^{239}U β^- decay 1969Cl12,1996Sa23,2006Wo03

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. Browne, J. K. Tuli	NDS 122, 293 (2014)	30-Jun-2013

Parent: ^{239}U: E=0; $J^\pi=5/2^+$; $T_{1/2}$=23.45 min *2*; Q(β^-)=1261.5 *16*; %β^- decay=100.0

Includes 2008GrZS.
Additional information 1.
Other: 1986LoZT.

^{239}Np Levels

E(level)‡	Jπ†	E(level)‡	Jπ†	E(level)‡	Jπ†	E(level)‡	Jπ†
0	$5/2^+$	347.33 *23*		662.261 *15*	($5/2^-$)	966.53 *6*	($7/2,9/2^-$)
31.1309 *12*	$7/2^+$	359.1 *2*		695.10 *4*	($7/2^-$)	992.05 *3*	($7/2^-$)
71.13 *3*	$9/2^+$	438.79 *5*	($11/2^+$)	781.85? *7*		1013.41? *6*	
74.6640 *10*	$5/2^-$	448.15 *3*	($3/2^-$)	784.96? *5*		1040.39 *4*	($5/2^-,7/2^-$)
117.715 *20*	$7/2^-$	452.76 *4*	($5/2^+,7/2^-$)	819.209 *18*	(7/2)	1049.45? *5*	($9/2^-$)
122.5? *10*	($11/2^+$)	474.43? *5*		844.072? *15*	(5/2,7/2)	1096.98 *5*	($7/2^+$)
173.086 *18*	$9/2^-$	517.98? *3*	($7/2^-$)	849.45 *4*	($7/2^-$)	1197.14? *10*	
241.312 *22*	($11/2^-$)	530.21? *8*		863.43? *9*	3/2,5/2,7/2		
257.63 *25*		563.87 *5*	($5/2^+,7/2$)	959.17 *3*			
260.81 *3*	($3/2^-$)	579.34? *7*	($9/2^-$)	964.208 *17*	($7/2^-$)		

† All J^π are from Adopted Levels. J^π assignments for Levels with E > 200 keV are tentative and based on (^{3}He,d) in 1975Vo01.
‡ Deduced by evaluator from a least-squares fit to γ-ray energies.

β^- radiations

E(decay)†	E(level)	Iβ⁻‡@	Log *ft*	Comments
(64.4& *16*)	1197.14?	0.0032 *1*	6.2	av Eβ=16.5 *5*
(164.5 *16*)	1096.98	0.013 *1*	6.8	av Eβ=43.7 *5*
(221.1 *16*)	1040.39	0.035 *2*	6.8	av Eβ=59.8 *5*
(248.1& *16*)	1013.41?	0.013 *1*	7.4	av Eβ=67.7 *5*
(269.5 *16*)	992.05	0.027 *2*	7.2	av Eβ=74.0 *5*
(297.3 *16*)	964.208	0.24 *1*	6.4	av Eβ=82.4 *5*
(417.4 *16*)	844.072?	0.26 *1*	6.8	av Eβ=119.5 *5*
(442.3 *16*)	819.209	0.27 *1*	6.9	av Eβ=127.5 *6*
(566.4 *16*)	695.10	0.049 *4*	8.0	av Eβ=168.0 *6*
(599.2 *16*)	662.261	0.30 *2*	7.3	av Eβ=179.1 *6*
(1143.8 *16*)	117.715	1.96# *24*	7.4	av Eβ=374.1 *6* Iβ⁻: %Iβ=0.15 *3*, from γ-ray transition-intensity balance.
1211	74.6640	69.0# *14*	5.9	av Eβ=390.3 *6* Iβ⁻: %Iβ=77.0 *25*, from γ-ray transition-intensity balance. Other result: Iβ(1211)/Iβ(1285)=3.5 *7* (1964Bl11).
(1230.4 *16*)	31.1309	9.4# *19*	6.9	av Eβ=406.8 *6* Iβ⁻: %Iβ=8.5 *22*, from γ-ray transition-intensity balance.
1285	0	18.7# *24*	6.6	av Eβ=418.6 *6* Iβ⁻: %Iβ=13 *4*, from γ-ray transition-intensity balance.

† From 1964Bl11.
‡ From γ-ray transition intensity balances. β- branches with Iβ<0.5% are tentative because of unplaced γ rays.
# Experimental value deduced by measuring absolute γ-ray intensities from ^{239}U β-decay and ^{239}Np β-decay in equilibrium

Continued on next page (footnotes at end of table)

^{239}U β^- decay 1969Cl12,1996Sa23,2006Wo03 (continued)

β^- radiations (continued)

(1996Sa23).
@ Absolute intensity per 100 decays.
& Existence of this branch is questionable.

^{239}U β^- decay 1969Cl12,1996Sa23,2006Wo03 (continued)

$\gamma(^{239}Np)$

Iγ normalization: From weighted average of Iγ(74)=49.2% 12 (1996Sa02) and Iγ=53.9% 5 (2008GrZS).
Additional information 2.

E_γ[‡]	I_γ[‡a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	δ	α[†]	Comments
31.131[#] *2*	13.0[#] *14*	31.1309	7/2+	0	5/2+	M1+E2	0.18 *1*	263 *13*	α(L)=195 *10*; α(M)=50 *3*; α(N+..)=17.6 *10* α(N)=13.7 *8*; α(O)=3.28 *17*; α(P)=0.59 *3*; α(Q)=0.0286 *4* δ: from α(exp)= 274 *11*; Average of α(exp)= 284 *45*, deduced by evaluator from a γ-ray transition intensity balance in ^{239}U β^- decay, and α(exp)= 273 *11*, also deduced by evaluator from γ-ray transition intensity balance in ^{243}Am α decay. I_γ: from 0.064% *7* (1996Sa23); Other: 0.068% *10* (1986LoZT).
(43.1)		117.715	7/2−	74.6640	5/2−	M1+E2	0.38	154.4	α(L)=113.7 *16*; α(M)=30.2 *5*; α(N+..)=10.51 *15* α(N)=8.22 *12*; α(O)=1.95 *3*; α(P)=0.336 *5*; α(Q)=0.01016 *15* δ: From α(M)exp=31 in ^{243}Am α decay. E_γ: From 2003Br12, 1971Ar47, 1969Cl12.
43.533 *1*	827 *15*	74.6640	5/2−	31.1309	7/2+	E1		1.143	α(L)=0.856 *12*; α(M)=0.215 *3*; α(N+..)=0.0722 *11* α(N)=0.0570 *8*; α(O)=0.01304 *19*; α(P)=0.00205 *3*; α(Q)=6.88×10^{-5} *10* E_γ: From 1979Bo30. I_γ: from 4.07% *11* (1996Sa23); Other: 4.16% *11* (1986LoZT).
(48[c])		1096.98	(7/2+)	1049.45?	(9/2−)				
(50.6)		173.086	9/2−	122.5?	(11/2+)				E_γ: From 2003Br12, 1971Ar47, 1969Cl12.
(55.18[#])	0.017[#]	173.086	9/2−	117.715	7/2−	M1+E2	0.6 *2*	9.×10^1 *3*	α(L)=63 *20*; α(M)=17 *6*; α(N+..)=5.9 *20* α(N)=4.6 *16*; α(O)=1.1 *4*; α(P)=0.19 *6*; α(Q)=0.0043 *5* δ: from ^{243}Am α Decay.
(71.2)		71.13	9/2+	0	5/2+	[E2]		72.0	α(L)=52.3 *8*; α(M)=14.58 *21*; α(N+..)=5.06 *7* α(N)=3.98 *6*; α(O)=0.927 *13*; α(P)=0.1516 *22*; α(Q)=0.000464 *7* E_γ: From 2003Br12, 1971Ar47, 1969Cl12.
74.664 *1*	1.0×10^4	74.6640	5/2−	0	5/2+	E1		0.276	α(L)=0.207 *3*; α(M)=0.0512 *8*; α(N+..)=0.01740 *25* α(N)=0.01364 *20*; α(O)=0.00319 *5*; α(P)=0.000540 *8*; α(Q)=2.23×10^{-5} *4* E_γ: From 2003Br12, 1971Ar47, 1969Cl12. I_γ: from 49.2% *12* (1996Sa23); others: 48.1% *10* (1986LoZT); Iγ=48% *2* if Iγ(277.6γ)=14.1% *4* in ^{239}Np β^- decay (1976GlZY). Iγ=59.3% (1969Cl12).
86.72 *7*	10.8 *12*	117.715	7/2−	31.1309	7/2+	E1		0.186	α(L)=0.1401 *20*; α(M)=0.0344 *5*; α(N+..)=0.01175 *17*

