Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	D. Abriola(a), A. A. Sonzogni	NDS 107, 2423 (2006)	1-Jan-2006

Q(β^-)=−9676 *5*; S(n)=13438 *4*; S(p)=6267 *4*; Q(α)=−4836 *5* 2012Wa38
Note: Current evaluation has used the following Q record.
ΔQ(β^-)=447 (2003Au03).
Q(β^-)=−9630.0 *SY*; S(n)=1.337×10^4 *9*; S(p)=6254 *13*; Q(α)=−4826 *14* 2003Au03

^{94}Ru Levels

Cross Reference (XREF) Flags

A	^{95}Pd β^+p decay (13.3 s)	D	^{92}Mo(^{3}He,n)
B	^{94}Rh ε decay (70.6 s)	E	^{96}Ru(p,t)
C	^{94}Rh ε decay (25.8 s)	F	(HI,xnγ)

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$[#]	XREF	Comments
0.0[@]	0$^+$	51.8 min *6*	ABCDEF	%β^++%ε=100 T$_{1/2}$: from 1968Bo27. Other: 53 min *1* (1967Ei01).
1430.71[@] *20*	2$^+$		ABCDEF	XREF: D(1370). J$^\pi$: L=2 in (p,t).
2186.6[@] *3*	4$^+$		ABC EF	J$^\pi$: L=(4) in (p,t), (E2) γ to 2$^+$, systematics of N=50 nuclei.
2498.0[@] *3*	6$^+$	65 ns *2*	ABC EF	J$^\pi$: E2 γ to 4$^+$.
2503.2 *3*	(3,4,5)		B E	J$^\pi$: log *ft*=6.1 in (4$^+$) decay, L=(2,4) in (p,t).
2624.4[&] *3*	5$^-$	0.51 ns *5*	BC EF	J$^\pi$: E1 γ's to 4$^+$ and 6$^+$.
2644.1[@] *4*	8$^+$	71 μs *4*	A C F	%IT=100 J$^\pi$: E2 γ to 6$^+$, systematics of N=50 nuclei.
2965 *6*	(3$^-$)		E	J$^\pi$: L(p,t)=(3).
2995 *6*	0$^+$		E	J$^\pi$: L(p,t)=0.
3117.0 *4*	(3,4,5)		B	J$^\pi$: log *ft*=6.8 in decay of (4$^+$).
3177.3 *4*	(3,4,5)		B	J$^\pi$: log *ft*=7.1 in decay of (4$^+$).
3254.7 *4*	(3,4,5)		B	J$^\pi$: log *ft*=6.7 in decay of (4$^+$).
3520 *7*			E	
3615 *7*	0$^+$		E	J$^\pi$: L(p,t)=0.
3657.6[&] *4*	(7$^-$)		C F	
3770 *8*	0$^+$		E	J$^\pi$: L(p,t)=0.
3820 *8*			E	
3930.1 *4*	(8$^+$)		F	
3991.2[@] *4*	(10)$^+$	<3.47 ps	F	J$^\pi$: from E2 γ to 8$^+$.
4000 *8*			E	
4197.3[&] *4*	(9)$^-$		F	J$^\pi$: fed from (11)$^-$ with E2 G.
4338.5 *4*	(9)$^-$		F	J$^\pi$: fed from (11)$^-$ with E2 G.
4489.1[&] *4*	(11)$^-$	0.760 ns *35*	F	J$^\pi$: from E1 to (10)$^+$.
4716.6[@] *4*	(12)$^+$	23.8 ps *11*	F	J$^\pi$: from E2 to (10)$^+$.
5567.8[&] *4*	(13)$^-$	2.01 ps *22*	F	J$^\pi$: from E2 to (11)$^-$.
6275.1 *4*	(12$^+$)		F	
6357.6 *4*	(12$^+$)		F	
6614.4[@] *4*	(13)$^+$	0.87 ps *12*	F	J$^\pi$: from M1 to (12)$^+$.
6918.9 *4*	(13$^-$)		F	
7157.6[@] *4*	(14)$^+$	0.33 ps *4*	F	J$^\pi$: from E2 to (12)$^+$ and M1 to (13)$^+$.
7768.3 *4*	(13)$^-$		F	J$^\pi$: fed from (15)$^-$ with E2 G.

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Adopted Levels, Gammas (continued)

^{94}Ru Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$#	XREF	Comments
7773.1@ 4	$(15)^+$	<0.28 ps	F	Jπ: from E2 to $(13)^+$.
7909.9 4	(15^+)		F	
7970.0 4	$(14)^-$		F	Jπ: fed from $(14)^-$ with M1 G.
8039.4 4	(14^+)		F	
8133.2 4	$(15)^-$		F	Jπ: fed from $(15)^-$ with M1 G.
8152.3 4	$(14)^-$		F	Jπ: fed from $(15)^-$ with M1 G.
8271.8& 4	$(14)^-$	0.291 ps 28	F	Jπ: from M1 to $(13)^-$.
8411.2@ 4	$(16)^+$	<0.69 ps	F	Jπ: from M1 to $(15)^+$ and E2 to $(14)^+$.
8501.5& 4	$(15)^-$	1.28 ps 8	F	Jπ: from M1 to $(14)^-$.
8736.7 4	$(15)^-$		F	Jπ: fed from $(16)^-$ with M1 G.
8853.4 4	(15^-)		F	
8996.7& 4	$(16)^-$	<0.69 ps	F	Jπ: from M1 to $(15)^-$.
9041.7@ 4	$(17)^+$	<1.4 ps	F	Jπ: from M1 to $(16)^+$ and E2 to $(15)^+$.
9134.9 4	$(16)^-$		F	Jπ: from E2 to $(18)^-$.
9254.2 4	$(17)^-$		F	Jπ: fed from $(18)^-$ with M1 G.
9464.0 4	(16^-)		F	
9526.6@ 4	$(18)^+$	0.360 ps 21	F	Jπ: from M1 to $(17)^+$.
9789.2 4	$(17)^-$		F	Jπ: fed from $(18)^-$ with M1 G.
9921.0@ 4	$(19)^+$	<3.4 ps	F	Jπ: from M1 to $(18)^+$ and E2 to $(17)^+$.
9928.6& 4	$(18)^-$	3.49 ps 24	F	Jπ: from E2 to $(16)^-$.
10129.4 4	(17^-)		F	
10444.3 4	$(19)^-$		F	Jπ: fed from $(20)^-$ with M1 G.
10544.8 4	(18^-)		F	
11041.8& 4	$(20)^-$	<1.8 ps	F	Jπ: from E2 to $(18)^-$.
11451.7 5	(19^+)		F	
12077.2 5	$(20^+,21^+)$		F	
12429.6 5	$(20^+,21^+)$		F	
12484.1 4	$(20^-,21^-)$		F	
12922.8 4	(20^-)		F	
12940.0 5	(20^+)		F	
13053.4 5	(22^-)		F	
13077.7 5	(21^-)		F	
13247.0 5	$(20^+,21^+)$		F	
13623.8 5	(21^+)		F	
13896.9 4	(21^-)		F	
13917.0 5	$(23^-,24^-)$		F	
13938.8 4	$(21^-,22^-)$		F	
14226.7 5	(21^-)		F	
14293.5 5	(23^-)		F	
14674.8 5	$(21^-,22^-)$		F	
14805.7 4	$(21^-,22^-)$		F	
15289.4 4	$(22^-,23^-)$		F	
16767.4 5	$(24^-,25^-)$		F	
18321.4 5	$(25^-,26^-,27^-)$		F	

† From least-squares fit to Eγ.
‡ Unless otherwise explained, from γ decay pattern.
# From (HI,xnγ).
@ Band(A): Cascade based on 0^+.
& Band(B): Cascade based on 5^-.

Adopted Levels, Gammas (continued)

$\gamma(^{94}Ru)$

E_i(level)	J^π_i	E_γ†	I_γ	E_f	J^π_f	Mult.†	α‡	Comments
1430.71	2^+	1430.7 *2*	100	0.0	0^+	(E2)	0.00041	α=0.00041; α(K)=0.00036 *1*
2186.6	4^+	755.9 *2*	100	1430.71	2^+	(E2)	0.00175	α=0.00175; α(K)=0.00151 *5*; α(L)=0.00018 *1*
2498.0	6^+	311.4 *2*	100	2186.6	4^+	E2	0.0238	α=0.0238; α(K)=0.0205 *7*; α(L)=0.00271 *9*; α(M)=0.00050 *2* B(E2)(W.u.)=0.117 *4*
2503.2	(3,4,5)	1072.5 *2*	100	1430.71	2^+			
2624.4	5^-	126.5 *2*	46.0 *18*	2498.0	6^+	E1	0.0707	α=0.0707; α(K)=0.0620 *19*; α(L)=0.00722 *22*; α(M)=0.00131 *4*; α(N+..)=0.00024 *1* B(E1)(W.u.)=0.000100 *11*
		437.7 *2*	100 *3*	2186.6	4^+	E1	0.00232	α=0.00232; α(K)=0.00204 *7*; α(L)=0.00023 *1* B(E1)(W.u.)=5.2×10^{-6} *6*
2644.1	8^+	146.1 *2*	100	2498.0	6^+	E2	0.335	α=0.335; α(K)=0.278 *9*; α(L)=0.0471 *15*; α(M)=0.0087 *3*; α(N+..)=0.00155 *5* B(E2)(W.u.)=0.0047 *3*
3117.0	(3,4,5)	492.6 *3*	100	2624.4	5^-			
3177.3	(3,4,5)	552.9 *3*	100	2624.4	5^-			
3254.7	(3,4,5)	1068.1 *3*	100	2186.6	4^+			
3657.6	(7^-)	1033.3 *2*	100	2624.4	5^-	(E2)	0.00083	α=0.00083; α(K)=0.00072 *2*
3930.1	(8^+)	1432.1 *2*	100	2498.0	6^+			
3991.2	$(10)^+$	1347.1 *2*	100	2644.1	8^+	E2	0.00047	α=0.00047; α(K)=0.00041 *1*
4197.3	$(9)^-$	267.2 *2*	13.4 *6*	3930.1	(8^+)			
		539.6 *2*	100.0 *17*	3657.6	(7^-)			
		1553.2 *2*	16.8 *11*	2644.1	8^+			
4338.5	$(9)^-$	680.9 *2*	100	3657.6	(7^-)			
4489.1	$(11)^-$	150.7 *2*	1.65 *24*	4338.5	$(9)^-$	E2	0.300	α=0.300; α(K)=0.249 *8*; α(L)=0.0416 *13*; α(M)=0.00771 *24*; α(N+..)=0.00137 *5* B(E2)(W.u.)=4.2 *7*
		291.7 *2*	46.8 *5*	4197.3	$(9)^-$	E2	0.0296	α=0.0296; α(K)=0.0254 *8*; α(L)=0.00342 *11*; α(M)=0.00063 *2*; α(N+..)=0.00012 B(E2)(W.u.)=4.38 *21*
		498.0 *2*	100.0 *9*	3991.2	$(10)^+$	E1	0.00169	α=0.00169; α(K)=0.00149 *5*; α(L)=0.00017 *1* B(E1)(W.u.)=2.35×10^{-6} *12*
4716.6	$(12)^+$	227.4 *2*	1.54 *19*	4489.1	$(11)^-$			
		725.3 *2*	≤100	3991.2	$(10)^+$	E2	0.00194	α=0.00194; α(K)=0.00168 *5*; α(L)=0.00020 *1* B(E2)(W.u.)=5 *+7−5*
5567.8	$(13)^-$	1078.8 *2*	100	4489.1	$(11)^-$	E2	0.00075	α=0.00075; α(K)=0.00065 *2* B(E2)(W.u.)=7.6 *9*
6275.1	(12^+)	2283.8 *2*	100	3991.2	$(10)^+$			
6357.6	(12^+)	1641.0 *2*	33 *6*	4716.6	$(12)^+$			
		1868.5 *2*	100 *9*	4489.1	$(11)^-$			
6614.4	$(13)^+$	256.7 *2*	50.7 *4*	6357.6	(12^+)			
		1897.9 *2*	100.0 *12*	4716.6	$(12)^+$	M1		B(M1)(W.u.)=0.0025 *4*
6918.9	(13^-)	2430.0 *2*	100	4489.1	$(11)^-$			
7157.6	$(14)^+$	543.0 *2*	100.0 *11*	6614.4	$(13)^+$	M1	0.00388	α=0.00388; α(K)=0.00336 *10*; α(L)=0.00039 *1* B(M1)(W.u.)=0.41 *5*
		2440.8 *2*	2.8 *6*	4716.6	$(12)^+$	E2		B(E2)(W.u.)=0.021 *6*
7768.3	$(13)^-$	2200.4 *2*	100	5567.8	$(13)^-$			
7773.1	$(15)^+$	615.3 *2*	≤100	7157.6	$(14)^+$	(M1)	0.00289	α=0.00289; α(K)=0.00251 *8*; α(L)=0.00029 *1*
		1158.8 *2*	23.8 *13*	6614.4	$(13)^+$	E2	0.00064	α=0.00064; α(K)=0.00056 *2*
7909.9	(15^+)	137.0 *2*	8.5 *12*	7773.1	$(15)^+$			
		752.1 *2*	100.0 *24*	7157.6	$(14)^+$			
		1295.5 *2*	62 *4*	6614.4	$(13)^+$			
7970.0	$(14)^-$	2402.0 *2*	100	5567.8	$(13)^-$			
8039.4	(14^+)	1764.3 *2*	100 *17*	6275.1	(12^+)			

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Adopted Levels, Gammas (continued)

$\gamma(^{94}Ru)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ	E_f	J^π_f	Mult.[†]	α[‡]	Comments
8039.4	(14+)	3322.7 2	50 8	4716.6	(12)+			
8133.2	(15)−	2565.4 2	100	5567.8	(13)−			
8152.3	(14)−	383.9 2	22.0 24	7768.3	(13)−			
		2584.5 2	100.0 24	5567.8	(13)−			
8271.8	(14)−	120.1 2	8.5 7	8152.3	(14)−			
		301.7 2	5.2 13	7970.0	(14)−	M1	0.0162	α=0.0162; α(K)=0.0142 5; α(L)=0.00166 5; α(M)=0.00030 1 B(M1)(W.u.)=0.13 4
		503.3 2		7768.3	(13)−			
		2704.1 2	100.0 20	5567.8	(13)−	M1		B(M1)(W.u.)=0.0034 4
8411.2	(16)+	501.0 2	≤43	7909.9	(15+)	(M1)	0.00470	α=0.00470; α(K)=0.00408 13; α(L)=0.00047 1
		638.0 2	100.0 18	7773.1	(15)+	M1	0.00266	α=0.00266; α(K)=0.00230 7; α(L)=0.00026 1
		1253.8 2	17.0 12	7157.6	(14)+	E2	0.00054	α=0.00054; α(K)=0.00047 2
8501.5	(15)−	229.8 2	100.0 20	8271.8	(14)−	M1	0.0326	α=0.0326; α(K)=0.0285 9; α(L)=0.00336 10; α(M)=0.00062 2; α(N+..)=0.00012 B(M1)(W.u.)=0.44 3
		349.0 2	39.2 20	8152.3	(14)−	M1	0.0112	α=0.0112; α(K)=0.0098 3; α(L)=0.00114 4; α(M)=0.00021 1 B(M1)(W.u.)=0.049 4
		368.3 2	28.1 13	8133.2	(15)−	M1	0.0098	α=0.0098; α(K)=0.0086 3; α(L)=0.00100 3; α(M)=0.00018 1 B(M1)(W.u.)=0.0300 24
		461.9 2	24.2 20	8039.4	(14+)			
		531.6 2	30.7 13	7970.0	(14)−	M1	0.00408	α=0.00408; α(K)=0.00354 11; α(L)=0.00041 1 B(M1)(W.u.)=0.0109 9
		733.3 2	28.1 13	7768.3	(13)−	E2	0.00189	α=0.00189; α(K)=0.00163 5; α(L)=0.00019 1 B(E2)(W.u.)=7.1 6
		1344.0 2	66.7 20	7157.6	(14)+			
		1582.8 2	5.9 20	6918.9	(13−)			
8736.7	(15)−	464.8 2	53 3	8271.8	(14)−			
		584.2 2	100 5	8152.3	(14)−			
		603.7 2	22 5	8133.2	(15)−			
		963.4 2	22 5	7773.1	(15)+			
8853.4	(15−)	581.8 2	69 8	8271.8	(14)−			
		701.1 2	100 8	8152.3	(14)−			
8996.7	(16)−	259.7 2	10.4 5	8736.7	(15)−	M1	0.0237	α=0.0237; α(K)=0.0208 7; α(L)=0.00244 8; α(M)=0.00045 1
		495.0 2	100.0 13	8501.5	(15)−	M1	0.00478	α=0.00478; α(K)=0.00420 13; α(L)=0.00048 2
		725.0 2		8271.8	(14)−			
9041.7	(17)+	630.2 2	100.0 14	8411.2	(16)+	M1	0.00273	α=0.00273; α(K)=0.00237 8; α(L)=0.00027 1
		1268.5 2	11.8 9	7773.1	(15)+	E2	0.00053	α=0.00053; α(K)=0.00046 1
9134.9	(16)−	281.6 2	73.2 24	8853.4	(15−)			
		398.1 2	100 5	8736.7	(15)−			
		1225.1 2	27 5	7909.9	(15+)			
9254.2	(17)−	119.7[#] 2	4.5[#] 4	9134.9	(16)−			
		257.3 2	100.0 8	8996.7	(16)−			
9464.0	(16−)	610.6 2	100 6	8853.4	(15−)			
		1691.0 2	8 4	7773.1	(15)+			
9526.6	(18)+	484.7 2	≤100	9041.7	(17)+	M1	0.00503	α=0.00503; α(K)=0.00441 14; α(L)=0.00051 2 B(M1)(W.u.)=0.5 5
		1115.6 2		8411.2	(16)+			
9789.2	(17)−	325.2 2	18.4 11	9464.0	(16−)			
		654.1 2	20.1 11	9134.9	(16)−			
		792.4 2	100.0 17	8996.7	(16)−			
		1288.0 2	8.4 11	8501.5	(15)−			

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Adopted Levels, Gammas (continued)

$\gamma(^{94}Ru)$ (continued)

E_i(level)	J_i^π	E_γ†	I_γ	E_f	J_f^π	Mult.†	α‡	Comments
9921.0	$(19)^+$	394.3 *2*	100 *3*	9526.6	$(18)^+$	M1	0.00831	α=0.00831; α(K)=0.00728 *22*; α(L)=0.00084 *3*; α(M)=0.00015 *1*
		879.3 *2*	32 *3*	9041.7	$(17)^+$	E2	0.00120	α=0.00120; α(K)=0.00104 *4*; α(L)=0.00012
9928.6	$(18)^-$	139.6 *2*	93.9 *11*	9789.2	$(17)^-$	M1	0.124	α=0.124; α(K)=0.108 *4*; α(L)=0.0129 *4*; α(M)=0.00237 *7*; α(N+..)=0.00046 *1* B(M1)(W.u.)=0.61 *5*
		401.9 *2*	9.5 *11*	9526.6	$(18)^+$			
		674.4 *2*	58.1 *17*	9254.2	$(17)^-$	M1	0.00234	α=0.00234; α(K)=0.00203 *6*; α(L)=0.00023 *1* B(M1)(W.u.)=0.0034 *3*
		793.4 *2*	100.0 *17*	9134.9	$(16)^-$	E2	0.00155	α=0.00155; α(K)=0.00134 *4*; α(L)=0.00016 *1* B(E2)(W.u.)=5.7 *5*
		886.8 *2*	17.3 *17*	9041.7	$(17)^+$			
		931.9 *2*	75.4 *17*	8996.7	$(16)^-$	E2	0.00105	α=0.00105; α(K)=0.00091 *3*; α(L)=0.00011 B(E2)(W.u.)=1.93 *15*
10129.4	(17^-)	1718.3 *2*	100	8411.2	$(16)^+$			
10444.3	$(19)^-$	515.6 *2*	100 *3*	9928.6	$(18)^-$			
		1190.4 *2*	95 *3*	9254.2	$(17)^-$			
10544.8	(18^-)	415.4 *2*	100 *8*	10129.4	(17^-)			
		615.7 *2*		9928.6	$(18)^-$			
11041.8	$(20)^-$	597.5 *2*	21.9 *9*	10444.3	$(19)^-$	M1	0.00309	α=0.00309; α(K)=0.00268 *8*; α(L)=0.00031 *1*
		1113.4 *2*	≤100	9928.6	$(18)^-$	E2	0.00070	α=0.00070; α(K)=0.00061 *2*
11451.7	(19^+)	2410.0 *2*	100	9041.7	$(17)^+$			
12077.2	$(20^+,21^+)$	2156.2 *2*	100	9921.0	$(19)^+$			
12429.6	$(20^+,21^+)$	2508.6 *2*	100	9921.0	$(19)^+$			
12484.1	$(20^-,21^-)$	2039.9 *2*	100	10444.3	$(19)^-$			
12922.8	(20^-)	1881.3 *2*	100 *9*	11041.8	$(20)^-$			
		2377.6 *2*	86 *9*	10544.8	(18^-)			
12940.0	(20^+)	3019.0 *2*	100	9921.0	$(19)^+$			
13053.4	(22^-)	2011.6 *2*	100	11041.8	$(20)^-$			
13077.7	(21^-)	2035.8 *2*	100	11041.8	$(20)^-$			
13247.0	$(20^+,21^+)$	1795.3 *2*	100	11451.7	(19^+)			
13623.8	(21^+)	683.8 *2*		12940.0	(20^+)			
		3702.8 *2*	100 *25*	9921.0	$(19)^+$			
13896.9	(21^-)	1412.9 *2*	1.0×10^2 *4*	12484.1	$(20^-,21^-)$			
		2854.7 *2*	67 *22*	11041.8	$(20)^-$			
		3452.6 *2*	78 *22*	10444.3	$(19)^-$			
13917.0	$(23^-,24^-)$	863.6 *2*	100	13053.4	(22^-)			
13938.8	$(21^-,22^-)$	2897.1 *2*	100	11041.8	$(20)^-$			
14226.7	(21^-)	3184.8 *2*	100	11041.8	$(20)^-$			
14293.5	(23^-)	1215.8 *2*	100 *18*	13077.7	(21^-)			
		1240.1 *2*	71 *12*	13053.4	(22^-)			
14674.8	$(21^-,22^-)$	3632.9 *2*	100	11041.8	$(20)^-$			
14805.7	$(21^-,22^-)$	867.0 *2*	1.0×10^2 *3*	13938.8	$(21^-,22^-)$			
		3763.7 *2*	27 *9*	11041.8	$(20)^-$			
15289.4	$(22^-,23^-)$	483.8 *2*		14805.7	$(21^-,22^-)$			
		1392.6 *2*	100 *13*	13896.9	(21^-)			
		2805.2 *2*	23 *6*	12484.1	$(20^-,21^-)$			
16767.4	$(24^-,25^-)$	1477.9 *2*	100	15289.4	$(22^-,23^-)$			
18321.4	$(25^-,26^-,27^-)$	1554.0 *2*	100	16767.4	$(24^-,25^-)$			

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

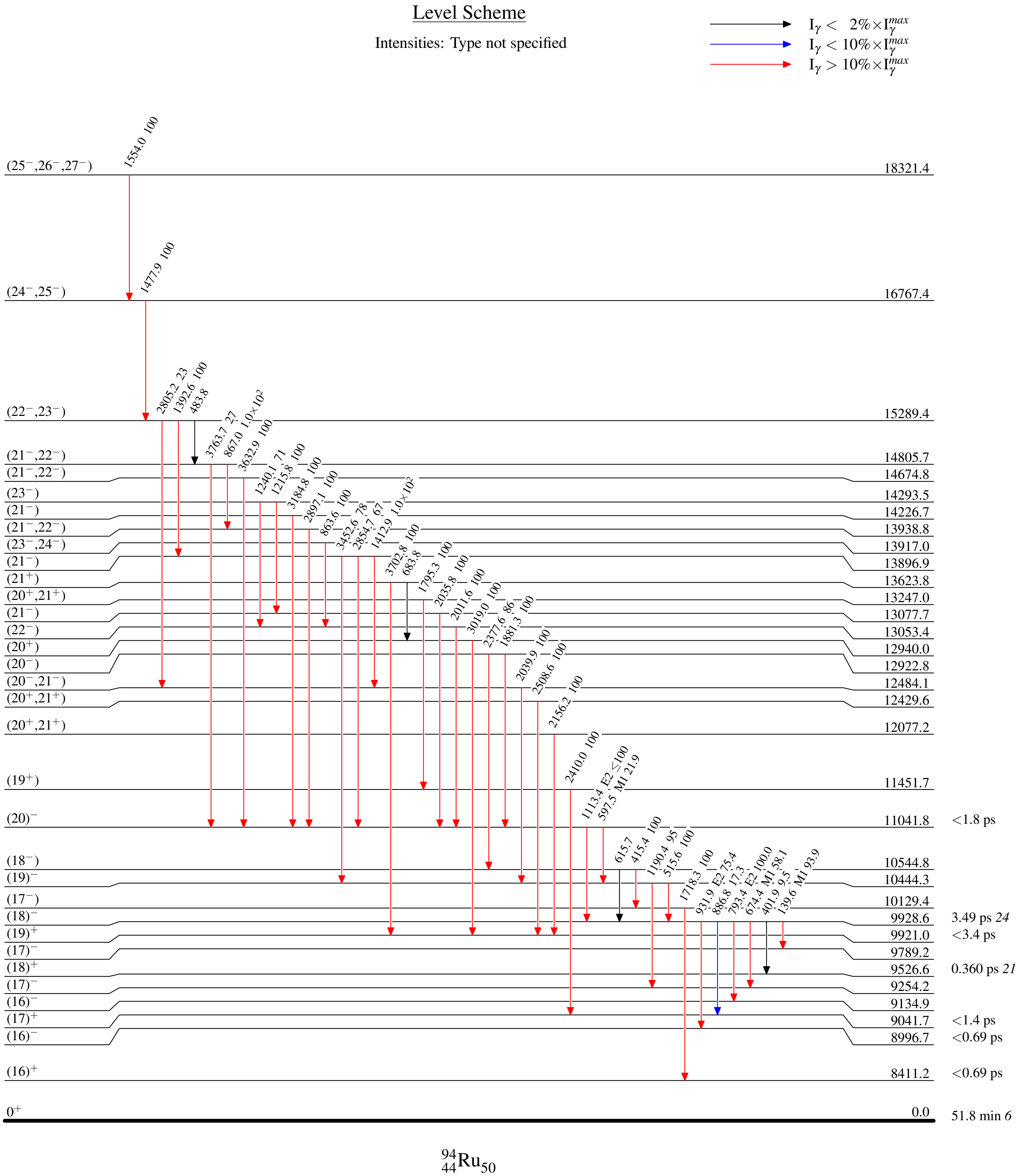
$\gamma(^{94}Ru)$ (continued)

† From (HI,xnγ).

‡ Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

Multiply placed with undivided intensity.

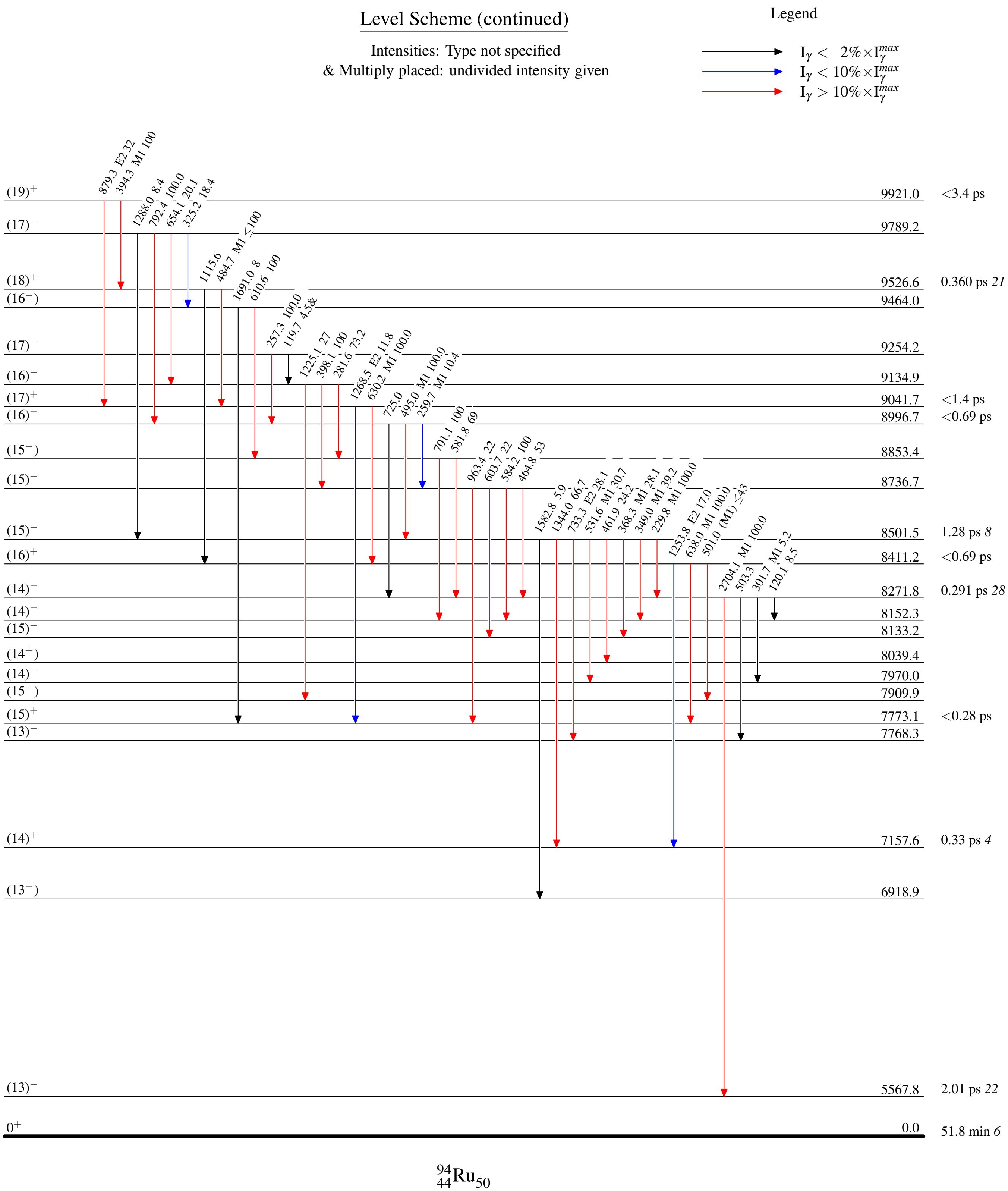
Adopted Levels, Gammas



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified
& Multiply placed: undivided intensity given



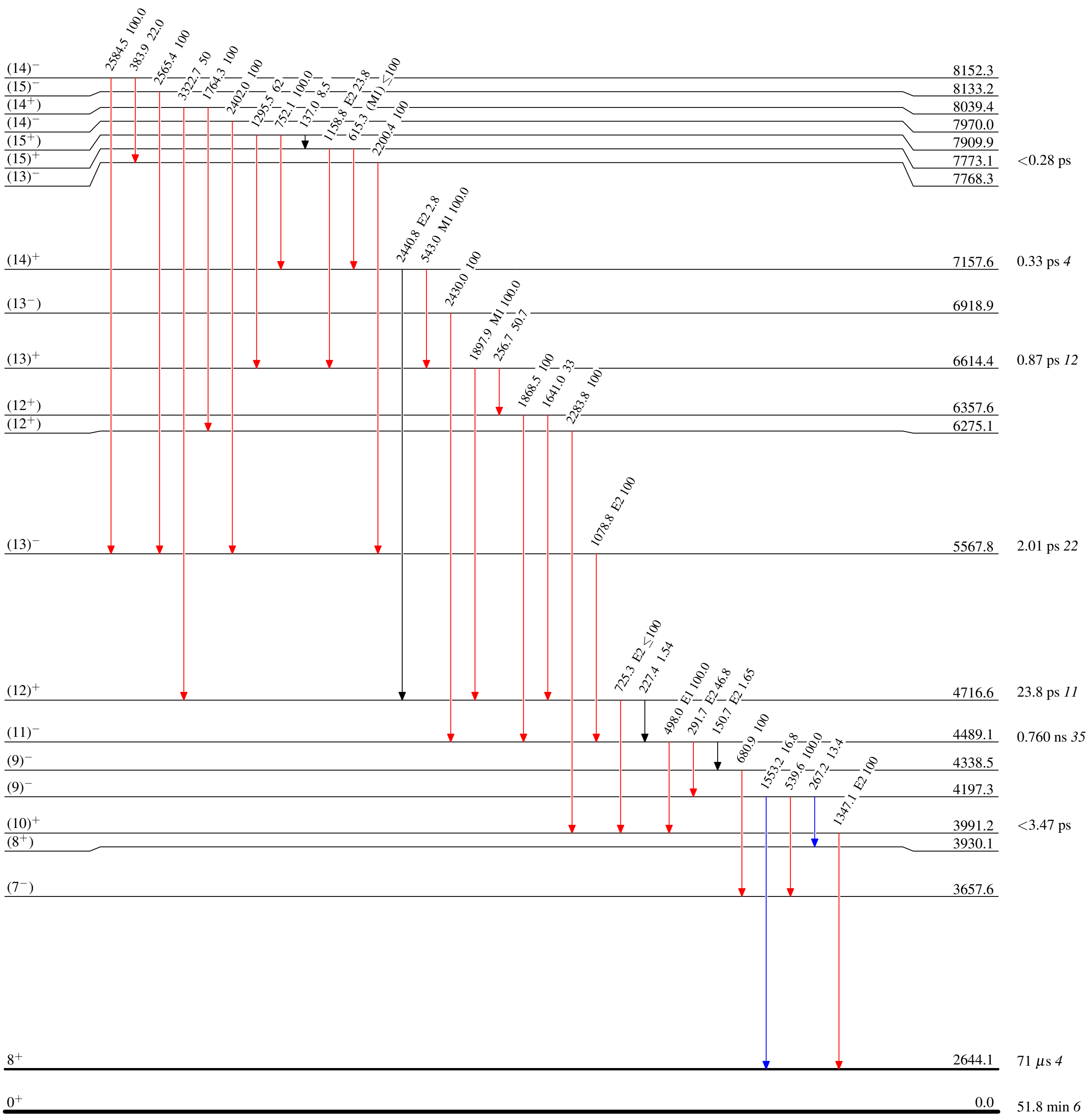
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified
& Multiply placed: undivided intensity given

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$

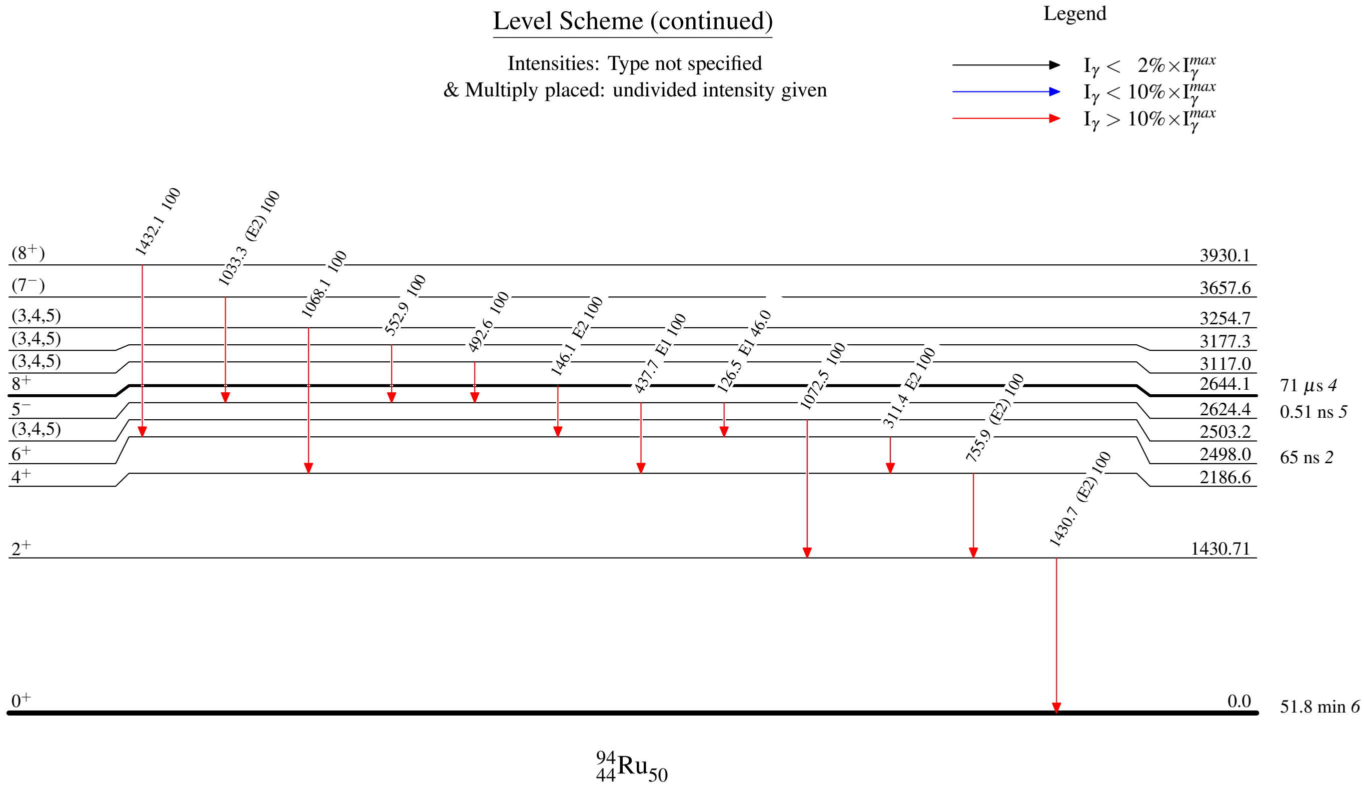


$^{94}_{44}Ru_{50}$

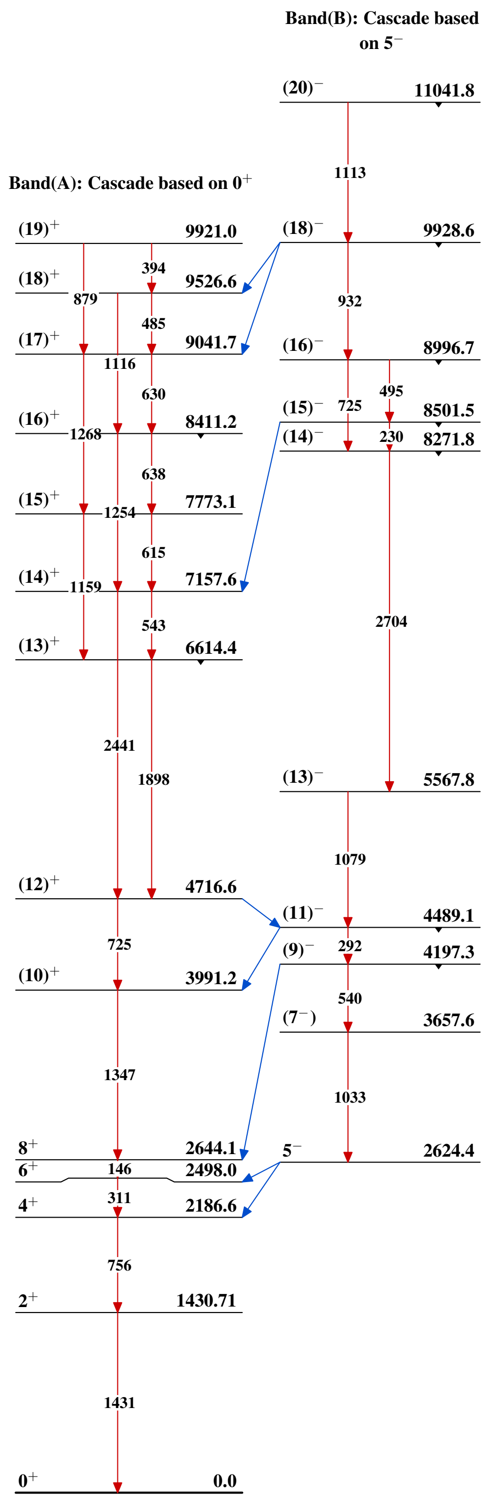
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified
& Multiply placed: undivided intensity given



Adopted Levels, Gammas



$^{94}_{44}Ru_{50}$

Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	D. Abriola(a), A. A. Sonzogni	NDS 109,2501 (2008)	1-Apr-2008

Q(β^-)=−6393 *10*; S(n)=10694 *10*; S(p)=7348 *5*; Q(α)=−1696.2 *9* 2012Wa38
Note: Current evaluation has used the following Q record −6393 1010694 107344 9 −1692 9 2003Au03.
α: Additional information 1.

^{96}Ru Levels

Cross Reference (XREF) Flags

A	^{96}Rh ε decay (9.90 min)	F	Coulomb excitation
B	^{96}Rh ε decay (1.51 min)	G	^{96}Ru(γ,γ')
C	(HI,xnγ)	H	^{65}Cu(^{36}S,p4nγ)
D	^{96}Ru(p,p$'\gamma$)	I	^{95}Mo(^{3}He,2nγ)
E	^{96}Ru(α,α')		

E(level)	J$^\pi$†	T$_{1/2}$‡	XREF	Comments
0.0#	0$^+$	stable	ABCDEFGHI	T$_{1/2}$: With Q(2ε)=2718 keV 8 and Q(2β^+)=674 keV 8 (2003Au03), ^{96}Ru could decay to ^{96}Mo by 2ε, 2β^+ or $\varepsilon\beta^+$. Experimentally, only upper limits were obtained, the shortest value being T$_{1/2}$(2β^+)>3.1x10^{16} y with a 68% confidence level (1985No03). <r^2>$^{1/2}$(charge)=4.393 *5* (2004An14).
832.56# *5*	2$^+$	2.94 ps *6*	ABCDEFGHI	Q=−0.13 *9* (1980La01,1989Ra17); B(E2)↑=0.240 *5* J$^\pi$: γ to 0$^+$ is E2. T$_{1/2}$: from B(E2) value, see Coulomb Excitation dataset.
1518.05# *6*	4$^+$	6.9 ps *5*	ABCDEF HI	J$^\pi$: stretched E2 cascade in (α,2nγ). T$_{1/2}$: Weighted av of 6.8 ps *7* from ^{65}Cu(^{36}S,p4nγ), 6.9 ps *9* from Coulomb excitation and 6.9 ps *9* from ^{95}Mo(^{3}He,2nγ).
1931.07 *6*	2$^+$	0.38 ps *3*	AB D FG I	T$_{1/2}$: Weighted av of 0.38 ps *+15−11* from ^{96}Ru(p,p$'\gamma$), 0.39 ps *6* from Coulomb excitation and 0.37 ps *6* from ^{95}Mo(^{3}He,2nγ). J$^\pi$: E2+M1 γ to 2$^+$. J=2 from pγ(θ) in (p,p$'\gamma$) (1979La15,1986Ad04).
2148.78 *7*	0$^+$	0.46^d ps *+63−18*	B D I	J$^\pi$: from pγ(θ) in (p,p$'\gamma$), E2 γ to 2$^+$.
2149.74# *7*	6$^+$	15 ps *5*	A CDE HI	J$^\pi$: from Hauser-Feshbach analysis, E2 γ to 4$^+$. T$_{1/2}$: Weighted av of 12.7 ps *10* from ^{65}Cu(^{36}S,p4nγ) and 26 ps *2* form ^{95}Mo(^{3}He,2n).
2283.88 *9*	2$^+$	0.15 fs *5*	AB D F I	J$^\pi$: from σ(θ) in Coulomb Excitation. T$_{1/2}$: from B(E2) (Coulomb Excitation).
2462.16 *9*	4	0.10^a ps *+5−3*	AB D I	J$^\pi$: J from $\gamma\gamma$(θ) (2002Kl07).
2524.85 *9*	3$^+$,4$^+$	<0.4^d ps	AB D I	J$^\pi$: pγ(θ) in (p,p$'\gamma$) and Hauser-Feshbach analysis.
2528.47 *10*	1$^+$,2$^+$		D I	J$^\pi$: from pγ(θ) in (p,p$'\gamma$).
2576.02 *9*	(2$^+$)		AB D I	
2579.02 *15*	1$^+$,2$^+$,3$^+$		D	E2+M1 γ to 2$^+$.
2588.41@ *8*	5$^-$	≥2.8 ps	ABCD HI	J$^\pi$: E1 γ to 4$^+$ and log *ft*=6.8 from 6$^+$.
2649.99 *9*	3$^{(-)}$		AB D I	J$^\pi$: J from $\gamma\gamma$(θ) (2002Kl07), parity from syst.
2699.80 *18*	4$^+$,5		D I	
2739.78 *12*	(2$^+$)	<0.4^d ps	B D I	J$^\pi$: From pγ(θ) in (p,p$'\gamma$), Hauser-Feshbach analysis in (p,p$'\gamma$) gives 2$^+$,3$^+$, γ to 0$^+$ excludes 3$^+$.
2760.20 *9*	(4$^+$,5)	<0.12^d ps	AB D I	J$^\pi$: Hauser-Feshbach analysis in (p,p$'\gamma$).
2793.89 *8*	(5,6)		A E I	J$^\pi$: From $\gamma\gamma$(θ) and spin and parity selection rules from 2002Kl07.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{96}Ru Levels (continued)

E(level)	J^{π} [†]	$T_{1/2}$ [‡]	XREF	Comments
2851.12 *14*	(2^+,3)	0.14[a] ps *+10−5*	DE I	J^{π}: From $\gamma\gamma(\theta)$ and spin and parity selection rules from 2002Kl07.
2891.64 *9*	6^+	<0.20[d] ps	A C I	J^{π}: $\gamma(\theta)$ in HI reactions.
2897.61 *13*	$3^{(+)}$	<0.4[d] ps	A D I	J^{π}: from $\gamma\gamma(\theta)$ (2002Kl07).
2950.39[#] *8*	8^+	11 ps *4*	A C HI	J^{π}: stretched E2 cascade in (α,2nγ). $T_{1/2}$: Weighted av. of 9.5 ps *8* from ^{65}Cu(^{36}S,p4nγ) and 20 ps *2* from ^{95}Mo(^{3}He,2n).
2987.8 *3*	(0,4)		D	
2996.30 *16*	2^+,3^+,4^+		B D I	J^{π}: log *ft*=5.4 from 3^+ ^{96}Rh isomer gives $(2,3,4)^+$.
3060.46 *15*	(1,4)		D I	J^{π}: From $\gamma\gamma(\theta)$ and spin and parity selection rules from 2002Kl07.
3072.21 *21*	(3^-,4)		I	J^{π}: γ to 5^-; not seen in decay of 6^+ ^{96}Rh isomer.
3076.28 *11*	3^-		B D I	
3077.1 *5*	(5,6)		AB	J^{π}: log *ft*=7.0 from 6^+ ^{96}Rh isomer gives (5,6,7); γ to 4^+.
3090.20 *19*	2^+	<0.13[d] ps	B DE I	J^{π}: log *ft*=5.65 from 3^+ ^{96}Rh isomer gives 2^+,3^+,4^+; γ to 0^+.
3154.24 *20*	$1^{(+)}$	3.12[ac] fs *14*	G	J^{π}: D γ to 0^+ and two more γ's to 2^+ levels.
3166.76 *21*	(5,6)		A D I	log *ft*=6.3 from 6^+ ^{96}Rh isomer gives (5,6,7); γ to 4^+.
3172.4 *3*	(9^+)		H	
3210.13 *22*	(2,6)		D I	
3232.2 *5*	(0,4)		D	
3261.03 *18*	2^+		B D I	J^{π}: log *ft*=5.42 from 3^+ ^{96}Rh isomer; γ to 0^+.
3281.3 *3*	(3,7)		I	
3282.4 *3*	1	49.2[c] fs *35*	G	J^{π}: D γ to 0^+ g.s.
3291.46[@] *15*	7^-	7.1[b] ps *9*	A C HI	J^{π}: stretched cascade in (α,2nγ) and $\gamma\gamma(\theta)$ and spin and parity selection rules from 2002Kl07.
3291.54 *18*	4^+	<0.4[d] ps	AB I	J^{π}: from $\gamma\gamma(\theta)$ (2002Kl07), γ to 2^+.
3306.78 *12*	5		A	J^{π}: log *ft*=6.2 from 6^+ ^{96}Rh isomer gives (5,6,7); γ to $3^{(-)}$.
3362.54 *20*	(4,8)		A	
3377.55 *10*	5^+		A	J^{π}: log *ft*=5.4 from 6^+ ^{96}Rh isomer gives $(5,6,7)^+$; γ to 3^-.
3380.51 *10*	$(6,7)^+$		A	J^{π}: log *ft*=5.4 from 6^+ ^{96}Rh isomer gives $(5,6,7)^+$; γ to 8^+.
3447.9 *10*	1	126[c] fs *21*	G	J^{π}: D γ to 0^+ g.s.
3479.6 *3*	1	35.3[c] fs *28*	G	J^{π}: D γ to 0^+ g.s.
3544.52 *13*	(6,7)		A	J^{π}: γ to 5; log *ft*=6.6 from 6^+ ^{96}Rh isomer gives (5,6,7); γ to 8^+.
3706.50 *18*	$(5,6)^+$		A	J^{π}: log *ft*=5.8 from 6^+ ^{96}Rh isomer gives $(5,6,7)^+$; γ to 4^+.
3742.87 *15*	(5,6)		A	J^{π}: log *ft*=6.3 from 6^+ ^{96}Rh isomer gives (5,6,7); γ to 4^+.
3755.15 *20*	$(5,6,7)^+$		A	J^{π}: log *ft*=5.7 from 6^+ ^{96}Rh isomer gives $(5,6,7)^+$; γ to 8^+.
3805.69 *20*	(5,6,7)		A	J^{π}: log *ft*=6.4 from 6^+ ^{96}Rh isomer.
3817.22[#] *13*	10^+	3.5[b] ps *4*	C H	J^{π}: stretched E2 cascade in (α,2nγ).
3887.23 *11*	$(5,6,7)^+$		A	J^{π}: log *ft*=5.4 from 6^+ ^{96}Rh isomer.
3928.6[&] *4*	(10^+)		H	
3951.08[@] *17*	9^-	8.3[b] ps *8*	C H	J^{π}: E2 γ to 7^-.
4057.52 *20*	(5,6)		A	J^{π}: log *ft*=6.0 from 6^+ ^{96}Rh isomer gives (5,6,7); γ to 4^+.
4080.28 *15*	$(5,6,7)^+$		A	J^{π}: log *ft*=5.9 from 6^+ ^{96}Rh isomer gives $(5,6,7)^+$; γ to 2^+ would be an unlikely [M3] and select 5^+.
4112.99 *12*	$(6,7)^+$		A	J^{π}: log *ft*=5.7 from 6^+ ^{96}Rh isomer gives $(5,6,7)^+$; γ to 8^+ 5.69.
4148.2 *5*	(5,6,7)		A	J^{π}: log *ft*=7.5 from 6^+ ^{96}Rh isomer gives (5,6,7); γ to 6^+.
4210.8 *4*	(5,6,7)		A	J^{π}: log *ft*=6.7 from 6^+ ^{96}Rh isomer.
4262.1 *4*	(8,12)		C	
4265.0[&] *4*	(11^+)		H	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{96}Ru Levels (continued)

E(level)	J^{π}[†]	$T_{1/2}$[‡]	XREF	Comments
4418.27[#] *16*	12^+	21[b] ps *3*	C H	J^{π}: stretched E2 to 10^+.
4521.08 *20*	$(5,6)^+$		A	J^{π}: log *ft*=5.5 from 6^+ ^{96}Rh isomer gives $(5,6,7)^+$; γ to 4 rules out 7.
4534.03 *21*	10^-		C H	
4560.93 *19*	$(5,6)^+$		A	J^{π}: log *ft*=5.6 from 6^+ ^{96}Rh isomer gives $(5,6,7)^+$; γ to 4^+.
4592.5 *5*	(5,6,7)		A	J^{π}: log *ft*=6.0 from 6^+ ^{96}Rh isomer gives (5,6,7); γ to 2^+.
4598.9 *7*			C	
4710.9[&] *3*	(12^+)		H	
4777.42 *12*	5^+		A	J^{π}: log *ft*=5.1 from 6^+ ^{96}Rh isomer gives $(5,6,7)^+$; γ to 3^- rules out 6 and 7.
4798.7[@] *3*	$11^{(-)}$	2.6[b] ps *5*	C H	
4866.0? *4*	(10,14)		C	
4949.64 *17*	5^+		A	J^{π}: log *ft*=5.3 from 6^+ ^{96}Rh isomer gives $(5,6,7)^+$; γ to 3^+ rules out 6 and 7.
5274.3? *4*	(9,13)		C	
5531.9[&] *3*	(13^+)		H	
5533.9? *5*	(11^-)		C H	
5541.47 *22*	$(5,6,7)^+$		A	J^{π}: log *ft*=4.96 from 6^+ ^{96}Rh isomer.
5680.69[#] *19*	14^+	2.43[b] ps *21*	C H	J^{π}: E2 γ to 12^+.
5750.2[@] *3*	$13^{(-)}$	2.1[b] ps *4*	C H	
5978.5[&] *4*	(14^+)		H	
5994.5? *4*	(9,13)		C	
6278.3 *3*	$14^{(-)}$		C H	
6441.61[#] *24*	16^+	≤7.4[b] ps	C H	J^{π}: E2 from 14^+.
6678.9 *5*	(14,18)		H	
6754.1[@] *4*	$15^{(-)}$		H	
6769.8 *5*	(14,18)		H	
6777.1 *4*	$16^{(-)}$		H	
7415.0 *5*	(17^+)		H	
7425.2 *5*	(16^+)		H	
7534.8 *5*	(17^+)		H	
7558.3 *5*	$17^{(-)}$		H	
7951.2[@] *5*	$17^{(-)}$	≤4.2[b] ps	H	
8187.6 *10*	(17^+)		H	
8205.7[#] *5*	18^+		C H	J^{π}: E2 γ to 16^+.
8236.0 *5*	$18^{(-)}$		H	
8499.6 *10*	(17^+)		H	
8644.1 *6*	(18^+)		H	
8736.2 *6*	(18^+)		H	
8968.8 *11*	(18^+)		H	
9101.0 *11*	(18^+)		H	
9249.1 *7*	(20^+)		H	
9250.3 *6*	(18^-)		H	
9391.4[@] *5*	(19^-)		H	
9586.4 *7*	(20^+)		H	
9665.3 *6*	(19^-)		H	
9713.4 *7*	(19^+)		H	
9852.2 *12*	(20^+)		H	
9892.3 *7*	(21^-)		H	
9992.4[@] *6*	(21^-)		H	
9997.4 *8*	(21^+)		H	
10592.8 *9*	(22^+)		H	

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Adopted Levels, Gammas (continued)

^{96}Ru Levels (continued)

E(level)	J$^{\pi}$†	XREF
10631.5 *8*	(22$^+$)	H
10720.4 *8*	(22$^+$)	H
11066.1 *12*	(22$^+$)	H
11360.1 *12*	(22$^+$)	H
11601.4[@] *12*	(23$^-$)	H

† From $\sigma(\theta)$ and γ decay patterns, except as noted.
‡ From (p,p′γ), except where noted.
# Band(A): g.s. cascade.
@ Band(B): 5$^-$ cascade.
& Band(C): (10$^+$) cascade.
[a] From ^{96}Ru(p,p′γ).
[b] From RDDS in ^{65}Cu(^{36}S,p4nγ).
[c] From ^{96}Ru(γ,γ').
[d] From DSAM in ^{95}Mo(^{3}He,2nγ).

γ(^{96}Ru)

E_i(level)	J^π_i	E_γ	I_γ	E_f	J^π_f	Mult.[&]	δ	α	Comments
832.56	2^+	832.55 *5*	100	0.0	0^+	E2		0.001360 *19*	α(K)=0.001190 *17*; α(L)=0.0001395 *20*; α(M)=2.56×10^{-5} *4* α(O)=2.11×10^{-7} *3*; α(N+..)=4.33×10^{-6} B(E2)(W.u.)=18.4 *4* E_γ: weighted average of 832.52 *10* (^{96}Rh ε decay (9.90 min)), 832.51 *9* ((HI,xnγ)), 832.57 *5* (^{96}Ru(p,p$'\gamma$)), 831.6 *4* (^{65}Cu(^{36}S,p4nγ)), 832.6 *1* (^{95}Mo(^{3}He,2nγ)).
1518.05	4^+	685.47 *4*	100	832.56	2^+	E2		0.00222 *4*	α(K)=0.00194 *3*; α(L)=0.000231 *4*; α(M)=4.24×10^{-5} *6*; α(N)=6.82×10^{-6} *10*; α(O)=3.42×10^{-7} *5* α(N+..)=7.16×10^{-6} *10* B(E2)(W.u.)=20.7 *15* E_γ: weighted average of 685.47 *10* (^{96}Rh ε decay (9.90 min)), 685.34 *12* ((HI,xnγ)), 685.49 *5* (^{96}Ru(p,p$'\gamma$)), 685.1 *4* (^{65}Cu(^{36}S,p4nγ)), 685.5 *1* (^{95}Mo(^{3}He,2nγ)).
1931.07	2^+	1098.49 *5*	100 *4*	832.56	2^+	E2+M1	−1.1 *1*	0.000745 *11*	α(K)=0.000654 *10*; α(L)=7.46×10^{-5} *11*; α(M)=1.366×10^{-5} *20* α(O)=1.174×10^{-7} *18*; α(N+..)=2.33×10^{-6} B(E2)(W.u.)=18.4 *24*; B(M1)(W.u.)=0.019 *3* E_γ: weighted average of 1098.2 *2* (^{96}Rh ε decay (9.90 min)), 1098.51 *5* (^{96}Ru(p,p$'\gamma$)), 1098.5 *1* (^{95}Mo(^{3}He,2nγ)). Mult.,δ: from ^{95}Mo(^{3}He,2nγ).
		1930.9 *2*	6.0 *10*	0.0	0^+				B(E2)(W.u.)=35 *6*; B(M1)(W.u.)=0.0016 *7* E_γ,I_γ: from ^{95}Mo(^{3}He,2nγ).
2148.78	0^+	1316.22 *6*	100	832.56	2^+	E2		0.000517 *8*	α(K)=0.000429 *6*; α(L)=4.88×10^{-5} *7*; α(M)=8.93×10^{-6} *13*; α(N)=1.445×10^{-6} *21* α(O)=7.65×10^{-8} *11*; α(N+..)=3.05×10^{-5} *5* B(E2)(W.u.)=12 *+5−12* E_γ: weighted average of 1316.23 *7* (^{96}Ru(p,p$'\gamma$)), 1316.2 *1* (^{95}Mo(^{3}He,2nγ)).
2149.74	6^+	631.70 *4*	100	1518.05	4^+	E2		0.00276 *4*	α(K)=0.00241 *4*; α(L)=0.000289 *4*; α(M)=5.31×10^{-5} *8*; α(N)=8.52×10^{-6} *12*; α(O)=4.24×10^{-7} *6* α(N+..)=8.95×10^{-6} *13* B(E2)(W.u.)=14 *5* E_γ: weighted average of 631.73 *10* (^{96}Rh ε decay (9.90 min)), 631.64 *10* ((HI,xnγ)), 631.71 *7* (^{96}Ru(p,p$'\gamma$)), 632.1 *4* (^{65}Cu(^{36}S,p4nγ)), 631.7 *1* (^{95}Mo(^{3}He,2nγ)).
2283.88	2^+	1451.31 *12*	100 *3*	832.56	2^+	(M1+E2)	+0.12 *3*	0.000489 *7*	α(K)=0.000381 *6*; α(L)=4.28×10^{-5} *6*; α(M)=7.83×10^{-6} *11*; α(N)=1.272×10^{-6} *18* α(O)=6.87×10^{-8} *10*; α(N+..)=5.78×10^{-5} *9* B(E2)(W.u.)=(3.0×10^2 *18*); B(M1)(W.u.)=(44 *15*)

$\gamma(^{96}Ru)$ (continued)

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.&	δ	α	Comments
									E_γ: weighted average of 1451.2 *2* (^{96}Rh ε decay (9.90 min)), 1451.9 *5* (^{96}Rh ε decay (1.51 min)), 1451.6 *3* (^{96}Ru(p,p$'\gamma$)), 1451.2 *2* (^{95}Mo(^{3}He,2nγ)). I_γ: from ^{95}Mo(^{3}He,2nγ).
2283.88	2^+	2283.78 *22*	7.5 *10*	0.0	0^+	E2		0.000612 *9*	α(K)=0.0001500 *21*; α(L)=1.675×10^{-5} *24*; α(M)=3.06×10^{-6} *5* α(O)=2.68×10^{-8} *4*; α(N+..)=0.000442 B(E2)(W.u.)=1.6×10^2 *6* E_γ: weighted average of 2283.6 *4* (^{96}Rh ε decay (9.90 min)), 2283.9 *5* (^{96}Rh ε decay (1.51 min)), 2284.2 *5* (^{96}Ru(p,p$'\gamma$)), 2283.6 *4* (^{95}Mo(^{3}He,2nγ)). I_γ: from ^{95}Mo(^{3}He,2nγ), other: 9 *5* (^{96}Rh ε decay (1.51 min)), 7.5 *22* (^{96}Ru(p,p$'\gamma$)).
2462.16	4	944.18 *8*	100	1518.05	4^+	D+Q			E_γ: weighted average of 944.07 *10* (^{96}Rh ε decay (9.90 min)), 944.33 *9* (^{96}Ru(p,p$'\gamma$)), 944.1 *1* (^{95}Mo(^{3}He,2nγ)).
2524.85	3^+,4^+	593.95 *15*	7.1 *24*	1931.07	2^+				E_γ: weighted average of 594.1 *2* (^{96}Rh ε decay (9.90 min)), 593.8 *2* (^{95}Mo(^{3}He,2nγ)). I_γ: from ^{96}Ru(p,p$'\gamma$).
		1006.67 *19*	10.6 *24*	1518.05	4^+				E_γ: weighted average of 1006.5 *5* (^{96}Rh ε decay (9.90 min)), 1006.7 *2* (^{96}Ru(p,p$'\gamma$)). I_γ: from ^{96}Ru(p,p$'\gamma$).
		1692.25 *14*	100.0 *20*	832.56	2^+				E_γ: weighted average of 1692.3 *2* (^{96}Rh ε decay (9.90 min)), 1692.2 *2* (^{96}Ru(p,p$'\gamma$)). I_γ: from ^{96}Ru(p,p$'\gamma$).
2528.47	1^+,2^+	1695.9 *1*	100 *4*	832.56	2^+	(M1+E2)		0.000459 *7*	α(K)=0.000269 *10*; α(L)=3.02×10^{-5} *11*; α(M)=5.52×10^{-6} *20*; α(N)=9.0×10^{-7} *4* α(O)=4.82×10^{-8} *21*; α(N+..)=0.000154 *1* E_γ,I_γ: observed only in (p,p$'\gamma$).
		2528.4 *3*	30 *4*	0.0	0^+				E_γ,I_γ: from in (p,p$'\gamma$).
2576.02	(2^+)	1743.39 *10*	100 *4*	832.56	2^+	D+Q			E_γ: weighted average of 1743.1 *5* (^{96}Rh ε decay (9.90 min)), 1743.4 *1* (^{96}Ru(p,p$'\gamma$)). I_γ: from (p,p$'\gamma$).
		2576.13 *17*	43 *4*	0.0	0^+				E_γ: weighted average of 2576.1 *2* (^{96}Rh ε decay (1.51 min)), 2576.2 *3* (^{96}Ru(p,p$'\gamma$)). I_γ: from (p,p$'\gamma$).
2579.02	1^+,2^+,3^+	647.9 *2*	59 *6*	1931.07	2^+	E2+M1	+2.0 +6−5	0.00257 *4*	α(K)=0.00225 *4*; α(L)=0.000267 *4*; α(M)=4.89×10^{-5} *8*; α(N)=7.87×10^{-6} *12*; α(O)=3.98×10^{-7} *6* α(N+..)=8.27×10^{-6} *13*

$^{96}_{44}Ru_{52}$-6

Adopted Levels, Gammas (continued)

$\gamma(^{96}Ru)$ (continued)

E_i(level)	J^{π}_i	E_γ	I_γ	E_f	J^{π}_f	Mult.[&]	δ	α	Comments
2579.02	$1^+,2^+,3^+$	1746.5[a] 2	100 8	832.56	2^+				
2588.41	5^-	1070.36 5	100	1518.05	4^+	E1+M2	−0.01 4	0.000333 6	α(K)=0.000293 6; α(L)=3.28×10^{-5} 6; α(M)=5.99×10^{-6} 11; α(N)=9.70×10^{-7} 18 α(O)=5.18×10^{-8} 10; α(N+..)=1.022×10^{-6} 19 B(E1)(W.u.)<9.4×10^{-5}; B(M2)(W.u.)<0.34 E_γ: weighted average of 1070.35 10 (^{96}Rh ε decay (9.90 min)), 1070.26 12 ((HI,xnγ)), 1070.36 8 (^{96}Ru(p,p$'\gamma$)), 1071.1 4 (^{65}Cu(^{36}S,p4nγ)), 1070.4 1 (^{95}Mo(^{3}He,2nγ)).
2649.99	$3^{(-)}$	366.3[#] 4	5.5[@] 5	2283.88	2^+				
		718.5[#] 2	4.0[@] 10	1931.07	2^+				
		1131.9[#] 2	20.0[@] 20	1518.05	4^+				
		1817.5[#] 1	100[@] 10	832.56	2^+				
2699.80	$4^+,5$	237.7[#] 2		2462.16	4				
		1181.6[#a] 3		1518.05	4^+				
2739.78	(2^+)	455.9[#] 2	3.50[@] 20	2283.88	2^+				
		591.1[#] 2	0.25[@] 5	2148.78	0^+				
		808.6[#] 2	100[@] 8	1931.07	2^+				
		1907.5[#] 3	40.0[@] 20	832.56	2^+				
2760.20	$(4^+,5)$	1242.13 7	100	1518.05	4^+				E_γ: weighted average of 1242.14 10 (^{96}Rh ε decay (9.90 min)), 1242.4 3 (^{96}Ru(p,p$'\gamma$)), 1242.1 1 (^{95}Mo(^{3}He,2nγ)).
2793.89	(5,6)	644.18 7	100[@] 3	2149.74	6^+				E_γ: weighted average of 644.16 10 (^{96}Rh ε decay (9.90 min)), 644.2 1 (^{95}Mo(^{3}He,2nγ)).
		1275.78 7	67.0[@] 20	1518.05	4^+				E_γ: weighted average of 1275.76 10 (^{96}Rh ε decay (9.90 min)), 1275.8 1 (^{95}Mo(^{3}He,2nγ)).
2851.12	$(2^+,3)$	567.0[#] 2	8.0[@] 20	2283.88	2^+				
		920.6[#] 5	9[@] 3	1931.07	2^+				
		1332.8[#] 3	13.3[@] 5	1518.05	4^+				
		2018.8[#] 2	100[@] 15	832.56	2^+				
2891.64	6^+	741.88 7	100	2149.74	6^+	D+Q			E_γ: weighted average of 741.87 10 (^{96}Rh ε decay (9.90 min)), 741.8 3 ((HI,xnγ)), 741.9 1 (^{95}Mo(^{3}He,2nγ)).
2897.61	$3^{(+)}$	435.3[#] 3	3.0[@] 10	2462.16	4				
		613.8[#] 3	20.0[@] 20	2283.88	2^+				
		966.8[#] 2	100[@] 12	1931.07	2^+				
		1379.5[#] 3	63[@] 12	1518.05	4^+				
		2064.7[#] 3	20.0[@] 20	832.56	2^+				

$^{96}_{44}Ru_{52}$-7

Adopted Levels, Gammas (continued)

$\gamma(^{96}Ru)$ (continued)

E_i(level)	J^π_i	E_γ	I_γ	E_f	J^π_f	Mult.[&]	α	Comments
2950.39	8^+	800.68 *6*	100	2149.74	6^+	E2	0.001496 *21*	α(K)=0.001309 *19*; α(L)=0.0001539 *22*; α(M)=2.82×10^{-5} *4* α(O)=2.32×10^{-7} *4*; α(N+..)=4.77×10^{-6} B(E2)(W.u.)=6.0 *22* E_γ: weighted average of 800.70 *10* (^{96}Rh ε decay (9.90 min)), 800.55 *13* ((HI,xnγ)), 801.2 *4* (^{65}Cu(^{36}S,p4nγ)), 800.7 *1* (^{95}Mo(^{3}He,2nγ)).
2987.8	(0,4)	2155.2 *3*	100	832.56	2^+			
2996.30	$2^+,3^+,4^+$	471.4[#] *5*	15 *5*	2524.85	$3^+,4^+$			I_γ: weighted average of 15 *6* (^{96}Rh ε decay (1.51 min)) and 15 *5* (^{95}Mo(^{3}He,2nγ)).
		533.7[#] *3*	3.1 *5*	2462.16	4			I_γ: weighted average of 3.08 (^{96}Rh ε decay (1.51 min)) and 3.1 *5* (^{95}Mo(^{3}He,2nγ)).
		1479.0[#] *5*	17.5 *22*	1518.05	4^+			I_γ: weighted average of 17 *6* (^{96}Rh ε decay (1.51 min)) and 17.6 *24* (^{96}Ru(p,p′γ)).
		2163.8[#] *2*	100.0 *23*	832.56	2^+			I_γ: weighted average of 100 *11* (^{96}Rh ε decay (1.51 min)) and 100.0 *24* (^{96}Ru(p,p′γ)).
3060.46	(1,4)	776.8[#] *3*	25[@] *7*	2283.88	2^+			
		1129.1[#] *2*	100[@] *7*	1931.07	2^+			
		2228.3[#] *3*	20[@] *7*	832.56	2^+			
3072.21	$(3^-,4)$	483.8 *2*	100	2588.41	5^-			
3076.28	3^-	425.7 *4*	18.0[@] *20*	2649.99	$3^{(-)}$			E_γ: weighted average of 425.2 *10* (^{96}Ru(p,p′γ)), 425.8 *5* (^{95}Mo(^{3}He,2nγ)).
		487.0[#] *5*	32[@] *9*	2588.41	5^-			
		614.9[#] *2*	8.0[@] *10*	2462.16	4			
		1144.9[#] *2*	55[@] *3*	1931.07	2^+			
		1557.4[#] *3*	1.0×10^2[@] *4*	1518.05	4^+			
		2244.0[#] *5*	2.2[@] *5*	832.56	2^+			
3077.1	(5,6)	1559.0 *5*	100	1518.05	4^+			E_γ: from ^{96}Rh ε decay (1.51 min).
3090.20	2^+	2257.6[#] *2*	100[@] *6*	832.56	2^+			
		3090.2[#] *5*	6.4[@] *21*	0.0	0^+			
3154.24	$1^{(+)}$	1224.1 *6*	28 *10*	1931.07	2^+			
		2321.5 *3*	6.0 *10*	832.56	2^+			
		3154.1 *3*	100 *8*	0.0	0^+	D		
3166.76	(5,6)	1648.7[#] *2*	100	1518.05	4^+			
3172.4	(9^+)	222.7 *4*	100	2950.39	8^+	D		
3210.13	(2,6)	1692.0[#] *3*	100[@] *15*	1518.05	4^+			
		2377.6[#] *3*	64[@] *25*	832.56	2^+			

$\gamma(^{96}Ru)$ (continued)

E_i(level)	J^π_i	E_γ	I_γ	E_f	J^π_f	Mult.[&]	α	Comments
3232.2	(0,4)	1301.1 5	100	1931.07	2^+			
3261.03	2^+	1330.5[#] 10	<12.0	1931.07	2^+			I_γ: from ^{96}Rh ε decay (1.51 min).
		1743.1[#] 5	100[@] 15	1518.05	4^+			
		2428.3[#] 2	32[@] 7	832.56	2^+			
		3261.5[#] 5	9.0[@] 20	0.0	0^+			
3281.3	(3,7)	692.9 3	100	2588.41	5^-			
3282.4	1	3282.3 3	100	0.0	0^+	D		
3291.46	7^-	497.4[#] 4		2793.89	(5,6)			
		703.04 16	100	2588.41	5^-	E2	0.00208 3	α(K)=0.00182 3; α(L)=0.000216 3; α(M)=3.96×10^{-5} 6; α(N)=6.37×10^{-6} 9; α(O)=3.21×10^{-7} 5 α(N+..)=6.69×10^{-6} 10 B(E2)(W.u.)=17.7 23 E_γ: weighted average of 702.95 25 ((HI,xnγ)), 703.1 2 (^{95}Mo(^{3}He,2nγ)). Other 703.9 4 ^{65}Cu(^{36}S,p4nγ).
3291.54	4^+	400.0[#] 4	36[@] 8	2891.64	6^+			
		531.2[#] 3	8.0[@] 20	2760.20	(4^+,5)			
		766.8[#] 5	56[@] 11	2524.85	$3^+,4^+$			
		1773.4[#] 5	44[@] 14	1518.05	4^+			
		2459.1[#] 5	100[@] 14	832.56	2^+			
3306.78	5	415.2 5	32 4	2891.64	6^+			
		657.5[a] 5	12 6	2649.99	$3^{(-)}$			γ previously placed in level 2588.51 (1983Wa06) but not seen in coincidence, inconsistent with J^π of level. Placed here by evaluator.
		1157.0 2	≈20	2149.74	6^+			
		1788.6 2	100 4	1518.05	4^+			
3362.54	(4,8)	1212.8 2	100	2149.74	6^+			
3377.55	5^+	300.7 5	3.1 8	3076.28	3^-			
		485.9 5	6.4 9	2891.64	6^+			
		852.3 5	6.2 9	2524.85	$3^+,4^+$			
		915.2 2	13.2 8	2462.16	4			
		1227.85 10	100 6	2149.74	6^+			
		1859.7 2	20.6 8	1518.05	4^+			
3380.51	$(6,7)^+$	430.2 1	31 3	2950.39	8^+			
		488.9 5	5.4 14	2891.64	6^+			
		586.62 20	21.3 7	2793.89	(5,6)			
		1230.66 10	100 7	2149.74	6^+			
3447.9	1	3447.8 10	100	0.0	0^+	D		
3479.6	1	3479.5 3	100	0.0	0^+	D		
3544.52	(6,7)	237.9 2	33 5	3306.78	5			

$\gamma(^{96}Ru)$ (continued)

E_i(level)	J^π_i	E_γ	I_γ	E_f	J^π_f	Mult.&	α	Comments
3544.52	(6,7)	594.1 2	100 11	2950.39	8^+			
		1394.7 2	47 9	2149.74	6^+			
3706.50	$(5,6)^+$	400.0 5	6.8 16	3306.78	5			
		415.2 5	32 4	3291.54	4^+			
		912.2 5	13.0 10	2793.89	(5,6)			
		1556.72 20	100 5	2149.74	6^+			
3742.87	(5,6)	380.4 5	46 14	3362.54	(4,8)			
		1593.1 2	100 11	2149.74	6^+			
		2224.8 2	66 9	1518.05	4^+			
3755.15	$(5,6,7)^+$	863.5 5	4.9 15	2891.64	6^+			
		1605.4 2	100 3	2149.74	6^+			
3805.69	(5,6,7)	1011.4 5	53 11	2793.89	(5,6)			
		1656.0 2	100 11	2149.74	6^+			
3817.22	10^+	866.71 10	100	2950.39	8^+	E2	0.001234 18	α(K)=0.001081 16; α(L)=0.0001262 18; α(M)=2.31×10^{-5} 4 α(O)=1.92×10^{-7} 3; α(N+..)=3.92×10^{-6} B(E2)(W.u.)=12.7 15 E_γ: from ((HI,xnγ)), other: 867.3 4 (^{65}Cu(^{36}S,p4nγ)).
3887.23	$(5,6,7)^+$	995.5 2	17.7 9	2891.64	6^+			
		1737.45 10	100 5	2149.74	6^+			
3928.6	(10^+)	112.1 4	100	3817.22	10^+			
3951.08	9^-	659.61‡ 11	100†	3291.46	7^-	E2	0.00246 4	α(K)=0.00215 3; α(L)=0.000257 4; α(M)=4.71×10^{-5} 7; α(N)=7.57×10^{-6} 11; α(O)=3.78×10^{-7} 6 α(N+..)=7.94×10^{-6} 12 B(E2)(W.u.)=20.2 20
		779.4‡ 4	1.7† 10	3172.4	(9^+)			
		1002.1‡ 4	1.6† 5	2950.39	8^+			
4057.52	(5,6)	1907.8 2	83 9	2149.74	6^+			
		2539.2 5	100 7	1518.05	4^+			
4080.28	$(5,6,7)^+$	699.5 5	16 5	3380.51	$(6,7)^+$			
		1188.6 2	100 9	2891.64	6^+			
		1286.4 2	43 9	2793.89	(5,6)			
		2149.6 5	11 4	1931.07	2^+			
4112.99	$(6,7)^+$	1162.9 5	27 4	2950.39	8^+			
		1525.2 5	5.5 16	2588.41	5^-			
		1963.19 10	100 5	2149.74	6^+			
4148.2	(5,6,7)	1998.4 5	100	2149.74	6^+			
4210.8	(5,6,7)	1450.5 5	1.0×10^2 4	2760.20	$(4^+,5)$			
		2061.2 5	1.0×10^2 3	2149.74	6^+			
4262.1	(8,12)	444.9 4	100	3817.22	10^+			
4265.0	(11^+)	337.2‡ 4	100	3928.6	(10^+)			

Adopted Levels, Gammas (continued)

$\gamma(^{96}Ru)$ (continued)

E_i(level)	J^π_i	E_γ	I_γ	E_f	J^π_f	Mult.[&]	α	Comments
4418.27	12^+	600.86 *10*	100	3817.22	10^+	E2	0.00317 *5*	α(K)=0.00276 *4*; α(L)=0.000333 *5*; α(M)=6.12×10^{-5} *9*; α(N)=9.81×10^{-6} *14*; α(O)=4.85×10^{-7} *7* α(N+..)=1.029×10^{-5} *15* B(E2)(W.u.)=13.1 *19* Measured Q, calculated B(M2)(W.u.) exceeds RUL excluding M2, hence E2. E_γ: from (HI,xnγ), other: 601.3 *4* (^{65}Cu(^{36}S,p4nγ)).
4521.08	$(5,6)^+$	1996.16 *20*	100 *5*	2524.85	$3^+,4^+$			
		2059.2 *5*	30.4 *22*	2462.16	4			
4534.03	10^-	582.99 *14*	100	3951.08	9^-	D		E_γ: from (HI,xnγ), other: 584.1 *4* (^{65}Cu(^{36}S,p4nγ)).
4560.93	$(5,6)^+$	1016.8 *5*	38 *11*	3544.52	(6,7)			
		1269.1 *5*	66 *9*	3291.54	4^+			
		1800.7 *2*	100 *11*	2760.20	$(4^+,5)$			
4592.5	(5,6,7)	1048.0 *5*	100	3544.52	(6,7)			
4598.9		336.8 *5*	100	4262.1	(8,12)			
4710.9	(12^+)	292.7[‡] *4*	71 *21*	4418.27	12^+			
		446.7[‡] *4*	1.0×10^2 *3*	4265.0	(11^+)			
		893.9[‡] *4*	$8.\times10^1$ *3*	3817.22	10^+			
4777.42	5^+	890.0 *2*	88 *7*	3887.23	$(5,6,7)^+$			
		1400.5 *5*	26 *7*	3377.55	5^+			
		1470.2 *5*	100 *21*	3306.78	5			
		1701.1 *2*	60 *7*	3076.28	3^-			
		1885.7 *2*	84 *9*	2891.64	6^+			
		2252.7 *2*	58 *9*	2524.85	$3^+,4^+$			
		2628.0 *5*	26 *7*	2149.74	6^+			
4798.7	$11^{(-)}$	265.1[‡] *4*	2.0[†] *6*	4534.03	10^-	D		
		849.2 *4*	100	3951.08	9^-			E_γ: weighted average of 847.38 *25* ((HI,xnγ)), 849.2 *4* (^{65}Cu(^{36}S,p4nγ)).
4866.0?	(10,14)	447.7 *4*	100	4418.27	12^+			
4949.64	5^+	1642.7 *2*	100 *11*	3306.78	5			
		2052.4 *5*	33 *14*	2897.61	$3^{(+)}$			
		2361.5 *5*	44 *8*	2588.41	5^-			
		2424.9 *5*	33 *8*	2524.85	$3^+,4^+$			
		2800.0 *5*	28 *8*	2149.74	6^+			
		3431.5 *5*	56 *14*	1518.05	4^+			
5274.3?	(9,13)	475.52 *35*	100	4798.7	$11^{(-)}$			
5531.9	(13^+)	822.0[‡] *4*	100	4710.9	(12^+)	D		
5533.9?	(11^-)	735.2[‡] *4*	44.2[†]	4798.7	$11^{(-)}$			
		999.9 *24*	100	4534.03	10^-	Q		E_γ: weighted average of 999.7 *3*((HI,xnγ)), 1000.3 *4* (^{65}Cu(^{36}S,p4nγ)).

