-section comparison for $^{63}\text{Ni}(n,\text{total})$ reaction.

Figure 155: Cross-section comparison for $^{63}\text{Ni}(n,\text{elastic})$ reaction.

Figure 156: Cross-section comparison for $^{63}\text{Ni}(n,2n)$ reaction.

Figure 157: Cross-section comparison for $^{63}\text{Ni}(n,g)$ reaction.

Figure 158: Cross-section comparison for $^{63}\text{Ni}(n,\text{inel})$ reaction.

Figure 159: Cross-section comparison for $^{63}\text{Ni}(n,n'_1)$ reaction.

Figure 160: Cross-section comparison for $^{63}\text{Ni}(n,n'_2)$ reaction.

Figure 161: Cross-section comparison for $^{63}\text{Ni}(n,n'_3)$ reaction.

8.21 ^{64}Cu (EMPIRE only)

Figure 162: Cross-section comparison for $^{64}\text{Cu}(n,\text{total})$ reaction.

Figure 163: Cross-section comparison for $^{64}\text{Cu}(n,\text{elastic})$ reaction.

Figure 164: Cross-section comparison for $^{64}\text{Cu}(n,2n)$ reaction.

Figure 165: Cross-section comparison for $^{64}\text{Cu}(n,g)$ reaction.

Figure 166: Cross-section comparison for $^{64}\text{Cu}(n,\text{inel})$ reaction.

Figure 167: Cross-section comparison for $^{64}\text{Cu}(n,n'_1)$ reaction.

Figure 168: Cross-section comparison for $^{64}\text{Cu}(n,n'_2)$ reaction.

Figure 169: Cross-section comparison for $^{64}\text{Cu}(n,n'_3)$ reaction.

8.22 ^{69}Zn (EMPIRE only)

Figure 170: Cross-section comparison for $^{69}\text{Zn}(n,\text{total})$ reaction.

Figure 171: Cross-section comparison for $^{69}\text{Zn}(n,\text{elastic})$ reaction.

Figure 172: Cross-section comparison for $^{69}\text{Zn}(n,2n)$ reaction.

Figure 173: Cross-section comparison for $^{69}\text{Zn}(n,g)$ reaction.

Figure 174: Cross-section comparison for $^{69}\text{Zn}(n,\text{inel})$ reaction.

Figure 175: Cross-section comparison for $^{69}\text{Zn}(n,n'_1)$ reaction.

Figure 176: Cross-section comparison for $^{69}\text{Zn}(n,n'_2)$ reaction.

Figure 177: Cross-section comparison for $^{69}\text{Zn}(n,n'_3)$ reaction.

8.23 ^{70}Ga (EMPIRE only)

Figure 178: Cross-section comparison for $^{70}\text{Ga}(n,\text{total})$ reaction.

Figure 179: Cross-section comparison for $^{70}\text{Ga}(n,\text{elastic})$ reaction.

Figure 180: Cross-section comparison for $^{70}\text{Ga}(n,2n)$ reaction.

Figure 181: Cross-section comparison for $^{70}\text{Ga}(n,g)$ reaction.

Figure 182: Cross-section comparison for $^{70}\text{Ga}(n,\text{incl})$ reaction.

Figure 183: Cross-section comparison for $^{70}\text{Ga}(n,n'_1)$ reaction.

Figure 184: Cross-section comparison for $^{70}\text{Ga}(n,n'_2)$ reaction.

Figure 185: Cross-section comparison for $^{70}\text{Ga}(n,n'_3)$ reaction.

8.24 ^{71}Ge

Figure 186: Cross-section comparison for $^{71}\text{Ge}(\text{n},\text{total})$ reaction.

Figure 187: Cross-section comparison for $^{71}\text{Ge}(\text{n},\text{elastic})$ reaction.

Figure 188: Cross-section comparison for $^{71}\text{Ge}(\text{n},2\text{n})$ reaction.

Figure 189: Cross-section comparison for $^{71}\text{Ge}(\text{n},\text{g})$ reaction.

Figure 190: Cross-section comparison for $^{71}\text{Ge}(\text{n},\text{incl})$ reaction.

Figure 191: Cross-section comparison for $^{71}\text{Ge}(n,n'_1)$ reaction.

Figure 192: Cross-section comparison for $^{71}\text{Ge}(n,n'_2)$ reaction.

Figure 193: Cross-section comparison for $^{71}\text{Ge}(n,n'_3)$ reaction.

8.25 ^{75}Ge (EMPIRE only)

Figure 194: Cross-section comparison for $^{75}\text{Ge}(n,\text{total})$ reaction.

Figure 195: Cross-section comparison for $^{75}\text{Ge}(n,\text{elastic})$ reaction.

Figure 196: Cross-section comparison for $^{75}\text{Ge}(n,2n)$ reaction.

Figure 197: Cross-section comparison for $^{75}\text{Ge}(n,g)$ reaction.

Figure 198: Cross-section comparison for $^{75}\text{Ge}(n,\text{incl})$ reaction.

Figure 199: Cross-section comparison for $^{75}\text{Ge}(n,n'_1)$ reaction.

Figure 200: Cross-section comparison for $^{75}\text{Ge}(n,n'_2)$ reaction.

Figure 201: Cross-section comparison for $^{75}\text{Ge}(n,n'_3)$ reaction.

8.26 ^{75}Se

Figure 202: Cross-section comparison for $^{75}\text{Se}(n,\text{total})$ reaction.

Figure 203: Cross-section comparison for $^{75}\text{Se}(n,\text{elastic})$ reaction.

Figure 204: Cross-section comparison for $^{75}\text{Se}(n,2n)$ reaction.

Figure 205: Cross-section comparison for $^{75}\text{Se}(n,g)$ reaction.

Figure 206: Cross-section comparison for $^{75}\text{Se}(n,\text{incl})$ reaction.

Figure 207: Cross-section comparison for $^{75}\text{Se}(n,n'_1)$ reaction.

Figure 208: Cross-section comparison for $^{75}\text{Se}(n,n'_2)$ reaction.

Figure 209: Cross-section comparison for $^{75}\text{Se}(n,n'_3)$ reaction.

8.27 ^{81}Se (EMPIRE only)

Figure 210: Cross-section comparison for $^{81}\text{Se}(n,\text{total})$ reaction.

Figure 211: Cross-section comparison for $^{81}\text{Se}(n,\text{elastic})$ reaction.

Figure 212: Cross-section comparison for $^{81}\text{Se}(n,2n)$ reaction.

Figure 213: Cross-section comparison for $^{81}\text{Se}(n,g)$ reaction.

Figure 214: Cross-section comparison for $^{81}\text{Se}(n,\text{incl})$ reaction.

Figure 215: Cross-section comparison for $^{81}\text{Se}(n,n'_1)$ reaction.

Figure 216: Cross-section comparison for $^{81}\text{Se}(n,n'_2)$ reaction.

Figure 217: Cross-section comparison for $^{81}\text{Se}(n,n'_3)$ reaction.

8.28 ^{80}Br (EMPIRE only)

Figure 218: Cross-section comparison for $^{80}\text{Br}(n,\text{total})$ reaction.

Figure 219: Cross-section comparison for $^{80}\text{Br}(n,\text{elastic})$ reaction.

Figure 220: Cross-section comparison for $^{80}\text{Br}(n,2n)$ reaction.

Figure 221: Cross-section comparison for $^{80}\text{Br}(n,g)$ reaction.

Figure 222: Cross-section comparison for $^{80}\text{Br}(n,\text{inel})$ reaction.

Figure 223: Cross-section comparison for $^{80}\text{Br}(n, n'_1)$ reaction.

Figure 224: Cross-section comparison for $^{80}\text{Br}(n, n'_2)$ reaction.

Figure 225: Cross-section comparison for $^{80}\text{Br}(n, n'_3)$ reaction.

8.29 ^{79}Kr (EMPIRE only)

Figure 226: Cross-section comparison for $^{79}\text{Kr}(n,\text{total})$ reaction.

Figure 227: Cross-section comparison for $^{79}\text{Kr}(n,\text{elastic})$ reaction.

Figure 228: Cross-section comparison for $^{79}\text{Kr}(n,2n)$ reaction.

Figure 229: Cross-section comparison for $^{79}\text{Kr}(n,g)$ reaction.

Figure 230: Cross-section comparison for $^{79}\text{Kr}(n,\text{incl})$ reaction.

Figure 231: Cross-section comparison for $^{79}\text{Kr}(n, n'_1)$ reaction.

Figure 232: Cross-section comparison for $^{79}\text{Kr}(n, n'_2)$ reaction.

Figure 233: Cross-section comparison for $^{79}\text{Kr}(n, n'_3)$ reaction.

8.30 ^{81}Kr

Figure 234: Cross-section comparison for $^{81}\text{Kr}(\text{n},\text{total})$ reaction.

Figure 235: Cross-section comparison for $^{81}\text{Kr}(\text{n},\text{elastic})$ reaction.

Figure 236: Cross-section comparison for $^{81}\text{Kr}(\text{n},2\text{n})$ reaction.

Figure 237: Cross-section comparison for $^{81}\text{Kr}(\text{n},\text{g})$ reaction.

Figure 238: Cross-section comparison for $^{81}\text{Kr}(\text{n},\text{incl})$ reaction.

