Adopted Levels, Gammas

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	S. Kumar(a), J. Chen(b) and F. G. Kondev	NDS 137, 1 (2016)	31-May-2016

Q(β^-)=4264 *10*; S(n)=5148 *12*; S(p)=12105 *12*; Q(α)=−5818 *13* 2012Wa38

^{109}Ru Levels

Cross Reference (XREF) Flags

A ^{109}Tc β^- decay
B ^{248}Cm SF decay
C ^{252}Cf SF decay
D ^{254}Cf SF decay
E ^{238}U(α,Fγ)

E(level)†	J$^\pi$‡	T$_{1/2}$	XREF	Comments
0.0#	(5/2$^+$)	34.4 s *2*	A CDE	%β^-=100 J$^\pi$: direct feeding in ^{109}Tc β^- decay (J$^\pi$=(5/2$^+$)); systematics of odd-N Ru isotopes; configuration assignment. T$_{1/2}$: Weighted average of 34.5 s *10* (using 206, 226γ(t) in 1978Fr16), 33 s *3* (using 206,358γ(t) in 1976MaYL), 34.5 s *2* (using 68,206,226, 890γ(t) in 1987Ka29,1986KaZS) 32.2 s *10* (using 116.4,206,226, and 358γ(t) in 1969WiZX), 34.5 s *24* (1967Fr16,1967Gr25, using chemical separation), and 35 s *2* (using 206γ(t) in 1976Tr02). Other: 35 s (1971Ri02); 1987Ka29 found no evidence for a 12.6 s activity reported by 1978Fr16, 1969WiZx. configuration: probably a mixture of ν5/2[413] or ν5/2[402] Nilsson configurations. The assignment is consistent with the observed g_K-g_R≈0.4 from the in-band cascade-to-crossover branching ratios, compared to 0.7 and 0.05 expected from deformed Woods-Saxon model for the ν5/2[402] and ν5/2[413] orbitals, respectively.
68.75 *12*	(1/2$^+$)	0.50 μs *20*	A	J$^\pi$: 68.8γ E2 to (5/2$^+$); probable ν1/2[411] Nilsson configuration. T$_{1/2}$: using 68.8γ(t) in ^{109}Tc β^- decay (1992PeZX). configuration: probable K$^\pi$=1/2$^+$, ν1/2[411] Nilsson configuration.
96.14& *15*	(5/2$^-$)	0.68 μs *3*	A CDE	μ=−0.550 *25* (1976ChZD) J$^\pi$: 96.2γ E1 to (5/2$^+$); band assignment; possible configuration=ν5/2[532]. T$_{1/2}$: from 96γ(t), weighted average of 0.68 μs *3* (1999Ge01), 0.75 μs *15* (1976ChZD), 0.54 μs *15* (1974ClZX), and 0.54 μs *17* (1992PeZX). Other: 0.55 μs from 96γ(t) in 1970Jo20. μ: from g=−0.22 *1* using TDPAD (1976ChZD). configuration: ν5/2[532] Nilsson orbital. From the experimental g factor, one can deduce a g_K=−0.20, assuming g_R=0.28, which is consistent with g_K(ν5/2[532])=−0.38 and g_K(ν5/2[402])=−0.42, but not with g_K(ν5/2[413])=+0.33 and g_K(ν1/2[411])=+1.75. The larger energy staggering supports ν5/2[532], compared to ν5/2[402].
131.84& *16*	(7/2$^-$)	1.0 ns *2*	A CDE	J$^\pi$: 35.7γ M1 to (5/2$^-$), 131.8γ (E1) to (5/2$^+$); band assignment. T$_{1/2}$: from ^{254}Cf SF decay (1981SeZW) using time-of-flight method.
137.83 *12*	(3/2$^-$)	1.44 ns *11*	A	J$^\pi$: 137.9γ E1+M2 to (5/2$^+$), 69.1γ to (1/2$^+$). T$_{1/2}$: from β-137.9γ(t) in ^{109}Tc β^- decay (1995Sc24).
185.0# *3*	(7/2$^+$)		C E	J$^\pi$: 185.1γ M1+E2 to (5/2$^+$); band assignment.
190.9 *3*	(3/2$^-$)		A	J$^\pi$: 122.2γ E1 to (1/2$^+$); direct feeding from (5/2$^+$) in ^{109}Tc β^- decay.
195.03 *20*	(3/2,5/2,7/2)$^+$	0.20 ns *6*	A	J$^\pi$: 195.0γ M1 to (5/2$^+$), 98.9γ (E1) to (5/2$^-$). T$_{1/2}$: from β-195γ(t) in ^{109}Tc β^- decay (1995Sc24).
197.41 *13*	(3/2$^-$)		A	J$^\pi$: 128.7γ E1+M2 to (1/2$^+$), 197.4γ to (5/2$^+$), direct feeding from (5/2$^+$) in ^{109}Tc β^- decay.