$^{96}_{44}Ru_{52}$-11

Adopted Levels, Gammas (continued)

γ(^{96}Ru) (continued)

E_i(level)	J^π_i	E_γ	I_γ	E_f	J^π_f	Mult.[&]	α	Comments
5541.47	(5,6,7)$^+$	2163.9 *2*	100	3377.55	5$^+$			
5680.69	14$^+$	150.2[‡] *4*	6.0[†] *16*	5531.9	(13$^+$)			
		1262.18 *11*	100	4418.27	12$^+$	E2	0.000550 *8*	α(K)=0.000467 *7*; α(L)=5.33×10^{-5} *8*; α(M)=9.76×10^{-6} *14*; α(N)=1.579×10^{-6} *23* α(O)=8.34×10^{-8} *12*; α(N+..)=1.94×10^{-5} *3* B(E2)(W.u.)=2.63 *23* E_γ: weighted average of 1262.17 *11* ((HI,xnγ)), 1262.3 *4* (^{65}Cu(^{36}S,p4nγ)).
5750.2	13$^{(-)}$	217.7[‡] *4*	17[†] *3*	5531.9	(13$^+$)	D		B(M1)(W.u.)=0.14 *4*
		952.6 *3*	100	4798.7	11$^{(-)}$	E2	0.000988 *14*	α(K)=0.000866 *13*; α(L)=0.0001005 *14*; α(M)=1.84×10^{-5} *3* α(O)=1.540×10^{-7} *22*; α(N+..)=3.12×10^{-6} B(E2)(W.u.)=11.2 *22* E_γ: weighted average of 952.3 *4* ((HI,xnγ)), 952.9 *4* (^{65}Cu(^{36}S,p4nγ)).
5978.5	(14$^+$)	447.0[‡] *4*	100	5531.9	(13$^+$)			
5994.5?	(9,13)	1195.8 *3*	100	4798.7	11$^{(-)}$			
6278.3	14$^{(-)}$	528.8[‡] *4*	100[†]	5750.2	13$^{(-)}$	D		
		597.2[‡] *4*	33[†] *5*	5680.69	14$^+$	Q		
		746.5[‡] *4*	33[†]	5531.9	(13$^+$)	Q		
6441.61	16$^+$	760.74 *16*	100	5680.69	14$^+$	E2	0.001700 *24*	α(K)=0.001487 *21*; α(L)=0.0001755 *25*; α(M)=3.22×10^{-5} *5* α(O)=2.63×10^{-7} *4*; α(N+..)=5.44×10^{-6} B(E2)(W.u.)>11 E_γ: weighted average of 760.68 *17* ((HI,xnγ)), 761.1 *4* (^{65}Cu(^{36}S,p4nγ)).
6678.9	(14,18)	237.3[‡] *4*	100	6441.61	16$^+$			
6754.1	15$^{(-)}$	475.6[‡] *4*	65	6278.3	14$^{(-)}$			
		1004.4[‡] *4*	100	5750.2	13$^{(-)}$	E2	0.000875 *13*	α(K)=0.000768 *11*; α(L)=8.87×10^{-5} *13*; α(M)=1.625×10^{-5} *23* α(O)=1.366×10^{-7} *20*; α(N+..)=2.76×10^{-6}
6769.8	(14,18)	328.2[‡] *4*	100	6441.61	16$^+$			
6777.1	16$^{(-)}$	499.4[‡] *4*	100	6278.3	14$^{(-)}$	Q		
7415.0	(17$^+$)	973.4 *4*	100	6441.61	16$^+$			
7425.2	(16$^+$)	1447.0[‡] *4*	1.0×10^2 *5*	5978.5	(14$^+$)			
		1744[‡] *1*	1.0×10^2 *4*	5680.69	14$^+$			
7534.8	(17$^+$)	1093.2[‡] *4*	100	6441.61	16$^+$			
7558.3	17$^{(-)}$	781.4[‡] *4*	100	6777.1	16$^{(-)}$			
7951.2	17$^{(-)}$	1197.4[‡] *4*	100	6754.1	15$^{(-)}$	E2	0.000602 *9*	α(K)=0.000522 *8*; α(L)=5.98×10^{-5} *9*; α(M)=1.094×10^{-5} *16*;

$^{96}_{44}$Ru$_{52}$-12

γ(^{96}Ru) (continued)

E_i(level)	J^π_i	E_γ	I_γ	E_f	J^π_f	Mult.&	α	Comments
								α(O)=9.31×10^{-8} *13* α(N+..)=9.03×10^{-6} *14* B(E2)(W.u.)>2.1
8187.6	(17$^+$)	1746‡ *1*	100	6441.61	16$^+$			
8205.7	18$^+$	780.8‡ *4*	29† *14*	7425.2	(16$^+$)			
		1763.1 *8*	100† *23*	6441.61	16$^+$	E2	0.000467 *7*	α(K)=0.000241 *4*; α(L)=2.71×10^{-5} *4*; α(M)=4.96×10^{-6} *7*; α(N)=8.03×10^{-7} *12* α(O)=4.30×10^{-8} *6*; α(N+..)=0.000194 *3* E_γ: weighted average of 1765 *1*, ^{65}Cu(^{36}S,p4nγ), and 1762.8 *4*, (HI,xnγ).
8236.0	18$^{(-)}$	677.9‡ *4*	100	7558.3	17$^{(-)}$			
		1459.3‡ *4*	6 *4*	6777.1	16$^{(-)}$			
8499.6	(17$^+$)	2058‡ *1*	100	6441.61	16$^+$			
8644.1	(18$^+$)	1229.1‡ *4*	100	7415.0	(17$^+$)			
8736.2	(18$^+$)	501.0‡ *4*	1.0×10^2 *5*	8236.0	18$^{(-)}$			
		2289‡ *1*	100 *20*	6441.61	16$^+$			
8968.8	(18$^+$)	781.2‡ *4*	100	8187.6	(17$^+$)			
9101.0	(18$^+$)	601.4‡ *4*	100	8499.6	(17$^+$)	D		
9249.1	(20$^+$)	1043.3‡ *4*	100	8205.7	18$^+$	Q		
9250.3	(18$^-$)	1299.1‡ *4*	100	7951.2	17$^{(-)}$			
9391.4	(19$^-$)	1155.0‡ *4*	100	8236.0	18$^{(-)}$			
		1440.4‡ *4*	50 *10*	7951.2	17$^{(-)}$	E2	0.000468 *7*	α(K)=0.000357 *5*; α(L)=4.05×10^{-5} *6*; α(M)=7.40×10^{-6} *11*; α(N)=1.199×10^{-6} *17* α(O)=6.37×10^{-8} *9*; α(N+..)=6.37×10^{-5} *9*
9586.4	(20$^+$)	850.2‡ *4*	100	8736.2	(18$^+$)	Q		
9665.3	(19$^-$)	1429.2‡ *4*	100	8236.0	18$^{(-)}$	D		
9713.4	(19$^+$)	977.2‡ *4*	100	8736.2	(18$^+$)			
9852.2	(20$^+$)	751.2‡ *4*	100	9101.0	(18$^+$)			
9892.3	(21$^-$)	227.0‡ *4*	100	9665.3	(19$^-$)			
9992.4	(21$^-$)	601.0‡ *4*	100	9391.4	(19$^-$)	Q		
9997.4	(21$^+$)	748.3‡ *4*	100	9249.1	(20$^+$)	D		
10592.8	(22$^+$)	595.4‡ *4*	100	9997.4	(21$^+$)			
10631.5	(22$^+$)	1382.4‡ *4*	100	9249.1	(20$^+$)			
10720.4	(22$^+$)	1134.0‡ *4*	100	9586.4	(20$^+$)	Q		
11066.1	(22$^+$)	1817‡ *1*	100	9249.1	(20$^+$)			

$^{96}_{44}$Ru$_{52}$-13

$\gamma(^{96}Ru)$ (continued)

E_i(level)	J^π_i	E_γ	I_γ	E_f	J^π_f	Mult.[&]
11360.1	(22^+)	2111[‡] *1*	100	9249.1	(20^+)	
11601.4	(23^-)	1609[‡] *1*	100	9992.4	(21^-)	Q

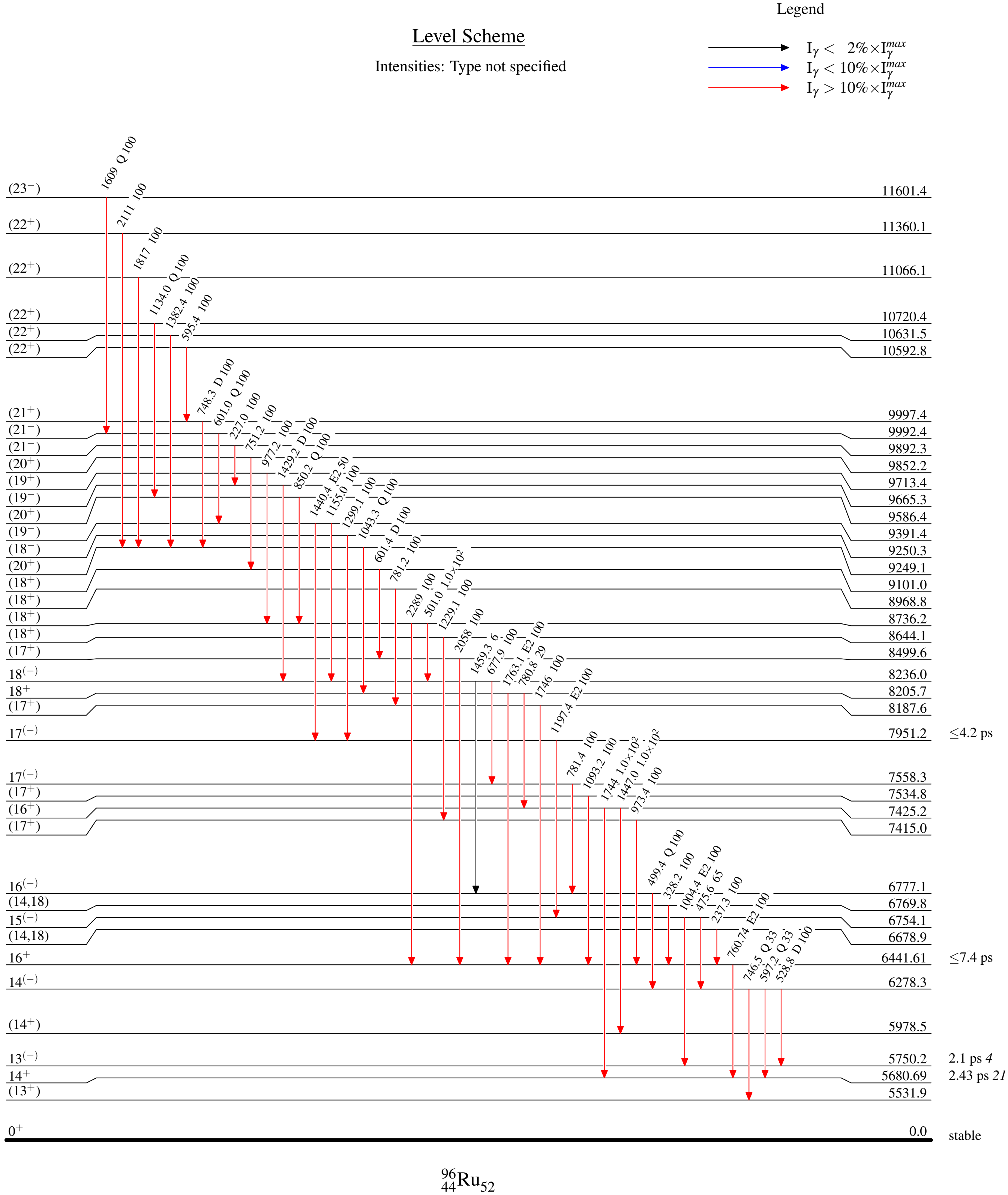
[†] From $^{65}Cu(^{36}S,p4n\gamma)$.
[‡] From $^{65}Cu(^{36}S,p4n\gamma)$.
[#] From $^{95}Mo(^{3}He,2n\gamma)$.
[@] From $^{95}Mo(^{3}He,2n\gamma)$.
[&] From $^{65}Cu(^{36}S,p4n\gamma)$, unless otherwise noted.
[a] Placement of transition in the level scheme is uncertain.

$^{96}_{44}Ru_{52}$-14

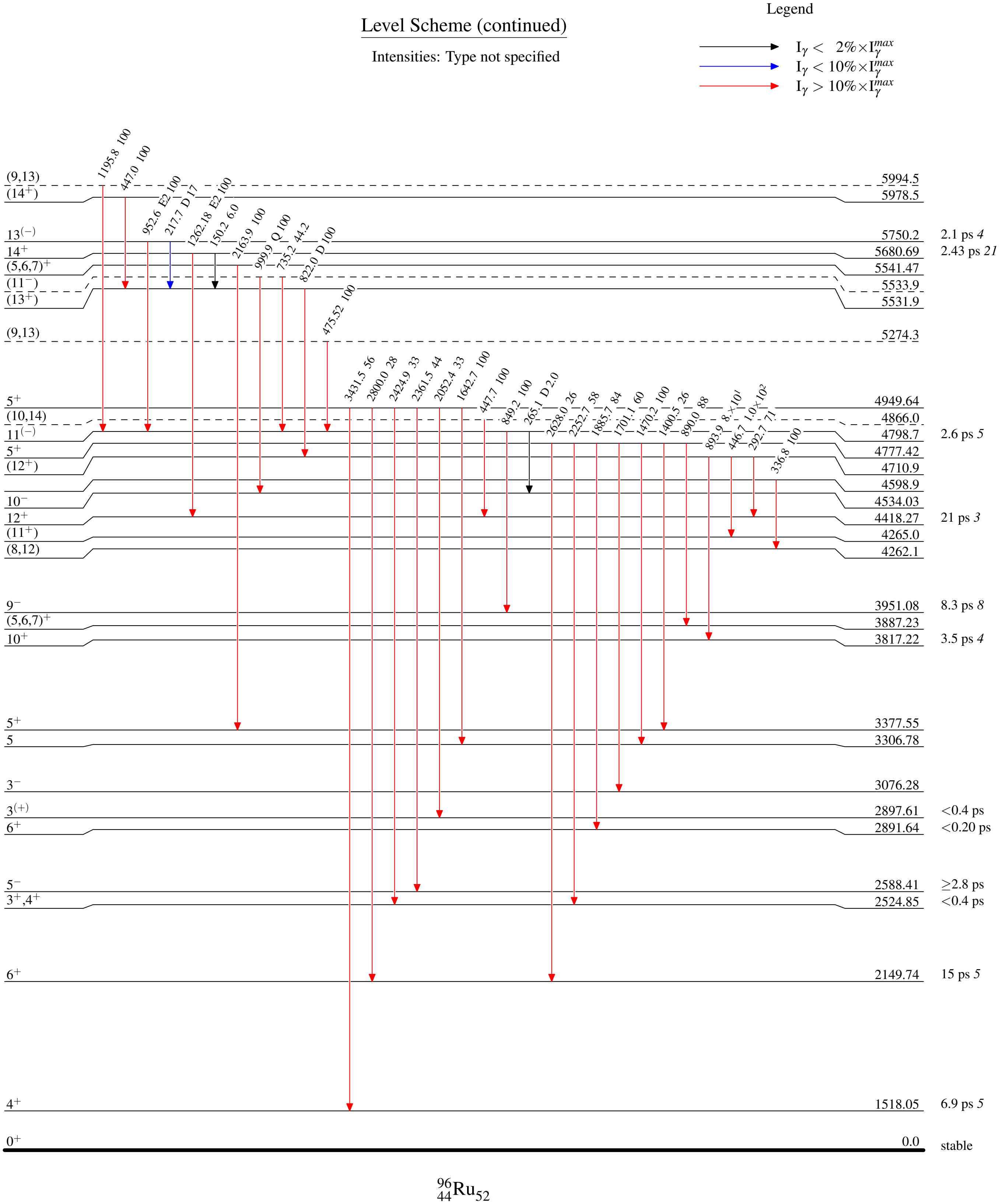
Adopted Levels, Gammas

Level Scheme

Intensities: Type not specified



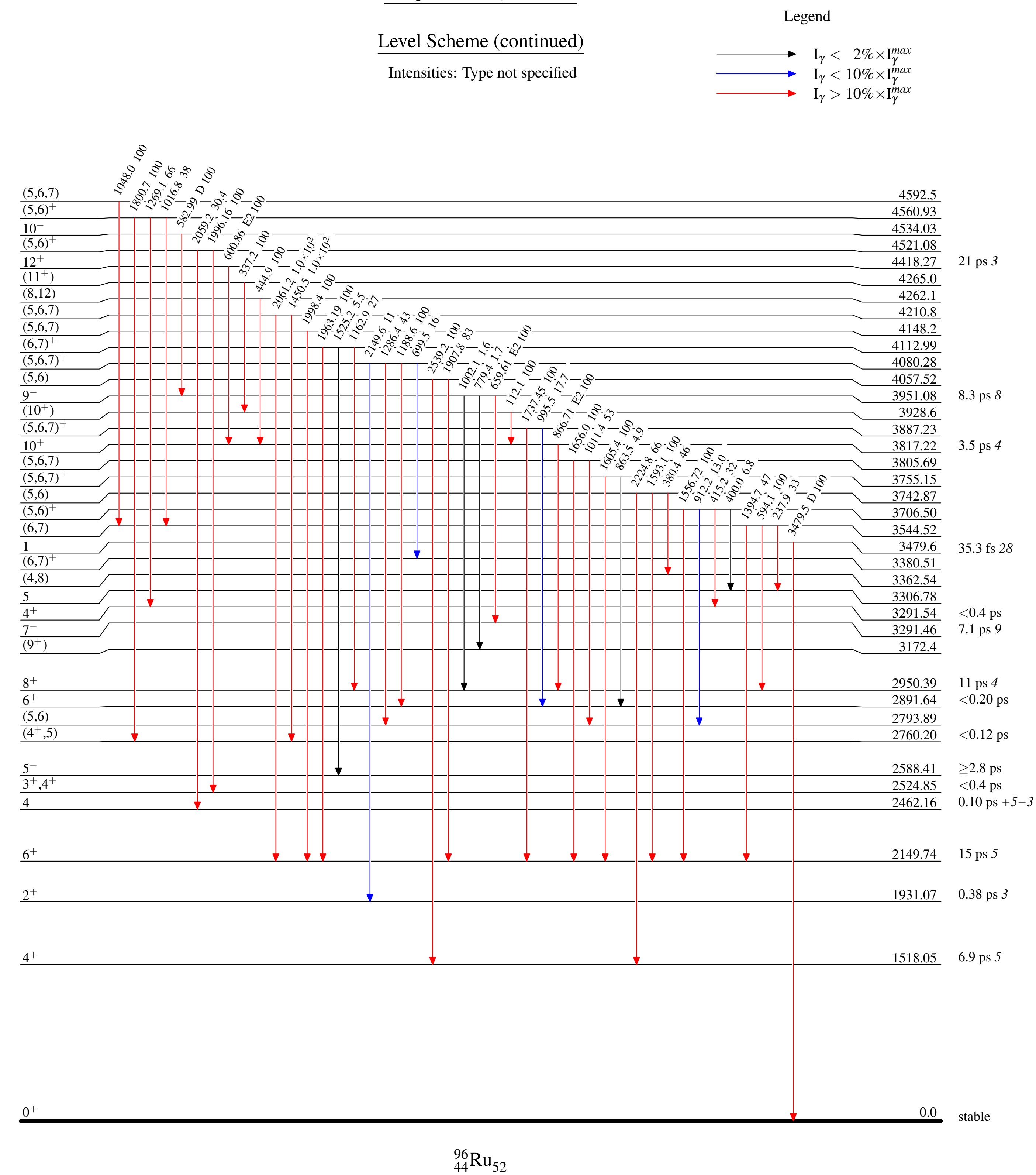
Adopted Levels, Gammas



Adopted Levels, Gammas

Level Scheme (continued)

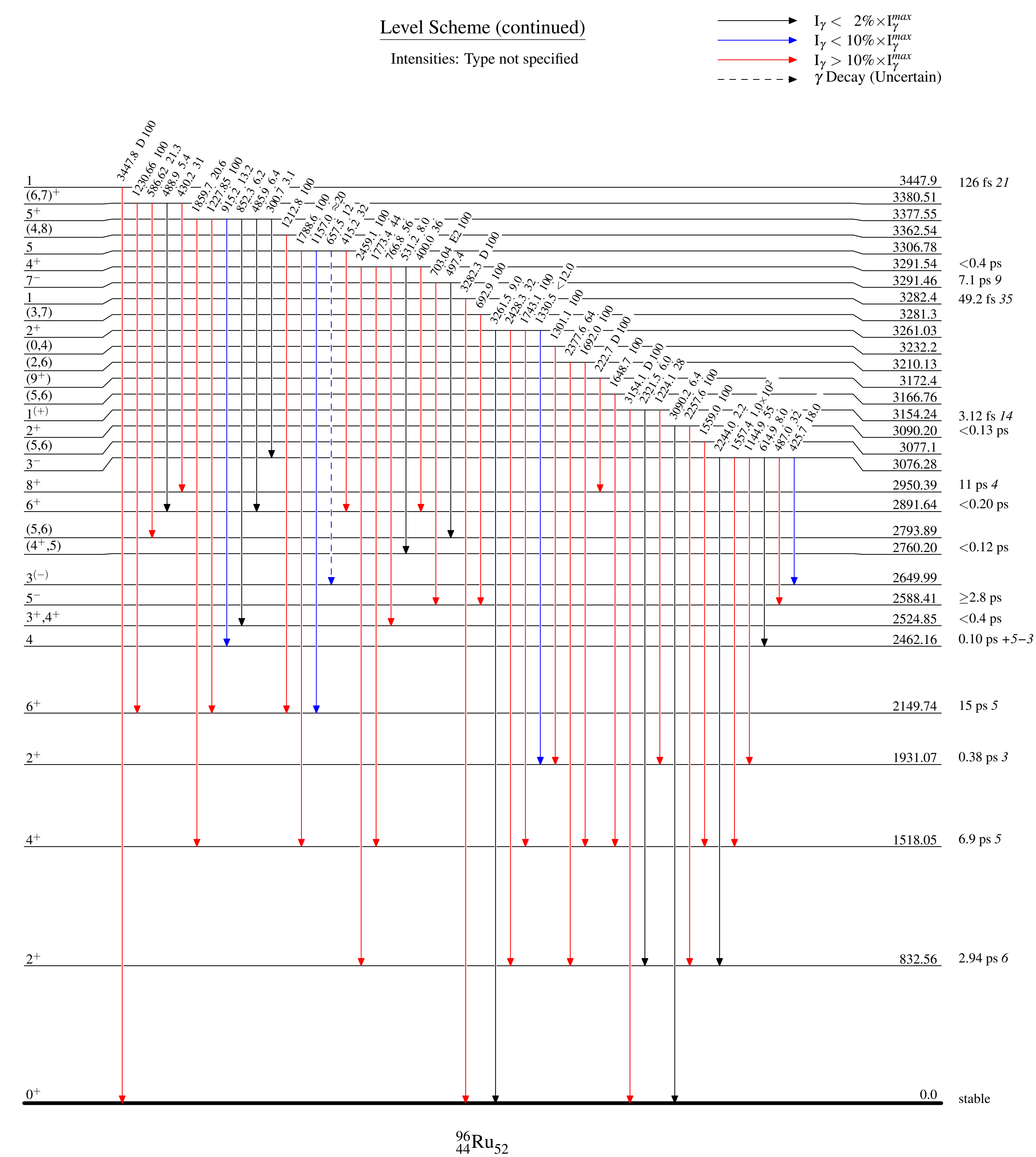
Intensities: Type not specified



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified



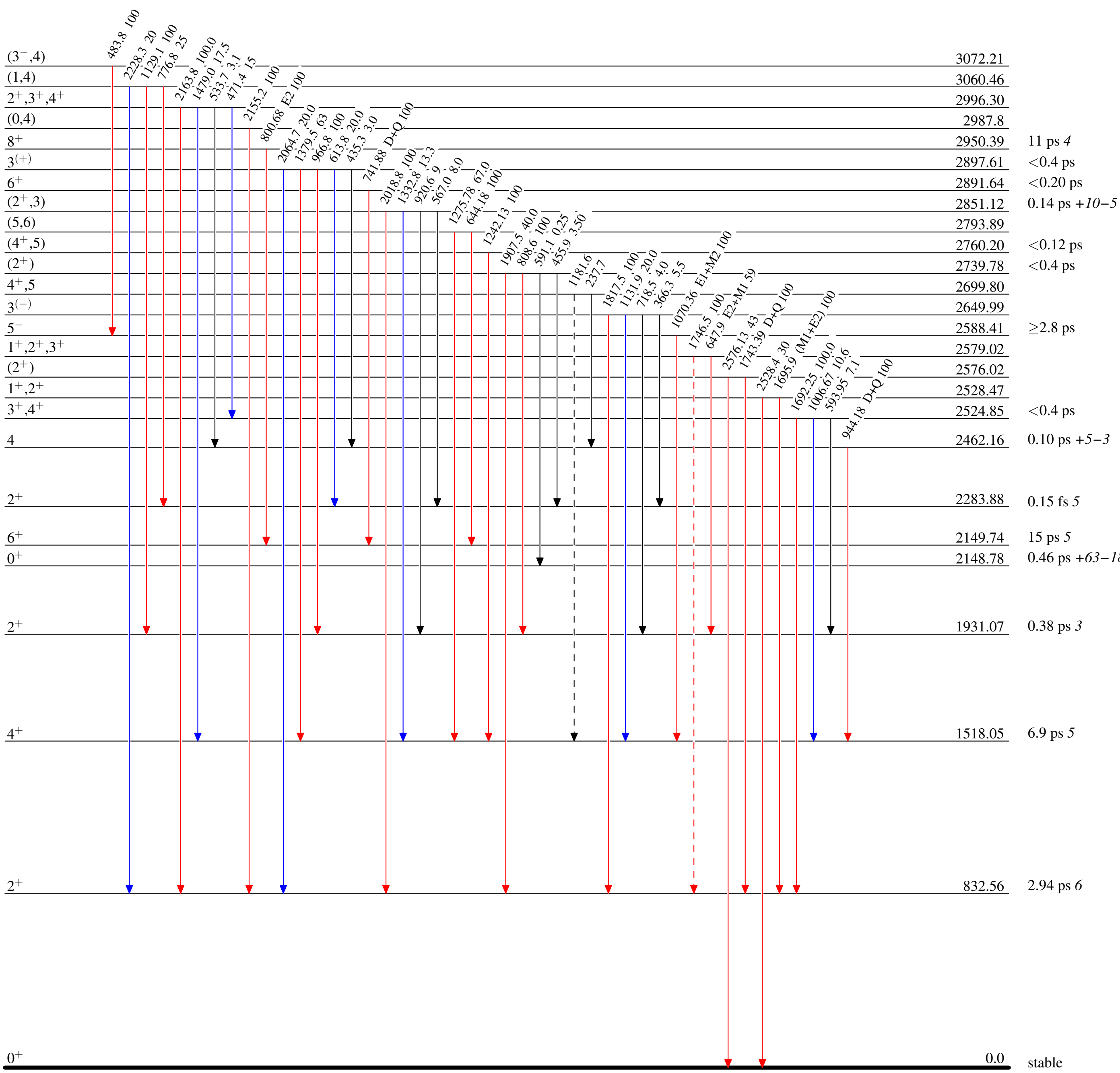
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified

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)

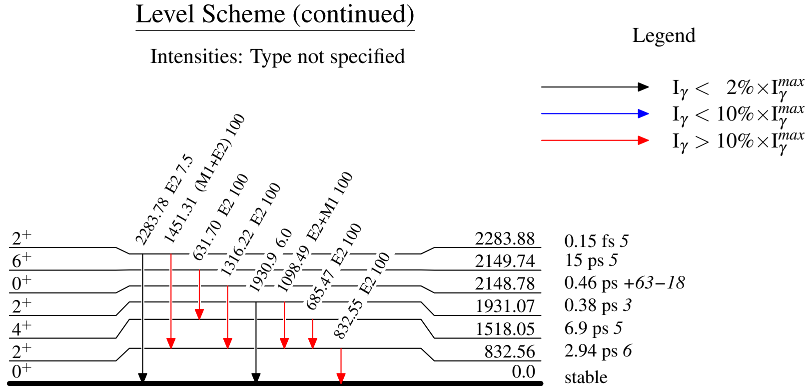


$^{96}_{44}Ru_{52}$

Adopted Levels, Gammas

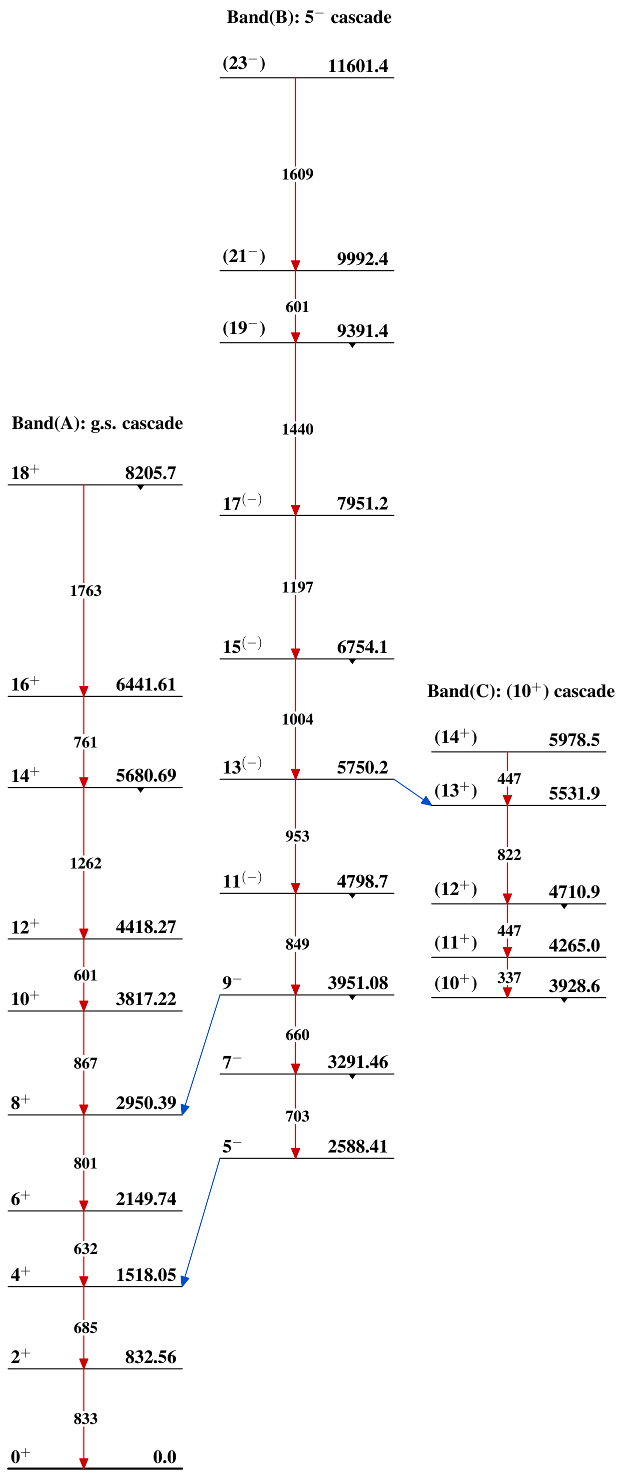
Level Scheme (continued)

Intensities: Type not specified



$^{96}_{44}Ru_{52}$

Adopted Levels, Gammas



$^{96}_{44}Ru_{52}$

Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen, Balraj Singh	NDS 164, 1 (2020)	15-Feb-2020

Q(β^-)=−5050 *10*; S(n)=10176 *7*; S(p)=8289 *8*; Q(α)=−2236 *6* 2017Wa10
S(2n)=18287 *6*, S(2p)=14008 *6* (2017Wa10).
Other measurements:
^{90}Zr(^{11}B,p2nγ): 1978Lu02, E=40 MeV. Measured γ, particle-γ coin. Six main γ rays reported from corresponding six levels.
^{96}Mo(^{32}S,^{30}Si): 1995He17, E=180 MeV. Measured $\sigma(\theta)$.
^{95}Mo(^{3}He,γ): 1996Be13, E=11-28 MeV, measured statistical γ production.
^{96}Ru(α,2pγ): 1985Be06, only four main γ rays reported.
Additional information 1.
(HI,X) (multi-nucleon transfer): 1974We04.
Mass measurements: 2008De16, 1963Da10.
Theory references: consult the NSR database (www.nndc.bnl.gov/nsr/) for 77 primary references dealing with nuclear structure calculations.
See (^{36}S,p2nγ) dataset (1998Kh01) for many additional possible levels and transitions, which have not been adopted due to severe disagreement with the higher statistics data in (^{36}S,α4nγ) from 2000Ti07. The orderings of the γ cascades, level energies and J^π values are adopted from 2000Ti07, since this experiment has about seven times more counting statistics for four-fold-γ-coin events than in 1998Kh01. Moreover, the results of (^{36}S,α4nγ) from 2000Ti07 and (α,4nγ) from 1981Du06 are in better agreement in the ordering of the γ cascades, and multipolarities of crucial interband transitions, as compared to those in (^{36}S,p2nγ) from 1998Kh01.

^{98}Ru Levels

Cross Reference (XREF) Flags

A	^{98}Tc β^- decay (4.2×10^6 y)	F	^{96}Mo(^{3}He,n)	K	^{99}Ru(d,t)
B	^{98}Rh ε decay (8.72 min)	G	^{96}Mo(α,2nγ)	L	^{100}Ru(p,t)
C	^{98}Rh ε decay (3.6 min)	H	^{97}Mo(^{3}He,2nγ)	M	Coulomb excitation
D	^{65}Cu(^{36}S,p2nγ)	I	^{98}Mo(α,4nγ)		
E	^{70}Zn(^{36}S,α4nγ)	J	^{98}Ru(p,p′),(p,p′γ)		

E(level)†	J^π‡	$T_{1/2}$#	XREF	Comments
0.0@	0+	stable	ABCDEFGHIJKLM	Evaluated rms charge radius=4.4229 fm *55* (2013An02). Evaluated δ<r^2>(^{104}Ru,^{98}Ru)=−0.772 fm^2 *5* (2013An02). Hyperfine structure measurements, and deduced changes in rms charge radii by 2014Fo01 with the following results: δ<r^2>(^{96}Ru,^{98}Ru)=0.2874 fm^2 *20*; δ<r^2>(^{98}Ru,^{100}Ru)=0.2538 fm^2 *21*; δ<r^2>(^{98}Ru,^{99}Ru)=0.0917 fm^2 *15*.
652.46@ *5*	2+	5.96 ps *20*	ABCDE GHIJKLM	μ=+0.88 *6* Q=−0.21 *8* J^π: 652.44γ E2 to 0+. $T_{1/2}$: from 2016Pr01 evaluation, based on weighted average of 5.79 ps *20* (2012Ra03, RDDS in Coul. ex.); 5.5 ps *8* (2000Kh02, RDDS in (^{36}S,p2nγ)); 6.42 ps *12* from B(E2)=0.373 *7*, and 6.16 ps *49* from B(E2)=0.389 *31* in Coul. ex. (1980La01); 5.83 ps *50* from B(E2)=0.411 *35* in Coul. ex. (1968Mc08); 5.04 ps *40* from B(E2)=0.475 *38* in Coul. ex. (1958St32). μ: from transient fields in Coulomb excitation (2011Ch23,2011Ta06). Other: +0.8 *6* (1974Hu01,1969He11) from $\gamma(\theta$,H) in Coulomb excitation. Compilation: 2014StZZ. Q: or −0.01 *9* from reorientation effect in Coulomb excitation (1980La01). Others: −0.03 *14* from constructive interference in Coulomb excitation (1977Ma41); −0.23 *14* from re-analysis of data in 1977Ma41 by 1998Hi01.

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Adopted Levels, Gammas (continued)

^{98}Ru Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$#	XREF	Comments
1322.16 *7*	0^+	3.7 ps +*13*−*8*	FGH J LM	Jπ: L(^{3}He,n)=0 from 0^+; $\gamma(\theta)$ in (p,p′γ) is isotropic. $T_{1/2}$: from B(E2)(W.u.)=43 *11* in Coulomb excitation (2006Wi15).
1397.91@ *7*	4^+	1.60 ps *11*	A CDE GHIJKLM	Jπ: 745.4γ ΔJ=2, E2 to 2^+; g.s. band member. $T_{1/2}$: from RDDS in Coulomb excitation (2012Ra03). Other: 1.68 ps +*12*−*9* from weighted average of all available values including those deduced from B(E2) values in Coulomb excitation; value of 7.6 ps *16* from RDDS in (^{36}S,p2nγ) (2000Kh02) seems discrepant.
1414.36 *6*	2^+	1.18 ps *14*	BC GHIJKLM	Jπ: 1414.3γ ΔJ=2, E2 to 0^+. $T_{1/2}$: from RDDS in Coulomb excitation (2012Ra03). Other: 1.2 ps *4* from B(E2) in Coulomb excitation (1980La01).
1797.03 *6*	3^+		BC GHIJK	Jπ: 382.66γ and 1144.2γ M1+E2 to 2^+, 399.0γ D+Q to 4^+; J=4 from γ excitation function in (^{3}He,2nγ) (1988Sa01).
1817.19 *7*	2^+		BC GH JKL	XREF: C(?). Jπ: L(d,t)=2 from $5/2^+$; 1164.8γ M1+E2 to 2^+, 1817.1γ to 0^+; J=2 from γγ(θ) in 2016Gi05 in (^{3}He,2nγ); 2004Ca42 in (α,2nγ) suggest 0^+ or 2^+ based on decay pattern and level population.
2012.81 *7*	3^+		C GHIJKL	Jπ: 598.5γ E2+M1 to 2^+, 614.9γ D+Q to 4^+.
2222.65@ *9*	6^+	4.3 ps *5*	CDE GHI K	Jπ: 824.8γ ΔJ=2, E2 to 4^+; 324.4γ from 5^+; no γ to 2^+ and 3^+ levels.
2241.5 *3*	(4^+,6^+)		H	Jπ: suggested by 1988Sa01 in (^{3}He,2nγ) based on γ(θ), γ(lin pol) and excitation function.
2245.87 *21*	$2^{(+)}$		GH KL	Jπ: 2 from γγ(θ) (2016Gi05) and (1,2) from excitation function (1988Sa01) in (^{3}He,2nγ); L(d,t)=(2+0) from $5/2^+$. other: 0^+ proposed by 2004Ca42 in (α,2nγ).
2257.9 *4*			H	
2266.58 *7*	4^+		GHI	Jπ: 253.8γ and 469.5γ M1+E2 to 3^+, 868.7γ M1+E2 to 4^+; γ excitation functions consistent with J=4 in (^{3}He,2nγ) (1988Sa01).
2277.07 *11*	$(2)^+$		GH kL	Jπ: 2^+ from γ(θ,pol) and excitation function (1988Sa01) and 3^+,4^+ from γγ(θ) and ce data (2016Gi05, who list $(2)^+$ for 2277 level in Table I) in (^{3}He,2nγ); L(d,t)=2 from $5/2^+$ for a 2277 group.
2285 *10*	$(4)^+$		Jk	E(level): probably the same as 2267 level. Jπ: L(p,p′)=4 from 0^+.
2295.52 *21*			H	
2362.6 *3*			H K	XREF: K(2365).
2369.1 *3*			L	
2371.37 *22*	(0^+ to 4^+)		H K	Jπ: 1719γ to 2^+.
2373.9 *8*	0^+		G L	XREF: G(?). Jπ: from σ(θ) in (p,t).
2406.13 *14*	(1^+,2^+)		H K	XREF: K(2409). Jπ: L(d,t)=(2) from $5/2^+$; 1084.1γ to 0^+.
2427.09 *8*	2^+		GH KL	Jπ: 630.0γ M1(+E2) to 3^+, 1774.5γ M1+E2 to 2^+; J=2 from γγ(θ) in (^{3}He,2nγ) (2016Gi05); L(d,t)=(2+0) from $5/2^+$.
2435 *10*	(3^-)		J	Jπ: L(p,p′)=(3) from 0^+.
2468.35 *20*	$(2)^+$		B H K	Jπ: L(d,t)=0 from $5/2^+$; possible 2467.6γ to 0^+.
2547.07 *8*	5^+		E GHI	Jπ: spin=5 from γγ(θ) in (^{3}He,2nγ) (2016Gi05); 1149.2γ M1+E2 to 4^+.
2602.33 *13*	(2^+,3^+,4^+)		GH K	Jπ: 1949.1γ to 2^+, 1204.4γ to 4^+; L(d,t)=(2) from $5/2^+$.
2619.5 *3*	(1,2^+)		B H K	Jπ: 2619.2γ to 0^+.
2656.62 *8*	(3,5^+)		GHI	Jπ: (3,5) is suggested by γγ(θ) and γ(θ) (2016Gi05) and (3) suggested by excitation function (1988Sa01) in (^{3}He,2nγ); 643.9γ to 3^+. But (5^-) proposed by 1981Du06 in (α,4nγ) based

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Adopted Levels, Gammas (continued)

^{98}Ru Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#]	XREF	Comments
				on possible band structure and theoretical predictions is in disagreement.
2659.73 *8*	(3+,4)		GH j	XREF: j(2671). Jπ: (2,3,4) from γ(θ) (2016Gi05) and (3+,4) from excitation function (1988Sa01) in (^{3}He,2nγ).
2670.39 *18*	(0+ to 3)		H j	XREF: j(2671). Jπ: from γ(θ) in (^{3}He,2nγ) (2016Gi05); 1256.1γ to 2+.
2707.35 *17*	(1,2+)		H	Jπ: 1385.6γ to 0+, 1293.0γ to 2+.
2720.17 *12*	(3,4+)		GH	Jπ: γ(θ) and excitation function.
2754.2 *3*			H	
2786.0 *4*			G	Jπ: (3) in (α,2nγ) inconsistent with 563.3γ to 6+.
2809.39 *9*	(3)		GH	Jπ: (3 to 6) from γ(θ) (2016Gi05) and (2,3) from excitation function (1988Sa01) in (^{3}He,2nγ). But (2+) proposed by 1988Sa01.
2811.59 *25*	(2+,3,4+)		H	Jπ: 1397.2γ to 2+, 1413.7γ to 4+.
2816.69 *20*	(2+,3,4+)		H	Jπ: 1418.9γ to 4+, 999.3γ and 2164.4γ to 2+.
2825.92 *21*			H	
2859.22 *21*			H	
2867.40 *12*	(6)+		GH	Jπ: 320.3γ M1(+E2) to 5+, 644.9γ M1,E2 to 6+; spin not 5 from γγ(θ) (2016Gi05) and J=(6,7,8) from excitation function (1988Sa01) in (^{3}He,2nγ).
2932.72 *21*	(4+)		H	Jπ: 710γ to 6+, 2280.8γ to 2+.
2954.5 *3*			H	
2997.8 *7*	(1,2+)		H	Jπ: 1675.6γ to 0+.
3014.5 *6*			H	
3016.9 *3*	(+)		H K	XREF: K(3020). Jπ: L(d,t)=(2) for a 3020 *5* level.
3026.7 *5*			H	
3046 *5*	2+,3+		K	Jπ: L(d,t)=0 from 5/2+.
3058.1 *4*			G	
3064.92 *11*	(3+)		GH K	XREF: K(3071). Jπ: (3,4,5) from γ(θ) (2016Gi05) and (3,4) from excitation function (1988Sa01); L(d,t)=(2+0) from 5/2+.
3069.25 *16*	(5,6)+		GH	Jπ: 846.6γ M1,E2 to 6+; (5,6) from γγ(θ) in (^{3}He,2nγ).
3069.5 *10*			C	
3074.73 *15*	(2+ to 5+)		H	Jπ: 1676.7γ to 4+, 1061.7γ to 3+.
3093.8 *4*	(2+,3,4+)		H	Jπ: 1679.6γ to 2+, 1695.7γ to 4+.
3097.63 *21*			H	
3109.15 *13*	(2+,3,4+)		H	Jπ: 682.2γ to 2+, 1710.7γ to 4+.
3120.36 *18*			H	
3126.61[@] *13*	8+	13.9 ps *21*	DE GHI	Jπ: 904γ E2, ΔJ=2 to 6+; member of g.s. band.
3132.6 *3*			H	
3179.0 *6*	(1,2+)		B	Jπ: 3179.3γ to 0+.
3185.02 *11*	(4+,5+)		H	Jπ: 1172.2γ to 3+, 962.3γ to 6+.
3190.44[a] *11*	8+		DE GHI	Jπ: 967.7γ E2, ΔJ=2 to 6+; J=(7,8) from γγ(θ) and J=8 from excitation function in (^{3}He,2nγ). But *J*π=7− proposed (by 1998Kh01) from 967.7γ ΔJ=1 to 6+ in (^{36}S,p2nγ) is in disagreement.
3205.2 *3*	(2+,3)		B H K	XREF: K(3209). Jπ: possible ε feeding from (2)+; 1807.2γ to 4+.
3245.24 *13*	(6)+		GH	Jπ: 978.9γ E2, ΔJ=(2) to 4+; (5,6) from γ(θ) (2016Gi05) and (6,7) from excitation function (1988Sa01) in (^{3}He,2nγ).
3251.05 *12*	(5)+		GH	Jπ: 984.6γ M1+E2 to 2267, 4+; 754.4γ from 4006 level, which is deexcited by a 879.6γ, (M1+E2) to 3126, 8+ level.
3279.32 *20*			H	

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Adopted Levels, Gammas (continued)

^{98}Ru Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	T$_{1/2}$[#]	XREF	Comments
3283.52 *11*	(5,7)$^+$		E GHI	J$^{\pi}$: 1061.6γ M1+E2 to 6$^+$; (5,7) from γγ(θ) in (^{3}He,2nγ).
3284 *5*	(2$^+$,3$^+$)		K	J$^{\pi}$: L(d,t)=(0) from 5/2$^+$.
3288.06 *22*			H	
3350.4 *3*			H	
3366.8? *5*	(1,2$^+$)		B	J$^{\pi}$: 3366.7γ to 0$^+$.
3382.97 *22*			H	
3442.22 *24*	2$^+$,3$^+$		C H K	XREF: C(?)K(3441). J$^{\pi}$: L(d,t)=0 from 5/2$^+$. A previously proposed 1428γ from this level in ^{98}Rh ε decay (3.6 min) not confirmed in (^{3}He,2nγ) (2016Gi05). Instead, 2016Gi05 have observed and placed a 1428γ from 2826 level.
3474.65 *25*	(4$^+$,5,6$^+$)		GH	J$^{\pi}$: 2076.5γ to 4$^+$, 1252.8γ to 6$^+$.
3523.72 *20*	(4$^+$,5,6$^+$)		H	J$^{\pi}$: 1301.2γ to 6$^+$, 803.0γ to (3,4$^+$).
3537.0? *5*	(1$^+$,2$^+$,3$^+$)		B	J$^{\pi}$: 1719.8γ to 2$^+$; possible ε feeding from (2)$^+$ in ^{98}Rh decay (8.72 min).
3538.79 *14*	(6)$^+$		E GHI	J$^{\pi}$: 992.0γ M1+E2 to 5$^+$, 412.1γ to 8$^+$.
3562.2 *3*			H	
3578.72 *21*	(4$^+$ to 7$^+$)		E GH	J$^{\pi}$: 1456.3γ to 6$^+$, 1032.4γ to 5$^+$, 295.1γ to (5,7)$^+$. But (8$^+$) proposed in (^{36}S,α4nγ) and (7$^-$,8$^+$) in (α,2nγ).
3620.56 *22*			H	
3624.02 *22*			H	
3637.9 *4*			H	
3671.22 *22*			H	
3703.22 *22*			H	
3721.88 *19*			H	
3851.72[&] *24*	9$^-$	≤6.0 ps	E GHI	J$^{\pi}$: 725.1γ E1(+M2),ΔJ=1 to 8$^+$; band structure. Previous placement of a 272γ from this level was not confirmed by 2016Gi05 in their γγ-coin data, this γ remains unplaced. Previously reported 312γ from this level not seen by 2016Gi05. Previously reported 567.4 and 661.3 γ rays are observed by 2016Gi05 as 569.0 and 662.1 keV, respectively, and both placed from a new level at 3852.3 keV. T$_{1/2}$: from RDDS of the 725.7γ placed from a level at 7626 in (^{36}S,p2nγ).
3852.3 *3*	(6$^+$ to 9$^+$)		e gHi	J$^{\pi}$: 569.0γ to (5,7)$^+$, 662.1γ to 8$^+$. See comments for 3851.7 level.
3855.3 *4*			GH	
3945.2 *6*			GH	
3965.0 *4*			H	
3971.84 *23*			H	
4001.19[a] *17*	10$^+$	14.3 ps *21*	DE GHI	J$^{\pi}$: 810.6γ and 874.8γ E2, ΔJ=2 to 8$^+$. J^{π}=9$^-$ proposed in (^{36}S,p2nγ) is in disagreement.
4005.98 *14*	(7$^+$)		GHI	E(level): only one level near this energy confirmed by 2016Gi05 in (^{3}He,2nγ), and not two at 4006.6 and 4007.4, as in (α,2nγ) (2004Ca42). J$^{\pi}$: 879.6γ (E2+M1) to 3126, 8$^+$, 722.6γ to (5,7)$^+$; 754.4γ to 3251 level, which is deexcited by a 984.6γ, M1+E2 to 2267, 4$^+$ level.
4134.5 *4*			GH	
4213.90 *24*	(6$^+$,7,8$^+$)		H	J$^{\pi}$: 1023.5γ to 8$^+$, 1144.6γ to (5,6)$^+$.
4215.26 *23*	(8$^+$)		G	J$^{\pi}$: 214.3γ to 10$^+$, 1024.9γ to 8$^+$, 676.3γ to (6)$^+$.
4220.8? *5*			G	XREF: G(?). 2016Gi05 in (^{3}He,2nγ) did not confirm a 4221.9 level decaying by a 1030.4γ, as proposed by 2004Ca42in (α,2nγ).
4223.56 *20*	(10$^+$)		GHI	J$^{\pi}$: (10) from γ(θ) in (α,2nγ) and (^{3}He,2nγ); 1097.2γ to 8$^+$.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{98}Ru Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#]	XREF	Comments
				Possible member of g.s. band (see 4001 level also).
4256.7 *7*			GH	
4415.8 *5*			G	
4562.8 *3*	$(8^+,9,10^+)$		G	Jπ: 339.0γ to (10^+), 1436.6γ to 8^+.
4633.9 *3*			G	
4673.4[&] *3*	11^-	6.4 ps *5*	DE G I	Jπ: 821.7γ E2, ΔJ=2 to 9^-; band member. $T_{1/2}$: from RDDS of 821.3γ placed from a level at 4798 in (^{36}S,p2nγ).
4823.19 *23*			E G	
4846.8 *3*	(9^+)		G I	Jπ: 840.6γ Q, ΔJ=2 to (7^+), 623.7γ to (10^+).
4915.0[a] *4*	12^+		DE G I	Jπ: 913.7γ E2, ΔJ=2 to 10^+; band member.
4988.6 *4*	(12^+)		DE G I	Jπ: 987.5γ (E2), ΔJ=(2) to 10^+.
5218.7 *4*	(12^+)		E G	Jπ: 303.5γ to 12^+, 1217.6γ to 10^+.
5348.4 *4*			G	
5521.8[&] *4*	13^-	4.6 ps *4*	DE G I	Jπ: 848.4γ E2, ΔJ=2 to 11^-; band member. $T_{1/2}$: from RDDS of 848.9γ placed from a level at 3977 in (^{36}S,p2nγ).
5613.8 *5*			G	
5625.7 *4*	(13^+)		DE G	Jπ: 710.6γ to 12^+.
5819.5[a] *4*	14^+		DE	Jπ: 904.6γ E2, DJ=2 to 12^+; band member.
5888.4 *5*			I	
6121.5 *6*	(14^+)		E	Jπ: 1206.4γ to 12^+, 302.2γ to 14^+.
6260.7 *7*	(14^+)		E	Jπ: 635.0γ to (13^+), 441.4γ to 14^+.
6591.8[&] *4*	15^-	3.1 ps *8*	DE G I	Jπ: 1070.0γ E2, ΔJ=2 to 13^-; band member. $T_{1/2}$: from RDDS of 1070γ placed from a level at 6900 in (^{36}S,p2nγ).
6593.8 *6*	(15^+)		E	Jπ: 774.6γ to 14^+; 968.2γ to (13^+).
6869.8[a] *6*	16^+		DE	Jπ: 1050.2γ E2, ΔJ=2 to 14^+; band member.
7623.5[&] *7*	17^-	1.46 ps *14*	DE I	Jπ: 1031.7γ E2, ΔJ=2 to 15^-; band member. $T_{1/2}$: from RDDS of 1032γ placed from a level at 5831 in (^{36}S,p2nγ).
8006.4 *8*	(17)		E	Jπ: 1136.5γ D to 16^+.
8449.5[&] *7*	19^-		DE	Jπ: 826.0γ E2, ΔJ=2 to 17^-; band member.
9930.5[&] *8*	21^-		DE	Jπ: 1480.9γ E2, ΔJ=2 to 19^-; band member.
11006.3 *8*	(22^-)		DE	Jπ: 1075.6γ (D) to 21^-.
11405.0[&] *9*	23^-		DE	Jπ: 1474.5γ E2, ΔJ=2 to 21^-; band member.
12282.3[&] *10*	25^-		DE	Jπ: 877.3γ E2, ΔJ=2 to 23^-; band member.
14285.3 *14*			E	
14476.1 *11*			DE	
14612.1 *11*			E	
14818.4 *14*			E	
14997.4 *14*			E	
15412.4 *14*			E	
15500.5 *11*			DE	
17238.5 *15*			DE	
17592.4 *18*			DE	
19892.5? *18*			E	

[†] From a least-squares fit to γ-ray energies, unless otherwise noted.
[‡] In general the assignments are from γ(θ), γγ(θ) (DCO) γ(lin pol) and ce data in (α,4nγ), (^{3}He,2nγ) and (^{36}S,p2nγ). An ascending order of spins is assumed for levels populated in in-beam γ-ray studies, that is supported by γ decay modes and yrast

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{98}Ru Levels (continued)

nature of such reactions.

[#] From recoil-distance Doppler-shift method (RDDS) in (^{36}S,p2nγ) (2000Kh02), unless otherwise stated. Since the gamma-cascade ordering is adopted from 2000Ti07, some of the level energies differ from those in 1998Kh01 and 2000Kh02. Absence of delayed γ rays with $T_{1/2}$ >0.5 ns in (α,4nγ) (1981Du06) suggests that the half-life of other levels populated in (α,4nγ) is <0.5 ns.

[@] Band(A): Ground state band.

[&] Band(B): Band based on 9^-.

[a] Band(C): Band based on 8^+. The ordering of the transitions in the cascade, level energies and J^π values in Band(B) and Band(C) are as proposed by 2000Ti07 in (^{36}S,α4nγ). Corresponding results in (^{36}S,p2nγ) study (1998Kh01) differ significantly.

$\gamma(^{98}$Ru)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]	δ[‡]	α[#]	Comments
652.46	2^+	652.47 *5*	100	0.0	0^+	E2		0.00253	B(E2)(W.u.)=29.8 *10* E_γ: weighted average of 652.41 *5* from ^{98}Tc β^- decay, 652.8 *1* from (^{36}S,α4nγ), 652.6 *2* from (α,2nγ), 652.45 *5* from (^{3}He,2nγ), and 652.4 *1* from Coulomb excitation. Others: 652.6 *4* from ^{98}Rh ε decay, 652.9 *4* from (^{36}S,p2nγ), and 652.6 *4* from (α,4nγ). Mult.: from $\gamma(\theta)$ and ce data in (α,4nγ), $\gamma(\theta)$ and γ(pol) in (^{3}He,2nγ), γ(DCO) and γ(pol) in (^{36}S,α4nγ).
1322.16	0^+	669.70 *5*	100	652.46	2^+	[E2]		0.00236	B(E2)(W.u.)=42 *+12−11* α(K)=0.00206 *3*; α(L)=0.000246 *4*; α(M)=4.52×10^{-5} *7* α(N)=7.26×10^{-6} *11*; α(O)=3.64×10^{-7} *5* E_γ: other: 668.1 *8* in (α,2nγ).
1397.91	4^+	745.43 *7*	100	652.46	2^+	E2		0.00179	B(E2)(W.u.)=57 *4* E_γ: weighted average of 745.35 *5* from ^{98}Tc β^- decay, 745.4 *4* from ^{98}Rh ε decay (3.6 min), 746.2 *4* from (^{36}S,p2nγ), 745.9 *1* from (^{36}S,α4nγ), 745.6 *2* from (α,2nγ), 745.37 *5* from (^{3}He,2nγ), 745.5 *4* from (α,4nγ), and 745.4 *5* from Coulomb excitation. Mult.: from $\gamma(\theta)$ and ce data in (α,4nγ), $\gamma(\theta)$ and γ(pol) in (^{3}He,2nγ), γ(DCO) and γ(pol) in (^{36}S,α4nγ).
1414.36	2^+	761.87 *6*	100 *2*	652.46	2^+	E2+M1	+13 *+4−2*	0.00169	B(M1)(W.u.)=1.7×10^{-4} *+10−8*; B(E2)(W.u.)=46 *+7−6* E_γ: weighted average of 761.9 *4* from ^{98}Rh ε decay (8.72 min), 761.5 *4* from ^{98}Rh ε decay (3.6 min), 762.3 *2* from (α,2nγ), 761.84 *5* from (^{3}He,2nγ), 762.2 *4* from (α,4nγ), and 762.5 *5* from Coulomb excitation. Mult.: Q+D from $\gamma(\theta)$ in (p,p$'\gamma$); M2+E1 ruled out by RUL. δ: weighted average of +13 *+4−3* from $\gamma(\theta)$ in (p,p$'\gamma$) and +11 *+8−3* from $\gamma\gamma(\theta)$ in (^{3}He,2nγ).
		1414.31 *9*	49 *1*	0.0	0^+	E2			B(E2)(W.u.)=1.04 *+17−14* E_γ: weighted average of 1414.2 *8* from ^{98}Rh ε decay (8.72 min), 1413.4 *4* from ^{98}Rh ε decay (3.6 min), 1415.0 *3* from (α,2nγ), 1414.29 *5* from (^{3}He,2nγ), 1415.1 *4* from (α,4nγ), and 1414.9 *5* from Coulomb excitation. I_γ: weighted average of 56 *5* from ^{98}Rh ε decay (8.72 min), 48.6 *20* from (α,2nγ) and 49 *1* from (^{3}He,2nγ). Others: 36 *3* in (α,4nγ), 20 *5* in Coulomb excitation, 70 *7* in ^{98}Rh ε decay (3.6 min). Mult.: Q from $\gamma(\theta)$ in (p,p$'\gamma$); M2 ruled out by RUL.
1797.03	3^+	382.66 *5*	25.3 *12*	1414.36	2^+	M1+E2	+0.8 *+8−3*	0.0102 *11*	α(K)=0.0088 *9*; α(L)=0.00108 *15*; α(M)=0.00020 *3* α(N)=3.2×10^{-5} *4*; α(O)=1.57×10^{-6} *13* E_γ: weighted average of 383.0 *5* from ^{98}Rh ε decay (3.6 min), 382.7 *3* from (α,2nγ), 382.65 *5* from (^{3}He,2nγ), and 382.7 *4* from (α,4nγ).

Adopted Levels, Gammas (continued)

$\gamma(^{98}$Ru) (continued)

E$_i$(level)	J$^\pi_i$	E$_\gamma$†	I$_\gamma$†	E$_f$	J$^\pi_f$	Mult.‡	δ‡	α#	Comments
									I$_\gamma$: weighted average of 25.8 11 from (α,2nγ), 25.7 9 from (^{3}He,2nγ), and 19.5 25 from (α,4nγ). Other: 42 8 from ^{98}Rh ε decay (3.6 min). Mult.: from $\gamma(\theta)$ and ce data in (α,4nγ) and (^{3}He,2nγ). δ: weighted average of +0.4 +17−3 from $\gamma(\theta)$ in (α,4nγ) and 0.9 +8−5 from ce data in (^{3}He,2nγ).
1797.03	3$^+$	399.0 2	7.1 9	1397.91	4$^+$	(M1+E2)	−0.22 +7−16	0.0082	E$_\gamma$: weighted average of 399.1 3 from (α,2nγ) and 398.9 2 from (^{3}He,2nγ). I$_\gamma$: weighted average of 7.0 11 from (α,2nγ) and 7.1 9 from (^{3}He,2nγ). Mult.: D+Q from $\gamma(\theta)$ in (^{3}He,2nγ) (2016Gi05). δ: or −5.2 +12−17 from $\gamma(\theta)$ in (^{3}He,2nγ) (2016Gi05).
		1144.55 8	100 1	652.46	2$^+$	M1+E2	<−0.2		E$_\gamma$: weighted average of 1144.2 4 from ^{98}Rh ε decay (8.72 min), 1144.2 4 from ^{98}Rh ε decay (3.6 min), 1145.1 2 from (α,2nγ), 1144.52 5 from (^{3}He,2nγ), and 1145.0 4 from (α,4nγ). Mult.: from $\gamma(\theta)$ and ce data in (α,4nγ) and (^{3}He,2nγ). δ: from $\gamma(\theta)$ in (α,4nγ).
1817.19	2$^+$	494.7 3	3 1	1322.16	0$^+$				E$_\gamma$,I$_\gamma$: from (^{3}He,2nγ) only.
		1164.79 7	100 5	652.46	2$^+$	M1+E2	−0.27 6		E$_\gamma$: weighted average of 1164.3 4 from ^{98}Rh ε decay (8.72 min), 1165.3 3 from (α,2nγ), and 1164.78 5 from (^{3}He,2nγ). Mult.,δ: mult from ce and δ from $\gamma\gamma(\theta)$ data in (^{3}He,2nγ).
		1817.1 3	18 3	0.0	0$^+$				E$_\gamma$: weighted average of 1817.2 4 from ^{98}Rh ε decay (8.72 min), and 1817.1 3 from (^{3}He,2nγ). Others: 1818.4 4 tentatively assigned to ^{98}Ru in (α,2nγ), I$_\gamma$: others: 38 3 from ^{98}Rh ε decay (8.72 min), 14.1 16 from (α,2nγ).
2012.81	3$^+$	598.47 7	80 10	1414.36	2$^+$	E2+M1	+0.14 +6−10		E$_\gamma$: weighted average of 599.0 4 from ^{98}Rh ε decay (3.6 min), 598.9 3 from (α,2nγ), 598.44 5 from (^{3}He,2nγ), and 599.0 4 from (α,4nγ). I$_\gamma$: unweighted average of 70 4 from (^{3}He,2nγ) and 89 4 from (α,2nγ). Others: 100 10 from ^{98}Rh ε decay (3.6 min) and (α,4nγ). Mult.: from $\gamma(\theta)$ and ce in (α,4nγ) and $\gamma\gamma(\theta)$ in (^{3}He,2nγ). δ: from $\gamma\gamma(\theta)$ in (^{3}He,2nγ). Other: +2.8 12 from $\gamma(\theta)$ and ce in (α,4nγ).
		614.89 6	100 4	1397.91	4$^+$	(M1+E2)	−0.35 5		E$_\gamma$: weighted average of 615.7 4 from ^{98}Rh ε decay (3.6 min), 615.0 3 from (α,2nγ), 614.87 5 from (^{3}He,2nγ), and 615.1 4 from (α,4nγ). I$_\gamma$: from (^{3}He,2nγ) and (α,2nγ). Others: 98 10 from ^{98}Rh ε decay (3.6 min) and 48 5 from (α,4nγ). Mult.: D+Q from $\gamma(\theta)$ and $\gamma\gamma(\theta)$ in (^{3}He,2nγ); (E2+M1) from ce data in (α,4nγ). δ: from $\gamma\gamma(\theta)$ in (^{3}He,2nγ) (2016Gi05).
		1360.6 4	8 2	652.46	2$^+$				E$_\gamma$: weighted average of 1360.9 5 from ^{98}Rh ε decay (3.6 min), 1360.9 4 from (α,2nγ), and 1360.1 4 from (^{3}He,2nγ). I$_\gamma$: unweighted average of 10.1 16 from (α,2nγ), and 6 1 from (^{3}He,2nγ). Other: 16.3 25 from ^{98}Rh ε decay (3.6 min).
2222.65	6$^+$	824.79 8	100	1397.91	4$^+$	E2			B(E2)(W.u.)=12.8 +17−14

$^{98}_{44}$Ru$_{54}$-8

Adopted Levels, Gammas (continued)

$\gamma(^{98}Ru)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	δ‡	α#	Comments
									E_γ: weighted average of 824.4 *4* from ^{98}Rh ε decay (3.6 min), 825.3 *4* from (^{36}S,p2nγ), 825.1 *1* from (^{36}S,α4nγ), 825.1 *2* from (α,2nγ), 824.69 *5* from (^{3}He,2nγ), and 824.9 *4* from (α,4nγ). Mult.: from γ(DCO) and γ(pol) in (^{36}S,α4nγ), $\gamma(\theta$,pol) and ce data in (^{3}He,2nγ), $\gamma(\theta)$ and ce data in (α,4nγ).
2241.5	(4$^+$,6$^+$)	843.6 *3*	100	1397.91	4$^+$				Mult.: $\gamma(\theta)$ and POL data in 1988Sa01 in (^{3}He,2nγ) suggest mult=E2 or E1 (if ΔJ=0).
2245.87	2$^{(+)}$	1593.4 *2*	100	652.46	2$^+$	D+Q	−0.19 *+10−11*		Mult.,δ: from $\gamma\gamma(\theta)$ in (^{3}He,2nγ).
2257.9		843.5 *4*	100	1414.36	2$^+$				
2266.58	4$^+$	253.80 *5*	24.6 *17*	2012.81	3$^+$	M1+E2	−0.9 *5*	0.035 *7*	α(K)=0.030 *6*; α(L)=0.0040 *10*; α(M)=0.00073 *18* α(N)=0.00012 *3*; α(O)=5.2×10^{-6} *9* E_γ: others: 253.8 *3* from (α,2nγ), 253.9 *4* from (α,4nγ). I_γ: weighted average of 26.4 *11* from (α,2nγ), 21 *2* from (^{3}He,2nγ), and 21.7 *22* from (α,4nγ). Mult.: from $\gamma(\theta)$ and ce data in (^{3}He,2nγ) and $\gamma(\theta)$ in (α,4nγ). δ: from $\gamma(\theta)$ in (^{3}He,2nγ). Other: +3.5 *+20−12* from (α,4nγ).
		469.54 *5*	100 *3*	1797.03	3$^+$	M1+E2	−0.8 *+3−6*		E_γ: others: 469.6 *2* from (α,2nγ), 469.7 *4* from (α,4nγ). I_γ: others: 100 *4* from (α,2nγ), 100 *9* from (α,4nγ). Mult.: from $\gamma(\theta$,pol) in (^{3}He,2nγ), $\gamma(\theta)$ and ce data in (α,4nγ). δ: from $\gamma(\theta)$ and ce data in (α,4nγ). Other: +0.45 *+14−8* or +4.20 *+6−13* from $\gamma(\theta)$ in (^{3}He,2nγ).
		868.7 *3*	28.7 *11*	1397.91	4$^+$	M1+E2	+2.3 *+15−8*		E_γ: weighted average of 869.2 *3* from (α,2nγ) and 868.5 *2* from (^{3}He,2nγ). I_γ: weighted average of 28.7 *11* from (α,2nγ) and 29 *3* from (^{3}He,2nγ). Mult.,δ: from $\gamma\gamma(\theta)$ and γ(pol) in (^{3}He,2nγ).
2277.07	(2)$^+$	264.1 *4*	5 *1*	2012.81	3$^+$				
		879.2 *1*	57 *3*	1397.91	4$^+$	(E2)			E_γ: other: 879.6 *3* from (α,2nγ). Mult.: M1,E2 from $\gamma(\theta$,pol) and ce data in (^{3}He,2nγ), but ΔJ^π requires E2.
		1624.3 *3*	100 *4*	652.46	2$^+$				E_γ: other: 1625.4 *3* from (α,2nγ).
2295.52		897.6 *2*	100	1397.91	4$^+$				
2362.6		1710.1 *3*	100	652.46	2$^+$				
2371.37	(0$^+$ to 4$^+$)	956.7 *3*	14 *4*	1414.36	2$^+$				
		1719.2 *3*	100 *10*	652.46	2$^+$				
2406.13	(1$^+$,2$^+$)	991.7 *2*	48 *10*	1414.36	2$^+$				
		1084.1 *2*	64 *6*	1322.16	0$^+$				
		1753.5 *3*	100 *16*	652.46	2$^+$				
2427.09	2$^+$	610.0 *1*	8.3 *18*	1817.19	2$^+$	D+Q	−1.5 *+8−53*		E_γ: weighted average of 609.9 *4* from (α,2nγ) and 610.0 *1*

From ENSDF

$^{98}_{44}Ru_{54}$-9

Adopted Levels, Gammas (continued)

$\gamma(^{98}Ru)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	δ‡	Comments
								from (^{3}He,2nγ). I_γ: unweighted average of 6.5 *10* from (α,2nγ) and 10 *1* from (^{3}He,2nγ). Mult.,δ: from $\gamma(\theta)$ in (^{3}He,2nγ).
2427.09	2^+	630.0 *2*	8.1 *22*	1797.03	3^+	M1(+E2)	−0.04 *45*	E_γ: weighted average of 630.3 *4* from (α,2nγ) and 629.9 *2* from (^{3}He,2nγ). I_γ: unweighted average of 6.0 *10* from (α,2nγ) and 10.3 *15* from (^{3}He,2nγ). Mult.: from $\gamma(\theta$,pol) in (^{3}He,2nγ) (1988Sa01). δ: deduced by 2016Gi05 from A_2 in 1988Sa01 for J(2427)=2 in (^{3}He,2nγ).
		1012.7 *1*	11 *1*	1414.36	2^+			
		1029.0 *2*	21 *1*	1397.91	4^+			E_γ: weighted average of 1029.7 *4* from (α,2nγ) and 1029.0 *1* from (^{3}He,2nγ).
		1774.5 *3*	100 *2*	652.46	2^+	M1+E2	+0.42 *+7−5*	E_γ: other: 1776.4 *6* from 2004Ca42 in (α,2nγ), transition identified as a doublet in 2004Ca42. Mult.,δ: mult from $\gamma(\theta$,pol) (1988Sa01) and δ from $\gamma\gamma(\theta)$ (2016Gi05) in (^{3}He,2nγ).
2468.35	$(2)^+$	670.2@ *7*		1797.03	3^+			E_γ: from ^{98}Rh ε decay (8.72 m) only with I(670.2γ)/I(2467.6γ)=100/19.5; but its existence can not be confirmed by 2004Ca42 in (α,2nγ) and 2016Gi05 in (^{3}He,2nγ).
		1815.9 *2*		652.46	2^+			E_γ: seen by 2016Gi05 in (^{3}He,2nγ) only.
		2467.6		0.0	0^+			E_γ: from ^{98}Rh ε decay (8.72 m) only; this transition can not been seen by 2004Ca42 in (α,2nγ) and 2016Gi05 in (^{3}He,2nγ) due detector limit.
2547.07	5^+	280.5 *2*	8 *2*	2266.58	4^+			E_γ: other: 280.5 *4* from (α,2nγ). I_γ: unweighted average of 10 *2* from (^{3}He,2nγ) and 5.4 *9* from (α,2nγ).
		324.4 *1*	21.6 *9*	2222.65	6^+			E_γ: others: 324.6 *3* from (α,2nγ), 323.9 *10* from (^{36}S,α4nγ). I_γ: weighted average of 21 *2* from (^{3}He,2nγ) and 21.7 *9* from (α,2nγ).
		534.2 *2*	11 *3*	2012.81	3^+			I_γ: other: <3 in (α,2nγ).
		1149.21 *8*	100 *4*	1397.91	4^+	M1+E2	+0.37 *5*	E_γ: weighted average of 1149.17 *5* from (^{3}He,2nγ), 1149.7 *2* from (α,2nγ), 1149.6 *4* from (α,4nγ) and 1149.1 *10* from (^{36}S,α4nγ). Mult.: E2 from $\gamma(\theta)$ and ce data in (α,4nγ), but ce data also agree with M1; D+Q from $\gamma\gamma(\theta)$ in (^{3}He,2nγ) (2016Gi05). δ: from $\gamma\gamma(\theta)$ in (^{3}He,2nγ) (2016Gi05).
2602.33	$(2^+,3^+,4^+)$	325.2 *3*	23 *4*	2277.07	$(2)^+$			
		589.5 *2*	100 *7*	2012.81	3^+			E_γ: other: 589.6 *4* from (α,2nγ). I_γ: other: 52 *9* from (α,2nγ).
		785.3 *3*	12 *3*	1817.19	2^+			
		1188.0 *3*	39 *5*	1414.36	2^+			
		1204.4 *2*	67 *5*	1397.91	4^+			E_γ: other: 1205.7 *4* from (α,2nγ). I_γ: other: 100 *15* from (α,2nγ).

