Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jean Blachot	NDS 110,1239 (2009)	1-Feb-2008

Q(β^-)=3682 *7*; S(n)=7547 *19*; S(p)=9523 *12*; Q(α)=−5982 *11* 2012Wa38
Note: Current evaluation has used the following Q record 3.65E+3 3 7.65×10^3 *6* 9660 *60* −5.68e$^+$315 2003Au03.
Band assignments are from ^{208}Pb(^{18}O,Fγ).

^{111}Rh Levels

Cross Reference (XREF) Flags

A ^{111}Ru β^- decay
B ^{208}Pb(^{18}O,Fγ)
C ^{252}Cf SF decay

E(level)[#]	J$^\pi$[†]	T$_{1/2}$[‡]	XREF	Comments
0.0[@]	(7/2$^+$)	11 s *1*	ABC	%β^-=100 T$_{1/2}$: 11 s *1* (1978Fr16) 275 γ-decay curve; 13.5 s *15* (1976MaYL) ^{252}Cf SF, timed gas-separation method, 275 γ-decay curve. J$^\pi$: allowed (log *ft*=4.7) β- from (5/2$^+$), Systematics in odd-A Rh supports the (7/2$^+$).
211.53[&] *11*	(9/2$^+$)	<0.5 ns	ABC	J$^\pi$: M1 γ to (7/2$^+$) gives 5/2$^+$,7/2$^+$,9/2$^+$. 9/2$^+$ is preferred by similarity with ^{109}Rh.
303.45[d] *12*	(3/2$^+$)	<0.5 ns	ABC	J$^\pi$: E2 γ to (7/2$^+$) gives 3/2$^+$ to 11/2$^+$. No transition to (9/2$^+$) favors (3/2$^+$).
382.02[d] *12*	(5/2$^+$)	0.3 ns *2*	A C	J$^\pi$: M1 γ to (3/2$^+$), E2 γ to (7/2$^+$) from syst (5/2$^+$) is preferred.
394.95[e] *17*	(3/2$^+$)	87 ns *8*	ABC	J$^\pi$: based on assumption that this level is the lowest member of intruder band. T$_{1/2}$: from $\gamma\gamma$(t) (1990Ro13).
417.3 *4*			A	
440.42[&] *23*	(1/2$^+$)	4.8 ns *5*	A C	J$^\pi$: M1 γ to (3/2$^+$), member of the intruder band.
490.74[@] *23*	(11/2$^+$)		ABC	
492.73[g] *21*	(1/2$^-$)	6.8 ns *4*	ABC	J$^\pi$: syst of odd-A Rh.
567.48[e] *18*	(7/2$^+$)		ABC	J$^\pi$: member of the intruder band.
586.3 *3*			A	
608.3[a] *3*	(11/2$^+$)		ABC	
632.37 *13*	(7/2$^+$)	<0.5 ns	A	J$^\pi$: M1 γ to (5/2$^+$).
661.2 *4*			A	
663.14[f] *20*	(5/2$^+$)	<0.5 ns	A C	
681.3 *3*	(3/2$^-$)		A C	J$^\pi$: syst of odd-A Rh.
684.8 *5*			A	
715.4[&] *3*	(13/2$^+$)		B	
732.7[g] *3*	(5/2$^-$)		ABC	
860.3 *3*	(3/2$^-$)		A	
922.5[e] *10*	(11/2$^+$)		BC	
936.0 *5*			A	
960.4 *4*	(3/2,5/2)		A	
976.8 *3*	(5/2$^-$)		A	
1018.02 *22*	(3/2)		A C	
1019.0[b] *3*	(13/2$^+$)		B	
1038.9 *3*	(5/2,7/2)		A	
1044.93[f] *23*	(9/2$^+$)		C	
1055.01 *22*			A	
1096.40 *21*	(3/2,5/2)		A	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{111}Rh Levels (continued)

E(level)[#]	J^{π}[†]	XREF	Comments
1157.8[@] 3	(15/2$^+$)	BC	
1159.5 4	(3/2,5/2,7/2)	A	
1168.3[g] 5	(9/2$^-$)	BC	
1348.82 17	(3/2,5/2,7/2)	A	
1373.3[a] 3	(15/2$^+$)	BC	
1382.4[&] 3	(17/2$^+$)	BC	
1444.4[e] 11	(15/2$^+$)	BC	
1548.1[b] 4	(17/2$^+$)	BC	
1759.3[g] 11	(13/2$^-$)	BC	
1780.2 7		A	
1898.05 18	(5/2,7/2)	A	
1931.8[@] 3	(19/2$^+$)	BC	
1949.9[a] 3	(19/2$^+$)	BC	
2033.94 18	(5/2,7/2)	A	
2111.7[c] 3	(19/2,21/2)	BC	
2112.4[e] 15	(19/2$^+$)	BC	
2126.74 22	(3/2$^+$)	A	J^{π}: allowed (log *ft*=4.6) β- from (5/2$^+$).
2155.7[&] 3	(21/2$^+$)	BC	
2214.77 25	(3/2$^+$,5/2$^+$,7/2$^+$)	A	J^{π}: allowed (log *ft*=4.4) β- from (5/2$^+$).
2354.4[c] 3	(21/2,23/2)	C	
2603.2[a] 3	(23/2$^+$)	C	
2649.8[c] 3	(23/2,25/2)	BC	
2732.1[@] 3	(23/2$^+$)	C	
2893.4[&] 3	(25/2$^+$)	BC	
2903.7[e] 15	(23/2$^+$)	C	
2963.5[c] 3	(25/2,27/2)	BC	
3271.3[@] 4	(27/2$^+$)	BC	
3324.4[c] 3	(27/2,29/2)	BC	
3522.8[&] 4	(29/2$^+$)	BC	
3741.6[c] 3	(29/2,31/2)	C	
3932.3[@] 4	(31/2$^+$)	C	
4248.2[&] 4	(33/2$^+$)	C	