Figure 239: Cross-section comparison for $^{81}\text{Kr}(n,n'_1)$ reaction.

Figure 240: Cross-section comparison for $^{81}\text{Kr}(n,n'_2)$ reaction.

Figure 241: Cross-section comparison for $^{81}\text{Kr}(n,n'_3)$ reaction.

8.31 ^{85}Sr (EMPIRE only)

Figure 242: Cross-section comparison for $^{85}\text{Sr}(\text{n},\text{total})$ reaction.

Figure 243: Cross-section comparison for $^{85}\text{Sr}(\text{n},\text{elastic})$ reaction.

Figure 244: Cross-section comparison for $^{85}\text{Sr}(\text{n},2\text{n})$ reaction.

Figure 245: Cross-section comparison for $^{85}\text{Sr}(\text{n},\text{g})$ reaction.

Figure 246: Cross-section comparison for $^{85}\text{Sr}(\text{n},\text{incl})$ reaction.

Figure 247: Cross-section comparison for $^{85}\text{Sr}(n,n'_1)$ reaction.

Figure 248: Cross-section comparison for $^{85}\text{Sr}(n,n'_2)$ reaction.

Figure 249: Cross-section comparison for $^{85}\text{Sr}(n,n'_3)$ reaction.

8.32 ^{93}Mo

Figure 250: Cross-section comparison for $^{93}\text{Mo}(n,\text{total})$ reaction.

Figure 251: Cross-section comparison for $^{93}\text{Mo}(n,\text{elastic})$ reaction.

Figure 252: Cross-section comparison for $^{93}\text{Mo}(n,2n)$ reaction.

Figure 253: Cross-section comparison for $^{93}\text{Mo}(n,g)$ reaction.

Figure 254: Cross-section comparison for $^{93}\text{Mo}(n,\text{incl})$ reaction.

Figure 255: Cross-section comparison for $^{93}\text{Mo}(n,n'_1)$ reaction.

Figure 256: Cross-section comparison for $^{93}\text{Mo}(n,n'_2)$ reaction.

Figure 257: Cross-section comparison for $^{93}\text{Mo}(n,n'_3)$ reaction.

8.33 ^{98}Tc

Figure 258: Cross-section comparison for $^{98}\text{Tc}(n,\text{total})$ reaction.

Figure 259: Cross-section comparison for $^{98}\text{Tc}(n,\text{elastic})$ reaction.

Figure 260: Cross-section comparison for $^{98}\text{Tc}(n,2n)$ reaction.

Figure 261: Cross-section comparison for $^{98}\text{Tc}(n,g)$ reaction.

Figure 262: Cross-section comparison for $^{98}\text{Tc}(n,\text{incl})$ reaction.

Figure 263: Cross-section comparison for $^{998}\text{Tc}(n,n'_1)$ reaction.

Figure 264: Cross-section comparison for $^{998}\text{Tc}(n,n'_2)$ reaction.

Figure 265: Cross-section comparison for $^{998}\text{Tc}(n,n'_3)$ reaction.

8.34 ^{97}Ru

Figure 266: Cross-section comparison for $^{97}\text{Ru}(n,\text{total})$ reaction.

Figure 267: Cross-section comparison for $^{97}\text{Ru}(n,\text{elastic})$ reaction.

Figure 268: Cross-section comparison for $^{97}\text{Ru}(n,2n)$ reaction.

Figure 269: Cross-section comparison for $^{97}\text{Ru}(n,g)$ reaction.

Figure 270: Cross-section comparison for $^{97}\text{Ru}(n,\text{inel})$ reaction.

Figure 271: Cross-section comparison for $^{097}\text{Ru}(n,n'_1)$ reaction.

Figure 272: Cross-section comparison for $^{097}\text{Ru}(n,n'_2)$ reaction.

Figure 273: Cross-section comparison for $^{097}\text{Ru}(n,n'_3)$ reaction.

8.35 ^{104}Rh (EMPIRE only)

Figure 274: Cross-section comparison for $^{104}\text{Rh}(n,\text{total})$ reaction.

Figure 275: Cross-section comparison for $^{104}\text{Rh}(n,\text{elastic})$ reaction.

Figure 276: Cross-section comparison for $^{104}\text{Rh}(n,2n)$ reaction.

Figure 277: Cross-section comparison for $^{104}\text{Rh}(n,g)$ reaction.

Figure 278: Cross-section comparison for $^{104}\text{Rh}(n,\text{inel})$ reaction.

Figure 279: Cross-section comparison for $^{104}\text{Rh}(n,n'_1)$ reaction.

Figure 280: Cross-section comparison for $^{104}\text{Rh}(n,n'_2)$ reaction.

Figure 281: Cross-section comparison for $^{104}\text{Rh}(n,n'_3)$ reaction.

8.36 ^{103}Pd

Figure 282: Cross-section comparison for $^{103}\text{Pd}(n,\text{total})$ reaction.

Figure 283: Cross-section comparison for $^{103}\text{Pd}(n,\text{elastic})$ reaction.

Figure 284: Cross-section comparison for $^{103}\text{Pd}(n,2n)$ reaction.

Figure 285: Cross-section comparison for $^{103}\text{Pd}(n,g)$ reaction.

Figure 286: Cross-section comparison for $^{103}\text{Pd}(n,\text{incl})$ reaction.

Figure 287: Cross-section comparison for $^{103}\text{Pd}(n,n'_1)$ reaction.

Figure 288: Cross-section comparison for $^{103}\text{Pd}(n,n'_2)$ reaction.

Figure 289: Cross-section comparison for $^{103}\text{Pd}(n,n'_3)$ reaction.

8.37 ^{109}Pd (EMPIRE only)

Figure 290: Cross-section comparison for $^{109}\text{Pd}(n,\text{total})$ reaction.

Figure 291: Cross-section comparison for $^{109}\text{Pd}(n,\text{elastic})$ reaction.

Figure 292: Cross-section comparison for $^{109}\text{Pd}(n,2n)$ reaction.

Figure 293: Cross-section comparison for $^{109}\text{Pd}(n,g)$ reaction.

Figure 294: Cross-section comparison for $^{109}\text{Pd}(n,\text{incl})$ reaction.

Figure 295: Cross-section comparison for $^{109}\text{Pd}(n,n'_1)$ reaction.

Figure 296: Cross-section comparison for $^{109}\text{Pd}(n,n'_2)$ reaction.

Figure 297: Cross-section comparison for $^{109}\text{Pd}(n,n'_3)$ reaction.

8.38 ^{108}Ag (EMPIRE only)

Figure 298: Cross-section comparison for $^{108}\text{Ag}(\text{n},\text{total})$ reaction.

Figure 299: Cross-section comparison for $^{108}\text{Ag}(\text{n},\text{elastic})$ reaction.

Figure 300: Cross-section comparison for $^{108}\text{Ag}(\text{n},2\text{n})$ reaction.

Figure 301: Cross-section comparison for $^{108}\text{Ag}(\text{n},\text{g})$ reaction.

Figure 302: Cross-section comparison for $^{108}\text{Ag}(\text{n},\text{incl})$ reaction.

Figure 303: Cross-section comparison for $^{108}\text{Ag}(n, n'_1)$ reaction.

Figure 304: Cross-section comparison for $^{108}\text{Ag}(n, n'_2)$ reaction.

Figure 305: Cross-section comparison for $^{108}\text{Ag}(n, n'_3)$ reaction.

8.39 ^{112}Ag (EMPIRE only)

Figure 306: Cross-section comparison for $^{112}\text{Ag}(\text{n},\text{total})$ reaction.

Figure 307: Cross-section comparison for $^{112}\text{Ag}(\text{n},\text{elastic})$ reaction.

Figure 308: Cross-section comparison for $^{112}\text{Ag}(\text{n},2\text{n})$ reaction.

Figure 309: Cross-section comparison for $^{112}\text{Ag}(\text{n},\text{g})$ reaction.

Figure 310: Cross-section comparison for $^{112}\text{Ag}(\text{n},\text{incl})$ reaction.

Figure 311: Cross-section comparison for $^{112}\text{Ag}(n,n'_1)$ reaction.

Figure 312: Cross-section comparison for $^{112}\text{Ag}(n,n'_2)$ reaction.

Figure 313: Cross-section comparison for $^{112}\text{Ag}(n,n'_3)$ reaction.

8.40 ^{113}Ag (EMPIRE only)

Figure 314: Cross-section comparison for $^{113}\text{Ag}(n,\text{total})$ reaction.

Figure 315: Cross-section comparison for $^{113}\text{Ag}(n,\text{elastic})$ reaction.

Figure 316: Cross-section comparison for $^{113}\text{Ag}(n,2n)$ reaction.

Figure 317: Cross-section comparison for $^{113}\text{Ag}(n,g)$ reaction.

Figure 318: Cross-section comparison for $^{113}\text{Ag}(n,\text{incl})$ reaction.

Figure 319: Cross-section comparison for $^{113}\text{Ag}(n,n'_1)$ reaction.

Figure 320: Cross-section comparison for $^{113}\text{Ag}(n,n'_2)$ reaction.

Figure 321: Cross-section comparison for $^{113}\text{Ag}(n,n'_3)$ reaction.

8.41 ^{114}Ag (EMPIRE only)

Figure 322: Cross-section comparison for $^{114}\text{Ag}(n,\text{total})$ reaction.