$^{98}_{44}Ru_{54}$-10

$\gamma(^{98}Ru)$ (continued)

E_i(level)	J_i^π	E_γ†	I_γ†	E_f	J_f^π	Mult.‡	δ‡	α#	Comments
2602.33	$(2^+,3^+,4^+)$	1949.1 *10*	40 *18*	652.46	2^+				
2619.5	$(1,2^+)$	802.2 *4*	10 *2*	1817.19	2^+				
		1967.3 *5*	100 *9*	652.46	2^+				
		2619.2	11.7 *12*	0.0	0^+				
2656.62	$(3,5^+)$	643.9 *2*	6 *1*	2012.81	3^+				
		1258.69 *5*	100 *2*	1397.91	4^+	D(+Q)	>−0.1		E_γ: others: 1259.3 *2* in (α,2nγ), 1259.4 *4* in (α,4nγ). Mult.,δ: from $\gamma(\theta)$ in (α,2nγ). Mult=D from $\gamma(\theta)$ in (^{3}He,2nγ).
2659.73	$(3^+,4)$	862.66 *5*	100	1797.03	3^+	D			E_γ: other: 863.2 *3* from (α,2nγ). Mult.: from $\gamma(\theta)$ in (^{3}He,2nγ).
2670.39	$(0^+$ to 3)	853.2 *2*	12 *2*	1817.19	2^+				
		1256.1 *5*	100 *4*	1414.36	2^+				
		2018.1 *7*	14 *3*	652.46	2^+				
2707.35	$(1,2^+)$	889.7 *4*	10 *3*	1817.19	2^+				
		1293.0 *2*	100 *16*	1414.36	2^+				
		1385.6 *4*	12 *3*	1322.16	0^+				
2720.17	$(3,4^+)$	1322.2 *1*	100 *3*	1397.91	4^+	D			E_γ: other: 1322.2 *4* from (α,2nγ). Mult.: from $\gamma(\theta)$ in (^{3}He,2nγ).
		2068.1 *5*	11 *2*	652.46	2^+				
2754.2		937.0 *3*	100	1817.19	2^+				
2786.0		563.3 *4*	100	2222.65	6^+				
2809.39	(3)	542.8 *1*	95 *5*	2266.58	4^+				E_γ: other: 542.8 *3* from (α,2nγ).
		796.4 *2*	19 *2*	2012.81	3^+				
		1012.4 *1*	100 *8*	1797.03	3^+				
		1411.5 *5*	33 *8*	1397.91	4^+				
2811.59	$(2^+,3,4^+)$	1397.2 *3*	100 *7*	1414.36	2^+				
		1413.7 *4*	58 *10*	1397.91	4^+				
2816.69	$(2^+,3,4^+)$	999.3 *4*	17 *4*	1817.19	2^+				
		1402.2 *4*	33 *8*	1414.36	2^+				
		1418.9 *3*	100 *11*	1397.91	4^+				
		2164.4 *6*	91 *15*	652.46	2^+				
2825.92		1428.0 *2*	100	1397.91	4^+				
2859.22		846.4 *2*	100	2012.81	3^+				
2867.40	$(6)^+$	320.3 *1*	100 *4*	2547.07	5^+	M1(+E2)	0.0 *5*	0.0139 *16*	α(K)=0.0122 *13*; α(L)=0.00142 *21*; α(M)=0.00026 *4* α(N)=4.2×10^{-5} *6*; α(O)=2.23×10^{-6} *19* E_γ: other: 320.6 *3* from (α,2nγ). Mult.,δ: from ce data (2016Gi05) in (^{3}He,2nγ).
		644.9 *2*	52 *3*	2222.65	6^+	M1,E2			E_γ: weighted average of 645.1 *4* from (α,2nγ) and 644.9 *2* from (^{3}He,2nγ). I_γ: other: 16 *2* from (α,2nγ). Mult.: from ce data in (^{3}He,2nγ).
		1469.2 *4*	8 *2*	1397.91	4^+				
2932.72	(4^+)	710.0 *2*	62 *13*	2222.65	6^+				
		2280.8 *6*	100 *27*	652.46	2^+				

$^{98}_{44}Ru_{54}$-11

$\gamma(^{98}Ru)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	Comments
2954.5		527.4 *3*	100	2427.09	2^+		
2997.8	$(1,2^+)$	1675.6 *7*	100	1322.16	0^+		
3014.5		1616.6 *6*	100	1397.91	4^+		
3016.9	$(^+)$	1619.0 *3*	100	1397.91	4^+		
3026.7		1013.9 *5*	100	2012.81	3^+		
3058.1		835.4 *4*	100	2222.65	6^+		E_γ: from $(\alpha,2n\gamma)$ only.
3064.92	(3^+)	408.3 *2*	7 *1*	2656.62	$(3,5^+)$		
		1052.1 *2*	10 *3*	2012.81	3^+		
		1667.0 *1*	100 *4*	1397.91	4^+	D	E_γ: other: 1668.5 *3* from $(\alpha,2n\gamma)$. Mult.: from $\gamma(\theta)$ in $(^3He,2n\gamma)$.
3069.25	$(5,6)^+$	522.3 *2*	9 *1*	2547.07	5^+		E_γ: weighted average of 522.5 *4* from $(\alpha,2n\gamma)$ and 522.2 *2* from $(^3He,2n\gamma)$.
		846.6 *3*	100 *6*	2222.65	6^+	M1,E2	Mult.: from ce data in $(^3He,2n\gamma)$.
		1671.0 *3*	12 *1*	1397.91	4^+		
3069.5		2417 *1*	100	652.46	2^+		E_γ: from ^{98}Rh ε decay (3.6 min) only.
3074.73	$(2^+$ to $5^+)$	418.3 *2*	55 *6*	2656.62	$(3,5^+)$		
		1061.7 *3*	45 *9*	2012.81	3^+		
		1676.7 *2*	100 *12*	1397.91	4^+		
3093.8	$(2^+,3,4^+)$	1679.6 *4*	51 *16*	1414.36	2^+		
		1695.7 *5*	100 *18*	1397.91	4^+		
3097.63		1699.7 *2*	100	1397.91	4^+		
3109.15	$(2^+,3,4^+)$	452.3 *3*	16 *3*	2656.62	$(3,5^+)$		
		682.2 *2*	100 *8*	2427.09	2^+		
		1312.3 *2*	46 *7*	1797.03	3^+		
		1710.7 *3*	73 *4*	1397.91	4^+		
3120.36		1107.6 *3*	28 *7*	2012.81	3^+		
		1722.4 *2*	100 *8*	1397.91	4^+		
3126.61	8^+	904.16 *15*	100	2222.65	6^+	E2	B(E2)(W.u.)=2.5 *+5−3* E_γ: unweighted average of 904.1 *4* from $(^{36}S,p2n\gamma)$, 904.7 *1* from $(^{36}S,\alpha4n\gamma)$, 904.1 *2* from $(\alpha,2n\gamma)$, 903.80 *5* from $(^3He,2n\gamma)$, and 904.1 *4* from $(\alpha,4n\gamma)$. Mult.: from $\gamma(\theta$,pol) in $(^3He,2n\gamma)$, γ(pol) and γ(DCO) in $(^{36}S,\alpha4n\gamma)$, $\gamma(\theta)$ and ce data in $(\alpha,4n\gamma)$.
3132.6		476.2 *5*	8 *2*	2656.62	$(3,5^+)$		
		1734.6 *3*	100 *5*	1397.91	4^+		
3179.0	$(1,2^+)$	1764.6	9 *1*	1414.36	2^+		E_γ,I_γ: from ^{98}Rh ε decay (3.6 min) only.
		2526.1	100 *7*	652.46	2^+		E_γ,I_γ: from ^{98}Rh ε decay (3.6 min) only.
		3179.3	50 *5*	0.0	0^+		E_γ,I_γ: from ^{98}Rh ε decay (3.6 min) only.
3185.02	$(4^+,5^+)$	638.0 *2*	48 *4*	2547.07	5^+		
		962.3 *2*	43 *3*	2222.65	6^+		
		1172.2 *1*	100 *5*	2012.81	3^+		
3190.44	8^+	967.73 *9*	100	2222.65	6^+	E2	E_γ: weighted average of 968.5 *3* from $(^{36}S,\alpha4n\gamma)$, 968.0 *2* from $(\alpha,2n\gamma)$, 967.69 *5* from $(^3He,2n\gamma)$, and 968.0 *4* from $(\alpha,4n\gamma)$. Other: 969.4 *4* from $(^{36}S,p2n\gamma)$. Mult.: from $\gamma(\theta$,pol) and ce data in $(^3He,2n\gamma)$, γ(pol) and γ(DCO) in $(^{36}S,\alpha4n\gamma)$,

$\gamma(^{98}Ru)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	Comments
							$\gamma(\theta)$ and ce data in (α,4nγ). But ΔJ=1, dipole suggested from γ(DCO) in (^{36}S,p2nγ) (1998Kh01) is in disagreement.
3205.2	(2^+,3)	1388.5 *6*	44 *13*	1817.19	2^+		I_γ: from (^{3}He,2nγ) only, normalized to I(1792.3γ)=63 *8* in ^{98}Rh ε decay (8.72 min).
		1790.6 *4*	63 *8*	1414.36	2^+		E_γ: other: 1792.3 from ^{98}Rh ε decay (8.72 min).
		1807.2 *6*	88 *18*	1397.91	4^+		I_γ: from (^{3}He,2nγ) only, normalized to I(1792.3γ)=63 *8* in ^{98}Rh ε decay (8.72 min).
		2552.3	100 *11*	652.46	2^+		E_γ,I_γ: from ^{98}Rh ε decay (8.72 min) only. Not seen by 2016Gi05 in (^{3}He,2nγ) probably due to detector limit.
3245.24	$(6)^+$	698.1 *2*	12 *2*	2547.07	5^+		
		978.9 *2*	100 *4*	2266.58	4^+	(E2)	E_γ: weighted average of 979.2 *2* from (α,2nγ) and 978.8 *1* from (^{3}He,2nγ). Mult.: E2 from ce data in (^{3}He,2nγ), but also in overlap with M1.
		1022.3 *2*	15 *2*	2222.65	6^+		
3251.05	$(5)^+$	590.8 *2*	40 *4*	2659.73	(3^+,4)		E_γ: weighted average of 591.3 *4* from (α,2nγ) and 590.7 *2* from (^{3}He,2nγ). I_γ: weighted average of 46 *7* from (α,2nγ) and 38 *4* from (^{3}He,2nγ).
		594.3 *2*	46 *6*	2656.62	(3,5^+)		E_γ: weighted average of 594.7 *4* from (α,2nγ) and 594.2 *2* from (^{3}He,2nγ). I_γ: weighted average of 56 *8* from (α,2nγ) and 42 *5* from (^{3}He,2nγ).
		984.6 *2*	100 *6*	2266.58	4^+	M1+E2	E_γ: weighted average of 984.9 *3* from (α,2nγ) and 984.4 *2* from (^{3}He,2nγ). Mult.: from $\gamma(\theta)$ and ce data in (^{3}He,2nγ).
3279.32		1482.2 *5*	43 *12*	1797.03	3^+		
		1881.4 *2*	100 *6*	1397.91	4^+		
3283.52	$(5,7)^+$	626.9 *1*	25 *1*	2656.62	(3,5^+)		E_γ: weighted average of 627.1 *3* from (α,2nγ), 626.8 *4* from (α,4nγ), and 626.9 *1* from (^{3}He,2nγ). I_γ: weighted average of 25.5 *11* from (α,2nγ), 29 *4* from (α,4nγ), and 23 *2* from (^{3}He,2nγ).
		1061.6 *4*	100 *2*	2222.65	6^+	M1+E2	E_γ: weighted average of 1062.6 *10* from (^{36}S,α4nγ), 1061.2 *2* from (α,2nγ), 1060.6 *1* from (^{3}He,2nγ), and 1061.8 *4* from (α,4nγ). Mult.: from $\gamma(\theta)$ and ce data in (^{3}He,2nγ). But E1 suggested from $\gamma(\theta)$ and ce data in (α,4nγ).
3288.06		1065.4 *2*	100	2222.65	6^+		
3350.4		1084.0 *3*	61 *12*	2266.58	4^+		
		1553.0 *5*	100 *22*	1797.03	3^+		
3366.8?	(1,2^+)	3366.7@	100	0.0	0^+		
3382.97		1106.0 *3*	58 *11*	2277.07	$(2)^+$		
		1370.0 *4*	48 *14*	2012.81	3^+		
		1585.9 *4*	100 *28*	1797.03	3^+		
3442.22	2^+,3^+	1014.8 *3*	42 *12*	2427.09	2^+		
		1625.1 *5*	22 *4*	1817.19	2^+		E_γ: weighted average of 1624.7 *6* from ^{98}Rh ε decay (3.6 min) and 1625.3 *5* from (^{3}He,2nγ).
		2045.1 *5*	100 *8*	1397.91	4^+		
3474.65	(4^+,5,6^+)	229.2 *3*	70 *9*	3245.24	$(6)^+$		E_γ: weighted average of 229.8 *4* from (α,2nγ) and 229.1 *2* from (^{3}He,2nγ). I_γ: weighted average of 66 *9* from (α,2nγ) and 78 *13* from (^{3}He,2nγ).
		1252.8 *5*	100 *13*	2222.65	6^+		E_γ: unweighted average of 1253.2 *4* from (α,2nγ) and 1252.3 *2* from (^{3}He,2nγ).
		2076.5 *5*	96 *21*	1397.91	4^+		

$^{98}_{44}Ru_{54}$-13

$\gamma(^{98}Ru)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	δ‡	Comments
3523.72	$(4^+,5,6^+)$	803.0 *4*	11 *3*	2720.17	$(3,4^+)$			
		1301.2 *2*	100 *6*	2222.65	6^+			
3537.0?	$(1^+,2^+,3^+)$	1719.8@ *5*	100	1817.19	2^+			
3538.79	$(6)^+$	412.1 *1*	100 *4*	3126.61	8^+			E_γ: weighted average of 412.4 *3* from (α,2nγ), 412.1 *1* from (^{3}He,2nγ), 412.3 *4* from (α,4nγ) and , 412.0 *10* from (^{36}S,α4nγ). I_γ: from (α,2nγ). Others: 100 *6* from (^{3}He,2nγ), 81 *6* from (α,4nγ).
		992.0 *2*	72 *7*	2547.07	5^+	M1+E2		E_γ: weighted average of 992.0 *3* from (α,2nγ), 991.8 *2* from (^{3}He,2nγ), 992.3 *4* from (α,4nγ) and 993.0 *10* from (^{36}S,α4nγ). I_γ: unweighted average of 79 *3* from (α,2nγ) and 65 *5* from (^{3}He,2nγ). Other: 100 *13* from (α,4nγ). Mult.: from $\gamma(\theta)$ and ce data in (^{3}He,2nγ).
3562.2		1014.9 *3*	69 *13*	2547.07	5^+			
		1340.0 *4*	100 *11*	2222.65	6^+			
3578.72	$(4^+$ to $7^+)$	295.1 *2*	23 *4*	3283.52	$(5,7)^+$			E_γ: weighted average of 295.1 *10* from (^{36}S,α4nγ), 295.5 *4* from (α,2nγ), and 295.0 *2* from (^{3}He,2nγ). E_γ: weighted average of 26 *4* from (α,2nγ), and 19 *4* from (^{3}He,2nγ).
		1032.4 *7*	100 *7*	2547.07	5^+			E_γ: unweighted average of 1033.7 *10* from (^{36}S,α4nγ), 1032.1 *3* from (α,2nγ), and 1031.5 *1* from (^{3}He,2nγ).
		1356.3 *5*	15 *3*	2222.65	6^+			E_γ: unweighted average of 1057.6 *10* from (^{36}S,α4nγ) and 1056.1 *4* from (^{3}He,2nγ).
3620.56		1397.9 *2*	100	2222.65	6^+			
3624.02		967.4 *2*	100	2656.62	$(3,5^+)$			
3637.9		1415.2 *3*	100	2222.65	6^+			
3671.22		1014.6 *2*	100	2656.62	$(3,5^+)$			
3703.22		1046.6 *2*	100	2656.62	$(3,5^+)$			
3721.88		438.5 *3*	46 *9*	3283.52	$(5,7)^+$			
		1065.2 *2*	100 *10*	2656.62	$(3,5^+)$			
3851.72	9^-	725.1 *2*	100	3126.61	8^+	E1(+M2)	+0.2 *2*	B(E1)(W.u.)>1.2×10^{-4} E_γ: unweighted average of 725.4 *1* from (^{36}S,α4nγ), 725.2 *2* from (α,2nγ), 724.7 *1* from (^{3}He,2nγ), and 724.9 *4* from (α,4nγ). Other: 725.7 *4* from (^{36}S,p2nγ), placed from a level 7626. Mult.: from $\gamma(\theta)$ and ce data in (^{3}He,2nγ). E1 from γ(DCO) and γ(pol) in (α,4nγ) and from $\gamma(\theta$,pol) in (^{3}He,2nγ). δ: from $\gamma(\theta)$ in (^{3}He,2nγ).
3852.3	$(6^+$ to $9^+)$	568.9 *3*	100 *23*	3283.52	$(5,7)^+$			E_γ: weighted average of 569.0 *2* from (^{3}He,2nγ) and 567.4 *10* (placed from the 3851, 9^- level) from (^{36}S,α4nγ).
		661.6 *4*	51 *16*	3190.44	8^+			E_γ: weighted average of 662.1 *4* from (^{3}He,2nγ), 661.3 *5* from (^{36}S,α4nγ), and 661.3 *4* from (α,2nγ) and (α,4nγ) (placed from the 3851, 9^- level except for the first one).
3855.3		316.8 *5*	100 *19*	3538.79	$(6)^+$			E_γ: unweighted average of 317.3 *3* from (α,2nγ) and 316.4 *1* from (^{3}He,2nγ).
		987.6 *5*	71 *16*	2867.40	$(6)^+$			

$\gamma(^{98}Ru)$ (continued)

E_i(level)	J^π_i	E_γ †	I_γ †	E_f	J^π_f	Mult. ‡	Comments
3945.2		1722.5 *6*	100	2222.65	6^+		E_γ: unweighted average of 1723.1 *4* from (α,2nγ) and 1721.9 *2* from (^{3}He,2nγ).
3965.0		1742.3 *4*	100	2222.65	6^+		
3971.84		1301.5 *3*	70 *11*	2670.39	(0^+ to 3)		
		1315.7 *4*	64 *12*	2656.62	($3,5^+$)		
		1958.4 *4*	100 *20*	2012.81	3^+		
4001.19	10^+	810.6 *2*	43 *2*	3190.44	8^+	E2	B(E2)(W.u.)=1.27 *+31−23* E_γ: weighted average of 811.4 *5* from (^{36}S,α4nγ), 810.7 *3* from (α,2nγ), 810.3 *2* from (^{3}He,2nγ), 810.5 *4* from (α,4nγ), and 810.9 *4* from (^{36}S,p2nγ). I_γ: weighted average of 75 *17* from (^{36}S,α4nγ), 42.5 *17* from (α,2nγ), 38 *4* from (^{3}He,2nγ), and 46 *3* from (α,4nγ). Mult.: from γ(DCO) and γ(pol) in (^{36}S,α4nγ), $\gamma(\theta)$ and ce data in (α,4nγ).
		874.8 *2*	100 *4*	3126.61	8^+	E2	B(E2)(W.u.)=2.0 *+4−3* E_γ: unweighted average of 875.4 *3* from (^{36}S,α4nγ), 874.7 *2* from (α,2nγ), 874.3 *1* from (^{3}He,2nγ), and 874.6 *4* from (α,4nγ). Mult.: from γ(DCO) and γ(pol) in (^{36}S,α4nγ), $\gamma(\theta)$ and ce data in (α,4nγ). In (^{36}S,p2nγ) it was suggested as ΔJ=1, E1 transition.
4005.98	(7^+)	722.6 *2*	100 *4*	3283.52	$(5,7)^+$		E_γ: weighted average of 722.4 *2* from (^{3}He,2nγ), 722.7 *4* from (α,4nγ), 722.9 *3* from (α,2nγ). I_γ: from (α,2nγ). Others: 100 *8* from (^{3}He,2nγ), 100 *9* from (α,4nγ).
		754.4 *2*	48 *15*	3251.05	$(5)^+$		E_γ: weighted average of 754.5 *3* from (α,2nγ) and 754.3 *2* from (^{3}He,2nγ).
		815.6 *3*	46 *2*	3190.44	8^+		E_γ: weighted average of 816.1 *3* from (α,2nγ) and 815.4 *2* from (^{3}He,2nγ). I_γ: weighted average of 45.7 *17* from (α,2nγ) and 48 *15* from (^{3}He,2nγ).
		879.6 *2*	38 *6*	3126.61	8^+	(E2+M1)	E_γ: weighted average of 879.5 *2* from (^{3}He,2nγ), 879.8 *4* from (α,4nγ), 879.6 *3* from (α,2nγ). I_γ: weighted average of 32 *5* from (α,2nγ) and 43 *5* from (^{3}He,2nγ). Other: 85 *7* from (α,4nγ). Mult.: from ce data in (α,4nγ).
4134.5		889.3 *3*	100	3245.24	$(6)^+$		E_γ: other: 889.3 *4* from (α,2nγ).
4213.90	(6^+,7,8^+)	1023.5 *3*	24 *4*	3190.44	8^+		
		1144.6 *3*	100 *8*	3069.25	$(5,6)^+$		
4215.26	(8^+)	214.3 *4*	44 *7*	4001.19	10^+		E_γ,I_γ: from (α,2nγ) only.
		676.3 *4*	40 *7*	3538.79	$(6)^+$		E_γ,I_γ: from (α,2nγ) only.
		1024.9 *4*	100 *14*	3190.44	8^+		E_γ,I_γ: from (α,2nγ) only.
		1088.5 *4*	60 *9*	3126.61	8^+		E_γ,I_γ: from (α,2nγ) only.
4220.8?		1030.4 *4*	100	3190.44	8^+		E_γ: from (α,2nγ) only, not confirmed by 2016Gi05 in (^{3}He,2nγ).
4223.56	(10^+)	1032.8 *3*	100 *4*	3190.44	8^+		E_γ: weighted average of 1033.3 *3* from (α,2nγ), 1032.5 *2* from (^{3}He,2nγ), and 1033.2 *4* from (α,4nγ). I_γ: from (α,2nγ). Others: 100 *10* from (^{3}He,2nγ), 100 *7* from (α,4nγ).
		1097.2 *3*	49 *3*	3126.61	8^+	(E2)	E_γ: weighted average of 1097.5 *3* from (α,2nγ), 1096.9 *4* from (^{3}He,2nγ), and 1096.9 *4* from (α,4nγ). I_γ: weighted average of 49.4 *19* from (α,2nγ) and 33 *9* from (^{3}He,2nγ). Other: 85 *7* from (α,4nγ). Mult.: M1,E2 suggested from ce data in (α,4nγ), E2 favored from level scheme.

$^{98}_{44}Ru_{54}$-15

Adopted Levels, Gammas (continued)

γ(^{98}Ru) (continued)

E_i(level)	J^π_i	E_γ †	I_γ †	E_f	J^π_f	Mult.‡	Comments
4256.7		1011.5 6	100	3245.24	(6)$^+$		E_γ: unweighted average of 1012.1 3 from (α,2nγ) and 1011.0 3 from (^{3}He,2nγ).
4415.8		1225.4 4	100	3190.44	8$^+$		E_γ: from (α,2nγ) only.
4562.8	(8$^+$,9,10$^+$)	339.0 3	100 4	4223.56	(10$^+$)		E_γ,I_γ: from (α,2nγ) only.
		1436.6 4	29 5	3126.61	8$^+$		E_γ,I_γ: from (α,2nγ) only.
4633.9		410.7 4	94 15	4223.56	(10$^+$)		E_γ,I_γ: from (α,2nγ) only.
		632.6 4	100 15	4001.19	10$^+$		E_γ,I_γ: from (α,2nγ) only.
4673.4	11$^-$	821.7 2	100	3851.72	9$^-$	E2	B(E2)(W.u.)=8.8 +8−7
							E_γ: weighted average of 822.0 1 from (^{36}S,α4nγ), 821.3 2 from (α,2nγ), 821.1 4 from (α,4nγ), 821.3 2 from (^{36}S,p2nγ) (placed from a level at 4798).
							Mult.: from γ(DCO) and γ(pol) in (^{36}S,α4nγ), $\gamma(\theta)$ and ce data in (α,4nγ); also supported by $\gamma(\theta)$ in (α,2nγ) and γ(DCO) in (^{36}S,p2nγ).
4823.19		189.5 4	11 2	4633.9			E_γ,I_γ: from (α,2nγ) only.
		260.3 4	13 2	4562.8	(8$^+$,9,10$^+$)		E_γ,I_γ: from (α,2nγ) only.
		599.4 3	47 6	4223.56	(10$^+$)		E_γ,I_γ: from (α,2nγ) only.
		822.1 3	100 4	4001.19	10$^+$		E_γ,I_γ: from (α,2nγ). Other: Eγ=823.1 10 from (^{36}S,α4nγ).
4846.8	(9$^+$)	623.7 4	15.8 25	4223.56	(10$^+$)		E_γ,I_γ: from (α,2nγ) only.
		840.6 3	100 4	4005.98	(7$^+$)	Q	E_γ: weighted average of 840.7 3 from (α,2nγ) and 840.4 4 from (α,4nγ).
							I_γ: from (α,2nγ).
							Mult.: from $\gamma(\theta)$ in (α,4nγ).
4915.0	12$^+$	913.7 4	100	4001.19	10$^+$	E2	E_γ: weighted average of 914.3 3 from (^{36}S,α4nγ), 913.4 3 from (α,2nγ), and 913.2 4 from (α,4nγ). Other: 912.1 4 in (^{36}S,p2nγ) placed from a different level at 11629.
							Mult.: from γ(DCO) and γ(pol) in (^{36}S,α4nγ), $\gamma(\theta)$ and ce data in (α,4nγ).
4988.6	(12$^+$)	987.5 3	100	4001.19	10$^+$	(E2)	E_γ: weighted average of 987.4 3 from (^{36}S,α4nγ), 987.6 3 from (α,2nγ), and 987.6 4 from (α,4nγ). Other: 989.8 4 in (^{36}S,p2nγ) placed from a different level at 14948.
							Mult.: from γ(pol) in (^{36}S,α4nγ), $\gamma(\theta)$ and ce data in (α,4nγ).
5218.7	(12$^+$)	303.5 4	68 12	4915.0	12$^+$		E_γ: weighted average of 303.9 10 from (^{36}S,α4nγ) and 303.4 4 from (α,2nγ).
							I_γ: weighted average of 50 25 from (^{36}S,α4nγ) and 72 12 from (α,2nγ).
		395.0 10	50 25	4823.19			E_γ,I_γ: γ from (^{36}S,α4nγ) only.
		1217.6 4	100 14	4001.19	10$^+$		E_γ: weighted average of 1218.1 5 from (^{36}S,α4nγ) and 1217.3 4 from (α,2nγ).
							I_γ: from (α,2nγ). Other: 100 25 from (^{36}S,α4nγ).
5348.4		1124.8 3	100	4223.56	(10$^+$)		E_γ: from (α,2nγ) only.
5521.8	13$^-$	848.4 1	100	4673.4	11$^-$	E2	B(E2)(W.u.)=10.4 +10−9
							E_γ: weighted average of 848.5 1 from (^{36}S,α4nγ), 848.0 3 from (α,2nγ), 848.0 4 from (α,4nγ), and 848.4 4 from (^{36}S,p2nγ) (placed from a level at 3977).
							Mult.: from γ(DCO) and γ(pol) in (^{36}S,α4nγ), $\gamma(\theta)$ and ce data in (α,4nγ).
5613.8		940.4 4	100	4673.4	11$^-$		E_γ: from (α,2nγ) only.
5625.7	(13$^+$)	406.8 4	100 25	5218.7	(12$^+$)		E_γ: weighted average of 406.7 5 from (^{36}S,α4nγ), 406.8 4 from (α,2nγ), and 406.9 4 from (^{36}S,p2nγ) (placed from a level at 12941).
							I_γ: from (^{36}S,α4nγ).
		637.5 10	50 25	4988.6	(12$^+$)		

$\gamma(^{98}Ru)$ (continued)

E_i(level)	J_i^π	E_γ†	I_γ†	E_f	J_f^π	Mult.‡	Comments
5625.7	(13^+)	710.6 *10*	50 *25*	4915.0	12^+		
5819.5	14^+	193.6 *5*	18 *5*	5625.7	(13^+)		
		831.0 *5*	73 *18*	4988.6	(12^+)		
		904.6 *4*	100 *18*	4915.0	12^+	E2	E_γ: weighted average of 904.3 *3* from ($^{36}S,\alpha4n\gamma$), and 905.0 *4* from ($^{36}S,p2n\gamma$) (placed from a level at 12534). I_γ: from ($^{36}S,\alpha4n\gamma$) for 904.7+904.3 doublet. Mult.: from γ(DCO) and γ(pol) for 904.7+904.3 doublet in ($^{36}S,\alpha4n\gamma$).
5888.4		899.8 *4*	100	4988.6	(12^+)		E_γ: from ($\alpha,4n\gamma$) only.
6121.5	(14^+)	302.2 *10*	<100	5819.5	14^+		
		495.8 *10*	100	5625.7	(13^+)		
		1206.4 *10*	100	4915.0	12^+		
6260.7	(14^+)	441.4 *10*	100	5819.5	14^+		
		635.0 *10*	100	5625.7	(13^+)		
6591.8	15^-	1070.0 *1*	100	5521.8	13^-	E2	B(E2)(W.u.)=4.8 *+17−10* E_γ: weighted average of 1070.0 *1* from ($^{36}S,\alpha4n\gamma$), 1069.3 *4* from ($\alpha,2n\gamma$), 1069.9 *4* from ($\alpha,4n\gamma$), and 1070.1 *4* from ($^{36}S,p2n\gamma$) (placed from a level at 6900). Mult.: from γ(DCO) and γ(pol) in ($^{36}S,\alpha4n\gamma$), $\gamma(\theta)$ and ce data in ($\alpha,4n\gamma$).
6593.8	(15^+)	333.2 *10*	25 *13*	6260.7	(14^+)		
		472.4 *10*	25 *13*	6121.5	(14^+)		
		774.6 *10*	100 *25*	5819.5	14^+		
		968.2 *10*	<25	5625.7	(13^+)		
6869.8	16^+	276.5 *8*	50 *13*	6593.8	(15^+)		E_γ: unweighted average of 275.7 *5* from ($^{36}S,\alpha4n\gamma$), and 277.2 *4* from ($^{36}S,p2n\gamma$) (placed from a level at 11088).
		1050.2 *4*	100 *25*	5819.5	14^+	E2	E_γ: weighted average of 1050.3 *5* from ($^{36}S,\alpha4n\gamma$), and 1050.1 *4* from ($^{36}S,p2n\gamma$) (placed from a level at 15998). I_γ: from ($^{36}S,\alpha4n\gamma$) for 904.7+904.3 doublet. Mult.: from γ(DCO) and γ(pol) in ($^{36}S,\alpha4n\gamma$).
7623.5	17^-	1031.7 *6*	100	6591.8	15^-	E2	B(E2)(W.u.)=12.3 *+14−11* E_γ: unweighted average of 1032.3 *1* from ($^{36}S,\alpha4n\gamma$), 1030.6 *4* from ($\alpha,4n\gamma$), 1032.2 *4* from ($^{36}S,p2n\gamma$) (placed from a level at 5831). Mult.: from γ(DCO) and γ(pol) in ($^{36}S,\alpha4n\gamma$), also supported by γ(DCO) in ($^{36}S,p2n\gamma$).
8006.4	(17)	1136.5 *5*	100	6869.8	16^+	D	Mult.: from γ(DCO) in ($^{36}S,\alpha4n\gamma$).
8449.5	19^-	826.0 *1*	100	7623.5	17^-	E2	E_γ: weighted average of 826.0 *1* from ($^{36}S,\alpha4n\gamma$), and 826.1 *4* from ($^{36}S,p2n\gamma$). Mult.: from γ(DCO) and γ(pol) in ($^{36}S,\alpha4n\gamma$), γ(DCO) in ($^{36}S,p2n\gamma$).
9930.5	21^-	1480.9 *2*	100	8449.5	19^-	E2	E_γ: weighted average of 1480.8 *1* from ($^{36}S,\alpha4n\gamma$), and 1481.6 *4* from ($^{36}S,p2n\gamma$). Mult.: from γ(DCO) and γ(pol) in ($^{36}S,\alpha4n\gamma$), γ(DCO) in ($^{36}S,p2n\gamma$).
11006.3	(22^-)	1075.9 *3*	100	9930.5	21^-	(D)	E_γ: weighted average of 1076.0 *3* from ($^{36}S,\alpha4n\gamma$), and 1075.6 *4* from ($^{36}S,p2n\gamma$) (placed from a level at 12286). Mult.: from γ(DCO) in ($^{36}S,p2n\gamma$).
11405.0	23^-	398.8 *7*	93 *13*	11006.3	(22^-)	M1	E_γ: unweighted average of 398.1 *3* from ($^{36}S,\alpha4n\gamma$), and 399.4 *4* from ($^{36}S,p2n\gamma$) (placed from a level at 12286). Mult.: from γ(DCO) and γ(pol) in ($^{36}S,\alpha4n\gamma$), γ(DCO) in ($^{36}S,p2n\gamma$).

$^{98}_{44}Ru_{54}$-17

$\gamma(^{98}Ru)$ (continued)

E_i(level)	J_i^π	E_γ†	I_γ†	E_f	J_f^π	Mult.‡	Comments
11405.0	23^-	1474.5 *5*	100 *13*	9930.5	21^-	E2	E_γ: unweighted average of 1474.0 *3* from (^{36}S,α4nγ), and 1475.0 *4* from (^{36}S,p2nγ) (placed from a level at 12286). Mult.: from γ(DCO) and γ(pol) in (^{36}S,α4nγ), γ(DCO) in (^{36}S,p2nγ).
12282.3	25^-	877.3 *5*	100	11405.0	23^-	E2	E_γ: unweighted average of 877.6 *3* from (^{36}S,α4nγ), and 876.7 *4* from (^{36}S,p2nγ) (placed from a level at 9329). Mult.: from γ(DCO) and γ(pol) in (^{36}S,α4nγ), γ(DCO) in (^{36}S,p2nγ).
14285.3		2003 *1*	100	12282.3	25^-		
14476.1		2193.3 *7*	100	12282.3	25^-		E_γ: weighted average of 2193.6 *5* from (^{36}S,α4nγ), and 2192 *1* from (^{36}S,p2nγ) (placed from a level at 17240).
14612.1		2330.0 *5*	100	12282.3	25^-		
14818.4		2536 *1*	100	12282.3	25^-		
14997.4		2715 *1*	100	12282.3	25^-		
15412.4		3130 *1*	100	12282.3	25^-		
15500.5		888.5 *4*	67 *17*	14612.1			E_γ: weighted average of 888.1 *5* from (^{36}S,α4nγ), and 888.8 *4* from (^{36}S,p2nγ) (placed from a level at 12099).
		1024.2 *4*	100 *30*	14476.1		(Q)	E_γ: weighted average of 1024.0 *5* from (^{36}S,α4nγ), and 1024.3 *4* from (^{36}S,p2nγ) (placed from a level at 13310). Mult.: from γ(DCO) in (^{36}S,p2nγ).
17238.5		1738 *1*	100	15500.5		(Q)	E_γ: from (^{36}S,α4nγ), and also from (^{36}S,p2nγ) (placed from a level at 15048).
17592.4		2180 *1*	100	15412.4			E_γ: other: 2181 *1* from (^{36}S,p2nγ) (placed from a level at 23425).
19892.5?		2654@ *1*	100	17238.5			

† From (^{3}He,2nγ) up to 4256 level and from (^{36}S,α4nγ) above that, unless otherwise noted. Weighted averages are taken when data of comparable precision from different reactions are available.

‡ Mostly from $\gamma(\theta)$ and ce data in (α,4nγ) and (^{3}He,2nγ). Since $T_{1/2}$(level) is expected to be <0.5 ns for each level populated in in-beam γ-ray studies, (no delayed γ's with $T_{1/2}$>0.5 ns seen in (α,4nγ) by 1981Du06), ΔJ=2 transitions are assumed as E2 and ΔJ=0 or 1 transitions assumed as M1+E2, in cases where definitive ce and γ(lin pol) data are not available.

Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

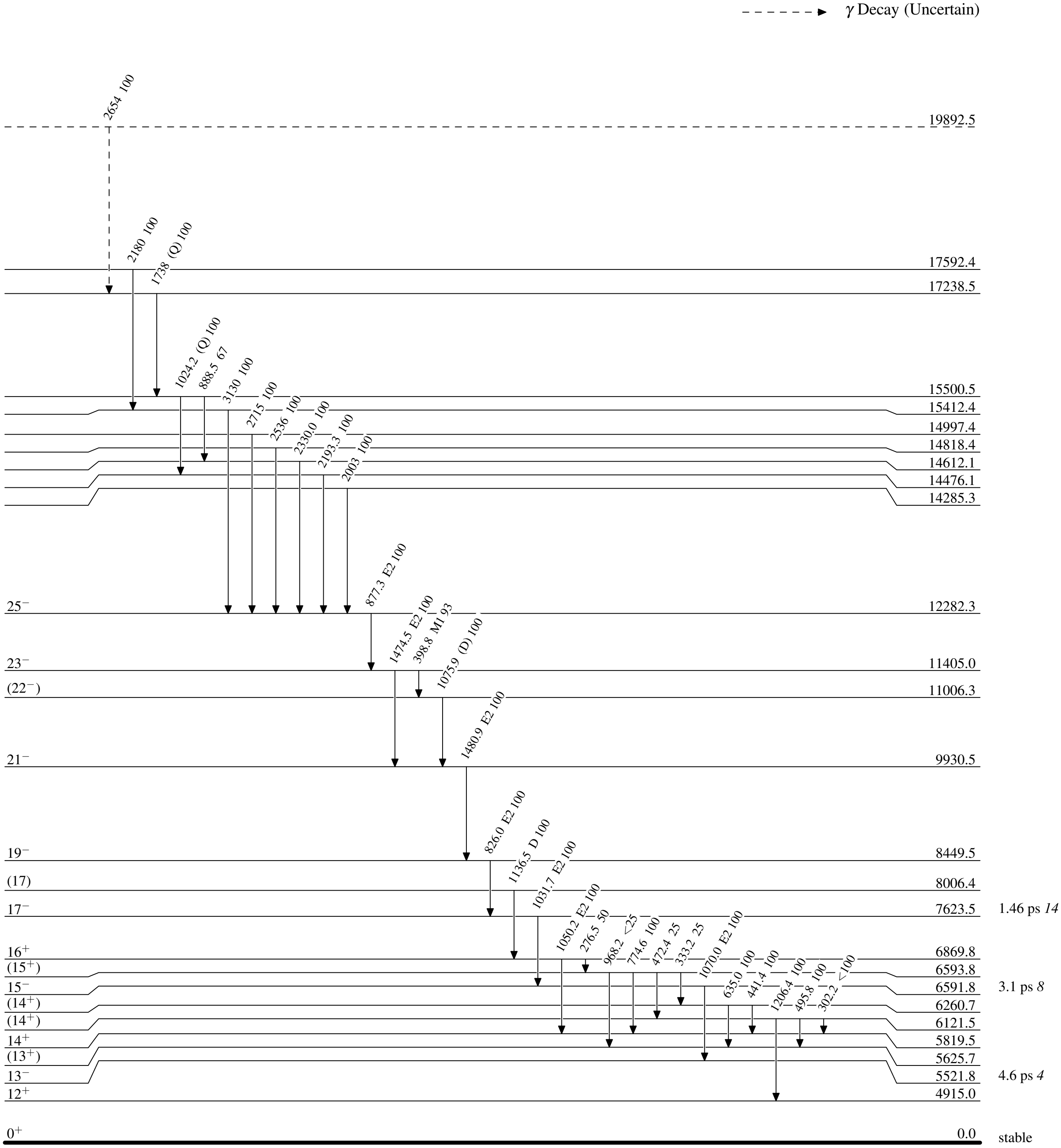
@ Placement of transition in the level scheme is uncertain.

$^{98}_{44}Ru_{54}$-18

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level

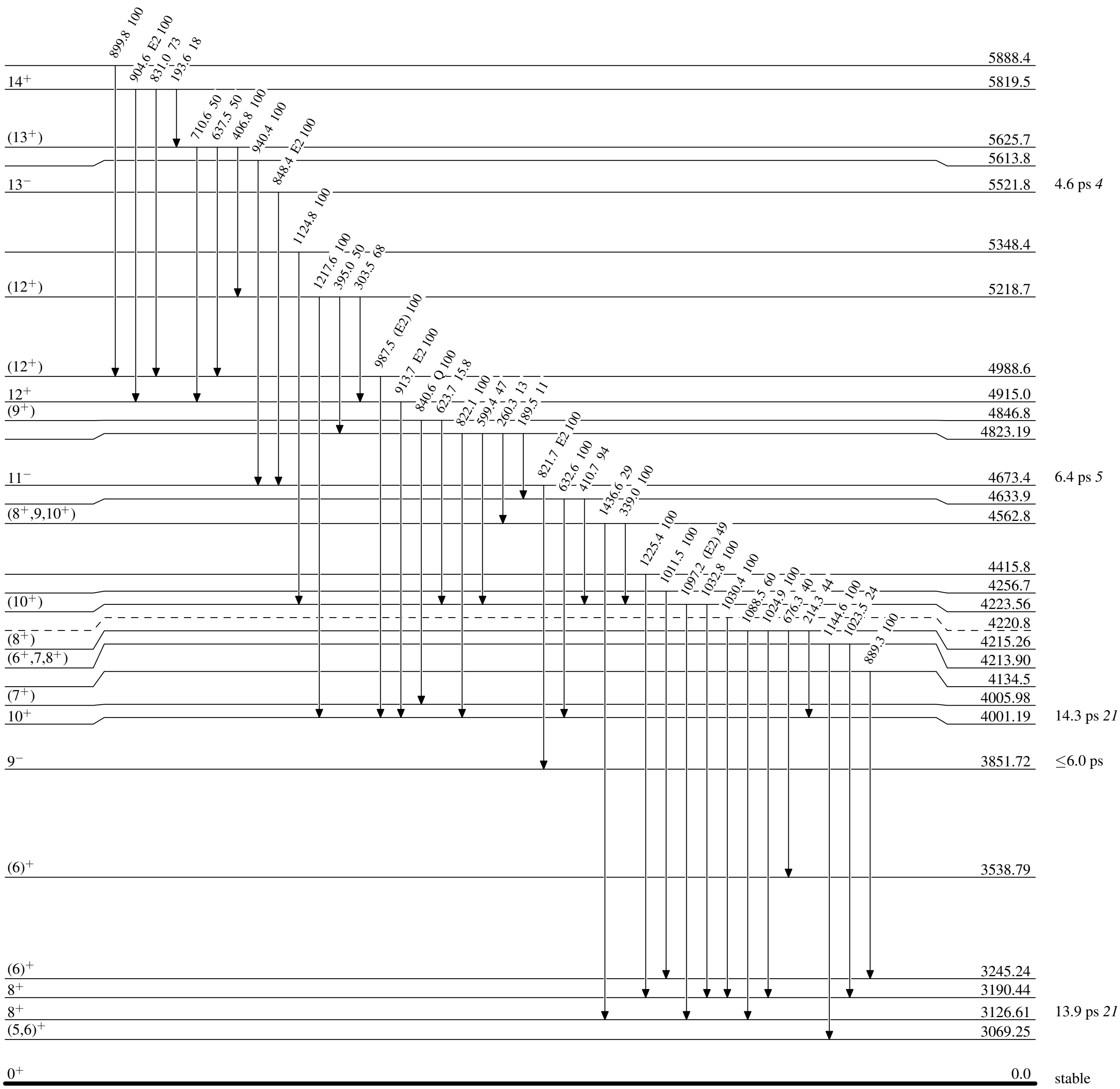


$^{98}_{44}Ru_{54}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

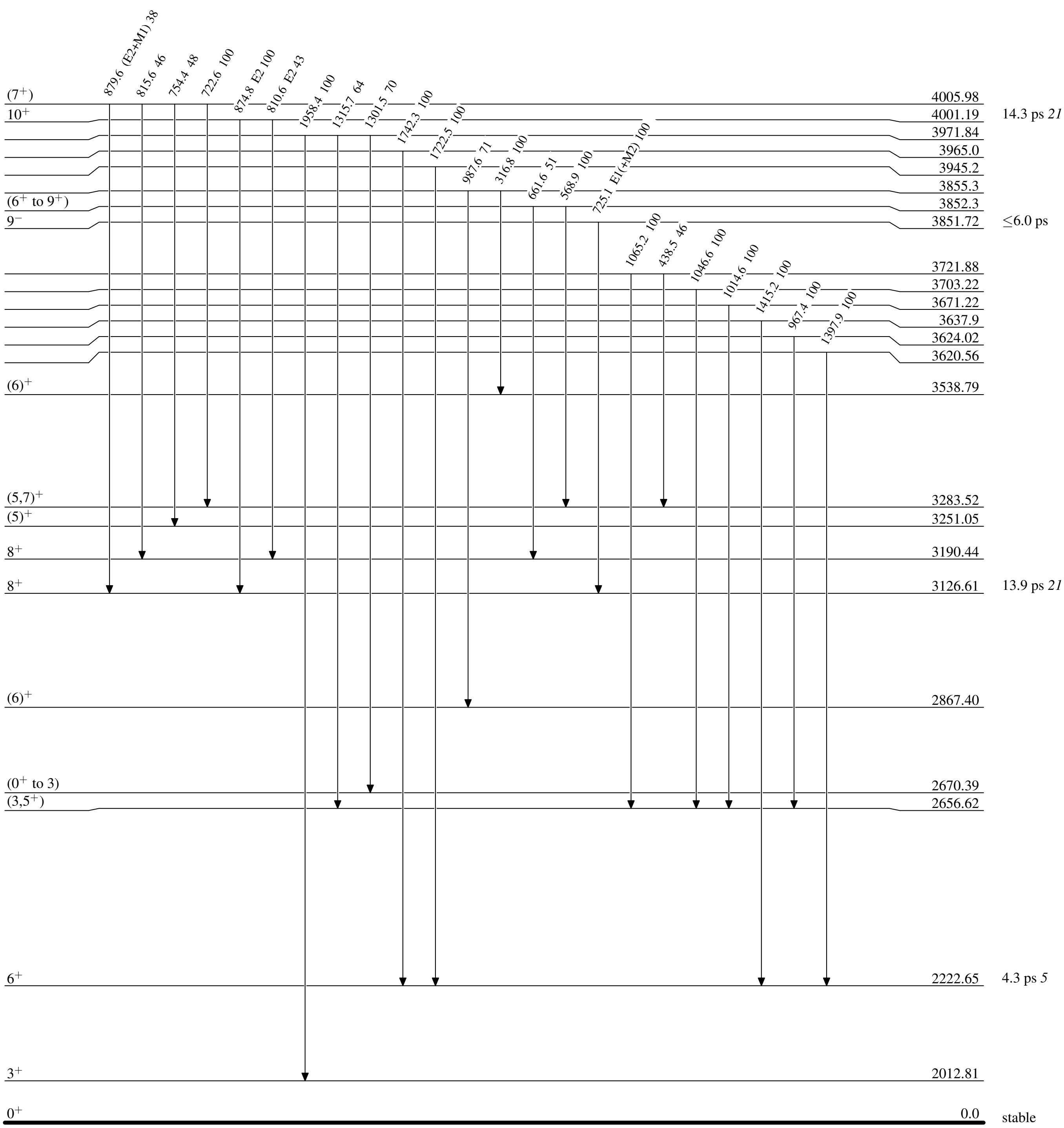


$^{98}_{44}Ru_{54}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

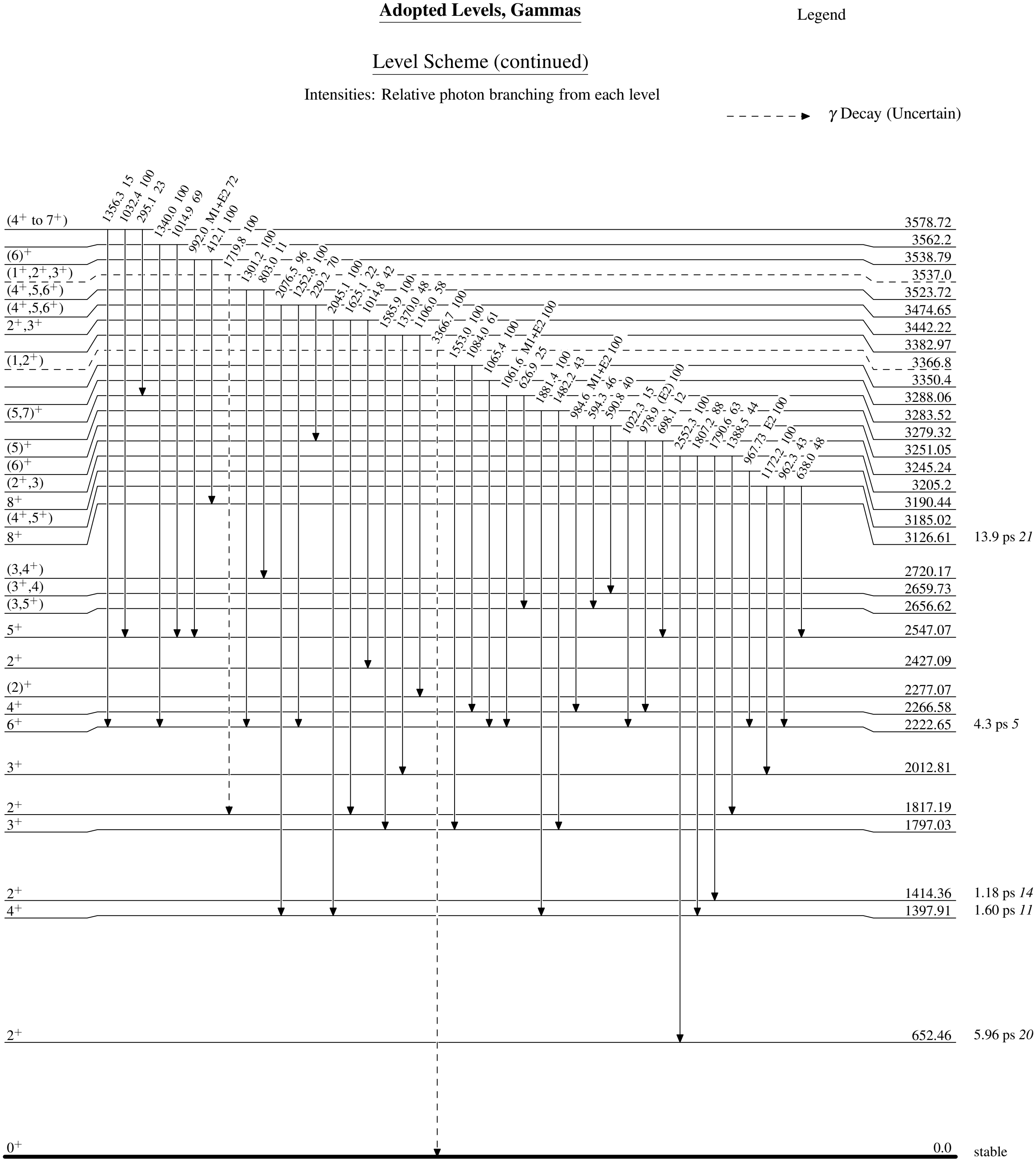


$^{98}_{44}Ru_{54}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

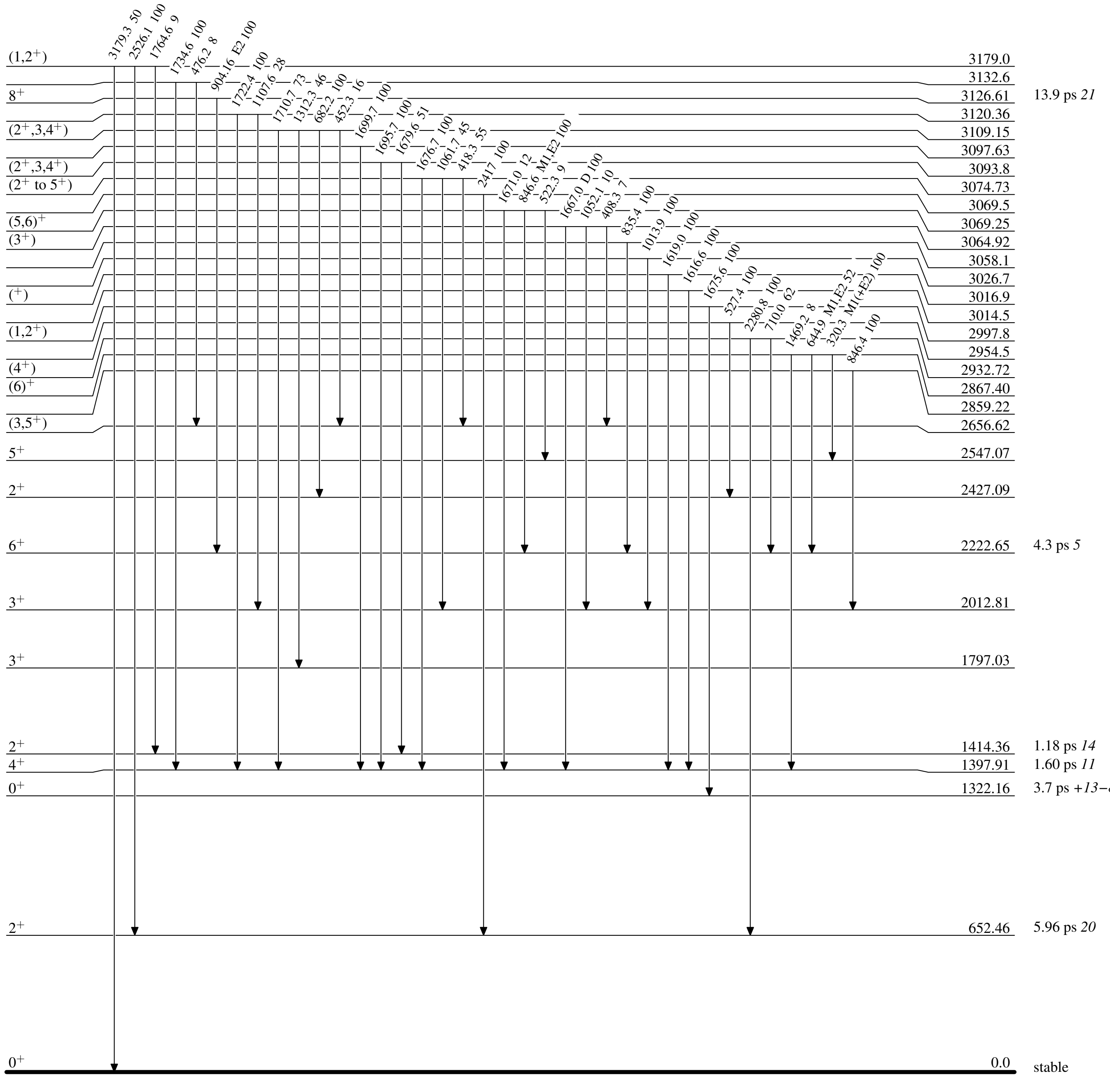


$^{98}_{44}Ru_{54}$

Adopted Levels, Gammas

Level Scheme (continued)

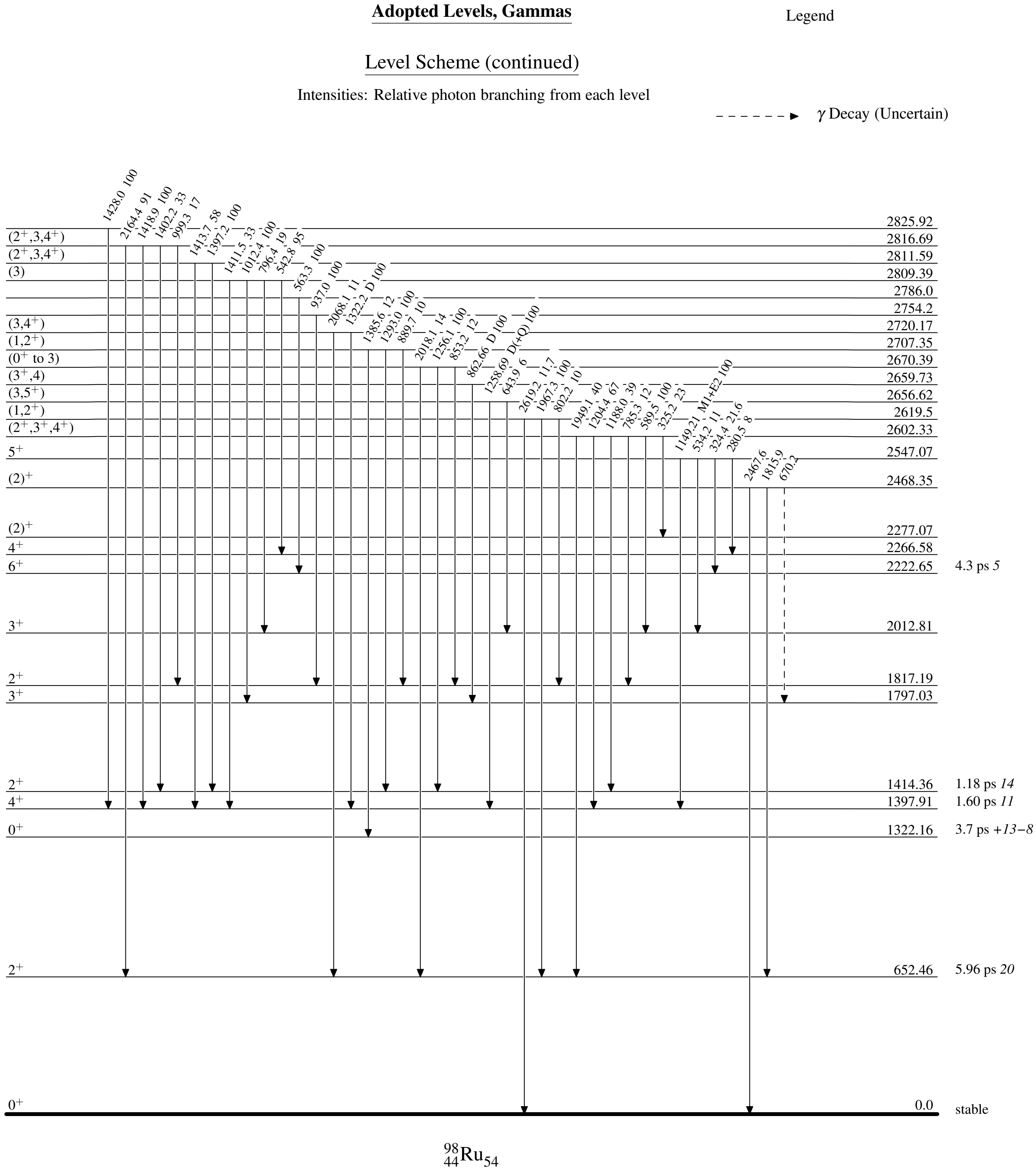
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

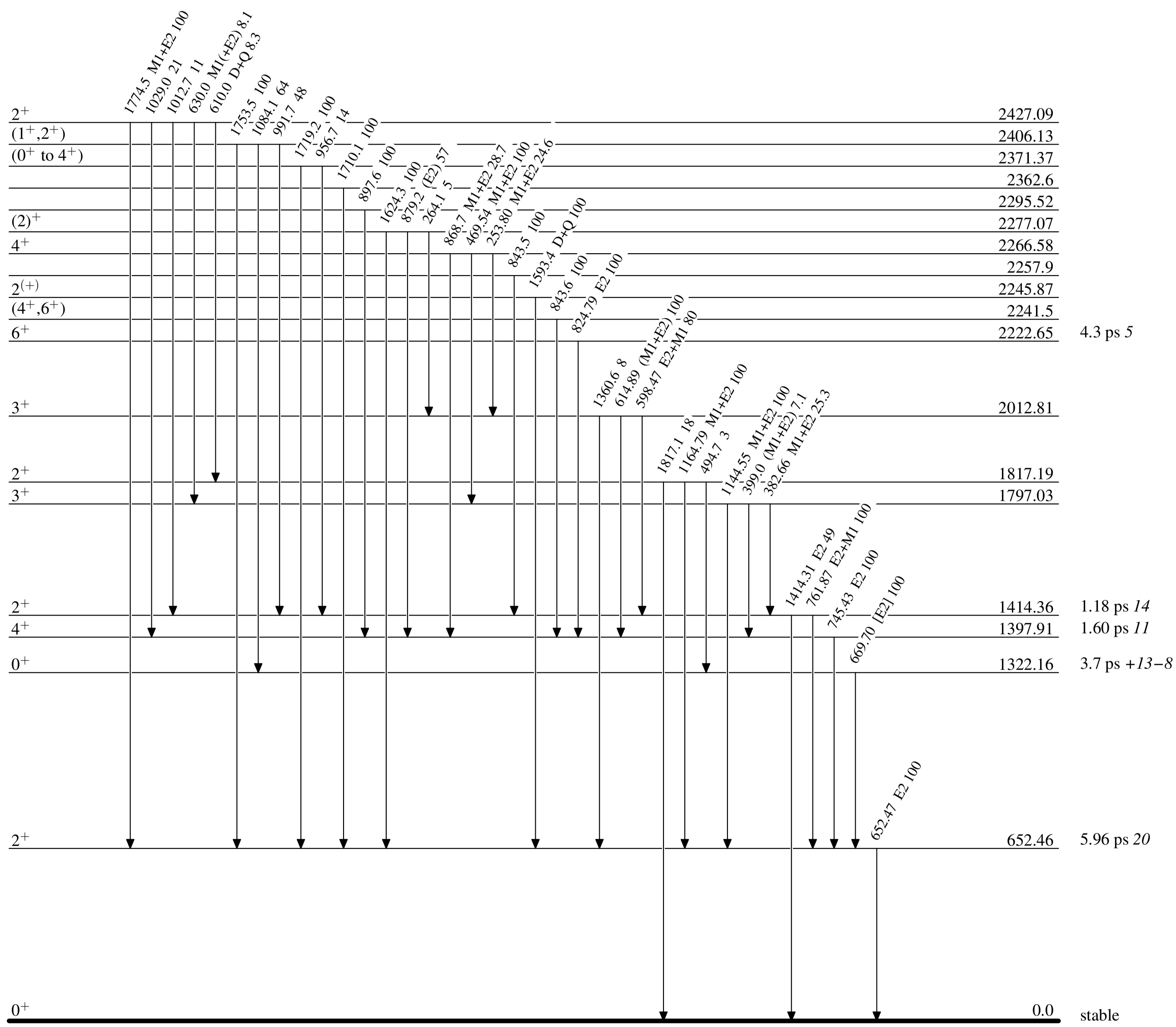
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

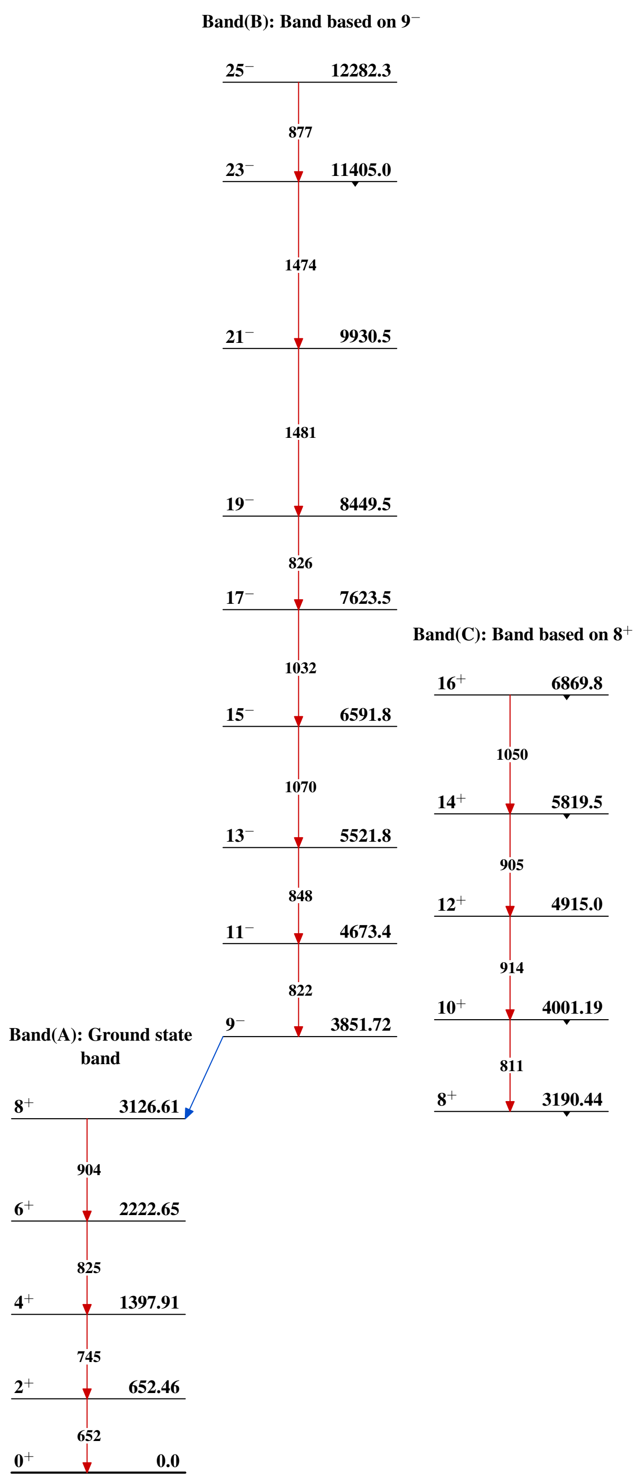
Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{98}_{44}Ru_{54}$

Adopted Levels, Gammas



$^{98}_{44}Ru_{54}$

Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen	NDS 172, 1 (2021)	31-Jan-2021

Q(β^-)=−3636 *18*; S(n)=9673.32 *3*; S(p)=9188.5 *9*; Q(α)=−2857.4 *4* 2017Wa10
S(2n)=17145 *6*, S(2p)=15689.4 *4* (2017Wa10).
Other reactions:
See ^{99}Ru(n,γ),(n,n):resonances dataset for 40 neutron resonances between 10.05 and 994.6 eV.
(HI,X): 1976Mi13, 1974We04.
^{100}Ru(^{32}S,^{32}S′); ^{100}Ru(^{32}S,X): 1993Co11, measured $\sigma(\theta)$.
^{100}Mo(^{32}S,^{28}Si): 1995He17, measured cross section.
^{99}Ru(p,n): 1969Fr18, search for IAR.
(μ^-,X): 1980HoZV.
^{103}Rh(p,4nγ): 1972KoZE, E=44 MeV, measured Eγ, Iγ, I(ce). Deduced E0/E2 branching for the first excited 0$^+$ state.
Additional information 1.
Theory references: consult the NSR database (www.nndc.bnl.gov/nsr/) for 127 primary references ealing with nuclear structure calculations.

^{100}Ru Levels

Band assignments are from (^{36}S,α2nγ) (2000Ti07) and from (α,2nγ) (2000Ge01).
In J^π assignments from ^{99}Tc(^{3}He,d); ^{99}Ru(d,p) and ^{101}Ru(p,d), the target J^{π}′s are: 9/2$^+$ for ^{99}Tc; 5/2$^+$ for ^{99}Ru and ^{101}Ru.

Cross Reference (XREF) Flags

A	^{100}Tc β^- decay (15.65 s)	H	^{99}Tc(^{3}He,d)	O	^{100}Ru(α,α′)
B	^{100}Rh ε decay (20.5 h)	I	^{99}Ru(n,γ) E=th	P	^{101}Ru(p,d)
C	^{100}Rh ε decay (4.6 min)	J	^{99}Ru(n,γ) E=res	Q	^{101}Ru(d,t)
D	^{100}Mo 2β^- decay (7.01×10^{18} y)	K	^{99}Ru(d,p)	R	^{102}Ru(p,t)
E	^{70}Zn(^{36}S,α2nγ),^{88}Sr(^{14}C,2nγ)	L	^{100}Mo(α,4nγ)	S	^{103}Rh(p,α)
F	^{76}Ge(^{34}S,2α2nγ)	M	^{100}Ru(n,n′γ),(n,n′)	T	Coulomb excitation
G	^{98}Mo(α,2nγ)	N	^{100}Ru(p,p′)		

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$[#]	XREF	Comments
0.0[a]	0$^+$	stable	ABCDEFGHIJKLM OPQRST	Evaluated rms charge radius <r^2>$^{1/2}$=4.4531 fm *31* (2013An02). Evaluated δr^2(^{100}Ru,^{104}Ru)=−0.506 fm^2 *3* (2013An02).
539.5103[a] *20*	2$^+$	12.54 ps *10*	ABCDEFGHIJKLM OPQRST	μ=+0.858 *46* (2011Ch23,2014StZZ) Q=−0.44 *7* (2016St14,1998Hi01); Q=−0.27 *7* (2016St14,1998Hi01) XREF: D(?). J$^\pi$: E2 539.5γ to 0$^+$. T$_{1/2}$: from B(E2)=0.4938 *40* in Coul. ex.; weighted average of 0.493 *4* (1998Hi01,1980HiZV); 0.494 *6* and 0.482 *26* (1980La01); 0.520 *44* (1968Mc08); and 0.572 *40* (1958St32). B(E2)=0.30 *6* (1956Te26) seems discrepant. All the values are from determination of Coulomb excitation probability. 2016Pr01 evaluation gives B(E2)=0.4927 *41* and T$_{1/2}$=12.51 ps *10* Other: B(E2)=0.471 *14*, deduced from δ(charge)=β_2R=1.154 *17* (1996Go36; (α,α′)); T$_{1/2}$=22.0 ps *17* from RDDS in (^{14}C,2nγ) (2017Ko03) is discrepant. μ: from g=+0.429 *23* measured using transient-field in Coulomb excitation (2011Ch23). Other: +0.88 *6* (2011Ta06, transient-field in Coulomb excitation) from g=+0.44 *3*, average of two measured values of +0.45 *2* and +0.43 *1* with absolute

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{100}Ru Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	XREF	Comments
				uncertainty of 0.03 in g factor; +1.02 *13* from $\gamma\gamma(\theta$,H,t) in ^{100}Rh ε decay (1966Au06, value of g=0.55 *7* given for $T_{1/2}$=11.0 ps); 0.94 *30* from $\gamma(\theta$,H,t) (1974Hu01) in Coul. ex. Q: =−0.44 *4* for constructive or −0.27 *7* for destructive interference (2016St14 evaluation based on 1998Hi01 (also 1980HiZV) experiment of reorientation effect in Coulomb excitation. 1998Hi01 give respective values of −0.54 *7* or −0.33 *7*. Others by the same method: −0.43 *7* or −0.20 *7* (1980La01); −0.40 *12* (1978Fa08); −0.13 *7* (1977Ma41). $\beta_2(\alpha,\alpha')$=0.204 *3* (from β_2R(charge)=1.154 *17*, β_2R(nuclear)=1.12 *5* (1996Go36)). β_2(Coul. ex.)=0.209 *2* (from B(E2) (1980La01,1980HiZV)).
1130.305 *7*	0^+	8.2 ps *+15−11*	AB D GHIJKLM PQRST	XREF: L(?). J^{π}: spin=0 from $\gamma\gamma(\theta)$ in ^{100}Tc β^- decay; ΔJ=2, E2 590.8γ to 2^+. $T_{1/2}$: from B(E2)=0.0191 *29* in Coul. ex.
1226.467[a] *5*	4^+	2.6 ps *2*	BC EFGHIJKLM OPQR T	J^{π}: spin=4 from $\gamma(\theta)$ in (α,xnγ); ΔJ=2, E2 686.97γ to 2^+; band assignment. $T_{1/2}$: from B(E2)=0.260 *22* in Coulomb excitation. Other: 2.5 ps *6* from RDDS in (^{14}C,2nγ) (2017Ko03).
1362.166[b] *5*	2^+	0.95 ps *+24−16*	ABCD GHIJKLM OPQRST	XREF: D(?). J^{π}: 1362.2γ E2 to 0^+. $T_{1/2}$: Other: 1.34 ps *+19−15*, from B(E2)(from g.s.)=0.0190 *23* in Coul. ex. and adopted branching %I(1362.2γ)=42.2 *1*.
1741.011 *8*	0^+	>1.39 ps	AB D GHIJK M P R	XREF: D(?)P(?). J^{π}: 378.9γ E2 to 2^+; E0 transitions to 0^+.
1828 *2*	0^+		QR	XREF: Q(1840). J^{π}: from $\sigma(\theta)$ ratio in (p,t).
1865.110 *5*	2^+	0.66 ps *+20−12*	AB D GhIJK M PQR	XREF: D(?)h(1870)P(1887). J^{π}: 638.6γ to 4^+ and 734.8γ to 0^+ have mult=M1,E2 from ce data; 1865.1γ E2 to 0^+ in ^{100}Rh ε decay (20.8 h).
1881.043[b] *5*	3^+	0.90 ps *+40−22*	BC GhIJKLM PQ	XREF: h(1870). J^{π}: 654.6γ M1+E2 to 4^+ and 1341.5γ M1+E2 to 2^+; band assignment.
2051.661 *7*	0^+	1.0 ps *+11−4*	AB D G IJ M QR	XREF: D(?). J^{π}: spin=0 from $\gamma\gamma(\theta)$ in ^{100}Tc β^-; ΔJ=2, E2 1512.1γ to 2^+.
2062.651[b] *7*	4^+	0.56 ps *+92−22*	C GhIJKLM QR	XREF: h(2077). J^{π}: ΔJ=2, E2 1523.1γ to 2^+; M1+E2 836.2γ to 4^+; L(d,p)=L(d,t)=2 from $5/2^+$; band assignment.
2075.675[a] *15*	6^+	>0.28 ps	C EFGhIJ LM R	XREF: C(?)h(2077). J^{π}: spin from $\gamma(\theta)$ in (α,xnγ); ΔJ=2, E2 849.2γ to 4^+; band assignment.
2099.103 *6*	2^+	0.39 ps *+7−6*	AB GhIJK M PQR	J^{π}: M1 1559.5γ to 2^+; 968.8γ and 2099.1γ to 0^+; 872.7γ to 4^+; L(d,p)=0+2 and L(p,d)=2 from $5/2^+$.
2131 *10*	$2^+,3^+$		P	J^{π}: L(p,d)=0(+2) from $5/2^+$.
2166.879[e] *5*	3^-	34 ps *+12−8*	B G IJKLMNO QR T	XREF: L(?). J^{π}: L(α,α')=L(p,p′)=3 from 0^+; band assignment. $T_{1/2}$: from B(E3)=0.053 *9* in Coul. ex. and adopted γ-ray branching ratio. Other: >0.97 ps from DSA method in (n,n′γ).