[†] J^{π} without comments are based on band assignments and syst.
[‡] From ^{111}Ru β^- Decay (1998Lh02).
[#] From least-squares fit to Eγ's (by evaluator).
[@] Band(A): g.s. band, α=−1/2.
[&] Band(a): g.s. band, α=+1/2.
[a] Band(B): 11/2$^+$ band, α=−1/2.
[b] Band(b): 13/2$^+$ band, α=+1/2.
[c] Band(C): (19/2,21/2) band.
[d] Band(D): 3/2$^+$ band.
[e] Band(E): π1/2[431] band, α=−1/2.
[f] Band(e): π1/2[431] band, α=+1/2.
[g] Band(F): π1/2[301] band.

Adopted Levels, Gammas (continued)

$\gamma(^{111}Rh)$

E_i(level)	J_i^π	E_γ[†]	I_γ	E_f	J_f^π	Mult.[‡]	α[@]
211.53	(9/2$^+$)	211.4 *2*	100	0.0	(7/2$^+$)	M1	0.0447
303.45	(3/2$^+$)	91.3 *3*		211.53	(9/2$^+$)		
		303.6 *2*	100	0.0	(7/2$^+$)	E2	0.027
382.02	(5/2$^+$)	78.7 *2*	82 *12*	303.45	(3/2$^+$)	M1	0.686
		170.6 *2*	3.3 *9*	211.53	(9/2$^+$)		
		382.0 *3*	100 *4*	0.0	(7/2$^+$)	E2	
394.95	(3/2$^+$)	91.3 *3*	44 *6*	303.45	(3/2$^+$)	M1,E2	
		395.0 *3*	100 *13*	0.0	(7/2$^+$)		
417.3		205.8 *4*	100	211.53	(9/2$^+$)		
440.42	(1/2$^+$)	136.9 *3*	100	303.45	(3/2$^+$)	M1	0.145
490.74	(11/2$^+$)	279.2 *3*	100 *22*	211.53	(9/2$^+$)		
		490.7 *4*	50 *9*	0.0	(7/2$^+$)		
492.73	(1/2$^-$)	189.1 *3*	100	303.45	(3/2$^+$)		
567.48	(7/2$^+$)	172.6 *5*	100 *30*	394.95	(3/2$^+$)		
		185.5 *2*	56 *11*	382.02	(5/2$^+$)		
		355.7 *4*	94 *22*	211.53	(9/2$^+$)		
		567.5 *4*	100 *17*	0.0	(7/2$^+$)		
586.3		191.3 *2*	100	394.95	(3/2$^+$)		
608.3	(11/2$^+$)	396.8 *3*	100	211.53	(9/2$^+$)		
632.37	(7/2$^+$)	250.5 *2*	100 *5*	382.02	(5/2$^+$)	M1	
		328.7 *4*	5.4 *13*	303.45	(3/2$^+$)		
		420.9 *2*	70 *6*	211.53	(9/2$^+$)		
		632.4 *3*	20 *4*	0.0	(7/2$^+$)		
661.2		449.7 *4*	100	211.53	(9/2$^+$)		
663.14	(5/2$^+$)	222.9 *4*	88 *9*	440.42	(1/2$^+$)		
		268.1 *3*	100 *14*	394.95	(3/2$^+$)		
		280.9 *4*	24 *5*	382.02	(5/2$^+$)		
681.3	(3/2$^-$)	188.8 *4*	100	492.73	(1/2$^-$)		
684.8		381.4 *5*	100	303.45	(3/2$^+$)		
715.4	(13/2$^+$)	224.4 *5*	100 *21*	490.74	(11/2$^+$)		
		503.9 *4*	83 *17*	211.53	(9/2$^+$)		
732.7	(5/2$^-$)	240.0 *3*	100 *17*	492.73	(1/2$^-$)		
		350.7 *4*	50 *12*	382.02	(5/2$^+$)		
860.3	(3/2$^-$)	179.1 *4*	20 *5*	681.3	(3/2$^-$)		
		367.3 *3*	100 *20*	492.73	(1/2$^-$)		
922.5	(11/2$^+$)	355 *1*	100	567.48	(7/2$^+$)		
936.0		554.0 *5*	100	382.02	(5/2$^+$)		
960.4	(3/2,5/2)	519.5 *5*	19	440.42	(1/2$^+$)		
		565.8 *5*	100 *30*	394.95	(3/2$^+$)		
		961.4 *11*	29 *14*	0.0	(7/2$^+$)		
976.8	(5/2$^-$)	244.4 *5*	100 *23*	732.7	(5/2$^-$)		
		295.4 *3*	54 *15*	681.3	(3/2$^-$)		
		483.9 *5*	54 *15*	492.73	(1/2$^-$)		
1018.02	(3/2)	157.5 *3*	33 *5*	860.3	(3/2$^-$)		
		525.5 *4*	22 *8*	492.73	(1/2$^-$)		
		577.4 *5*	5 *3*	440.42	(1/2$^+$)		
		714.8 *3*	100 *18*	303.45	(3/2$^+$)		
1019.0	(13/2$^+$)	410.6 *3*	100	608.3	(11/2$^+$)		
1038.9	(5/2,7/2)	827.4 *3*	100 *14*	211.53	(9/2$^+$)		
		1038.9 *4*	29 *5*	0.0	(7/2$^+$)		
1044.93	(9/2$^+$)	381.79 *10*	0.5	663.14	(5/2$^+$)		
1055.01		672.8 *4*	12.3 *23*	382.02	(5/2$^+$)		
		843.7 *3*	100 *8*	211.53	(9/2$^+$)		
		1054.8 *4*	37 *5*	0.0	(7/2$^+$)		
1096.40	(3/2,5/2)	603.66 *3*	100	492.73	(1/2$^-$)		