Figure 323: Cross-section comparison for $^{114}\text{Ag}(n,\text{elastic})$ reaction.

Figure 324: Cross-section comparison for $^{114}\text{Ag}(n,2n)$ reaction.

Figure 325: Cross-section comparison for $^{114}\text{Ag}(n,g)$ reaction.

Figure 326: Cross-section comparison for $^{114}\text{Ag}(n,\text{incl})$ reaction.

Figure 327: Cross-section comparison for $^{114}\text{Ag}(n,n'_1)$ reaction.

Figure 328: Cross-section comparison for $^{114}\text{Ag}(n,n'_2)$ reaction.

Figure 329: Cross-section comparison for $^{114}\text{Ag}(n,n'_3)$ reaction.

8.42 ^{115}Ag (EMPIRE only)

Figure 330: Cross-section comparison for $^{115}\text{Ag}(n,\text{total})$ reaction.

Figure 331: Cross-section comparison for $^{115}\text{Ag}(n,\text{elastic})$ reaction.

Figure 332: Cross-section comparison for $^{115}\text{Ag}(n,2n)$ reaction.

Figure 333: Cross-section comparison for $^{115}\text{Ag}(n,g)$ reaction.

Figure 334: Cross-section comparison for $^{115}\text{Ag}(n,\text{incl})$ reaction.

Figure 335: Cross-section comparison for $^{115}\text{Ag}(n,n'_1)$ reaction.

Figure 336: Cross-section comparison for $^{115}\text{Ag}(n,n'_2)$ reaction.

Figure 337: Cross-section comparison for $^{115}\text{Ag}(n,n'_3)$ reaction.

8.43 ^{116}Ag (EMPIRE only)

Figure 338: Cross-section comparison for $^{116}\text{Ag}(n,\text{total})$ reaction.

Figure 339: Cross-section comparison for $^{116}\text{Ag}(n,\text{elastic})$ reaction.

Figure 340: Cross-section comparison for $^{116}\text{Ag}(n,2n)$ reaction.

Figure 341: Cross-section comparison for $^{116}\text{Ag}(n,g)$ reaction.

Figure 342: Cross-section comparison for $^{116}\text{Ag}(n,\text{incl})$ reaction.

Figure 343: Cross-section comparison for $^{116}\text{Ag}(n,n'_1)$ reaction.

Figure 344: Cross-section comparison for $^{116}\text{Ag}(n,n'_2)$ reaction.

Figure 345: Cross-section comparison for $^{116}\text{Ag}(n,n'_3)$ reaction.

8.44 ^{117}Ag (EMPIRE only)

Figure 346: Cross-section comparison for $^{117}\text{Ag}(n,\text{total})$ reaction.

Figure 347: Cross-section comparison for $^{117}\text{Ag}(n,\text{elastic})$ reaction.

Figure 348: Cross-section comparison for $^{117}\text{Ag}(n,2n)$ reaction.

Figure 349: Cross-section comparison for $^{117}\text{Ag}(n,g)$ reaction.

Figure 350: Cross-section comparison for $^{117}\text{Ag}(n,\text{incl})$ reaction.

Figure 351: Cross-section comparison for $^{117}\text{Ag}(n,n'_1)$ reaction.

Figure 352: Cross-section comparison for $^{117}\text{Ag}(n,n'_2)$ reaction.

Figure 353: Cross-section comparison for $^{117}\text{Ag}(n,n'_3)$ reaction.

8.45 ^{118m}Ag

Figure 354: Cross-section comparison for $^{118m}\text{Ag}(n,\text{total})$ reaction.

Figure 355: Cross-section comparison for $^{118m}\text{Ag}(n,\text{elastic})$ reaction.

Figure 356: Cross-section comparison for $^{118m}\text{Ag}(n,2n)$ reaction.

Figure 357: Cross-section comparison for $^{118m}\text{Ag}(n,g)$ reaction.

Figure 358: Cross-section comparison for $^{118m}\text{Ag}(n,\text{incl})$ reaction.

Figure 359: Cross-section comparison for $^{118m}\text{Ag}(n,n'_1)$ reaction.

Figure 360: Cross-section comparison for $^{118m}\text{Ag}(n,n'_2)$ reaction.

Figure 361: Cross-section comparison for $^{118m}\text{Ag}(n,n'_3)$ reaction.

8.46 ^{107}Cd (EMPIRE only)

Figure 362: Cross-section comparison for $^{107}\text{Cd}(n,\text{total})$ reaction.

Figure 363: Cross-section comparison for $^{107}\text{Cd}(n,\text{elastic})$ reaction.

Figure 364: Cross-section comparison for $^{107}\text{Cd}(n,2n)$ reaction.

Figure 365: Cross-section comparison for $^{107}\text{Cd}(n,g)$ reaction.

Figure 366: Cross-section comparison for $^{107}\text{Cd}(n,\text{inel})$ reaction.

Figure 367: Cross-section comparison for $^{107}\text{Cd}(n,n'_1)$ reaction.

Figure 368: Cross-section comparison for $^{107}\text{Cd}(n,n'_2)$ reaction.

Figure 369: Cross-section comparison for $^{107}\text{Cd}(n,n'_3)$ reaction.

8.47 ^{109}Cd

Figure 370: Cross-section comparison for $^{109}\text{Cd}(n,\text{total})$ reaction.

Figure 371: Cross-section comparison for $^{109}\text{Cd}(n,\text{elastic})$ reaction.

Figure 372: Cross-section comparison for $^{109}\text{Cd}(n,2n)$ reaction.

Figure 373: Cross-section comparison for $^{109}\text{Cd}(n,g)$ reaction.

Figure 374: Cross-section comparison for $^{109}\text{Cd}(n,\text{incl})$ reaction.

Figure 375: Cross-section comparison for $^{109}\text{Cd}(n,n'_1)$ reaction.

Figure 376: Cross-section comparison for $^{109}\text{Cd}(n,n'_2)$ reaction.

Figure 377: Cross-section comparison for $^{109}\text{Cd}(n,n'_3)$ reaction.

8.48 ^{114}In (EMPIRE only)

Figure 378: Cross-section comparison for $^{114}\text{In}(n,\text{total})$ reaction.

Figure 379: Cross-section comparison for $^{114}\text{In}(n,\text{elastic})$ reaction.

Figure 380: Cross-section comparison for $^{114}\text{In}(n,2n)$ reaction.

Figure 381: Cross-section comparison for $^{114}\text{In}(n,g)$ reaction.

Figure 382: Cross-section comparison for $^{114}\text{In}(n,\text{incl})$ reaction.

Figure 383: Cross-section comparison for $^{114}\text{In}(n,n'_1)$ reaction.

Figure 384: Cross-section comparison for $^{114}\text{In}(n,n'_2)$ reaction.

Figure 385: Cross-section comparison for $^{114}\text{In}(n,n'_3)$ reaction.

8.49 ^{121m}Sn

Figure 386: Cross-section comparison for $^{121m}\text{Sn}(n,\text{total})$ reaction.

Figure 387: Cross-section comparison for $^{121m}\text{Sn}(n,\text{elastic})$ reaction.

Figure 388: Cross-section comparison for $^{121m}\text{Sn}(n,2n)$ reaction.

Figure 389: Cross-section comparison for $^{121m}\text{Sn}(n,g)$ reaction.

Figure 390: Cross-section comparison for $^{121m}\text{Sn}(n,\text{inel})$ reaction.

Figure 391: Cross-section comparison for $^{121m}\text{Sn}(n,n'_1)$ reaction.

Figure 392: Cross-section comparison for $^{121m}\text{Sn}(n,n'_2)$ reaction.

Figure 393: Cross-section comparison for $^{121m}\text{Sn}(n,n'_3)$ reaction.

8.50 ^{122}Sb (EMPIRE only)

Figure 394: Cross-section comparison for $^{122}\text{Sb}(n,\text{total})$ reaction.

Figure 395: Cross-section comparison for $^{122}\text{Sb}(n,\text{elastic})$ reaction.

Figure 396: Cross-section comparison for $^{122}\text{Sb}(n,2n)$ reaction.

Figure 397: Cross-section comparison for $^{122}\text{Sb}(n,g)$ reaction.

Figure 398: Cross-section comparison for $^{122}\text{Sb}(n,\text{incl})$ reaction.

Figure 399: Cross-section comparison for $^{122}\text{Sb}(n,n'_1)$ reaction.

Figure 400: Cross-section comparison for $^{122}\text{Sb}(n,n'_2)$ reaction.

Figure 401: Cross-section comparison for $^{122}\text{Sb}(n,n'_3)$ reaction.

8.51 ^{121}Te (EMPIRE only)

Figure 402: Cross-section comparison for $^{121}\text{Te}(n,\text{total})$ reaction.

Figure 403: Cross-section comparison for $^{121}\text{Te}(n,\text{elastic})$ reaction.

Figure 404: Cross-section comparison for $^{121}\text{Te}(n,2n)$ reaction.

Figure 405: Cross-section comparison for $^{121}\text{Te}(n,g)$ reaction.

Figure 406: Cross-section comparison for $^{121}\text{Te}(n,\text{incl})$ reaction.

Figure 407: Cross-section comparison for $^{121}\text{Te}(n,n'_1)$ reaction.

Figure 408: Cross-section comparison for $^{121}\text{Te}(n,n'_2)$ reaction.