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Adopted Levels, Gammas (continued)

^{100}Ru Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	XREF	Comments
				B(E3)=0.052 *9* (2002Ki06, evaluation). β_3R(nuclear)(α,α')=0.76 *2* (1996Go36). β_3(Coul. ex.)=0.127 *11*.
2194? *10*			P	
2240.804 *7*	2^+	83 ps *6*	AB G IJK M QR	J^{π}: L(d,p)=2 from $5/2^+$; spin from $\gamma(\theta)$ in (α,2nγ) and (n,n$'\gamma$); 1701.3γ D to 2^+; 228.6γ E1 from 2^-;
2268 *5*	$2^+,3^+$		P	J^{π}: L(p,d)=2+0 from $5/2^+$.
2313.5 *3*	$(3^-,4^+)$		C	J^{π}: 951.5γ to 2^+ and 1087.1γ to 4^+; probable ε feeding from (5^+) suggests J^{π} not $2^+,3^+$.
2324.6 *4*	(3^- to 6^+)		C	J^{π}: 262.3γ and 1097.8γ to 4^+; probable ε feeding from (5^+) suggest $3^-,4,5,6^+$.
2351.240 *6*	4^+	0.42 ps *+26−12*	G IJK M QR	J^{π}: 1811.6γ E2, ΔJ=2 to 2^+; 1124.8γ M1+E2 to 4^+.
2366.588 *7*	4^+	0.78 ps *+76−26*	C G I K MNO QR T	J^{π}: L(p,p$'$)=4; ΔJ=2, E2 1827.1γ to 2^+; 1139.9γ to 4^+. In (n,γ) E=th, 1988Co18 assigned $J^{\pi}=2^+$ on the basis of a 2366.3γ (Iγ=32 *4*) to g.s. But the placement of 2366.3γ is considered incorrect (evaluators) since no such γ is reported in ^{100}Rh ε decay (4.6 min). β_4R(nuclear)(α,α')=0.038 *8* (1996Go36). Large value of β_4(p,p$'$)=0.10 (1989Si15) suggests this state as hexadecapole excitation.
2387.22 *7*	0^+	>0.52 ps	AB D I M PQR	XREF: D(?)P(2394). J^{π}: spin=0 from cross-section ratio in (p,t) and $\gamma\gamma(\theta)$ in ^{100}Tc β^- decay (15.46 s); L(p,d)=2 from $5/2^+$; allowed β feeding (log *ft*=5.4) from 1^+ parent.
2413.86 *11*	(4^+)	87 fs *+7−6*	G IJK M QR	J^{π}: ΔJ=(2), (E2) 1874.4γ to 2^+; primary 7259.6γ from $2^+,3^+$.
2438 *5*	$2^+,3^+$		P	J^{π}: L(p,d)=2+0 from $5/2^+$.
2469.389[c] *5*	2^-	0.44 ps *+51−16*	B G IJ M R	J^{π}: M2 2469.3γ to 0^+, E1 588.3γ to 3^+.
2493.06 *4*	$(3,4,5^+)$	>0.83 ps	G I K M R	J^{π}: 1266.4γ D(+Q) to 4^+; 612.0γ to 3^+. But possible γ to 2^+ disfavors 5^+.
2512.411 *11*	$(4)^+$	0.41 ps *+55−15*	B G I k M P	XREF: P(2515). J^{π}: ΔJ=(2), (E2) 1972.9γ to 2^+; M1+E2 631.4γ to 3^+; L(p,d)=2+4 from $5/2^+$.
2516.827 *6*	1^-	105 fs *+43−26*	B IJk M R	J^{π}: 651.7γ E1 to 2^+; 1386.5γ and 1154.5γ, D to 0^+.
2527.247[e] *9*	5^-	0.6 ps *+14−3*	E G IJ LM R	J^{π}: ΔJ=2, E2 360.4γ to 3^-; ΔJ=1, E1 1300.8γ to 4^+.
2536.194 *12*	3	0.7 ps *+12−3*	B G I M	J^{π}: spin from $\gamma(\theta)$ in (α,2nγ) and (n,n$'\gamma$).
2543.71 *3*	2^+	0.38 ps *+49−15*	B G I K M P R	XREF: P(2560). J^{π}: M1+E2 1181.4γ to 2^+; 2543.6γ to 0^+; L(p,d)=2+0 from $5/2^+$.
2569.912[c] *7*	$(3)^-$	>0.30 ps	B G IJ M R	J^{π}: M1,E2 499.6γ from $(1,2)^-$; D+Q 403.0γ to 3^-; 1343.5γ to 4^+, 1207.7γ to 2^+; band assignment.
2576.872[b] *15*	$5^{(+)}$	>125 fs	G I M	J^{π}: ΔJ=2, Q 695.8γ to 3^+; D+Q 1350.4γ to 4^+; band assignment.
2591.817[d] *6*	4^-	0.26 ps *+62−12*	G IJ M	J^{π}: (M1+E2) 424.9γ to 3^-; D(+Q) 1365.4γ to 4^+; ΔJ=2, E2 371.8γ from 6^-; band assignment.
2606.07 *8*	(2,3)	71 fs *+10−8*	I K M p R	XREF: p(2610). J^{π}: from $\gamma(\theta)$ in (n,n$'\gamma$).
2617.14 *4*	$1,2^+$	121 fs *+26−19*	B I M p	XREF: p(2610). J^{π}: 2617.1γ to 0^+ and RUL.

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Adopted Levels, Gammas (continued)

^{100}Ru Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	XREF	Comments
2634 *10*	(0 to 5)$^+$		P	J^{π}: L(p,d)=2 from 5/2$^+$.
2660.140 *17*	1,2$^+$	48 fs *+6−5*	AB I k M	J^{π}: 2660.1γ to 0$^+$ and RUL.
2660.82 *4*	5$^{(+)}$		G I k	J^{π}: ΔJ=2, Q 779.8γ to 3$^+$; D+Q 1434.3γ to 4$^+$.
2666.29 *3*	(2,3)	55 fs *+6−5*	B IJk M R	J^{π}: from $\gamma(\theta)$ in (n,n′γ). Possible γ to 0$^+$ disfavors 3$^+$.
2705.52[b] *3*	6$^+$		G K P R	XREF: P(2695)R(2703.4). J^{π}: L(p,d)=4 from 5/2$^+$; ΔJ=2, Q 642.8γ to 4$^+$; 629.8γ to 6$^+$.
2738.678 *6*	(2$^+$,3,4$^+$)		hI M R	XREF: h(2750). J^{π}: 873.7γ to 2$^+$ and 372.1γ to 4$^+$.
2745.60 *5*	(1,2$^+$)	132 fs *+42−28*	B h k M	XREF: h(2750)k(2748). J^{π}: 1615.4γ and 693.9γ to 0$^+$; M2 is disfavored for 693.9γ by RUL.
2747.495[c] *10*	4$^{(-)}$		GhIJK	XREF: h(2750). J^{π}: ΔJ=0, D 155.7γ to 4$^-$; band assignment; 580.6γ possibly (M1+E2) to 3$^-$.
2764.943 *18*	2$^+$,3$^+$	>0.17 ps	GhIJK M P R	XREF: h(2750)R(2759.4). J^{π}: L(p,d)=2+0 from 5/2$^+$.
2775.179 *18*	(5$^-$)		G M	XREF: M(?). E(level): see comment for 2775.34 level. J^{π}: ΔJ=(0) 247.9γ to 5$^-$, most likely (M1+E2).
2775.34 *6*	2$^+$,3$^+$	0.30 ps *+24−10*	B GhIJ M P	XREF: G(?)h(2750)P(2783). E(level): in (n,n′γ), 248, 1413, 1548 and 2236 gammas are reported from this level (2001Ge03), whereas in (α,2nγ) 248, 712 and 1548 gammas are reported from this level. In ^{100}Rh ε decay (20.8 h), only the 1548 γ is reported. But Iγ(248)/Iγ(1548)=116/23 in (α,2nγ) and 13/15 in (n,n′γ). This large discrepancy suggests that there are likely two levels, one high-spin decaying through the 248γ and the other low spin populated in (n,n′γ) and ^{100}Rh ε decay. The 248γ is placed from a high-spin level in (α,2nγ) whereas the 1548γ can be from both the levels. J^{π}: 2236.1γ to 2$^+$ and 1548.7γ to 4$^+$; L(p,d)=2+0 from 5/2$^+$.
2785.193 *22*	6$^{(+)}$		G	J^{π}: ΔJ=2, Q 1558.8γ to 4$^+$; 709.4γ to 6$^+$, most likely (M1+E2).
2800.84 *5*	(2$^+$,3)	0.13 ps *+5−3*	M r	J^{π}: 1438.7γ D(+Q) to 2$^+$, 1574.2γ to 4$^+$.
2801.48 *5*	(1$^+$,2,3)	97 fs *+17−13*	B IJK M r	J^{π}: 2262.3γ D+Q to 2$^+$; 920.6γ to 3$^+$.
2816 *10*	2$^+$,3$^+$		P	J^{π}: L(p,d)=2+0 from 5/2$^+$.
2832.8 *17*	0$^+$[@]		J R	E(level): from (n,γ) E=res. J^{π}: from $\sigma(\theta)$ ratio in (p,t).
2837.71 *12*	(1$^+$,2$^+$)	116 fs *+21−17*	A I K M	J^{π}: probable allowed β feeding from 1$^+$; 2298.2γ D+Q to 2$^+$.
2862.52 *9*	(0$^+$ to 4$^+$)	0.25 ps *+51−10*	I M	J^{π}: 763.3γ and 1500.4γ to 2$^+$.
2877.57 *8*	2$^+$,3$^+$		G IJK M P	XREF: P(2865). J^{π}: L(p,d)=2+0 from 5/2$^+$.
2878.44 *4*	2$^+$,3,4$^+$	140 fs *+30−21*	M	J^{π}: 779.5γ to 2$^+$ and 1651.9γ to 4$^+$, with mult=M2 ruled out by RUL.
2890 *10*	2$^+$,3$^+$		P	J^{π}: L(p,d)=2+0 from 5/2$^+$.
2905.14 *20*	(4$^+$)	0.21 ps *+8−5*	I K M R	XREF: R(2902.6). J^{π}: ΔJ=(2), (E2) 2365.5γ to 2$^+$.
2911.47[c] *3*	5$^{(-)}$		G K	J^{π}: ΔJ=0, D+Q 384.2γ to 5$^-$; band assignment.
2915.545 *5*	2$^-$	0.35 ps *+29−11*	B IJ M	J^{π}: spin=2 from $\gamma\gamma(\theta)$ in ^{100}Rh ε decay (20.8 h);

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Adopted Levels, Gammas (continued)

^{100}Ru Levels (continued)

E(level)[†]	Jπ[‡]	T$_{1/2}$[#]	XREF	Comments
				1553.3γ and 2375.98γ E1 to 2$^+$; allowed β feeding from 1$^-$ parent.
2933.65 *10*	(1,2)$^+$		AB P	XREF: P(2926). Jπ: 2933.6γ to 0$^+$; L(p,d)=2 from 5/2$^+$.
2951.10 *8*	2$^+$,3,4$^+$	87 fs +*14*−*10*	K M	XREF: K(2953). Jπ: 2411.4γ to 2$^+$ and 1724.6γ to 4$^+$, with mult=M2 ruled out by RUL.
2951.552[e] *13*	7$^-$		E G L	Jπ: ΔJ=1, E1 876.3γ to 6$^+$; ΔJ=2, Q 424.3γ to 5$^-$; band assignment.
2963.626[d] *13*	6$^-$		E G L	Jπ: ΔJ=0, E1(+M2) 887.4γ to 6$^+$.
2967.57 *3*	6$^{(+)}$		G	Jπ: ΔJ=2, Q 1741.2γ to 4$^+$; 262.1γ to 6$^+$; 891.7γ (M1+E2) to 6$^+$.
2983.04 *7*	(0 to 4)$^+$		IJ P	XREF: P(2971). Jπ: L(p,d)=2 from 5/2$^+$; probable 2444.3γ to 2$^+$.
2999.32 *11*	(0$^+$ to 4$^+$)	0.18 ps +*10*−*5*	I K M	Jπ: 2459.4γ to 2$^+$.
3016.77 *16*	[@]		IJ	E(level): from (n,γ) E=th.
3034.0 *4*			I K	E(level): from (n,γ) E=th.
3058.1 *10*	(2,3,4)		J p	XREF: p(3051). Jπ: primary 6614.6γ from 3$^{(+)}$ and 2$^{(+)}$. L(p,d)=2+0 from 5/2$^+$ for a 3051 group suggests 2$^+$,3$^+$ for 3058 and/or 3060 level.
3060.051[a] *17*	8$^+$		EFGH kL	XREF: k(3065.5). Jπ: ΔJ=2, E2 984.8γ to 6$^+$; band assignment.
3060.14 *5*	1,2$^+$	11 fs *3*	B k M p	XREF: k(3065.5)p(3051). Jπ: 3060.2γ to 0$^+$, with mult=M2 ruled out by RUL. See also Jπ comment for 3058 level.
3064.61 *7*	4$^+$	37 fs +*10*−*7*	I k M	XREF: k(3065.5). Jπ: ΔJ=2, E2 γ to 2$^+$; primary 6608.5γ from 2$^+$,3$^+$.
3069.525 *6*	(1,2)$^-$	>0.45 ps	B IJk M	XREF: I(3071.6)k(3065.5). Jπ: M1,E2 600.1γ to 2$^-$; M1,E2 499.6γ to (3)$^-$; 2529.97γ D+Q to 2$^+$; weak 3069.4γ to 0$^+$.
3072.268 *19*	2$^+$	0.20 ps +*14*−*6*	B M P	XREF: P(3080). Jπ: 3071.8γ to 0$^+$; L(p,d)=0+2 from 5/2$^+$.
3102 *4*			K	
3110.57 *11*	(2$^+$,3$^+$)	>0.26 ps	G IJ M P	XREF: P(3124). Jπ: L(p,d)=2+0 from 5/2$^+$ for a level at 3124; 943.7γ to 3$^-$.
3118.67 *13*	(0$^+$ to 4$^+$)	37 ps +*8*−*6*	I M P	XREF: P(3132). Jπ: 1756.2γ to 2$^+$.
3139.303 *14*	7$^-$		E G L	Jπ: ΔJ=2, E2 612.1γ to 5$^-$; 187.8γ to 7$^-$.
3177.07 *23*	2$^+$,3$^+$		I P	Jπ: L(p,d)=0 from 5/2$^+$. E(level): from (n,γ) E=th.
3218.111 *23*	(8)$^-$		G	Jπ: ΔJ=2, E2 254.5γ to 6$^-$;
3231.79 *17*			I	
3263.664[f] *18*	8$^{(+)}$		EFG L	XREF: L(3266.1). Jπ: ΔJ=0, D 203.6γ to 8$^+$; ΔJ=2, Q 557.98γ and 1188.0γ to 6$^+$; 6 levels; γ from 10$^+$; probable γ to 6$^+$.
3266.3 *3*	(0 to 5)$^+$		HI P	XREF: H(3240)P(3268). E(level): from (n,γ) E=th. Jπ: L(p,d)=2 from 5/2$^+$; L(^{3}He,d)=4 from 9/2$^+$.
3272.1 *3*			I P	XREF: P(3278).
3300.62 *8*	2$^+$,3$^+$		IJ P	XREF: P(3315). Jπ: L(p,d)=2+0 from 5/2$^+$.
3308.08 *14*			I	

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Adopted Levels, Gammas (continued)

^{100}Ru Levels (continued)

E(level)†	Jπ‡	XREF	Comments
3323.70 *5*	(1,2$^+$)	B	Jπ: 3323.9γ to 0$^+$.
3326.27 *8*	@	IJ	
3332.40 *6*	@	IJ	
3348.13 *6*	@	IJ	
3354.637[d] *14*	8$^-$	E G L	Jπ: ΔJ=2, E2 390.98γ to 6$^-$; E2+M1 403.1γ to 7$^-$; band assignment.
3368.982[c] *21*	(7$^-$)	G	Jπ: 229.7γ to 7$^-$; 593.9γ to (5$^-$); band assignment.
3375.01 *13*	@	IJ	
3419.13 *17*	(2$^+$)	B IJ P	XREF: P(3403). Jπ: 3419.4γ to 0$^+$; L(p,d)=0 from 5/2$^+$ for a 3403 group favors 2$^+$.
3441 *10*	2$^+$,3$^+$	P	Jπ: L(p,d)=0 from 5/2$^+$.
3446.56[b] *6*	7$^{(+)}$	G	Jπ: ΔJ=2, Q 869.7γ to 5$^{(+)}$; D+Q 1370.95γ to 6$^+$.
3460.4 *15*	@	J	
3463.43 *12*	(1$^+$,2)	B IJ	Jπ: weak 3464.8γ to 0$^+$; weak 1582.9γ to 3$^+$; primary 6212.3γ from 3$^{(+)}$.
3503.365[e] *15*	9$^-$	E G L	Jπ: Δ=2, E2 364.1γ and 551.9γ to 7$^-$; E1(+M2) 443.3γ to 8$^+$.
3517 *10*	2$^+$,3$^+$	P	Jπ: L(p,d)=2+0 from 5/2$^+$.
3550.10[b] *3*	8$^{(+)}$	G	Jπ: ΔJ=2, Q 1474.4γ to 6$^+$; 490.1γ to 8$^+$; band assignment.
3575.51[h] *3*	9$^-$	E G L	Jπ: ΔJ=2, E2 623.9γ to 7$^-$; D(+Q) 515.5γ to 8$^+$.
3576.43 *6*	7$^{(+)}$	G	Jπ: ΔJ=2, Q 999.5γ to 5$^{(+)}$, most likely E2; D+Q 870.99γ to 6$^+$; 312.6γ to 8$^{(+)}$.
3585 *10*	2$^+$,3$^+$	P	Jπ: L(p,d)=2+0 from 5/2$^+$.
3599.301[c] *23*	(8$^-$)	G	Jπ: D+Q 460.0γ and 647.8γ to 7$^-$; band assignment.
3608 *10*	2$^+$,3$^+$	P	Jπ: L(p,d)=2+0 from 5/2$^+$.
3609.96 *8*	7$^{(+)}$	G	Jπ: ΔJ=2, Q 948.98γ to 5$^{(+)}$, most likely E2; D+Q 1534.4γ to 6$^+$.
3661.48 *13*	(4,5,6)	G	Jπ: D+Q 1134.2γ to 5$^-$.
3693 *10*	(0 to 5)$^+$	P	Jπ: L(p,d)=2 from 5/2$^+$.
3731.88 *13*	@	J	
3779.72 *13*	(1 to 4)$^+$	IJ P	Jπ: L(p,d)=2 from 5/2$^+$; primary 5894.2γ from 2$^{(+)}$ and 3$^{(+)}$.
3851.5 *4*	(4$^+$,5,6,7$^+$)	G	Jπ: 883.8γ to 6$^{(+)}$, 1274.7γ to 5$^{(+)}$.
3877.75 *17*	2$^+$,3$^+$	IJ P	Jπ: L(p,d)=2+0 from 5/2$^+$.
3883.0 *3*	@	IJ	
3929.64 *6*	(8$^+$)	G	Jπ: ΔJ=2, Q 961.9γ to (6$^+$).
3960.36[c] *4*	(9$^-$)	G	Jπ: D+Q 742.3γ to (8)$^-$; band assignment.
3973.6 *5*	(0$^+$ to 5$^+$)	IJ	Jπ: primary 5699.6γ from 2$^+$,3$^+$.
3983.0 *7*	(1$^+$ to 4$^+$)	IJ	Jπ: primary 5699.3γ from 2$^{(+)}$ and 3$^{(+)}$.
3992.13[d] *5*	10$^-$	E G L	Jπ: ΔJ=2, E2 637.5γ to 8$^-$; E2+M1 488.7γ to 9$^-$.
4000.70 *20*	@	IJ	
4049.5 *12*	@	J	
4075.93 *11*	(8,9$^-$)	G	Jπ: D(+Q) 572.4γ to 9$^-$; 936.9γ to 7$^-$.
4083.30[f] *4*	10$^+$	EFG L	Jπ: ΔJ=2, E2 1023.8γ to 8$^+$; band assignment.
4091.5 *14*	@	J	
4097.38 *6*	(9$^-$)	G	Jπ: D+Q 521.9γ to 9$^-$; 728.5γ to 7$^-$; 565.7γ from (11$^-$).
4102.9 *11*	@	J	
4148.6 *20*	@	J	
4187.6 *3*	(1$^+$ to 4$^+$)	IJ	Jπ: primary 5486.8γ from 2$^{(+)}$ and 3$^{(+)}$.
4230.56[e] *6*	11$^-$	E G L	Jπ: ΔJ=2, E2 727.3γ to 9$^-$; D+Q 238.4γ to 10$^-$.
4235.82[c] *5*	(10$^-$)	G	Jπ: D+Q 732.5γ to 9$^-$; ΔJ=2, (Q) 636.5γ to (8$^-$); band assignment.
4235.84[a] *3*	10$^{(+)}$	E G	XREF: E(4239.7). Jπ: ΔJ=2, Q 1175.8γ to 8$^+$; 152.6γ to 10$^+$; band assignment.
4248.49 *7*	(7$^-$,8,9)	G	Jπ: D+Q 893.8γ to 8$^-$; 673.1γ to 9$^-$.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{100}Ru Levels (continued)

E(level)[†]	J^{π}[‡]	XREF	Comments
4257.1 *3*	@	IJ	
4273.5 *16*	@	J	
4307.4 *10*	@	J	
4315.73[h] *4*	11^-	E G L	J^{π}: ΔJ=2, E2 740.2γ to 9^-; band assignment.
4337.6 *18*	@	J	
4343.44[b] *8*	$9^{(+)}$	G	J^{π}: ΔJ=2, Q 896.8γ to 7^+; D+Q 1079.98γ to $8^{(+)}$.
4353.36[i] *4*	(10^+)	EFG	J^{π}: ΔJ=(2), (Q) 803.3γ to $8^{(+)}$; 270.1γ to 10^+; band assignment.
4366.4 *18*	$(1^+$ to $4^+)$	J	J^{π}: primary 5306.3γ from $2^{(+)}$ and $3^{(+)}$.
4376.1 *11*	@	J	
4381.83 *8*	$(7,8,9^+)$	G	J^{π}: D+Q 1117.99γ to 8^+; 935.4γ to 7^+.
4403.6 *12*	@	J	
4408.63 *8*	$(9^-,10^-)$	G	J^{π}: 1054.0γ to 8^-; 178.1γ to 11^-.
4503.48 *4*	(10^+)	G	J^{π}: ΔJ=(2), (Q) 953.4γ to $8^{(+)}$; 419.9γ to 10^+.
4519.6 *9*	@	J	
4530 *3*	@	J	
4543.7 *18*	@	J	
4585.6 *12*	@	J	
4601.2 *12*	@	J	
4650.7 *20*	@	J	
4663.44[c] *7*	(11^-)	G	J^{π}: ΔJ=(2), (Q) 1160.1γ to 9^-; 433.0γ to 11^-; band assignment.
4791.59 *5*	$(8^+,9,10^+)$	G	J^{π}: 1731.7γ to 8^+; 708.5γ to 10^+.
4798.15[d] *5*	$12^{(-)}$	E G L	J^{π}: ΔJ=2, (E2) 806.0γ to 10^-; 567.5γ to 11^-; band assignment.
4818.58 *6*	(10^+)	G	J^{π}: ΔJ=(0), (D+Q) 582.8γ γ to $10^{(+)}$, most likely (M1+E2).
4917.97[f] *13*	12^+	EFG L	XREF: L(?). J^{π}: ΔJ=2, E2 834.95γ to 10^+; band assignment.
5010.49 *6*	$(8^+,9,10,11)$	G	J^{π}: 927.6γ to 10^+; D+Q 218.9γ to $(8^+,9,10^+)$.
5066.19[c] *6*	(12^-)	G	J^{π}: 830.4γ to $10^{(-)}$; band assignment.
5126.3 *10*	(12^+)	G L	J^{π}: 1043γ to 10^+; proposed from a band member of the g.s band in (α,2nγ); γ(θ) in (α,4nγ) give J=10,11,12.
5162.52[e] *13*	13^-	E G L	J^{π}: ΔJ=2, E2 932.2γ to 11^-; band assignment.
5274.67[h] *12*	(13^-)	E G L	J^{π}: ΔJ=2, Q 1043.8γ to 11^-; ΔJ=(2), (E2) 959.1γ to 11^-; band assignment.
5307.2[i] *5*	(12^+)	E	J^{π}: 1223.9γ to 10^+; band assignment.
5713.31[f] *14*	14^+	EFG L	XREF: L(?). J^{π}: ΔJ=2, E2 795.3γ to 12^+; band assignment.
5784.4[d] *3*	(14^-)	E	J^{π}: 986.2γ to $12^{(-)}$; band assignment.
6167.2[e] *4*	(15^-)	E	J^{π}: ΔJ=2, Q 1004.7γ to 13^-; band assignment.
6283.7[h] *6*	(15^-)	E	J^{π}: 1009.0γ to (13^-); band assignment.
6365.2[i] *7*	(14^+)	E	J^{π}: 1058.0γ to (12^+); band assignment.
6714.81[f] *18*	16^+	EF	J^{π}: ΔJ=2, E2 1001.5γ to 14^+; band assignment.
6885.1[d] *6*	(16^-)	E	J^{π}: 1100.7γ to (14^-); band assignment.
7203.7[e] *5*	(17^-)	E L	E(level): a 6202 level is proposed in (α,4nγ) to decay by the 1036.5γ. J^{π}: ΔJ=2, (E2) 1036.5γ to (15^-); band assignment.
7408.6[i] *9*	(16^+)	E	J^{π}: 1043.4γ to (14^+); band assignment.
7827.02[f] *20*	18^+	EF	J^{π}: ΔJ=2, E2 1112.2γ to 16^+; band assignment.
8018.2[d] *8*	(18^-)	E	J^{π}: 1133.1γ to (16^-); band assignment.
8450.6[i] *10*	(18^+)	E	J^{π}: 1042.0γ to (16^+); band assignment.
8458.7[e] *7*	(19^-)	E	J^{π}: 1255.0γ to (17^-); band assignment.
9057.73[f] *23*	20^+	EF	J^{π}: ΔJ=2, E2 1230.7γ to (18^+); band assignment.

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Adopted Levels, Gammas (continued)

^{100}Ru Levels (continued)

E(level)[†]	J^{π}[‡]	XREF	Comments
9178.8[d] 10	(20^-)	E	J^π: 1160.6γ to (18^-); band assignment.
(9673.32 3)	$2^+,3^+$	I	E(level): S(n)=9673.32 3 (2017Wa10). J^π: s-wave neutron capture in ^{99}Ru g.s. with $J^\pi=5/2^+$.
(9673.33 3)	$3^{(+)}$[&]	J	E(level): S(n)+E(n), where S(n)=9673.32 3 (2017Wa10), and E(n)=10.05 eV.
(9673.35 3)	$3^{(+)}$[&]	J	E(level): S(n)+E(n), where S(n)=9673.32 3 (2017Wa10), and E(n)=25.2 eV.
(9673.38 3)	$3^{(+)}$[&]	J	E(level): S(n)+E(n), where S(n)=9673.32 3 (2017Wa10), and E(n)=57.1 eV.
(9673.40 3)	$2^{(+)}$[&]	J	E(level): S(n)+E(n), where S(n)=9673.32 3 (2017Wa10), and E(n)=81.6 eV.
(9763.42 3)	$3^{(+)}$[&]	J	E(level): S(n)+E(n), where S(n)=9673.32 3 (2017Wa10), and E(n)=104 eV.
9796.7[e] 9	(21^-)	E	J^π: 1338.0γ to (19^-); band assignment.
10378.14[f] 25	22^+	EF	J^π: ΔJ=2, E2 1320.4γ to 20^+; band assignment.
10403.3[d] 11	(22^-)	E	J^π: 1224.5γ to (20^-); band assignment.
11738.5[f] 3	$24^{(+)}$	EF	J^π: ΔJ=2, (E2) 1360.4γ to 22^+; band assignment.
11746.3[d] 12	(24^-)	E	J^π: 1343.0γ to (22^-); band assignment.
13170.0[f] 3	$26^{(+)}$	EF	J^π: ΔJ=2, E2 1431.4γ to $24^{(+)}$; band assignment.
13309.3[d] 13	(26^-)	E	J^π: 1563.0γ to (24^-); band assignment.
14738.2[f] 4	$28^{(+)}$	EF	J^π: ΔJ=2, E2 1568.2γ to $26^{(+)}$; band assignment.
14933.3[d] 14	(28^-)	E	J^π: 1624.0γ to (26^-); band assignment.
14938.1[g] 5	(28^+)	E	J^π: ΔJ=2, Q 1768.1γ to $26^{(+)}$; band assignment.
16105.8[g] 5	(30^+)	E	J^π: ΔJ=2, Q 1167.7γ to (28^+); band assignment.
16648.4[f] 6	(30^+)	E	J^π: ΔJ=2, Q 1910.2γ to $28^{(+)}$; band assignment.
17740.7[g] 6	(32^+)	E	J^π: ΔJ=2, Q 1092.3γ to (30^+); band assignment.
20197.7 8		E	J^π: 2457.0γ to (32^+).

† From least-squares fit to Eγ data for levels seen in γ-ray studies. In other cases weighted averages of available level energies are taken. About 31 γ rays amongst a total of about 450 γ rays are outside 3 times the quoted standard deviation, resulting in a reduced χ^2/n=5.7, much greater than the critical value=1.2. This indicates either low uncertainties for some of the γ rays or some systematic deviations in one or more datasets. So in the fitting procedure to reduce χ^2, the uncertainties of poor-fit γ rays are increased by factors as noted for those γ rays in the γ-ray table, resulting χ^2/n=1.8.

‡ For high-spin states (J≥6), in using arguments based on available experimental data, it is assumed that the spin values increase as the excitation energy rises in reactions of the type: (HI,xnγ). This assumption is generally supported by the decay modes.

From Doppler-shift attenuation method (DSAM) in (n,n′γ) (2001Ge03), unless otherwise stated.

@ Primary γ from (3^+) suggests $J^\pi=1^+$,2,3,4,5^+; the choices 1^+ and 5^+ are less likely if there is a strong primary transition.

& From 2018MuZY evaluation.

a Band(A): g.s. band.

b Band(B): Quasi-γ band.

c Band(C): 2^- band,

d Band(D): 4^- band, α=0. Configuration=$\pi g^4_{9/2}\otimes\nu[(d_{5/2}g_{7/2})^5h_{11/2}]$, with terminating state of 28^- when fully aligned ($g_{9/2}$ protons coupled to spin 12, and $d_{5/2}g_{7/2}$ neutrons coupled to spin 21/2).

e Band(d): 3^- band, α=1. Configuration=$\pi g^4_{9/2}\otimes\nu[(d_{5/2}g_{7/2})^5h_{11/2}]$.

f Band(E): Band based on $8^{(+)}$, α=0. Configuration=$\pi(g^5_{9/2})_{25/2}\otimes\nu h_{11/2}$ coupled to one proton hole in N=3 shell, with the configuration of the terminating state of 30^+ as $\pi(g^5_{9/2})_{25/2}\otimes\nu(d_{5/2}g_{7/2})^5_{23/2}(h_{11/2})$ coupled to one proton hole in N=3 shell. The upper part of this band may have an alternate configuration=$\pi g^4_{9/2}\otimes\nu[(d^3_{5/2})(g_{7/2})(h^2_{11/2})]$, with terminating state of 30^+ when fully aligned ($g_{9/2}$ protons coupled to spin of 12, $d_{5/2}$ neutrons coupled to spin 9/2, and $h_{11/2}$ neutrons coupled to spin 10) (2000Ti07).

g Band(F): Band based on (28^+). This structure of three levels is related to band based on 8^+. Configuration of terminating state at 32+=$\pi g^4_{9/2}\otimes\nu[(d_{5/2}g_{7/2})^4h^2_{11/2}]$, ($g_{9/2}$ protons coupled to spin 12, and $d_{5/2}g_{7/2}$ neutrons coupled to spin 10, and $h_{11/2}$

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Adopted Levels, Gammas (continued)

^{100}Ru Levels (continued)

neutrons coupled to spin 10).

[h] Band(G): Band based on 9^-.

[i] Band(H): Band based on (10^+).

Adopted Levels, Gammas (continued)

$\gamma(^{100}\mathrm{Ru})$

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[f]	δ[f]	α[g]	$I_{(\gamma+ce)}$	Comments
539.5103	2^+	539.509 *2*	100	0.0	0^+	E2		0.00428		B(E2)(W.u.)=35.7 *3* E_γ: weighted average of 539.512 *5* from ^{100}Rh ε decay (20.8 h) and 539.508 *2* from (n,γ) E=th. Others: 539.52 *11* from ^{100}Tc β^- decay (15.46 s), 539.7 *1* from (^{36}S,α2nγ), 539.509 *14* from (α,2nγ), 539.7 *3* from (α,4nγ), 539.506 *18* from (n,n$'\gamma$), and 539.6 *1* from Coulomb excitation. Mult.: from ce data in ^{100}Rh ε decay (20.8 h), γ(DCO) in (^{36}S,α2nγ) and (^{34}S,2α2nγ), $\gamma(\theta)$ in (α,2nγ) and (n,n$'\gamma$).
1130.305	0^+	590.786 *11*	100	539.5103	2^+	E2		0.00332		B(E2)(W.u.)=35 *5* E_γ: weighted average of 590.792 *6* from ^{100}Rh ε decay (20.8 h), 590.844 *20* from (α,2nγ), 590.765 *9* from (n,γ) E=th, and 590.774 *20* from (n,n$'\gamma$). Others: 590.77 *10* from ^{100}Tc β^- decay (15.46 s) and 590.8 *5* from Coulomb excitation. Mult.: M1,E2 from ce data and Q from $\gamma\gamma(\theta)$ in ^{100}Rh ε decay (20.8 h).
		1130.3 *3*		0.0	0^+	E0			0.038 *3*	E_γ,Mult.: from ce data in ^{100}Rh ε decay (20.8 h). q^2_K(E0/E2)=0.098 *9*, X(E0/E2)=0.0104 *9*, ρ^2(E0)=0.0103 *18* (2005Ki02, evaluation). B(E0)(Wilkinson units)=0.048 *8*.
1226.467	4^+	686.972 *7*	100	539.5103	2^+	E2		0.00221		B(E2)(W.u.)=52 *4* E_γ: weighted average of 686.971 *7* from ^{100}Rh ε decay (20.8 h), 686.973 *17* from (α,2nγ), 686.972 *3* from (n,γ) E=th, and 686.963 *17* from (n,n$'\gamma$). Others: 687.5 *1* from (^{36}S,α2nγ), 687.4 *3* from (α,4nγ), and 686.9 *5* from Coulomb excitation. Mult.: M1,E2 from ce data and Q from $\gamma\gamma(\theta)$ in ^{100}Rh ε decay (20.8 h); also from γ(DCO) and γ(pol) in (^{36}S,α2nγ), γ(DCO) in (^{34}S,2α2nγ), $\gamma(\theta)$ in (α,2nγ), (α,4nγ) an d(n,n$'\gamma$).
1362.166	2^+	822.646 *9*	100.0 *5*	539.5103	2^+	E2+M1	+3.7 *3*	0.0014		B(M1)(W.u.)=0.0016 *+5−4*; B(E2)(W.u.)=31 *6* α(K)=0.001230 *17*; α(L)=0.0001439 *20*; α(M)=2.64×10^{-5} *4* α(N)=4.25×10^{-6} *6*; α(O)=2.185×10^{-7} *31* E_γ: weighted average of 822.6 *1* from ^{100}Tc β^- decay (15.46 s), 822.654 *7* from ^{100}Rh ε decay (20.8 h), 822.666 *17* from (α,2nγ), 822.614 *10* from (n,γ) E=th, 822.672 *16* from (n,n$'\gamma$), and 822.5 *2* from Coulomb excitation. I_γ: from (n,n$'\gamma$). Others: 100.0 *10* from ^{100}Rh ε decay (20.8 h), 100.0 *12* from (α,2nγ), 100 *4* from (n,γ) E=th. Mult.: from ce data and $\gamma\gamma(\theta)$ in ^{100}Rh ε decay (20.8 h) and $\gamma(\theta)$ in (n,n$'\gamma$), 100 *8* from (n,γ) E=res. δ: weighted average of +3.7 *3* (2001Ge03) from $\gamma(\theta)$ in

From ENSDF

$^{100}_{44}\mathrm{Ru}_{56}$-10

$\gamma(^{100}Ru)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[f]	α[g]	$I_{(\gamma+ce)}$	Comments
									(n,n′γ), +3.2 *8* (1978Ba29) and 3.7 *4* (1990KeZV) from γγ(θ) in ^{100}Rh ε decay (20.8 h).
1362.166	2^+	1362.157 *10*	73.1 *2*	0.0	0^+	E2			B(E2)(W.u.)=2.0 *4* E_γ: weighted average of 1362.152 *10* from ^{100}Rh ε decay (20.8 h), 1362.172 *23* from (α,2nγ), 1362.17 *3* from (n,γ) E=th, and 1362.160 *21* from (n,n′γ). Others: 1362.2 *1* from ^{100}Tc β^- decay (15.46 s) and 1362.1 *2* from Coulomb excitation. I_γ: weighted average of 72.95 *23* from ^{100}Rh ε decay (20.8 h), 73.3 *12* from (α,2nγ), and 73.6 *5* from (n,n′γ). Others: 68 *4* from (n,γ) E=th; 52 *5* in Coulomb excitation, 95 *3* in ^{100}Tc β^- decay and 112 *11* in (n,γ) E=res are in disagreement. Mult.: from ce data and γγ(θ) in ^{100}Rh ε decay (20.8 h) and γ(θ) in (α,2nγ) and (n,n′γ).
1741.011	0^+	378.90 *5*	75.4 *13*	1362.166	2^+	E2	0.01250		α(K)=0.01081 *16*; α(L)=0.001388 *20*; α(M)=0.000255 *4* α(N)=4.05×10^{-5} *6*; α(O)=1.85×10^{-6} *3* E_γ: weighted average of 378.7 *1* from ^{100}Tc β^- decay (15.46 s), 378.79 *5* from ^{100}Rh ε decay (20.8 h), 378.81 *11* from (α,2nγ), 379.10 *10* from (n,γ) E=th, and 378.94 *3* from (n,n′γ). I_γ: weighted average of 85 *6* from ^{100}Tc β^- decay (15.46 s), 75.1 *11* from (n,n′γ), and 69 *12* from ^{100}Rh ε decay (20.8 h). Others: 130 *18* in (n,γ) E=th; 220 *20* in (α,2nγ) are in disagreement. Mult.: from ce data and γγ(θ) in ^{100}Rh ε decay (20.8 h).
		610.48 *10*		1130.305	0^+	E0		0.08 *4*	E_γ,Mult.: from ce data in ^{100}Rh ε decay (20.8 h). q^2_K(E0/E2)=0.9 *5*, X(E0/E2)=1.1 *6*, ρ^2(E0)<0.090 (2005Ki02, evaluation).
		1201.503 *16*	100.0 *11*	539.5103	2^+	(E2)			E_γ: weighted average of 1201.493 *16* from ^{100}Rh ε decay (20.8 h) and 1201.54 *3* from (n,n′γ). Others: 1201.5 *1* from ^{100}Tc β^- decay (15.46 s), 1201.4 *3* from (α,2nγ), and 1201.44 *14* from (n,γ) E=th. I_γ: from (n,n′γ). Others: 100 *4* from ^{100}Tc β^- decay (15.46 s), 100.0 *21* from ^{100}Rh ε decay (20.8 h), 100 *17* from (α,2nγ), 100 *18* from (n,γ) E=th. Mult.: (Q) from γγ(θ) in ^{100}Rh ε decay (20.8 h); polarity from no level-parity change.
		1740.6 *2*		0.0	0^+	E0		0.16 *3*	E_γ,Mult.: from ce data in ^{100}Rh ε decay (20.8 h). q^2_K(E0/E2)=1.6 *9*, X(E0/E2)=0.6 *3*, ρ^2(E0)<0.048 (2005Ki02, evaluation).
1865.110	2^+	502.905 *23*	14.1 *5*	1362.166	2^+	M1,E2	0.0049 *4*		E_γ: weighted average of 502.907 *18* from ^{100}Rh ε decay (20.8 h), 502.7 *3* from (α,2nγ), 503.09 *10* from (n,γ) E=th, and 502.83 *6* from (n,n′γ). I_γ: weighted average of 16.0 *14* from ^{100}Rh ε decay (20.8 h), 21 *8* from (α,2nγ), 19.8 *28* from (n,γ) E=th, and 13.9 *3* from (n,n′γ). Mult.: from ce data in ^{100}Rh ε decay (20.8 h).

$^{100}_{44}Ru_{56}$-11

$\gamma(^{100}Ru)$ (continued)

E_i(level)	J^{π}_i	E_γ†	I_γ†	E_f	J^{π}_f	Mult.f	δf	αg	Comments
1865.110	2^+	638.631 *20*	18 *3*	1226.467	4^+	E2		0.00268	B(E2)(W.u.)=17 *5* α(K)=0.002340 *33*; α(L)=0.000281 *4*; α(M)=5.15×10^{-5} *7* α(N)=8.27×10^{-6} *12*; α(O)=4.12×10^{-7} *6* E_γ: weighted average of 638.619 *14* from ^{100}Rh ε decay (20.8 h), 638.81 *13* from (α,2nγ), 638.70 *7* from (n,γ) E=th, and 638.72 *5* from (n,n′γ). I_γ: unweighted average of 14.2 *5* from ^{100}Rh ε decay (20.8 h), 21 *4* from (α,2nγ), 25 *3* from (n,γ) E=th, and 13.0 *3* from (n,n′γ). Mult.: M1,E2 from ce data in ^{100}Rh ε decay (20.8 h); ΔJ=2 requires E2.
		734.798 *7*	77.6 *9*	1130.305	0^+	E2		0.00186	B(E2)(W.u.)=37 *+8−9* α(K)=0.001623 *23*; α(L)=0.0001921 *27*; α(M)=3.52×10^{-5} *5* α(N)=5.67×10^{-6} *8*; α(O)=2.87×10^{-7} *4* E_γ: weighted average of 734.806 *7* from ^{100}Rh ε decay (20.8 h), 734.789 *7* from (n,γ) E=th, and 734.810 *21* from (n,n′γ). Others: 734.8 *3* from ^{100}Tc β^- decay (15.46 s) and 734.84 *8* from (α,2nγ). I_γ: weighted average of 76.8 *7* from ^{100}Rh ε decay (20.8 h), 78.3 *6* from (n,n′γ), and 69 *4* from (α,2nγ). Others: 114 *14* in ^{100}Tc β^-; 118 *3* in (n,γ) E=th, 104 *5* in (n,γ) E=res are in disagreement. Mult.: M1,E2 from ce data in ^{100}Rh ε decay (20.8 h); ΔJ=2 requires E2.
		1325.590 *17*	100.0 *7*	539.5103	2^+	M1+E2	−1.0 *3*		B(M1)(W.u.)=0.0023 *+10−8*; B(E2)(W.u.)=1.24 *+43−53* E_γ: weighted average of 1325.8 *5* from ^{100}Tc β^- decay (15.46 s), 1325.583 *13* from ^{100}Rh ε decay (20.8 h), 1325.56 *7* from (α,2nγ), 1325.45 *6* from (n,γ) E=th, and 1325.633 *22* from (n,n′γ). I_γ: from (n,n′γ). Others: 100.0 *10* from ^{100}Rh ε decay (20.8 h), 100 *4* from (α,2nγ), 100 *13* from (n,γ) E=th, 100 *7* from (n,γ) E=res, 100 *33* from ^{100}Tc β^- decay. Mult.: from ce data and γγ(θ) in ^{100}Rh ε decay (20.8 h) and γ(θ) in (n,n′γ). δ: from γ(θ) in (n,n′γ), −2.5 *9* is also possible. Other: −1.6 *+14−7* from γγ(θ) in ^{100}Rh ε decay (20.8 h).
		1865.06 *6*	95.9 *12*	0.0	0^+	E2			B(E2)(W.u.)=0.43 *10* E_γ: weighted average of 1864.9 *2* from ^{100}Tc β^- decay (15.46 s), 1865.12 *15* from ^{100}Rh ε decay (20.8 h), 1865.12 *9* from (α,2nγ), 1865.04 *6* from (n,γ) E=th, and 1865.07 *6* from (n,n′γ). I_γ: weighted average of 93 *7* from ^{100}Tc β^- decay (15.46 s), 90 *4* from (α,2nγ), and 96.4 *12* from (n,n′γ), 109 *13* from (n,γ) E=th, and 109 *23* from (n,γ) E=res. Other: 63 *6* in ^{100}Rh ε decay (20.8 h) is in disagreement. Mult.: Q from γ(θ) in (n,n′γ); M2 ruled out by RUL.

From ENSDF

$^{100}_{44}Ru_{56}$-12

$\gamma(^{100}$Ru) (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.f	δf	αg	Comments
1881.043	3^+	518.881 *8*	16.9 *4*	1362.166	2^+	M1+E2	+0.37 *7*	0.00432 *7*	B(M1)(W.u.)=0.020 *+7−6*; B(E2)(W.u.)=9.6 *+46−41* α(K)=0.00379 *6*; α(L)=0.000441 *7*; α(M)=8.08×10^{-5} *13* α(N)=1.307×10^{-5} *21*; α(O)=6.87×10^{-7} *10* E_γ: weighted average of 518.882 *5* from ^{100}Rh ε decay (20.8 h), 518.88 *6* from (α,2nγ), 519.11 *13* from (n,γ) E=th, and 518.82 *3* from (n,n′γ). I_γ: weighted average of 17.2 *2* from ^{100}Rh ε decay (20.8 h), 14.2 *13* from (α,2nγ), 22 *4* from (n,γ) E=th, and 16.1 *4* from (n,n′γ). Other: 86 *4* in (n,γ) E=res is in disagreement. Mult.: from ce data and $\gamma\gamma(\theta)$ in ^{100}Rh ε decay (20.8 h) and $\gamma(\theta)$ in (n,n′γ) and (α,2nγ). δ: weighted average of +0.36 *8* from (n,n′γ) and +0.38 *6* from (α,2nγ).
		654.574 *6*	12.1 *9*	1226.467	4^+	M1+E2	+2.3 *5*	0.00250	B(M1)(W.u.)=0.0013 *+8−5*; B(E2)(W.u.)=15 *5* α(K)=0.002188 *31*; α(L)=0.000260 *4*; α(M)=4.77×10^{-5} *7* α(N)=7.67×10^{-6} *11*; α(O)=3.87×10^{-7} *5* E_γ: weighted average of 654.571 *6* from ^{100}Rh ε decay (20.8 h), 654.587 *17* from (n,γ) E=th, and 654.60 *3* from (n,n′γ). Other: 654.78 *5* from (α,2nγ). I_γ: unweighted average of 10.5 *1* from ^{100}Rh ε decay (20.8 h), 12.7 *5* from (α,2nγ), 14.2 *8* from (n,γ) E=th, and 10.9 *3* from (n,n′γ). Other: 116 *31* in (n,γ) E=res is in disagreement. Mult.,δ: ce data in ^{100}Rh ε decay (20.8 h) gives mult=M1,E2; mixing ratio is weighted average of +3.2 *6* from $\gamma(\theta)$ in (n,n′γ) and +2.1 *3* from $\gamma(\theta)$ in (α,2nγ).
		1341.548 *21*	100.0 *6*	539.5103	2^+	M1+E2	+5.7 *5*		B(M1)(W.u.)=0.00023 *+9−8*; B(E2)(W.u.)=3.9 *+13−12* E_γ: unweighted average of 1341.515 *9* from ^{100}Rh ε decay (20.8 h), 1341.601 *18* from (α,2nγ), 1341.560 *9* from (n,γ) E=th, and 1341.515 *22* from (n,n′γ). I_γ: from (n,γ) E=th. Others: 100.0 *10* from ^{100}Rh ε decay (20.8 h), 100.0 *13* from (α,2nγ), and 100.0 *8* from (n,n′γ), 100 *16* from (n,γ) E=res. Mult.: from ce data and $\gamma\gamma(\theta)$ in ^{100}Rh ε decay (20.8 h), $\gamma(\theta)$ in (α,2nγ) and (n,n′γ). δ: weighted average of +6.7 *12* in (n,n′γ) and +5.5 *5* in (α,2nγ). Others: ce data give δ=4.4 +∞*−21* and $\gamma\gamma(\theta)$ gives δ=6.8 *+13−19*; +0.37 *10* also from (n,n′γ) and +0.35 *2* also from (α,2nγ).
2051.661	0^+	689.491 *5*	14.2 *19*	1362.166	2^+	[E2]		0.00219	B(E2)(W.u.)=16 *+11−8* α(K)=0.001912 *27*; α(L)=0.0002276 *32*; α(M)=4.17×10^{-5} *6* α(N)=6.71×10^{-6} *9*; α(O)=3.37×10^{-7} *5*

$^{100}_{44}$Ru$_{56}$-13

γ(^{100}Ru) (continued)

E_i(level)	J^{π}_i	E_{γ}[†]	I_{γ}[†]	E_f	J^{π}_f	Mult.[f]	δ[f]	α[g]	Comments
									E_{γ}: from ^{100}Rh ε decay (20.8 h). Others: 689.2 *1* from ^{100}Tc β^- decay (15.46 s), and 689.46 *9* from (n,n′γ). I_{γ}: unweighted average of 12.3 *4* from ^{100}Tc β^- decay (15.46 s) and 16.0 *12* from ^{100}Rh ε decay (20.8 h).
2051.661	0^+	1512.134 *16*	100.0 *13*	539.5103	2^+	E2			B(E2)(W.u.)=2.3 *+15−11* E_{γ}: weighted average of 1512.1 *1* from ^{100}Tc β^- decay (15.46 s), 1512.140 *16* from ^{100}Rh ε decay (20.8 h), 1512.01 *8* from (n,γ) E=th, and 1512.13 *4* from (n,n′γ). Other: 1512.10 *22* from (α,2nγ). I_{γ}: from ^{100}Rh ε decay (20.8 h). Others: 100 *15* from ^{100}Tc β^- decay (15.46 s). Mult.: Q from $\gamma\gamma(\theta)$ in ^{100}Tc β^- decay (15.46 s) and ^{100}Rh ε decay (20.8 h); M2 ruled out by RUL.
2062.651	4^+	700.51 *5*	44.9 *13*	1362.166	2^+	E2		0.0021	B(E2)(W.u.)=41 *+27−21* α(K)=0.001835 *26*; α(L)=0.0002181 *31*; α(M)=4.00×10^{-5} *6* α(N)=6.43×10^{-6} *9*; α(O)=3.24×10^{-7} *5* E_{γ}: weighted average of 700.52 *6* from (n,γ) E=th and 700.51 *5* from (n,n′γ). Other: 700.7 *6* from (α,2nγ). I_{γ}: weighted average of 47 *3* from (α,2nγ), 44.5 *8* from (n,n′γ), 60 *7* from (n,γ) E=th, and 88 *24* from (n,γ) E=res. Other: 200 *18* in ^{100}Rh ε decay (4.6 min) is in disagreement. Mult.: Q from $\gamma(\theta)$ in (α,2nγ); M2 ruled out by RUL.
		836.181 *4*	95 *6*	1226.467	4^+	M1+E2	+1.73 *21*	0.00136	B(M1)(W.u.)=0.007 *+5−4*; B(E2)(W.u.)=27 *+18−14* α(K)=0.001194 *17*; α(L)=0.0001389 *20*; α(M)=2.54×10^{-5} *4* α(N)=4.11×10^{-6} *6*; α(O)=2.132×10^{-7} *31* E_{γ}: weighted average of 836.187 *23* from (α,2nγ), 836.180 *3* from (n,γ) E=th, and 836.24 *3* from (n,n′γ). I_{γ}: unweighted average of 87.6 *18* from (α,2nγ), 104 *2* from (n,γ) E=th, 96 *12* from E=res. Other: 188 *18* in ^{100}Rh ε decay (4.6 min); 52.4 *2* in (n,n′γ) are in disagreement. Mult.: D+Q from $\gamma(\theta)$ in (n,n′γ) and (α,2nγ); M2 ruled out by RUL. δ: weighted average of +1.5 *3* from $\gamma(\theta)$ in (n,n′γ) and +1.85 *21* from $\gamma(\theta)$ from (α,2nγ).
		1523.14 *5*	100.0 *14*	539.5103	2^+	E2			B(E2)(W.u.)=1.9 *+13−10* E_{γ}: unweighted average of 1523.199 *24* from (α,2nγ), 1523.07 *3* from (n,γ) E=th, and 1523.08 *6* from (n,n′γ). I_{γ}: from (n,n′γ). Others: 100 *13* from ^{100}Rh ε decay (4.6 min), 100.0 *15* from (α,2nγ), 100 *5* from (n,γ) E=th, 100 *48* from (n,γ) E=res. Mult.: Q from $\gamma(\theta)$ in (n,n′γ) and (α,2nγ); M2 ruled out by RUL.
2075.675	6^+	849.22 *2*	100	1226.467	4^+	E2			E_{γ}: unweighted average of 849.241 *15* from (α,2nγ), and 849.188 *7*

$\gamma(^{100}$Ru) (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.[f]	α[g]	Comments
								from (n,γ) E=th, and 849.241 *15* from (n,n′γ). Others: 849.9 *1* from (^{36}S,α2nγ), 849.9 *3* from (α,4nγ). Mult.: from γ(DCO) and γ(lin pol) in (^{36}S,α2nγ), ce data and γ(θ) in (α,4nγ), γ(θ) in (α,2nγ), γ(DCO) in (^{34}S,2α2nγ).
2099.103	2⁺	234.0[@i] *5*	0.19[@] *7*	1865.110	2⁺			
		358.080[‡] *9*	3.9[‡] *4*	1741.011	0⁺	[E2]	0.015	B(E2)(W.u.)=2.7×10^{2} *+6−5* α(K)=0.01295 *18*; α(L)=0.001677 *23*; α(M)=0.000309 *4* α(N)=4.89×10^{-5} *7*; α(O)=2.204×10^{-6} *31*
		736.99 *4*	13.17 *13*	1362.166	2⁺	(M1,E2)		E_γ: weighted average of 736.966 *20* from ^{100}Rh ε decay (20.8 h), 736.93 *18* from (α,2nγ), 737.20 *13* from (n,γ) E=th, and 737.15 *6* from (n,n′γ). I_γ: weighted average of 13.16 *13* from ^{100}Rh ε decay (20.8 h), 13.2 *7* from (n,n′γ), and 17 *3* from (n,γ) E=th. Others: 57 *9* in (α,2nγ); 89 *20* in (n,γ) E=res are in disagreement. Mult.: from ce data in ^{100}Rh ε decay (20.8 h).
		872.67 *5*	2.3 *6*	1226.467	4⁺	[E2]	0.00121	B(E2)(W.u.)=1.9 *+6−5* α(K)=0.001063 *15*; α(L)=0.0001241 *17*; α(M)=2.274×10^{-5} *32* α(N)=3.67×10^{-6} *5*; α(O)=1.888×10^{-7} *26* E_γ: weighted average of 872.62 *5* from ^{100}Rh ε decay (20.8 h), 872.71 *5* from (n,γ) E=th, and 872.67 *16* from (n,n′γ). I_γ: unweighted average of 2.10 *24* from ^{100}Rh ε decay (20.8 h), 3.6 *3* from (n,γ) E=th, and 1.59 *25* from (n,n′γ).
		968.83 *3*	4.0 *8*	1130.305	0⁺	[E2]		B(E2)(W.u.)=1.9 *5* E_γ: weighted average of 968.85 *3* from ^{100}Rh ε decay (20.8 h), 968.80 *5* from (n,γ) E=th, and 968.68 *10* from (n,n′γ). Other: 969.2 *5* from (α,2nγ). I_γ: unweighted average of 3.95 *24* from ^{100}Rh ε decay (20.8 h), 6.4 *4* from (n,γ) E=th, and 3.18 *25* from (n,n′γ). Other: 22 *13* in (α,2nγ) is in severe disagreement.
		1559.54 *3*	100.0 *9*	539.5103	2⁺	M1		B(M1)(W.u.)=0.0117 *+21−18* E_γ: weighted average of 1558.9 *3* from ^{100}Tc β^- decay (15.46 s), 1559.554 *21* from ^{100}Rh ε decay (20.8 h), 1560.1 *6* from (α,2nγ), 1559.37 *6* from (n,γ) E=th, and 1559.56 *3* from (n,n′γ). I_γ: from (n,n′γ). Others: 100.0 *10* from ^{100}Rh ε decay (20.8 h), 100 *9* from ^{100}Tc β^- decay (15.46 s), 100 *13* from (α,2nγ), 100 *12* from (n,γ) E=th, and 100 *23* from (n,γ) E=res. Mult.: from ce data in ^{100}Rh ε decay (20.8 h).
		2099.14 *7*	4.0 *4*	0.0	0⁺	[E2]		B(E2)(W.u.)=0.040 *+9−7* E_γ: weighted average of 2099.16 *7* from ^{100}Rh ε decay (20.8 h), 2099.4 *5* from (n,γ) E=th, and 2099.03 *15* from (n,n′γ). I_γ: weighted average of 3.3 *4* from ^{100}Rh ε decay (20.8 h), 10 *4* from (n,γ) E=th, and 4.28 *25* from (n,n′γ).

$^{100}_{44}$Ru$_{56}$-15

$\gamma(^{100}Ru)$ (continued)

E_i(level)	J^π_i	E_γ [†]	I_γ [†]	E_f	J^π_f	Mult. [f]	δ [f]	α [g]	Comments
2166.879	3^-	301.769 *3*	12.67 *24*	1865.110	2^+	(E1(+M2))	+0.04 *3*	0.00620 *23*	B(E1)(W.u.)=3.5×10^{-5} *10*; B(M2)(W.u.)=2.8 *+63−22* α(K)=0.00544 *20*; α(L)=0.000626 *26*; α(M)=0.000114 *5* α(N)=1.84×10^{-5} *8*; α(O)=9.4×10^{-7} *4* E_γ: weighted average of 301.771 *8* from ^{100}Rh ε decay (20.8 h), 301.769 *1* from (n,γ) E=th. Others: 301.63 *3* from (α,2nγ), 301.82 *3* from (n,n′γ). I_γ: weighted average of 12.7 *9* from ^{100}Rh ε decay (20.8 h), 13.5 *12* from (α,2nγ), and 12.63 *24* from (n,n′γ). Other: 21.8 *4* in (n,γ) E=th is in disagreement. Mult.: D(+Q) from $\gamma(\theta)$ in (n,n′γ) and (α,2nγ); polarity from level-parity change. δ: weighted average of +0.04 *4* from $\gamma(\theta)$ in (n,n′γ) and +0.03 *6* from $\gamma(\theta)$ in (α,2nγ).
		804.85 *12*	2.2 *13*	1362.166	2^+	[E1]			B(E1)(W.u.)=3.2×10^{-7} *+22−17* E_γ: unweighted average of 804.73 *8* from ^{100}Rh ε decay (20.8 h) and 804.96 *7* from (n,γ) E=th. I_γ: unweighted average of 0.93 *9* from ^{100}Rh ε decay (20.8 h) and 3.5 *4* from (n,γ) E=th.
		940.75 [‡d] *8*	2.2 [‡] *4*	1226.467	4^+	[E1]			B(E1)(W.u.)=2.0×10^{-7} *+7−6*
		1627.36 *3*	100.0 *5*	539.5103	2^+	E1			B(E1)(W.u.)=1.7×10^{-6} *5* E_γ: weighted average of 1627.340 *11* from ^{100}Rh ε decay (20.8 h), 1627.462 *22* from (α,2nγ), 1627.35 *4* from (n,γ) E=th, 1627.34 *4* from (n,n′γ), and 1626.4 *5* from Coulomb excitation. I_γ: from ^{100}Rh ε decay (20.8 h). Others: 100.0 *15* from (α,2nγ), 100.0 *7* from (n,γ) E=th, and 100.0 *10* from (n,n′γ). Mult.: from ce data and $\gamma\gamma(\theta)$ in ^{100}Rh ε decay (20.8 h). δ(M2/E1)=−0.008 *24* in (n,n′γ), +0.02 *3* in (α,2nγ).
		2166.81 *4*	5.9 *7*	0.0	0^+	(E3)			B(E3)(W.u.)=13 *4* E_γ: weighted average of 2166.80 *3* from ^{100}Rh ε decay (20.8 h), 2166.65 *16* from (α,2nγ), 2166.94 *7* from (n,γ) E=th, and 2166.61 *21* from (n,n′γ). I_γ: unweighted average of 4.98 *25* from ^{100}Rh ε decay (20.8 h), 7.3 *8* from (α,2nγ), and 5.4 *4* from (n,n′γ). Other: 10.9 *13* from (n,γ) E=th, is in severe disagreement. Mult.: (O) from $\gamma(\theta)$ in (n,n′γ); polarity from level-parity change.
2240.804	2^+	375.686 *8*	3.1 *15*	1865.110	2^+				E_γ: from (n,γ) E=th. Other: 375.73 *9* from (n,n′γ). I_γ: unweighted average of 4.6 *3* from (n,γ) E=th and 1.6 *3* from (n,n′γ).
		499.8 [i]	≈50	1741.011	0^+	[E2]		0.00535	B(E2)(W.u.)=2.1 *10*

$^{100}_{44}Ru_{56}$-16

$\gamma(^{100}Ru)$ (continued)

E_i(level)	J_i^π	E_γ [†]	I_γ [†]	E_f	J_f^π	Mult. [f]	δ [f]	α [g]	Comments
									α(K)=0.00465 *7*; α(L)=0.000574 *8*; α(M)=0.0001054 *15* α(N)=1.684×10^{-5} *24*; α(O)=8.09×10^{-7} *11* E_γ: from ^{100}Tc β^- decay only.
2240.804	2^+	878.55[‡] *9*	2.4[‡] *3*	1362.166	2^+				
		1013.69[‡c] *7*	25[‡] *3*	1226.467	4^+	[E2]			B(E2)(W.u.)=0.030 *+6−5*
		1110.66[@i] *11*	8.3[@] *21*	1130.305	0^+	[E2]			B(E2)(W.u.)=0.0064 *+19−18* Placement is questioned (by evaluators) since with reported intensity of ≈8% in ^{100}Rh ε decay, this γ should have been seen in (n,γ) E=th.
		1701.292 *21*	100.0 *3*	539.5103	2^+	(M1)			B(M1)(W.u.)=2.84×10^{-5} *+46−39* E_γ: weighted average of 1701.0 *10* from ^{100}Tc β^- decay (15.46 s), 1701.310 *18* from ^{100}Rh ε decay (20.8 h), 1701.30 *15* from (α,2nγ), 1701.14 *6* from (n,γ) E=th, and 1701.28 *3* from (n,n′γ). I_γ: from (n,n′γ). Others: 100.0 *16* from ^{100}Rh ε decay (20.8 h), 100 *12* from (n,γ) E=th. Mult.: D from $\gamma(\theta)$ in (α,2nγ), δ(Q/D)=−0.014 *50* from $\gamma(\theta)$ in (n,n′γ), δ(Q/D)=0.12 *40* from $\gamma\gamma(\theta)$ in ^{100}Rh ε decay (20.8 h); polarity from no level-parity change.
		2240.1[@i] *5*	0.7[@] *6*	0.0	0^+	[E2]			B(E2)(W.u.)=1.6×10^{-5} *+16−9*
2313.5	(3^-,4^+)	951.5[#] *5*	24[#] *14*	1362.166	2^+				
		1087.1[#] *5*	33[#] *14*	1226.467	4^+				
		1773.8[#] *5*	100[#] *14*	539.5103	2^+				
2324.6	(3^- to 6^+)	262.3[#] *5*	100[#] *16*	2062.651	4^+				
		1097.8[#] *5*	24[#] *8*	1226.467	4^+				
2351.240	4^+	470.188[‡] *17*	2.31[‡] *23*	1881.043	3^+				
		486.121[‡] *5*	7.5[‡] *4*	1865.110	2^+	[E2]		0.0058	B(E2)(W.u.)=77 *+32−29* α(K)=0.00505 *7*; α(L)=0.000624 *9*; α(M)=0.0001147 *16* α(N)=1.832×10^{-5} *26*; α(O)=8.77×10^{-7} *12*
		1124.770 *8*	100.0 *18*	1226.467	4^+	M1+E2	−0.36 *5*		B(M1)(W.u.)=0.019 *7*; B(E2)(W.u.)=1.8 *+9−8* E_γ: weighted average of 1124.84 *3* from (α,2nγ), 1124.768 *5* from (n,γ) E=th, and 1124.77 *3* from (n,n′γ). I_γ: from (n,n′γ). Others: 100 *3* from (α,2nγ), 100 *5* from (n,γ) E=th, and 100 *30* from (n,γ) E=res. Mult.,δ: D+Q from $\gamma(\theta)$ in (n,n′γ); M2 ruled out by RUL.
		1811.63 *8*	64.5 *22*	539.5103	2^+	E2			B(E2)(W.u.)=0.9 *4* E_γ: weighted average of 1811.79 *8* from (α,2nγ), 1811.53 *6* from (n,γ) E=th, and 1811.66 *8* from (n,n′γ). I_γ: weighted average of 62 *3* from (α,2nγ), 52 *6* from (n,γ) E=th, 81 *25* from (n,γ) E=res, and 66.4 *18* from

$\gamma(^{100}Ru)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[f]	α[g]	Comments
								(n,n′γ). Mult.: Q from γ(θ) in (n,n′γ); M2 ruled out by RUL.
2366.588	4^+	485.547[‡] *15*	3.5[‡] *5*	1881.043	3^+			
		1139.91[e] *6*	14.3 *24*	1226.467	4^+			E_γ: weighted average of 1139.8 *7* from (α,2nγ), 1139.96 *7* from (n,γ) E=th, and 1139.88 *6* from (n,n′γ). level-energy difference=1140.12. I_γ: unweighted average of 15.0 *13* from ^{100}Rh ε decay (4.6 min), 8 *7* from (α,2nγ), 14.4 *18* from (n,γ) E=th, and 19.8 *7* from (n,n′γ).
		1827.13 *4*	100.0 *7*	539.5103	2^+	E2		B(E2)(W.u.)=1.1 *+6−5* E_γ: weighted average of 1827.13 *5* from (α,2nγ), 1827.16 *4* from (n,γ) E=th, and 1827.04 *6* from (n,n′γ). I_γ: from (n,n′γ). Others: 100.0 *25* from (α,2nγ), 100 *8* from ^{100}Rh ε decay (4.6 min) and 100 *8* from (n,γ) E=th. Mult.: Q from γ(θ) in (α,2nγ) and (n,n′γ); M2 ruled out by RUL.
2387.22	0^+	288.81[‡i] *10*	360[‡] *60*	2099.103	2^+	[E2]	0.0305	α(K)=0.0262 *4*; α(L)=0.00354 *5*; α(M)=0.000653 *9* α(N)=0.0001028 *14*; α(O)=4.38×10^{-6} *6* E_γ: level-energy difference=288.28.
		1025.13 *17*	100 *2*	1362.166	2^+	[E2]		E_γ: unweighted average of 1024.9 *1* from ^{100}Tc β^- decay (15.46 s), 1024.98 *3* from ^{100}Rh ε decay (20.8 h), 1025.62 *9* from (n,γ) E=th, and 1025.00 *5* from (n,n′γ). I_γ: from (n,n′γ). Other: 100 *22* from (n,γ) E=th, 100 *4* from ^{100}Rh ε decay (20.8 h), 100 *4* from ^{100}Tc β^- decay (15.46).
		1847.68 *7*	78 *4*	539.5103	2^+	[E2]		E_γ: weighted average of 1847.6 *2* from ^{100}Tc β^- decay (15.46 s), 1847.57 *8* from ^{100}Rh ε decay (20.8 h), 1847.76 *7* from (n,γ) E=th, and 1847.73 *11* from (n,n′γ). I_γ: unweighted average of 76 *9* from ^{100}Tc β^- decay (15.46 s), 102 *8* from ^{100}Rh ε decay (20.8 h), and 76.7 *20* from (n,n′γ). Other: 200 *22* in (n,γ) E=th is in disagreement.
2413.86	(4^+)	1051.68 *14*	14.1 *23*	1362.166	2^+	[E2]		B(E2)(W.u.)=23 *5* E_γ: unweighted average of 1051.51 *6* from (α,2nγ), 1051.57 *7* from (n,γ) E=th, and 1051.96 *7* from (n,n′γ). I_γ: unweighted average of 9.5 *10* from (n,γ) E=th and 15.2 *5* from (n,n′γ). Other: 312 *19* from (α,2nγ) is in severe disagreement.
		1874.38 *17*	100.0 *5*	539.5103	2^+	(E2)		B(E2)(W.u.)=8.9 *7* E_γ: unweighted average of 1874.70 *23* from (α,2nγ), 1874.15 *5* from (n,γ) E=th, and 1874.29 *6* from (n,n′γ). I_γ: from (n,n′γ). Others: 100 *13* from (α,2nγ), 100 *15* from (n,γ) E=th. Mult.: (Q), ΔJ=2 from γ(θ) in (n,n′γ); ΔJ=0 is also possible; M2 ruled out by RUL.
2469.389	2^-	228.581[@] *8*	1.07[@] *1*	2240.804	2^+	E1	0.01306	α(K)=0.01146 *16*; α(L)=0.001322 *19*; α(M)=0.000241 *4* α(N)=3.87×10^{-5} *6*; α(O)=1.94×10^{-6} *3* B(E1)(W.u.)=0.00027 *+16−13* Mult.: from α(K)exp in ^{100}Rh ε decay (20.8 h).

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$\gamma(^{100}\mathrm{Ru})$ (continued)

E_i(level)	E_γ [†]	I_γ [†]	E_f	J^π_f	Mult. [f]	δ [f]	α [g]	Comments
2469.389	302.512 *7*	5.34 *11*	2166.879	3^-	M1+E2	1.8 *+12−5*	0.0237 *14*	α(K)=0.0205 *12*; α(L)=0.00268 *19*; α(M)=0.00049 *4* α(N)=7.8×10^{-5} *6*; α(O)=3.49×10^{-6} *17* B(M1)(W.u.)=0.010 *+8−7*; B(E2)(W.u.)=3.2×10^{2} *+19−16* E_γ: weighted average of 302.507 *6* from ^{100}Rh ε decay (20.8 h) and 302.522 *8* from (n,γ) E=th. I_γ: from ^{100}Rh ε decay (20.8 h). Other: 8.1 *6* from (n,γ) E=th is in disagreement. Mult.,δ: from ce data in ^{100}Rh ε decay (20.8 h).
	370.280 *5*	5.54 *6*	2099.103	2^+	E1		0.00355	α(K)=0.00312 *4*; α(L)=0.000357 *5*; α(M)=6.52×10^{-5} *9* α(N)=1.051×10^{-5} *15*; α(O)=5.40×10^{-7} *8* B(E1)(W.u.)=0.00033 *+20−16* E_γ: weighted average of 370.275 *7* from ^{100}Rh ε decay (20.8 h) and 370.283 *5* from (n,γ) E=th. I_γ: from ^{100}Rh ε decay (20.8 h). Other: 10.4 *11* from (n,γ) E=th is in disagreement. Mult.: from ce data in ^{100}Rh ε decay (20.8 h) and RUL.
	588.343 *6*	36.9 *4*	1881.043	3^+	E1		0.00115	B(E1)(W.u.)=0.00055 *+32−26* α(K)=0.001010 *14*; α(L)=0.0001145 *16*; α(M)=2.092×10^{-5} *29* α(N)=3.38×10^{-6} *5*; α(O)=1.771×10^{-7} *25* E_γ: weighted average of 588.343 *5* from ^{100}Rh ε decay (20.8 h), 588.30 *10* from (α,2nγ), 588.47 *8* from (n,γ) E=th, and 588.25 *8* from (n,n′γ). I_γ: weighted average of 36.9 *4* from ^{100}Rh ε decay (20.8 h), and 36.6 *9* from (n,n′γ). Others: 68 *11* from (α,2nγ), 71 *9* from (n,γ) E=th are in disagreement. Mult.: from ce data and $\gamma\gamma(\theta)$ in ^{100}Rh ε decay (20.8 h), $\gamma(\theta)$ in (n,n′γ), and RUL. δ(Q/D)=+0.14 *16* from (n,n′γ) would give an unreasonably large B(M2)(W.u.) exceeding RUL.
	604.33 [@] *5*	1.70 [@] *8*	1865.110	2^+	E1		0.00108	B(E1)(W.u.)=2.3×10^{-5} *+13−11* α(K)=0.000950 *13*; α(L)=0.0001076 *15*; α(M)=1.967×10^{-5} *28* α(N)=3.18×10^{-6} *4*; α(O)=1.667×10^{-7} *23* Mult.: from ce data in ^{100}Rh ε decay (20.8 h).
	1107.222 *14*	100.0 *10*	1362.166	2^+	E1			B(E1)(W.u.)=0.00022 *+13−11* E_γ: weighted average of 1107.223 *8* from ^{100}Rh ε decay (20.8 h), 1107.10 *12* from (α,2nγ), 1107.07 *6* from (n,γ) E=th, and 1107.29 *5* from (n,n′γ). I_γ: from ^{100}Rh ε decay (20.8 h). Others: 100.0 *16* from (n,n′γ), 100 *11* from (α,2nγ) and 100 *12* from (n,γ) E=th. Mult.: from ce data and $\gamma\gamma(\theta)$ in ^{100}Rh ε decay (20.8 h), $\gamma(\theta)$ in (n,n′γ), and RUL. δ(Q/D)=−0.10 *13* from (n,n′γ) would give an unreasonably large B(M2)(W.u.) exceeding RUL.
	1929.804 *20*	85.2 *8*	539.5103	2^+	E1			B(E1)(W.u.)=3.6×10^{-5} *+21−17*

γ(^{100}Ru) (continued)

E_i(level)	J^{π}_i	E_{γ}†	I_{γ}†	E_f	J^{π}_f	Mult.f	δf	αg	Comments
									E_{γ}: weighted average of 1929.811 *20* from ^{100}Rh ε decay (20.8 h), 1929.74 *6* from (n,γ) E=th, and 1929.80 *7* from (n,n′γ). I_{γ}: weighted average of 85.6 *8* from ^{100}Rh ε decay (20.8 h) and 84.1 *16* from (n,n′γ). Other: 111 *13* from (n,γ) E=th. Mult.: from ce data and $\gamma\gamma(\theta)$ in ^{100}Rh ε decay (20.8 h), $\gamma(\theta)$ in (n,n′γ), and RUL. δ(Q/D)=−0.8 *9* from (n,n′γ) would give an unreasonably large B(M2)(W.u.) exceeding RUL.
2469.389	2⁻	2469.328@ *22*	1.08@ *8*	0.0	0⁺	M2			B(M2)(W.u.)=0.16 *+10−8* Mult.: from ce data in ^{100}Rh ε decay (20.8 h).
2493.06	(3,4,5⁺)	430.42 *9*	45.5 *18*	2062.651	4⁺				E_{γ}: unweighted average of 430.34 *4* from (α,2nγ), 430.61 *7* from (n,γ) E=th, and 430.32 *6* from (n,n′γ). I_{γ}: from (n,n′γ). Other: 100 *13* in (n,γ) E=th is in disagreement.
		612.02 *5*	18.9 *18*	1881.043	3⁺				E_{γ}: weighted average of 612.03 *6* from (n,γ) E=th, and 612.01 *5* from (n,n′γ). Other: 612.055 *18* from (α,2nγ) for a doublet. I_{γ}: from (n,n′γ). Others: 37 *4* in (n,γ) E=th; doublet in (α,2nγ).
		627.83‡i *8*	56‡ *7*	1865.110	2⁺				Placement is considered suspect, since with the reported intensity in (n,γ) E=th, it should have been seen in other studies.
		1266.46 *14*	100.0 *20*	1226.467	4⁺	D(+Q)	+0.4 *6*		E_{γ}: unweighted average of 1266.52 *22* from (α,2nγ), 1266.20 *8* from (n,γ) E=th, and 1266.66 *10* from (n,n′γ). I_{γ}: from (n,n′γ). Other: 100 *13* from (n,γ) E=th. Mult.,δ: from $\gamma(\theta)$ in (n,n′γ).
2512.411	(4)⁺	345.518‡ *12*	5.0‡ *8*	2166.879	3⁻	[E1]		0.00425	α(K)=0.00374 *5*; α(L)=0.000428 *6*; α(M)=7.82×10^{-5} *11* α(N)=1.259×10^{-5} *18*; α(O)=6.45×10^{-7} *9* B(E1)(W.u.)=0.00047 *+28−24*
		413.42 *7*	16.6 *13*	2099.103	2⁺	[E2]		0.0095	B(E2)(W.u.)=3.5×10^{2} *+21−18* α(K)=0.00823 *12*; α(L)=0.001042 *15*; α(M)=0.0001916 *27* α(N)=3.05×10^{-5} *4*; α(O)=1.416×10^{-6} *20* E_{γ}: weighted average of 413.43 *7* from (n,γ) E=th and 413.28 *25* from (n,n′γ). I_{γ}: weighted average of 24 *4* from (n,γ) E=th and 16.4 *7* from (n,n′γ).
		450.04‡ *19*	4.7‡ *12*	2062.651	4⁺				
		631.382 *20*	100.0 *17*	1881.043	3⁺	M1+E2	+0.41 *5*	0.00270	B(M1)(W.u.)=0.09 *+6−5*; B(E2)(W.u.)=36 *+24−19* α(K)=0.002365 *33*; α(L)=0.000273 *4*; α(M)=5.01×10^{-5} *7* α(N)=8.10×10^{-6} *11*; α(O)=4.29×10^{-7} *6* E_{γ}: weighted average of 631.35 *3* from ^{100}Rh ε decay (20.8 h), 631.41 *5* from (α,2nγ), 631.393 *20* from (n,γ) E=th, and 631.38 *3* from (n,n′γ). I_{γ}: from (n,n′γ). Others: 100 *3* from ^{100}Rh ε decay (20.8 h),

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$\gamma(^{100}Ru)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[f]	α[g]	Comments
								100 *6* from (n,γ) E=th, and 100 *14* from (α,2nγ). Mult.,δ: D+Q from γ(θ) in (n,n′γ); M2 ruled out by RUL.
2512.411	(4)$^+$	1150.44 *10*	10 *4*	1362.166	2$^+$	[E2]		B(E2)(W.u.)=1.3 +*9*−*8* E_γ: weighted average of 1150.6 *3* from (n,γ) E=th and 1150.42 *10* from (n,n′γ). I_γ: unweighted average of 5.8 *12* from (n,γ) E=th and 13.4 *11* from (n,n′γ).
		1285.82[‡] *15*	12.4[‡] *19*	1226.467	4$^+$			
		1972.91 *6*	49 *6*	539.5103	2$^+$	(E2)		B(E2)(W.u.)=0.41 +*25*−*20* E_γ: weighted average of 1972.91 *6* from ^{100}Rh ε decay (20.8 h), 1972.83 *25* from (α,2nγ), 1972.96 *7* from (n,γ) E=th, and 1972.85 *9* from (n,n′γ). I_γ: unweighted average of 63 *4* from ^{100}Rh ε decay (20.8 h), 41 *10* from (α,2nγ), 36 *5* from (n,γ) E=th, and 54.3 *13* from (n,n′γ). Mult.: (Q), ΔJ=(2) from γ(θ) in γ(θ) in (n,n′γ), ΔJ=0 is also possible; M2 ruled out by RUL.
2516.827	1$^-$	349.960[@] *16*	6.71[@] *23*	2166.879	3$^-$	[E2]	0.0161	α(K)=0.01394 *20*; α(L)=0.001813 *25*; α(M)=0.000334 *5* α(N)=5.29×10^{-5} *7*; α(O)=2.368×10^{-6} *33* B(E2)(W.u.)=7.3×10^2 +*25*−*22* B(E2)(W.u.)=730 exceeds RUL=300; this γ could be questionable.
		465.148 *17*	27 *3*	2051.661	0$^+$	[E1]	0.0020	α(K)=0.001759 *25*; α(L)=0.0002003 *28*; α(M)=3.66×10^{-5} *5* α(N)=5.91×10^{-6} *8*; α(O)=3.07×10^{-7} *4* B(E1)(W.u.)=0.0024 +*8*−*7* E_γ: weighted average of 465.15 *3* from ^{100}Rh ε decay (20.8 h), 465.148 *17* from (n,γ) E=th, and 465.11 *15* from (n,n′γ). I_γ: unweighted average of 22.7 *2* from ^{100}Rh ε decay (20.8 h), 25.7 *19* from (n,γ) E=th, 33 *3* from (n,n′γ) is in disagreement.
		651.708 *10*	100.0 *10*	1865.110	2$^+$	E1		B(E1)(W.u.)=0.0032 +*11*−*9* E_γ: weighted average of 651.707 *6* from ^{100}Rh ε decay (20.8 h), 651.88 *7* from (n,γ) E=th, and 651.72 *4* from (n,n′γ). I_γ: from ^{100}Rh ε decay (20.8 h). Others: 100 *3* from (n,n′γ), 100 *14* from (n,γ) E=th. Mult.: from ce data in ^{100}Rh ε decay (20.8 h) and RUL.
		775.832 *11*	20 *6*	1741.011	0$^+$	[E1]		B(E1)(W.u.)=0.00038 *16* E_γ: weighted average of 775.831 *11* from ^{100}Rh ε decay (20.8 h), 775.97 *23* from (n,γ) E=th, and 775.95 *13* from (n,n′γ). I_γ: unweighted average of 21.0 *3* from ^{100}Rh ε decay (20.8 h), 10 *5* from (n,γ) E=th, and 29.0 *19* from (n,n′γ).
		1154.50 *15*	52.3 *5*	1362.166	2$^+$	(E1)		B(E1)(W.u.)=3.0×10^{-4} +*10*−*9* E_γ: unweighted average of 1154.680 *10* from ^{100}Rh ε decay (20.8 h), 1154.21 *13* from (n,γ) E=th, and 1154.60 *8* from (n,n′γ). I_γ: weighted average of 52.4 *5* from ^{100}Rh ε decay (20.8 h), 52 *10* from (n,γ) E=th, and 49 *3* from (n,n′γ). Mult.: D from γγ(θ) in ^{100}Rh ε decay (20.8 h); polarity from level-parity change.