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Adopted Levels, Gammas (continued)

γ(^{111}Rh) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ	E_f	J_f^π
1157.8	(15/2$^+$)	442.2 *3*	100 *21*	715.4	(13/2$^+$)
		667.1[a] *4*	50[a] *13*	490.74	(11/2$^+$)
1159.5	(3/2,5/2,7/2)	777.5 *4*	100	382.02	(5/2$^+$)
1168.3	(9/2$^-$)	435.6 *4*	100	732.7	(5/2$^-$)
1348.82	(3/2,5/2,7/2)	717.6 *5*	46 *11*	632.37	(7/2$^+$)
		967.2 *4*	100 *19*	382.02	(5/2$^+$)
		1046.1 *12*	43 *22*	303.45	(3/2$^+$)
		1348.5 *2*	54 *11*	0.0	(7/2$^+$)
1373.3	(15/2$^+$)	354.2 *3*	100 *23*	1019.0	(13/2$^+$)
		658.0 *4*	54 *15*	715.4	(13/2$^+$)
		765.2 *4*	62 *15*	608.3	(11/2$^+$)
1382.4	(17/2$^+$)	224.4[&] *5*	59[&] *14*	1157.8	(15/2$^+$)
		667.1[a] *4*	100[a] *14*	715.4	(13/2$^+$)
1444.4	(15/2$^+$)	521.9 *4*	100	922.5	(11/2$^+$)
1548.1	(17/2$^+$)	529.0 *4*	100	1019.0	(13/2$^+$)
1759.3	(13/2$^-$)	591 *1*	100	1168.3	(9/2$^-$)
1780.2		1398.2 *7*	100	382.02	(5/2$^+$)
1898.05	(5/2,7/2)	1265.7 *2*	100 *13*	632.37	(7/2$^+$)
		1515.9 *5*	100 *13*	382.02	(5/2$^+$)
		1594.7 *5*	13 *3*	303.45	(3/2$^+$)
		1686.3 *5*	16 *3*	211.53	(9/2$^+$)
		1898.1 *5*	13 *3*	0.0	(7/2$^+$)
1931.8	(19/2$^+$)	549.7 *5*	54 *23*	1382.4	(17/2$^+$)
		774[&] *1*	100[&] *23*	1157.8	(15/2$^+$)
1949.9	(19/2$^+$)	401.8 *3*	69 *15*	1548.1	(17/2$^+$)
		576.8 *4*	100 *23*	1373.3	(15/2$^+$)
		792.1 *4*	38 *15*	1157.8	(15/2$^+$)
2033.94	(5/2,7/2)	1401.3 *4*	29 *4*	632.37	(7/2$^+$)
		1652.1 *4*	18 *3*	382.02	(5/2$^+$)
		1730.3 *4*	13.4 *21*	303.45	(3/2$^+$)
		1822.3 *4*	29 *4*	211.53	(9/2$^+$)
		2034.1 *3*	100 *13*	0.0	(7/2$^+$)
2111.7	(19/2,21/2)	161.79 *10*	100	1949.9	(19/2$^+$)
		729.32 *10*	10.6	1382.4	(17/2$^+$)
2112.4	(19/2$^+$)	668 *1*	100	1444.4	(15/2$^+$)
2126.74	(3/2$^+$)	1030.1 *3*	31 *6*	1096.40	(3/2,5/2)
		1108.8 *3*	100 *14*	1018.02	(3/2)
		1445.6 *5*	9 *4*	681.3	(3/2$^-$)
		1463.6 *3*	89 *13*	663.14	(5/2$^+$)
		1634.4 *7*	17 *7*	492.73	(1/2$^-$)
		1686.5 *5*	22 *6*	440.42	(1/2$^+$)
		1731.5 *5*	67 *16*	394.95	(3/2$^+$)
2155.7	(21/2$^+$)	223.73 *10*		1931.8	(19/2$^+$)
		773.26 *10*	100	1382.4	(17/2$^+$)
2214.77	(3/2$^+$,5/2$^+$,7/2$^+$)	1551.4 *4*	74 *16*	663.14	(5/2$^+$)
		1819.3 *6*	67 *21*	394.95	(3/2$^+$)
		1910.8 *5*	100 *21*	303.45	(3/2$^+$)
		2215.5 *4*	58 *14*	0.0	(7/2$^+$)
2354.4	(21/2,23/2)	242.65 *10*	100	2111.7	(19/2,21/2)
2603.2	(23/2$^+$)	653.29 *10*	100	1949.9	(19/2$^+$)
2649.8	(23/2,25/2)	295.44 *10*	100	2354.4	(21/2,23/2)
		538.14 *10*	25	2111.7	(19/2,21/2)
2732.1	(23/2$^+$)	576.32 *10*	100	2155.7	(21/2$^+$)
		800.4 *1*	50	1931.8	(19/2$^+$)
2893.4	(25/2$^+$)	161.24 *10*	22.7	2732.1	(23/2$^+$)