Figure 409: Cross-section comparison for $^{121}\text{Te}(n,n'_3)$ reaction.

8.52 ^{121m}Te (EMPIRE only)

Figure 410: Cross-section comparison for $^{121m}\text{Te}(n,\text{total})$ reaction.

Figure 411: Cross-section comparison for $^{121m}\text{Te}(n,\text{elastic})$ reaction.

Figure 412: Cross-section comparison for $^{121m}\text{Te}(n,2n)$ reaction.

Figure 413: Cross-section comparison for $^{121m}\text{Te}(n,g)$ reaction.

Figure 414: Cross-section comparison for $^{121m}\text{Te}(n,\text{inel})$ reaction.

Figure 415: Cross-section comparison for $^{121m}\text{Te}(n,n'_1)$ reaction.

Figure 416: Cross-section comparison for $^{121m}\text{Te}(n,n'_2)$ reaction.

Figure 417: Cross-section comparison for $^{121m}\text{Te}(n,n'_3)$ reaction.

8.53 ^{131}Te (EMPIRE only)

Figure 418: Cross-section comparison for $^{131}\text{Te}(n,\text{total})$ reaction.

Figure 419: Cross-section comparison for $^{131}\text{Te}(n,\text{elastic})$ reaction.

Figure 420: Cross-section comparison for $^{131}\text{Te}(n,2n)$ reaction.

Figure 421: Cross-section comparison for $^{131}\text{Te}(n,g)$ reaction.

Figure 422: Cross-section comparison for $^{131}\text{Te}(n,\text{incl})$ reaction.

Figure 423: Cross-section comparison for $^{131}\text{Te}(n, n'_1)$ reaction.

Figure 424: Cross-section comparison for $^{131}\text{Te}(n, n'_2)$ reaction.

Figure 425: Cross-section comparison for $^{131}\text{Te}(n, n'_3)$ reaction.

8.54 ^{131m}Te (EMPIRE only)

Figure 426: Cross-section comparison for $^{131m}\text{Te}(n,\text{total})$ reaction.

Figure 427: Cross-section comparison for $^{131m}\text{Te}(n,\text{elastic})$ reaction.

Figure 428: Cross-section comparison for $^{131m}\text{Te}(n,2n)$ reaction.

Figure 429: Cross-section comparison for $^{131m}\text{Te}(n,g)$ reaction.

Figure 430: Cross-section comparison for $^{131m}\text{Te}(n,\text{incl})$ reaction.

Figure 431: Cross-section comparison for $^{131m}\text{Te}(n,n'_1)$ reaction.

Figure 432: Cross-section comparison for $^{131m}\text{Te}(n,n'_2)$ reaction.

Figure 433: Cross-section comparison for $^{131m}\text{Te}(n,n'_3)$ reaction.

8.55 ^{128}I (EMPIRE only)

Figure 434: Cross-section comparison for $^{128}\text{I}(\text{n},\text{total})$ reaction.

Figure 435: Cross-section comparison for $^{128}\text{I}(\text{n},\text{elastic})$ reaction.

Figure 436: Cross-section comparison for $^{128}\text{I}(\text{n},2\text{n})$ reaction.

Figure 437: Cross-section comparison for $^{128}\text{I}(\text{n},\text{g})$ reaction.

Figure 438: Cross-section comparison for $^{128}\text{I}(\text{n},\text{inel})$ reaction.

Figure 439: Cross-section comparison for $^{128}\text{I}(\text{n},\text{n}'_1)$ reaction.

Figure 440: Cross-section comparison for $^{128}\text{I}(\text{n},\text{n}'_2)$ reaction.

Figure 441: Cross-section comparison for $^{128}\text{I}(\text{n},\text{n}'_3)$ reaction.

8.56 ^{132}I (EMPIRE only)

Figure 442: Cross-section comparison for $^{132}\text{I}(\text{n},\text{total})$ reaction.

Figure 443: Cross-section comparison for $^{132}\text{I}(\text{n},\text{elastic})$ reaction.

Figure 444: Cross-section comparison for $^{132}\text{I}(\text{n},2\text{n})$ reaction.

Figure 445: Cross-section comparison for $^{132}\text{I}(\text{n},\text{g})$ reaction.

Figure 446: Cross-section comparison for $^{132}\text{I}(\text{n},\text{inel})$ reaction.

Figure 447: Cross-section comparison for $^{132}\text{I}(\text{n}, \text{n}'_1)$ reaction.

Figure 448: Cross-section comparison for $^{132}\text{I}(\text{n}, \text{n}'_2)$ reaction.

Figure 449: Cross-section comparison for $^{132}\text{I}(\text{n}, \text{n}'_3)$ reaction.

8.57 ^{132m}I (EMPIRE only)

Figure 450: Cross-section comparison for $^{132m}\text{I}(\text{n},\text{total})$ reaction.

Figure 451: Cross-section comparison for $^{132m}\text{I}(\text{n},\text{elastic})$ reaction.

Figure 452: Cross-section comparison for $^{132m}\text{I}(\text{n},2\text{n})$ reaction.

Figure 453: Cross-section comparison for $^{132m}\text{I}(\text{n},\text{g})$ reaction.

Figure 454: Cross-section comparison for $^{132m}\text{I}(\text{n},\text{incl})$ reaction.

Figure 455: Cross-section comparison for $^{132m}\text{I}(n,n'_1)$ reaction.

Figure 456: Cross-section comparison for $^{132m}\text{I}(n,n'_2)$ reaction.

Figure 457: Cross-section comparison for $^{132m}\text{I}(n,n'_3)$ reaction.

8.58 ^{133}I (EMPIRE only)

Figure 458: Cross-section comparison for $^{133}\text{I}(\text{n},\text{total})$ reaction.

Figure 459: Cross-section comparison for $^{133}\text{I}(\text{n},\text{elastic})$ reaction.

Figure 460: Cross-section comparison for $^{133}\text{I}(\text{n},2\text{n})$ reaction.

Figure 461: Cross-section comparison for $^{133}\text{I}(\text{n},\text{g})$ reaction.

Figure 462: Cross-section comparison for $^{133}\text{I}(\text{n},\text{inel})$ reaction.

Figure 463: Cross-section comparison for $^{133}\text{I}(n, n'_1)$ reaction.

Figure 464: Cross-section comparison for $^{133}\text{I}(n, n'_2)$ reaction.

Figure 465: Cross-section comparison for $^{133}\text{I}(n, n'_3)$ reaction.

8.59 ^{134}I (EMPIRE only)

Figure 466: Cross-section comparison for $^{134}\text{I}(\text{n},\text{total})$ reaction.

Figure 467: Cross-section comparison for $^{134}\text{I}(\text{n},\text{elastic})$ reaction.

Figure 468: Cross-section comparison for $^{134}\text{I}(\text{n},2\text{n})$ reaction.

Figure 469: Cross-section comparison for $^{134}\text{I}(\text{n},\text{g})$ reaction.

Figure 470: Cross-section comparison for $^{134}\text{I}(\text{n},\text{inel})$ reaction.

Figure 471: Cross-section comparison for $^{134}\text{I}(\text{n},\text{n}'_1)$ reaction.

Figure 472: Cross-section comparison for $^{134}\text{I}(\text{n},\text{n}'_2)$ reaction.

Figure 473: Cross-section comparison for $^{134}\text{I}(\text{n},\text{n}'_3)$ reaction.

8.60 ^{125}Xe (EMPIRE only)

Figure 474: Cross-section comparison for $^{125}\text{Xe}(n,\text{total})$ reaction.

Figure 475: Cross-section comparison for $^{125}\text{Xe}(n,\text{elastic})$ reaction.

Figure 476: Cross-section comparison for $^{125}\text{Xe}(n,2n)$ reaction.

Figure 477: Cross-section comparison for $^{125}\text{Xe}(n,g)$ reaction.

Figure 478: Cross-section comparison for $^{125}\text{Xe}(n,\text{incl})$ reaction.

Figure 479: Cross-section comparison for $^{125}\text{Xe}(n,n'_1)$ reaction.

Figure 480: Cross-section comparison for $^{125}\text{Xe}(n,n'_2)$ reaction.

Figure 481: Cross-section comparison for $^{125}\text{Xe}(n,n'_3)$ reaction.

8.61 ^{127}Xe (EMPIRE only)

Figure 482: Cross-section comparison for $^{127}\text{Xe}(n,\text{total})$ reaction.

Figure 483: Cross-section comparison for $^{127}\text{Xe}(n,\text{elastic})$ reaction.

Figure 484: Cross-section comparison for $^{127}\text{Xe}(n,2n)$ reaction.

Figure 485: Cross-section comparison for $^{127}\text{Xe}(n,g)$ reaction.

Figure 486: Cross-section comparison for $^{127}\text{Xe}(n,\text{incl})$ reaction.

Figure 487: Cross-section comparison for $^{127}\text{Xe}(n,n'_1)$ reaction.

Figure 488: Cross-section comparison for $^{127}\text{Xe}(n,n'_2)$ reaction.

Figure 489: Cross-section comparison for $^{127}\text{Xe}(n,n'_3)$ reaction.

8.62 ^{131}Ba (EMPIRE only)

Figure 490: Cross-section comparison for $^{131}\text{Ba}(n,\text{total})$ reaction.