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$\gamma(^{100}Ru)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[f]	α[g]	Comments
2516.827	1^-	1386.51 *6*	78 *16*	1130.305	0^+	(E1)		B(E1)(W.u.)=0.00026 *9* E_γ: weighted average of 1386.521 *10* from ^{100}Rh ε decay (20.8 h) and 1386.43 *6* from (n,n′γ). Other: 1385.86 *8* from (n,γ) E=th. I_γ: unweighted average of 86.0 *7* from ^{100}Rh ε decay (20.8 h) and 100 *3* from (n,n′γ), 48 *5* from (n,γ) E=th. Mult.: D from $\gamma\gamma(\theta)$ in ^{100}Rh ε decay (20.8 h); polarity from level-parity change.
		1977.37 *16*	51 *9*	539.5103	2^+	(E1)		B(E1)(W.u.)=5.8×10^{-5} *+20−19* E_γ: unweighted average of 1977.24 *4* from ^{100}Rh ε decay (20.8 h), 1977.69 *13* from (n,γ) E=th, and 1977.18 *13* from (n,n′γ). I_γ: unweighted average of 57.5 *11* from ^{100}Rh ε decay (20.8 h), 33 *5* from (n,γ) E=th, and 61.3 *22* from (n,n′γ). Mult.: δ(Q/D)=0.11 *15* from $\gamma\gamma(\theta)$ in ^{100}Rh ε decay (20.8 h); polarity from level-parity change.
		2516.86[@] *5*	5.08[@] *16*	0.0	0^+	[E1]	0.0010	α(K)=7.24×10^{-5} *10*; α(L)=8.00×10^{-6} *11*; α(M)=1.459×10^{-6} *20* α(N)=2.368×10^{-7} *33*; α(O)=1.281×10^{-8} *18*; α(IPF)=0.000953 *13* B(E1)(W.u.)=2.8×10^{-6} *+10−8*
2527.247	5^-	175.84[a] *6*	2.08[a] *18*	2351.240	4^+	[E1]	0.0274	α(K)=0.02403 *34*; α(L)=0.00279 *4*; α(M)=0.000509 *7* α(N)=8.13×10^{-5} *11*; α(O)=3.99×10^{-6} *6* B(E1)(W.u.)=0.0016 *+17−10*
		360.371 *9*	6.0 *6*	2166.879	3^-	E2	0.01468	α(K)=0.01268 *18*; α(L)=0.001642 *23*; α(M)=0.000302 *5* α(N)=4.79×10^{-5} *7*; α(O)=2.16×10^{-6} *3* B(E2)(W.u.)=2.7×10^{2} *+29−16* E_γ: weighted average of 360.331 *23* from (α,2nγ) and 360.373 *5* from (n,γ) E=th. I_γ: unweighted average of 5.43 *9* from (α,2nγ) and 6.6 *4* from (n,γ) E=th. Mult.: Q from $\gamma(\theta)$ in (α,2nγ); M2 ruled out by RUL.
		451.58[‡] *3*	1.36[‡] *12*	2075.675	6^+	[E1]	0.00215	α(K)=0.001891 *26*; α(L)=0.0002155 *30*; α(M)=3.94×10^{-5} *6* α(N)=6.35×10^{-6} *9*; α(O)=3.30×10^{-7} *5* B(E1)(W.u.)=6×10^{-5} *+7−4*
		464.9[‡i] *10*	14[‡] *7*	2062.651	4^+	[E1]	0.0020	α(K)=0.001761 *26*; α(L)=0.0002006 *30*; α(M)=3.67×10^{-5} *5* α(N)=5.91×10^{-6} *9*; α(O)=3.07×10^{-7} *5* B(E1)(W.u.)=0.0006 *+7−4*
		1300.780 *19*	100.0 *9*	1226.467	4^+	E1		B(E1)(W.u.)=0.00019 *+20−11* E_γ: weighted average of 1300.792 *12* from (α,2nγ), 1300.764 *18* from (n,γ) E=th, and 1300.71 *4* from (n,n′γ). Others: 1301.3 *3* from (^{36}S,α2nγ) and 1301.6 *3* from (α,4nγ). I_γ: from (α,2nγ). Mult.: δ(Q/D)=+0.004 *6* from $\gamma(\theta)$ in (α,2nγ), +0.05 *7* from $\gamma(\theta)$ in (n,n′γ); δ(M2/E1)=−0.07 *3* from $\gamma(\theta)$ and γ(lin pol) in (α,4nγ).
2536.194	3	295.49[‡i] *8*	32[‡] *5*	2240.804	2^+			Placement is considered suspect (by evaluators) since with the reported intensity in (n,γ) E=th, it should have been seen in other studies.

γ(^{100}Ru) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[f]	δ[f]	Comments
2536.194	3	655.156[‡] *12*	8.9[‡] *6*	1881.043	3^+			
		671.2 *3*	1.8 *4*	1865.110	2^+			E_γ: weighted average of 671.3 *6* from ^{100}Rh ε decay (20.8 h) and 671.2 *3* from (n,γ) E=th. I_γ: weighted average of 1.8 *4* from ^{100}Rh ε decay (20.8 h) and 2.2 *11* from (n,γ) E=th.
		1173.99[‡] *9*	5.6[‡] *11*	1362.166	2^+			
		1309.65 *14*	11.4 *6*	1226.467	4^+			E_γ: weighted average of 1309.8 *3* from ^{100}Rh ε decay (20.8 h), 1309.5 *3* from (α,2nγ), 1309.41 *13* from (n,γ) E=th, and 1309.94 *14* from (n,n′γ). I_γ: weighted average of 13.5 *25* from ^{100}Rh ε decay (20.8 h), 10.0 *11* from (n,γ) E=th, and 11.7 *6* from (n,n′γ). Other: 42 *8* in (α,2nγ) is in disagreement.
		1996.62 *3*	100.0 *6*	539.5103	2^+	D(+Q)	+0.02 *3*	E_γ: weighted average of 1996.59 *3* from ^{100}Rh ε decay (20.8 h), 1996.81 *13* from (α,2nγ), 1996.69 *6* from (n,γ) E=th, and 1996.62 *8* from (n,n′γ). I_γ: from (n,n′γ). Others: 100.0 *16* from ^{100}Rh ε decay (20.8 h), 100 *8* from (α,2nγ) and 100 *12* from (n,γ) E=th. Mult.,δ: from $\gamma(\theta)$ in (n,n′γ). Other: δ=−0.2 *3* from $\gamma(\theta)$ in (α,2nγ).
2543.71	2^+	662.68 *17*	11.0 *22*	1881.043	3^+			E_γ: weighted average of 662.99 *21* from ^{100}Rh ε decay (20.8 h), 662.54 *17* from (n,γ) E=th, and 662.56 *25* from (n,n′γ). I_γ: weighted average of 12 *3* from ^{100}Rh ε decay (20.8 h), 6.6 *3.4* from (n,γ) E=th, and 12.3 *22* from (n,n′γ).
		678.62 *3*	65 *3*	1865.110	2^+			E_γ: weighted average of 678.65 *3* from ^{100}Rh ε decay (20.8 h), 678.54 *14* from (α,2nγ), 678.60 *7* from (n,γ) E=th, and 678.59 *4* from (n,n′γ). I_γ: weighted average of 78 *6* from ^{100}Rh ε decay (20.8 h), 71 *12* from (α,2nγ), 55 *7* from (n,γ) E=th, and 64.0 *22* from (n,n′γ).
		1181.42 *7*	100.0 *22*	1362.166	2^+	M1+E2	−0.12 *9*	B(M1)(W.u.)=0.011 *+7−6*; B(E2)(W.u.)=0.11 *+26−9* E_γ: unweighted average of 1181.49 *5* from ^{100}Rh ε decay (20.8 h), 1181.43 *12* from (α,2nγ), 1181.21 *7* from (n,γ) E=th, and 1181.53 *4* from (n,n′γ). I_γ: from (n,n′γ). Others: 100 *6* from (α,2nγ), 100 *14* from (n,γ) E=th, 100 *5* from ^{100}Rh ε decay (20.8 h). Mult.: D+Q from $\gamma(\theta)$ in (n,n′γ); M2 ruled out by RUL. δ: from $\gamma(\theta)$ in (n,n′γ), with +3.5 *12* is possible.
		1413.19[‡i] *7*	46[‡] *7*	1130.305	0^+			Placement is considered suspect (by evaluators) since with the reported intensity in (n,γ) E=th, it should have been seen in other studies.
		2004.31 *9*	48 *5*	539.5103	2^+			E_γ: weighted average of 2004.30 *13* from ^{100}Rh ε decay (20.8 h), 2004.01 *13* from (α,2nγ), 2004.44 *7* from (n,γ) E=th, and 2004.20 *12* from (n,n′γ). I_γ: unweighted average of 53 *4* from ^{100}Rh ε decay (20.8 h) and 42.6 *17* from (n,n′γ). Others: 147 *12* in (α,2nγ) and 179 *23* in (n,γ) E=th are in disagreement.
		2543.58 *9*	38 *7*	0.0	0^+			E_γ: weighted average of 2543.60 *9* from ^{100}Rh ε decay (20.8 h), 2543.5 *3* from (n,γ) E=th, and 2543.4 *3* from (n,n′γ). I_γ: weighted average of 49.4 *24* from ^{100}Rh ε decay (20.8 h), 36 *7* from (n,γ) E=th, and 27.3 *17* from (n,n′γ).

$^{100}_{44}$Ru$_{56}$-23

$\gamma(^{100}$Ru) (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.[f]	δ[f]	α[g]	Comments
2569.912	(3)$^-$	329.058‡e *12*	1.44‡ *21*	2240.804	2$^+$				E_γ: level-energy difference=329.096.
		403.042 *24*	100.0 *19*	2166.879	3$^-$	(M1+E2)	+1.58 *7*	0.00958 *15*	α(K)=0.00832 *12*; α(L)=0.001037 *16*; α(M)=0.0001905 *29* α(N)=3.04×10^{-5} *5*; α(O)=1.452×10^{-6} *21* E_γ: weighted average of 403.07 *11* from ^{100}Rh ε decay (20.8 h), 403.092 *15* from (α,2nγ), 403.013 *10* from (n,γ) E=th, and 403.14 *4* from (n,n′γ). I_γ: from (n,n′γ). Others: 100 *5* from (n,γ) E=th, 100 *20* from ^{100}Rh ε decay (20.8 h), 100 *13* from (n,nγ) E=res. Mult.: D+Q from $\gamma(\theta)$ in (α,2nγ) and (n,n′γ); polarity from no level-parity change. δ: from (α,2nγ). Other: +0.08 *8* or +1.36 *20* from (n,n′γ).
		470.82 *3*	3.2 *4*	2099.103	2$^+$				E_γ: weighted average of 470.98 *17* from ^{100}Rh ε decay (20.8 h) and 470.82 *3* from (n,γ) E=th. I_γ: weighted average of 3.7 *8* from ^{100}Rh ε decay (20.8 h) and 3.1 *4* from (n,γ) E=th.
		688.89 *3*	3.9 *3*	1881.043	3$^+$				E_γ: weighted average of 689.3 *5* from (α,2nγ) and 688.89 *3* from (n,γ) E=th. I_γ: from (n,γ) E=th.
		1207.68 *6*	61 *13*	1362.166	2$^+$				E_γ: unweighted average of 1207.50 *3* from ^{100}Rh ε decay (20.8 h), 1207.70 *5* from (α,2nγ), 1207.74 *7* from (n,γ) E=th, and 1207.78 *6* from (n,n′γ). I_γ: unweighted average of 52 *7* from ^{100}Rh ε decay (20.8 h), 31 *4* from (n,γ) E=th, 90 *30* from (n,γ) E=res, and 70.4 *21* from (n,n′γ).
		1343.47 *3*	56 *4*	1226.467	4$^+$				E_γ: weighted average of 1343.44 *5* from ^{100}Rh ε decay (20.8 h), 1343.49 *3* from (n,γ) E=th, and 1343.39 *10* from (n,n′γ). I_γ: weighted average of 60 *12* from ^{100}Rh ε decay (20.8 h), 58 *4* from (n,γ) E=th, and 51 *6* from (n,n′γ).
		2030.55 *8*	10.6 *14*	539.5103	2$^+$				E_γ: weighted average of 2030.56 *20* from ^{100}Rh ε decay (20.8 h), 2030.54 *8* from (n,γ) E=th, and 2030.7 *3* from (n,n′γ). I_γ: unweighted average of 11 *3* from ^{100}Rh ε decay (20.8 h), 8.0 *11* from (n,γ) E=th, and 12.9 *14* from (n,n′γ).
2576.872	5$^{(+)}$	695.783 *21*	72 *9*	1881.043	3$^+$	(E2)		0.00214	E_γ: from (n,γ) E=th. Other: 695.8 *3* from (α,2nγ). I_γ: unweighted average of 63 *3* from (α,2nγ) and 80 *6* from (n,γ) E=th. Mult.: Q from $\gamma(\theta)$ in (n,γ) E=th, mostly likely E2.
		1350.431 *20*	100.0 *21*	1226.467	4$^+$	D+Q			E_γ: weighted average of 1350.40 *3* from (α,2nγ), 1350.450 *20* from (n,γ) E=th, and 1350.37 *7* from (n,n′γ).

$^{100}_{44}$Ru$_{56}$-24

$\gamma(^{100}$Ru) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[f]	δ[f]	α[g]	Comments
									I_γ: from (α,2nγ). Other: 100 *5* from (n,γ) E=th. Mult.,δ: δ(Q/D)=−3.4 *2* or −0.12 *4* from $\gamma(\theta)$ in (α,2nγ).
2591.817	4^-	240.549[‡e] *8*	3.5[‡] *3*	2351.240	4^+	[E1]		0.0113	α(K)=0.00994 *14*; α(L)=0.001146 *16*; α(M)=0.0002092 *29* α(N)=3.36×10^{-5} *5*; α(O)=1.684×10^{-6} *24* B(E1)(W.u.)=0.0013 *+11−7*
		424.874[e] *18*	42.7 *24*	2166.879	3^-	(M1+E2)	+1.2 *3*	0.0080 *3*	B(M1)(W.u.)=0.08 *+8−5*; B(E2)(W.u.)=6×10^2 *+6−4* α(K)=0.00694 *24*; α(L)=0.00085 *4*; α(M)=0.000156 *7* α(N)=2.50×10^{-5} *11*; α(O)=1.223×10^{-6} *33* E_γ: from (n,γ) E=th. Others: 424.83 *21* from (α,2nγ), and 424.88 *17* from (n,n′γ). I_γ: weighted average of 61 *14* from (α,2nγ), 54 *6* from (n,γ) E=th, 85 *23* from (n,γ) E=res, and 41.7 *14* from (n,n′γ). Mult.,δ: (D+Q) from $\gamma(\theta)$ in (α,2nγ); M2 ruled out by RUL.
		710.771 *3*	100.0 *25*	1881.043	3^+	(E1(+M2))	+0.03 *5*		B(E1)(W.u.)=0.0014 *+14−10* E_γ: from (n,γ) E=th. Others: 710.82 *5* from (α,2nγ), and 710.80 *3* from (n,n′γ). I_γ: from (n,n′γ). Others: 100 *5* from (α,2nγ), 100 *6* from (n,γ) E=th, 100 *12* from (n,γ) E=res. Mult.: D(+Q) from $\gamma(\theta)$ in (n,n′γ) and (α,2nγ); polarity from level scheme. δ: weighted average of +0.02 *5* from (n,n′γ) and +0.05 *8* from (α,2nγ).
		1229.46[‡i] *12*	3.1[‡] *6*	1362.166	2^+	[M2]		0.00137	α(K)=0.001199 *17*; α(L)=0.0001387 *19*; α(M)=2.55×10^{-5} *4* α(N)=4.13×10^{-6} *6*; α(O)=2.209×10^{-7} *31*; α(IPF)=2.165×10^{-6} *31* this γ is considered questionable by evaluators due to unreasonably large B(M2)(W.u.) of 26 *+25−15*.
		1365.415[c] *12*	81 *6*	1226.467	4^+	(E1(+M2))	−0.05 *12*		B(E1)(W.u.)=1.6×10^{-4} *+16−12* Unusually large B(E1)(W.u.) casts some doubt on the level half-life. E_γ: weighted average of 1365.40 *3* from (α,2nγ) and 1365.416 *12* from (n,γ) E=th. Other: 1365.49 *9* from (n,n′γ). I_γ: unweighted average of 73.9 *19* from (α,2nγ), 71 *4* from (n,γ) E=th, 96 *8* from (n,γ) E=res, and 85.0 *23* from (n,n′γ). Mult.: D(+Q) from $\gamma(\theta)$ in (α,2nγ); polarity from level scheme.
		1461.19[‡i] *14*	4.4[‡] *6*	1130.305	0^+	[M4]		0.00289	Placement suspect as ΔJ=4 is involved. this γ is considered questionable by evaluators due to unreasonably large B(M4)(W.u.).
		2052.60[‡] *16*	1.9[‡] *6*	539.5103	2^+	[M2]			B(M2)(W.u.)=1.2 *+12−8*

$^{100}_{44}Ru_{56}$-25

$\gamma(^{100}Ru)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[f]	δ[f]	Comments
2606.07	(2,3)	2066.52 *8*	100	539.5103	2^+			E_γ: weighted average of 2066.55 *8* from (n,γ) E=th and 2066.49 *9* from (n,n′γ).
2617.14	1,2^+	752.0[@] *3*	6.8[@] *14*	1865.110	2^+			
		1255.12[‡] *9*	35[‡] *15*	1362.166	2^+			
		2617.09 *5*	100.0 *17*	0.0	0^+			E_γ: weighted average of 2617.07 *4* from ^{100}Rh ε decay (20.8 h), 2617.32 *12* from (n,γ) E=th, and 2617.09 *9* from (n,n′γ). I_γ: from ^{100}Rh ε decay (20.8 h). Other: 100 *9* from (n,γ) E=th.
2660.140	1,2^+	560.95[‡] *8*	12.3[‡] *13*	2099.103	2^+			
		2120.59 *7*	100.0 *11*	539.5103	2^+			E_γ: weighted average of 2120.61 *7* from ^{100}Rh ε decay (20.8 h), 2120.55 *11* from (n,γ) E=th, and 2120.57 *11* from (n,n′γ). Other: 2121.2 *7* from ^{100}Tc β^- decay (15.46 s). I_γ: from (n,n′γ). Others: 100 *20* from ^{100}Tc β^- decay (15.46 s), 100 *9* from ^{100}Rh ε decay (20.8 h), 100 *10* from (n,γ) E=th.
		2660.11 *12*	21.6 *11*	0.0	0^+			E_γ: weighted average of 2660.09 *12* from ^{100}Rh ε decay (20.8 h), 2660.0 *4* from (n,γ) E=th, and 2660.22 *20* from (n,n′γ). Other: 2659.5 *10* from ^{100}Tc β^- decay (15.46 s). I_γ: weighted average of 40 *20* from ^{100}Tc β^- decay (15.46 s), 20 *3* from ^{100}Rh ε decay (20.8 h), 23 *7* from (n,γ) E=th, and 21.7 *11* from (n,n′γ).
2660.82	$5^{(+)}$	309.52[a] *9*	11.1[a] *12*	2351.240	4^+			
		598.16[h] *6*	<46[h]	2062.651	4^+			E_γ: weighted average of 598.19 *6* from (n,γ) E=th and 598.11 *17* from (α,2nγ). I_γ: from (α,2nγ), <310 from (n,γ) E=th.
		779.79 *6*	100 *3*	1881.043	3^+	Q		E_γ: from (α,2nγ). Other: 778.980 *14* from (n,γ) E=th differs greatly with level-energy difference. I_γ: from (n,γ) E=th. Other: 100 *6* from (α,2nγ). Mult.: from $\gamma(\theta)$ in (α,2nγ).
		1434.28 *19*	104 *18*	1226.467	4^+	(M1+E2)	+0.38 *4*	E_γ: weighted average of 1434.21 *7* from (n,γ) E=th and 1434.81 *20* from (α,2nγ). I_γ: weighted average of 116 *15* from (n,γ) E=th and 78 *22* from (α,2nγ). Mult.,δ: D+Q from $\gamma(\theta)$ in (α,2nγ), most likely M1+E2.
2666.29	(2,3)	1535.12[‡i] *6*	63[‡] *7*	1130.305	0^+			E_γ: poor fit, level-energy difference=1535.82. Placement is considered suspect (by evaluators) since with the reported intensity in (n,γ) E=th, it should have been seen in other studies.
		2126.86 *7*	100 *13*	539.5103	2^+			E_γ: weighted average of 2126.92 *14* from ^{100}Rh ε decay (20.8 h), 2126.91 *6* from (n,γ) E=th, and 2126.68 *11* from (n,n′γ). I_γ: from (n,γ) E=th.
2705.52	6^+	128.3[a] *3*	1.9[a] *4*	2576.872	$5^{(+)}$			
		629.79[a] *5*	26.0[a] *11*	2075.675	6^+	(M1+E2)	+1.00 *7*	Mult.,δ: ΔJ=0, D+Q from $\gamma(\theta)$ in (α,2nγ).
		642.818[ad] *19*	100.0[a] *15*	2062.651	4^+	Q		Mult.: from $\gamma(\theta)$ in (α,2nγ).

Adopted Levels, Gammas (continued)

γ(^{100}Ru) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[f]	δ[f]	α[g]	Comments
2705.52	6^+	1479.143[e] *22*	68.0 *11*	1226.467	4^+	Q			Mult.: from $\gamma(\theta)$ in (α,2nγ).
2738.678	(2^+,3,4^+)	372.090[‡] *4*	45.2[‡] *23*	2366.588	4^+				
		387.436[‡] *3*	50.3[‡] *17*	2351.240	4^+				
		676.071[‡] *21*	67[‡] *6*	2062.651	4^+				
		857.621 *12*	100 *12*	1881.043	3^+				E_γ: from (n,γ) E=th. Other: 857.71 *23* from (n,n′γ).
		873.66[‡] *5*	48.6[‡] *23*	1865.110	2^+				
2745.60	(1,2^+)	693.89[@] *14*	11[@] *3*	2051.661	0^+				
		880.8[@] *3*	17[@] *5*	1865.110	2^+				
		1615.29 *5*	100.0 *14*	1130.305	0^+				E_γ: weighted average of 1615.29 *5* from ^{100}Rh ε decay (20.8 h) and 1615.4 *9* from (n,n′γ). I_γ: from (n,n′γ). Other: 100 *5* from ^{100}Rh ε decay (20.8 h).
		2205.95 *14*	40.5 *14*	539.5103	2^+				E_γ: weighted average of 2205.96 *14* from ^{100}Rh ε decay (20.8 h) and 2205.93 *19* from (n,n′γ). I_γ: weighted average of 35 *6* from ^{100}Rh ε decay (20.8 h) and 40.8 *14* from (n,n′γ).
2747.495	$4^{(-)}$	155.68[a] *4*	32.5[a] *25*	2591.817	4^-	D			Mult.: from $\gamma(\theta)$ in (α,2nγ) with ΔJ=0.
		580.600 *11*	44 *16*	2166.879	3^-	(M1+E2)	+0.62 *16*		E_γ: from (n,γ) E=th. Other: 580.52 *12* from (α,2nγ). I_γ: unweighted average of 27.5 *25* from (α,2nγ) and 60 *4* from (n,γ) E=th. Mult.,δ: D+Q from $\gamma(\theta)$ in (α,2nγ), most likely M1+E2.
		866.466 *12*	39.4 *18*	1881.043	3^+				E_γ: from (n,γ) E=th. Other: 866.29 *21* from (α,2nγ). I_γ: weighted average of 38 *8* from (α,2nγ) and 39.5 *18* from (n,γ) E=th.
		882.63[‡] *16*	1.8[‡] *5*	1865.110	2^+				
		1520.69[d] *8*	100 *5*	1226.467	4^+	(D+Q)	+0.38 *15*		E_γ: weighted average of 1520.83 *12* from (α,2nγ) and 1520.64 *7* from (n,γ) E=th. I_γ: from (α,2nγ). Other: 100 *13* from (n,γ) E=th. Mult.,δ: from $\gamma(\theta)$ in (α,2nγ).
2764.943	2^+,3^+	398.6[‡] *4*	33[‡] *11*	2366.588	4^+				
		413.703[‡] *19*	8.8[‡] *6*	2351.240	4^+				
		598.16[h] *6*	<103[h]	2166.879	3^-				I_γ: from (n,n′γ). Other: 208 *27* from (n,γ) E=th.
		883.88[‡] *9*	13[‡] *3*	1881.043	3^+				
		899.87[‡] *10*	13[‡] *3*	1865.110	2^+				
		1538.33 *7*	100 *3*	1226.467	4^+				E_γ: weighted average of 1538.38 *8* from (n,n′γ) and 1538.29 *7* from (n,γ) E=th. I_γ: from (n,n′γ). Other: 100 *13* from (n,γ) E=th.
2775.179	(5^-)	247.943 *17*	100.0 *17*	2527.247	5^-	(M1+E2)	+0.6 *2*	0.033 *4*	α(K)=0.029 *3*; α(L)=0.0037 *5*; α(M)=0.00067 *8* α(N)=0.000107 *13*; α(O)=5.1×10^{-6} *4* E_γ: from (α,2nγ). Other: 248.11 *7* from (n,n′γ).

$^{100}_{44}$Ru$_{56}$-27

$\gamma(^{100}$Ru) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[f]	δ[f]	Comments
								Mult.,δ: ΔJ=0, (D+Q) from $\gamma(\theta)$ in (α,2nγ), with ΔJ=2 also possible; most likely (M1+E2).
2775.179	(5$^-$)	712.76[a] *13*	20[a] *3*	2062.651	4$^+$			
		1548.70 *12*	<20	1226.467	4$^+$			E_γ,I_γ: from (α,2nγ).
2775.34	2$^+$,3$^+$	1413.18[&] *7*	63.2[&] *16*	1362.166	2$^+$			
		1548.73 *10*	<34	1226.467	4$^+$			E_γ: weighted average of 1548.74 *10* from (n,n$'\gamma$) and 1548.4 *8* from ^{100}Rh ε decay (20.8 h).
		2236.09[&] *17*	100.0[&] *25*	539.5103	2$^+$			
2785.193	6$^{(+)}$	709.43[ae] *3*	100.0[a] *22*	2075.675	6$^+$	(M1+E2)	+0.54 *8*	Mult.,δ: ΔJ=0, D+Q from $\gamma(\theta)$ in (α,2nγ), most likely (M1+E2); ΔJ=2 is also possible.
		722.677[ad] *22*	6.7[a] *11*	2062.651	4$^+$	(Q)		E_γ: poor fit, level-energy difference=722.566. Mult.: from $\gamma(\theta)$ in (α,2nγ).
		1558.80[a] *8*	41[a] *4*	1226.467	4$^+$	Q		Mult.: from $\gamma(\theta)$ in (α,2nγ).
2800.84	(2$^+$,3)	1438.69[&] *5*	100.0[&] *13*	1362.166	2$^+$	D(+Q)	+0.01 *5*	Mult.,δ: from $\gamma(\theta)$ in (n,n$'\gamma$).
		1574.24[&] *11*	45.4[&] *13*	1226.467	4$^+$			
2801.48	(1$^+$,2,3)	141.27[@] *5*	46[@] *8*	2660.140	1,2$^+$			
		920.6[&] *3*	19.8[&] *7*	1881.043	3$^+$			
		2262.26 *11*	100.0 *7*	539.5103	2$^+$	D+Q		E_γ: weighted average of 2262.1 *5* from ^{100}Rh ε decay (20.8 h), 2262.32 *7* from (n,γ) E=th, and 2261.88 *18* from (n,n$'\gamma$). I_γ: from (n,n$'\gamma$). Others: 100 *25* from ^{100}Rh ε decay (20.8 h). δ: δ(Q/D)=+0.42 *15* or +3.9 *8* from $\gamma(\theta)$ in (n,n$'\gamma$).
2837.71	(1$^+$,2$^+$)	1475.67[&] *19*	9.3[&] *6*	1362.166	2$^+$			
		2298.22 *20*	100.0 *6*	539.5103	2$^+$	D+Q		E_γ: weighted average of 2298.4 *4* from ^{100}Tc β^- decay (15.46 s) and 2298.17 *20* from (n,n$'\gamma$). I_γ: from (n,n$'\gamma$). δ: δ(Q/D)=+3.0 *5* or −0.07 *4* from $\gamma(\theta)$ in (n,n$'\gamma$).
2862.52	(0$^+$ to 4$^+$)	763.33[&] *17*	14[&] *3*	2099.103	2$^+$			
		1500.38[&] *10*	100[&] *3*	1362.166	2$^+$			
2877.57	2$^+$,3$^+$	996.56[a] *15*	97[a] *10*	1881.043	3$^+$	(D(+Q))	+0.05 *20*	Mult.,δ: from $\gamma(\theta)$ in (α,2nγ).
		1515.41 *20*	100 *7*	1362.166	2$^+$			E_γ: unweighted average of 1515.54 *12* from (α,2nγ) and 1515.10 *19* from (n,n$'\gamma$). I_γ: from (α,2nγ).
		2337.98[‡i] *22*		539.5103	2$^+$			
2878.44	2$^+$,3,4$^+$	779.54[&] *10*	21.6[&] *10*	2099.103	2$^+$			
		997.41[&] *5*	72.6[&] *14*	1881.043	3$^+$			
		1651.89[&] *5*	100.0[&] *18*	1226.467	4$^+$			
2905.14	(4$^+$)	2365.50 *25*	100	539.5103	2$^+$	(E2)		B(E2)(W.u.)=1.3 *4* Mult.: ΔJ=2, Q from $\gamma(\theta)$ in (n,n$'\gamma$); M2 ruled out by RUL. ΔJ=0 is also possible.
2911.47	5$^{(-)}$	384.22[a] *3*	89[a] *4*	2527.247	5$^-$	D+Q		Mult.: ΔJ=0, from $\gamma(\theta)$ in (α,2nγ).

From ENSDF

$^{100}_{44}$Ru$_{56}$-28

$\gamma(^{100}Ru)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[f]	δ[f]	α[g]	Comments
2911.47	$5^{(-)}$	544.91[a] *14*	100[a] *19*	2366.588	4^+				
		1685.30[a] *24*	89[a] *15*	1226.467	4^+				
2915.545	2^-	249.25[@] *3*	0.0373[@] *15*	2666.29	(2,3)				E_γ: poor fit, level-energy difference=249.39.
		255.417[@] *17*	0.0519[@] *12*	2660.140	$1,2^+$				
		298.55[@] *11*	0.0148[@] *22*	2617.14	$1,2^+$				
		345.654[@] *8*	0.243[@] *4*	2569.912	$(3)^-$				
		379.24[@] *5*	0.16[@] *3*	2536.194	3				
		398.716[@] *6*	0.429[@] *5*	2516.827	1^-				
		403.07[@i] *11*	0.22[@] *7*	2512.411	$(4)^+$	[M2]		0.0289	α(K)=0.02502 *35*; α(L)=0.00316 *4*; α(M)=0.000586 *8* α(N)=9.45×10^{-5} *13*; α(O)=4.85×10^{-6} *7* This γ is considered questionable by evaluators due to unreasonably large B(M2)(W.u.)=4.0×10^2 *+38−26*.
		446.153 *5*	36.7 *4*	2469.389	2^-	M1(+E2)	<0.45	0.00624 *15*	B(M1)(W.u.)=0.12 *+7−6* α(K)=0.00546 *12*; α(L)=0.000638 *19*; α(M)=0.0001170 *35* α(N)=1.89×10^{-5} *5*; α(O)=9.93×10^{-7} *19* Mult.,δ: from ce data in ^{100}Rh ε decay (20.8 h).
		748.666[@] *7*	2.77[@] *3*	2166.879	3^-	M1,E2		0.00179	α(K)=0.001572 *32*; α(L)=0.0001825 *26*; α(M)=3.34×10^{-5} *5* α(N)=5.40×10^{-6} *8*; α(O)=2.82×10^{-7} *9* Mult.: from ce data in ^{100}Rh ε decay (20.8 h).
		816.454[@] *16*	1.146[@] *12*	2099.103	2^+	(E1+M2)	0.7 *6*	0.0017 *11*	α(K)=0.0014 *9*; α(L)=1.7×10^{-4} *11*; α(M)=3.1×10^{-5} *20* α(N)=5.0×10^{-6} *33*; α(O)=2.7×10^{-7} *17* B(E1)(W.u.)=6.0×10^{-6} *+31−37*; B(M2)(W.u.)=20 *+23−16* Mult.,δ: D+Q from $\gamma\gamma(\theta)$ in ^{100}Rh ε decay (20.8 h); polarity from spin-parity change.
		1034.510[@] *8*	4.74[@] *5*	1881.043	3^+	(E1)			B(E1)(W.u.)=1.8×10^{-5} *+9−8* Mult.: from ce data in ^{100}Rh ε decay (20.8 h).
		1553.348 *10*	63.3 *6*	1362.166	2^+	E1			B(E1)(W.u.)=7.2×10^{-5} *+33−31* Mult.: from ce data in ^{100}Rh ε decay (20.8 h).
		2375.976 *16*	100.0 *10*	539.5103	2^+	E1			B(E1)(W.u.)=3.2×10^{-5} *+15−14* Mult.: from ce data in ^{100}Rh ε decay (20.8 h).
		2915.42[@] *7*	0.22[@] *7*	0.0	0^+	[M2]			B(M2)(W.u.)=0.020 *+12−11*
2933.65	$(1,2)^+$	2933.60 *10*	100	0.0	0^+				
2951.10	$2^+,3,4^+$	1589.1[&] *3*	14.2[&] *15*	1362.166	2^+				
		1724.62[&] *8*	100.0[&] *22*	1226.467	4^+				E_γ: poor fit, level-energy difference=1724.99.

$^{100}_{44}Ru_{56}$-29

Adopted Levels, Gammas (continued)

$\gamma(^{100}Ru)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[f]	δ[f]	α[g]	Comments
2951.10	$2^+,3,4^+$	2411.41[&] *21*	70.6[&] *24*	539.5103	2^+				
2951.552	7^-	166.38[a] *15*	0.19[a] *6*	2785.193	$6^{(+)}$				
		245.97[a] *8*	0.84[a] *6*	2705.52	6^+				
		424.318 *14*	16.7 *11*	2527.247	5^-	(E2)		0.00876	E_γ: from (α,2nγ). Others: 423.8 *5* from (^{36}S,α2nγ), and 424.3 *3* from (α,4nγ). I_γ: weighted average of 17 *4* from (^{36}S,α2nγ), 13.5 *19* from (α,2nγ), and 17.4 *9* from (α,4nγ). Mult.: Q from γ(DCO) in (^{36}S,α2nγ), $\gamma(\theta)$ in (α,2nγ) and (α,4nγ); ce data in (α,4nγ) indicates (E2).
		876.26 *24*	100.0 *8*	2075.675	6^+	E1			E_γ: unweighted average of 876.2 *1* from (^{36}S,α2nγ), 875.878 *12* from (α,2nγ), and 876.7 *3* from (α,4nγ). I_γ: from (α,2nγ). Others: 100 *4* from (^{36}S,α2nγ), 100 *9* from (α,4nγ). Mult.: from $\gamma(\theta)$ in (α,2nγ), γ(DCO) and γ(pol) in (^{36}S,α2nγ), and $\gamma(\theta$,pol) and ce data in (α,4nγ). δ(M2/E1)=−0.02 *3* from (α,2nγ).
2963.626	6^-	188[a]	[a]	2775.179	(5^-)				
		371.774[a] *19*	28.0[a] *5*	2591.817	4^-	E2			Mult.: Q from $\gamma(\theta)$ in (α,2nγ); M2 ruled out since it would require an isomeric half-life by RUL, which is unlikely.
		436.352[h] *18*	<38[h]	2527.247	5^-	(M1+E2)	+2.8 *20*	0.0079 *8*	E_γ,I_γ: from (α,2nγ). Others: Eγ=436.5 *5* and Iγ=50 *25* from (^{36}S,α2nγ), Eγ=436.4 *3* and Iγ=39.0 *25* from (α,4nγ). Mult.,δ: from $\gamma(\theta)$ and ce data in (α,4nγ). Other: δ(Q/D)=+0.69 *25* from $\gamma(\theta)$ in (α,2nγ) for a doublet.
		887.43 *24*	100.0 *14*	2075.675	6^+	E1(+M2)	−0.08 *10*		E_γ: unweighted average of 888.5 *5* from (^{36}S,α2nγ), 887.981 *17* from (α,2nγ), and 888.8 *3* from (α,4nγ). I_γ: from (α,2nγ). Others: 100 *5* from (α,4nγ), 100 *25* from (^{36}S,α2nγ). Mult.,δ: ΔJ=0, δ(Q/D)=−0.08 *10* from $\gamma(\theta)$ in (α,2nγ); E1(+M2) from $\gamma(\theta$,pol) and ce data in (α,4nγ), with δ(M2/E1)=+0.4 *7*.
2967.57	$6^{(+)}$	262.08[a] *3*	34.1[a] *11*	2705.52	6^+	(D(+Q))	+0.17 *22*		
		891.67[a] *8*	61[a] *3*	2075.675	6^+	(M1+E2)	−0.17 *8*		Mult.: (D+Q) from $\gamma(\theta)$ in (α,2nγ), most likely (M1+E2) by RUL.
		904.80[a] *5*	100[a] *5*	2062.651	4^+				
		1741.24[a] *7*	43.2[a] *23*	1226.467	4^+	Q			
2983.04	(0 to 4)$^+$	2444.25[‡i] *8*	100[‡]	539.5103	2^+				E_γ: poor fit, level-energy difference=2443.78.

$^{100}_{44}Ru_{56}$-30

Adopted Levels, Gammas (continued)

$\gamma(^{100}Ru)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[f]	α[g]	Comments
2999.32	(0$^+$ to 4$^+$)	2459.39[&] *24*	100[&]	539.5103	2$^+$			
3060.051	8$^+$	984.81 *22*	100	2075.675	6$^+$	E2		E_γ: unweighted average of 984.8 *1* from (^{36}S,α2nγ), 984.439 *12* from (α,2nγ), and 985.2 *3* from (α,4nγ). Mult.: from γ(DCO) and γ(pol) in (^{36}S,α2nγ), $\gamma(\theta)$ and ce data in (α,4nγ), $\gamma(\theta)$ in (α,2nγ).
3060.14	1,2$^+$	1698.32[@] *24*	21[@] *3*	1362.166	2$^+$			
		2520.56[@] *5*	28.6[@] *9*	539.5103	2$^+$			
		3060.20 *11*	100.0 *17*	0.0	0$^+$			E_γ: weighted average of 3060.25 *11* from ^{100}Rh ε decay (20.8 h) and 3059.97 *24* from (n,n′γ).
3064.61	4$^+$	2525.26[&] *17*	100[&]	539.5103	2$^+$	E2		B(E2)(W.u.)=5.4 *+13−12* Mult.: Q from $\gamma(\theta)$ in (n,n′γ); M2 ruled out by RUL.
3069.525	(1,2)$^-$	154.007[@] *10*	1.03[@] *3*	2915.545	2$^-$			
		409.18[@] *8*	0.26[@] *3*	2660.140	1,2$^+$			
		499.599[@] *7*	4.41[@] *6*	2569.912	(3)$^-$	M1,E2	0.0050 *4*	Mult.: from ce data in ^{100}Rh ε decay (20.8 h).
		533.52[@] *7*	3.5[@] *6*	2536.194	3	[E1]		
		552.706[@] *8*	4.31[@] *4*	2516.827	1$^-$			
		600.124[@] *6*	9.20[@] *9*	2469.389	2$^-$	M1,E2	0.00310 *9*	Mult.: from ce data in ^{100}Rh ε decay (20.8 h).
		828.70[@] *4*	0.48[@] *8*	2240.804	2$^+$	[E1]		
		902.673[@] *19*	3.75[@] *16*	2166.879	3$^-$			
		1204.46[@] *5*	1.16[@] *8*	1865.110	2$^+$	[E1]		
		1707.44[@] *6*	6.61[@] *9*	1362.166	2$^+$	[E1]		
		2529.969 *20*	100.0 *8*	539.5103	2$^+$	D+Q		E_γ,I_γ: from ^{100}Rh ε decay (20.8 h). Other: Eγ=2530.06 *18*, Iγ=100 from (n,n′γ). Mult.: from $\gamma\gamma(\theta)$ in ^{100}Rh ε decay (20.8 h).
		3069.44 *16*	0.09 *9*	0.0	0$^+$	[M2]		E_γ,I_γ: from ^{100}Rh ε decay (20.8 h). Other: a questionable strong 3070.2γ reported in (n,γ) E=th.
3072.268	2$^+$	555.42[@] *4*	7.6[@] *4*	2516.827	1$^-$	[E1]	0.00131	α(K)=0.001153 *16*; α(L)=0.0001308 *18*; α(M)=2.391×10^{-5} *33* α(N)=3.86×10^{-6} *5*; α(O)=2.019×10^{-7} *28* B(E1)(W.u.)=0.00031 *+18−15*
		602.91[@] *4*	17[@] *3*	2469.389	2$^-$	[E1]	0.00109	B(E1)(W.u.)=0.00054 *+25−23* α(K)=0.000955 *13*; α(L)=0.0001082 *15*; α(M)=1.978×10^{-5} *28* α(N)=3.20×10^{-6} *4*; α(O)=1.676×10^{-7} *23*
		831.272[@i] *19*	23.8[@] *6*	2240.804	2$^+$			
		905.60[@] *21*	24.1[@] *21*	2166.879	3$^-$	[E1]		B(E1)(W.u.)=0.00022 *+10−9*
		973.15[@] *4*	12.7[@] *11*	2099.103	2$^+$			
		1191.16[@e] *4*	15.1[@] *10*	1881.043	3$^+$			
		1207.50[@c] *3*	12[@] *3*	1865.110	2$^+$			E_γ,I_γ: for doublet in ^{100}Rh ε decay (20.8 h).
		1710.07 *3*	100.0 *21*	1362.166	2$^+$			E_γ: weighted average of 1710.07 *3* from ^{100}Rh ε decay (20.8

$^{100}_{44}Ru_{56}$-31

γ(^{100}Ru) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[f]	δ[f]	α[g]	Comments
									h) and 1710.00 *12* from (n,n′γ). I_γ: from ^{100}Rh ε decay (20.8 h). Other: 100 *4* from (n,n′γ).
3072.268	2^+	3071.80[d] *12*	14.6 *9*	0.0	0^+	[E2]			B(E2)(W.u.)=0.024 *+11−10* E_γ: weighted average of 3071.80 *12* from ^{100}Rh ε decay (20.8 h) and 3071.86 *24* from (n,n′γ). I_γ: ^{100}Rh ε decay (20.8 h). Other: 106 *4* from (n,n′γ) is in disagreement. E_γ: level-energy difference=3072.20.
3110.57	$(2^+,3^+)$	943.70 *16*	100	2166.879	3^-	[E1]			E_γ: weighted average of 943.62 *16* from (α,2nγ) and 943.79 *16* from (n,n′γ).
3118.67	(0^+ to 4^+)	1756.21[&] *21*	34.1[&] *22*	1362.166	2^+				
		2579.28[&] *16*	100.0[&] *22*	539.5103	2^+				
3139.303	7^-	175.55[a] *6*	5.3[a] *8*	2963.626	6^-				
		187.759 *13*	54 *4*	2951.552	7^-	(D+Q)	+0.17 *10*		E_γ: weighted average of 187.5 *5* from (^{36}S,α2nγ), 187.760 *13* from (α,2nγ), and 187.4 *3* from (α,4nγ). I_γ: weighted average of 76 *26* from (^{36}S,α2nγ), 56.1 *21* from (α,2nγ), and 43 *5* from (α,4nγ). Mult.,δ: from γ(θ) in (α,2nγ).
		228.1[a] *5*	2.0[a] *12*	2911.47	$5^{(-)}$				
		354.09[a] *4*	9.4[a] *4*	2785.193	$6^{(+)}$	D(+Q)	+0.04 *6*		Mult.,δ: from γ(θ) in (α,2nγ).
		612.057 *18*	100.0 *17*	2527.247	5^-	E2		0.00301	α(K)=0.00263 *4*; α(L)=0.000316 *4*; α(M)=5.80×10^{-5} *8* α(N)=9.31×10^{-6} *13*; α(O)=4.61×10^{-7} *6* E_γ: weighted average of 612.4 *5* from (^{36}S,α2nγ), 612.055 *18* from (α,2nγ), and 612.4 *3* from (α,4nγ). I_γ: from (α,2nγ) for a doublet, but most intensity belongs with 3140 level. Others: 100 *10* from (α,4nγ), 100 *26* from (^{36}S,α2nγ). Mult.: from γ(θ) in (α,2nγ), γ(θ) and ce data in (α,4nγ).
		1063.8 *4*	37.3 *8*	2075.675	6^+	D(+Q)	−0.03 *5*		E_γ: unweighted average of 1063.3 *5* from (^{36}S,α2nγ), 1063.67 *3* from (α,2nγ), and 1064.5 *3* from (α,4nγ). I_γ: from (α,2nγ). Others: <81 from (α,4nγ); 200 *50* from (^{36}S,α2nγ) is in disagreement. Mult.,δ: from γ(θ) in (α,2nγ).
3218.111	$(8)^-$	254.486 *19*	100	2963.626	6^-	E2		0.0469	α(K)=0.0401 *6*; α(L)=0.00559 *8*; α(M)=0.001032 *14* α(N)=0.0001618 *23*; α(O)=6.63×10^{-6} *9* E_γ: from (α,2nγ) only. Mult.: Q from γ(θ) in (α,2nγ); M2 ruled out since it would require an isomeric half-life (>0.45 μs) by RUL, which is unlikely.
3263.664	$8^{(+)}$	203.590 *24*	79.0 *25*	3060.051	8^+	D			E_γ: weighted average of 202.6 *5* from (^{36}S,α2nγ),

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$^{100}_{44}$Ru$_{56}$-32

$\gamma(^{100}$Ru) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[f]	δ[f]	α[g]	Comments
									203.590 *14* from (α,2nγ), and 204.0 *3* from (α,4nγ). I_γ: from (α,2nγ). Other: 100 *15* from (α,4nγ). Mult.: δ(Q/D)=+0.18 *20* from $\gamma(\theta)$ in (α,2nγ); ΔJ=0, D from γ(DCO) in (^{36}S,α2nγ).
3263.664	8$^{(+)}$	478.467[a] *22*	52.2[a] *13*	2785.193	6$^{(+)}$	Q			
		557.98[ad] *3*	34.4[a] *6*	2705.52	6$^+$	Q			
		1188.012 *20*	100.0 *13*	2075.675	6$^+$	Q			E_γ: weighted average of 1188.012 *20* from (α,2nγ) and 1188.1 *10* from (α,4nγ). I_γ: from (α,2nγ). Other: 100 *15* from (α,4nγ). Mult.: from $\gamma(\theta)$ in (α,2nγ).
3323.70	(1,2$^+$)	806.93[@e] *6*	9.7[@] *10*	2516.827	1$^-$				
		854.32[@] *6*	7.57[@] *10*	2469.389	2$^-$				
		1224.63[@] *13*	6.9[@] *10*	2099.103	2$^+$				
		1272.01[@] *11*	5.6[@] *10*	2051.661	0$^+$				
		2193.40[@e] *4*	9.1[@] *9*	1130.305	0$^+$				
		2784.29[@c] *5*	100.0[@] *10*	539.5103	2$^+$	D+Q			Mult.,δ: δ(Q/D)=0.61 *+18−3* for J=2, and 5.1 *+120−25* or −0.05 *20* for J=1 from $\gamma\gamma(\theta)$ in ^{100}Rh ε decay (20.8 h).
		3323.91[@] *22*	5.2[@] *3*	0.0	0$^+$				
3354.637	8$^-$	91.7[ai] *10*	2.4[a] *7*	3263.664	8$^{(+)}$				
		215.48[ae] *3*	9.3[a] *5*	3139.303	7$^-$				
		294.61[a] *3*	8.83[a] *24*	3060.051	8$^+$	D(+Q)	+0.08 *20*		Mult.,δ: from $\gamma(\theta)$ in (α,2nγ) with ΔJ=0.
		390.981 *14*	100.0 *10*	2963.626	6$^-$	E2		0.01131	α(K)=0.00979 *14*; α(L)=0.001251 *18*; α(M)=0.000230 *4* α(N)=3.66×10^{-5} *6*; α(O)=1.679×10^{-6} *24* E_γ: from (α,2nγ). Others: 390.9 *5* from (^{36}S,α2nγ) and 391.0 *3* from (α,4nγ). I_γ: from (α,2nγ). Others: 100 *6* from (α,4nγ), 100 *17* from (^{36}S,α2nγ). Mult.: from $\gamma(\theta$,pol) and ce data in (α,4nγ), γ(DCO) in (^{36}S,α2nγ), and $\gamma(\theta)$ in (α,2nγ).
		403.092 *15*	<35	2951.552	7$^-$	E2+M1	+1.58 *7*	0.00958 *15*	α(K)=0.00832 *12*; α(L)=0.001036 *16*; α(M)=0.0001905 *29* α(N)=3.04×10^{-5} *5*; α(O)=1.451×10^{-6} *21* E_γ: from (α,2nγ). Others: 403.7 *5* from (^{36}S,α2nγ) and 403.2 *3* from (α,4nγ). I_γ: from (α,2nγ). Others: 67 *17* from (^{36}S,α2nγ), 55 *3* from (α,4nγ). Mult.: from $\gamma(\theta$,pol) and ce data in (α,4nγ).
3368.982	(7$^-$)	229.69[a] *5*	14.7[a] *9*	3139.303	7$^-$	(D(+Q))	+0.02 *15*		
		405.5[a] *5*	4.6[a] *28*	2963.626	6$^-$				

From ENSDF

$^{100}_{44}$Ru$_{56}$-33

$\gamma(^{100}Ru)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[f]	δ[f]	α[g]	Comments
3368.982	(7⁻)	417.407[a] *20*	100.0[a] *18*	2951.552	7⁻	(M1+E2)	−0.21 *7*	0.00728 *12*	α(K)=0.00638 *10*; α(L)=0.000744 *13*; α(M)=0.0001364 *25* α(N)=2.21×10⁻⁵ *4*; α(O)=1.163×10⁻⁶ *18*
		593.93[a] *5*	29.4[a] *18*	2775.179	(5⁻)				
3419.13	(2⁺)	2879.43[@] *20*	38[@] *4*	539.5103	2⁺				
		3419.4[@] *3*	100[@] *6*	0.0	0⁺				
3446.56	7⁽⁺⁾	785.70[a] *20*	39[a] *7*	2660.82	5⁽⁺⁾				
		869.69[a] *16*	100[a] *17*	2576.872	5⁽⁺⁾	Q			
		1370.95[a] *9*	83[a] *4*	2075.675	6⁺	D+Q	+0.12 *2*		
3463.43	(1⁺,2)	140.03[@c] *3*	100[@] *10*	3323.70	(1,2⁺)				
		1582.9[@] *5*	96[@] *58*	1881.043	3⁺				
		3464.8[@e] *5*	98[@] *15*	0.0	0⁺				
3503.365	9⁻	148.720 *14*	25.0 *11*	3354.637	8⁻	(M1+E2)	+0.05 *1*	0.1040	α(K)=0.0908 *13*; α(L)=0.01090 *16*; α(M)=0.00201 *3* α(N)=0.000324 *5*; α(O)=1.678×10⁻⁵ *24* E_γ: from (α,2nγ). Others: 148.1 *5* from (³⁶S,α2nγ) and 148.6 *3* from (α,4nγ). I_γ: weighted average of 17 *8* from (³⁶S,α2nγ), 24.7 *11* from (α,2nγ), and 25.8 *16* from (α,4nγ). Mult.,δ: D+Q from γ(θ) in (α,2nγ); polarity from no level-parity change. Other: δ(Q/D)=−1.5 *15* from γ(θ) in (α,4nγ).
		239.74[a] *5*	6.0[a] *4*	3263.664	8⁽⁺⁾				
		364.055 *15*	55.6 *11*	3139.303	7⁻	E2		0.01420	α(K)=0.01228 *18*; α(L)=0.001586 *23*; α(M)=0.000292 *4* α(N)=4.63×10⁻⁵ *7*; α(O)=2.09×10⁻⁶ *3* E_γ: from (α,2nγ). Others: 363.7 *5* from (³⁶S,α2nγ) and 364.2 *3* from (α,4nγ). I_γ: weighted average of 42 *8* from (³⁶S,α2nγ), 55.5 *7* from (α,2nγ), and 60 *3* from (α,4nγ). Mult.: from γ(θ,pol) and ce data in (α,4nγ), γ(θ) in (α,2nγ).
		443.317 *16*	75.8 *11*	3060.051	8⁺	E1(+M2)	+0.06 *6*	0.00232 *21*	α(K)=0.00204 *18*; α(L)=0.000233 *23*; α(M)=4.3×10⁻⁵ *4* α(N)=6.9×10⁻⁶ *7*; α(O)=3.56×10⁻⁷ *35* E_γ: from (α,2nγ). Others: 442.8 *5* from (³⁶S,α2nγ) and 443.3 *3* from (α,4nγ). I_γ: weighted average of 67 *17* from (³⁶S,α2nγ), 76.0 *11* from (α,2nγ), and 73 *5* from (α,4nγ). Mult.: from γ(DCO) and γ(pol) in (³⁶S,α2nγ), γ(θ,pol) and ce data (α,4nγ), γ(θ) in (α,2nγ). δ: from (α,2nγ). Other: −0.11 *5* from (α,4nγ).
		551.883[e] *17*	100.0 *11*	2951.552	7⁻	E2		0.00402	α(K)=0.00350 *5*; α(L)=0.000426 *6*; α(M)=7.83×10⁻⁵ *11*

$\gamma(^{100}Ru)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[f]	δ[f]	α[g]	Comments
									α(N)=1.253×10^{-5} *18*; α(O)=6.12×10^{-7} *9* E_γ: weighted average of 552.3 *3* from (^{36}S,α2nγ), 551.881 *14* from (α,2nγ), and 552.2 *3* from (α,4nγ). I_γ: from (α,2nγ). Others: 100 *7* from (α,4nγ), 100 *8* from (^{36}S,α2nγ).
3550.10	$8^{(+)}$	490.05[a] *4*	30.7[a] *11*	3060.051	8^+	(Q)			
		765.04[a] *6*	24.7[a] *11*	2785.193	$6^{(+)}$	Q			
		844.47[a] *7*	100[a] *11*	2705.52	6^+				
		1474.37[a] *7*	22.6[a] *11*	2075.675	6^+	Q			
3575.51	9^-	436.352[hac] *18*	<30[ha]	3139.303	7^-				
		515.47[a] *5*	11.6[a] *11*	3060.051	8^+	D(+Q)	+0.09 *12*		
		623.933[e] *14*	100.0 *9*	2951.552	7^-	E2		0.00286	α(K)=0.002492 *35*; α(L)=0.000300 *4*; α(M)=5.50×10^{-5} *8* α(N)=8.82×10^{-6} *12*; α(O)=4.38×10^{-7} *6* E_γ: from (α,2nγ). Others: 623.8 *3* from (^{36}S,α2nγ) and 624.2 *3* from (α,4nγ). I_γ: from (α,2nγ). Mult.: from γ(DCO) and γ(pol) in (^{36}S,α2nγ), γ(θ,pol) and ce data (α,4nγ), γ(θ) in (α,2nγ).
3576.43	$7^{(+)}$	129.94[a] *10*	7.1[a] *18*	3446.56	$7^{(+)}$				
		312.62[a] *15*	20[a] *4*	3263.664	$8^{(+)}$				
		608.9[a] *5*	9[a] *5*	2967.57	$6^{(+)}$				
		870.99[a] *21*	68[a] *18*	2705.52	6^+	D+Q	−0.12 *7*		
		999.54[a] *7*	100[a] *5*	2576.872	$5^{(+)}$	Q			E_γ: poor fit, level-energy difference=999.22.
3599.301	(8^-)	244.41[a] *13*	4.5[a] *7*	3354.637	8^-	(D(+Q))	+0.2 *3*		
		381.21[a] *18*	5.2[a] *7*	3218.111	$(8)^-$				
		460.01[a] *7*	14.8[a] *13*	3139.303	7^-	D+Q	−2.8 *2*		
		647.752[a] *20*	100.0[a] *19*	2951.552	7^-	D+Q	−0.30 *2*		
3609.96	$7^{(+)}$	948.98[a] *11*	35.4[a] *21*	2660.82	$5^{(+)}$	Q			
		1534.40[a] *10*	100[a] *4*	2075.675	6^+	D+Q	+2.6 *2*		
3661.48	(4,5,6)	886.5[a] *5*	33[a] *20*	2775.179	(5^-)				
		1134.21[a] *13*	100[a] *7*	2527.247	5^-	D+Q	−0.16 *6*		
3851.5	$(4^+,5,6,7^+)$	883.8[a] *5*	100[a] *20*	2967.57	$6^{(+)}$				
		1274.7[a] *5*	100[a] *20*	2576.872	$5^{(+)}$				
3929.64	(8^+)	666.15[a] *10*	36[a] *5*	3263.664	$8^{(+)}$				
		961.93[a] *8*	100[a] *7*	2967.57	$6^{(+)}$	Q			
3960.36	(9^-)	605.72[a] *4*	100[a] *3*	3354.637	8^-				
		742.27[a] *9*	80[a] *6*	3218.111	$(8)^-$	D+Q	+0.58 *12*		
3992.13	10^-	416.8[a] *3*	1.8[a] *11*	3575.51	9^-				
		488.671[d] *20*	54.3 *7*	3503.365	9^-	E2+M1	+0.37 *2*	0.00501	α(K)=0.00439 *6*; α(L)=0.000512 *7*; α(M)=9.39×10^{-5} *13*

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$\gamma(^{100}Ru)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[f]	δ[f]	α[g]	Comments
									α(N)=1.518×10^{-5} *22*; α(O)=7.96×10^{-7} *11* E_γ: weighted average of 489.0 *5* from (^{36}S,α2nγ), 488.671 *20* from (α,2nγ), and 489.3 *3* from (α,4nγ). I_γ: weighted average of 67 *17* from (^{36}S,α2nγ), 54.3 *7* from (α,2nγ), and 46 *8* from (α,4nγ). Mult.: from $\gamma(\theta$,pol) and ce data in (α,4nγ), $\gamma(\theta)$ in (α,2nγ). δ: from (α,2nγ). Other: +4 *2* from (α,4nγ).
3992.13	10$^-$	637.47 *7*	100 *6*	3354.637	8$^-$	E2		0.00269	α(K)=0.002352 *33*; α(L)=0.000282 *4*; α(M)=5.18×10^{-5} *7* α(N)=8.31×10^{-6} *12*; α(O)=4.14×10^{-7} *6* E_γ: weighted average of 637.8 *5* from (^{36}S,α2nγ), 637.44 *7* from (α,2nγ), and 637.7 *2* from (α,4nγ). I_γ: from (α,4nγ). Others: 100 *11* from (α,2nγ), 100 *17* from (^{36}S,α2nγ). Mult.: from $\gamma(\theta$,pol) and ce data in (α,4nγ), $\gamma(\theta)$ in (α,2nγ), γ(DCO) in (^{36}S,α2nγ).
4075.93	(8,9$^-$)	477.1[a] *5*	26[a] *16*	3599.301	(8$^-$)				
		572.41[a] *13*	53[a] *5*	3503.365	9$^-$	D(+Q)	+0.05 *7*		
		936.94[a] *21*	100[a] *16*	3139.303	7$^-$				
4083.30	10$^+$	819.63 *13*	6.9 *8*	3263.664	8$^{(+)}$				E_γ: weighted average of 821.4 *10* from (^{36}S,α2nγ) and 819.62 *7* from (α,2nγ). I_γ: weighted average of 3.7 *19* from (^{36}S,α2nγ) and 7.1 *5* from (α,2nγ).
		1023.75 *25*	100.0 *10*	3060.051	8$^+$	E2			E_γ: unweighted average of 1024.0 *1* from (^{36}S,α2nγ), 1023.252 *15* from (α,2nγ), and 1024.0 *3* from (α,4nγ). I_γ: from (α,2nγ). Other: 100 *8* from (^{36}S,α2nγ). Mult.: from γ(DCO) and γ(pol) in (^{36}S,α2nγ), $\gamma(\theta$,pol) and ce data in (α,4nγ), $\gamma(\theta)$ in (α,2nγ).
4097.38	(9$^-$)	521.86[a] *5*	100[a] *6*	3575.51	9$^-$	D+Q	−0.25 *7*		
		728.48[a] *19*	29[a] *6*	3368.982	(7$^-$)				
4230.56	11$^-$	238.351[e] *16*	35.4 *7*	3992.13	10$^-$	D+Q			E_γ: from (α,2nγ). Others: 238.5 *10* from (^{36}S,α2nγ) and 238.2 *3* from (α,4nγ). I_γ: from (α,2nγ), but 6.7 *33* in (^{36}S,α2nγ) is in disagreement.
		727.34[c] *3*	100.0 *14*	3503.365	9$^-$	E2			E_γ: weighted average of 727.8 *3* from (^{36}S,α2nγ), 727.340 *20* from (α,2nγ), and 727.7 *3* from (α,4nγ). I_γ: from (α,2nγ). Other: 100 *6* from (α,4nγ). Mult.: from γ(DCO) and γ(pol) in (^{36}S,α2nγ), $\gamma(\theta)$ and ce data in (α,4nγ), $\gamma(\theta)$ in (α,2nγ).
4235.82	(10$^-$)	636.54[a] *15*	100[a] *31*	3599.301	(8$^-$)	(Q)			
		660.34[a] *11*	17.9[a] *25*	3575.51	9$^-$				
		732.46[a] *5*	53.7[a] *25*	3503.365	9$^-$	D+Q	−1.05 *12*		
4235.84	10$^{(+)}$	152.56[a] *4*	7.6[a] *6*	4083.30	10$^+$	(D(+Q))	+0.04 *9*		
		972.13 *9*	43.3 *23*	3263.664	8$^{(+)}$	(Q)			E_γ: weighted average of 973.6 *10* from (^{36}S,α2nγ), and

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$\gamma(^{100}$Ru) (continued)

E_i(level)	J^{π}_i	E_γ[†]	I_γ[†]	E_f	J^{π}_f	Mult.[f]	δ[f]	Comments
								973.13 6 from (α,2nγ). I_γ: from (α,2nγ), but 8 4 in (^{36}S,α2nγ) is in disagreement.
4235.84	$10^{(+)}$	1175.776 23	100.0 12	3060.051	8^+	Q		E_γ: from (α,2nγ). Other: 1177.9 3 in (^{36}S,α2nγ) is discrepant. I_γ: from (α,2nγ). Other: 100 8 from (^{36}S,α2nγ).
4248.49	(7^-,8,9)	673.05[a] 8	54[a] 4	3575.51	9^-			
		893.77[a] 9	100[a] 9	3354.637	8^-	D+Q	+0.52 5	
4315.73	11^-	740.222 19	100.0 13	3575.51	9^-	E2		E_γ: from (α,2nγ). Others: 740.3 5 from (^{36}S,α2nγ) and 740.6 3 from (α,4nγ). I_γ: from (α,2nγ). Mult.: from $\gamma(\theta$,pol) in (α,4nγ), $\gamma(\theta)$ in (α,2nγ).
		812.39[a] 8	10.5[a] 9	3503.365	9^-			E_γ: poor fit, level-energy difference=812.89.
4343.44	$9^{(+)}$	896.79[a] 8	100[a] 8	3446.56	$7^{(+)}$	Q		
		1079.98[a] 13	45[a] 5	3263.664	$8^{(+)}$	D+Q	+2.84 8	
4353.36	(10^+)	270.08[a] 8	5.8[a] 7	4083.30	10^+			
		803.26[a] 6	20.7[a] 13	3550.10	$8^{(+)}$	(Q)		
		1293.30 4	100.0 19	3060.051	8^+			E_γ: weighted average of 1293.9 5 from (^{36}S,α2nγ) and 1293.30 3 from (α,2nγ).
4381.83	(7,8,9^+)	935.37[a] 9	100[a] 6	3446.56	$7^{(+)}$			
		1117.99[a] 11	65[a] 6	3263.664	$8^{(+)}$	D+Q	−0.11 7	
4408.63	(9^-,10^-)	178.05[a] 9	12.7[a] 18	4230.56	11^-			
		1054.01[a] 11	100[a] 9	3354.637	8^-			
4503.48	(10^+)	419.92[a] 16	18[a] 3	4083.30	10^+			
		953.38[a] 3	100[a] 3	3550.10	$8^{(+)}$	(Q)		
4663.44	(11^-)	433.00[a] 15	26[a] 5	4230.56	11^-			
		565.7[a] 7	13[a] 11	4097.38	(9^-)			
		1160.05[a] 7	100[a] 5	3503.365	9^-	(Q)		
4791.59	(8^+,9,10^+)	288.08[a] 11	22[a] 3	4503.48	(10^+)			
		438.4[a] 3	25[a] 6	4353.36	(10^+)			
		555.69[a] 6	81[a] 3	4235.84	$10^{(+)}$			
		708.5[a] 5	16[a] 9	4083.30	10^+			
		861.93[a] 10	100[a] 9	3929.64	(8^+)			
		1731.7[a] 3	25[a] 3	3060.051	8^+			
4798.15	$12^{(-)}$	567.46 9	20 2	4230.56	11^-			
		806.021 20	100 2	3992.13	10^-	(E2)		Mult.: Q from $\gamma(\theta)$ in (α,2nγ) and (α,4nγ), polarity from ce data in (α,4nγ).
4818.58	(10^+)	465.33 15	35 4	4353.36	(10^+)			
		582.82 8	100 9	4235.84	$10^{(+)}$	(D+Q)	−0.26 20	Mult.: from $\gamma(\theta)$ in (α,2nγ) with ΔJ=(0).
4917.97	12^+	564.54 15	25 4	4353.36	(10^+)			E_γ: weighted average of 564.9 5 from (^{36}S,α2nγ) and 564.51 15 from (α,2nγ). I_γ: weighted average of 25 4 from (^{36}S,α2nγ) and 24 4 from (α,2nγ).
		681.5 5	29 7	4235.84	$10^{(+)}$	Q		E_γ,I_γ,Mult.: γ from (^{36}S,α2nγ) only, ΔJ=2.

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$\gamma(^{100}$Ru) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[f]	δ[f]	Comments
4917.97	12^+	688.2		4230.56	11^-			E_γ: γ from (^{36}S,α2nγ) only.
		834.95 *25*	100 *6*	4083.30	10^+	E2		E_γ: unweighted average of 835.2 *1* from (^{36}S,α2nγ), 834.45 *8* from (α,2nγ), and 835.2 *3* from (α,4nγ). I_γ: from (α,2nγ). Other: 100 *7* from (^{36}S,α2nγ). Mult.: from γ(DCO) and γ(pol) in (^{36}S,α2nγ), $\gamma(\theta)$ and ce data in (α,4nγ), $\gamma(\theta)$ in (α,2nγ).
5010.49	(8^+,9,10,11)	191.93[a] *3*	100[a] *4*	4818.58	(10^+)			
		218.87[a] *4*	96[a] *4*	4791.59	(8^+,9,10^+)	D+Q	+0.078 *8*	
		774.4[a] *3*	64[a] *14*	4235.84	$10^{(+)}$			
		927.6[a] *5*	18[a] *11*	4083.30	10^+			
5066.19	(12^-)	750.8[a] *5*	10[a] *6*	4315.73	11^-			
		830.39[a] *4*	100[a] *4*	4235.82	(10^-)			
		835.20[a] *20*	9.8[a] *20*	4230.56	11^-			
5126.3	(12^+)	1043.0 *10*	100	4083.30	10^+			E_γ: unweighted average of 1042.03 *13* from (α,2nγ) and 1044.0 *3* from (α,4nγ).
5162.52	13^-	846.73 *14*	106 *6*	4315.73	11^-			E_γ: weighted average of 847.5 *5* from (^{36}S,α2nγ) and 846.71 *9* from (α,2nγ). I_γ: from (α,2nγ), but 33 *8* in (^{36}S,α2nγ) is in disagreement.
		932.2 *3*	100 *2*	4230.56	11^-	E2		E_γ: unweighted average of 932.7 *3* from (^{36}S,α2nγ), 931.72 *3* from (α,2nγ), and 932.4 *3* from (α,4nγ). I_γ: from (α,2nγ). Other: 100 *8* from (^{36}S,α2nγ). Mult.: from γ(DCO) and γ(pol) in (^{36}S,α2nγ), $\gamma(\theta)$ and ce data in (α,4nγ), $\gamma(\theta)$ in (α,2nγ).
5274.67	(13^-)	959.06 *13*	100 *9*	4315.73	11^-	(E2)		E_γ: weighted average of 959.6 *5* from (^{36}S,α2nγ) and 959.03 *12*. Other: 962.1 *3* in (α,4nγ) seems discrepant. I_γ: from (α,2nγ). Mult.: (Q) from $\gamma(\theta)$ in (α,2nγ); (E2,M1) from $\gamma(\theta)$ and ce data in (α,4nγ).
		1043.80[a] *20*	75[a] *16*	4230.56	11^-	Q		E_γ: poor fit, level-energy difference=1044.45.
5307.2	(12^+)	1223.9[b] *5*	100	4083.30	10^+			
5713.31	14^+	795.34 *6*	100	4917.97	12^+	E2		E_γ: weighted average of 795.5 *1* from (^{36}S,α2nγ), 795.30 *5* from (α,2nγ), and 795.5 *3* from (α,4nγ). Mult.: from γ(DCO) and γ(pol) in (^{36}S,α2nγ), $\gamma(\theta)$ and ce data in (α,4nγ), $\gamma(\theta)$ in (α,2nγ).
5784.4	(14^-)	986.2[b] *3*	100	4798.15	$12^{(-)}$			
6167.2	(15^-)	1004.7[b] *3*	100	5162.52	13^-	Q		
6283.7	(15^-)	1009.0[b] *5*	100	5274.67	(13^-)			
6365.2	(14^+)	1058.0[b] *5*	100	5307.2	(12^+)			
6714.81	16^+	1001.5 *1*	100	5713.31	14^+	E2		E_γ: from (^{36}S,α2nγ). Mult.: from γ(DCO) and γ(pol) in (^{36}S,α2nγ), γ(DCO) in (^{34}S,2α,2nγ).