From ENSDF

$^{239}_{93}Np_{146}$-3

^{239}U β^- decay 1969Cl12,1996Sa23,2006Wo03 (continued)

$\gamma(^{239}Np)$ (continued)

E_γ[‡]	I_γ[‡a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	α[†]	Comments
								α(N)=0.00920 *13*; α(O)=0.00216 *3*; α(P)=0.000371 *6*; α(Q)=1.620×10^{-5} *23* E_γ: From 2003Br12, 1971Ar47, 1969Cl12. I_γ: from 0.053% *6* (1996Sa23); Other: 0.052% *6* (1986LoZT).
111.0[#] *2*	4.1[#]	563.87	(5/2$^+$,7/2)	452.76	(5/2$^+$,7/2$^-$)			
117.66 *3*	28 *4*	117.715	7/2$^-$	0	5/2$^+$	E1	0.0841	α(L)=0.0633 *9*; α(M)=0.01549 *22*; α(N+..)=0.00531 *8* α(N)=0.00415 *6*; α(O)=0.000984 *14*; α(P)=0.0001730 *25*; α(Q)=8.35×10^{-6} *12* E_γ: From 2003Br12, 1971Ar47, 1969Cl12. I_γ: from 0.14% *3* (1996Sa23); Other: 0.13% *4* (1986LoZT). Additional information 3.
[x]134.71 *13*	0.41 *9*							
141.97 *2*	0.34	173.086	9/2$^-$	31.1309	7/2$^+$	[E1]	0.224	α(K)=0.1721 *25*; α(L)=0.0391 *6*; α(M)=0.00954 *14*; α(N+..)=0.00328 *5* α(N)=0.00255 *4*; α(O)=0.000609 *9*; α(P)=0.0001085 *16*; α(Q)=5.55×10^{-6} *8*
142.93	0.45	260.81	(3/2$^-$)	117.715	7/2$^-$	[E2]	3.03	α(K)=0.211 *3*; α(L)=2.05 *3*; α(M)=0.571 *8*; α(N+..)=0.199 *3* α(N)=0.1561 *22*; α(O)=0.0365 *6*; α(P)=0.00606 *9*; α(Q)=3.63×10^{-5} *5*
(169)		241.312	(11/2$^-$)	71.13	9/2$^+$			E_γ: From 2003Br12, 1971Ar47, 1969Cl12.
174.07 *6*	2.1 *2*	959.17		784.96?				
186.15 *4*	6.3 *6*	260.81	(3/2$^-$)	74.6640	5/2$^-$	[M1+E2]	2.6 *16*	α(K)=1.7 *16*; α(L)=0.645 *10*; α(M)=0.167 *11*; α(N+..)=0.059 *4* α(N)=0.046 *3*; α(O)=0.0109 *5*; α(P)=0.00197 *8*; α(Q)=9.E−5 *7*
187.28 *8*	1.22 *14*	448.15	(3/2$^-$)	260.81	(3/2$^-$)	[M1+E2]	2.6 *16*	α(K)=1.7 *16*; α(L)=0.631 *12*; α(M)=0.164 *10*; α(N+..)=0.057 *3* α(N)=0.045 *3*; α(O)=0.0107 *4*; α(P)=0.00193 *8*; α(Q)=9.E−5 *7*
191.97[#] *6*	0.56[#]	452.76	(5/2$^+$,7/2$^-$)	260.81	(3/2$^-$)			
[x]196.85[#] *10*	0.44[#]							
197.28 *12*	0.53 *9*	438.79	(11/2$^+$)	241.312	(11/2$^-$)	[E1]	0.1038	α(K)=0.0812 *12*; α(L)=0.01709 *24*; α(M)=0.00415 *6*; α(N+..)=0.001434 *21* α(N)=0.001115 *16*; α(O)=0.000268 *4*; α(P)=4.86×10^{-5} *7*; α(Q)=2.72×10^{-6} *4*
201.09 *18*	0.11 *4*	863.43?	3/2,5/2,7/2	662.261	(5/2$^-$)			
220.52 *4*	6.2 *6*	695.10	(7/2$^-$)	474.43?				
231.70[#] *10*	0.62[#]	1013.41?		781.85?				
[x]236.28 *14*	0.20 *4*							
240.00 *15*	0.19 *5*	819.209	(7/2)	579.34?	(9/2$^-$)			
255.71 *12*	0.25 *5*	819.209	(7/2)	563.87	(5/2$^+$,7/2)			
258.80 *16*	0.16 *4*	1040.39	(5/2$^-$,7/2$^-$)	781.85?				
260.86 *9*	0.67 *7*	260.81	(3/2$^-$)	0	5/2$^+$	[E1]	0.0549	α(K)=0.0434 *6*; α(L)=0.00869 *13*; α(M)=0.00211 *3*; α(N+..)=0.000729 *11* α(N)=0.000566 *8*; α(O)=0.0001365 *20*; α(P)=2.51×10^{-5} *4*; α(Q)=1.503×10^{-6} *21*

From ENSDF

$^{239}_{93}Np_{146}$-4

^{239}U β^- decay 1969Cl12,1996Sa23,2006Wo03 (continued)

$\gamma(^{239}Np)$ (continued)