Figure 491: Cross-section comparison for $^{131}\text{Ba}(n,\text{elastic})$ reaction.

Figure 492: Cross-section comparison for $^{131}\text{Ba}(n,2n)$ reaction.

Figure 493: Cross-section comparison for $^{131}\text{Ba}(n,g)$ reaction.

Figure 494: Cross-section comparison for $^{131}\text{Ba}(n,\text{incl})$ reaction.

Figure 495: Cross-section comparison for $^{131}\text{Ba}(n,n'_1)$ reaction.

Figure 496: Cross-section comparison for $^{131}\text{Ba}(n,n'_2)$ reaction.

Figure 497: Cross-section comparison for $^{131}\text{Ba}(n,n'_3)$ reaction.

8.63 ^{139}Ba (EMPIRE only)

Figure 498: Cross-section comparison for $^{139}\text{Ba}(n,\text{total})$ reaction.

Figure 499: Cross-section comparison for $^{139}\text{Ba}(n,\text{elastic})$ reaction.

Figure 500: Cross-section comparison for $^{139}\text{Ba}(n,2n)$ reaction.

Figure 501: Cross-section comparison for $^{139}\text{Ba}(n,g)$ reaction.

Figure 502: Cross-section comparison for $^{139}\text{Ba}(n,\text{incl})$ reaction.

Figure 503: Cross-section comparison for $^{139}\text{Ba}(n,n'_1)$ reaction.

Figure 504: Cross-section comparison for $^{139}\text{Ba}(n,n'_2)$ reaction.

Figure 505: Cross-section comparison for $^{139}\text{Ba}(n,n'_3)$ reaction.

8.64 ^{137}Ce (EMPIRE only)

Figure 506: Cross-section comparison for $^{137}\text{Ce}(n,\text{total})$ reaction.

Figure 507: Cross-section comparison for $^{137}\text{Ce}(n,\text{elastic})$ reaction.

Figure 508: Cross-section comparison for $^{137}\text{Ce}(n,2n)$ reaction.

Figure 509: Cross-section comparison for $^{137}\text{Ce}(n,g)$ reaction.

Figure 510: Cross-section comparison for $^{137}\text{Ce}(n,\text{incl})$ reaction.

Figure 511: Cross-section comparison for $^{137}\text{Ce}(n, n'_1)$ reaction.

Figure 512: Cross-section comparison for $^{137}\text{Ce}(n, n'_2)$ reaction.

Figure 513: Cross-section comparison for $^{137}\text{Ce}(n, n'_3)$ reaction.

8.65 ^{137m}Ce (EMPIRE only)

Figure 514: Cross-section comparison for $^{137m}\text{Ce}(n,\text{total})$ reaction.

Figure 515: Cross-section comparison for $^{137m}\text{Ce}(n,\text{elastic})$ reaction.

Figure 516: Cross-section comparison for $^{137m}\text{Ce}(n,2n)$ reaction.

Figure 517: Cross-section comparison for $^{137m}\text{Ce}(n,g)$ reaction.

Figure 518: Cross-section comparison for $^{137m}\text{Ce}(n,\text{inel})$ reaction.

Figure 519: Cross-section comparison for $^{137m}\text{Ce}(n,n'_1)$ reaction.

Figure 520: Cross-section comparison for $^{137m}\text{Ce}(n,n'_2)$ reaction.

Figure 521: Cross-section comparison for $^{137m}\text{Ce}(n,n'_3)$ reaction.

8.66 ^{149}Nd (EMPIRE only)

Figure 522: Cross-section comparison for $^{149}\text{Nd}(n,\text{total})$ reaction.

Figure 523: Cross-section comparison for $^{149}\text{Nd}(n,\text{elastic})$ reaction.

Figure 524: Cross-section comparison for $^{149}\text{Nd}(n,2n)$ reaction.

Figure 525: Cross-section comparison for $^{149}\text{Nd}(n,g)$ reaction.

Figure 526: Cross-section comparison for $^{149}\text{Nd}(n,\text{inel})$ reaction.

Figure 527: Cross-section comparison for $^{149}\text{Nd}(n,n'_1)$ reaction.

Figure 528: Cross-section comparison for $^{149}\text{Nd}(n,n'_2)$ reaction.

Figure 529: Cross-section comparison for $^{149}\text{Nd}(n,n'_3)$ reaction.

8.67 ^{143}Pm

Figure 530: Cross-section comparison for $^{143}\text{Pm}(n,\text{total})$ reaction.

Figure 531: Cross-section comparison for $^{143}\text{Pm}(n,\text{elastic})$ reaction.

Figure 532: Cross-section comparison for $^{143}\text{Pm}(n,2n)$ reaction.

Figure 533: Cross-section comparison for $^{143}\text{Pm}(n,g)$ reaction.

Figure 534: Cross-section comparison for $^{143}\text{Pm}(n,\text{inel})$ reaction.

Figure 535: Cross-section comparison for $^{143}\text{Pm}(n,n'_1)$ reaction.

Figure 536: Cross-section comparison for $^{143}\text{Pm}(n,n'_2)$ reaction.

Figure 537: Cross-section comparison for $^{143}\text{Pm}(n,n'_3)$ reaction.

8.68 ^{144}Pm

Figure 538: Cross-section comparison for $^{144}\text{Pm}(n,\text{total})$ reaction.

Figure 539: Cross-section comparison for $^{144}\text{Pm}(n,\text{elastic})$ reaction.

Figure 540: Cross-section comparison for $^{144}\text{Pm}(n,2n)$ reaction.

Figure 541: Cross-section comparison for $^{144}\text{Pm}(n,g)$ reaction.

Figure 542: Cross-section comparison for $^{144}\text{Pm}(n,\text{inel})$ reaction.

Figure 543: Cross-section comparison for $^{144}\text{Pm}(n,n'_1)$ reaction.

Figure 544: Cross-section comparison for $^{144}\text{Pm}(n,n'_2)$ reaction.

Figure 545: Cross-section comparison for $^{144}\text{Pm}(n,n'_3)$ reaction.

8.69 ^{145}Pm

Figure 546: Cross-section comparison for $^{145}\text{Pm}(n,\text{total})$ reaction.

Figure 547: Cross-section comparison for $^{145}\text{Pm}(n,\text{elastic})$ reaction.

Figure 548: Cross-section comparison for $^{145}\text{Pm}(n,2n)$ reaction.

Figure 549: Cross-section comparison for $^{145}\text{Pm}(n,g)$ reaction.

Figure 550: Cross-section comparison for $^{145}\text{Pm}(n,\text{inel})$ reaction.

Figure 551: Cross-section comparison for $^{145}\text{Pm}(n,n'_1)$ reaction.

Figure 552: Cross-section comparison for $^{145}\text{Pm}(n,n'_2)$ reaction.

Figure 553: Cross-section comparison for $^{145}\text{Pm}(n,n'_3)$ reaction.

8.70 ^{146}Pm

Figure 554: Cross-section comparison for $^{146}\text{Pm}(n,\text{total})$ reaction.

Figure 555: Cross-section comparison for $^{146}\text{Pm}(n,\text{elastic})$ reaction.

Figure 556: Cross-section comparison for $^{146}\text{Pm}(n,2n)$ reaction.

Figure 557: Cross-section comparison for $^{146}\text{Pm}(n,g)$ reaction.

Figure 558: Cross-section comparison for $^{146}\text{Pm}(n,\text{incl})$ reaction.

Figure 559: Cross-section comparison for $^{146}\text{Pm}(n,n'_1)$ reaction.

Figure 560: Cross-section comparison for $^{146}\text{Pm}(n,n'_2)$ reaction.

Figure 561: Cross-section comparison for $^{146}\text{Pm}(n,n'_3)$ reaction.

8.71 ^{150}Pm (EMPIRE only)

Figure 562: Cross-section comparison for $^{150}\text{Pm}(n,\text{total})$ reaction.

Figure 563: Cross-section comparison for $^{150}\text{Pm}(n,\text{elastic})$ reaction.

Figure 564: Cross-section comparison for $^{150}\text{Pm}(n,2n)$ reaction.

Figure 565: Cross-section comparison for $^{150}\text{Pm}(n,g)$ reaction.

Figure 566: Cross-section comparison for $^{150}\text{Pm}(n,\text{inel})$ reaction.

Figure 567: Cross-section comparison for $^{150}\text{Pm}(n,n'_1)$ reaction.

Figure 568: Cross-section comparison for $^{150}\text{Pm}(n,n'_2)$ reaction.

Figure 569: Cross-section comparison for $^{150}\text{Pm}(n,n'_3)$ reaction.

8.72 ^{145}Sm

Figure 570: Cross-section comparison for $^{145}\text{Sm}(n,\text{total})$ reaction.

Figure 571: Cross-section comparison for $^{145}\text{Sm}(n,\text{elastic})$ reaction.

Figure 572: Cross-section comparison for $^{145}\text{Sm}(n,2n)$ reaction.

Figure 573: Cross-section comparison for $^{145}\text{Sm}(n,g)$ reaction.

Figure 574: Cross-section comparison for $^{145}\text{Sm}(n,\text{inel})$ reaction.

Figure 575: Cross-section comparison for $^{145}\text{Sm}(n,n'_1)$ reaction.

Figure 576: Cross-section comparison for $^{145}\text{Sm}(n,n'_2)$ reaction.