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Adopted Levels, Gammas (continued)

$\gamma(^{100}Ru)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[f]	Comments
6885.1	(16^-)	1100.7[b] 5	100	5784.4	(14^-)		
7203.7	(17^-)	1036.5 3	100	6167.2	(15^-)	(E2)	E_γ: weighted average of 1036.6 3 from (^{36}S,α2nγ), and 1036.3 3 from (α,4nγ). Mult.: Q from γ(DCO) in (^{36}S,α2nγ) and $\gamma(\theta)$ in (α,4nγ), polarity from ce data in (α,4nγ).
7408.6	(16^+)	1043.4[b] 5	100	6365.2	(14^+)		
7827.02	18^+	1112.2 1	100	6714.81	16^+	E2	E_γ: from (^{36}S,α2nγ). Mult.: from γ(DCO) and γ(pol) in (^{36}S,α2nγ), γ(DCO) in (^{34}S,2α2nγ).
8018.2	(18^-)	1133.1[b] 5	100	6885.1	(16^-)		
8450.6	(18^+)	1042.0[b] 5	100	7408.6	(16^+)		
8458.7	(19^-)	1255.0[b] 5	100	7203.7	(17^-)		
9057.73	20^+	1230.7 1	100	7827.02	18^+	E2	Mult.: from γ(DCO) and γ(pol) in (^{36}S,α2nγ), γ(DCO) in (^{34}S,2α2nγ).
9178.8	(20^-)	1160.6[b] 5	100	8018.2	(18^-)		
(9673.32)	$2^+,3^+$	5416.1 3	7.1 13	4257.1			
		5485.6 3	5.9 10	4187.6	$(1^+$ to $4^+)$		
		5672.46 19	4.5 7	4000.70			
		5690.2 7	3.4 9	3983.0	$(1^+$ to $4^+)$		
		5699.6 5	8.1 18	3973.6	$(0^+$ to $5^+)$		
		5790.2 3	4.6 8	3883.0			
		5795.41 16	9.4 15	3877.75	$2^+,3^+$		
		5893.43 12	40 7	3779.72	$(1$ to $4)^+$		
		5941.27 12	30 5	3731.88			
		6210.36[c] 4	70 3	3463.43	$(1^+,2)$		
		6254.6[i] 7	3.3 9	3419.13	(2^+)		
		6298.11 12	38 6	3375.01			
		6324.99 5	39.6 10	3348.13			
		6340.72 5	100 3	3332.40			
		6346.85 7	31.9 12	3326.27			
		6365.04 13	10.4 7	3308.08			
		6372.50 7	29.4 11	3300.62	$2^+,3^+$		
		6401.0 3	3.8 6	3272.1			
		6406.8 3	3.3 5	3266.3	$(0$ to $5)^+$		
		6441.32 16	6.9 7	3231.79			
		6496.04 23	4.3 5	3177.07	$2^+,3^+$		
		6554.4 4	2.2 4	3118.67	$(0^+$ to $4^+)$		
		6562.55 14	8.9 7	3110.57	$(2^+,3^+)$		
		6602.37[c] 7	21.3 7	3069.525	$(1,2)^-$		
		6608.53 7	24.7 10	3064.61	4^+		
		6639.1 4	2.0 4	3034.0			
		6656.33 15	7.3 6	3016.77			
		6673.70 11	11.5 7	2999.32	$(0^+$ to $4^+)$		
		6690.06 6	51.6 16	2983.04	$(0$ to $4)^+$		E_γ: level-energy difference=6689.8.
		6757.2 3	5.7 10	2915.545	2^-		

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$\gamma(^{100}Ru)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f
(9673.32)	$2^+,3^+$	6767.8 3	3.4 5	2905.14	(4^+)
		6795.54 9	18.2 9	2877.57	$2^+,3^+$
		6811.1 6	1.3 4	2862.52	$(0^+$ to $4^+)$
		6835.56 19	4.9 5	2837.71	$(1^+,2^+)$
		6871.62 20	4.8 5	2801.48	$(1^+,2,3)$
		6898.24[i] 18	32 5	2775.34	$2^+,3^+$
		6908.29 15	7.1 6	2764.943	$2^+,3^+$
		6926.00 18	5.6 5	2747.495	$4^{(-)}$
		6934.0 5	1.6 4	2738.678	$(2^+,3,4^+)$
		7007.05 9	16.3 8	2666.29	(2,3)
		7013.4 5	1.9 4	2660.82	$5^{(+)}$
		7056.4 6	1.3 4	2617.14	$1,2^+$
		7066.7 3	10.2 7	2606.07	(2,3)
		7081.30 15	6.9 6	2591.817	4^-
		7103.14 5	90.8 22	2569.912	$(3)^-$
		7129.65 26	3.6 5	2543.71	2^+
		7136.6 5	1.9 4	2536.194	3
		7160.66 19	5.3 5	2512.411	$(4)^+$
		7180.00 9	15.9 8	2493.06	$(3,4,5^+)$
		7203.40[e] 9	16.4 8	2469.389	2^-
		7259.6 5	1.7 4	2413.86	(4^+)
		7306.28 9	15.8 8	2366.588	4^+
		7432.2 8	0.9 4	2240.804	2^+
		7506.16 6	56.2 17	2166.879	3^-
		7574.00 16	6.2 5	2099.103	2^+
		7610.29 7	41.6 14	2062.651	4^+
		7791.80 9	11.5 5	1881.043	3^+
		7807.96 11	7.2 4	1865.110	2^+
		8310.78 7	17.9 6	1362.166	2^+
		8446.57 8	16.2 6	1226.467	4^+
		8543.8[i] 5	0.6 2	1130.305	0^+
		9133.21 8	16.8 4	539.5103	2^+
		9673.4 3	0.5 1	0.0	0^+
(9673.33)	$3^{(+)}$	5021.6 18		4650.7	
		5071.5 10		4601.2	
		5087.1 10		4585.6	
		5129.0 16		4543.7	
		5142.6 28		4530	
		5153.2 7		4519.6	
		5269.1 10		4403.6	
		5296.6 9		4376.1	
		5306.3 16		4366.4	$(1^+$ to $4^+)$
		5336.8 16		4337.6	
(9673.33)	$3^{(+)}$	5365.3 8		4307.4	
		5399.2 14		4273.5	
		5416.1 10		4257.1	
		5486.8 21		4187.6	$(1^+$ to $4^+)$
		5581.2 12		4091.5	
		5673.6 5		4000.70	
		5688.3 5		3983.0	$(1^+$ to $4^+)$
		5700.4 19		3973.6	$(0^+$ to $5^+)$
		5797.0 11		3877.75	$2^+,3^+$
		5894.2 21		3779.72	$(1$ to $4)^+$
		5942.4 7		3731.88	
		6206.3 5		3463.43	$(1^+,2)$
		6212.3 13		3460.4	
		6296.1 17		3375.01	
		6325.2 12		3348.13	
		6340.2 21		3332.40	
		6346.8 15		3326.27	
		6371.6 21		3300.62	$2^+,3^+$
		6562.2 5		3110.57	$(2^+,3^+)$
		6602.3 9		3069.525	$(1,2)^-$
		6654.4 5		3016.77	
		6689.9 8		2983.04	$(0$ to $4)^+$
		6795.3 6		2877.57	$2^+,3^+$
		6899.6 19		2775.34	$2^+,3^+$
		7080.0 4		2591.817	4^-
		7102.7 21		2569.912	$(3)^-$
		7202.3 12		2469.389	2^-
		7504.5 4		2166.879	3^-
		7574.9 5		2099.103	2^+
		7611.0 15		2062.651	4^+
		7806.0 10		1865.110	2^+
		8308.5 15		1362.166	2^+
		8444.7 5		1226.467	4^+
(9673.35)	$3^{(+)}$	5021.6 18		4650.7	
		5129.0 16		4543.7	
		5142.6 28		4530	
		5296.6 9		4376.1	
		5336.8 16		4337.6	
		5365.3 8		4307.4	
		5399.2 14		4273.5	
		5416.1 10		4257.1	
		5523.6 22		4148.6	
		5570.8 9		4102.9	

$\gamma(^{100}Ru)$ (continued)

E_i(level)	J^π_i	E_γ†	E_f	J^π_f
(9673.35)	$3^{(+)}$	5581.2 *12*	4091.5	
		5673.6 *5*	4000.70	
		5688.3 *5*	3983.0	(1^+ to 4^+)
		5700.4 *19*	3973.6	(0^+ to 5^+)
		5791.8 *5*	3883.0	
		5894.2 *21*	3779.72	$(1\text{ to }4)^+$
		5942.4 *7*	3731.88	
		6212.3 *13*	3460.4	
		6296.1 *17*	3375.01	
		6325.2 *12*	3348.13	
		6340.2 *21*	3332.40	
		6371.6 *21*	3300.62	$2^+,3^+$
		6562.2 *5*	3110.57	$(2^+,3^+)$
		6602.3 *9*	3069.525	$(1,2)^-$
		6689.9 *8*	2983.04	$(0\text{ to }4)^+$
		6755.5 *6*	2915.545	2^-
		6839.9 *15*	2832.8	0^+
		6870.2 *15*	2801.48	$(1^+,2,3)$
		6899.6 *19*	2775.34	$2^+,3^+$
		6908.2 *17*	2764.943	$2^+,3^+$
		6925.5 *6*	2747.495	$4^{(-)}$
		7005.5 *7*	2666.29	(2,3)
		7102.7 *21*	2569.912	$(3)^-$
		7158.1 *24*	2516.827	1^-
		7504.5 *4*	2166.879	3^-
		7574.9 *5*	2099.103	2^+
		7611.0 *15*	2062.651	4^+
		7624.4 *15*	2051.661	0^+
		7790.8 *5*	1881.043	3^+
		8308.5 *15*	1362.166	2^+
		8447.7 *5*	1226.467	4^+
		9135.9 *13*	539.5103	2^+
(9673.38)	$3^{(+)}$	5021.6 *18*	4650.7	
		5129.0 *16*	4543.7	
		5153.2 *7*	4519.6	
		5269.1 *10*	4403.6	
		5523.6 *22*	4148.6	
		5623.2 *10*	4049.5	
		5688.3 *5*	3983.0	(1^+ to 4^+)
		5791.8 *5*	3883.0	
		5797.0 *11*	3877.75	$2^+,3^+$
		5894.2 *21*	3779.72	$(1\text{ to }4)^+$
		6206.3 *5*	3463.43	$(1^+,2)$

$^{100}_{44}Ru_{56}$-41

$\gamma(^{100}Ru)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.f	Comments
(9673.38)	$3^{(+)}$	6296.1 *17*		3375.01			
		6346.8 *15*		3326.27			
		6371.6 *21*		3300.62	$2^+,3^+$		
		6562.2 *5*		3110.57	$(2^+,3^+)$		
		6614.6 *8*		3058.1	(2,3,4)		
		6755.5 *6*		2915.545	2^-		
		6839.9 *15*		2832.8	0^+		
		6870.2 *15*		2801.48	$(1^+,2,3)$		
		6908.2 *17*		2764.943	$2^+,3^+$		
		7080.0 *4*		2591.817	4^-		
		7158.1 *24*		2516.827	1^-		
		7202.3 *12*		2469.389	2^-		
		7504.5 *4*		2166.879	3^-		
		7574.9 *5*		2099.103	2^+		
		7790.8 *5*		1881.043	3^+		
		7806.0 *10*		1865.110	2^+		
		8444.7 *5*		1226.467	4^+		
(9673.40)	$2^{(+)}$	5306.3 *16*		4366.4	$(1^+$ to $4^+)$		
		5486.8 *21*		4187.6	$(1^+$ to $4^+)$		
		5688.3 *5*		3983.0	$(1^+$ to $4^+)$		
		5700.4 *19*		3973.6	$(0^+$ to $5^+)$		
		5894.2 *21*		3779.72	$(1$ to $4)^+$		
		6602.3 *9*		3069.525	$(1,2)^-$		
		6614.6 *8*		3058.1	(2,3,4)		
		7102.7 *21*		2569.912	$(3)^-$		
		7624.4 *15*		2051.661	0^+		
		7790.8 *5*		1881.043	3^+		
(9763.42)	$3^{(+)}$	6252 *2*		3517	$2^+,3^+$		
9796.7	(21^-)	1338.0b *5*	100	8458.7	(19^-)		
10378.14	22^+	1320.4b *1*	100	9057.73	20^+	E2	E_γ: from $(^{36}S,\alpha 2n\gamma)$. Mult.: from γ(DCO) and γ(pol) in $(^{36}S,\alpha 2n\gamma)$, γ(DCO) in $(^{34}S,2\alpha 2n\gamma)$.
10403.3	(22^-)	1224.5b *5*	100	9178.8	(20^-)		
11738.5	$24^{(+)}$	1360.4b *1*	100	10378.14	22^+	(E2)	E_γ: from $(^{36}S,\alpha 2n\gamma)$. Mult.: Q from γ(DCO) in $(^{36}S,\alpha 2n\gamma)$ and $(^{34}S,2\alpha 2n\gamma)$; E2 indicated by γ(pol) in $(^{36}S,\alpha 2n\gamma)$.
11746.3	(24^-)	1343.0b *5*	100	10403.3	(22^-)		
13170.0	$26^{(+)}$	1431.4b *1*	100	11738.5	$24^{(+)}$	E2	E_γ: from $(^{36}S,\alpha 2n\gamma)$. Mult.: from γ(DCO) and γ(pol) in $(^{36}S,\alpha 2n\gamma)$, γ(DCO) in $(^{34}S,2\alpha 2n\gamma)$.
13309.3	(26^-)	1563.0b *5*	100	11746.3	(24^-)		
14738.2	$28^{(+)}$	1568.2b *3*	100	13170.0	$26^{(+)}$	E2	E_γ: from $(^{36}S,\alpha 2n\gamma)$. Mult.: from γ(DCO) and γ(pol) in $(^{36}S,\alpha 2n\gamma)$, γ(DCO) in $(^{34}S,2\alpha 2n\gamma)$.

γ(^{100}Ru) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[f]	Comments
14933.3	(28$^-$)	1624.0[b] 5	100	13309.3	(26$^-$)		
14938.1	(28$^+$)	1768.1[b] 5	100	13170.0	26$^{(+)}$	Q	
16105.8	(30$^+$)	1167.7[b] 5	60[b] 20	14938.1	(28$^+$)	Q	
		1367.6[b] 5	100[b] 20	14738.2	28$^{(+)}$		
16648.4	(30$^+$)	1910.2[b] 5	100	14738.2	28$^{(+)}$	Q	
17740.7	(32$^+$)	1092.3[b] 5	100[b] 33	16648.4	(30$^+$)	Q	
		1634.9[b] 5	100[b] 33	16105.8	(30$^+$)	Q	
20197.7		2457.0[b] 5	100	17740.7	(32$^+$)		

[†] Deduced from γ-ray energies available from different studies. Weighted averages taken when values of comparable accuracy exist. Iγ values are photon branching ratios. A minimum uncertainty of 1% is assigned (by evaluators) when quoted ΔIγ<1% for a transition from ^{100}Rh ε decay.

[‡] γ from (n,γ) E=th only.

[#] γ from ^{100}Rh ε decay (4.6 m) only.

[@] γ from ^{100}Rh ε decay (20.8 h) only.

[&] γ from (n,n$'\gamma$) only.

[a] γ from (α,2nγ) only.

[b] γ from (^{36}S,α2nγ) only.

[c] Uncertainty increased by a factor of 5 in the fitting procedure, as the γ ray fits poorly.

[d] Uncertainty increased by a factor of 4 in the fitting procedure, as the γ ray fits poorly.

[e] Uncertainty increased by a factor of 3 in the fitting procedure, as the γ ray fits poorly.

[f] The multipolarity assignments and mixing ratios are based on ce, $\gamma(\theta)$, $\gamma\gamma(\theta)$ and γ(lin pol) in the following datasets: $\gamma\gamma(\theta)$ and ce data in ^{100}Rh ε decay (20.8 h); $\gamma(\theta)$ and ce data in (α,4nγ); $\gamma\gamma(\theta)$ and γ(lin pol) in (^{34}S,α2nγ); $\gamma(\theta)$ in (α,2nγ) and (n,n$'\gamma$). In addition lifetime data are used to rule out M2 transitions over E2 and assign M1+E2 when mixing ratio is significant. The multipolarity assignments and mixing ratios given here are from $\gamma(\theta)$ data in (α,2nγ) data, unless otherwise stated. For Eγ's below 1 MeV or so, for ΔJ=1 transitions, M1+E2 multipolarity is assigned when δ has a significantly large value so that M2 component is less likely from Weisskopf estimates.

[g] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

[h] Multiply placed with undivided intensity.

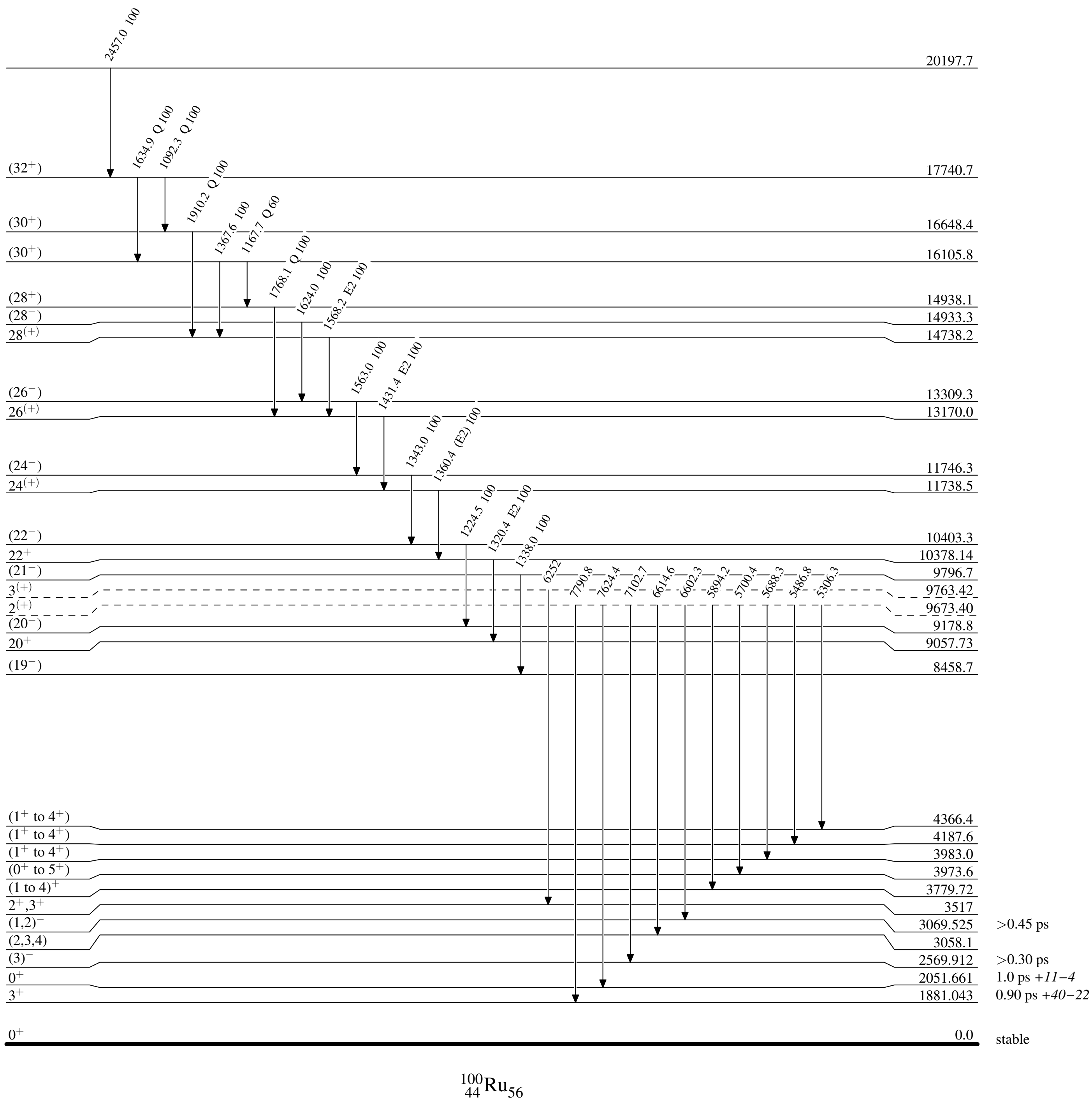
[i] Placement of transition in the level scheme is uncertain.

$^{100}_{44}$Ru$_{56}$-43

Adopted Levels, Gammas

Level Scheme

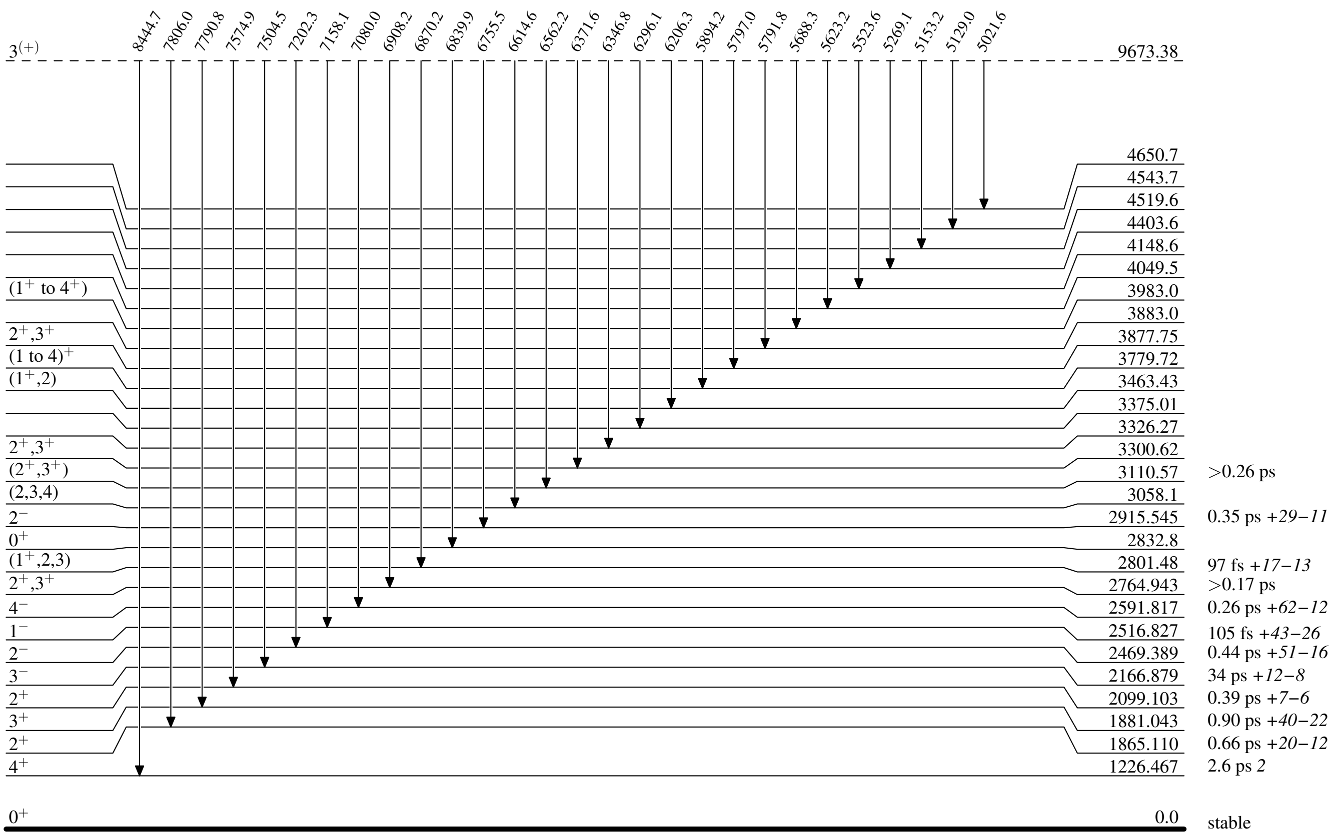
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

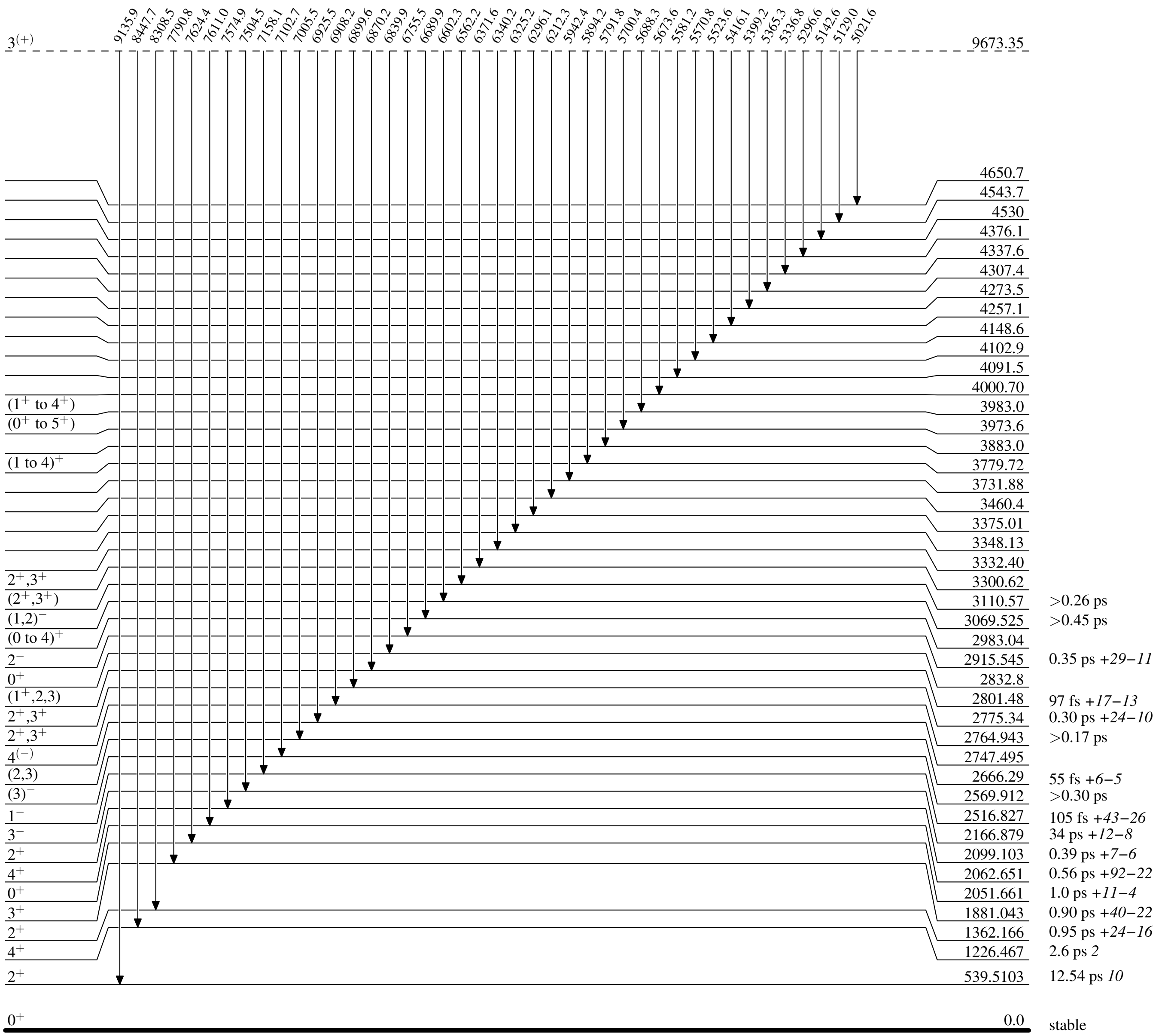


$^{100}_{44}Ru_{56}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

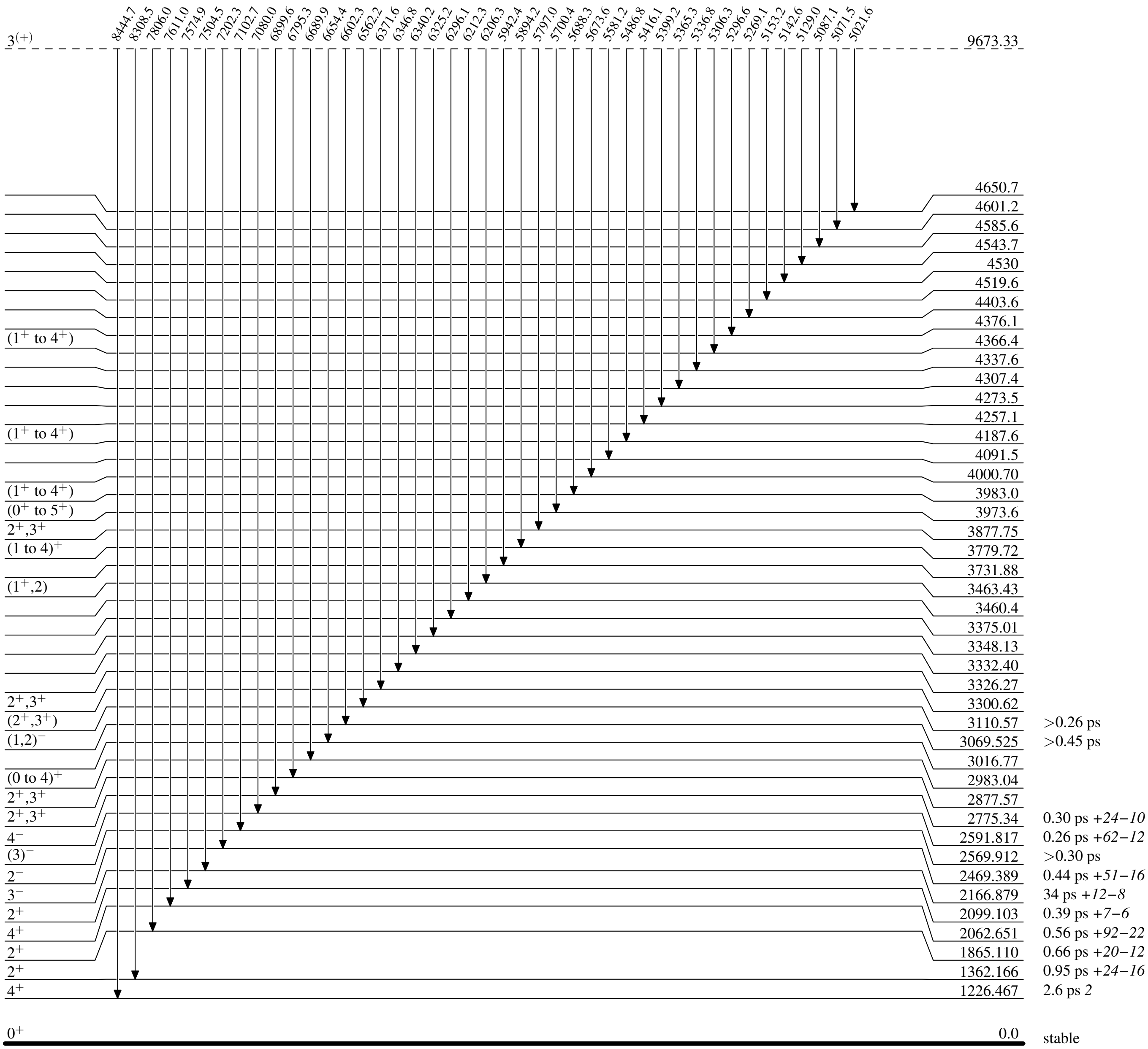


$^{100}_{44}Ru_{56}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{100}_{44}Ru_{56}$

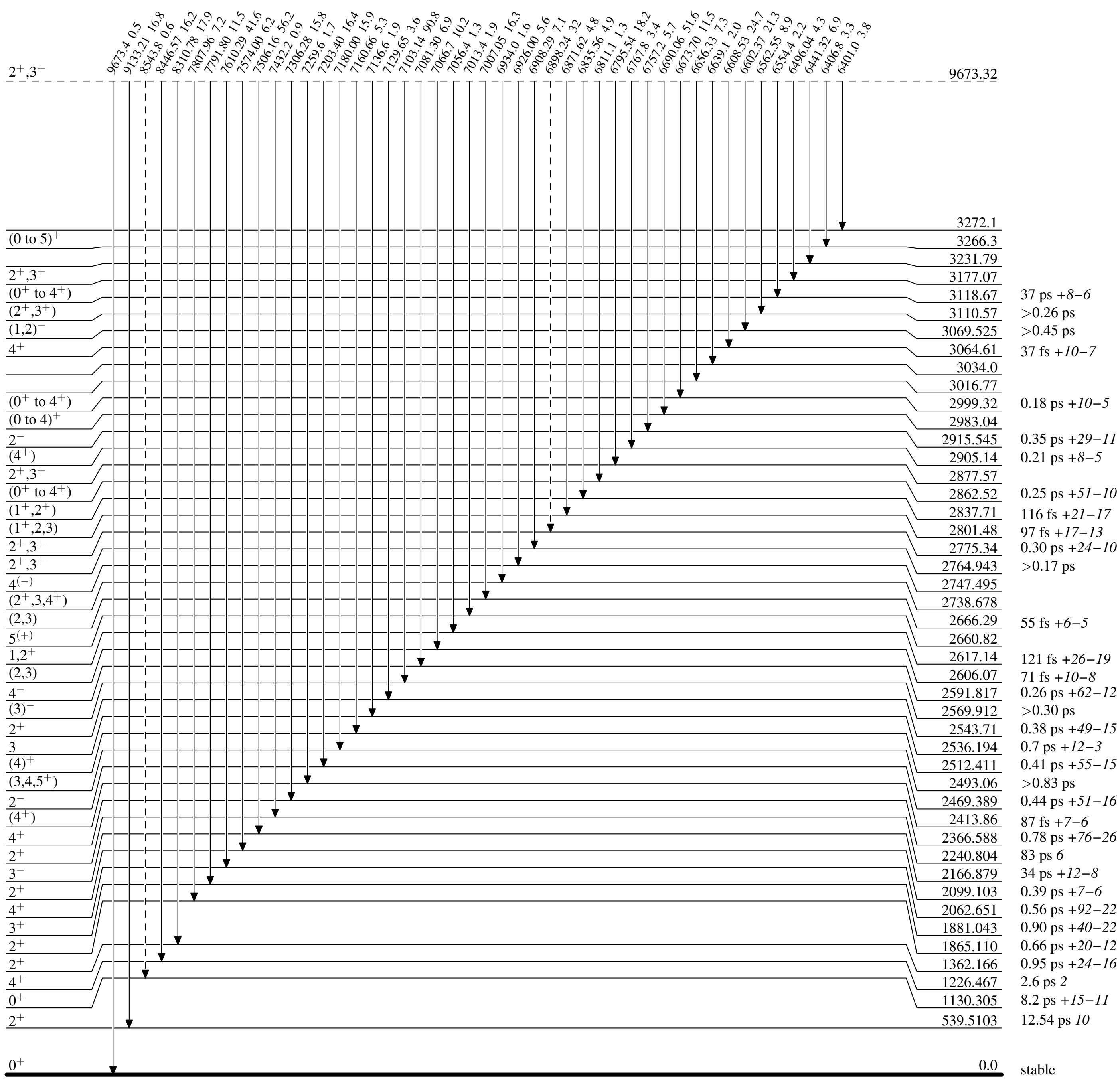
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{100}_{44}Ru_{56}$

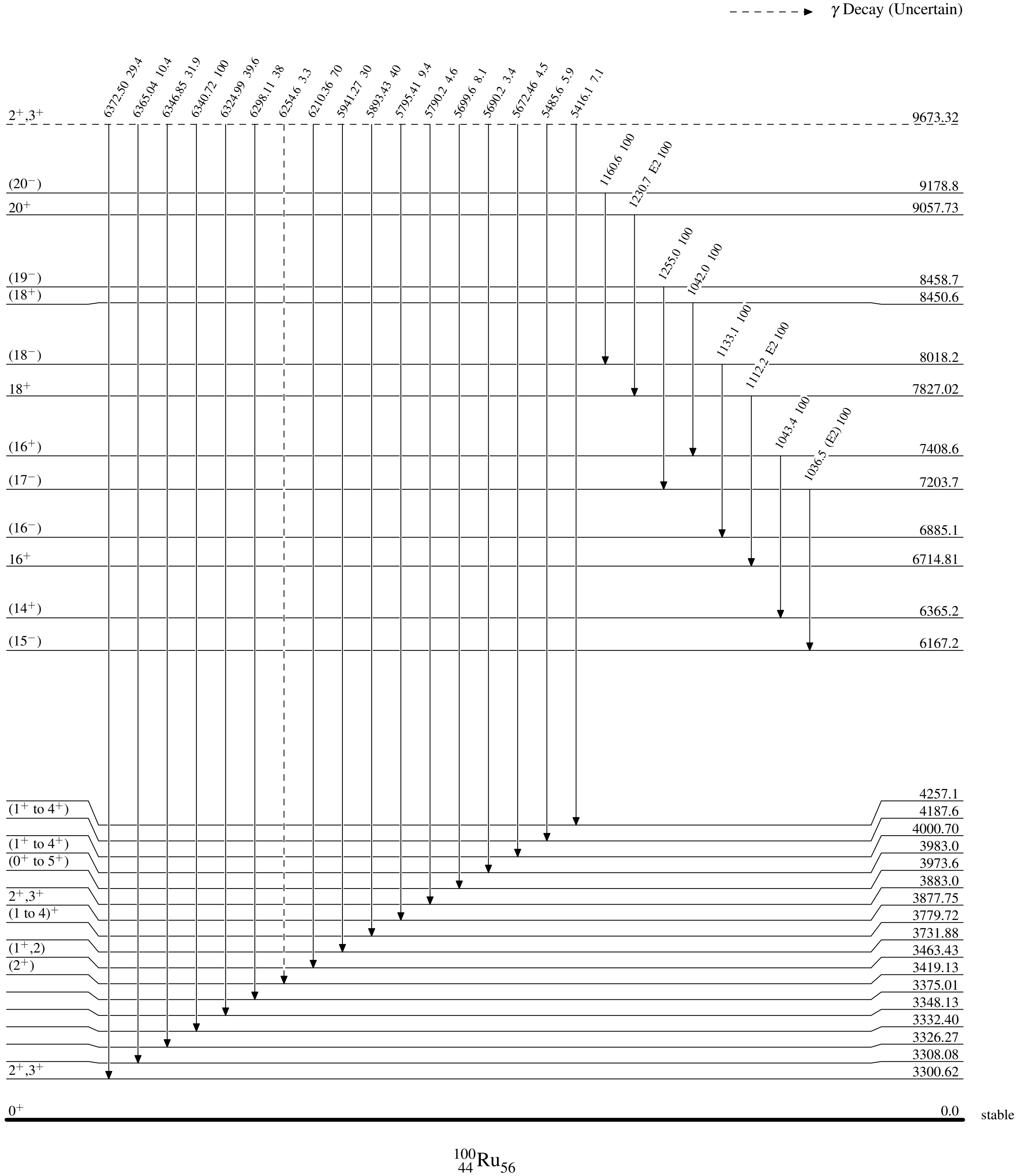
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

Legend

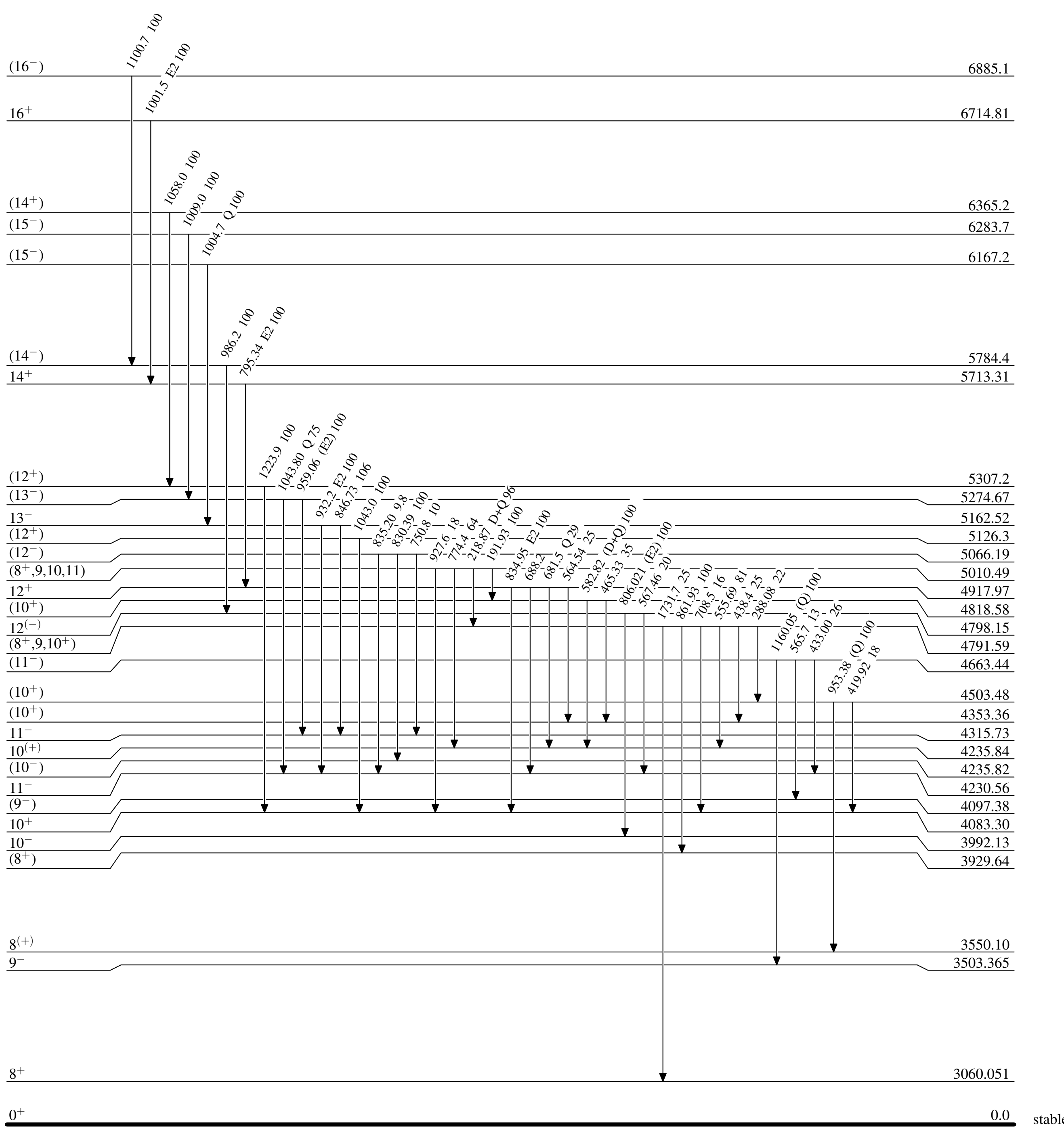
γ Decay (Uncertain)



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

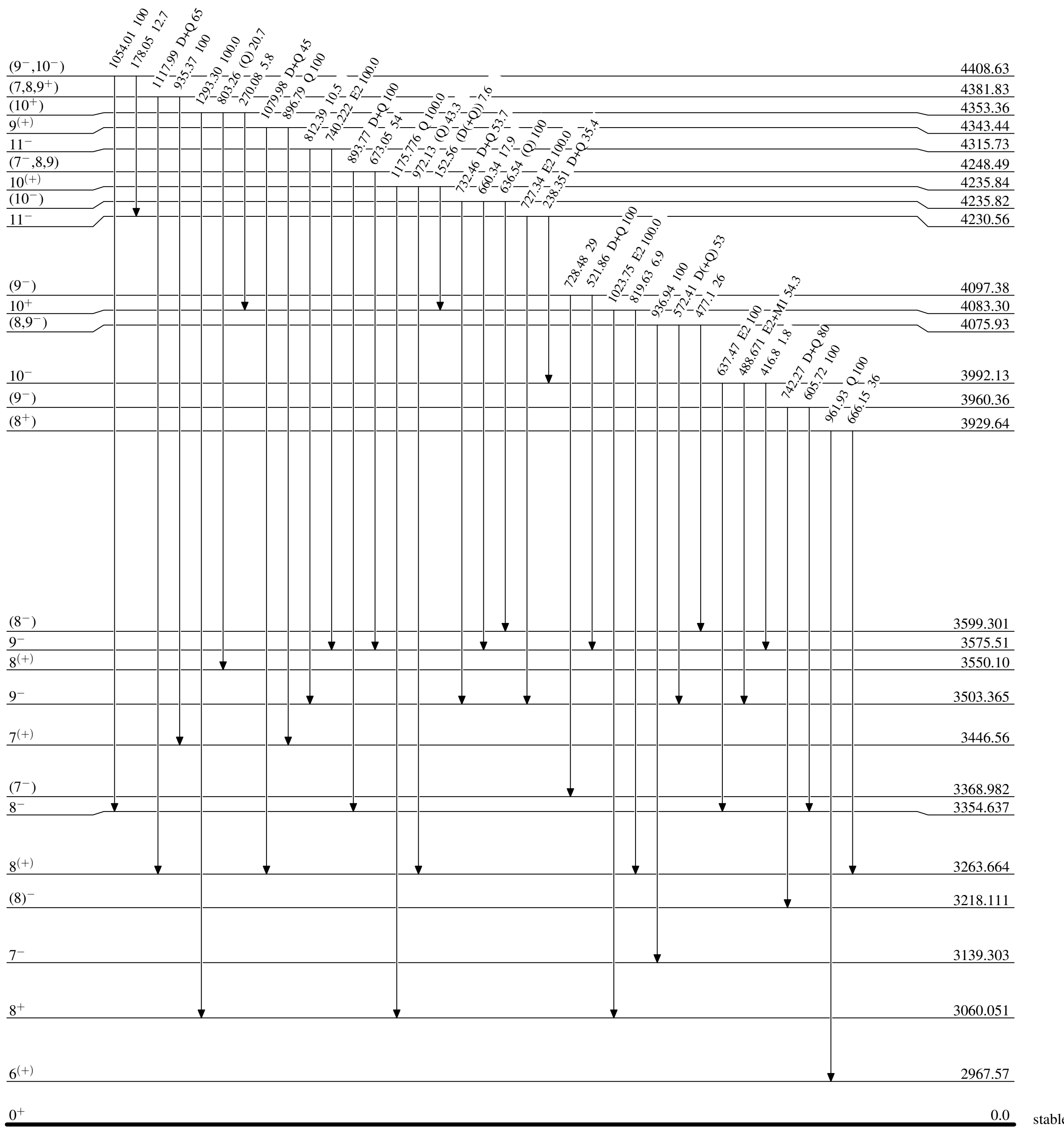


$^{100}_{44}Ru_{56}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{100}_{44}Ru_{56}$

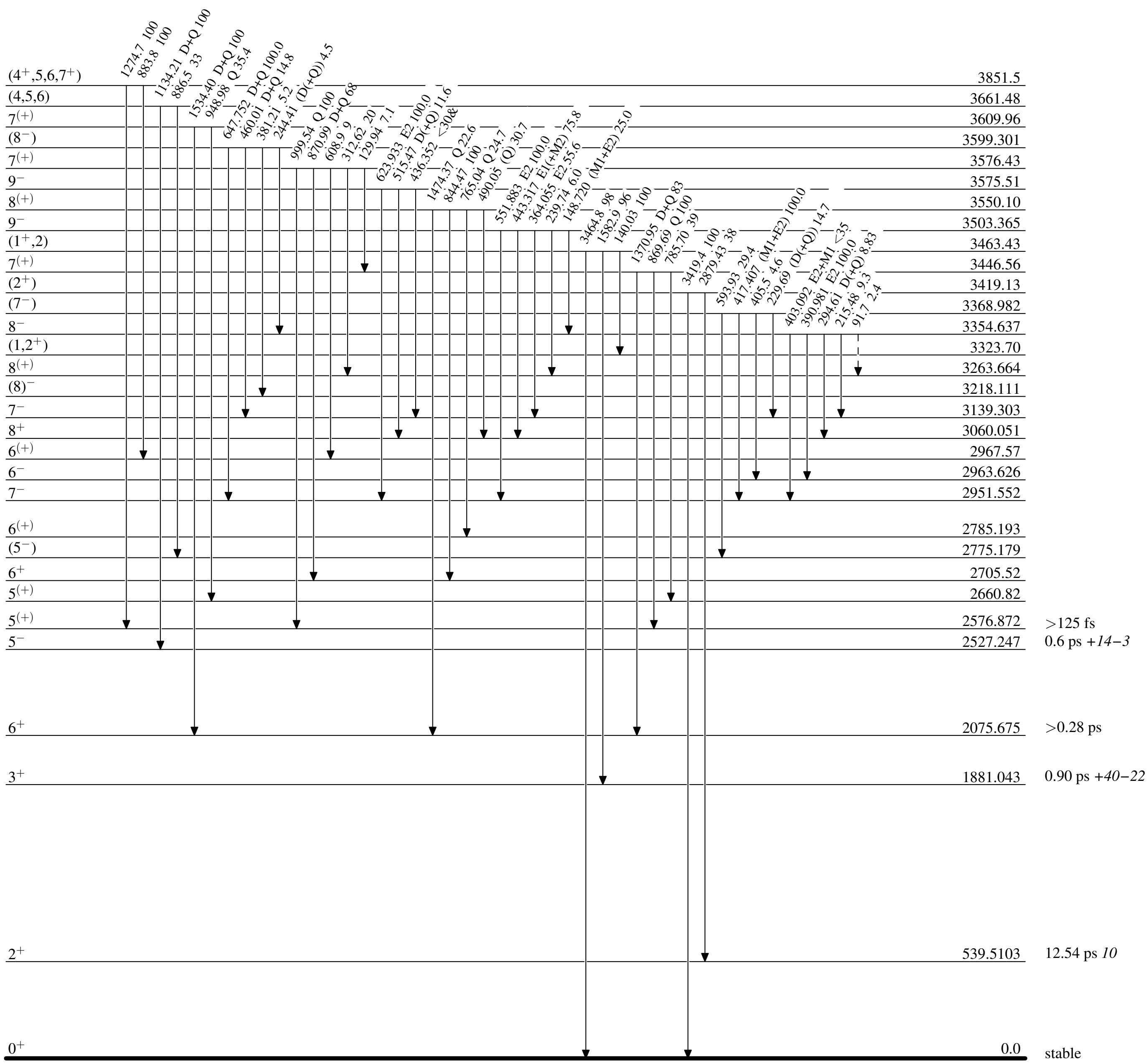
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

γ Decay (Uncertain)



$^{100}_{44}Ru_{56}$

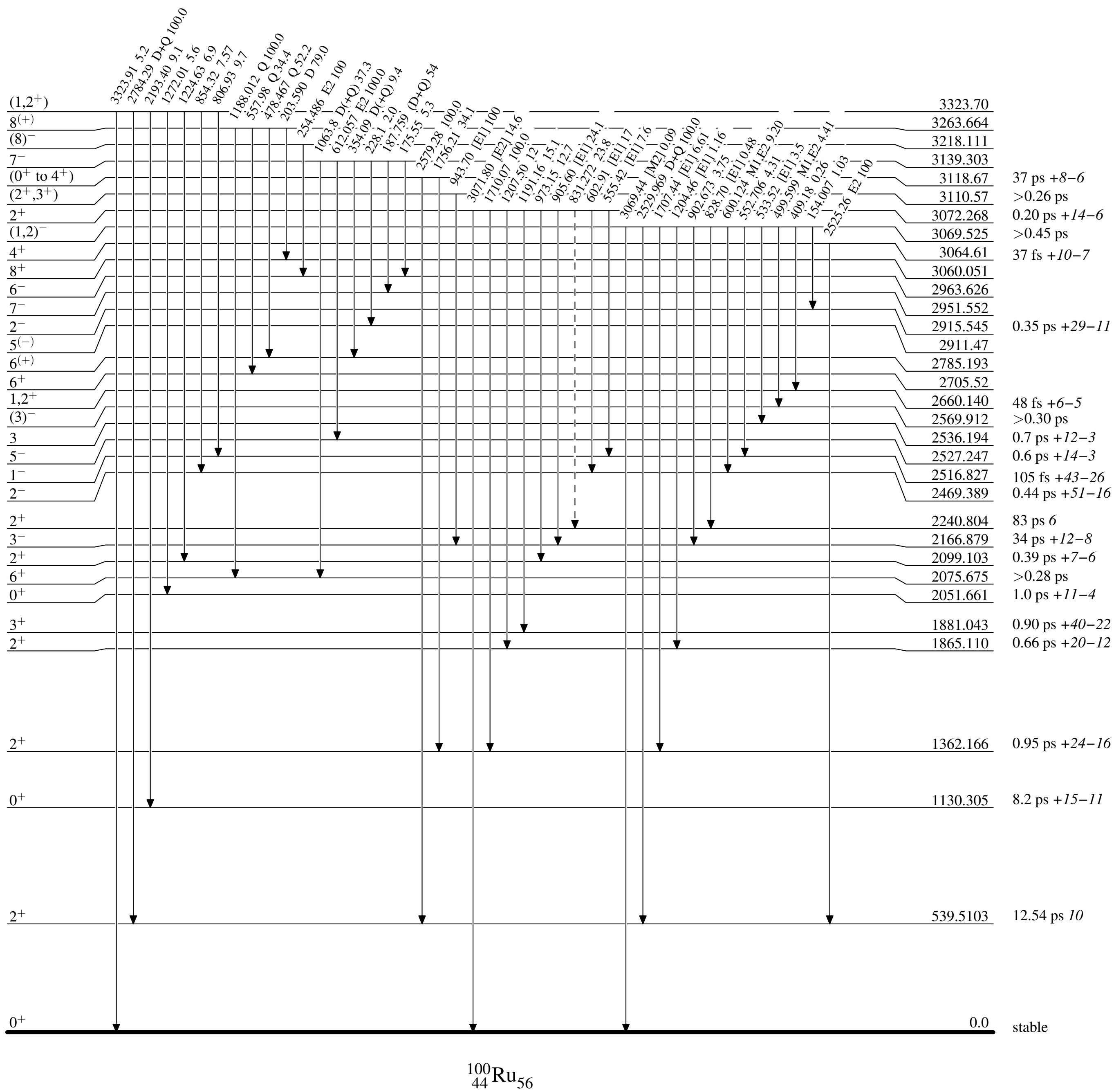
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

Legend

γ Decay (Uncertain)



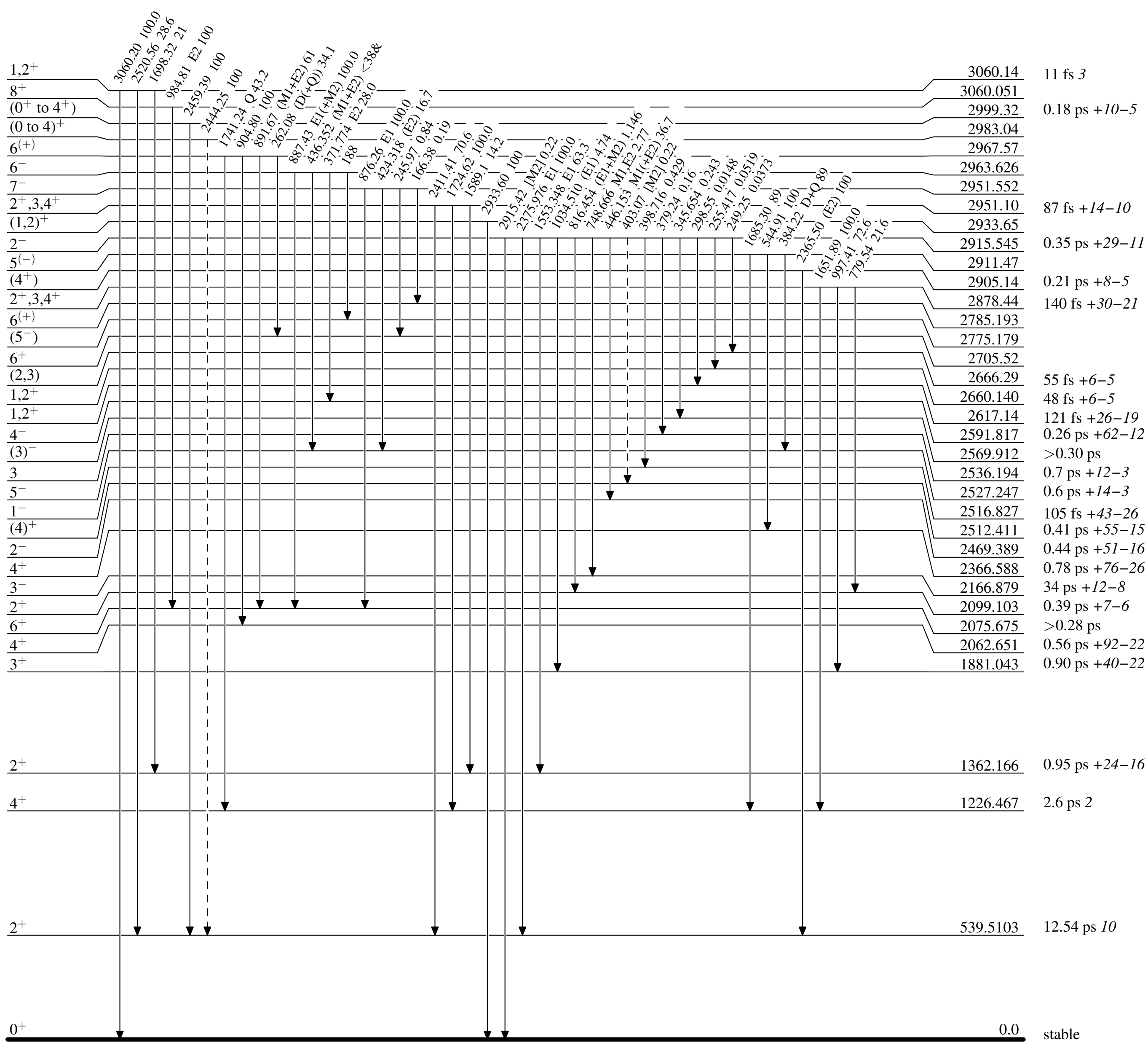
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

Legend

γ Decay (Uncertain)



$^{100}_{44}Ru_{56}$

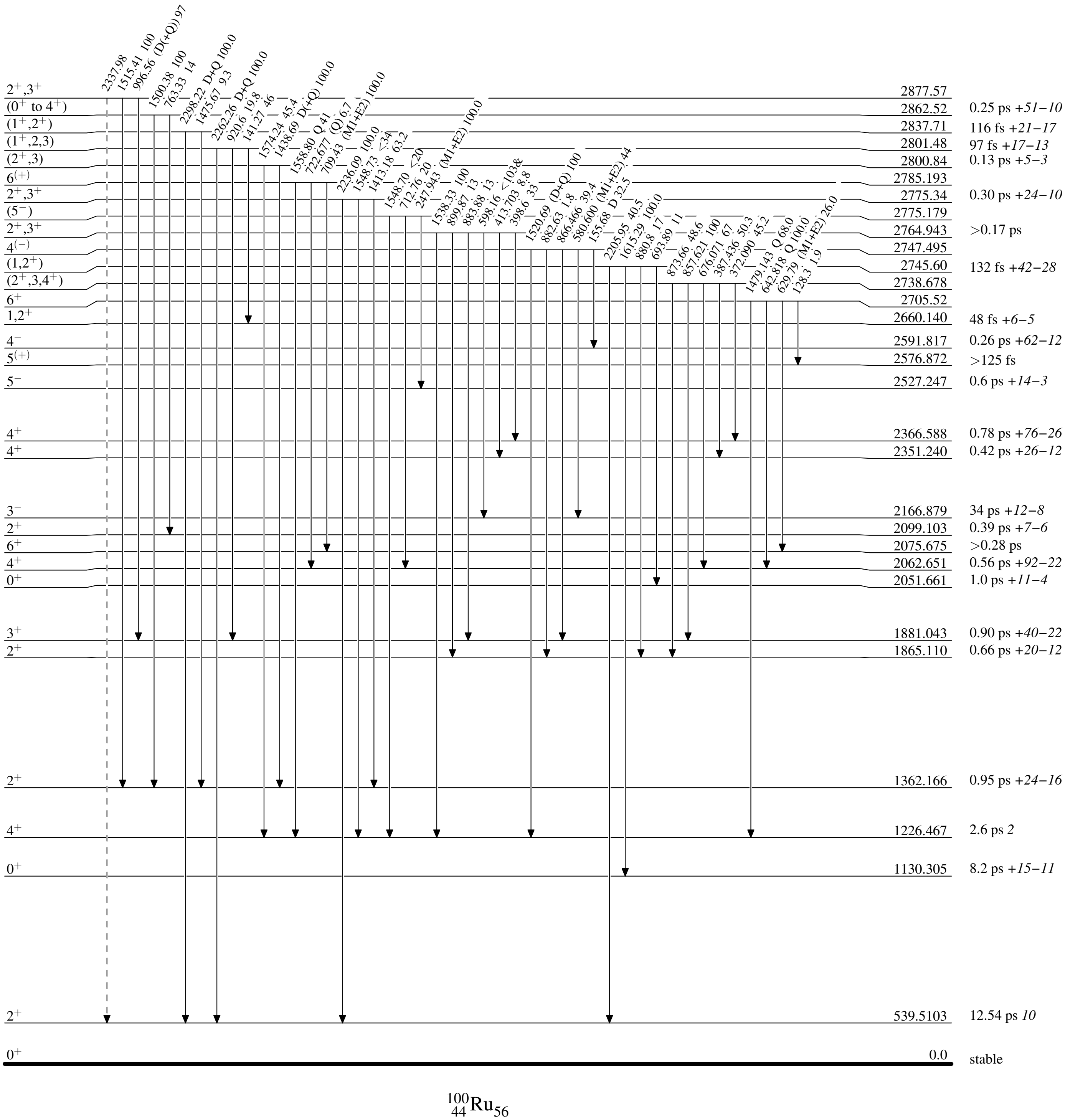
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

γ Decay (Uncertain)



$^{100}_{44}Ru_{56}$

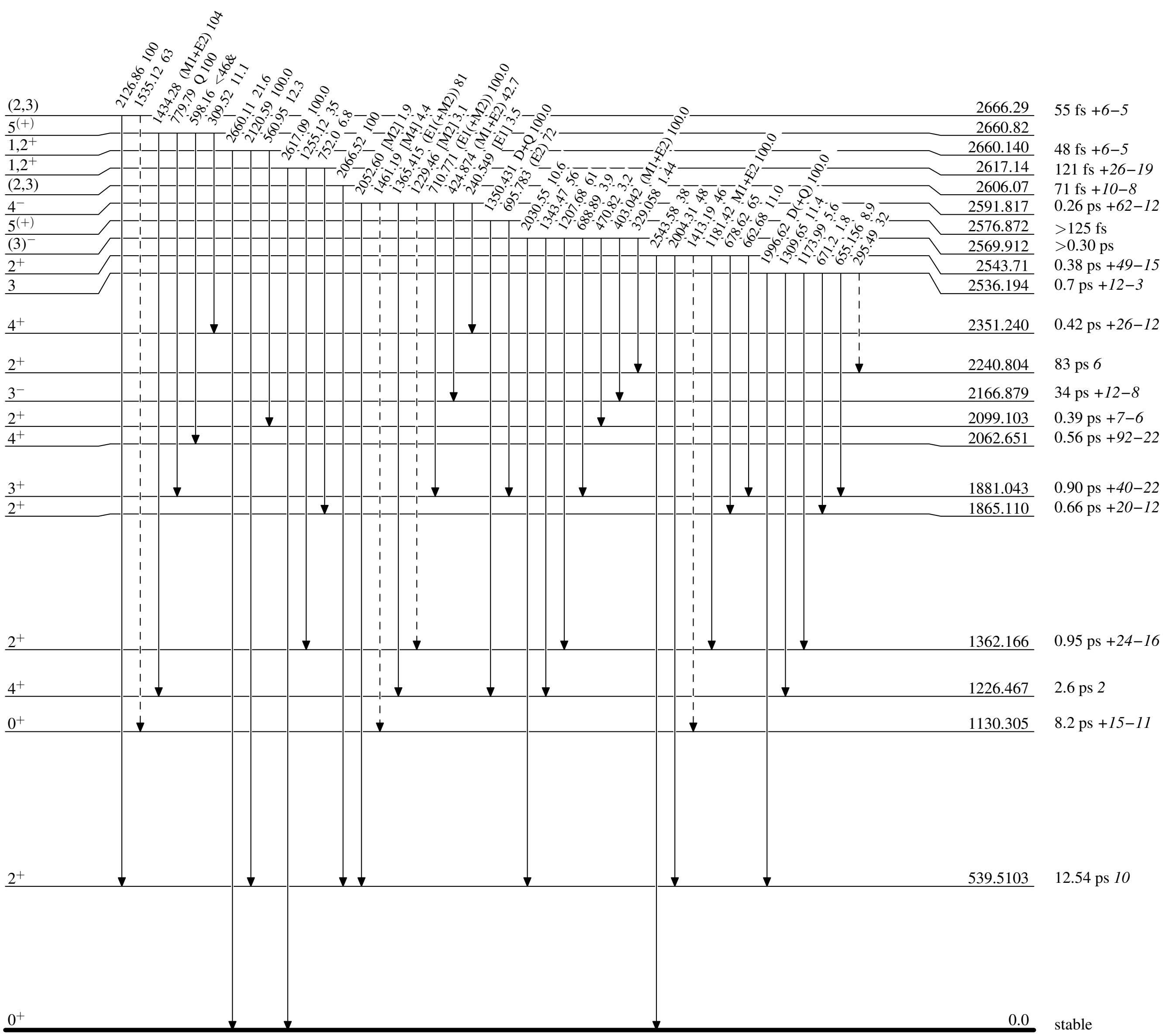
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

Legend

γ Decay (Uncertain)



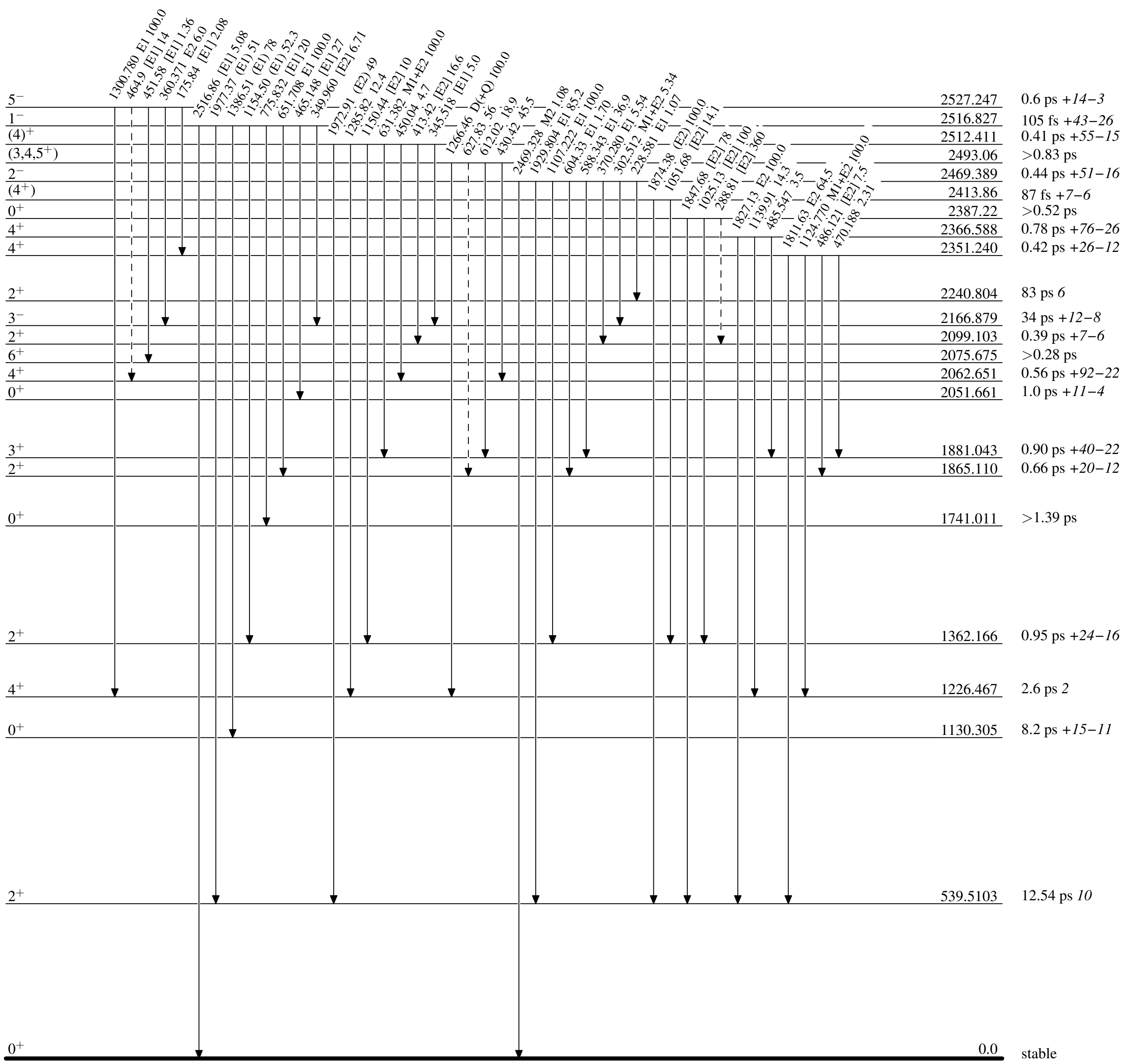
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

- - - - - -► γ Decay (Uncertain)



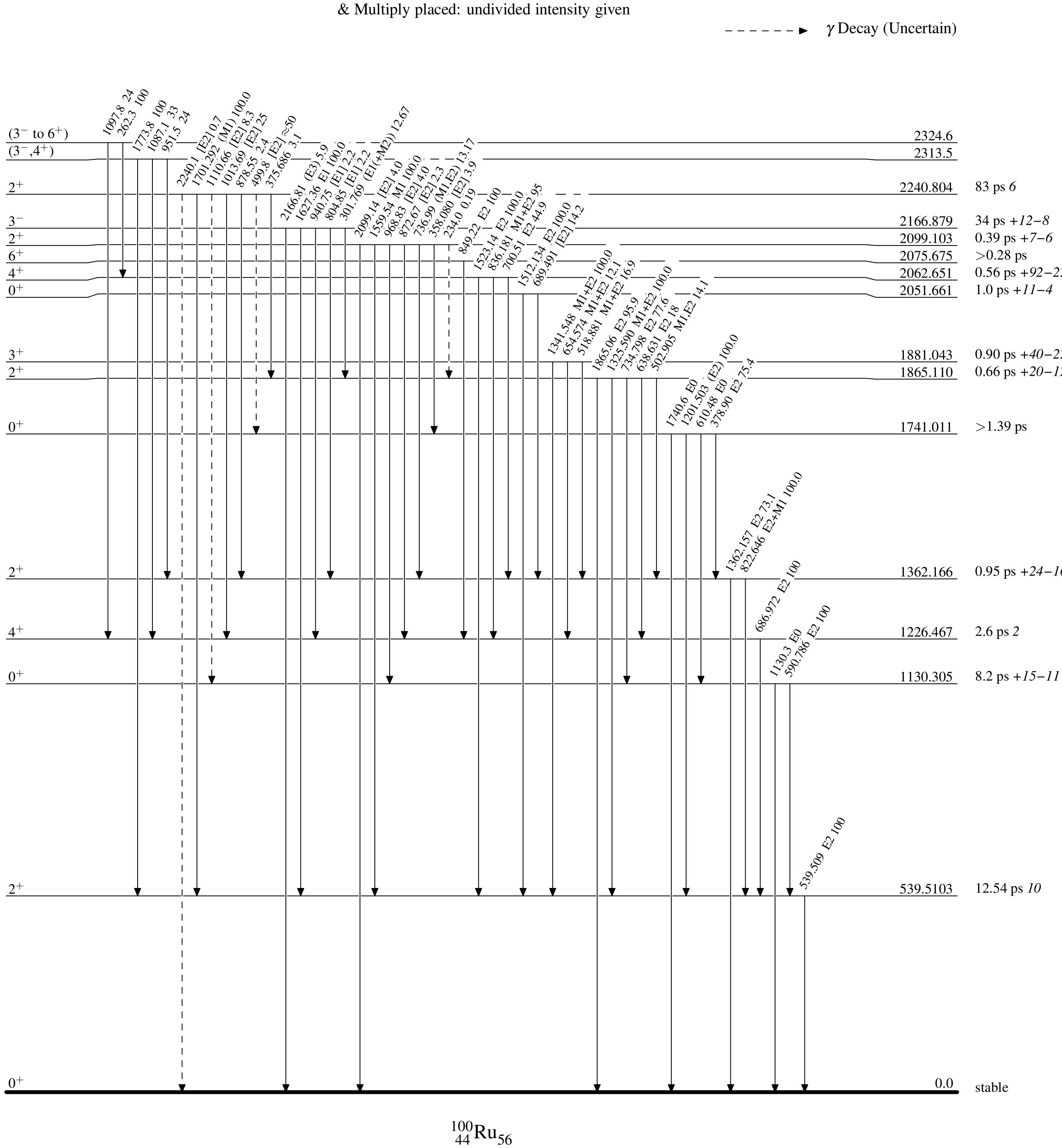
$^{100}_{44}Ru_{56}$

Adopted Levels, Gammas

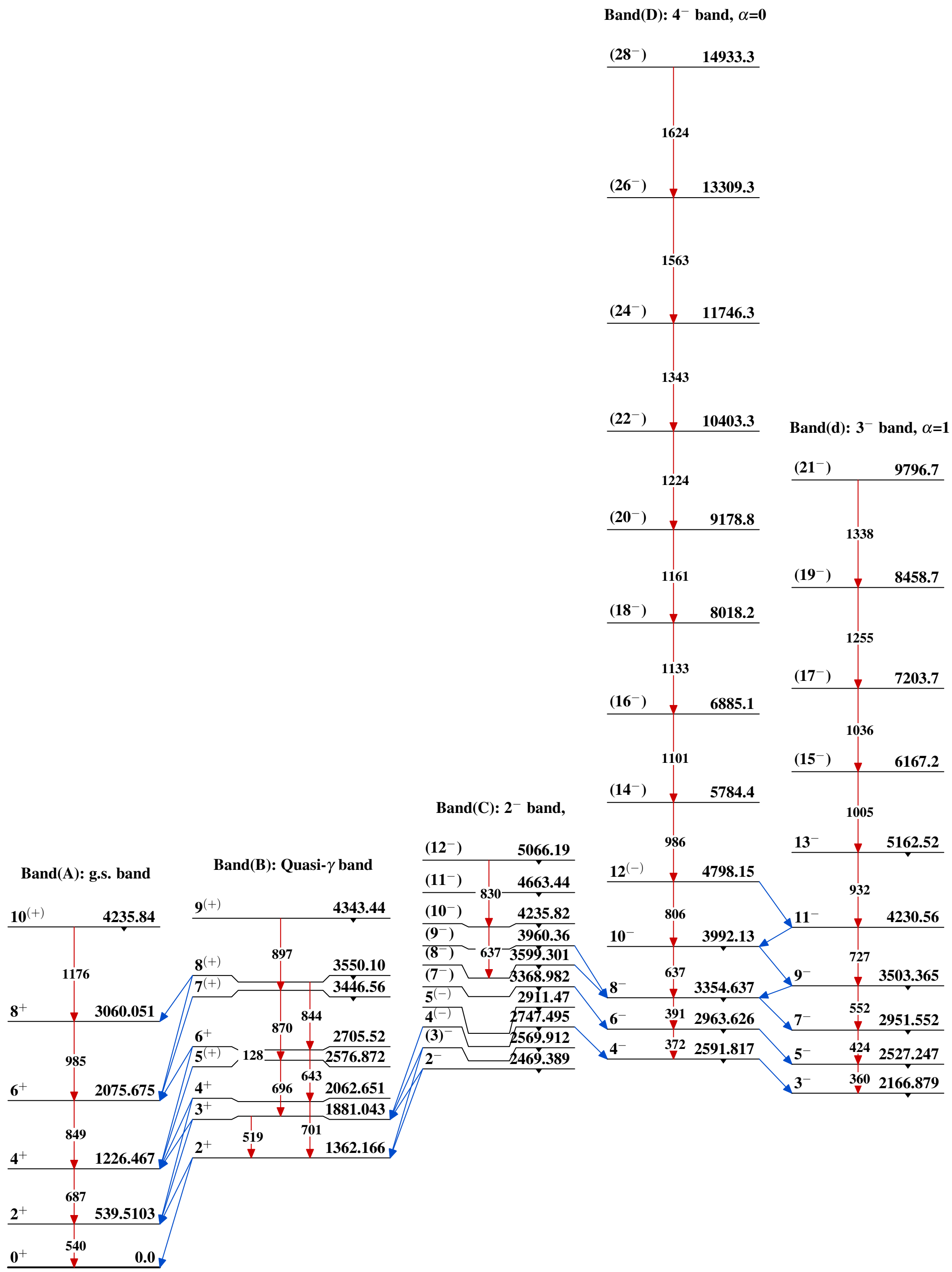
Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

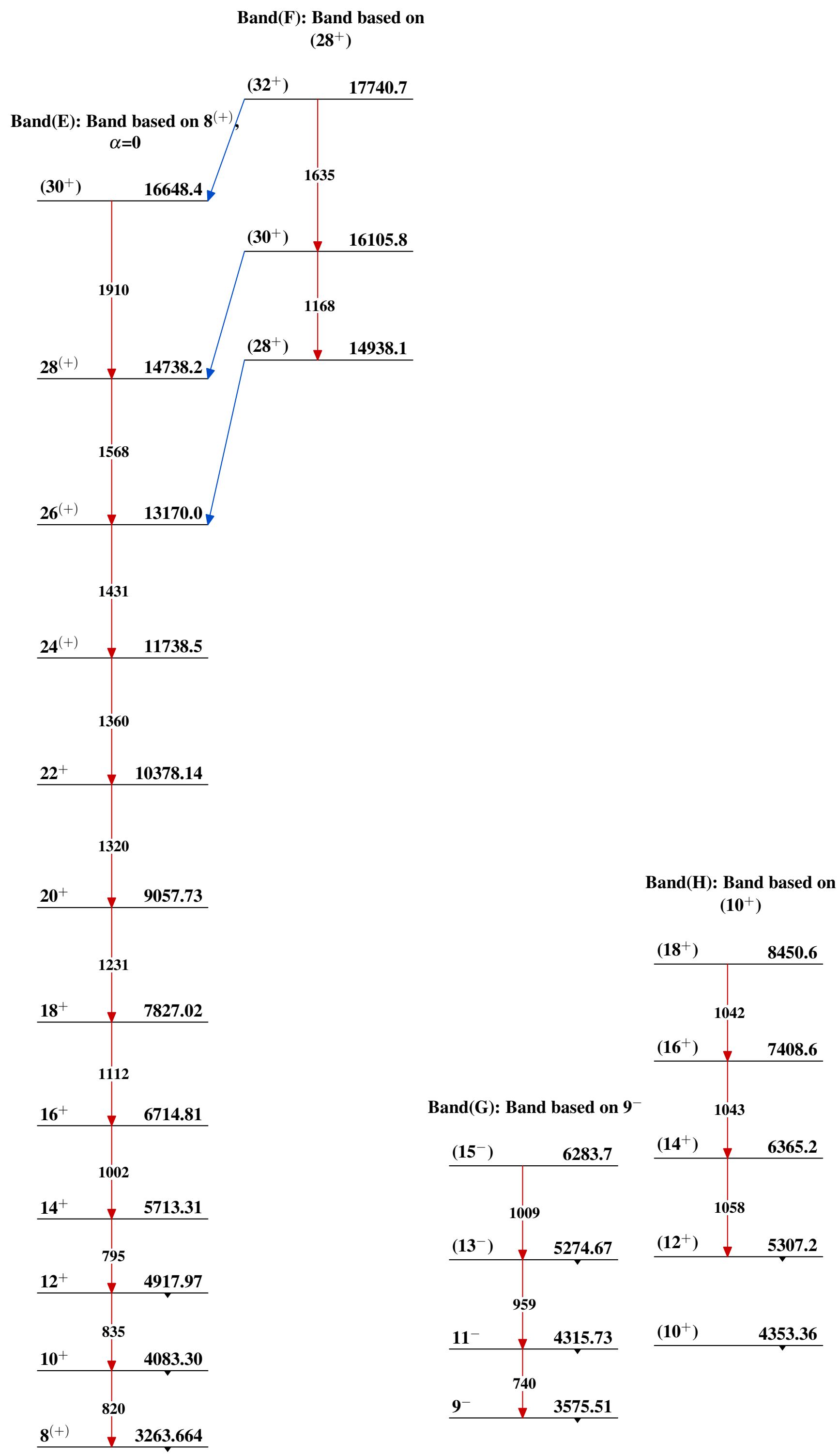


Adopted Levels, Gammas



$^{100}_{44}Ru_{56}$

Adopted Levels, Gammas (continued)



$^{100}_{44}Ru_{56}$

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	D. De Frenne	NDS 110,1745 (2009)	31-Dec-2008

Q(β^-)=−2322 *5*; S(n)=9219.64 *5*; S(p)=10051 *24*; Q(α)=−3413.0 *12* 2012Wa38
Note: Current evaluation has used the following Q record −2323 5 *9219.74 5* 10051 24-3411.2 *16* 2003Au03.