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Adopted Levels, Gammas (continued)

$\gamma(^{111}Rh)$ (continued)

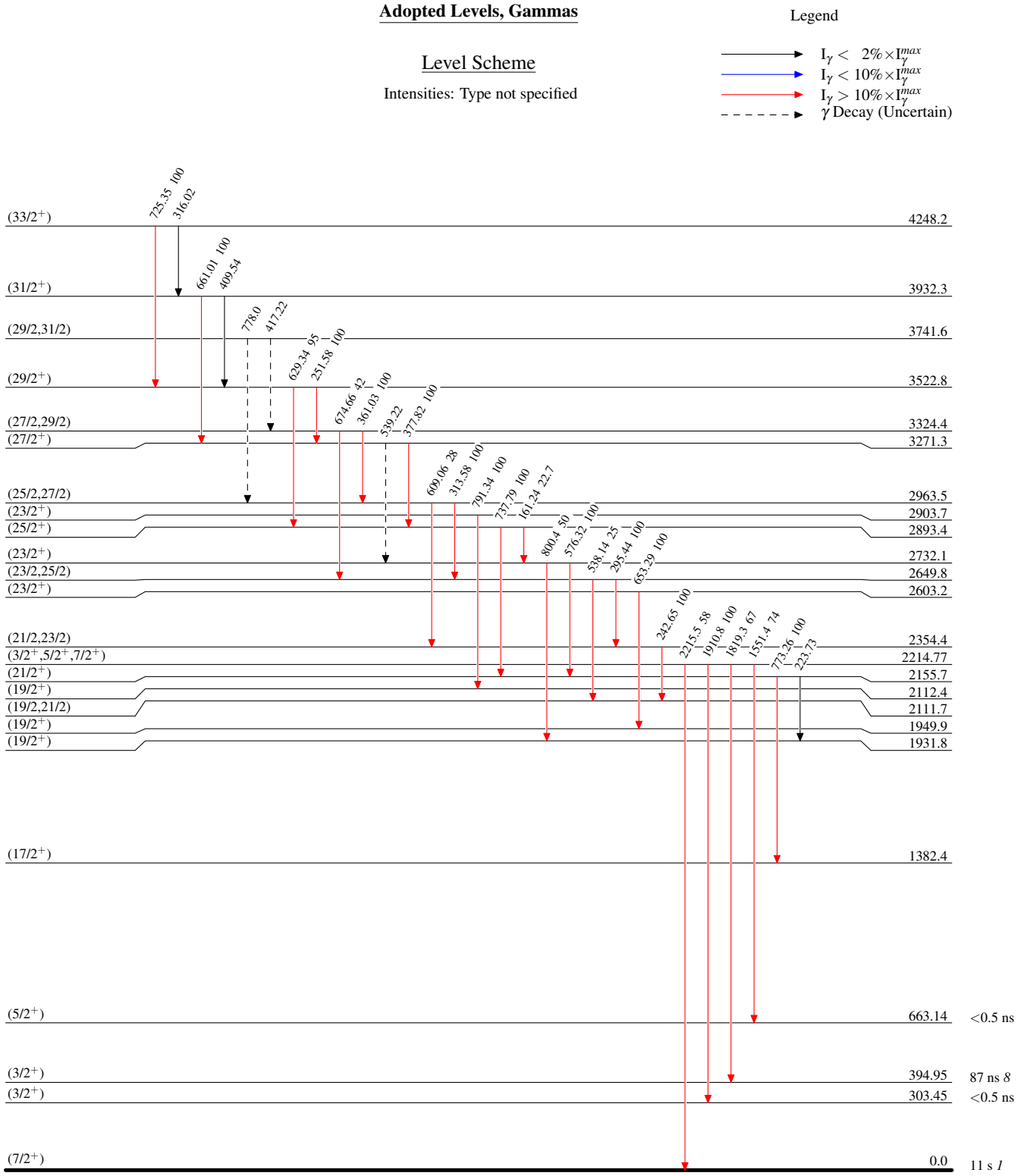
E_i(level)	J_i^π	E_γ [†]	I_γ	E_f	J_f^π
2893.4	$(25/2^+)$	737.79 *10*	100	2155.7	$(21/2^+)$
2903.7	$(23/2^+)$	791.34 *10*	100	2112.4	$(19/2^+)$
2963.5	(25/2,27/2)	313.58 *10*	100	2649.8	(23/2,25/2)
		609.06 *10*	28	2354.4	(21/2,23/2)
3271.3	$(27/2^+)$	377.82 *10*	100	2893.4	$(25/2^+)$
		539.22[b] *10*		2732.1	$(23/2^+)$
3324.4	(27/2,29/2)	361.03 *10*	100[#]	2963.5	(25/2,27/2)
		674.66 *10*	42	2649.8	(23/2,25/2)
3522.8	$(29/2^+)$	251.58 *10*	100	3271.3	$(27/2^+)$
		629.34 *10*	95	2893.4	$(25/2^+)$
3741.6	(29/2,31/2)	417.22[b] *10*		3324.4	(27/2,29/2)
		778.0[b] *1*		2963.5	(25/2,27/2)
3932.3	$(31/2^+)$	409.54 *10*		3522.8	$(29/2^+)$
		661.01 *10*	100	3271.3	$(27/2^+)$
4248.2	$(33/2^+)$	316.02 *10*		3932.3	$(31/2^+)$
		725.35 *10*	100	3522.8	$(29/2^+)$