E_γ ‡	I_γ ‡ a	E_i(level)	J_i^π	E_f	J_f^π	Mult. &	α †	Comments
x262.89 *19*	0.18 *7*							
x265.44 *17*	0.20 *7*							
296.93 b *13*	≤0.31 b	959.17		662.261	(5/2$^-$)			
296.93 b *13*	≤0.31 b	992.05	(7/2$^-$)	695.10	(7/2$^-$)	[M1+E2]	0.7 *5*	α(K)=0.5 *4*; α(L)=0.13 *4*; α(M)=0.034 *9*; α(N+..)=0.012 *3* α(N)=0.0092 *23*; α(O)=0.0022 *6*; α(P)=0.00042 *14*; α(Q)=2.4×10^{-5} *19*
301.64 *15*	0.24 *6*	964.208	(7/2$^-$)	662.261	(5/2$^-$)	[M1+E2]	0.6 *5*	α(K)=0.5 *4*; α(L)=0.13 *4*; α(M)=0.032 *9*; α(N+..)=0.011 *3* α(N)=0.0088 *23*; α(O)=0.0021 *6*; α(P)=0.00040 *13*; α(Q)=2.3×10^{-5} *18*
304.17 # *10*	0.35 #	966.53	(7/2,9/2$^-$)	662.261	(5/2$^-$)			
312.05 # *3*	1.1 #	1096.98	(7/2$^+$)	784.96?				
x321.71 # *15*	0.24 #							
326.21 *7*	0.95 *10*	844.072?	(5/2,7/2)	517.98?	(7/2$^-$)			
330.14 *14*	0.15 *3*	448.15	(3/2$^-$)	117.715	7/2$^-$	[E2]	0.1494	α(K)=0.0638 *9*; α(L)=0.0626 *9*; α(M)=0.01697 *24*; α(N+..)=0.00592 *9* α(N)=0.00463 *7*; α(O)=0.001093 *16*; α(P)=0.000189 *3*; α(Q)=3.89×10^{-6} *6*
332.06 *14*	0.25 *6*	784.96?		452.76	(5/2$^+$,7/2$^-$)			
x343.74 # *10*	0.39 #							
345.13 *8*	0.85 *10*	1040.39	(5/2$^-$,7/2$^-$)	695.10	(7/2$^-$)			
x348.23 *18*	0.16 *6*							
351.33 *15*	0.16 *4*	1013.41?		662.261	(5/2$^-$)			
x361.83 *8*	0.97 *9*							
x363.1 # *2*	0.17 #							
373.51 *4*	5.37 *40*	448.15	(3/2$^-$)	74.6640	5/2$^-$	[M1+E2]	0.35 *25*	α(K)=0.26 *22*; α(L)=0.07 *3*; α(M)=0.017 *6*; α(N+..)=0.0058 *21* α(N)=0.0045 *16*; α(O)=0.0011 *4*; α(P)=0.00021 *9*; α(Q)=1.3×10^{-5} *10*
378.06 *6*	2.2 *2*	452.76	(5/2$^+$,7/2$^-$)	74.6640	5/2$^-$			
381.27 *16*	0.14 *4*	452.76	(5/2$^+$,7/2$^-$)	71.13	9/2$^+$			
x393.01 *18*	0.14 *5*							
395.19 *11*	0.45 *6*	959.17		563.87	(5/2$^+$,7/2)			
399.13 *13*	0.34 *6*	474.43?		74.6640	5/2$^-$			
x400.55 *15*	0.20 *5*							
x404.84 *18*	0.19 *7*							
407.70 # *5*	0.71 #	438.79	(11/2$^+$)	31.1309	7/2$^+$	[E2]	0.0830	α(K)=0.0433 *6*; α(L)=0.0292 *4*; α(M)=0.00781 *11*; α(N+..)=0.00272 *4* α(N)=0.00213 *3*; α(O)=0.000505 *7*; α(P)=8.88×10^{-5} *13*; α(Q)=2.42×10^{-6} *4*
434.44 *13*	0.25 *4*	1096.98	(7/2$^+$)	662.261	(5/2$^-$)	[E1]	0.0185	α(K)=0.01481 *21*; α(L)=0.00276 *4*; α(M)=0.000663 *10*; α(N+..)=0.000230 *4*

From ENSDF

^{239}U β^- decay 1969Cl12,1996Sa23,2006Wo03 (continued)

$\gamma(^{239}Np)$ (continued)

E_γ[‡]	I_γ[‡a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	α[†]	Comments
								α(N)=0.0001782 *25*; α(O)=4.33×10^{-5} *6*; α(P)=8.14×10^{-6} *12*; α(Q)=5.40×10^{-7} *8*
[x]445.81 *12*	0.24 *3*							
448.19 *6*	1.97 *15*	448.15	(3/2$^-$)	0	5/2$^+$	[E1]	0.01733	α(K)=0.01392 *20*; α(L)=0.00258 *4*; α(M)=0.000620 *9*; α(N+..)=0.000215 *3* α(N)=0.0001668 *24*; α(O)=4.06×10^{-5} *6*; α(P)=7.63×10^{-6} *11*; α(Q)=5.09×10^{-7} *8*
[x]452.17 *12*	0.34 *6*							
455.26 *18*	0.18 *7*	530.21?		74.6640	5/2$^-$			
474.5 *1*	0.38 *5*	474.43?		0	5/2$^+$			
[x]478.13 *19*	0.12 *5*							
[x]479.55 *14*	0.22 *5*							
486.87 *3*	13.5 *9*	517.98?	(7/2$^-$)	31.1309	7/2$^+$	[E1]	0.01469	α(K)=0.01182 *17*; α(L)=0.00217 *3*; α(M)=0.000520 *8*; α(N+..)=0.000181 *3* α(N)=0.0001400 *20*; α(O)=3.41×10^{-5} *5*; α(P)=6.43×10^{-6} *9*; α(Q)=4.35×10^{-7} *6*
490.33[@] *13*	0.15[@] *3*	849.45	(7/2$^-$)	359.1				
492.76 *7*	1.09 *9*	563.87	(5/2$^+$,7/2)	71.13	9/2$^+$			
499.1 *1*	0.45 *6*	530.21?		31.1309	7/2$^+$			
502.12[@] *17*	0.13[@] *4*	849.45	(7/2$^-$)	347.33				
504.76 *8*	1.14 *9*	579.34?	(9/2$^-$)	74.6640	5/2$^-$	[E2]	0.0488	α(K)=0.0293 *5*; α(L)=0.01434 *20*; α(M)=0.00377 *6*; α(N+..)=0.001318 *19* α(N)=0.001027 *15*; α(O)=0.000245 *4*; α(P)=4.38×10^{-5} *7*; α(Q)=1.534×10^{-6} *22*
[x]506.80 *14*	0.22 *5*							
514.1[#] *3*	0.14[#]	966.53	(7/2,9/2$^-$)	452.76	(5/2$^+$,7/2$^-$)			
518.01 *9*	0.98 *9*	517.98?	(7/2$^-$)	0	5/2$^+$	[E1]	0.01301	α(K)=0.01048 *15*; α(L)=0.00191 *3*; α(M)=0.000457 *7*; α(N+..)=0.0001591 *23* α(N)=0.0001231 *18*; α(O)=3.00×10^{-5} *5*; α(P)=5.67×10^{-6} *8*; α(Q)=3.88×10^{-7} *6*
522.12 *10*	0.53 *6*	695.10	(7/2$^-$)	173.086	9/2$^-$	[M1+E2]	0.14 *10*	α(K)=0.11 *9*; α(L)=0.025 *13*; α(M)=0.006 *3*; α(N+..)=0.0022 *10* α(N)=0.0017 *8*; α(O)=0.00041 *19*; α(P)=8.E−5 *4*; α(Q)=5.E−6 *4*
530.5[#] *2*	0.24[#]	530.21?		0	5/2$^+$			
532.86 *10*	0.50 *6*	563.87	(5/2$^+$,7/2)	31.1309	7/2$^+$			
535.01[#] *14*	0.27[#]	1197.14?		662.261	(5/2$^-$)			
[x]541.32 *10*	0.63 *7*							
544.48 *9*	0.79 *7*	662.261	(5/2$^-$)	117.715	7/2$^-$	[M1+E2]	0.13 *9*	α(K)=0.10 *8*; α(L)=0.022 *11*; α(M)=0.005 *3*; α(N+..)=0.0019 *9* α(N)=0.0015 *7*; α(O)=0.00036 *18*; α(P)=7.E−5 *4*; α(Q)=5.E−6 *4*
547.99 *16*	0.43 *9*	579.34?	(9/2$^-$)	31.1309	7/2$^+$	[E1]	0.01166	α(K)=0.00941 *14*; α(L)=0.001700 *24*; α(M)=0.000408 *6*; α(N+..)=0.0001418 *20* α(N)=0.0001097 *16*; α(O)=2.67×10^{-5} *4*; α(P)=5.06×10^{-6} *7*; α(Q)=3.49×10^{-7} *5*