^{102}Ru Levels

All band assignments from ^{96}Zr(^{13}C,α3nγ) (2005So09).

Cross Reference (XREF) Flags

A	^{102}Tc β^- decay (4.35 min)	G	^{101}Ru(n,γ) E=resonance	M	^{162}Dy(^{36}S,F)
B	^{102}Rh ε decay (207.3 d)	H	^{101}Ru(d,p)	N	^{96}Zr(^{9}Be,3nγ)
C	^{102}Rh ε decay (3.742 y)	I	^{102}Ru(d,d′)	O	^{96}Zr(^{10}B,p3nγ)
D	^{100}Mo(^{3}He,n)	J	Coulomb excitation	P	^{96}Zr(^{13}C,α3nγ)
E	^{100}Mo(α,2nγ)	K	^{100}Mo(^{7}Li,p4nγ),(^{7}Li,d3nγ),		
F	^{101}Ru(n,γ) E=thermal	L	^{100}Mo(^{12}C,^{10}Be)		

E(level)[†]	J$^\pi$[@]	$T_{1/2}$[‡]	XREF	Comments
0[&]	0$^+$	stable	ABCDEFGHIJKLMNOP	<r^2>$^{1/2}$=4.4818 fm *20* (2004An14, evaluation).
475.0962[&] *10*	2$^+$	18.4 ps *3*	ABC EFGHIJKLMNOP	Q=−0.64 *5*; μ=+0.71 *6* β_2= 0.2404 *14*(2001Ra27) E(level): From Budapest data for (n,γ). Q: From coulomb excitation, other value: −0.33 *4* (1998Hi01) Others: 1980La01, 1979Bo28. μ: From IPAC (1989Ra17), recalculated for $T_{1/2}$. J$^\pi$: E2 γ to 0$^+$ (α,2nγ). $T_{1/2}$: From B(E2) evaluation (2001Ra27) (207-d ^{102}Rh ε decay).
943.69 *5*	0$^+$	25 ps *4*	B FG J	q_K^2(E0/E2)=0.175 *15*, X(E0/E2)=0.0142 *12*, ρ^2(E0)=0.014 *3* (2005Ki02, evaluation). J$^\pi$: E0 γ to 0$^+$ (^{102}Rh ε decay (207 d)).
1103.047[g] *13*	2$^+$	4.0 ps *5*	ABC EFG IJ O	E(level): From Budapest data for (n,γ). J$^\pi$: E2+M1 to 2$^+$; $\gamma\gamma(\theta)$ in ^{102}Rh ε decay (2.9 y).
1106.43[&] *3*	4$^+$	3.0[#] ps *5*	ABC EFG JK MNOP	J$^\pi$: $\gamma(\theta)$, γ(pol), excit in (α,2nγ).
1521.600[h] *22*	3$^+$		ABC FG O	E(level): From Budapest data for (n,γ). J$^\pi$: E2+M1 γ to 2$^+$; $\gamma\gamma(\theta)$ in ^{102}Rh ε decay (2.9 y).
1580.56 *4*	2$^+$		B FG	J$^\pi$: E2+M1 γ to 2$^+$; $\gamma\gamma(\theta)$ in ^{102}Rh ε decay (207 d) rules out J=1; γ′s to 0$^+$ rule out J=3.
1603.37 *18*	(3,4$^+$)		A F	J$^\pi$: from log *ft*=5.5 from (4,5) and γ to 2$^+$.
1799.08[g] *4*	4$^+$		A C FG K O	J$^\pi$: γ′s to 2$^+$,4$^+$.
1837.25 *7*	0$^+$		B G	J$^\pi$: J=0 from $\gamma\gamma(\theta)$ in ^{102}Rh ε decay (207 d); positive parity from E2 γ to 2$^+$.
1873.25[&] *7*	6$^+$	1.1[#] ps *4*	C EFG K MNOP	J$^\pi$: $\gamma(\theta)$, γ(pol), excit in (α,2nγ) and band structure in (^{7}Li,(p,d,t)xn).
1968.01 *16*	(0)$^+$		F	J$^\pi$: (0,1,2)$^+$ from log *ft*=5.5 from 1$^+$. 0$^+$ favored from absence of γ′s to other 0$^+$ states.
2036.73 *9*	2$^+$		B FG	J$^\pi$: E2+M1 γ to 2$^+$; $\gamma\gamma(\theta)$ in ^{102}Rh ε decay (207 d).
2043.393[a] *25*	3$^-$		B FG IJ L P	B(E3)↑=0.065 *10* E(level): From Budapest data for (n,γ). B(E3)↑: From Coul. ex., (d,d′). J$^\pi$: L(d,d′)=3.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{102}Ru Levels (continued)

E(level)[†]	J^{π}[@]	$T_{1/2}$[‡]	XREF	Comments
2152.74 *6*			E	
2190.0 *14*			G	
2219.03[h] *9*	5^+		A C FG O	J^{π}: E2+M1 γ to 4^+; $\gamma\gamma(\theta)$ in ^{102}Rh ε decay (2.9 y) consistent with J=3 or 5; log *ft* rules out J=3.
2240.78 *12*			FG	
2261.09 *5*	2^-		B FG	J^{π}: $\gamma\gamma(\theta)$ results from ^{102}Rh ε decay (207 d) consistent with J=2, not with J=1 or J=3; strong population of this level from the 3^+ 42-eV resonance in ^{101}Ru(n,γ). J^{π}: parity from E1 to π=+ states.
2302.70 *11*	(4)		G I	E(level): from (n,γ). J^{π}: combining the results of 1974Ri03 and 1982Co15 J^{π}=(4) is suggested by 1982Co15.
2367.3 *7*	(3^-)		E G I K	E(level): from (n,γ). J^{π}: L(d,d′) probably 3, although L=4 cannot be excluded.
2373.05[a] *20*	5^-		P	
2385.7 *11*			G I	
2420.0 *4*	$(3,4^+)$		A FG	J^{π}: from log *ft*=6.6 from (4,5) and γ to 2^+.
2441.8 *3*	$(3,4^+)$		A	J^{π}: from log *ft*=6.2 from (4,5) and γ to 2^+.
2460 *5*			I	
2467.389 *25*			EFG	E(level): From Budapest data for (n,γ).
2567 *5*			I	
2586.5[g] *4*	6^+		O	
2591.79 *5*			FG	
2614.74 *12*	$(3,4^+)$		A F	J^{π}: log *ft*=6.4 from (4,5) and γ to 2^+.
2649.93[b] *23*	6^-		E G I K P	
2676.1 *10*	$(0,1,2)^+$		F	J^{π}: log *ft*=5.7 from 1^+.
2700.5 *5*	$(3,4^+)$		A E G I K O	J^{π}: log *ft*=5.8 from (4,5) and γ to 2^+.
2706.1[&] *3*	8^+	0.9[#] ps *3*	MN P	
2706.45[a] *25*	(7^-)		E K P	
2711.15 *6*			G	E(level): from (n,γ).
2719.2 *4*	$(3,4^+)$		A	J^{π}: log *ft*=5.2 from (4,5) and γ to 2^+.
2789.84 *6*			G	E(level): from (n,γ).
2800.97 *9*			G	E(level): from (n,γ).
2814.4 *3*	$(3,4^+)$		A	J^{π}: log *ft*=5.8 from (4,5) and γ to 2^+.
2822.9 *11*			G	
2877.5 *13*			G	
2899.0 *14*			G	
2909.1 *10*	$(0,1,2)^+$			J^{π}: log *ft*=5.5 from 1^+.
2913.7 *7*	$(3,4^+)$		A	J^{π}: log *ft*=5.5 from (4,5) and γ to 2^+.
2936.6[c] *4*	(7^-)		P	J^{π}: parentheses used as no strong arguments are given.
2942.0[b] *3*	(8^-)		E K P	
2944.75 *4*			F	
2946.1 *6*			G	
2956.4 *17*			G	
2967.0 *13*			G	
3010.3 *7*	$(3,4^+)$		A	J^{π}: log *ft*=6.0 from (4,5) and γ to 2^+.
3035.4[h] *4*	7^+		FG O	
3056.73 *6*			FG	E(level): from (n,γ).
3085.6 *18*			G	
3138.5[a] *4*	(9^-)		K P	
3157.1 *21*			G	
3234.2 *11*			G	
3244.7 *14*			G	
3328.2[d] *5*	(8^-)		P	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{102}Ru Levels (continued)

E(level)[†]	J^π[@]	$T_{1/2}$[‡]	XREF
3347.2 *26*			G
3388.6 *13*			E G
3394.9[g] *6*	(8^+)		O
3434.2[&] *4*	10^+	1.7[#] ps *6*	E K MNOP
3450.4 *11*			G
3456.7[c] *4*	(9^-)		P
3468.9 *15*			G
3537.9[b] *4*	(10^-)		K P
3549.1 *15*			G
3576.7 *14*			G
3680.1 *13*			G
3688.6 *12*			G
3699.6 *13*			G
3718.4 *11*			G
3733.0 *22*			G
3741.3 *11*			G
3749.3 *13*			G
3758.5 *10*			G
3772			K
3782.1 *11*			G
3791.3 *13*			G
3819.6[a] *5*	(11^-)		G K P
3840.9 *12*			G
3858.9[e] *5*	$(10)^+$		P
3875.7 *16*			G
3885.6 *11*			G
3916.7[h] *6*	9^+		O
3937.0 *13*			G
3972.9 *14*			G
4013.0[d] *7*	(10^-)		P
4033.5 *14*			G
4055.6[&] *5*	12^+	2.5[#] ps *7*	E K MN P
4066.2 *13*			G
4081.0 *13*			G
4087.9 *13*			G
4113.9 *22*			G
4125.3 *14*			G
4179.1 *15*			G
4179.8 *13*			G
4183.7[c] *5*	(11^-)		P
4294.7[g] *8*	(10^+)		O
4365.1[b] *5*	(12^-)		P
4615			K
4710.9[a] *7*	(13^-)		K P
4720.1[e] *5*	$(12)^+$		P
4754.6[h] *8*	(11^+)		O
4808.4[&] *7*	14^+	0.9[#] ps *3*	E K MN P
4839.8[d] *9*	(12^-)		P
5069.9[c] *6*	(13^-)		P
5370.4[b] *6*	(14^-)		P
5678.4[e] *6*	$(14)^+$		P
5724.6[&] *8*	16^+		E K N P
5757.6[a] *8*	(15^-)		P
5766.6[d] *11*	(14^-)		P
6058.3[c] *8*	(15^-)		P
6080.8[f] *8*	(14^+)		P
6507.2[b] *7*	(16^-)		P
6725.4[d] *12*	(16^-)		P
6790.4[&] *8*	18^+		N P
6918.0[a] *9*	(17^-)		P
7000.5[f] *8*	(16^+)		P
7118.3[c] *9*	(17^-)		P
7750.4[b] *8*	(18^-)		P
7998.3[&] *9*	20^+		N P
8053.6[f] *8*	(18^+)		P
8125.9[a] *10*	(19^-)		P
8247.0[c] *10*	(19^-)		P
9037.3[b] *11*	(20^-)		P
9219.52 *10*			F
9248.7[f] *9*	(20^+)		P
9304.5[&] *10*	22^+		P
9370.5[a] *11*	(21^-)		P
9509.7[c] *11*	(21^-)		P
10681.1[a] *12*	(23^-)		P
10708.3[&] *11*	24^+		P
12221.6?[&] *13*	(26^+)		P

[†] Unless noted otherwise, from adopted gammas using a least-squares procedure.
[‡] Unless noted otherwise, from Coulomb excitation.
[#] From ^{100}Mo(α,2nγ).
[@] Unless noted otherwise, from $\gamma\gamma$, charged particle-γ coin, $\gamma\gamma(\theta)$(DCO), $\gamma\gamma$(lin pol) and observed band structure in ^{96}Zr(^{13}C,α3nγ) (2005So09).
[&] Band(A): Yrast band. Predominantly $\nu h^2_{11/2}$ above the first crossing at $\hbar\omega\approx$0.4 MeV.
[a] Band(B): Band 2. $\nu(h_{11/2}(d_{5/2},g_{7/2}))$; α=1. Vibration structure below 9^-, rotational above this spin. Bandhead at 2045 keV.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{102}Ru Levels (continued)

[b] Band(b): Band 3. $\nu(h_{11/2}(d_{5/2},g_{7/2}))$; α=0.
[c] Band(C): Band 4. $\nu(h_{11/2}(d_{5/2},g_{7/2}))$; α=1. Bandhead at 2936 keV.
[d] Band(c): Band 5. $\nu(h_{11/2}(d_{5/2},g_{7/2}))$; α=0.
[e] Band(D): Band based on 10^+. γ-vibration $\otimes$ $\nu h^2_{11/2}$ (?).
[f] Band(E): Band based on (14^+). β-vibration $\otimes$ $\nu h^2_{11/2}$ (?).
[g] Band(F): quasi-γ band, even spin (2005La07).
[h] Band(f): quasi-γ band, odd spin (2005La07).

$\gamma(^{102}Ru)$

E_i(level)	J^{π}_i	E_γ[†]	I_γ[‡]	E_f	J^{π}_f	Mult.[#]	δ[&]	Comments
475.0962	2^+	475.095 *1*	100	0	0^+	E2		B(E2)(W.u.)=44.6 *7* E_γ: From Budapest data for (n,γ). B(E2)(W.u.): From Coul. ex. Mult.: from (α,2nγ).
943.69	0^+	468.64 *9*	100	475.0962	2^+	E2		B(E2)(W.u.)=35 *6* B(E2)(W.u.): From Coul. ex.
		943.48		0	0^+	E0		Observed in 207-d ^{102}Rh ε decay. $I_{(\gamma+ce)}$: Ice(944γ)/Iγ(468γ)=0.00095 *18*.
1103.047	2^+	627.974 *12*	100 *3*	475.0962	2^+	E2(+M1)+E0	−60 *20*	B(M1)(W.u.)=(4.E−6 *3*); B(E2)(W.u.)=(32 *5*) E_γ: From Budapest data for (n,γ). B(E2)(W.u.): From Coul. ex.
		1103.03 *3*	59 *3*	0	0^+	E2		B(E2)(W.u.)=1.14 *15* B(E2)(W.u.): From Coul. ex.
1106.43	4^+	631.25 *3*	100	475.0962	2^+	E2[@]		B(E2)(W.u.)=66 *11* B(E2)(W.u.): From Coul. ex. Mult.: from (α,2nγ).
1521.600	3^+	415.24 *3*	6.3 *6*	1106.43	4^+			
		418.48 *3*	31.8 *22*	1103.047	2^+	E2+M1	−7.2 *10*	
		1046.498 *2*	100 *4*	475.0962	2^+	E2+M1	−5.7 *3*	δ: from 1989Hi12.
1580.56	2^+	636.83 *4*	60 *4*	943.69	0^+			
		1105.36 *7*	100 *7*	475.0962	2^+	E2+M1	+0.25 *3*	
		1580.64 *16*	14 *3*	0	0^+			
1603.37	$(3,4^+)$	497.14 *19*	100 *14*	1106.43	4^+			
		1127.5 *3*	20 *1*	475.0962	2^+			
1799.08	4^+	692.25 *6*	59 *5*	1106.43	4^+			
		696.50 *6*	100 *14*	1103.047	2^+			
		1323.3 *3*	16 *3*	475.0962	2^+			
1837.25	0^+	256.8 *4*	5.3 *24*	1580.56	2^+			
		733.93 *8*	27 *5*	1103.047	2^+			
		1362.06 *19*	100 *11*	475.0962	2^+	E2		
1873.25	6^+	766.83 *4*	100	1106.43	4^+	E2[@]		B(E2)(W.u.)=68 *25* Mult.: from (α,2nγ).
1968.01	$(0)^+$	865.96 *16*	100	1103.047	2^+			
2036.73	2^+	456.26 *13*	81 *12*	1580.56	2^+			
		930.5 *2*	27 *10*	1106.43	4^+			
		1561.48 *17*	100 *16*	475.0962	2^+	E2+M1+E0	−1.9 *4*	
		2037.0 *2*	27 *12*	0	0^+			
2043.393	3^-	463.1[a]		1580.56	2^+			
		940.30 *3*	86 *8*	1103.047	2^+			
		1568.39 *4*	100 *9*	475.0962	2^+	E1[@]		

$^{102}_{44}Ru_{58}$-5

$\gamma(^{102}Ru)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[&]	Comments
2152.74		1047.3[a]	100	1106.43	4^+			
2219.03	5^+	345.89 *12*	1.98 *23*	1873.25	6^+			
		420.40 *15*	7.2 *6*	1799.08	4^+			
		697.42 *9*	100 *4*	1521.600	3^+	E2		
		1112.82 *8*	39 *3*	1106.43	4^+	E2+M1	−1.1 *+6−9*	
2261.09	2^-	216.9 *3*	1.7 *17*	2043.393	3^-			
		680.64 *4*	83 *11*	1580.56	2^+	E1		
		739.50 *7*	100 *10*	1521.600	3^+	E1+M2	−0.1 *1*	
		1158.11 *5*	100 *7*	1103.047	2^+	E1		
		1786.4 *4*	71 *10*	475.0962	2^+			
		2261.3 *4*	3 *3*	0	0^+			
2302.70	(4)	1197.2[a]	100	1106.43	4^+			
2373.05	5^-	328.1 *4*	2.4 *8*	2043.393	3^-	Q[@]		
		498.4 *4*	3.2 *8*	1873.25	6^+			
		1266.2 *5*	100 *6*	1106.43	4^+	E1[@]		
2420.0	$(3,4^+)$	1318 *3*	59 *12*	1103.047	2^+			
		1944.9 *4*	100 *6*	475.0962	2^+			
2441.8	$(3,4^+)$	920.2 *9*	20 *3*	1521.600	3^+			
		1338.6 *3*	100 *4*	1103.047	2^+			
		1967 *3*	35.4 *21*	475.0962	2^+			
2467.389		1992.02 *10*	100	475.0962	2^+			
2586.5	6^+	712.4 *5*	<56	1873.25	6^+			
		786.8 *4*	100 *11*	1799.08	4^+			
2591.79		548.44 *5*	100	2043.393	3^-			
2614.74	$(3,4^+)$	1511.68 *14*	54 *4*	1103.047	2^+			
		2140.00 *25*	100 *5*	475.0962	2^+			
2649.93	6^-	276.8 *3*	33 *3*	2373.05	5^-	D[@]		
		775.4 *3*	100 *11*	1873.25	6^+	E1[@]		
2676.1	$(0,1,2)^+$	2201.2 *3*	100	475.0962	2^+			
2700.5	$(3,4^+)$	1179.2 *6*	10.7 *15*	1521.600	3^+			
		1596.2 *8*	48 *3*	1103.047	2^+			
		2225.7 *15*	100 *4*	475.0962	2^+			
2706.1	8^+	831.4 *3*	100	1873.25	6^+	E2[@]		B(E2)(W.u.)=56 *19* E_γ: forms together with $E\gamma$=831.0 in single spectra an unresolved doublet.
2706.45	(7^-)	333.6 *5*	14 *3*	2373.05	5^-	E2[@]		
		831.4 *3*	100 *5*	1873.25	6^+	E1[@]		
2719.2	$(3,4^+)$	1197.6 *5*	49 *6*	1521.600	3^+			
		1615.3 *7*	100 *4*	1103.047	2^+			
		2244.7 *15*	77 *3*	475.0962	2^+			
2814.4	$(3,4^+)$	1292.5 *3*	100 *10*	1521.600	3^+			

From ENSDF

$^{102}_{44}Ru_{58}$-6

$\gamma(^{102}\mathrm{Ru})$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Mult.[#]	Comments
2814.4	$(3,4^+)$	1711.2 *15*	66 *4*	1103.047	2^+		
		2340.0 *15*	12.8 *16*	475.0962	2^+		
2909.1	$(0,1,2)^+$	2434 *1*	100	475.0962	2^+		
2913.7	$(3,4^+)$	1810.7 *10*	100 *4*	1103.047	2^+		
		2438.4 *10*	79 *3*	475.0962	2^+		
2936.6	(7^-)	563.9 *4*	100 *17*	2373.05	5^-	Q[@]	
		1061.9 *9*	33 *8*	1873.25	6^+		
2942.0	(8^-)	235.4 *3*	58 *4*	2706.45	(7^-)	D[@]	
		292.3 *5*	100 *6*	2649.93	6^-	E2[@]	
3010.3	$(3,4^+)$	1488.1 *10*	41.1 *21*	1521.600	3^+		
		1907.3 *10*	100 *8*	1103.047	2^+		
		2536 *3*	30.2 *21*	475.0962	2^+		
3035.4	7^+	815.1 *4*	100 *12*	2219.03	5^+		
		1161.5 *5*	<40	1873.25	6^+		
3138.5	(9^-)	196.6 *5*	0.9 *5*	2942.0	(8^-)		
		432.0 *3*	100 *6*	2706.45	(7^-)	E2[@]	
3328.2	(8^-)	386.3 *4*	100 *13*	2942.0	(8^-)	M1+E2[@]	Mult.: No δ from ^{96}Zr(^{13}C,α3nγ) (2005So09).
		621.4 *9*	38 *13*	2706.45	(7^-)		
3394.9	(8^+)	808.4 *5*	100	2586.5	6^+		
3434.2	10^+	728.1 *3*	100	2706.1	8^+	E2[@]	B(E2)(W.u.)=57 *21*
3456.7	(9^-)	514.6 *4*	100 *13*	2942.0	(8^-)		
		520.4 *4*	44 *6*	2936.6	(7^-)	Q[@]	
		750.2 *8*	25 *6*	2706.45	(7^-)		
3537.9	(10^-)	399.4 *4*	16 *2*	3138.5	(9^-)	M1+E2[@]	Mult.: No δ from ^{96}Zr(^{13}C,α3nγ) (2005So09).
		595.9 *3*	100 *5*	2942.0	(8^-)	E2[@]	
3772		830.0 *3*	100	2942.0	(8^-)		
3819.6	(11^-)	680.9 *5*	100	3138.5	(9^-)	E2[@]	
3858.9	$(10)^+$	424.6 *4*	65 *10*	3434.2	10^+	M1+E2[@]	Mult.: No δ from ^{96}Zr(^{13}C,α3nγ) (2005So09).
		1152.7 *4*	100 *10*	2706.1	8^+	E2[@]	
3916.7	9^+	881.3 *4*	100	3035.4	7^+		
4013.0	(10^-)	684.8 *5*	100	3328.2	(8^-)	Q[@]	
4055.6	12^+	621.4 *3*	100	3434.2	10^+		
4183.7	(11^-)	645.6 *5*	35 *4*	3537.9	(10^-)	M1+E2[@]	Mult.: No δ from ^{96}Zr(^{13}C,α3nγ) (2005So09).
		727.1 *4*	100 *7*	3456.7	(9^-)	Q[@]	
4294.7	(10^+)	899.8 *5*	100	3394.9	(8^+)		
4365.1	(12^-)	545.4 *4*	7.8 *13*	3819.6	(11^-)		
		827.2 *3*	100 *7*	3537.9	(10^-)	E2	
4615		843.0 *5*	100	3772			

$\gamma(^{102}Ru)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ‡	E_f	J^π_f	Mult.#	Comments
4710.9	(13^-)	891.3 5	100	3819.6	(11^-)		
4720.1	$(12)^+$	664.6 4	55 9	4055.6	12^+	M1+E2@	Mult.: No δ from $^{96}Zr(^{13}C,\alpha3n\gamma)$ (2005So09).
		860.8 5	55 9	3858.9	$(10)^+$	Q@	
		1286.1 4	100 9	3434.2	10^+	Q@	
4754.6	(11^+)	837.9 5	100	3916.7	9^+		
4808.4	14^+	752.8 5	100	4055.6	12^+	E2@	B(E2)(W.u.)=9.E+1 3
4839.8	(12^-)	826.8 5	100	4013.0	(10^-)		
5069.9	(13^-)	886.2 4	100	4183.7	(11^-)	Q@	
5370.4	(14^-)	1005.3 3	100	4365.1	(12^-)	E2@	
5678.4	$(14)^+$	958.4 5	100 11	4720.1	$(12)^+$	Q@	
		1622.7 5	22 11	4055.6	12^+		
5724.6	16^+	916.3 3	100	4808.4	14^+	E2@	
5757.6	(15^-)	1046.7 3	100	4710.9	(13^-)	E2@	
5766.6	(14^-)	926.8 7	100	4839.8	(12^-)		
6058.3	(15^-)	988.4 4	100	5069.9	(13^-)	E2@	
6080.8	(14^+)	1272.3 4	100	4808.4	14^+		
6507.2	(16^-)	1136.8 4	100	5370.4	(14^-)	E2@	
6725.4	(16^-)	958.8 5	100	5766.6	(14^-)		
6790.4	18^+	1065.8 3	100	5724.6	16^+	E2@	
6918.0	(17^-)	1160.4 4	100	5757.6	(15^-)	E2@	
7000.5	(16^+)	919.6 5	22 11	6080.8	(14^+)		
		1276.0 4	100 22	5724.6	16^+	M1+E2@	Mult.: No δ from $^{96}Zr(^{13}C,\alpha3n\gamma)$ (2005So09).
7118.3	(17^-)	1060.0 4	100	6058.3	(15^-)	Q@	
7750.4	(18^-)	1243.2 4	100	6507.2	(16^-)	Q@	
7998.3	20^+	1207.9 4	100	6790.4	18^+	E2@	
8053.6	(18^+)	1053.0 4	75 25	7000.5	(16^+)	Q@	
		1263.2 4	100 25	6790.4	18^+		
8125.9	(19^-)	1207.9 4	100	6918.0	(17^-)	E2@	
8247.0	(19^-)	1128.7 4	100	7118.3	(17^-)	Q@	
9037.3	(20^-)	1286.9 8	100	7750.4	(18^-)		
9219.52		6161.9 6	3.4 14	3056.73			
		6185.5 4	7.5 17	3035.4	7^+		
		6274.2 3	18 3	2944.75			
		6607.5 7	5.4 18	2614.74	$(3,4^+)$		
		6626.84 14	100 10	2591.79			
		6751.4 4	86 15	2467.389			

$^{102}_{44}Ru_{58}$-8

Adopted Levels, Gammas (continued)

$\gamma(^{102}Ru)$ (continued)

E_i(level)	J^π_i	E_γ [†]	I_γ [‡]	E_f	J^π_f	Mult. [#]	E_i(level)	J^π_i	E_γ [†]	I_γ [‡]	E_f	J^π_f	Mult. [#]
9219.52		6957.8 *5*	9.0 *18*	2261.09	2^-		9304.5	22^+	1306.2 *4*	100	7998.3	20^+	E2 [@]
		6978.08 *18*	44 *5*	2240.78			9370.5	(21^-)	1244.6 *4*	100	8125.9	(19^-)	Q [@]
		7176.6 *5*	13.2 *25*	2043.393	3^-		9509.7	(21^-)	1262.7 *6*	100	8247.0	(19^-)	
		7697.2 *6*	4.7 *18*	1521.600	3^+		10681.1	(23^-)	1310.6 *6*	100	9370.5	(21^-)	
		8112.7 *4*	7.4 *12*	1106.43	4^+		10708.3	24^+	1403.8 *4*	100	9304.5	22^+	Q [@]
9248.7	(20^+)	1195.1 *4*	100 *50*	8053.6	(18^+)	Q [@]	12221.6?	(26^+)	1512.4 [a] *7*	100	10708.3	24^+	
		1250.3 *5*	100 *50*	7998.3	20^+								

† Unless noted otherwise, weighted averages of data from ^{102}Tc β^- decay, ^{102}Rh β^- decay, ^{100}Mo(α,2nγ) ^{101}Ru(n,γ) and different (HI,xnγ) experiments if available.

‡ Branchings from each level are weighted averages of data from ^{102}Tc β^- decay, ^{102}Rh β^- decay,^{101}Ru(n,γ) ^{100}Mo(α,2nγ) and other (HI,xnγ) reactions if available.

From ^{102}Rh ε decay, unless noted otherwise.

@ From ^{96}Zr(^{13}C,α3nγ) and/or ^{100}Mo(α,2nγ).

& From ^{102}Rh ε decay.

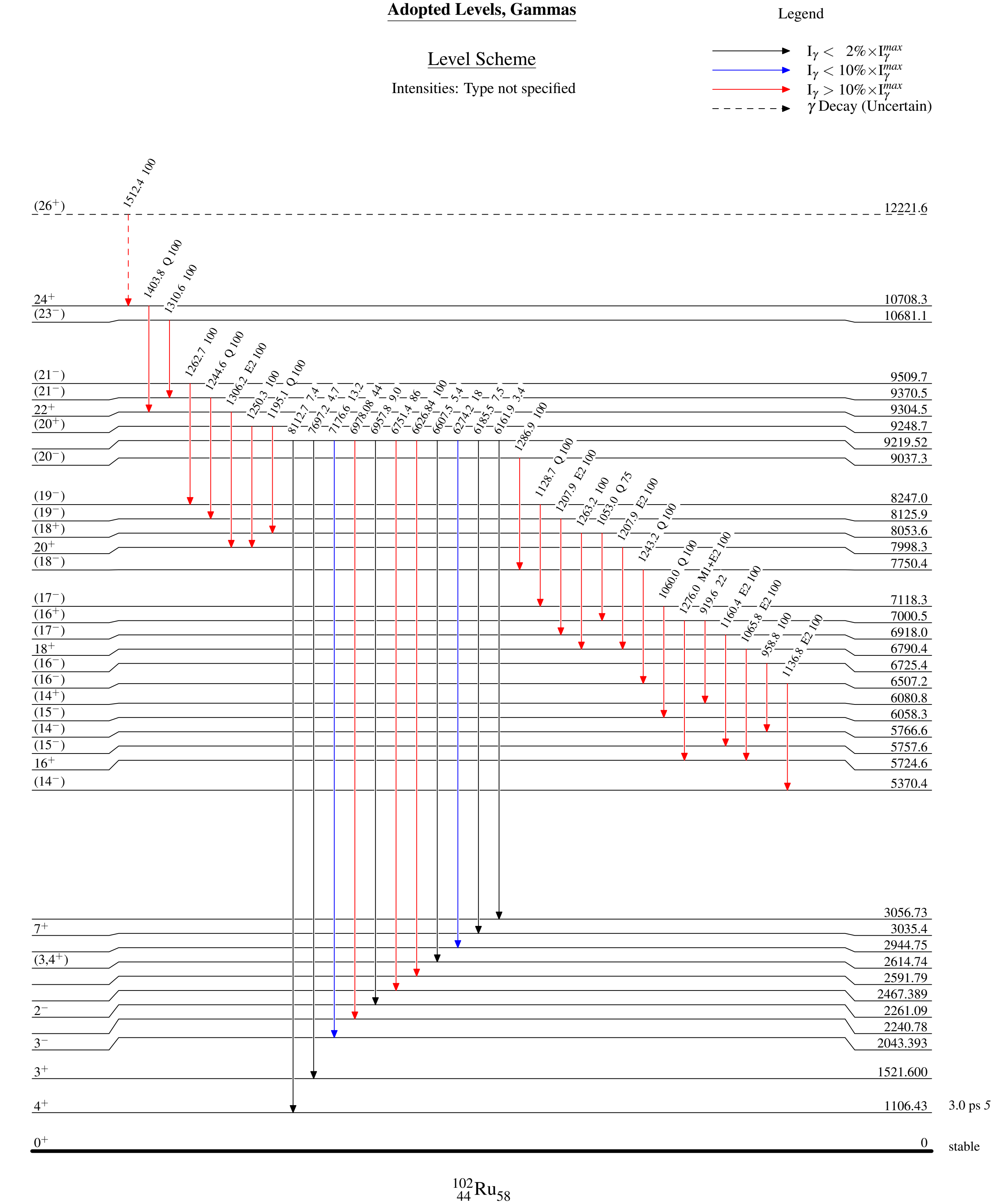
a Placement of transition in the level scheme is uncertain.

$^{102}_{44}Ru_{58}$-9

Adopted Levels, Gammas

Level Scheme

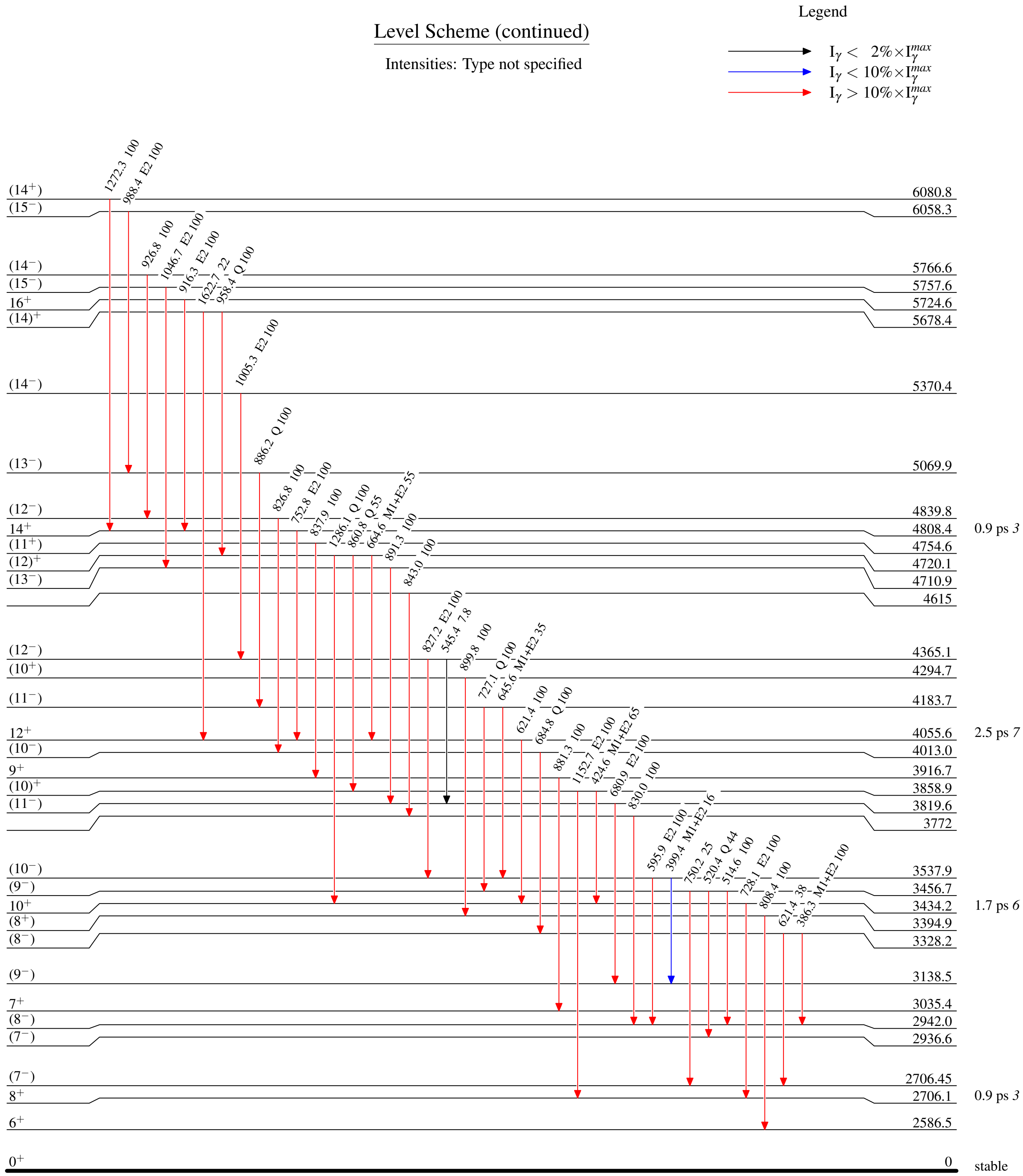
Intensities: Type not specified



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified

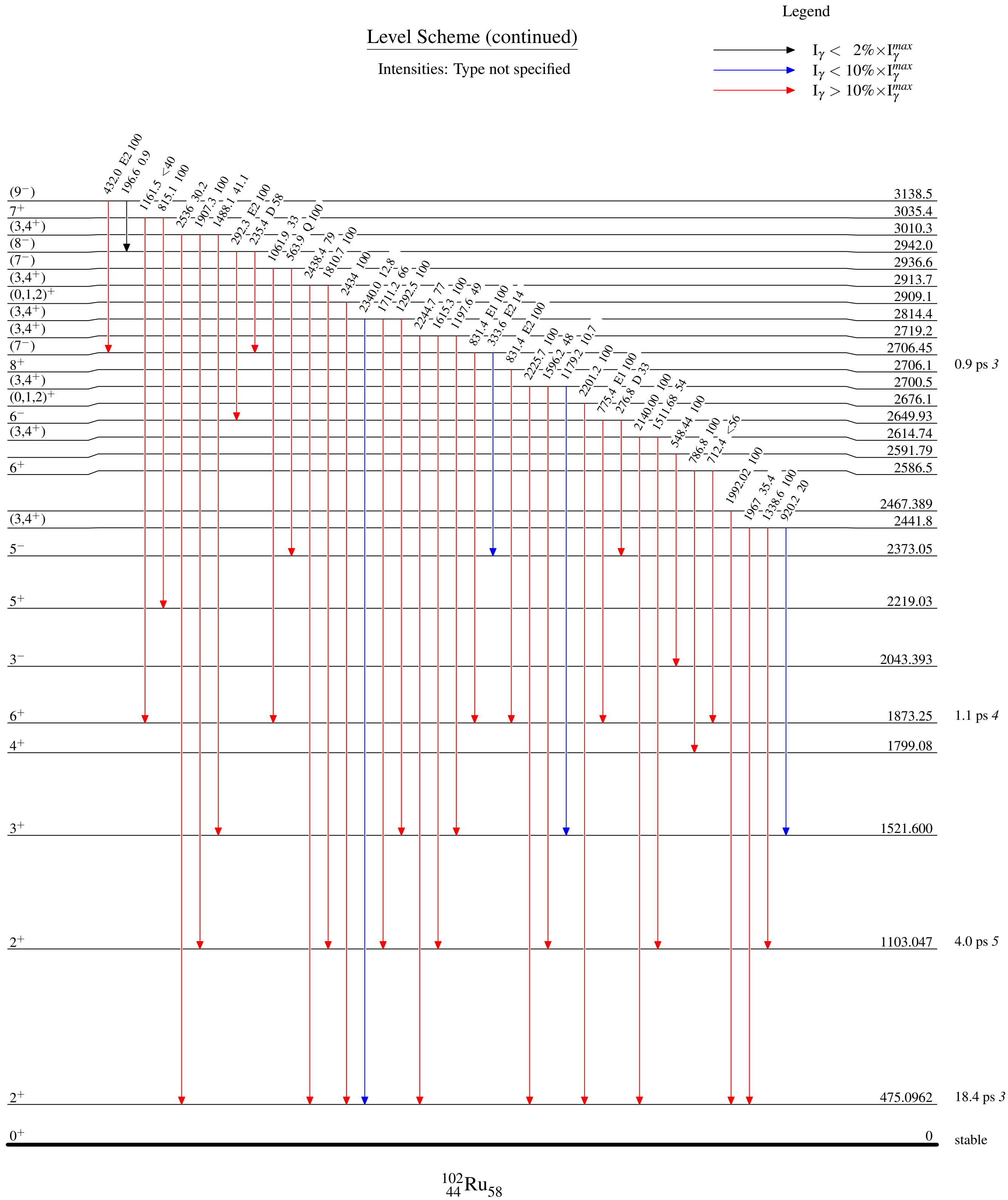


$^{102}_{44}Ru_{58}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified

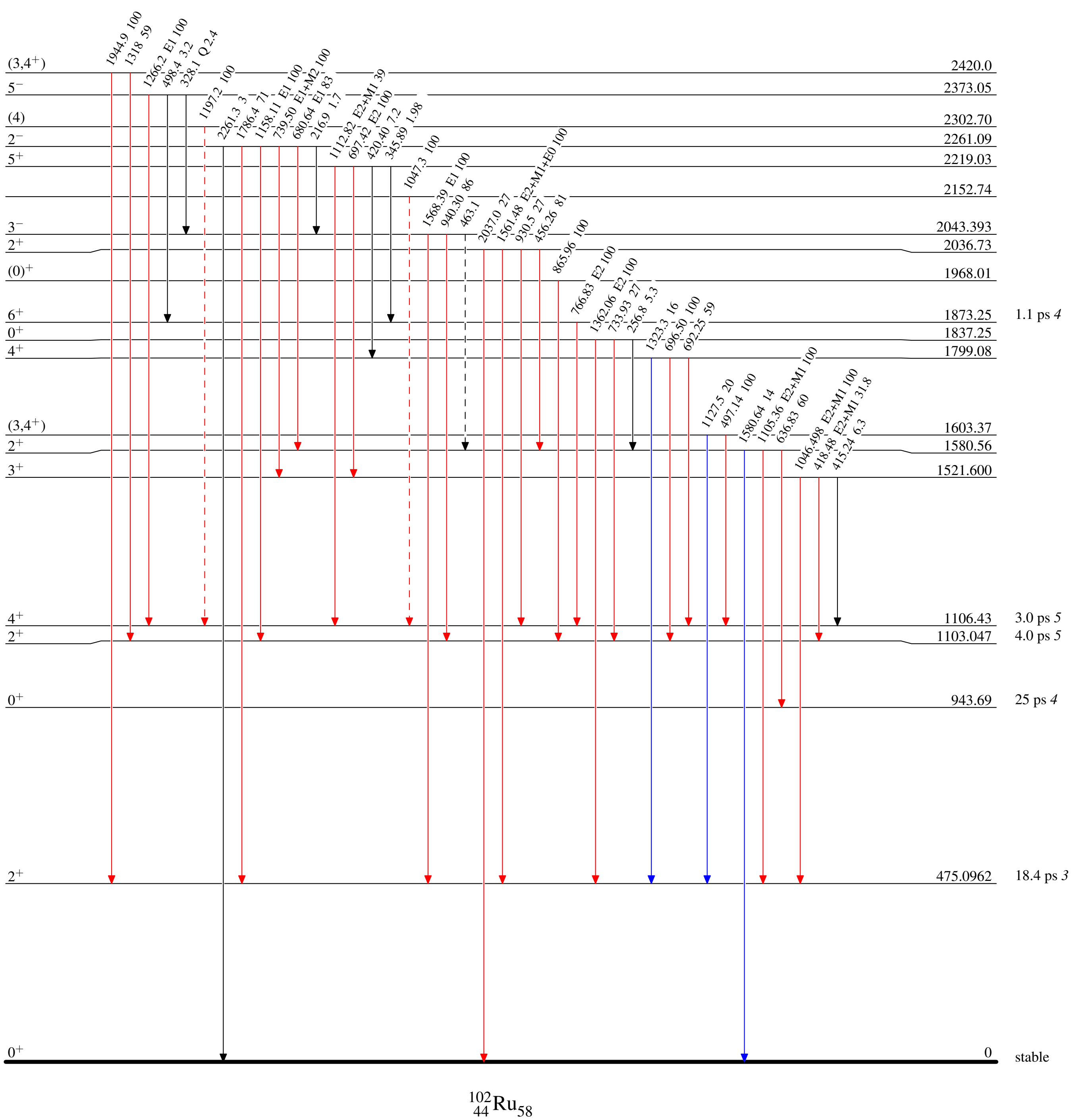
Legend

$I_\gamma < 2\% \times I_\gamma^{max}$

$I_\gamma < 10\% \times I_\gamma^{max}$

$I_\gamma > 10\% \times I_\gamma^{max}$

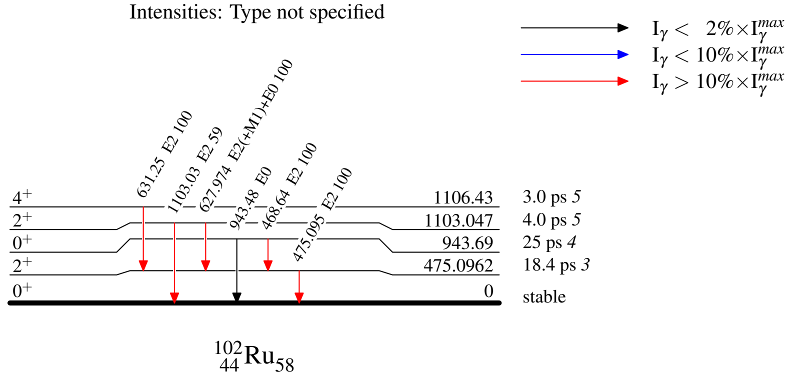
γ Decay (Uncertain)



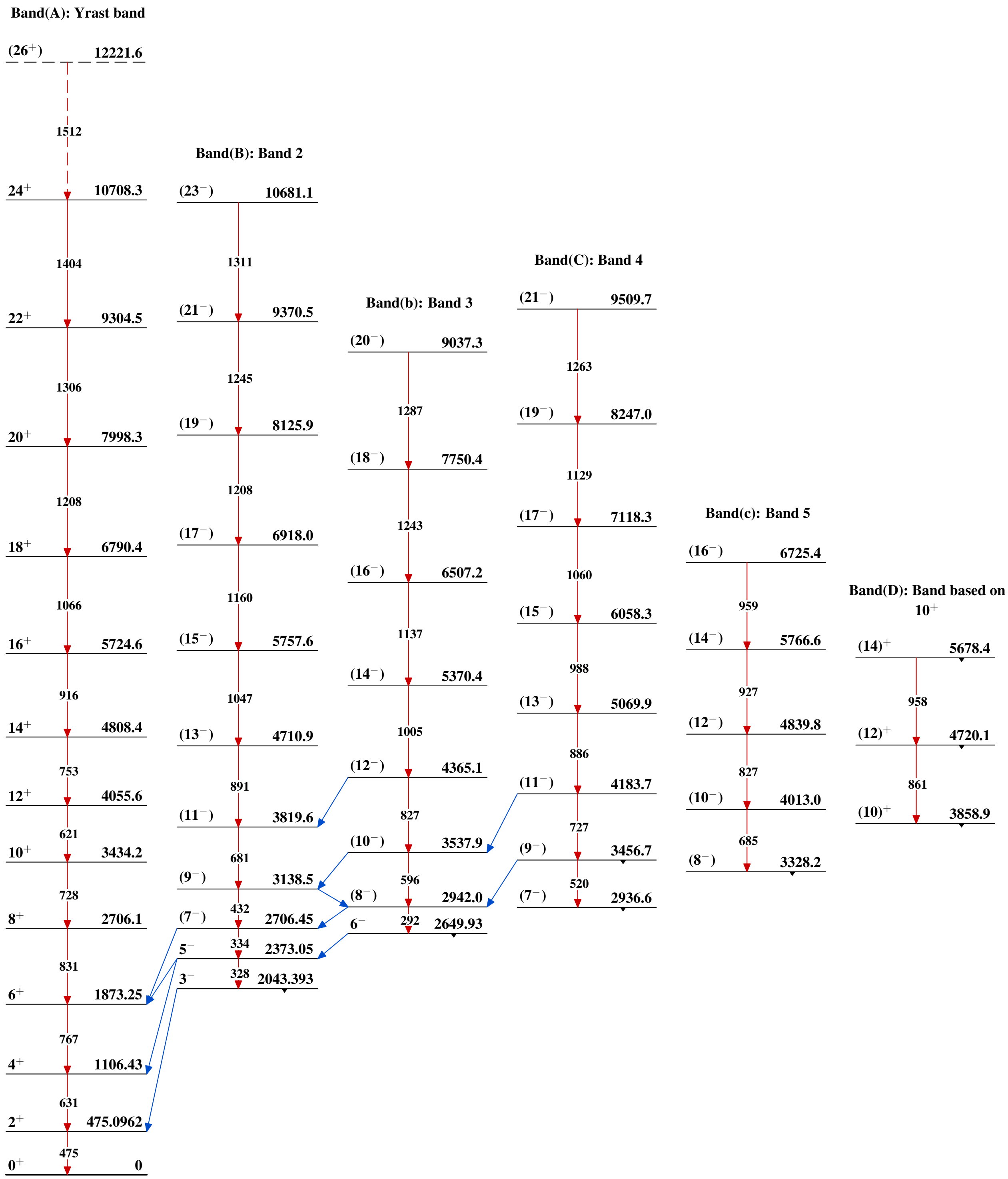
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified

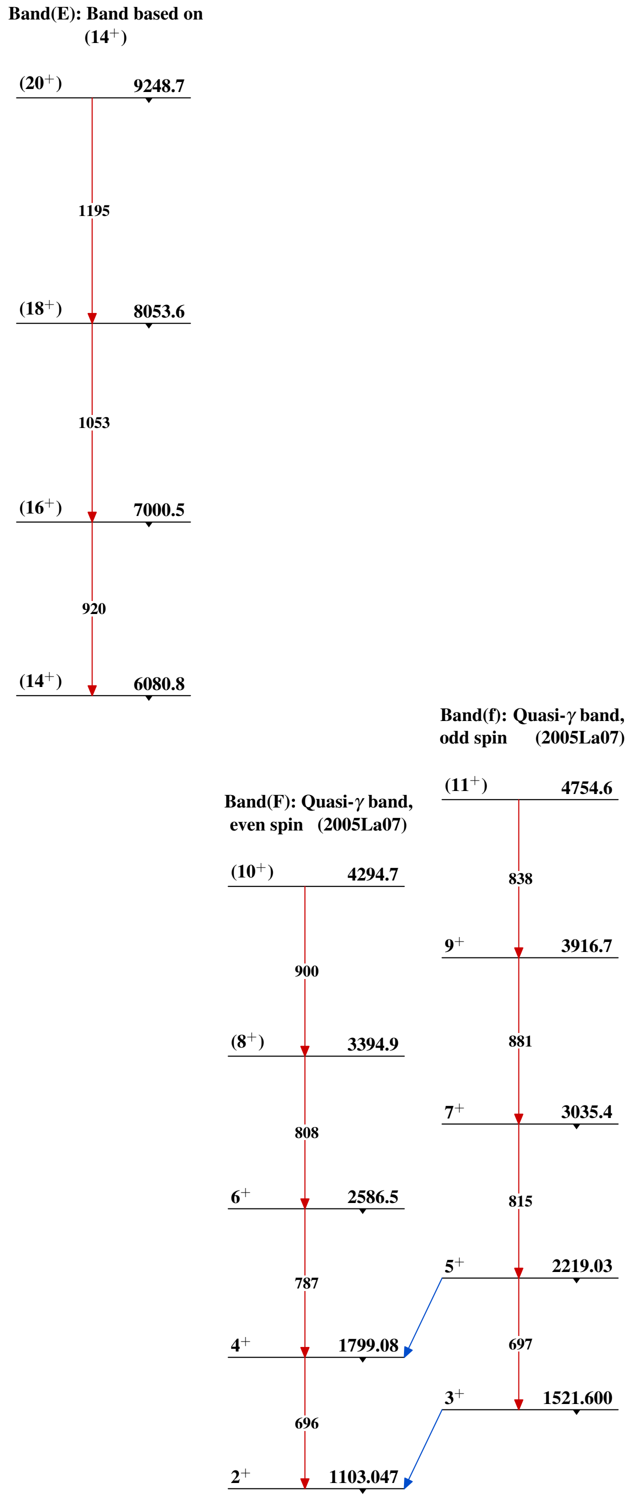


Adopted Levels, Gammas



$^{102}_{44}Ru_{58}$

Adopted Levels, Gammas (continued)



$^{102}_{44}Ru_{58}$

Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Jean Blachot	NDS 108,2035 (2007)	30-Mar-2007

Q(β^-)=−1138 *4*; S(n)=8901 *3*; S(p)=10781 *10*; Q(α)=−4329 *3* 2012Wa38
Note: Current evaluation has used the following Q record −1139 4 *8901* 3 *10781* 9 −4329 7 2003Au03.

^{104}Ru Levels

Cross Reference (XREF) Flags

A	^{104}Tc β^- decay	F	^{232}Th(^{18}O,xnγ)
B	^{104}Rh ε decay (42.3 s)	G	^{162}Dy(^{36}S,xnγ)
C	^{104}Ru(π^-,π^-X)	H	^{110}Pd(^{86}Kr,xnγ)
D	^{104}Ru(d,d′) E=12 MeV	I	^{176}Yb(^{28}Si,Xγ)
E	Coulomb excitation		

E(level)[‡]	J$^\pi$[†]	T$_{1/2}$	XREF	Comments
0.0[#]	0$^+$	stable	ABCDEFGHI	
358.02[#] *7*	2$^+$	56.4 ps *10*	AB DEFGHI	μ=+0.82 *10* (1969He11,1974Hu01,1989Ra17); Q=−0.70 *8* Q: from Coul. ex. μ: from IMPAC (1989Ra17). J$^\pi$: Coul. excited, L in (d,d′). T$_{1/2}$: from B(E2)=0.841 *16* (1987Ra01) in Coul. ex.
888.48[#] *9*	4$^+$	5.6 ps *6*	A DEFGHI	T$_{1/2}$: from B(E2) in Coul. ex. J$^\pi$: E2 γ to 2$^+$, L=4 in (d,d′).
893.10[&] *8*	2$^+$	5.0 ps *5*	A DE I	J$^\pi$: $\gamma\gamma(\theta)$ in Tc decay, L=2 in (d,d′). T$_{1/2}$: from B(E2) in Coul. ex.
988.27 *17*	0$^+$	7.9 ps *9*	AB E	T$_{1/2}$: from B(E2) in Coul. ex. J$^\pi$: $\gamma\gamma(\theta)$ in Tc decay.
1242.36[&] *9*	3$^+$		A E I	J$^\pi$: J=3 from $\gamma\gamma(\theta)$ in Tc decay. M1+E2 γ to 2$^+$.
1335	0$^+$	0.90 ps *5*	E	
1502.60[&] *10*	4$^+$	2.7 ps *3*	A E I	J$^\pi$: from $\gamma\gamma(\theta)$ in Tc decay. T$_{1/2}$: from B(E2) in Coul. ex.
1515.44[b] *9*	2$^+$	1.2 ps *2*	A E	T$_{1/2}$: from B(E2) in Coul. ex. J$^\pi$: from $\gamma\gamma(\theta)$ in Tc decay.
1556.4[#] *3*	6$^+$	1.33 ps *+12−4*	EFGHI	T$_{1/2}$: from B(E2) in Coul. ex.
1750?	(2$^+$)		E	
1872.39[&] *12*	(5$^+$)		A I	
1970.43 *10*	3$^-$		A DE H	J$^\pi$: $\gamma\gamma(\theta)$ in Tc decay gives J=1 or 3, DWBA in (d,d′) gives J=3.
1974.8 *4*	(6$^-$,7)		H	
2004 *5*			D	
2034.85 *9*	2$^+$		A D	J$^\pi$: from $\gamma\gamma(\theta)$ in Tc decay. Observed in (d,d′).
2080.84[b] *10*	4$^+$	0.7 ps *+3−2*	A E	T$_{1/2}$: from B(E2) in Coul. ex.
2095	(2$^+$,4$^+$)		E	
2196.6 *10*	(6$^+$)		E I	
2232.8[a] *3*	(5$^-$)		HI	
2269.04 *10*	(3,4)		A	J$^\pi$: from $\gamma\gamma(\theta)$ in Tc decay.
2285.07 *12*	2$^+$		A D	J$^\pi$: from $\gamma\gamma(\theta)$ in Tc decay. Observed in (d,d′).
2320.4[#] *4*	8$^+$	0.56 ps *+5−10*	EFGHI	T$_{1/2}$: from B(E2) in Coul. ex.
2329.22 *18*	(1,2,3)		A	J$^\pi$: from $\gamma\gamma(\theta)$ in Tc decay.
2373.75 *12*	(3,1)		A	J$^\pi$: from $\gamma\gamma(\theta)$ in Tc decay J=3 is most probable, but J=1 is not ruled out.
2429.85 *12*			A	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{104}Ru Levels (continued)

E(level)‡	Jπ†	$T_{1/2}$	XREF	Comments
2443 *5*			D	
2481.90 *11*	3^-		A D	Jπ: DWBA in (d,d′) fits well with 3^-.
2489.91 *10*			A	
2524.28 *10*			A	
2597.31 *16*			A	
2600.7@ *4*	(6^-)		HI	
2613.9[a] *3*	(7^-)		HI	
2618.97 *18*			A	
2623.4& *10*	(7^+)		I	
2627.8 *11*			I	
2629.99 *12*			A	
2758.1 *9*			I	
2759.95 *16*			A	
2823.43 *17*			A	
2847.6& *15*	(8^+)	2.1 ps +*13*−*4*	E I	$T_{1/2}$: from B(E2) in Coul. ex.
2861.4 *11*			I	
2927.9@ *9*	(8^-)		I	
3035.9 *8*			I	
3075.03 *11*			A	
3075.2[a] *4*	(9^-)		HI	
3111.9# *5*	10^+		EFGHI	
3284.7 *5*	(10^+)	0.26 ps +*16*−*7*	E HI	$T_{1/2}$: from B(E2) in Coul. ex.
3333.80 *23*			A	
3384.4 *15*			I	
3414.42 *20*			A	
3443.34 *14*			A	
3472.9@ *14*	(10^-)		I	
3501.59 *11*			A	
3507.32 *12*			A	
3582.81 *14*			A	
3583.90 *15*			A	
3618.16 *15*			A	
3676.74 *19*			A	
3691.2[a] *5*	(11^-)		HI	
3713.4# *6*	(12^+)		FGHI	
3875.40 *18*			A	
3919.45 *19*			A	
4163.9@ *17*	(12^-)		I	
4170.10 *17*			A	
4263.72 *20*			A	
4267.70 *19*			A	
4439.2# *7*	(14^+)		GHI	
4443.2[a] *12*	(13^-)		I	
5357.0# *12*	(16^+)		HI	

† J^π without comments are from γ properties and band assignments.
‡ Level energy from least-squares adjustment.
# Band(A): g.s. band.
@ Band(B): Band based on (6^-).
& Band(C): $K^\pi=2^+$ band(Gamma Band).
[a] Band(D): Band based on 5^-.
[b] Band(E): Beta Band.

Adopted Levels, Gammas (continued)

$\gamma(^{104}Ru)$

E_i(level)	J^π_i	E_γ	I_γ †	E_f	J^π_f	Mult.‡	δ‡	α#	Comments
358.02	2+	358.0 *1*	100	0.0	0+	E2		0.01502	B(E2)(W.u.)=57.9 *11*
888.48	4+	530.5 *1*	100	358.02	2+	E2			B(E2)(W.u.)=83 *9*
893.10	2+	535.1 *1*	100 *7*	358.02	2+	M1+E2	−9 *2*		B(M1)(W.u.)=0.00022 *10*; B(E2)(W.u.)=55 *6*
		893.1 *1*	70 *7*	0.0	0+	E2			B(E2)(W.u.)=2.8 *5* Mult.: from Coul. ex.
988.27	0+	630.3 *3*	100	358.02	2+	E2			B(E2)(W.u.)=25 *3* Mult.: from Coul. ex.
1242.36	3+	349.3 *2*	22.8 *24*	893.10	2+				
		353.7 *3*	8.9 *16*	888.48	4+				
		884.4 *1*	100 *13*	358.02	2+	M1+E2	3.2 *4*		
1335	0+	442@ *1*		893.10	2+				
		977 *1*		358.02	2+				
1502.60	4+	609.5 *1*	100 *14*	893.10	2+				
		614.2 *1*	59 *5*	888.48	4+				
		1144.7 *2*	21 *3*	358.02	2+				
1515.44	2+	527.2 *2*	13.7 *25*	988.27	0+				
		627.0 *2*	7.8 *16*	888.48	4+				
		1157.4 *1*	100 *9*	358.02	2+				
		1515.5 *2*	28 *3*	0.0	0+				
1556.4	6+	667.9 *3*	100	888.48	4+				
1872.39	(5+)	630.0 *1*	100 *40*	1242.36	3+				
		984.0 *2*	34 *6*	888.48	4+				
1970.43	3−	1612.4 *1*	100	358.02	2+	E1+M2	0.01		
1974.8	(6−,7)	418.4 *3*	100	1556.4	6+				
2034.85	2+	519.4 *1*	11.4 *11*	1515.44	2+				
		792.5 *1*	32 *3*	1242.36	3+				
		1676.8 *1*	100 *9*	358.02	2+				
2080.84	4+	565.5 *3*	11.4 *20*	1515.44	2+				
		838.6 *1*	100 *10*	1242.36	3+				
		1187.7 *2*	43 *5*	893.10	2+				
		1722.7 *1*	89 *9*	358.02	2+				
2095	(2+,4+)	580@ *1*		1515.44	2+				
		852 *1*		1242.36	3+				
		1203 *1*		893.10	2+				
		1206 *1*		888.48	4+				
2196.6	(6+)	694 *1*	100	1502.60	4+				
2232.8	(5−)	1344.2 *3*	100	888.48	4+				
2269.04	(3,4)	298.6 *2*	5.5 *14*	1970.43	3−				
		1376.1 *2*	18.6 *25*	893.10	2+				
		1380.5 *1*	86 *9*	888.48	4+				
		1911.0 *1*	100 *9*	358.02	2+				
2285.07	2+	314.7 *3*	7.8 *19*	1970.43	3−				
		1396.6 *1*	100 *11*	888.48	4+				
2320.4	8+	764.0 *3*	100	1556.4	6+				
2329.22	(1,2,3)	1436.3 *3*	23 *6*	893.10	2+				
		1971.1 *2*	100 *11*	358.02	2+				
2373.75	(3,1)	2015.7 *1*	100	358.02	2+				
2429.85		349.1 *3*	8 *4*	2080.84	4+				
		459.6 *2*	10 *3*	1970.43	3−				
		1541.3 *1*	100 *8*	888.48	4+				
2481.90	3−	511.6 *3*	6.4 *16*	1970.43	3−				
		1239.6 *2*	8.0 *12*	1242.36	3+				
		1593.6 *3*	15.2 *20*	888.48	4+				
		2123.8 *1*	100 *8*	358.02	2+				

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Adopted Levels, Gammas (continued)

$\gamma(^{104}Ru)$ (continued)

E_i(level)	J^π_i	E_γ	I_γ[†]	E_f	J^π_f
2489.91		1247.6 *1*	13.4 *14*	1242.36	3^+
		1596.7 *1*	100 *9*	893.10	2^+
		1601.5 *2*	4.5 *10*	888.48	4^+
2524.28		553.8 *1*	15 *3*	1970.43	3^-
		1021.8 *1*	22.6 *20*	1502.60	4^+
		1281.8 *1*	100 *9*	1242.36	3^+
		1635.8 *2*	31 *4*	888.48	4^+
2597.31		1609.0 *3*	35 *10*	988.27	0^+
		2239.3 *2*	100 *13*	358.02	2^+
2600.7	(6^-)	1044.3 *3*	100	1556.4	6^+
2613.9	(7^-)	381.0 *3*	15 *3*	2232.8	(5^-)
		1057.5 *3*	100 *11*	1556.4	6^+
2618.97		333.8 *3*	100 *14*	2285.07	2^+
		584.0 *3*	99 *14*	2034.85	2^+
		648.7 *3*	36 *7*	1970.43	3^-
2623.4	(7^+)	751 *1*		1872.39	(5^+)
2627.8		395 *1*		2232.8	(5^-)
2629.99		659.3 *3*	4.8	1970.43	3^-
		1736.9 *1*	100 *10*	893.10	2^+
2758.1		1202 *1*		1556.4	6^+
2759.95		475.0 *2*	34 *10*	2285.07	2^+
		1517.4 *2*	100 *12*	1242.36	3^+
		1871.6 *3*	30 *12*	888.48	4^+
2823.43		1580.9 *3*	25 *4*	1242.36	3^+
		1934.8 *3*	19 *3*	888.48	4^+
		2465.5 *2*	100 *8*	358.02	2^+
2847.6	(8^+)	651 *1*		2196.6	(6^+)
2861.4		1305 *1*		1556.4	6^+
2927.9	(8^-)	170 *1*		2758.1	
		327 *1*		2600.7	(6^-)
3035.9		406 *1*		2627.8	
		422 *1*		2613.9	(7^-)
3075.03		585.1 *3*	33 *9*	2489.91	
		2181.9 *1*	76 *8*	893.10	2^+
		2717.0 *2*	100 *10*	358.02	2^+
3075.2	(9^-)	316 *1*		2758.1	
		461.3 *3*	100	2613.9	(7^-)
3111.9	10^+	791.5 *3*	11.2 *15*	2320.4	8^+
3284.7	(10^+)	964.3 *3*	100	2320.4	8^+
3333.80		1363.3 *3*	100 *18*	1970.43	3^-
		2975.8 *3*	92 *11*	358.02	2^+
3384.4		523 *1*		2861.4	
3414.42		795.4 *3*	55 *15*	2618.97	
		2525.8 *3*	31 *6*	888.48	4^+
		3056.5 *3*	100 *11*	358.02	2^+
3443.34		919.0 *2*	14 *5*	2524.28	
		1927.9 *3*	48 *6*	1515.44	2^+
		2550.2 *2*	100 *9*	893.10	2^+
		3085.4 *3*	17 *3*	358.02	2^+
3472.9	(10^-)	545 *1*		2927.9	(8^-)
3501.59		1128.0 *3*	19 *6*	2373.75	(3,1)
		1466.7 *1*	56 *6*	2034.85	2^+
		1531.2 *3*	25 *5*	1970.43	3^-
		1986.2 *2*	11 *6*	1515.44	2^+
		2608.5 *2*	100 *11*	893.10	2^+
		3143.4 *2*	50 *5*	358.02	2^+

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Adopted Levels, Gammas (continued)

$\gamma(^{104}Ru)$ (continued)

E_i(level)	J^π_i	E_γ	I_γ†	E_f	J^π_f	Comments
3507.32		1133.4 *3*	19 *8*	2373.75	(3,1)	
		1472.5 *1*	60 *6*	2034.85	2^+	
		1536.7 *4*	15 *4*	1970.43	3^-	
		3149.2 *2*	100 *8*	358.02	2^+	
3582.81		1092.9 *1*	100 *10*	2489.91		
		2340.4 *5*	49 *12*	1242.36	3^+	
3583.90		986.6 *2*	69 *12*	2597.31		
		1210.0 *3*	94 *12*	2373.75	(3,1)	
		2690.9 *2*	57 *11*	893.10	2^+	
		3225.6 *3*	100 *11*	358.02	2^+	
3618.16		2375.8 *2*	51 *12*	1242.36	3^+	
		2724.9 *2*	100 *12*	893.10	2^+	
		3260.3 *3*	46 *7*	358.02	2^+	
3676.74		2788.2 *2*	100 *10*	888.48	4^+	
		3318.7 *3*	55 *7*	358.02	2^+	
3691.2	(11^-)	616.0 *3*	100	3075.2	(9^-)	
3713.4	(12^+)	429 *1*		3284.7	(10^+)	
		601.5 *3*	100	3111.9	10^+	
3875.40		1840.5 *3*	100 *25*	2034.85	2^+	
		2633.0 *3*	55 *20*	1242.36	3^+	
		2982.3 *3*	60 *10*	893.10	2^+	
		3517.3 *4*	90 *15*	358.02	2^+	
3919.45		2677.0 *2*	100 *14*	1242.36	3^+	
		3026.4 *3*	68 *8*	893.10	2^+	
4163.9	(12^-)	691 *1*	100	3472.9	(10^-)	
4170.10		2089.3 *2*	100 *11*	2080.84	4^+	
		2927.9 *5*	33 *11*	1242.36	3^+	
		3276.8 *3*	33 *7*	893.10	2^+	
		3811.9 *4*	30 *9*	358.02	2^+	
4263.72		1633.7 *2*	39 *12*	2629.99		
		3370.6 *3*	100 *12*	893.10	2^+	
4267.70		2395.3 *2*	100 *13*	1872.39	(5^+)	
		3374.5 *3*	69 *10*	893.10	2^+	
4439.2	(14^+)	725.8 *3*	100	3713.4	(12^+)	
4443.2	(13^-)	752 *1*	100	3691.2	(11^-)	
5357.0	(16^+)	917.8		4439.2	(14^+)	E_γ: From 1998Fo08.

† Photon branching from each level.

‡ From ^{104}Tc β^- decay, unless indicated otherwise.