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Adopted Levels, Gammas (continued)

^{109}Ru Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$	XREF	Comments
230.07& *24*	(9/2⁻)	0.95 ns *5*	A CDE	Jπ: 98.2γ (M1) to (7/2⁻), 134.2γ to (5/2⁻); band assignment. $T_{1/2}$: from ^{254}Cf SF decay (1981SeZW) using time-of-flight method.
255.57 *14*	(3/2⁺)		A	Jπ: 186.8 M1+E2 to (1/2⁺), 58.2γ E1 to (3/2⁻), 117.7γ E1 to (3/2⁻), 255.6γ to (5/2⁺).
304.2& *4*	(11/2⁻)	0.70 ns *5*	CDE	Jπ: 172.3 (E2) to (7/2⁻); band assignment. $T_{1/2}$: from ^{254}Cf SF decay (1981SeZW) using time-of-flight method.
332.20@ *22*	(7/2⁺)		A C	Jπ: 332.5γ to (5/2⁺);band assignment. configuration: possible ν7/2[404] Nilsson state (2009Di12 in ^{252}Cf SF decay). The assignment is tentative.
405.42 *19*	(3/2,5/2,7/2⁻)		A	Jπ: 208.0γ to (3/2⁻); direct feeding from (5/2⁺) in ^{109}Tc β⁻ decay.
407.7# *4*	(9/2⁺)		C E	Jπ: 222.7γ M1+E2 to (7/2⁺), 407.8γ (E2) to (5/2⁺); band assignment.
514.57 *17*	(3/2,5/2⁺)	0.16 ns *13*	A	Jπ: 514.5γ to (5/2⁺), 445.8γ to (1/2⁺), 376.7γ to (3/2⁻); direct feeding from (5/2⁺) in ^{109}Tc β⁻ decay. $T_{1/2}$: from β-445.8γ(t) in ^{109}Tc β⁻ decay (1995Sc24).
553.4@ *5*	(9/2⁺)		C	Jπ: 368.5γ to (7/2⁺); band assignment.
618.9& *5*	(13/2⁻)		C E	Jπ: 314.7γ to (11/2⁻), 388.9γ to (9/2⁻); band assignment.
627.94 *17*	(3/2⁺,5/2,7/2⁻)		A	Jπ: direct feeding from (5/2⁺) in ^{109}Tc β⁻ decay; 490.2γ to (3/2⁻), 295.7γ to (7/2⁺).
657.8# *4*	(11/2⁺)		C E	Jπ: 250.1γ to (9/2⁺), 472.8γ to (7/2⁺); band assignment.
678.9& *5*	(15/2⁻)	≈0.15 ns	C E	Jπ: 374.7γ (E2) to (11/2⁻); band assignment. $T_{1/2}$: from ^{254}Cf SF decay (1981SeZW) using time-of-flight method.
777.1@ *4*	(11/2⁺)		C	Jπ: 369.5γ (M1) to (9/2⁺),444.8γ to (7/2⁺); band assignment.
948.4# *5*	(13/2⁺)		C E	Jπ: 290.6γ to (11/2⁺), 540.7γ to (9/2⁺); band assignment.
995.01 *25*	(3/2,5/2,7/2⁻)		A	Jπ: 804.0γ to (3/2⁻); direct feeding from (5/2⁺) in ^{109}Tc β⁻ decay.