From ENSDF

$^{239}_{93}Np_{146}$-6

^{239}U β^- decay 1969Cl12,1996Sa23,2006Wo03 (continued)

$\gamma(^{239}Np)$ (continued)

E_γ[‡]	I_γ[‡a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	α[†]	Comments
558.46 *17*	0.13 *5*	819.209	(7/2)	260.81	(3/2$^-$)			
560.63 *7*	1.27 *9*	1013.41?		452.76	(5/2$^+$,7/2$^-$)			
564.09 *20*	0.09 *4*	563.87	(5/2$^+$,7/2)	0	5/2$^+$			
567.88 *18*	0.09 *3*	1040.39	(5/2$^-$,7/2$^-$)	474.43?				
[x]575.27 *5*	2.85 *15*							
577.15[b] *14*	≤0.3[b]	695.10	(7/2$^-$)	117.715	7/2$^-$	[M1+E2]	0.11 *8*	α(K)=0.09 *7*; α(L)=0.019 *10*; α(M)=0.0047 *22*; α(N+..)=0.0016 *8* α(N)=0.0013 *6*; α(O)=0.00031 *15*; α(P)=6.E−5 *3*; α(Q)=4.E−6 *3*
577.15[b] *14*	≤0.3[b]	819.209	(7/2)	241.312	(11/2$^-$)			
[x]585.49 *14*	0.27 *5*							
587.63 *5*	4.2 *2*	662.261	(5/2$^-$)	74.6640	5/2$^-$	[M1+E2]	0.11 *7*	α(K)=0.08 *6*; α(L)=0.018 *9*; α(M)=0.0044 *21*; α(N+..)=0.0016 *8* α(N)=0.0012 *6*; α(O)=0.00029 *15*; α(P)=6.E−5 *3*; α(Q)=4.E−6 *3*
587.63 *5*	4.2 *2*	1040.39	(5/2$^-$,7/2$^-$)	452.76	(5/2$^+$,7/2$^-$)			
588.70[@] *8*	1.19[@] *8*	849.45	(7/2$^-$)	260.81	(3/2$^-$)			
591.82[@] *19*	0.20[@] *8*	849.45	(7/2$^-$)	257.63				
[x]599.13 *15*	0.16 *4*							
[x]602.68[#] *4*	0.98[#]							
602.79 *2*	1.05 *7*	844.072?	(5/2,7/2)	241.312	(11/2$^-$)			
[x]604.85 *16*	0.21 *6*							
[x]607.96 *15*	0.29 *7*							
[x]614.53 *17*	0.14 *5*							
[x]618.03 *16*	0.16 *4*							
624.11 *7*	1.35 *8*	695.10	(7/2$^-$)	71.13	9/2$^+$	[E1]	0.00910 *13*	α=0.00910 *13*; α(K)=0.00737 *11*; α(L)=0.001312 *19*; α(M)=0.000314 *5*; α(N+..)=0.0001093 α(N)=8.45×10^{-5} *12*; α(O)=2.06×10^{-5} *3*; α(P)=3.92×10^{-6} *6*; α(Q)=2.76×10^{-7} *4*
[x]629.00 *11*	0.58 *8*							
631.10 *3*	14.7 *7*	662.261	(5/2$^-$)	31.1309	7/2$^+$	[E1]	0.00892 *13*	α=0.00892 *13*; α(K)=0.00722 *11*; α(L)=0.001283 *18*; α(M)=0.000307 *5*; α(N+..)=0.0001069 α(N)=8.26×10^{-5} *12*; α(O)=2.02×10^{-5} *3*; α(P)=3.83×10^{-6} *6*; α(Q)=2.70×10^{-7} *4*
644.12 *14*	0.42 *9*	1096.98	(7/2$^+$)	452.76	(5/2$^+$,7/2$^-$)			
646.26 *10*	0.63 *6*	819.209	(7/2)	173.086	9/2$^-$			
[x]649.79 *19*	0.20 *8*							
658.5[#] *4*	0.12[#]	1096.98	(7/2$^+$)	438.79	(11/2$^+$)	[E2]	0.0269	α(K)=0.0182 *3*; α(L)=0.00646 *10*; α(M)=0.001664 *24*; α(N+..)=0.000582 *9* α(N)=0.000452 *7*; α(O)=0.0001087 *16*; α(P)=1.98×10^{-5} *3*; α(Q)=8.94×10^{-7} *13*
662.26 *2*	37 *2*	662.261	(5/2$^-$)	0	5/2$^+$	[E1]	0.00815 *12*	α=0.00815 *12*; α(K)=0.00660 *10*; α(L)=0.001168 *17*;

From ENSDF

^{239}U β^- decay 1969Cl12,1996Sa23,2006Wo03 (continued)

$\gamma(^{239}Np)$ (continued)