† From ^{101}Ru β^- decay and ^{252}Cf SF decay.
‡ From ^{101}Ru β^- decay.
# From figure 5 of 2004Lu03.
@ 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.
a Multiply placed with intensity suitably divided.
b Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Level Scheme

Intensities: Type not specified



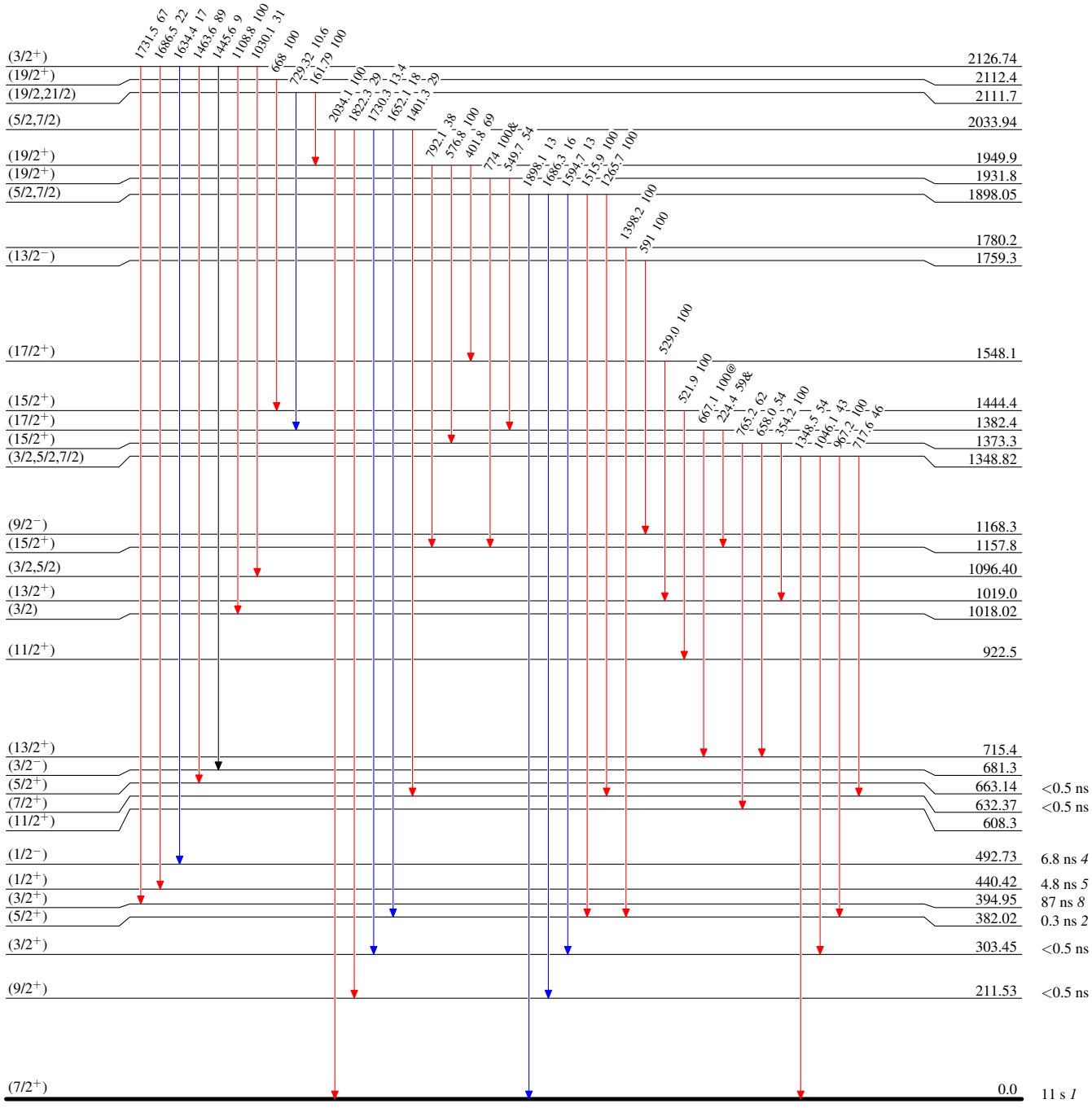
$^{111}_{45}Rh_{66}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