1056.0@ *5*	(13/2⁺)		C	Jπ: 502.5γ to (9/2⁺); band assignment.
1159.0 *3*	(3/2,5/2,7/2)		A	Jπ: 1158.7γ to (5/2⁺); direct feeding from (5/2⁺) in ^{109}Tc β⁻ decay.
1184.0& *6*	(17/2⁻)		C E	Jπ: 505.1γ to (15/2⁻), 565.1γ to (13/2⁻); band assignment.
1220.5& *6*	(19/2⁻)		C E	Jπ: 541.6γ (E2) to (15/2⁻); band assignment.
1256.2# *5*	(15/2⁺)		C E	Jπ: 307.8γ to (13/2⁺), 598.4γ to (11/2⁺); band assignment.
1267.8 *5*	(3/2,5/2,7/2)		A	Jπ: 1267.8γ to (5/2⁺); direct feeding from (5/2⁺) in ^{109}Tc β⁻ decay.
1350.5@ *5*	(15/2⁺)		C	Jπ: 573.4γ to (11/2⁺); band assignment.
1502.6 *3*	(3/2,5/2,7/2)		A	Jπ: 1502.6γ to (5/2⁺); direct feeding from (5/2⁺) in ^{109}Tc β⁻ decay.
1600.1# *5*	(17/2⁺)		C E	Jπ: 343.9γ to (15/2⁺), 651.7γ to (15/2⁺); band assignment.
1677.0@ *5*	(17/2⁺)		C	Jπ: 621.0γ to (13/2⁺); band assignment.
1890.6& *7*	(21/2⁻)		C E	Jπ: 706.6γ to (17/2⁻); band assignment.
1911.5& *7*	(23/2⁻)	1.45 ps *22*	BC E	Jπ: 691.0γ (E2) to (19/2⁻); band assignment. $T_{1/2}$: using the Doppler Profile Method in ^{248}Cm SF decay (2012Sm02). statistical uncertainty=0.16 ps, systematic uncertainty=0.15 ps.
1964.57 *24*	(3/2⁺,5/2,7/2)		A	Jπ: 1632.6γ to (7/2⁺); direct feeding from (5/2⁺) in ^{109}Tc β⁻ decay.
1965.9# *7*	(19/2⁺)		C E	Jπ: 709.7γ to (15/2⁺); band assignment.
2011.8@ *5*	(19/2⁺)		C	Jπ: 661.2γ to (15/2⁺); band assignment.
2328.6@ *6*	(21/2⁺)		C E	Jπ: 651.6γ to (17/2⁺); band assignment.
2364.3# *6*	(21/2⁺)		C	Jπ: 764.2γ to (17/2⁺); band assignment.
2693.1@ *6*	(23/2⁺)		C	Jπ: 681.3γ to (19/2⁺); band assignment.
2715.0& *7*	(25/2⁻)		C E	Jπ: 824.4γ to (21/2⁻); band assignment.
2733.5& *9*	(27/2⁻)	0.56 ps *8*	BC E	Jπ: 822.0γ to (23/2⁻); band assignment. $T_{1/2}$: using the Doppler Profile Method in ^{248}Cm SF decay (2012Sm02). statistical uncertainty=0.062 ps, systematic uncertainty=0.055 ps.
2773.3# *9*	(23/2⁺)		C E	Jπ: 807.4γ to (19/2⁺); band assignment.

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Adopted Levels, Gammas (continued)

^{109}Ru Levels (continued)