E_γ[‡]	I_γ[‡a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	α[†]	Comments
								α(M)=0.000279 *4*; α(N+..)=9.73×10^{-5} *14* α(N)=7.52×10^{-5} *11*; α(O)=1.84×10^{-5} *3*; α(P)=3.49×10^{-6} *5*; α(Q)=2.48×10^{-7} *4*
664.17 *9*	1.17 *10*	695.10	(7/2$^-$)	31.1309	7/2$^+$	[E1]	0.00811 *12*	α=0.00811 *12*; α(K)=0.00657 *10*; α(L)=0.001162 *17*; α(M)=0.000278 *4*; α(N+..)=9.67×10^{-5} *14* α(N)=7.47×10^{-5} *11*; α(O)=1.83×10^{-5} *3*; α(P)=3.47×10^{-6} *5*; α(Q)=2.47×10^{-7} *4*
[x]668.76 *18*	0.12 *4*							
[x]670.88 *20*	0.13 *6*							
[x]691.01 *6*	1.61 *9*							
[x]692.61 *13*	0.36 *6*							
695.18 *8*	0.79 *6*	695.10	(7/2$^-$)	0	5/2$^+$	[E1]	0.00745 *11*	α=0.00745 *11*; α(K)=0.00604 *9*; α(L)=0.001064 *15*; α(M)=0.000254 *4*; α(N+..)=8.85×10^{-5} *13* α(N)=6.84×10^{-5} *10*; α(O)=1.671×10^{-5} *24*; α(P)=3.18×10^{-6} *5*; α(Q)=2.28×10^{-7} *4*
[x]700.93[#] *8*	0.42[#]							
[x]701.21 *10*	0.52 *5*							
703.63 *10*	0.51 *6*	964.208	(7/2$^-$)	260.81	(3/2$^-$)	[E2]	0.0235	α(K)=0.01622 *23*; α(L)=0.00537 *8*; α(M)=0.001377 *20*; α(N+..)=0.000481 *7* α(N)=0.000374 *6*; α(O)=9.00×10^{-5} *13*; α(P)=1.651×10^{-5} *24*; α(Q)=7.84×10^{-7} *11*
707.38 *9*	0.48 *5*	781.85?		74.6640	5/2$^-$			
710.35[#] *15*	0.25[#]	784.96?		74.6640	5/2$^-$			
[x]714.22 *9*	0.81							
722.85 *4*	5.89 *30*	964.208	(7/2$^-$)	241.312	(11/2$^-$)	[E2]	0.0222	α(K)=0.01547 *22*; α(L)=0.00499 *7*; α(M)=0.001277 *18*; α(N+..)=0.000446 *7* α(N)=0.000347 *5*; α(O)=8.35×10^{-5} *12*; α(P)=1.535×10^{-5} *22*; α(Q)=7.44×10^{-7} *11*
[x]727.52 *10*	0.56 *6*							
727.52[@] *10*	0.56[@] *6*	849.45	(7/2$^-$)	122.5?	(11/2$^+$)			
[x]730.92[#] *4*	2.5[#]							
[x]730.95 *6*	2.05 *11*							
746.06 *11*	0.93 *12*	863.43?	3/2,5/2,7/2	117.715	7/2$^-$			
748.09 *3*	19.4 *10*	819.209	(7/2)	71.13	9/2$^+$			
752.39 *14*	0.28 *6*	1013.41?		260.81	(3/2$^-$)			
[x]764.04 *11*	0.56 *7*							
[x]768.15 *11*	0.44 *5*							
769.52 *17*	0.09 *3*	844.072?	(5/2,7/2)	74.6640	5/2$^-$			
772.94 *9*	0.64 *6*	844.072?	(5/2,7/2)	71.13	9/2$^+$			
774.77[@] *4*	3.3[@] *2*	849.45	(7/2$^-$)	74.6640	5/2$^-$			
779.57 *14*	0.14 *3*	1040.39	(5/2$^-$,7/2$^-$)	260.81	(3/2$^-$)			

From ENSDF

$^{239}_{93}Np_{146}$-8

^{239}U β^- decay 1969Cl12,1996Sa23,2006Wo03 (continued)

$\gamma(^{239}Np)$ (continued)

E_γ‡	I_γ‡[a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.&	α†	Comments
788.19 *7*	1.06 *7*	819.209	(7/2)	31.1309	7/2+			
x791.3#	1.8#							
791.33 *6*	1.63 *9*	964.208	(7/2−)	173.086	9/2−	[M1+E2]	0.05 *3*	α(K)=0.04 *3*; α(L)=0.008 *5*; α(M)=0.0020 *10*; α(N+..)=0.0007 *4* α(N)=0.0005 *3*; α(O)=0.00013 *7*; α(P)=2.5×10^{-5} *13*; α(Q)=1.8×10^{-6} *12*
793.55# *8*	0.61#	966.53	(7/2,9/2−)	173.086	9/2−			
x795.13 *15*	0.18 *4*							
812.89 *3*	15.0 *8*	844.072?	(5/2,7/2)	31.1309	7/2+			
819.19 *2*	28.1 *14*	819.209	(7/2)	0	5/2+			
x829.59 *17*	0.10 *3*							
x831.86# *4*	0.71#							
x831.89 *9*	0.45 *5*							
x840.3# *3*	0.93#							
841.48 *12*	0.54 *8*	959.17		117.715	7/2−			
844.05 *2*	30.3 *15*	844.072?	(5/2,7/2)	0	5/2+			
846.39 *4*	6.8 *4*	964.208	(7/2−)	117.715	7/2−	[M1+E2]	0.04 *3*	α(K)=0.032 *21*; α(L)=0.007 *4*; α(M)=0.0016 *8*; α(N+..)=0.0006 *3* α(N)=0.00044 *22*; α(O)=0.00011 *6*; α(P)=2.1×10^{-5} *11*; α(Q)=1.5×10^{-6} *10*
849.44[b@] *9*	0.44[b@] *4*	849.45	(7/2−)	0	5/2+			
849.44[bc] *9*	0.44[b] *5*	966.53	(7/2,9/2−)	117.715	7/2−			
862.56 *18*	0.09 *3*	863.43?	3/2,5/2,7/2	0	5/2+			
867.11 *10*	0.165 *20*	1040.39	(5/2−,7/2−)	173.086	9/2−			
x869.57 *9*	0.35 *3*							
874.22 *7*	0.72 *5*	992.05	(7/2−)	117.715	7/2−	[M1+E2]	0.038 *23*	α(K)=0.030 *19*; α(L)=0.006 *4*; α(M)=0.0015 *8*; α(N+..)=0.0005 *3* α(N)=0.00041 *20*; α(O)=0.00010 *5*; α(P)=1.9×10^{-5} *10*; α(Q)=1.4×10^{-6} *9*
876.14# *7*	0.41#	1049.45?	(9/2−)	173.086	9/2−	[M1+E2]	0.038 *23*	α(K)=0.030 *19*; α(L)=0.006 *4*; α(M)=0.0015 *8*; α(N+..)=0.0005 *3* α(N)=0.00041 *20*; α(O)=0.00010 *5*; α(P)=1.9×10^{-5} *10*; α(Q)=1.4×10^{-6} *9*
884.45 *5*	1.87 *10*	959.17		74.6640	5/2−			
887.83 *10*	0.51 *5*	959.17		71.13	9/2+			
889.49 *4*	4.56 *23*	964.208	(7/2−)	74.6640	5/2−	[M1+E2]	0.036 *22*	α(K)=0.029 *18*; α(L)=0.006 *3*; α(M)=0.0014 *7*; α(N+..)=0.00050 *25* α(N)=0.00039 *19*; α(O)=0.00010 *5*; α(P)=1.8×10^{-5} *10*; α(Q)=1.3×10^{-6} *9*
895.15 *15*	0.18 *4*	966.53	(7/2,9/2−)	71.13	9/2+			
x913.68 *9*	0.41 *3*							
917.40 *8*	0.58 *4*	992.05	(7/2−)	74.6640	5/2−	[M1+E2]	0.034 *20*	α(K)=0.026 *17*; α(L)=0.005 *3*; α(M)=0.0013 *7*; α(N+..)=0.00046 *23* α(N)=0.00036 *18*; α(O)=9.E−5 *5*; α(P)=1.7×10^{-5} *9*; α(Q)=1.2×10^{-6} *8*
920.95 *8*	0.56 *4*	992.05	(7/2−)	71.13	9/2+	[E1]	0.00450 *7*	α=0.00450 *7*; α(K)=0.00366 *6*; α(L)=0.000629 *9*; α(M)=0.0001497 *21*; α(N+..)=5.22×10^{-5} *8*