Figure 577: Cross-section comparison for $^{145}\text{Sm}(n,n'_3)$ reaction.

8.73 ^{146}Sm (EMPIRE only)

Figure 578: Cross-section comparison for $^{146}\text{Sm}(n,\text{total})$ reaction.

Figure 579: Cross-section comparison for $^{146}\text{Sm}(n,\text{elastic})$ reaction.

Figure 580: Cross-section comparison for $^{146}\text{Sm}(n,2n)$ reaction.

Figure 581: Cross-section comparison for $^{146}\text{Sm}(n,g)$ reaction.

Figure 582: Cross-section comparison for $^{146}\text{Sm}(n,\text{incl})$ reaction.

Figure 583: Cross-section comparison for $^{146}\text{Sm}(n,n'_1)$ reaction.

Figure 584: Cross-section comparison for $^{146}\text{Sm}(n,n'_2)$ reaction.

Figure 585: Cross-section comparison for $^{146}\text{Sm}(n,n'_3)$ reaction.

8.74 ^{159}Gd (EMPIRE only)

Figure 586: Cross-section comparison for $^{159}\text{Gd}(n,\text{total})$ reaction.

Figure 587: Cross-section comparison for $^{159}\text{Gd}(n,\text{elastic})$ reaction.

Figure 588: Cross-section comparison for $^{159}\text{Gd}(n,2n)$ reaction.

Figure 589: Cross-section comparison for $^{159}\text{Gd}(n,g)$ reaction.

Figure 590: Cross-section comparison for $^{159}\text{Gd}(n,\text{inel})$ reaction.

Figure 591: Cross-section comparison for $^{159}\text{Gd}(n,n'_1)$ reaction.

Figure 592: Cross-section comparison for $^{159}\text{Gd}(n,n'_2)$ reaction.

Figure 593: Cross-section comparison for $^{159}\text{Gd}(n,n'_3)$ reaction.

8.75 ^{158}Tb

Figure 594: Cross-section comparison for $^{158}\text{Tb}(n,\text{total})$ reaction.

Figure 595: Cross-section comparison for $^{158}\text{Tb}(n,\text{elastic})$ reaction.

Figure 596: Cross-section comparison for $^{158}\text{Tb}(n,2n)$ reaction.

Figure 597: Cross-section comparison for $^{158}\text{Tb}(n,g)$ reaction.

Figure 598: Cross-section comparison for $^{158}\text{Tb}(n,\text{inel})$ reaction.

Figure 599: Cross-section comparison for $^{158}\text{Tb}(n,n'_1)$ reaction.

Figure 600: Cross-section comparison for $^{158}\text{Tb}(n,n'_2)$ reaction.

Figure 601: Cross-section comparison for $^{158}\text{Tb}(n,n'_3)$ reaction.

8.76 ^{161}Tb

Figure 602: Cross-section comparison for $^{161}\text{Tb}(n,\text{total})$ reaction.

Figure 603: Cross-section comparison for $^{161}\text{Tb}(n,\text{elastic})$ reaction.

Figure 604: Cross-section comparison for $^{161}\text{Tb}(n,2n)$ reaction.

Figure 605: Cross-section comparison for $^{161}\text{Tb}(n,g)$ reaction.

Figure 606: Cross-section comparison for $^{161}\text{Tb}(n,\text{inel})$ reaction.

Figure 607: Cross-section comparison for $^{161}\text{Tb}(n,n'_1)$ reaction.

Figure 608: Cross-section comparison for $^{161}\text{Tb}(n,n'_2)$ reaction.

Figure 609: Cross-section comparison for $^{161}\text{Tb}(n,n'_3)$ reaction.

8.77 ^{155}Dy (EMPIRE only)

Figure 610: Cross-section comparison for $^{155}\text{Dy}(n,\text{total})$ reaction.

Figure 611: Cross-section comparison for $^{155}\text{Dy}(n,\text{elastic})$ reaction.

Figure 612: Cross-section comparison for $^{155}\text{Dy}(n,2n)$ reaction.

Figure 613: Cross-section comparison for $^{155}\text{Dy}(n,g)$ reaction.

Figure 614: Cross-section comparison for $^{155}\text{Dy}(n,\text{inel})$ reaction.

Figure 615: Cross-section comparison for $^{155}\text{Dy}(n,n'_1)$ reaction.

Figure 616: Cross-section comparison for $^{155}\text{Dy}(n,n'_2)$ reaction.

Figure 617: Cross-section comparison for $^{155}\text{Dy}(n,n'_3)$ reaction.

8.78 ^{157}Dy (EMPIRE only)

Figure 618: Cross-section comparison for $^{157}\text{Dy}(n,\text{total})$ reaction.

Figure 619: Cross-section comparison for $^{157}\text{Dy}(n,\text{elastic})$ reaction.

Figure 620: Cross-section comparison for $^{157}\text{Dy}(n,2n)$ reaction.

Figure 621: Cross-section comparison for $^{157}\text{Dy}(n,g)$ reaction.

Figure 622: Cross-section comparison for $^{157}\text{Dy}(n,\text{inel})$ reaction.

Figure 623: Cross-section comparison for $^{157}\text{Dy}(n, n'_1)$ reaction.

Figure 624: Cross-section comparison for $^{157}\text{Dy}(n, n'_2)$ reaction.

Figure 625: Cross-section comparison for $^{157}\text{Dy}(n, n'_3)$ reaction.

8.79 ^{163}Er (EMPIRE only)

Figure 626: Cross-section comparison for $^{163}\text{Er}(n,\text{total})$ reaction.

Figure 627: Cross-section comparison for $^{163}\text{Er}(n,\text{elastic})$ reaction.

Figure 628: Cross-section comparison for $^{163}\text{Er}(n,2n)$ reaction.

Figure 629: Cross-section comparison for $^{163}\text{Er}(n,g)$ reaction.

Figure 630: Cross-section comparison for $^{163}\text{Er}(n,\text{incl})$ reaction.

Figure 631: Cross-section comparison for $^{163}\text{Er}(n,n'_1)$ reaction.

Figure 632: Cross-section comparison for $^{163}\text{Er}(n,n'_2)$ reaction.

Figure 633: Cross-section comparison for $^{163}\text{Er}(n,n'_3)$ reaction.

8.80 ^{165}Er (EMPIRE only)

Figure 634: Cross-section comparison for $^{165}\text{Er}(n,\text{total})$ reaction.

Figure 635: Cross-section comparison for $^{165}\text{Er}(n,\text{elastic})$ reaction.

Figure 636: Cross-section comparison for $^{165}\text{Er}(n,2n)$ reaction.

Figure 637: Cross-section comparison for $^{165}\text{Er}(n,g)$ reaction.

Figure 638: Cross-section comparison for $^{165}\text{Er}(n,\text{inel})$ reaction.

Figure 639: Cross-section comparison for $^{165}\text{Er}(n,n'_1)$ reaction.

Figure 640: Cross-section comparison for $^{165}\text{Er}(n,n'_2)$ reaction.

Figure 641: Cross-section comparison for $^{165}\text{Er}(n,n'_3)$ reaction.

8.81 ^{169}Er

Figure 642: Cross-section comparison for $^{169}\text{Er}(n,\text{total})$ reaction.

Figure 643: Cross-section comparison for $^{169}\text{Er}(n,\text{elastic})$ reaction.

Figure 644: Cross-section comparison for $^{169}\text{Er}(n,2n)$ reaction.

Figure 645: Cross-section comparison for $^{169}\text{Er}(n,g)$ reaction.

Figure 646: Cross-section comparison for $^{169}\text{Er}(n,\text{inel})$ reaction.

Figure 647: Cross-section comparison for $^{169}\text{Er}(n,n'_1)$ reaction.

Figure 648: Cross-section comparison for $^{169}\text{Er}(n,n'_2)$ reaction.

Figure 649: Cross-section comparison for $^{169}\text{Er}(n,n'_3)$ reaction.

8.82 ^{171}Tm

Figure 650: Cross-section comparison for $^{171}\text{Tm}(n,\text{total})$ reaction.

Figure 651: Cross-section comparison for $^{171}\text{Tm}(n,\text{elastic})$ reaction.

Figure 652: Cross-section comparison for $^{171}\text{Tm}(n,2n)$ reaction.

Figure 653: Cross-section comparison for $^{171}\text{Tm}(n,g)$ reaction.

Figure 654: Cross-section comparison for $^{171}\text{Tm}(n,\text{inel})$ reaction.

Figure 655: Cross-section comparison for $^{171}\text{Tm}(n,n'_1)$ reaction.

Figure 656: Cross-section comparison for $^{171}\text{Tm}(n,n'_2)$ reaction.

Figure 657: Cross-section comparison for $^{171}\text{Tm}(n,n'_3)$ reaction.

8.83 ^{169}Yb

Figure 658: Cross-section comparison for $^{169}\text{Yb}(n,\text{total})$ reaction.

Figure 659: Cross-section comparison for $^{169}\text{Yb}(n,\text{elastic})$ reaction.

Figure 660: Cross-section comparison for $^{169}\text{Yb}(n,2n)$ reaction.

Figure 661: Cross-section comparison for $^{169}\text{Yb}(n,g)$ reaction.

Figure 662: Cross-section comparison for $^{169}\text{Yb}(n,\text{inel})$ reaction.