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



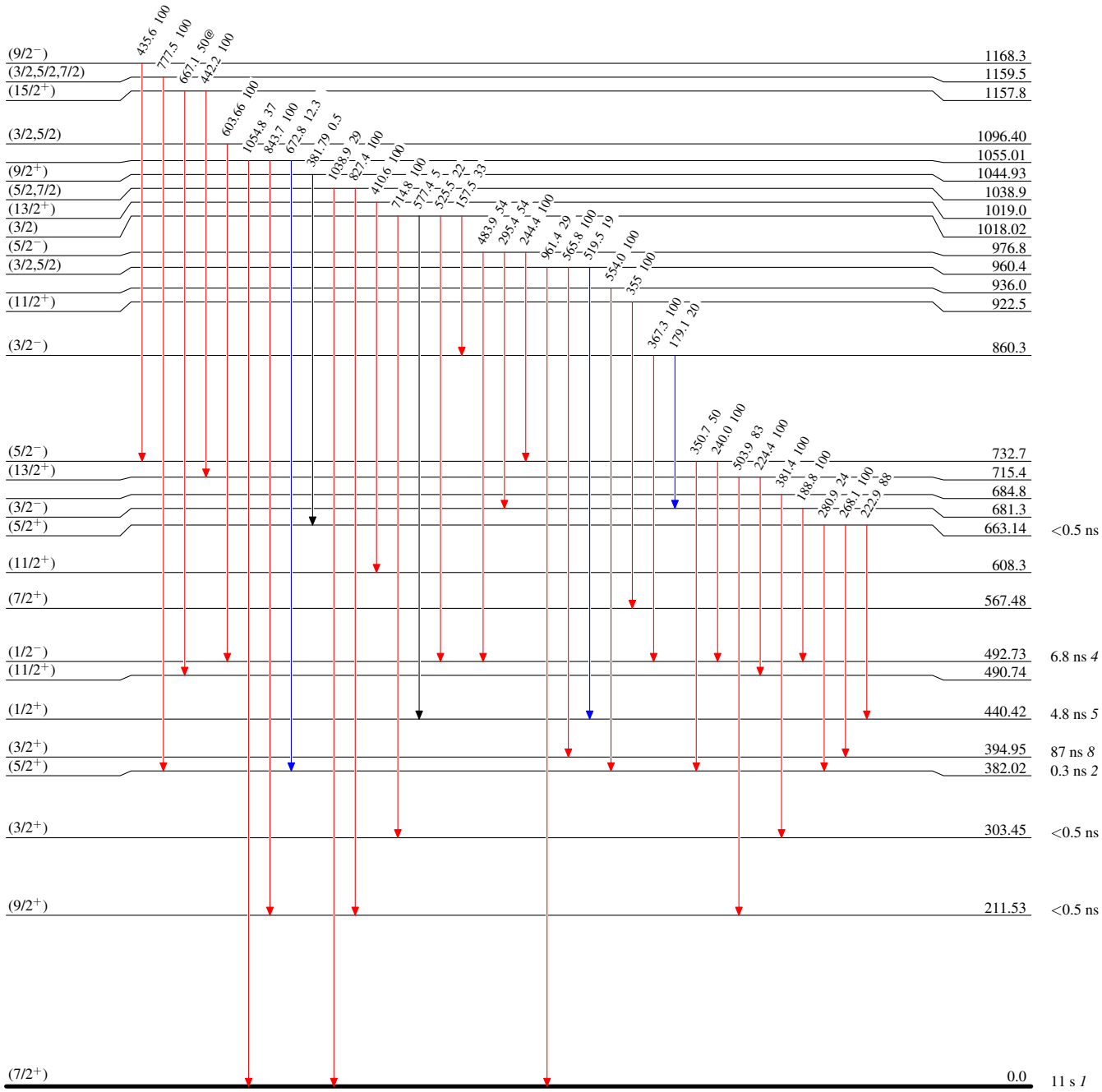
$^{111}_{45}Rh_{66}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