From ENSDF

$^{239}_{93}Np_{146}$-9

^{239}U β^- decay 1969Cl12,1996Sa23,2006Wo03 (continued)

$\gamma(^{239}Np)$ (continued)

E_γ[‡]	I_γ[‡a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	α[†]	Comments
								α(N)=4.03×10^{-5} *6*; α(O)=9.87×10^{-6} *14*; α(P)=1.89×10^{-6} *3*; α(Q)=1.401×10^{-7} *20*
922.83 *13*	0.132 *24*	1040.39	(5/2$^-$,7/2$^-$)	117.715	7/2$^-$			
928.00[c] *6*	1.12 *6*	959.17		31.1309	7/2$^+$			
931.97 *7*	1.16 *8*	1049.45?	(9/2$^-$)	117.715	7/2$^-$	[M1+E2]	0.032 *19*	α(K)=0.025 *16*; α(L)=0.005 *3*; α(M)=0.0013 *7*; α(N+..)=0.00045 *22* α(N)=0.00034 *17*; α(O)=8.E−5 *5*; α(P)=1.6×10^{-5} *9*; α(Q)=1.2×10^{-6} *8*
933.09 *3*	5.7 *3*	964.208	(7/2$^-$)	31.1309	7/2$^+$	[E1]	0.00439 *7*	α=0.00439 *7*; α(K)=0.00358 *5*; α(L)=0.000614 *9*; α(M)=0.0001462 *21*; α(N+..)=5.10×10^{-5} *8* α(N)=3.94×10^{-5} *6*; α(O)=9.64×10^{-6} *14*; α(P)=1.85×10^{-6} *3*; α(Q)=1.370×10^{-7} *20*
938.59 *16*	0.067 *18*	1013.41?		74.6640	5/2$^-$			
[x]948.88 *19*	0.05 *2*							
959.48 *6*	1.69 *10*	959.17		0	5/2$^+$			
960.99 *5*	2.28 *12*	992.05	(7/2$^-$)	31.1309	7/2$^+$	[E1]	0.00417 *6*	α=0.00417 *6*; α(K)=0.00340 *5*; α(L)=0.000582 *9*; α(M)=0.0001385 *20*; α(N+..)=4.83×10^{-5} *7* α(N)=3.73×10^{-5} *6*; α(O)=9.14×10^{-6} *13*; α(P)=1.753×10^{-6} *25*; α(Q)=1.304×10^{-7} *19*
964.30 *5*	19.7 *10*	964.208	(7/2$^-$)	0	5/2$^+$	[E1]	0.00415 *6*	α=0.00415 *6*; α(K)=0.00338 *5*; α(L)=0.000579 *8*; α(M)=0.0001377 *20*; α(N+..)=4.80×10^{-5} *7* α(N)=3.71×10^{-5} *6*; α(O)=9.08×10^{-6} *13*; α(P)=1.742×10^{-6} *25*; α(Q)=1.296×10^{-7} *19*
965.58[#] *10*	0.44[#]	1040.39	(5/2$^-$,7/2$^-$)	74.6640	5/2$^-$			
[x]970.07 *14*	0.20 *4*							
974.91 *14*	0.087 *17*	1049.45?	(9/2$^-$)	74.6640	5/2$^-$	[E2]	0.01229	α(K)=0.00917 *13*; α(L)=0.00234 *4*; α(M)=0.000585 *9*; α(N+..)=0.000204 *3* α(N)=0.0001584 *23*; α(O)=3.84×10^{-5} *6*; α(P)=7.20×10^{-6} *10*; α(Q)=4.19×10^{-7} *6*
[x]988.51 *14*	0.097 *21*							
992.00 *7*	0.61 *4*	992.05	(7/2$^-$)	0	5/2$^+$	[E1]	0.00395 *6*	α=0.00395 *6*; α(K)=0.00322 *5*; α(L)=0.000550 *8*; α(M)=0.0001308 *19*; α(N+..)=4.56×10^{-5} *7* α(N)=3.52×10^{-5} *5*; α(O)=8.63×10^{-6} *12*; α(P)=1.656×10^{-6} *24*; α(Q)=1.236×10^{-7} *18*
[x]1002.40 *13*	0.11 *2*							
[x]1005.27 *13*	0.14 *2*							
1009.38 *18*	0.065 *2*	1040.39	(5/2$^-$,7/2$^-$)	31.1309	7/2$^+$			
1018.14[#] *13*	≤0.22[#]	1049.45?	(9/2$^-$)	31.1309	7/2$^+$	[E1]	0.00377 *6*	α=0.00377 *6*; α(K)=0.00308 *5*; α(L)=0.000525 *8*; α(M)=0.0001248 *18*; α(N+..)=4.35×10^{-5} *6* α(N)=3.36×10^{-5} *5*; α(O)=8.24×10^{-6} *12*; α(P)=1.581×10^{-6} *23*; α(Q)=1.183×10^{-7} *17*
1040.19 *9*	0.245 *22*	1040.39	(5/2$^-$,7/2$^-$)	0	5/2$^+$			

From ENSDF

$^{239}_{93}Np_{146}$-10

$\gamma(^{239}Np)$ (continued)