Figure 663: Cross-section comparison for $^{169}\text{Yb}(n, n'_1)$ reaction.

Figure 664: Cross-section comparison for $^{169}\text{Yb}(n, n'_2)$ reaction.

Figure 665: Cross-section comparison for $^{169}\text{Yb}(n, n'_3)$ reaction.

8.84 ^{175}Yb

Figure 666: Cross-section comparison for $^{175}\text{Yb}(n,\text{total})$ reaction.

Figure 667: Cross-section comparison for $^{175}\text{Yb}(n,\text{elastic})$ reaction.

Figure 668: Cross-section comparison for $^{175}\text{Yb}(n,2n)$ reaction.

Figure 669: Cross-section comparison for $^{175}\text{Yb}(n,g)$ reaction.

Figure 670: Cross-section comparison for $^{175}\text{Yb}(n,\text{inel})$ reaction.

Figure 671: Cross-section comparison for $^{175}\text{Yb}(n,n'_1)$ reaction.

Figure 672: Cross-section comparison for $^{175}\text{Yb}(n,n'_2)$ reaction.

Figure 673: Cross-section comparison for $^{175}\text{Yb}(n,n'_3)$ reaction.

8.85 ^{175}Hf (EMPIRE only)

Figure 674: Cross-section comparison for $^{175}\text{Hf}(\text{n},\text{total})$ reaction.

Figure 675: Cross-section comparison for $^{175}\text{Hf}(\text{n},\text{elastic})$ reaction.

Figure 676: Cross-section comparison for $^{175}\text{Hf}(\text{n},2\text{n})$ reaction.

Figure 677: Cross-section comparison for $^{175}\text{Hf}(\text{n},\text{g})$ reaction.

Figure 678: Cross-section comparison for $^{175}\text{Hf}(\text{n},\text{incl})$ reaction.

Figure 679: Cross-section comparison for $^{175}\text{Hf}(n,n'_1)$ reaction.

Figure 680: Cross-section comparison for $^{175}\text{Hf}(n,n'_2)$ reaction.

Figure 681: Cross-section comparison for $^{175}\text{Hf}(n,n'_3)$ reaction.

8.86 ^{181}W

Figure 682: Cross-section comparison for $^{181}\text{W}(\text{n},\text{total})$ reaction.

Figure 683: Cross-section comparison for $^{181}\text{W}(\text{n},\text{elastic})$ reaction.

Figure 684: Cross-section comparison for $^{181}\text{W}(\text{n},2\text{n})$ reaction.

Figure 685: Cross-section comparison for $^{181}\text{W}(\text{n},\text{g})$ reaction.

Figure 686: Cross-section comparison for $^{181}\text{W}(\text{n},\text{incl})$ reaction.

Figure 687: Cross-section comparison for $^{181}\text{W}(n,n'_1)$ reaction.

Figure 688: Cross-section comparison for $^{181}\text{W}(n,n'_2)$ reaction.

Figure 689: Cross-section comparison for $^{181}\text{W}(n,n'_3)$ reaction.

8.87 ^{185}W

Figure 690: Cross-section comparison for $^{185}\text{W}(\text{n},\text{total})$ reaction.

Figure 691: Cross-section comparison for $^{185}\text{W}(\text{n},\text{elastic})$ reaction.

Figure 692: Cross-section comparison for $^{185}\text{W}(\text{n},2\text{n})$ reaction.

Figure 693: Cross-section comparison for $^{185}\text{W}(\text{n},\text{g})$ reaction.

Figure 694: Cross-section comparison for $^{185}\text{W}(\text{n},\text{incl})$ reaction.

Figure 695: Cross-section comparison for $^{185}\text{W}(n,n'_1)$ reaction.

Figure 696: Cross-section comparison for $^{185}\text{W}(n,n'_2)$ reaction.

Figure 697: Cross-section comparison for $^{185}\text{W}(n,n'_3)$ reaction.

8.88 ^{186m}Re

Figure 698: Cross-section comparison for $^{186m}\text{Re}(n,\text{total})$ reaction.

Figure 699: Cross-section comparison for $^{186m}\text{Re}(n,\text{elastic})$ reaction.

Figure 700: Cross-section comparison for $^{186m}\text{Re}(n,2n)$ reaction.

Figure 701: Cross-section comparison for $^{186m}\text{Re}(n,g)$ reaction.

Figure 702: Cross-section comparison for $^{186m}\text{Re}(n,\text{inel})$ reaction.

Figure 703: Cross-section comparison for $^{186m}\text{Re}(n,n'_1)$ reaction.

Figure 704: Cross-section comparison for $^{186m}\text{Re}(n,n'_2)$ reaction.

Figure 705: Cross-section comparison for $^{186m}\text{Re}(n,n'_3)$ reaction.

8.89 ^{185}Os

Figure 706: Cross-section comparison for $^{185}\text{Os}(n,\text{total})$ reaction.

Figure 707: Cross-section comparison for $^{185}\text{Os}(n,\text{elastic})$ reaction.

Figure 708: Cross-section comparison for $^{185}\text{Os}(n,2n)$ reaction.

Figure 709: Cross-section comparison for $^{185}\text{Os}(n,g)$ reaction.

Figure 710: Cross-section comparison for $^{185}\text{Os}(n,\text{incl})$ reaction.

Figure 711: Cross-section comparison for $^{185}\text{Os}(n,n'_1)$ reaction.

Figure 712: Cross-section comparison for $^{185}\text{Os}(n,n'_2)$ reaction.

Figure 713: Cross-section comparison for $^{185}\text{Os}(n,n'_3)$ reaction.

8.90 ^{191}Os

Figure 714: Cross-section comparison for $^{191}\text{Os}(n,\text{total})$ reaction.

Figure 715: Cross-section comparison for $^{191}\text{Os}(n,\text{elastic})$ reaction.

Figure 716: Cross-section comparison for $^{191}\text{Os}(n,2n)$ reaction.

Figure 717: Cross-section comparison for $^{191}\text{Os}(n,g)$ reaction.

Figure 718: Cross-section comparison for $^{191}\text{Os}(n,\text{incl})$ reaction.

Figure 719: Cross-section comparison for $^{191}\text{Os}(n,n'_1)$ reaction.

Figure 720: Cross-section comparison for $^{191}\text{Os}(n,n'_2)$ reaction.

Figure 721: Cross-section comparison for $^{191}\text{Os}(n,n'_3)$ reaction.

8.91 ^{192}Ir

Figure 722: Cross-section comparison for $^{192}\text{Ir}(n,\text{total})$ reaction.

Figure 723: Cross-section comparison for $^{192}\text{Ir}(n,\text{elastic})$ reaction.

Figure 724: Cross-section comparison for $^{192}\text{Ir}(n,2n)$ reaction.

Figure 725: Cross-section comparison for $^{192}\text{Ir}(n,g)$ reaction.

Figure 726: Cross-section comparison for $^{192}\text{Ir}(n,\text{inel})$ reaction.

Figure 727: Cross-section comparison for $^{192}\text{Ir}(n,n'_1)$ reaction.

Figure 728: Cross-section comparison for $^{192}\text{Ir}(n,n'_2)$ reaction.

Figure 729: Cross-section comparison for $^{192}\text{Ir}(n,n'_3)$ reaction.

8.92 ^{194m}Ir

Figure 730: Cross-section comparison for $^{194m}\text{Ir}(n,\text{total})$ reaction.

Figure 731: Cross-section comparison for $^{194m}\text{Ir}(n,\text{elastic})$ reaction.

Figure 732: Cross-section comparison for $^{194m}\text{Ir}(n,2n)$ reaction.

Figure 733: Cross-section comparison for $^{194m}\text{Ir}(n,g)$ reaction.

Figure 734: Cross-section comparison for $^{194m}\text{Ir}(n,\text{inel})$ reaction.

Figure 735: Cross-section comparison for $^{194m}\text{Ir}(n,n'_1)$ reaction.

Figure 736: Cross-section comparison for $^{194m}\text{Ir}(n,n'_2)$ reaction.

Figure 737: Cross-section comparison for $^{194m}\text{Ir}(n,n'_3)$ reaction.

8.93 ^{193}Pt

Figure 738: Cross-section comparison for $^{193}\text{Pt}(n,\text{total})$ reaction.

Figure 739: Cross-section comparison for $^{193}\text{Pt}(n,\text{elastic})$ reaction.

Figure 740: Cross-section comparison for $^{193}\text{Pt}(n,2n)$ reaction.

Figure 741: Cross-section comparison for $^{193}\text{Pt}(n,g)$ reaction.

Figure 742: Cross-section comparison for $^{193}\text{Pt}(n,\text{incl})$ reaction.

Figure 743: Cross-section comparison for $^{193}\text{Pt}(n,n'_1)$ reaction.

Figure 744: Cross-section comparison for $^{193}\text{Pt}(n,n'_2)$ reaction.

Figure 745: Cross-section comparison for $^{193}\text{Pt}(n,n'_3)$ reaction.

8.94 ^{197}Hg (EMPIRE only)

Figure 746: Cross-section comparison for $^{197}\text{Hg}(n,\text{total})$ reaction.

Figure 747: Cross-section comparison for $^{197}\text{Hg}(n,\text{elastic})$ reaction.