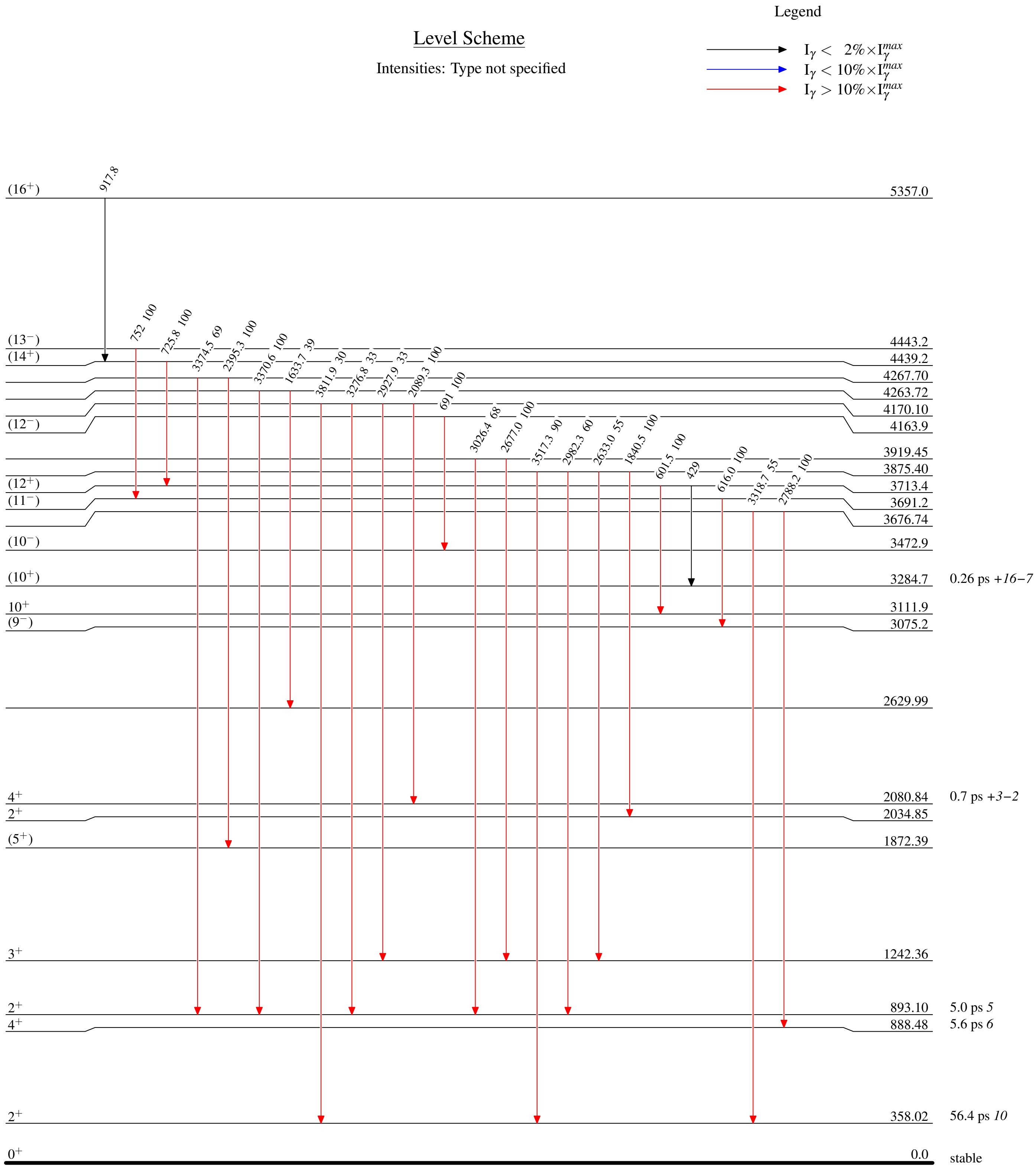
\# Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

@ Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Level Scheme

Intensities: Type not specified

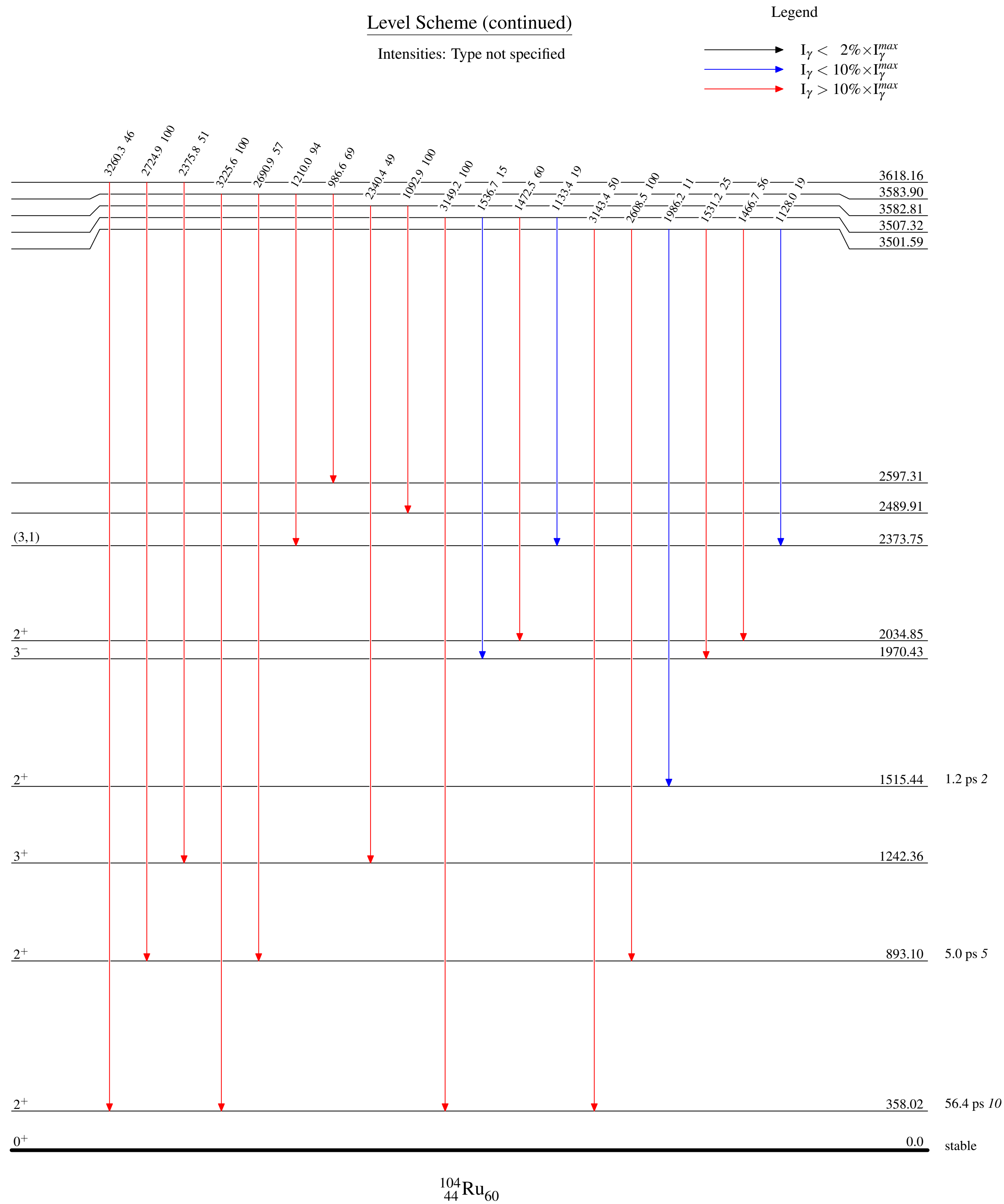


$^{104}_{44}Ru_{60}$

Adopted Levels, Gammas

Level Scheme (continued)

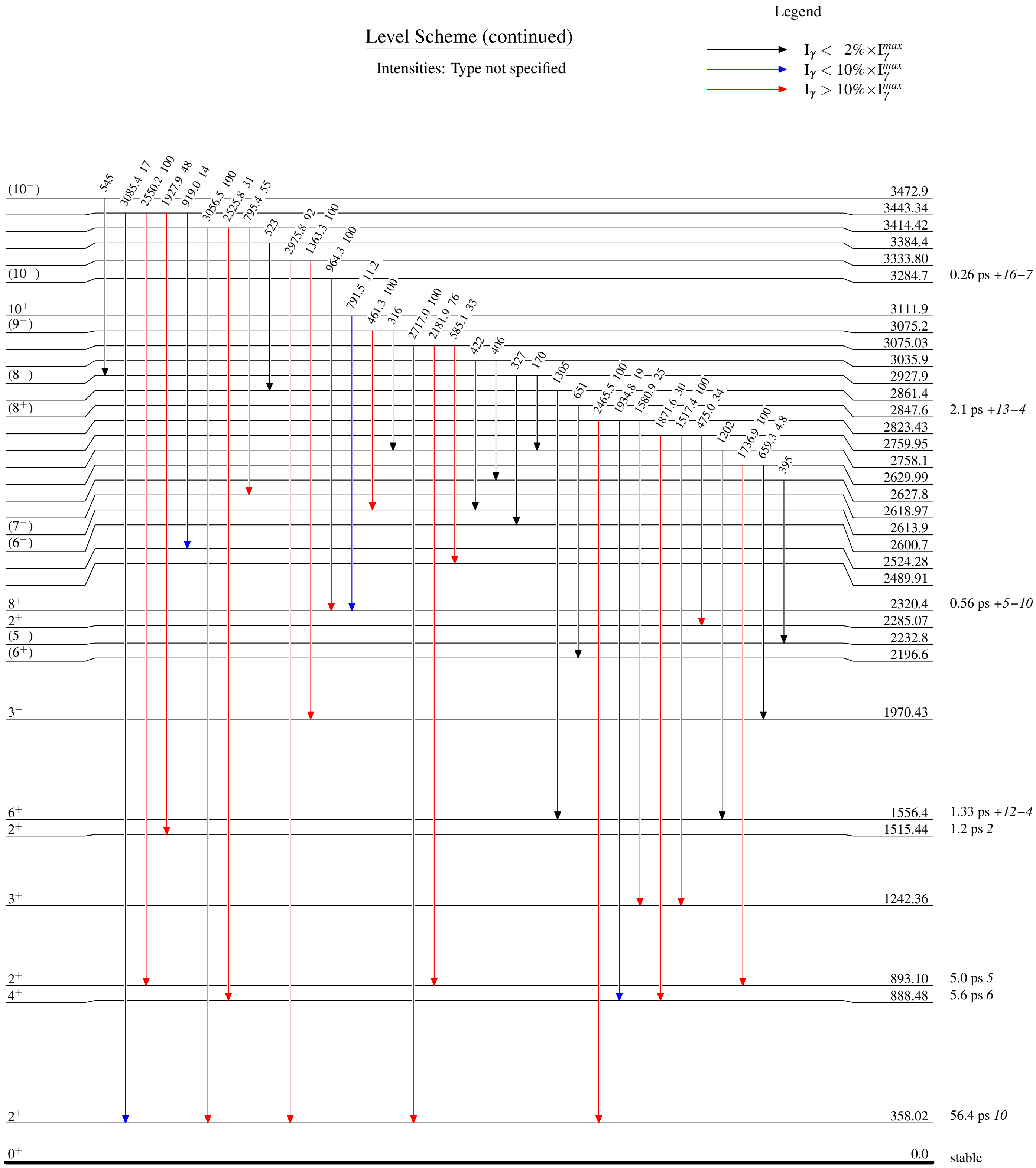
Intensities: Type not specified



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified



$^{104}_{44}Ru_{60}$

Adopted Levels, Gammas

Level Scheme (continued)

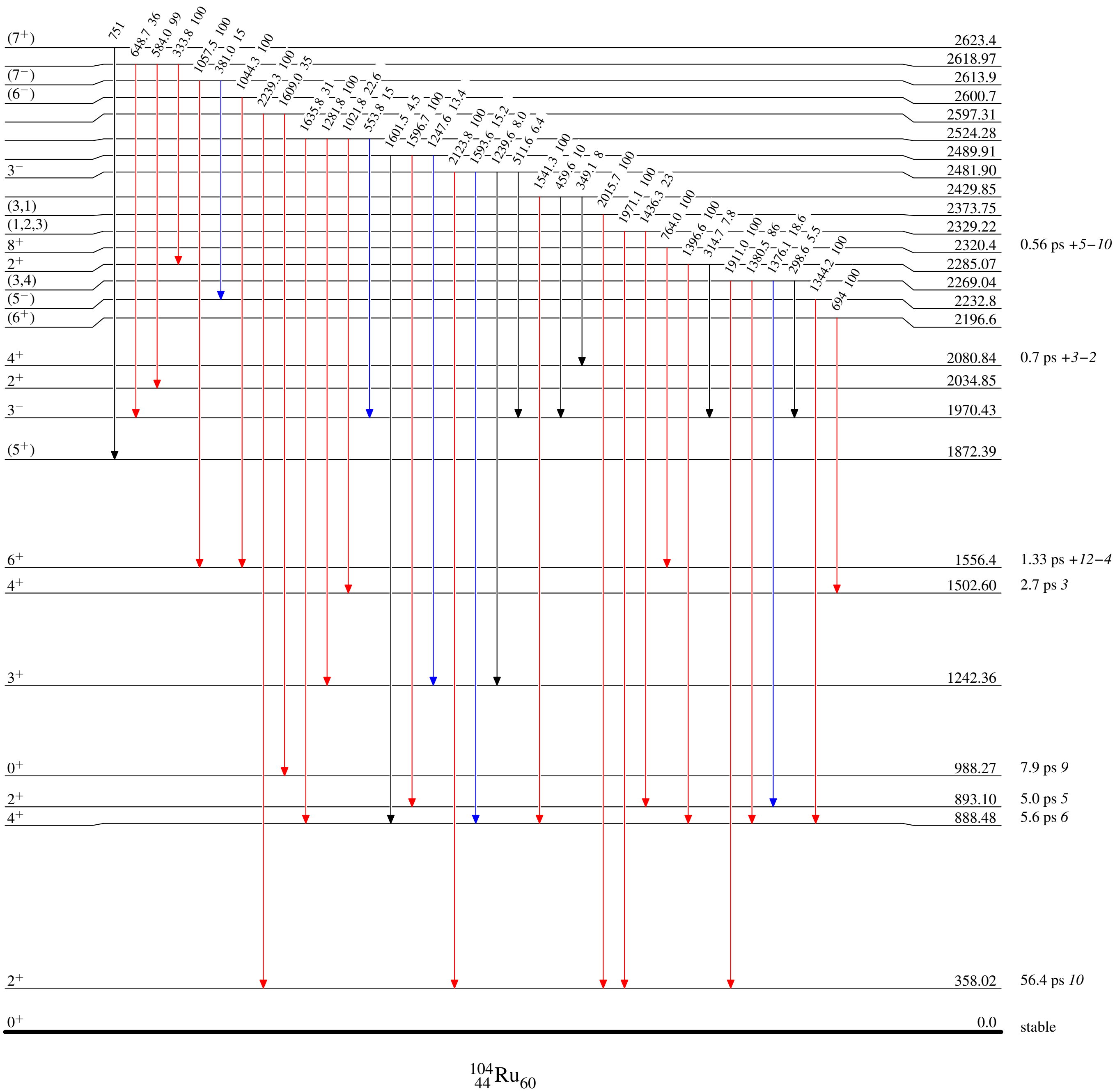
Intensities: Type not specified

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$

$I_\gamma < 10\% \times I_\gamma^{max}$

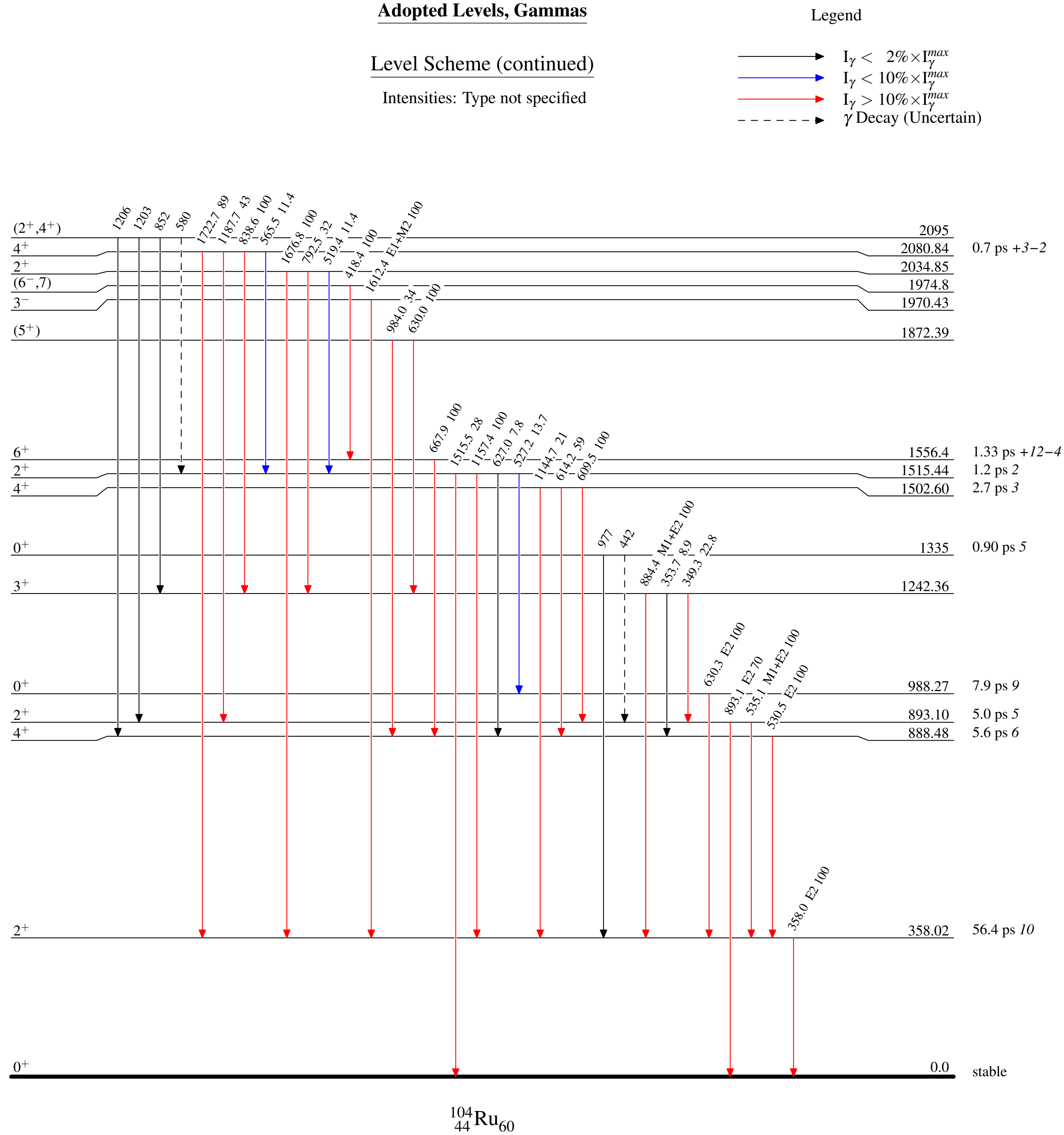
$I_\gamma > 10\% \times I_\gamma^{max}$



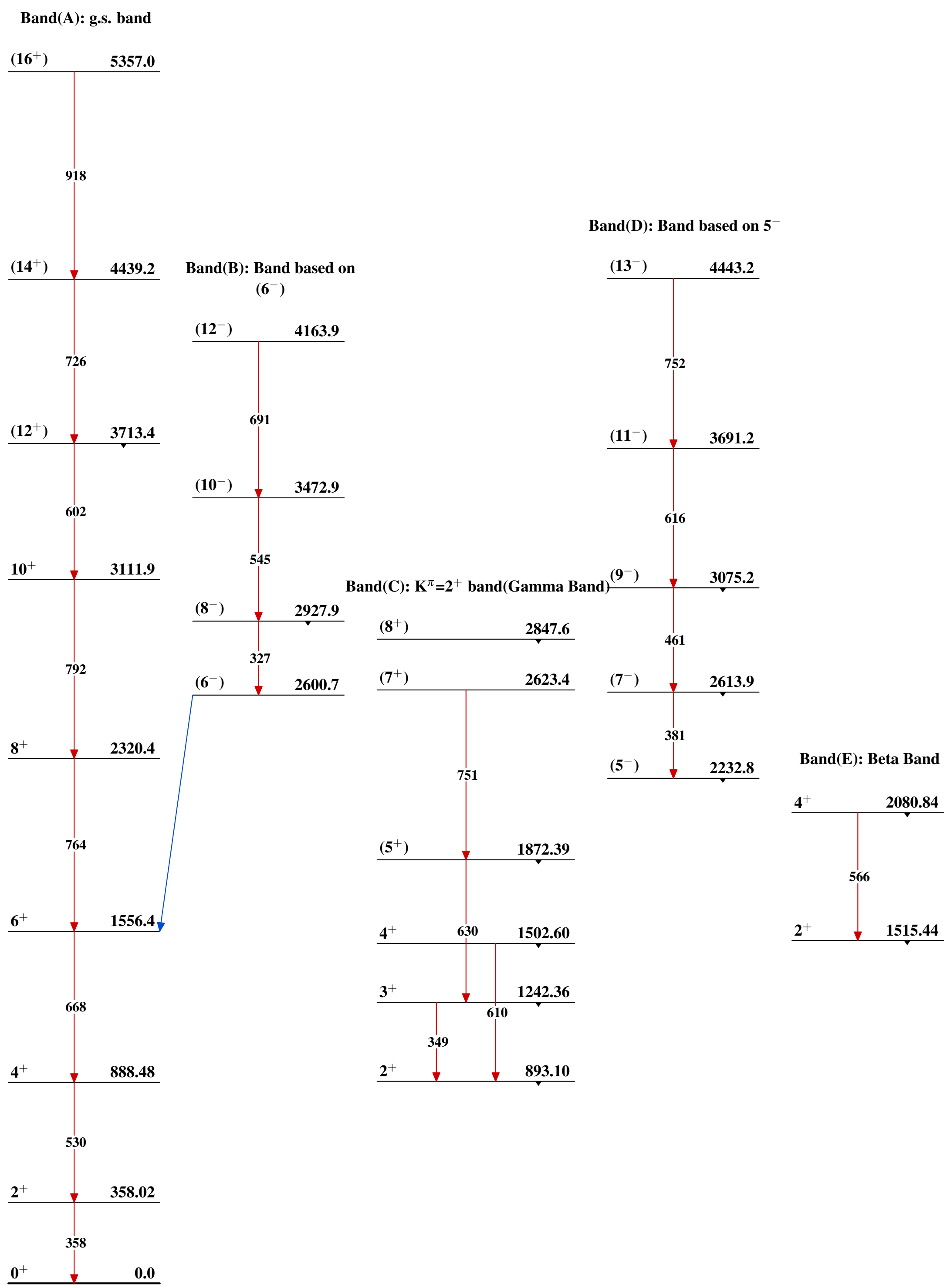
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified



Adopted Levels, Gammas



$^{104}_{44}Ru_{60}$

Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	G. Gürdal and F. G. Kondev	NDS 113,1315 (2012)	1-Aug-2011

Q(β^-)=2758 *20*; S(n)=7406 *13*; S(p)=13079 *13*; Q(α)=−6355 *13* 2012Wa38
Note: Current evaluation has used the following Q record 2774 20 *7406* 12 *13079* 13 −6350 *13* 2011AuZZ.

^{110}Ru Levels

Cross Reference (XREF) Flags

A	^{110}Tc β^- decay	D	^{254}Cf SF decay
B	^{252}Cf SF decay	E	^{238}U(α,Fγ)
C	^{248}Cm SF decay		

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$	XREF	Comments
0.0[#]	0$^+$	12.04 s *17*	ABCDE	%β^-=100 T$_{1/2}$: Unweighted average of 11.6 s *6* (using β-112γ(t) in 1991Jo11), 12.2 s *1* (using 96γ(t) in 1986KaZS), 11.98 s *4* (using 112γ(t) in 1986KaZS), 11.8 s *2* (using 374γ(t) in 1986KaZS) and 12.6 s *5* (using 374γ(t) in 1978Fr16). Others: 17.0 s *1* (using 374γ(t) in 1975Fe12), 14.7 s *13* (using 112γ(t) in 1976MaYL) and 15.9 s *5* (using 374γ(t) in 1969WiZX).
240.73[#] *8*	2$^+$	0.32 ns *2*	ABCDE	J$^\pi$: 240.7γ E2 to 0$^+$. T$_{1/2}$: Unweighted average of 0.34 ns 4 from ^{252}Cf decay (1974JaYY) and 0.30 ns *2* from ^{254}Cf decay (1980ChZM). Others: 0.50 ns *8* in 1995Sc24, 0.23 ns in 1972Wi15 and 1970Ch11, and <0.5 ns in 1970Wa05. μ: +0.88 *14*, from g−factor=+0.44 *7* measured using time-integral perturbed angular correlation technique in 2005Sm08 and in 2004Sm04 (T$_{1/2}$=0.30 ns 2 was used). Q: −0.74 *9* from lifetime measurements using Doppler-profile method in 1999SmZX.
612.86[@] *8*	(2$^+$)	0.16 ns *8*	ABC E	J$^\pi$: 372.1γ M1+E2 to 2$^+$ and 612.9γ to 0$^+$. Branching ratio favors 2$^+$. T$_{1/2}$: From 372.1γ(t) (centroid-shift) in 1995Sc24. Others: 0.01 ns *16* from 612.9γ(t) (centroid-shift) in 1995Sc24.
663.35[#] *9*	4$^+$	15.4 ps *17*	ABC E	J$^\pi$: 422.6γ E2 to 2$^+$; member of the g.s. band. T$_{1/2}$: From 2001Kr13, using differential recoil distance method. Others: 13.4 ps 10 (1986Ma22). However, this is a combined value for ^{108}Ru and ^{110}Ru since the 4$^+$ to 2$^+$ transitions in those isotopes can not be resolved.
859.96[&] *9*	(3$^+$)		ABC E	J$^\pi$: 619.2γ to 2$^+$ and 196.6γ to 4$^+$; member of the one-phonon γ-vibrational band.
1084.37[@] *11*	(4$^+$)		ABC E	J$^\pi$: 224.5γ to (3$^+$) and 471.5γ to (2$^+$); member of the one-phonon γ-vibrational band.
1137.33 *10*	(0$^+$)		AB	J$^\pi$: 896.7γ to 2$^+$. No transition to the ground state nor feeding to or from the levels with J>2 were observed.
1239.1[#] *3*	6$^+$	2.4 ps *10*	BC E	J$^\pi$: 575.7γ E2 to 4$^+$; member of the g.s. band. T$_{1/2}$: From 2001Kr13, using differential recoil distance method.
1375.41[&] *23*	(5$^+$)		BC E	J$^\pi$: 291.0γ to (4$^+$) and 515.5γ to (3$^+$); member of the one-phonon γ-vibrational band.
1396.42 *8*	2$^+$		AB	J$^\pi$: 1396.4γ to 0$^+$ and 733.1γ to 4$^+$.
1618.37[a] *21*	(4$^+$)		B	J$^\pi$: 534.0γ to (4$^+$) and 1005.7γ to (2$^+$); member of the two-phonon γ-vibrational band.
1655.85 *10*	(2,3,4$^+$)		AB	J$^\pi$: 1415.1γ to 2$^+$; direct population in ^{110}Tc β- decay (J^π=2,3$^+$).
1684.27[@] *25*	(6$^+$)		BC E	J$^\pi$: 599.8γ to (4$^+$) and 308.7γ to (5$^+$); member of the one-phonon γ-vibrational band.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{110}Ru Levels (continued)

E(level)[†]	J^{π}[‡]	XREF	Comments
1799.5 *3*	(2,3,4$^+$)	A	J^{π}: 1186.6γ to (2$^+$); direct population in ^{110}Tc β- decay (J^{π}=2,3$^+$).
1820.49 *10*	(2,3,4$^+$)	AB	J^{π}: 424.2γ to 2$^+$,960.5γ to (3$^+$); direct population in ^{110}Tc β- decay (J^{π}=2,3$^+$).
1860.8[a] *3*	(5$^+$)	B	J^{π}: 1000.9γ to (3$^+$) and 242.4γ to (5$^+$); member of the two-phonon γ-vibrational band.
1883.34 *22*	(2,3,4$^+$)	A	J^{π}: 1642.6γ to 2$^+$; direct population in ^{110}Tc β- decay (J^{π}=2,3$^+$).
1944.5[#] *4*	8$^+$	BC E	J^{π}: 705.3γ to 6$^+$; member of the g.s. band.
1978.21 *19*	(2$^+$,3,4$^+$)	A	J^{π}: 1314.7γ to 4$^+$ and 1737.8γ to 2$^+$; direct population in ^{110}Tc β- decay (J^{π}=2,3$^+$).
2003.57 *22*	(2,3,4$^+$)	A	J^{π}: 1390.7γ to (2$^+$); direct population in ^{110}Tc β- decay (J^{π}=2,3$^+$).
2016.27[f] *24*	(4$^-$)	B	J^{π}: 931.8γ to (4$^+$) and 1156.4γ to (3$^+$); band assignment; 226.5γ from (6$^-$).
2020.9[&] *4*	(7$^+$)	BC E	J^{π}: 645.5γ to (5$^+$); member of the one-phonon γ-vibrational band.
2042.39 *14*	(2,3,4)	AB	J^{π}: direct population in ^{110}Tc β- decay (J^{π}=2,3$^+$).
2047.03 *23*	(1,2$^+$)	A	J^{π}: 2046.8γ to 0$^+$ and 1806.4γ to 2$^+$; direct population in ^{110}Tc β- decay (J^{π}=2,3$^+$).
2085.27 *13*	(2,3,4$^+$)	A	J^{π}: 1844.5γ to 2$^+$; direct population in ^{110}Tc β- decay (J^{π}=2,3$^+$).
2110.8[a] *4*	(6$^+$)	B	J^{π}: 492.4γ to (4$^+$) and 735.4γ to (5$^+$); member of two-phonon γ-vibrational band.
2143.1 *3*	(1$^+$,2,3,4$^+$)	A	J^{π}: 1902.4γ to 2$^+$; direct population in ^{110}Tc β- decay (J^{π}=2,3$^+$).
2145.3[e] *3*	(5$^-$)	B	J^{π}: 1481.9γ to 4$^+$; band assignment.
2152.69 *18*	(2,3,4$^+$)	A	J^{π}: 1539.5γ to 2$^+$, 1292.9γ to (3$^+$); direct population in ^{110}Tc β- decay (J^{π}=2,3$^+$).
2204.6 *4*	(2,3,4$^+$)	A	J^{π}: 1963.9γ to 2$^+$, direct population in ^{110}Tc β- decay (J^{π}=2,3$^+$).
2242.8[d] *4*	(6$^-$)	B	J^{π}: 867.5γ D to (5$^+$); band assignment.
2266.3 *4*	(2,3,4$^+$)	A	J^{π}: 2025.6γ to 2$^+$; direct population in ^{110}Tc β- decay (J^{π}=2,3$^+$).
2328.0[f] *3*	(6$^-$)	B	J^{π}: 312.0γ to (4$^-$), 182.8γ to (5$^-$) and 1088.8γ to 6$^+$; band assignment.
2337.9 *4*	(2$^+$,3,4$^+$)	A	J^{π}: 2096.8 to 2$^+$, 1674.6γ to 4$^+$; direct population in ^{110}Tc β- decay (J^{π}=2,3$^+$).
2367.0 *5*	(2,3,4$^+$)	A	J^{π}: 2126.2γ to 2$^+$; direct population in ^{110}Tc β- decay (J^{π}=2,3$^+$).
2397.0[@] *4*	(8$^+$)	BC E	J^{π}: 712.7γ to (6$^+$); member of the one-phonon γ-vibrational band.
2413.03 *25*		A	
2419.6 *4*	(1,2$^+$)	A	J^{π}: 1282.3γ to (0$^+$); direct population in ^{110}Tc β- decay (J^{π}=2,3$^+$).
2426.5[c] *4*	(7$^-$)	B	J^{π}: 1187.2γ D to 6$^+$; band assignment.
2491.4 *6*	(2,3,4$^+$)	A	J^{π}: 2250.6γ to 2$^+$; direct population in ^{110}Tc β- decay (J^{π}=2,3$^+$).
2516.6[e] *4*	(7$^-$)	B	J^{π}: 371.4γ to (5$^-$) and 832.3γ to (6$^+$); band assignment.
2552.04 *23*	(1,2$^+$)	A	J^{π}: 1414.7γ to (0$^+$); direct population in ^{110}Tc β- decay (J^{π}=2,3$^+$).
2573.8 *7*	(2,3,4$^+$)	A	J^{π}: 2333.0 γ to 2$^+$; direct population in ^{110}Tc β- decay (J^{π}=2,3$^+$).
2637.4[d] *4*	(8$^-$)	B	J^{π}: 210.9γ to (7$^-$) and 394.5γ to (6$^-$); band assignment.
2759.5[#] *4*	10$^+$	BC E	J^{π}: 815γ to 8$^+$; member of the g.s. band.
2764.6[f] *4*	(8$^-$)	B	J^{π}: 436.7γ to (6$^-$), 247.9γ to (7$^-$) and 820.2γ to 8$^+$; band assignment.
2776.9[&] *5*	(9$^+$)	BC E	J^{π}: 756.0γ to (7$^+$); member of the one-phonon γ-vibrational band.
2892.7[c] *4*	(9$^-$)	B	J^{π}: 466.3γ to (7$^-$), 255.4γ to (8$^-$) and 948.2γ to 8$^+$; band assignment.
2942.8 *4*	(3$^-$)	A	J^{π}: 2082.8γ to (3$^+$); nonobservation of γ to 2$^+$ and 0$^+$; direct population in ^{110}Tc β- decay (J^{π}=2,3$^+$).
3006.06 *23*	(1,2$^+$)	A	J^{π}: 1868.6γ to (0$^+$) and 2393.0γ to (2$^+$); direct population in ^{110}Tc β- decay (J^{π}=2,3$^+$).
3019.5 *8*	(2,3,4$^+$)	A	J^{π}: 2406.6γ to (2$^+$); direct population in ^{110}Tc β- decay (J^{π}=2,3$^+$).
3041.3[e] *4*	(9$^-$)	B	J^{π}: 524.7γ to (7$^-$) 276.8γ to (8$^-$) and 1096.8γ to 8$^+$; band assignment.
3072.2 *3*	(2,3,4$^+$)	A	J^{π}: 2459.4γ to 2$^+$; direct population in ^{110}Tc β- decay (J^{π}=2,3$^+$).
3091.39 *14*		A	
3113.0 *7*	(9,10$^+$)	B	J^{π}: 716.0γ to (8$^+$).
3175.3[d] *5*	(10$^-$)	B	J^{π}: 537.9γ to (8$^-$) and 282.6γ to (9$^-$); band assignment.
3193.3[b] *4*	(9,10$^+$)	B	J^{π}: 416.4γ to (9$^+$) and 796.3γ to (8$^+$); band assignment.
3254.2[@] *6*	(10$^+$)	B E	J^{π}: 857.3γ to (8$^+$); member of the one-phonon γ-vibrational band.
3337.1[f] *5*	(10$^-$)	B	J^{π}: 572.4γ to (8$^-$) and 295.9γ to (9$^-$); band assignment.
3485.3[c] *5*	(11$^-$)	B	J^{π}: 592.6γ to (9$^-$) and 309.9γ to (10$^-$); band assignment.
3627.1[&] *7*	(11$^+$)	B E	J^{π}: 850.2γ to (9$^+$); member of the one-phonon γ-vibrational band.

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Adopted Levels, Gammas (continued)

^{110}Ru Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	XREF	Comments
3647.1[#] *6*	12$^+$	B E	J$^{\pi}$: 887.6γ to 10$^+$; member of the g.s. band.
3689.8[e] *5*	(11$^-$)	B	J$^{\pi}$: 648.5γ to (9$^-$), 352.8γ to (10$^-$) and 930.3γ to 10$^+$; band assignment.
3700.1 *6*	(12$^+$)	B	J$^{\pi}$: 940.5γ to 10$^+$.
3719.0[b] *5*	(12$^+$)	B	J$^{\pi}$: 959.5γ to 10$^+$.
3818.6[d] *5*	(12$^-$)	B	J$^{\pi}$: 643.2γ to (10$^-$) and 333.3γ to (11$^-$); band assignment.
3956.9 *8*	(12$^+$)	B	J$^{\pi}$: 843.9γ to 10$^+$.
4038.7[f] *6*	(12$^-$)	B	J$^{\pi}$: 701.7γ to (10$^-$) and 348.8γ to (11$^-$); band assignment.
4153.8[@] *8*	(12$^+$)	B E	J$^{\pi}$: 899.6γ to (10$^+$); member of the one-phonon γ-vibrational band.
4195.5[c] *6*	(13$^-$)	B	J$^{\pi}$: 710.2γ to (11$^-$) and 376.8γ to (12$^-$); band assignment.
4351.0[#] *7*	14$^+$	B E	J$^{\pi}$: 705γ to 12$^+$; member of the g.s. band.
4370.5[b] *6*	(14$^+$)	B	J$^{\pi}$: 651.5γ to (12$^+$); band assignment.
4446.3[e] *7*	(13$^-$)	B	J$^{\pi}$: 756.4γ to (11$^-$); band assignment.
4556.1[&] *9*	(13$^+$)	B E	J$^{\pi}$: 929γ to (11$^+$); member of the one-phonon γ-vibrational band.
4566.4[d] *7*	(14$^-$)	B	J$^{\pi}$: 747.9γ to (12$^-$) and 370.9γ to (11$^-$); band assignment.
4874.0[f] *8*	(14$^-$)	B	J$^{\pi}$: 835.3γ to (12$^-$); band assignment.
5010.8[c] *8*	(15$^-$)	B	J$^{\pi}$: 815.3γ to (13$^-$); band assignment.
5124.8[@] *13*	(14$^+$)	E	J$^{\pi}$: 971γ to (12$^+$); member of the one-phonon γ-vibrational band.
5143.0[b] *8*	(16$^+$)	B	J$^{\pi}$: 772.5γ to (14$^+$); band assignment.
5150.7[#] *8*	16$^+$	B E	J$^{\pi}$: 799.7γ to 14$^+$; member of the g.s. band.
5302.5[e] *9*	(15$^-$)	B	J$^{\pi}$: 856.2γ to (13$^-$); band assignment.
5412.7[d] *8*	(16$^-$)	B	J$^{\pi}$: 846.3γ to (14$^-$); band assignment.
5544.1[&] *14*	(15$^+$)	E	J$^{\pi}$: 988γ to (13$^+$); member of the one-phonon γ-vibrational band.
6017.4[b] *9*	(18$^+$)	B	J$^{\pi}$: 874.4γ to (16$^+$); band assignment.
6050.8[#] *10*	18$^+$	B E	J$^{\pi}$: 900.1γ to 16$^+$; member of the g.s. band.
7053.8[#] *14*	(20$^+$)	E	J$^{\pi}$: 1003γ to 18$^+$; member of the g.s. band.
8159.8[#] *17*	(22$^+$)	E	J$^{\pi}$: 1106γ to (20$^+$); member of the g.s. band.

[†] From a least-square fit to E_{γ}.
[‡] Based on measured transition multipolarities, systematics of low-lying collective states in Ru isotopes, γ-ray decay pattern and the observed band structures.
[#] Band(A): g.s. band.
[@] Band(B): One-phonon γ-vibrational band, α=0.
[&] Band(C): One-phonon γ-vibrational band, α=1.
[a] Band(D): Two-phonon γ-vibrational band. The J^{π} assignment is tentative, based on the decay of this band mainly to one-phonon γ-vibrational band.
[b] Band(E): Band based on 3193.3 keV (2009Zh24). J^{π} assignments are tentative. This band could have negative parities and odd spins one unit less. Assigned as four-quasiparticle band in 2003Ji03, but the authors stated that more experimental data needed for assigning a definitive configuration.
[c] Band(F): Band based on (7$^-$) at 2426.5 keV.
[d] Band(G): Band based on (6$^-$) at 2242.8 keV.
[e] Band(H): Band based on (5$^-$) at 2145.3 keV.
[f] Band(I): Band based on (4$^-$) at 2016.27 keV.

$\gamma(^{110}Ru)$

E_i(level)	J^{π}_i	E_{γ}[‡]	I_{γ}[‡]	E_f	J^{π}_f	Mult.	α[†]	Comments
240.73	2^+	240.7[#] *1*	100[#]	0.0	0^+	E2	0.0569	α(K)=0.0485 *7*; α(L)=0.00686 *10*; α(M)=0.001267 *18*; α(N+..)=0.000206 *3* α(N)=0.000198 *3*; α(O)=7.97×10^{-6} *12* B(E2)(W.u.)=66 *5* Mult.: A_2=0.229 *101*, A_4=0.195 *153* from $\gamma(\theta)$ in 1972Wi15. α(K)exp/α(L)exp≈4.0 in 1970Wa05, α(K)exp measurements in 1990Ay02, but the value was not given by the authors.
612.86	(2^+)	372.1[#] *1*	100[#]	240.73	2^+	(M1+E2)	0.0114 *19*	α(K)=0.0099 *16*; α(L)=0.0012 *3*; α(M)=0.00023 *5*; α(N+..)=3.8×10^{-5} *8* α(N)=3.6×10^{-5} *7*; α(O)=1.74×10^{-6} *22* Mult.: From ^{110}Tc β^- decay (1990Ay02), based on conversion electron measurements, but the value was not given by the authors.
		612.9[#] *1*	80.2[#] *25*	0.0	0^+	[E2]	0.00300 *5*	α(K)=0.00262 *4*; α(L)=0.000315 *5*; α(M)=5.78×10^{-5} *8*; α(N+..)=9.73×10^{-6} *14* α(N)=9.27×10^{-6} *13*; α(O)=4.60×10^{-7} *7* B(E2)(W.u.)=0.6 *3* Mult.: From ^{110}Tc β^- decay (1990Ay02), based on conversion electron measurements, but the value was not given by the authors.
663.35	4^+	422.6[#] *1*	100[#]	240.73	2^+	E2	0.00887 *13*	α(K)=0.00769 *11*; α(L)=0.000971 *14*; α(M)=0.000178 *3*; α(N+..)=2.97×10^{-5} *5* α(N)=2.84×10^{-5} *4*; α(O)=1.325×10^{-6} *19* B(E2)(W.u.)=86 *10* Mult.: From ^{110}Tc β^- decay (1990Ay02), based on conversion electron measurements, but the value was not given by the authors and the band structure.
859.96	(3^+)	196.6[#] *1*	1.53[#] *20*	663.35	4^+			
		247.1[#] *1*	20.7[#] *20*	612.86	(2^+)			
		619.2[#] *1*	100[#] *3*	240.73	2^+			
1084.37	(4^+)	224.5[#] *5*	2.70[#] *16*	859.96	(3^+)			
		421.0[#] *5*	50.6[#] *14*	663.35	4^+			
		471.5[#] *1*	100[#] *13*	612.86	(2^+)			
		843.6[#] *2*	62[#] *8*	240.73	2^+			I_{γ}: 15.9 *10* in ^{252}Cf SF decay; 15.7 in ^{248}Cm SF decay.
1137.33	(0^+)	896.7[#] *1*	100[#]	240.73	2^+			
1239.1	6^+	575.7 *5*	100	663.35	4^+	E2	0.00356 *5*	α(K)=0.00311 *5*; α(L)=0.000377 *6*; α(M)=6.92×10^{-5} *10*; α(N+..)=1.163×10^{-5} *17* α(N)=1.108×10^{-5} *16*; α(O)=5.45×10^{-7} *8* B(E2)(W.u.)=1.2×10^{2} *5* Mult.: From ^{248}Cm SF decay (1994Sh26), based on $\gamma\gamma(\theta)$ but A_2 and A_4 values were not given by the authors.

$^{110}_{44}Ru_{66}$-4

Adopted Levels, Gammas (continued)

$\gamma(^{110}Ru)$ (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ[‡]	E_f	J^π_f
1375.41	(5+)	291.0 *5*	3.60 *20*	1084.37	(4+)
		515.5 *5*	100	859.96	(3+)
		711.9 *5*	20.3 *6*	663.35	4+
1396.42	2+	259.2[#] *1*	3.04[#] *14*	1137.33	(0+)
		536.3[#] *1*	3.5[#] *7*	859.96	(3+)
		733.1[#] *1*	12.0[#] *9*	663.35	4+
		783.6[#] *1*	9.7[#] *13*	612.86	(2+)
		1155.8[#] *1*	100[#] *6*	240.73	2+
		1396.4[#] *2*	29[#] *3*	0.0	0+
1618.37	(4+)	534.0 *5*	26.7 *21*	1084.37	(4+)
		758.5 *5*	67 *4*	859.96	(3+)
		1005.7 *5*	100	612.86	(2+)
		1377.6 *5*	13.3 *8*	240.73	2+
1655.85	(2,3,4+)	796.1[#] *2*	37[#] *3*	859.96	(3+)
		1043.6[#] *5*	25.0[#] *20*	612.86	(2+)
		1415.1[#] *1*	100[#] *7*	240.73	2+
1684.27	(6+)	308.7 *5*	7.7 *4*	1375.41	(5+)
		445.2 *5*	11.1 *7*	1239.1	6+
		599.8 *5*	100	1084.37	(4+)
		1021.0 *5*	23 *4*	663.35	4+
1799.5	(2,3,4+)	1186.6[#] *3*	100[#]	612.86	(2+)
1820.49	(2,3,4+)	164.7[#] *1*	50[#] *9*	1655.85	(2,3,4+)
		424.2[#] *1*	100[#] *16*	1396.42	2+
		960.5[#] *1*	20.5[#] *23*	859.96	(3+)
		1579.0[#] *2*	43[#] *5*	240.73	2+
1860.8	(5+)	242.4 *5*	100	1618.37	(4+)
		776.4 *5*	12.5 *8*	1084.37	(4+)
		1000.9 *5*	12.5 *11*	859.96	(3+)
1883.34	(2,3,4+)	1642.6[#] *2*	100[#]	240.73	2+
1944.5	8+	705.3 *5*	100	1239.1	6+
1978.21	(2+,3,4+)	1314.7[#] *2*	100[#] *15*	663.35	4+
		1737.8[#] *3*	62[#] *8*	240.73	2+
2003.57	(2,3,4+)	1390.7[#] *2*	100[#]	612.86	(2+)
2016.27	(4−)	398.0 *5*	<22.5	1618.37	(4+)
		931.8 *5*	27 *4*	1084.37	(4+)
		1156.4 *5*	100	859.96	(3+)
		1353.0 *5*	29 *3*	663.35	4+

From ENSDF

$^{110}_{44}Ru_{66}$-5

Adopted Levels, Gammas (continued)

$\gamma(^{110}Ru)$ (continued)

E_i(level)	J^π_i	E_γ‡	I_γ‡	E_f	J^π_f	Mult.	Comments
2020.9	(7^+)	645.5 *5*	100	1375.41	(5^+)		
		781.7 *5*	7.4 *7*	1239.1	6^+		
2042.39	(2,3,4)	221.9# *1*	100#	1820.49	$(2,3,4^+)$		
2047.03	$(1,2^+)$	1806.4# *3*	100# *8*	240.73	2^+		
		2046.8# *4*	100# *18*	0.0	0^+		
2085.27	$(2,3,4^+)$	1225.3# *1*	100# *10*	859.96	(3^+)		
		1844.5# *3*	23# *3*	240.73	2^+		
2110.8	(6^+)	492.4 *5*	43 *5*	1618.37	(4^+)		
		735.4 *5*	4.8 *6*	1375.41	(5^+)		
		1026.4 *5*	100	1084.37	(4^+)		
2143.1	$(1^+,2,3,4^+)$	1902.4# *3*	100#	240.73	2^+		
2145.3	(5^-)	129.1&		2016.27	(4^-)		
		527.1 *5*	33 *4*	1618.37	(4^+)		
		1060.8 *5*	40 *4*	1084.37	(4^+)		
		1481.9 *5*	100	663.35	4^+		
2152.69	$(2,3,4^+)$	1292.9# *2*	16.7# *24*	859.96	(3^+)		
		1539.5# *3*	100# *12*	612.86	(2^+)		
2204.6	$(2,3,4^+)$	1963.9# *4*	100#	240.73	2^+		
2242.8	(6^-)	226.5 *5*	21.5 *11*	2016.27	(4^-)		
		867.5 *5*	100	1375.41	(5^+)	D	Mult.: From 2009Lu18:$(867.5\gamma)(515.5\gamma)(\theta)$: A_2=−0.052 *14*, A_4=−0.002 *21*. In 2009Lu01, A_4 = +0.002 *21* is quoted. The theoretical values for a pure dipole transition are: A_2=−0.071, A_4=0; and for a pure quadrupole transition are A_2=−0.112 and A_4=−0.054. $(867.5\gamma)(394.5\gamma)(\theta)$: A_2=−0.079 *14*, A_4=+0.023 *20*. The theoretical values for a pure dipole transition are: A_2=−0.071, A_4=0; and for a pure quadrupole transition are A_2=−0.007 and A_4=−0.023.
2266.3	$(2,3,4^+)$	2025.6# *4*	100#	240.73	2^+		
2328.0	(6^-)	182.8 *5*	3.7 *3*	2145.3	(5^-)		
		312.0 *5*	12.7 *6*	2016.27	(4^-)		
		643.6 *5*	13.5 *18*	1684.27	(6^+)		
		952.5 *5*	100	1375.41	(5^+)		
		1088.8 *5*	41 *13*	1239.1	6^+		
2337.9	$(2^+,3,4^+)$	1674.6# *4*	86# *17*	663.35	4^+		
		2096.8# *7*	100# *26*	240.73	2^+		
2367.0	$(2,3,4^+)$	2126.2# *5*	100#	240.73	2^+		
2397.0	(8^+)	452.5 *5*	12.9 *19*	1944.5	8^+		
		712.7 *5*	100	1684.27	(6^+)		
2413.03		366.0# *1*	100#	2047.03	$(1,2^+)$		

$^{110}_{44}Ru_{66}$-6

Adopted Levels, Gammas (continued)

γ(^{110}Ru) (continued)

E_i(level)	J^π_i	E_γ‡	I_γ‡	E_f	J^π_f	Mult.	Comments
2419.6	(1,2$^+$)	1282.3# 3	100#	1137.33	(0$^+$)		
2426.5	(7$^-$)	183.6 5	6.0 20	2242.8	(6$^-$)		
		742.3 5	20 3	1684.27	(6$^+$)		
		1187.2 5	100	1239.1	6$^+$	D	Mult.: From 2009Lu18: (1187.2γ)(575.5γ)(θ): A_2=−0.086 11, A_4=+0.010 17. The theoretical values for a pure dipole transition are: A_2=−0.071, A_4=0; and for a pure quadrupole transition are: A_2=−0.102 and A_4=−0.051.
2491.4	(2,3,4$^+$)	2250.6# 6	100#	240.73	2$^+$		
2516.6	(7$^-$)	188.7&	0.2	2328.0	(6$^-$)		
		371.4 5	6.8 13	2145.3	(5$^-$)		
		832.3 5	6.1 25	1684.27	(6$^+$)		
		1277.5 5	100	1239.1	6$^+$		
2552.04	(1,2$^+$)	1414.7# 2	100#	1137.33	(0$^+$)		
2573.8	(2,3,4$^+$)	2333.0# 7	100#	240.73	2$^+$		
2637.4	(8$^-$)	210.9 5	42.5 11	2426.5	(7$^-$)		
		309.3 5	15.1 7	2328.0	(6$^-$)		
		394.5 5	100	2242.8	(6$^-$)		
		616.5 5	38.1 13	2020.9	(7$^+$)		
2759.5	10$^+$	815.0 5	100	1944.5	8$^+$		
2764.6	(8$^-$)	247.9 5	34 3	2516.6	(7$^-$)		
		436.7 5	100	2328.0	(6$^-$)		
		820.2 5	12.5 21	1944.5	8$^+$		
2776.9	(9$^+$)	756.0 5	100	2020.9	(7$^+$)		
2892.7	(9$^-$)	255.4 5	15.2 11	2637.4	(8$^-$)		
		466.3 5	47.1 18	2426.5	(7$^-$)		
		948.2 5	100	1944.5	8$^+$		
2942.8	(3$^-$)	2082.8# 4	100#	859.96	(3$^+$)		
3006.06	(1,2$^+$)	853.4# 2	18# 3	2152.69	(2,3,4$^+$)		
		1868.6# 5	27# 4	1137.33	(0$^+$)		
		2393.0# 7	100# 14	612.86	(2$^+$)		
3019.5	(2,3,4$^+$)	2406.6# 8	100#	612.86	(2$^+$)		
3041.3	(9$^-$)	276.8 5	5.8 13	2764.6	(8$^-$)		
		524.7 5	41 4	2516.6	(7$^-$)		
		1096.8 5	100	1944.5	8$^+$		
3072.2	(2,3,4$^+$)	1025.2# 3	58# 11	2047.03	(1,2$^+$)		
		2212.2# 5	42# 5	859.96	(3$^+$)		
		2459.4# 8	100# 11	612.86	(2$^+$)		
3091.39		1270.9# 1	100#	1820.49	(2,3,4$^+$)		
3113.0	(9,10$^+$)	716.0 5	100	2397.0	(8$^+$)		

$^{110}_{44}$Ru$_{66}$-7

Adopted Levels, Gammas (continued)

$\gamma(^{110}$Ru) (continued)

E_i(level)	J^π_i	E_γ‡	I_γ‡	E_f	J^π_f	E_i(level)	J^π_i	E_γ‡	I_γ‡	E_f	J^π_f
3175.3	(10⁻)	282.6 5	14.5 7	2892.7	(9⁻)	4038.7	(12⁻)	701.7 5	100	3337.1	(10⁻)
		537.9 5	100	2637.4	(8⁻)	4153.8	(12⁺)	899.6 5	100	3254.2	(10⁺)
3193.3	(9,10⁺)	416.4 5	100	2776.9	(9⁺)	4195.5	(13⁻)	376.8 5	≤22.5	3818.6	(12⁻)
		796.3 5	24 5	2397.0	(8⁺)			710.2 5	100	3485.3	(11⁻)
		1249.0 5	51 5	1944.5	8⁺	4351.0	14⁺	650.9 5	14.0 4	3700.1	(12⁺)
3254.2	(10⁺)	857.3 5	100	2397.0	(8⁺)			703.9 5	100	3647.1	12⁺
3337.1	(10⁻)	295.9 5	21 5	3041.3	(9⁻)	4370.5	(14⁺)	651.5 5	100	3719.0	(12⁺)
		572.4 5	100	2764.6	(8⁻)			670.4 5	≤1.8	3700.1	(12⁺)
		577.7&	0.1	2759.5	10⁺	4446.3	(13⁻)	756.4 5	100	3689.8	(11⁻)
3485.3	(11⁻)	309.9 5	19 3	3175.3	(10⁻)	4556.1	(13⁺)	929.0 5	100	3627.1	(11⁺)
		592.6 5	100	2892.7	(9⁻)	4566.4	(14⁻)	370.9 5	10.5 23	4195.5	(13⁻)
		725.9 5	87 9	2759.5	10⁺			747.9 5	100	3818.6	(12⁻)
3627.1	(11⁺)	850.2 5	100	2776.9	(9⁺)	4874.0	(14⁻)	835.3 5	100	4038.7	(12⁻)
3647.1	12⁺	887.6 5	100	2759.5	10⁺	5010.8	(15⁻)	815.3 5	100	4195.5	(13⁻)
3689.8	(11⁻)	352.8 5	8.6 23	3337.1	(10⁻)	5124.8	(14⁺)	971.0@ 10	100@	4153.8	(12⁺)
		648.5 5	100	3041.3	(9⁻)	5143.0	(16⁺)	772.5 5	100	4370.5	(14⁺)
		930.3 5	37 9	2759.5	10⁺	5150.7	16⁺	799.7 5	100	4351.0	14⁺
3700.1	(12⁺)	940.5 5	100	2759.5	10⁺	5302.5	(15⁻)	856.2 5	100	4446.3	(13⁻)
3719.0	(12⁺)	464.9 5	≤2.9	3254.2	(10⁺)	5412.7	(16⁻)	846.3 5	100	4566.4	(14⁻)
		525.7 5	100	3193.3	(9,10⁺)	5544.1	(15⁺)	988.0@ 10	100@	4556.1	(13⁺)
		959.5 5	7.1 12	2759.5	10⁺	6017.4	(18⁺)	874.4 5	100	5143.0	(16⁺)
3818.6	(12⁻)	333.3 5	9.9 10	3485.3	(11⁻)	6050.8	18⁺	900.1 5	100	5150.7	16⁺
		643.2 5	100	3175.3	(10⁻)	7053.8	(20⁺)	1003.0@ 10	100@	6050.8	18⁺
3956.9	(12⁺)	843.9 5	100	3113.0	(9,10⁺)	8159.8	(22⁺)	1106.0@ 10	100@	7053.8	(20⁺)
4038.7	(12⁻)	348.8 5	15 4	3689.8	(11⁻)						

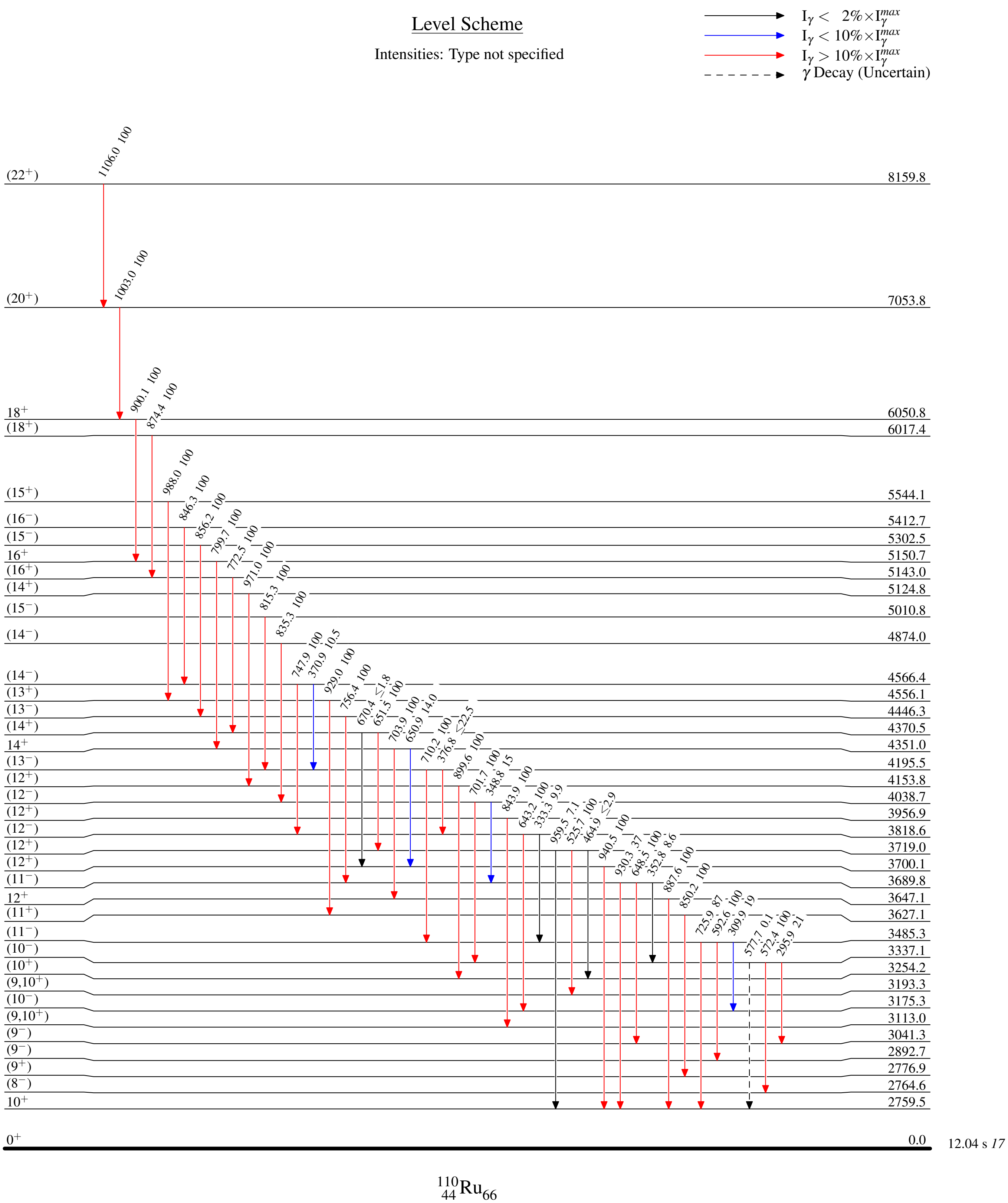
† Additional information 1.
‡ From ^{252}Cf SF Decay (2009Zh24,2009Lu18), unless otherwise stated. $\Delta E\gamma$=0.5 keV was estimated by the evaluators.
# From ^{110}Tc β^- decay.
@ From ^{238}U(α,Fγ).
& Placement of transition in the level scheme is uncertain.

$^{110}_{44}$Ru$_{66}$-8

Adopted Levels, Gammas

Level Scheme

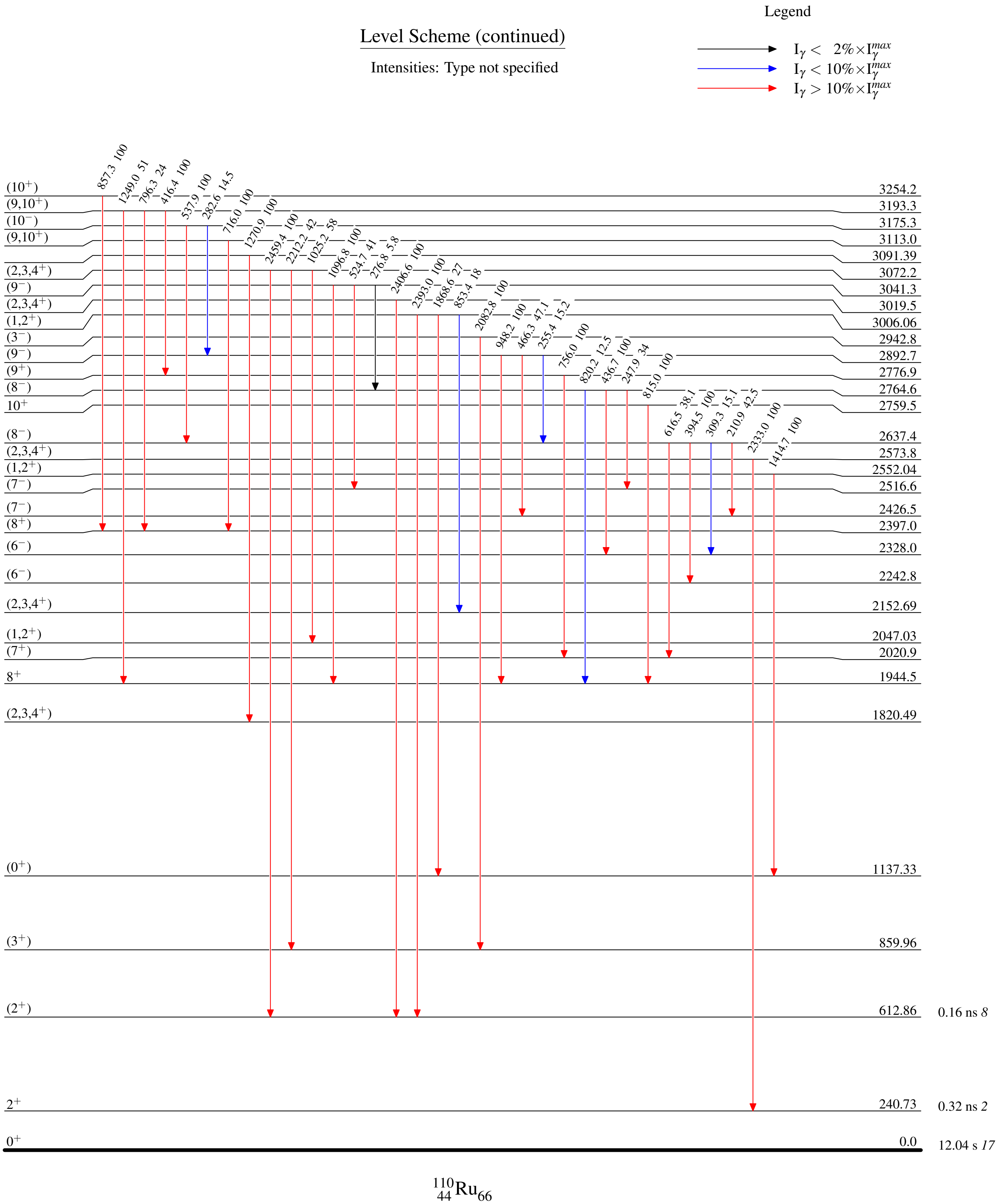
Intensities: Type not specified



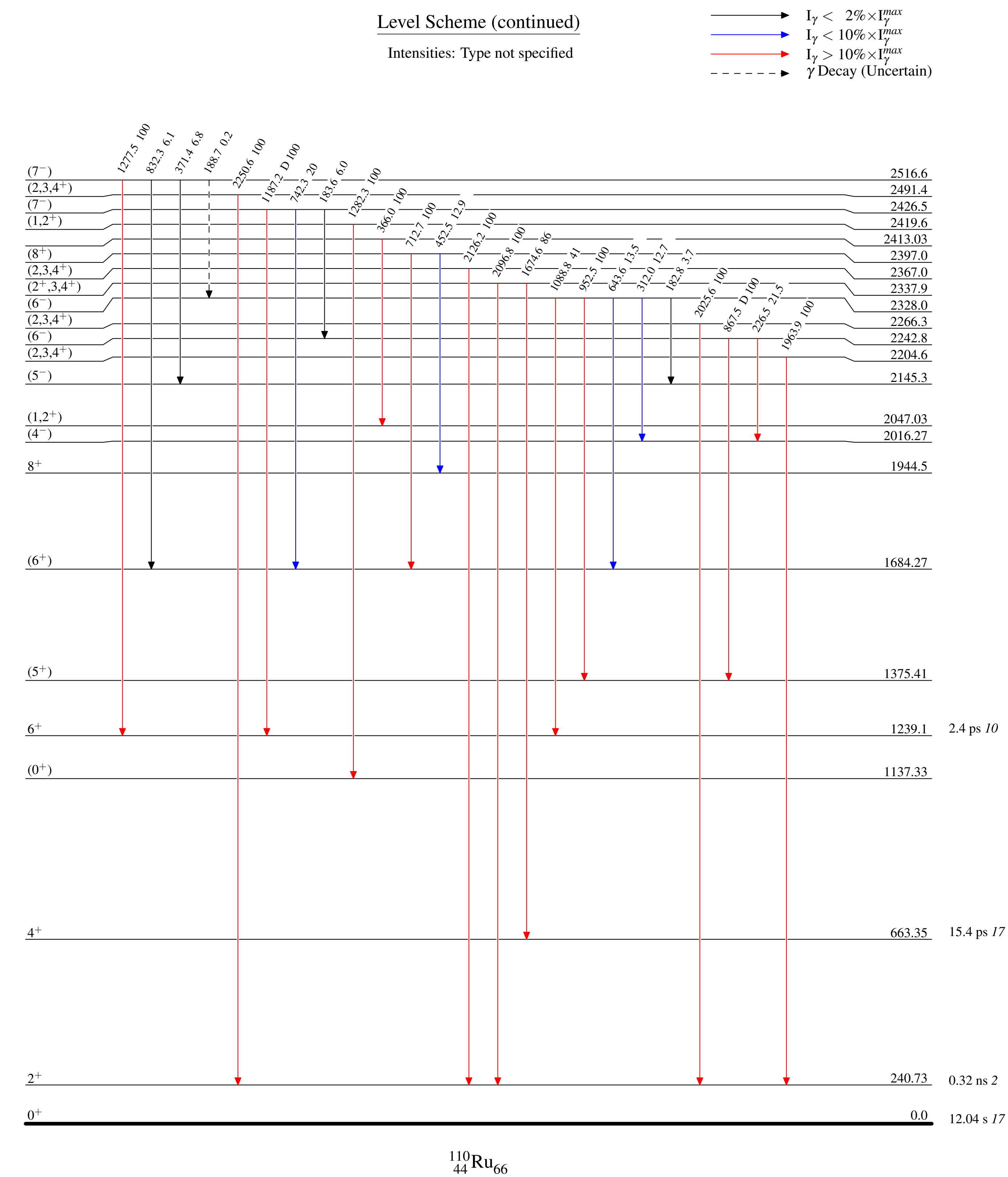
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified



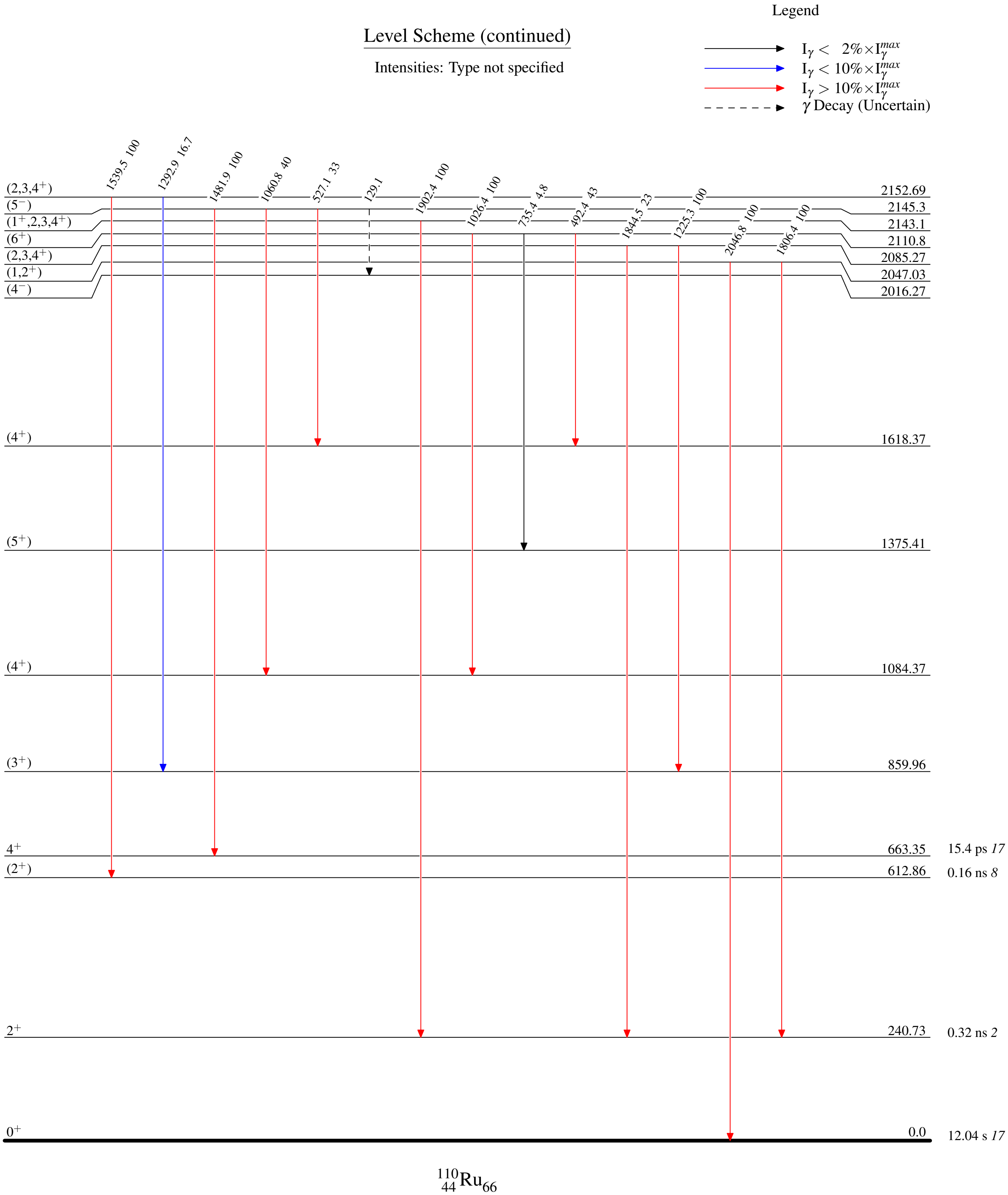
Adopted Levels, Gammas



Adopted Levels, Gammas

Level Scheme (continued)

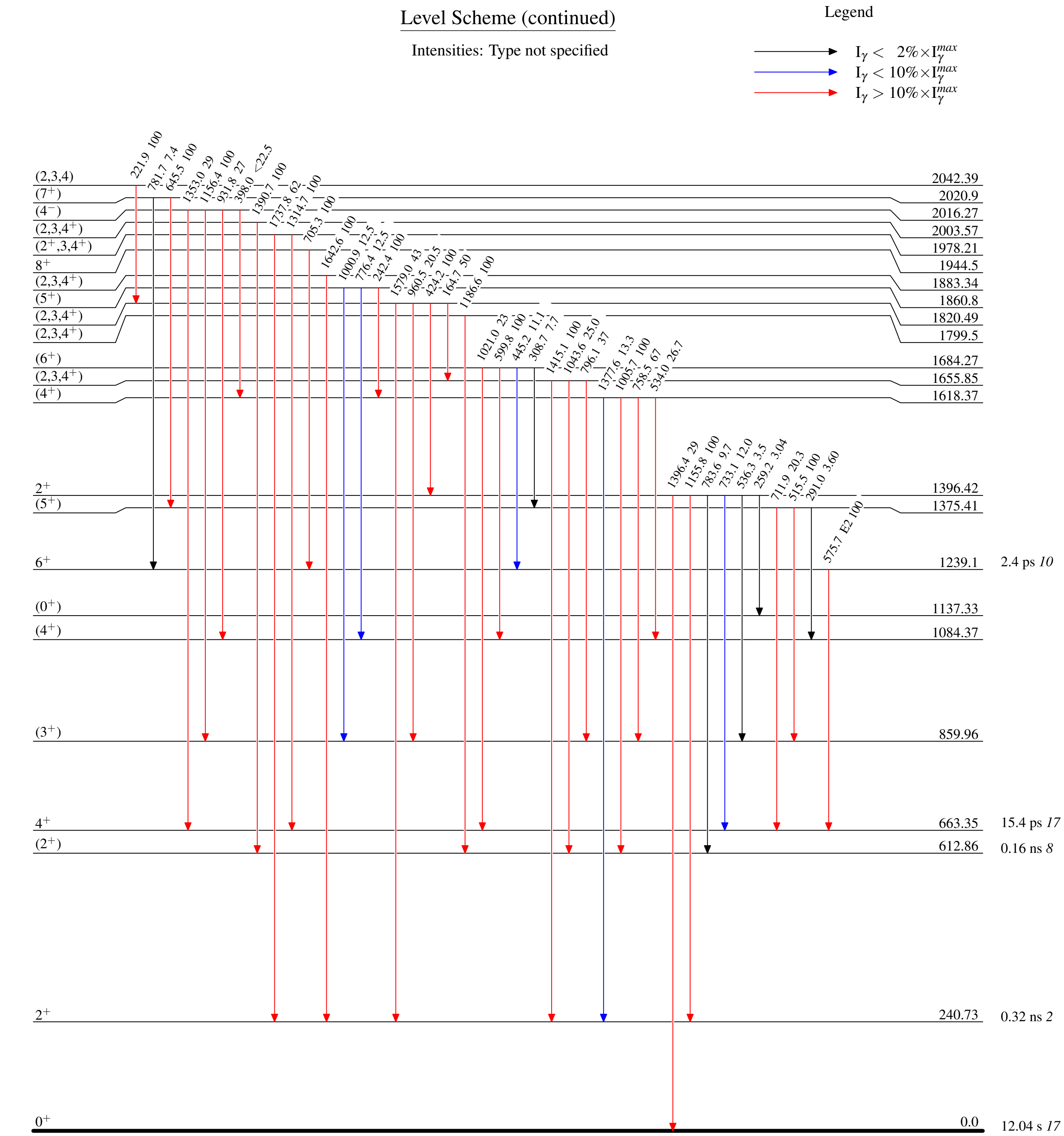
Intensities: Type not specified



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified



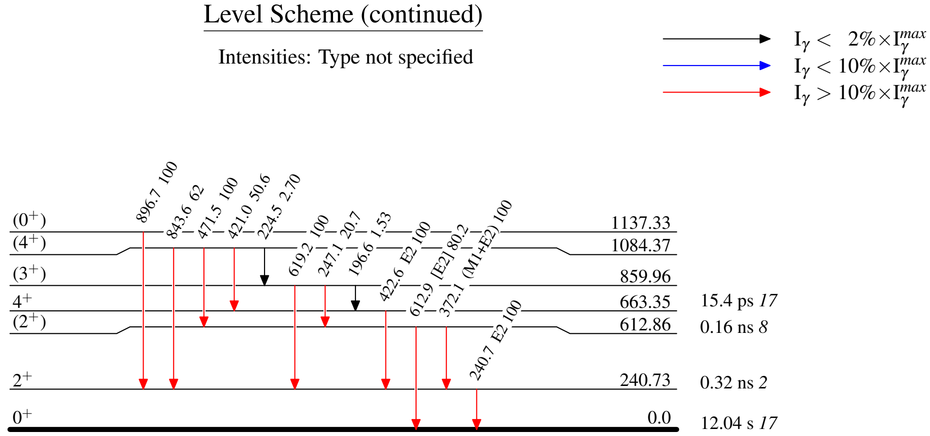
$^{110}_{44}Ru_{66}$

Adopted Levels, Gammas

Legend

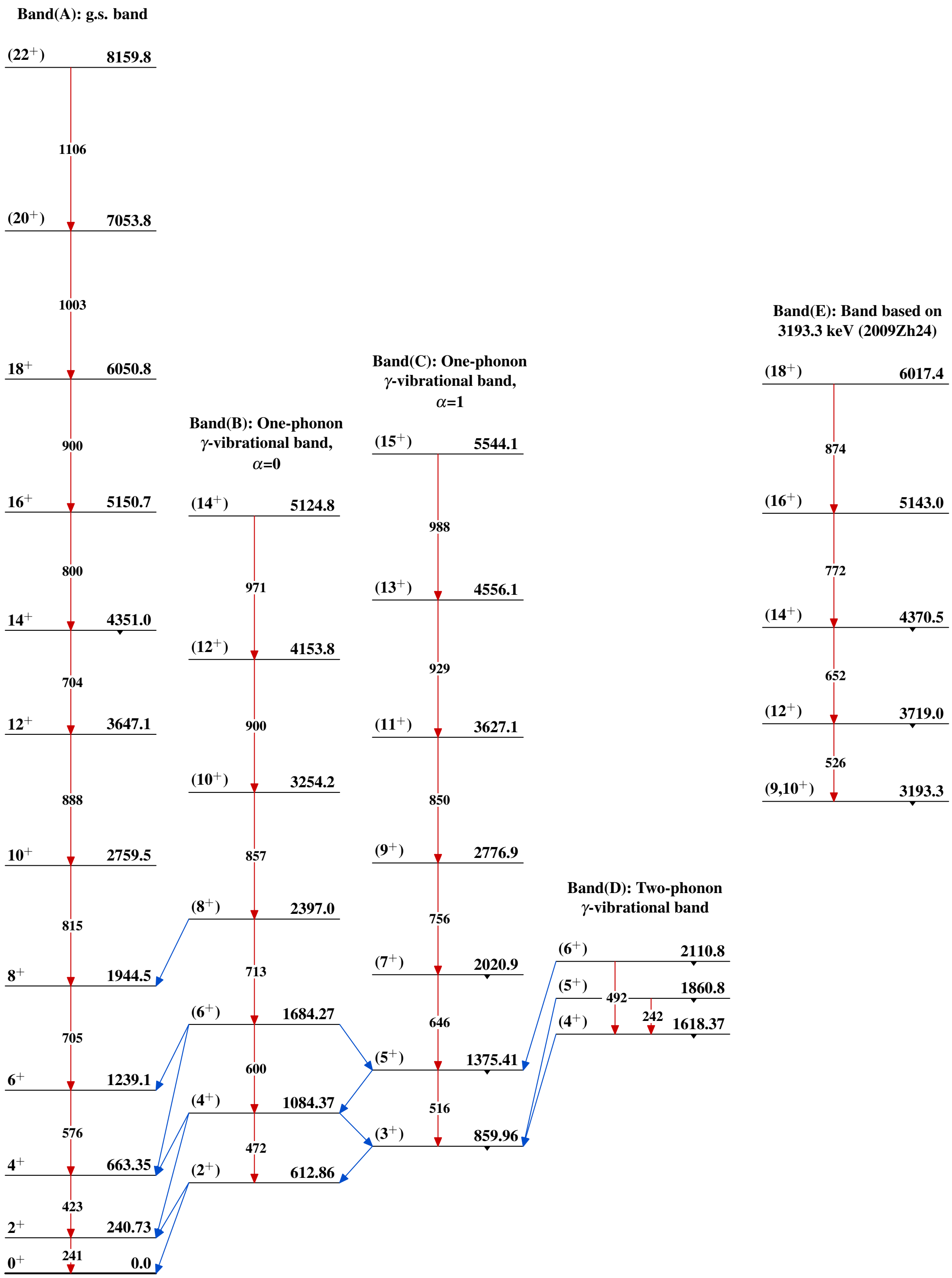
Level Scheme (continued)

Intensities: Type not specified



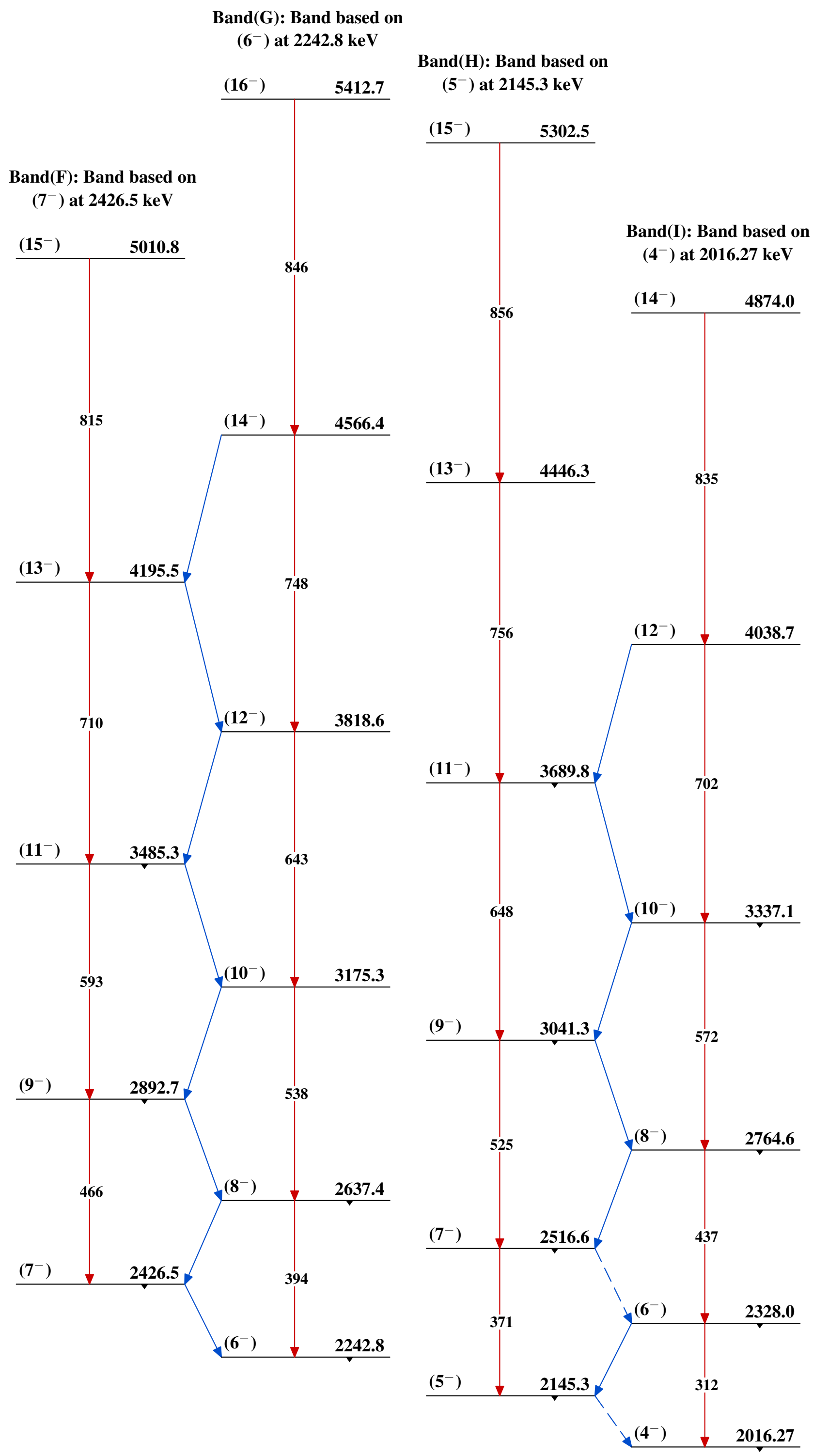
$^{110}_{44}Ru_{66}$

Adopted Levels, Gammas



$^{110}_{44}Ru_{66}$

Adopted Levels, Gammas (continued)



$^{110}_{44}Ru_{66}$