E_γ[‡]	I_γ[‡a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	α[†]	Comments
1065.76 *12*	0.13 *2*	1096.98	(7/2$^+$)	31.1309	7/2$^+$	[M1+E2]	0.023 *13*	α(K)=0.018 *11*; α(L)=0.0037 *18*; α(M)=0.0009 *5*; α(N+..)=0.00031 *15* α(N)=0.00024 *12*; α(O)=6.E−5 *3*; α(P)=1.1×10^{-5} *6*; α(Q)=8.E−7 *5*
[x]1078.88[#] *15*	0.32[#]							
1096.92 *8*	0.36 *3*	1096.98	(7/2$^+$)	0	5/2$^+$	[M1+E2]	0.022 *12*	α(K)=0.017 *10*; α(L)=0.0034 *17*; α(M)=0.0008 *4*; α(N+..)=0.00029 *14* α(N)=0.00022 *11*; α(O)=6.E−5 *3*; α(P)=1.1×10^{-5} *6*; α(Q)=8.E−7 *5*
[x]1101.99 *16*	0.067 *19*							
1122.8[#] *3*	0.14[#]	1197.14?		74.6640	5/2$^-$			
[x]1161.4[#] *2*	0.20[#]							
1196.90[#] *15*	0.19[#]	1197.14?		0	5/2$^+$			
[x]1204.9[#] *2*	0.32[#]							

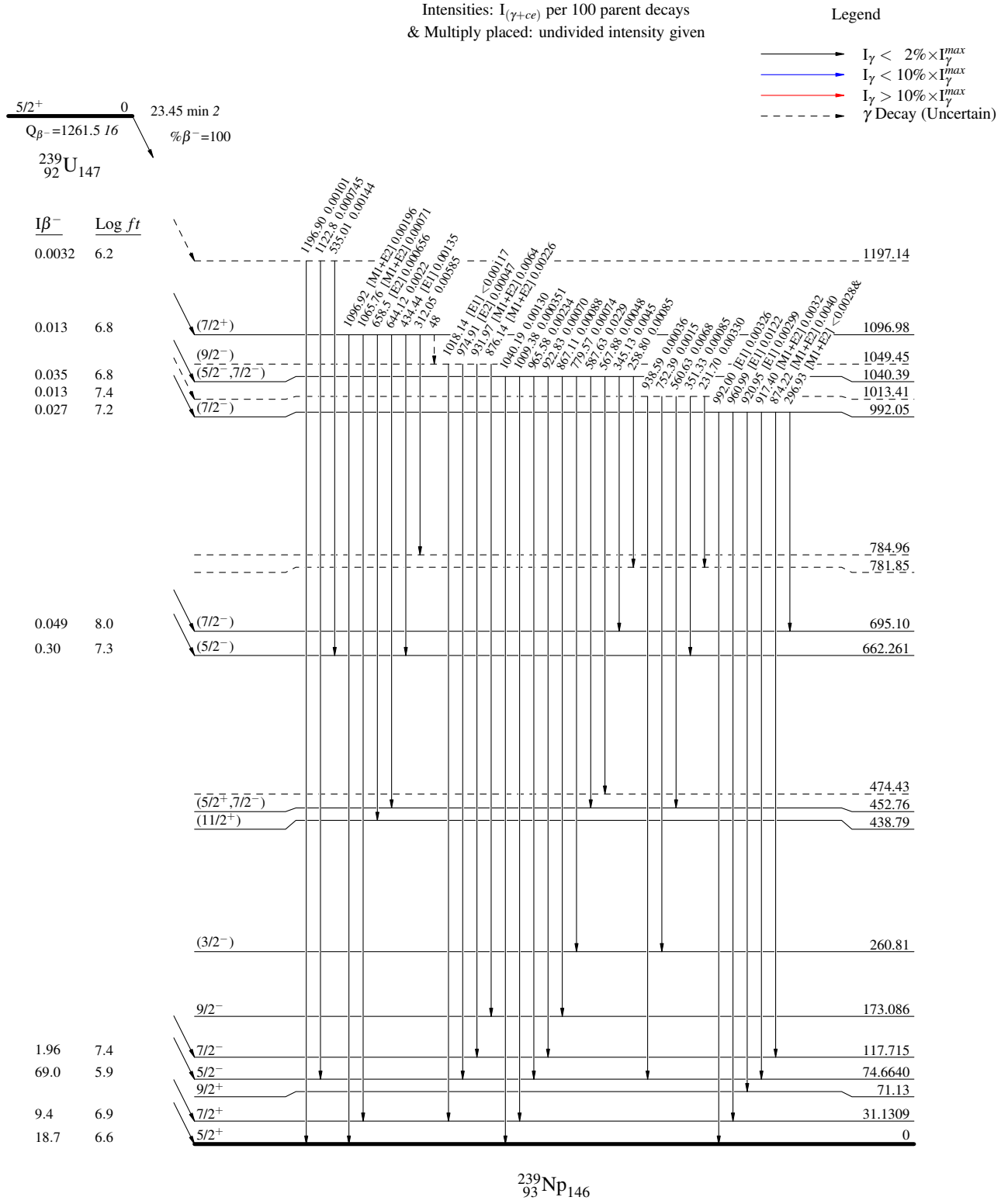
[†] Additional information 4.
[‡] From 2006Wo03, unless otherwise specified. Uncertainties in γ-ray intensities given in 2006Wo03 do not include the contribution from the detector efficiency. Evaluators have corrected the uncertainties given here as suggested in 2006Wo03 by combining them with fractional uncertainties as follows: 15% for Eγ < 150 keV; 10% for 150 keV < Eγ < 360 keV; 7% for 360 keV < Eγ < 500 keV; 5% for Eγ > 500 keV. Other: 1968Ma06.
[#] From 2003Br12, 1971Ar47, 1969Cl12.
[@] From 2006Wo03.
[&] From ce data of 1964Bl11, 1957Ho07, 1969En02 and from ^{243}Am α decay.
[a] For absolute intensity per 100 decays, multiply by 0.00532 *17*.
[b] Multiply placed with undivided intensity.
[c] Placement of transition in the level scheme is uncertain.
[x] γ ray not placed in level scheme.