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

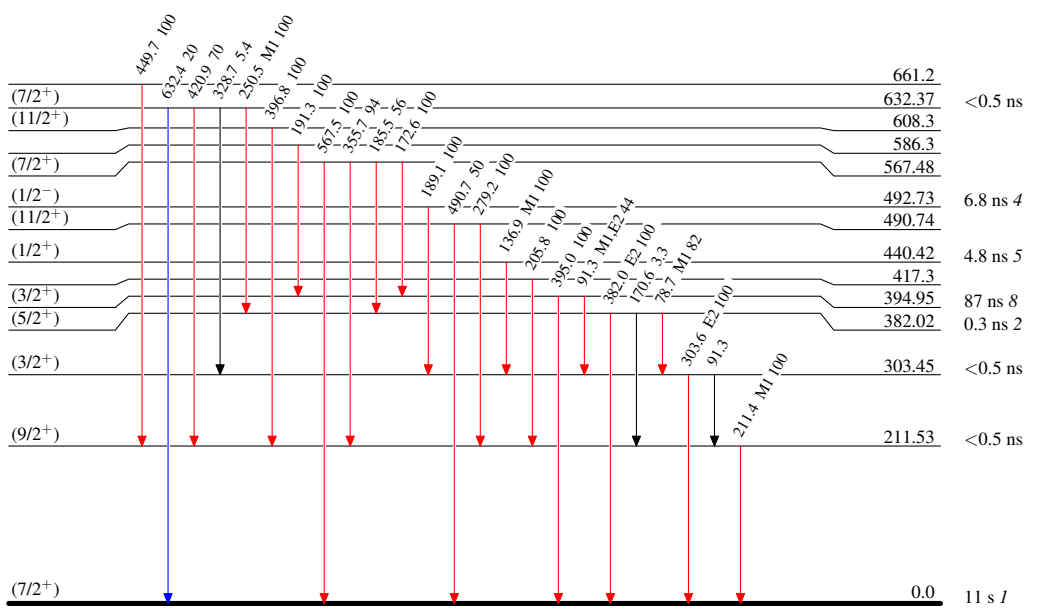


$^{111}_{45}Rh_{66}$

Adopted Levels, Gammas

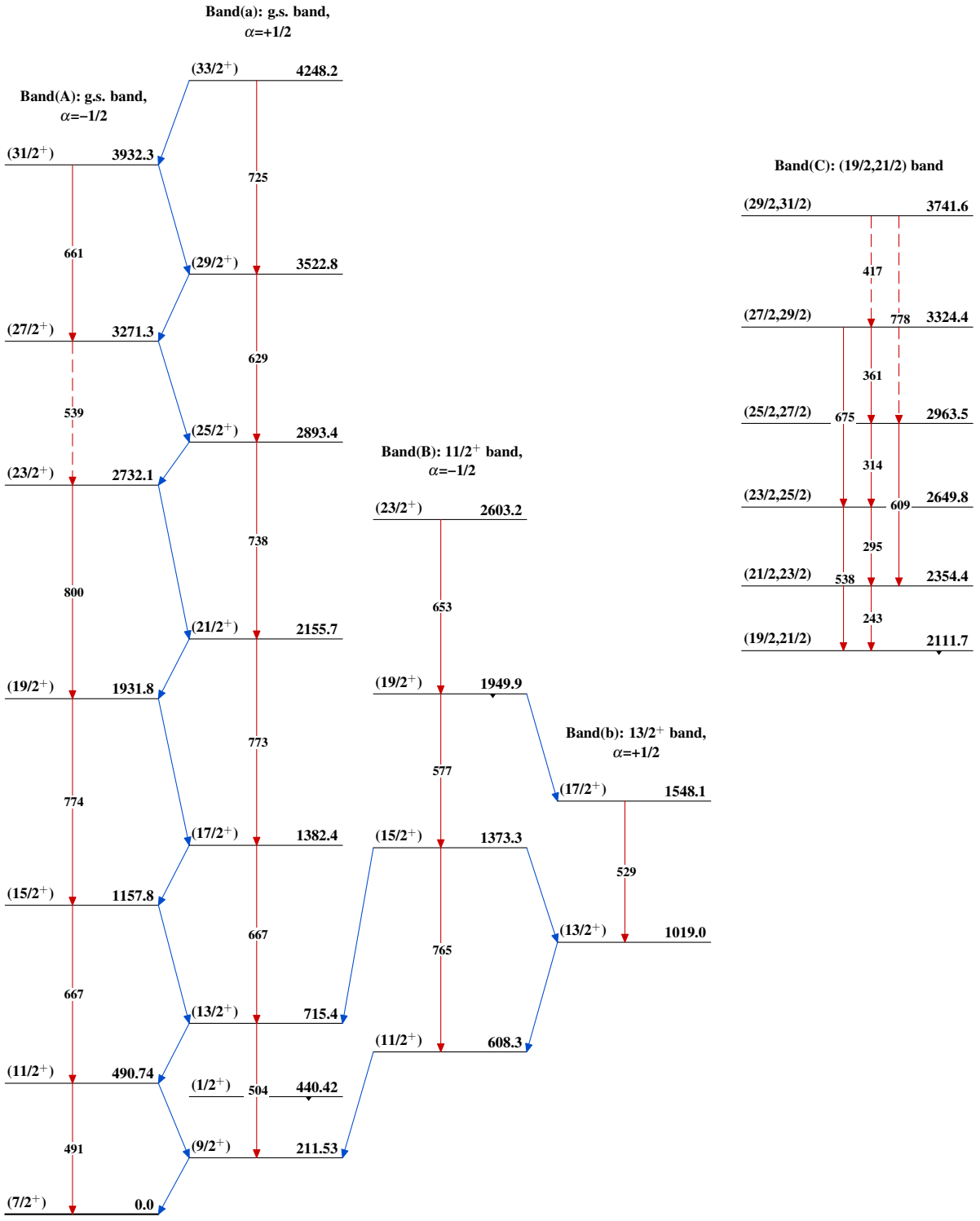
Level Scheme (continued)