Figure 748: Cross-section comparison for $^{197}\text{Hg}(n,2n)$ reaction.

Figure 749: Cross-section comparison for $^{197}\text{Hg}(n,g)$ reaction.

Figure 750: Cross-section comparison for $^{197}\text{Hg}(n,\text{incl})$ reaction.

Figure 751: Cross-section comparison for $^{197}\text{Hg}(n,n'_1)$ reaction.

Figure 752: Cross-section comparison for $^{197}\text{Hg}(n,n'_2)$ reaction.

Figure 753: Cross-section comparison for $^{197}\text{Hg}(n,n'_3)$ reaction.

8.95 ^{197m}Hg (EMPIRE only)

Figure 754: Cross-section comparison for $^{197m}\text{Hg}(n,\text{total})$ reaction.

Figure 755: Cross-section comparison for $^{197m}\text{Hg}(n,\text{elastic})$ reaction.

Figure 756: Cross-section comparison for $^{197m}\text{Hg}(n,2n)$ reaction.

Figure 757: Cross-section comparison for $^{197m}\text{Hg}(n,g)$ reaction.

Figure 758: Cross-section comparison for $^{197m}\text{Hg}(n,\text{inel})$ reaction.

Figure 759: Cross-section comparison for $^{197m}\text{Hg}(n,n'_1)$ reaction.

Figure 760: Cross-section comparison for $^{197m}\text{Hg}(n,n'_2)$ reaction.

Figure 761: Cross-section comparison for $^{197m}\text{Hg}(n,n'_3)$ reaction.

8.96 ^{203}Hg

Figure 762: Cross-section comparison for $^{203}\text{Hg}(\text{n},\text{total})$ reaction.

Figure 763: Cross-section comparison for $^{203}\text{Hg}(\text{n},\text{elastic})$ reaction.

Figure 764: Cross-section comparison for $^{203}\text{Hg}(\text{n},2\text{n})$ reaction.

Figure 765: Cross-section comparison for $^{203}\text{Hg}(\text{n},\text{g})$ reaction.

Figure 766: Cross-section comparison for $^{203}\text{Hg}(\text{n},\text{incl})$ reaction.

Figure 767: Cross-section comparison for $^{203}\text{Hg}(n,n'_1)$ reaction.

Figure 768: Cross-section comparison for $^{203}\text{Hg}(n,n'_2)$ reaction.

Figure 769: Cross-section comparison for $^{203}\text{Hg}(n,n'_3)$ reaction.

8.97 ^{204}Tl

Figure 770: Cross-section comparison for $^{204}\text{Tl}(n,\text{total})$ reaction.

Figure 771: Cross-section comparison for $^{204}\text{Tl}(n,\text{elastic})$ reaction.

Figure 772: Cross-section comparison for $^{204}\text{Tl}(n,2n)$ reaction.

Figure 773: Cross-section comparison for $^{204}\text{Tl}(n,g)$ reaction.

Figure 774: Cross-section comparison for $^{204}\text{Tl}(n,\text{incl})$ reaction.

Figure 775: Cross-section comparison for $^{204}\text{Tl}(n,n'_1)$ reaction.

Figure 776: Cross-section comparison for $^{204}\text{Tl}(n,n'_2)$ reaction.

Figure 777: Cross-section comparison for $^{204}\text{Tl}(n,n'_3)$ reaction.

8.98 ^{205}Pb

Figure 778: Cross-section comparison for $^{205}\text{Pb}(n,\text{total})$ reaction.

Figure 779: Cross-section comparison for $^{205}\text{Pb}(n,\text{elastic})$ reaction.

Figure 780: Cross-section comparison for $^{205}\text{Pb}(n,2n)$ reaction.

Figure 781: Cross-section comparison for $^{205}\text{Pb}(n,g)$ reaction.

Figure 782: Cross-section comparison for $^{205}\text{Pb}(n,\text{incl})$ reaction.

Figure 783: Cross-section comparison for $^{205}\text{Pb}(n,n'_1)$ reaction.

Figure 784: Cross-section comparison for $^{205}\text{Pb}(n,n'_2)$ reaction.

Figure 785: Cross-section comparison for $^{205}\text{Pb}(n,n'_3)$ reaction.

8.99 ^{210m}Bi

Figure 786: Cross-section comparison for $^{210m}\text{Bi}(n,\text{total})$ reaction.

Figure 787: Cross-section comparison for $^{210m}\text{Bi}(n,\text{elastic})$ reaction.

Figure 788: Cross-section comparison for $^{210m}\text{Bi}(n,2n)$ reaction.

Figure 789: Cross-section comparison for $^{210m}\text{Bi}(n,g)$ reaction.

Figure 790: Cross-section comparison for $^{210m}\text{Bi}(n,\text{inel})$ reaction.

Figure 791: Cross-section comparison for $^{210m}\text{Bi}(n,n'_1)$ reaction.

Figure 792: Cross-section comparison for $^{210m}\text{Bi}(n,n'_2)$ reaction.

Figure 793: Cross-section comparison for $^{210m}\text{Bi}(n,n'_3)$ reaction.

8.100 ^{208}Po

Figure 794: Cross-section comparison for $^{208}\text{Po}(n,\text{total})$ reaction.

Figure 795: Cross-section comparison for $^{208}\text{Po}(n,\text{elastic})$ reaction.

Figure 796: Cross-section comparison for $^{208}\text{Po}(n,2n)$ reaction.

Figure 797: Cross-section comparison for $^{208}\text{Po}(n,g)$ reaction.

Figure 798: Cross-section comparison for $^{208}\text{Po}(n,\text{incl})$ reaction.

Figure 799: Cross-section comparison for $^{208}\text{Po}(n,n'_1)$ reaction.

Figure 800: Cross-section comparison for $^{208}\text{Po}(n,n'_2)$ reaction.

Figure 801: Cross-section comparison for $^{208}\text{Po}(n,n'_3)$ reaction.

8.101 ^{209}Po

Figure 802: Cross-section comparison for $^{209}\text{Po}(n,\text{total})$ reaction.

Figure 803: Cross-section comparison for $^{209}\text{Po}(n,\text{elastic})$ reaction.

Figure 804: Cross-section comparison for $^{209}\text{Po}(n,2n)$ reaction.

Figure 805: Cross-section comparison for $^{209}\text{Po}(n,g)$ reaction.

Figure 806: Cross-section comparison for $^{209}\text{Po}(n,\text{incl})$ reaction.

Figure 807: Cross-section comparison for $^{209}\text{Po}(n,n'_1)$ reaction.

Figure 808: Cross-section comparison for $^{209}\text{Po}(n,n'_2)$ reaction.

Figure 809: Cross-section comparison for $^{209}\text{Po}(n,n'_3)$ reaction.

8.102 ^{210}Po

Figure 810: Cross-section comparison for $^{210}\text{Po}(\text{n},\text{total})$ reaction.

Figure 811: Cross-section comparison for $^{210}\text{Po}(\text{n},\text{elastic})$ reaction.

Figure 812: Cross-section comparison for $^{210}\text{Po}(\text{n},2\text{n})$ reaction.

Figure 813: Cross-section comparison for $^{210}\text{Po}(\text{n},\text{g})$ reaction.

Figure 814: Cross-section comparison for $^{210}\text{Po}(\text{n},\text{incl})$ reaction.

Figure 815: Cross-section comparison for $^{210}\text{Po}(n,n'_1)$ reaction.

Figure 816: Cross-section comparison for $^{210}\text{Po}(n,n'_2)$ reaction.

Figure 817: Cross-section comparison for $^{210}\text{Po}(n,n'_3)$ reaction.

8.103 ^{245}Pu (EMPIRE only)

Figure 818: Cross-section comparison for $^{245}\text{Pu}(n,\text{total})$ reaction.

Figure 819: Cross-section comparison for $^{245}\text{Pu}(n,\text{elastic})$ reaction.

Figure 820: Cross-section comparison for $^{245}\text{Pu}(n,2n)$ reaction.

Figure 821: Cross-section comparison for $^{245}\text{Pu}(n,g)$ reaction.

Figure 822: Cross-section comparison for $^{245}\text{Pu}(n,\text{inel})$ reaction.

Figure 823: Cross-section comparison for $^{245}\text{Pu}(n,n'_1)$ reaction.

Figure 824: Cross-section comparison for $^{245}\text{Pu}(n,n'_2)$ reaction.

Figure 825: Cross-section comparison for $^{245}\text{Pu}(n,n'_3)$ reaction.

8.104 ^{247}Cf (EMPIRE only)

Figure 826: Cross-section comparison for $^{247}\text{Cf}(n,\text{total})$ reaction.

Figure 827: Cross-section comparison for $^{247}\text{Cf}(n,\text{elastic})$ reaction.

Figure 828: Cross-section comparison for $^{247}\text{Cf}(n,2n)$ reaction.

Figure 829: Cross-section comparison for $^{247}\text{Cf}(n,g)$ reaction.

Figure 830: Cross-section comparison for $^{247}\text{Cf}(n,\text{incl})$ reaction.

Figure 831: Cross-section comparison for $^{247}\text{Cf}(n,n'_1)$ reaction.

Figure 832: Cross-section comparison for $^{247}\text{Cf}(n,n'_2)$ reaction.

Figure 833: Cross-section comparison for $^{247}\text{Cf}(n,n'_3)$ reaction.