$^{239}_{93}Np_{146}$-11 From ENSDF $^{239}_{93}Np_{146}$-11

^{239}U β^- decay 1969Cl12,1996Sa23,2006Wo03

Decay Scheme

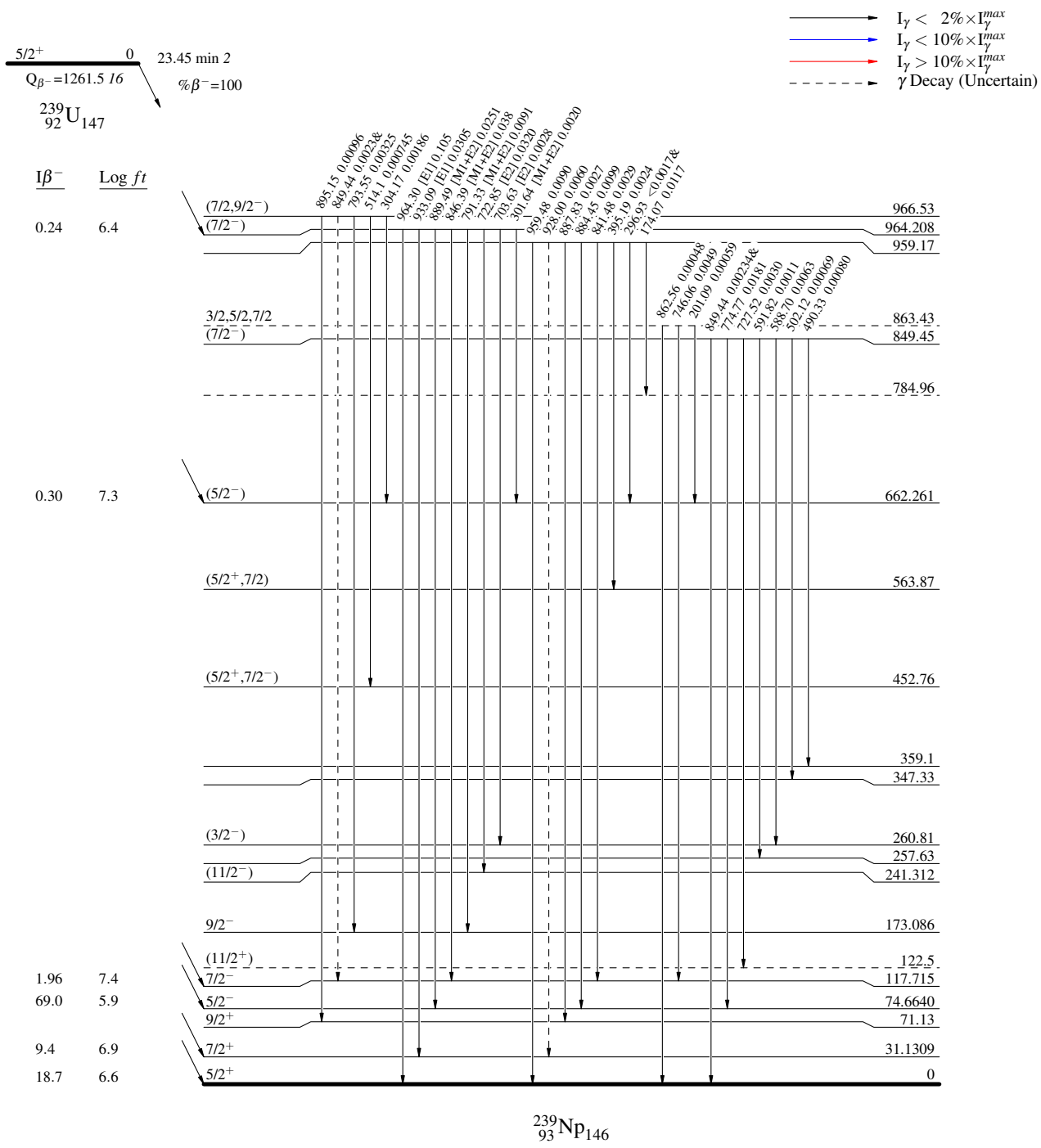
Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given



^{239}U β^- decay 1969Cl12,1996Sa23,2006Wo03

Decay Scheme (continued)

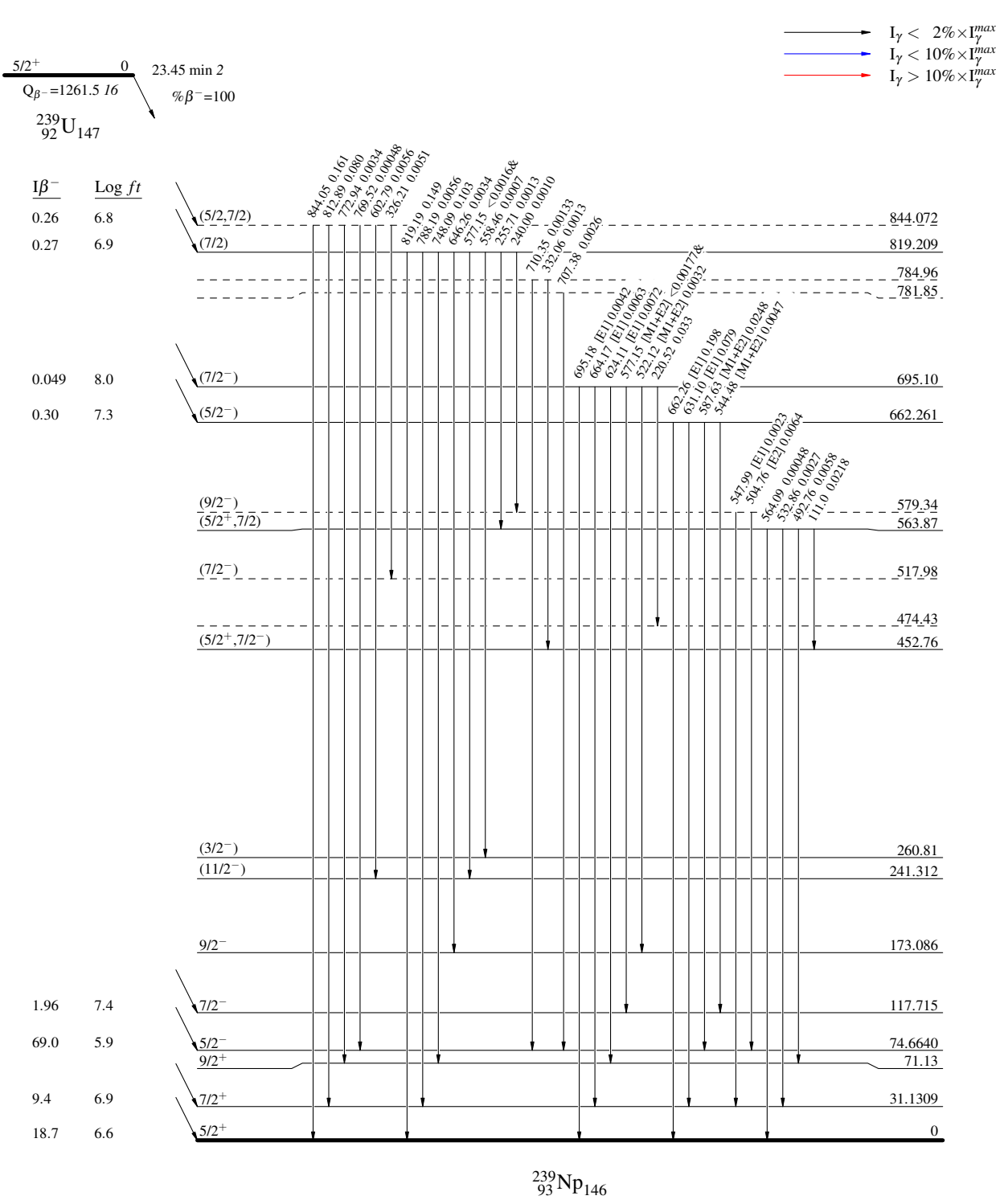
Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given



^{239}U β^- decay 1969Cl12,1996Sa23,2006Wo03

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given



^{239}U β^- decay 1969Cl12,1996Sa23,2006Wo03

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given

Legend
$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$
γ Decay (Uncertain)