Intensities: Type not specified
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided



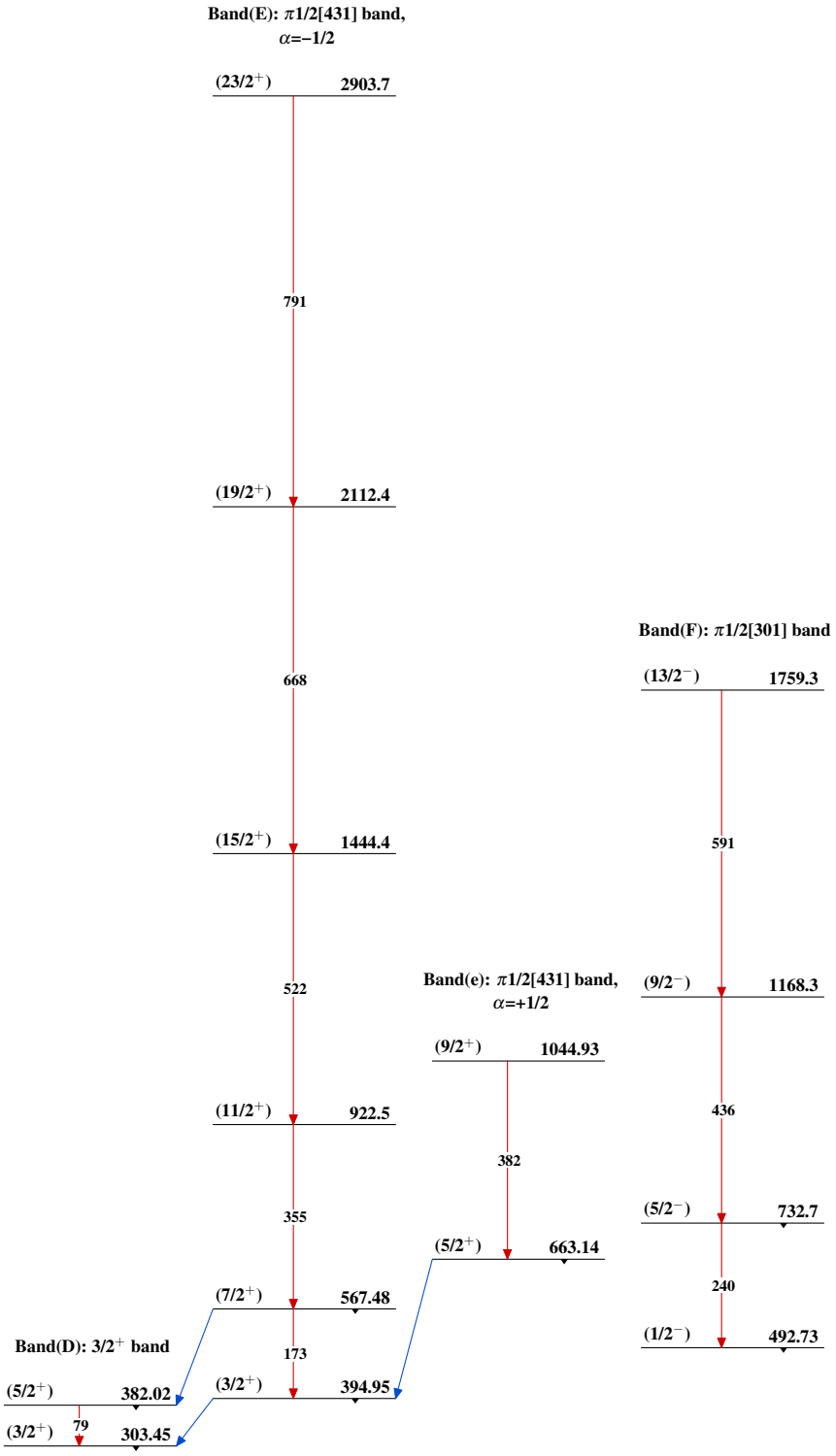
$^{111}_{45}Rh_{66}$

Adopted Levels, Gammas



$^{111}_{45}Rh_{66}$

Adopted Levels, Gammas (continued)



$^{111}_{45}Rh_{66}$