E(level)[†]	Jπ[‡]	XREF	Comments
2994.7[@] *7*	(25/2$^+$)	C	Jπ: 666.1γ to (21/2$^+$); band assignment.
3179.3[#] *8*	(25/2$^+$)	C	Jπ: 815.0γ to (21/2$^+$); band assignment.
3390.9[@] *8*	(27/2$^+$)	C	Jπ: 697.8γ to (23/2$^+$); band assignment.
3635.9[&] *9*	(29/2$^-$)	C E	Jπ: 920.9γ to (25/2$^-$); band assignment.
3662.3[#] *10*	(27/2$^+$)	C E	Jπ: 889.0γ to (23/2$^+$); band assignment.
3666.6[&] *10*	(31/2$^-$)	C E	Jπ: 933.1γ to (27/2$^-$); band assignment.
4022.5[#] *10*	(29/2$^+$)	C	Jπ: 843.2γ to (25/2$^+$); band assignment.
4167.2[@] *10*	(31/2$^+$)	C	Jπ: 776.3γ to (27/2$^+$); band assignment.
4622.3[#] *14*	(31/2$^+$)	E	Jπ: 960γ to (27/2$^+$); band assignment.
4639.0[&] *14*	(33/2$^-$)	E	Jπ: 1003γ to (29/2$^-$); band assignment.
4693.7[&] *14*	(35/2$^-$)	E	Jπ: 1027γ to (29/2$^-$); band assignment.
5804.7[&] *18*	(39/2$^-$)	E	Jπ: 1111γ to (29/2$^-$); band assignment.

[†] From a least-square fit to Eγ.
[‡] From the measured transition multipolarities and the apparent band structures.
[#] Band(A): K$^\pi$=5/2$^+$ band, a mixture between ν5/2$^+$[413] and ν5/2$^+$[402] Nilsson configurations.
[@] Band(B): ν7/2[404] band (2009Di12).
[&] Band(C): ν5/2[532] band (1995Bu14).

Adopted Levels, Gammas (continued)

γ(^{109}Ru)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[@]	δ[&b]	α[a]	Comments
68.75	(1/2$^+$)	68.8[‡] *2*	100[‡]	0.0	(5/2$^+$)	E2		4.97 *9*	α(K)=3.61 *7*; α(L)=1.116 *22*; α(M)=0.211 *4* α(N)=0.0310 *6*; α(O)=0.000496 *9* B(E2)(W.u.)=4.0 *16* Mult.: α(K)exp=3.5 *9* and K/L=3.0 *2* (1992PeZX).
96.14	(5/2$^-$)	96.2[‡] *2*	100[‡]	0.0	(5/2$^+$)	E1		0.1557	α(K)=0.1362 *21*; α(L)=0.01614 *25*; α(M)=0.00294 *5* α(N)=0.000465 *7*; α(O)=2.14×10^{-5} *4* B(E1)(W.u.)=4.24×10^{-7} *19* Mult.: α(K)exp=0.13 *2* (1992PeZX); A_2/A_0=+0.08 *5*, A_4/A_0=0.07 *6* (1976ChZD).
131.84	(7/2$^-$)	35.7[‡] *2*	88[‡] *6*	96.14	(5/2$^-$)	M1		6.02 *13*	α(K)=5.24 *12*; α(L)=0.644 *14*; α(M)=0.118 *3* α(N)=0.0191 *5*; α(O)=0.000972 *22* B(M1)(W.u.)=0.059 *13* Mult.: α(K)exp=5.2 *14* (1992PeZX).
		131.8[‡] *2*	100[‡] *10*	0.0	(5/2$^+$)	(E1)		0.0627	α(K)=0.0549 *8*; α(L)=0.00643 *10*; α(M)=0.001171 *18* α(N)=0.000187 *3*; α(O)=8.90×10^{-6} *13* B(E1)(W.u.)=1.8×10^{-5} *5* Mult.: A_2/A_0=−0.14 *4*, A_4/A_0=0.06 *4* for (172γ)(132γ)(θ) in ^{252}Cf SF decay (1995Bu14).
137.83	(3/2$^-$)	69.1[‡] *2*	100[‡] *5*	68.75	(1/2$^+$)	[E1]		0.403 *7*	α(K)=0.352 *6*; α(L)=0.0426 *7*; α(M)=0.00774 *13* α(N)=0.001216 *20*; α(O)=5.31×10^{-5} *9* B(E1)(W.u.)=0.00028 *3*
		137.9[‡] *2*	78[‡] *5*	0.0	(5/2$^+$)	E1		0.0551	α(K)=0.0482 *7*; α(L)=0.00563 *9*; α(M)=0.001027 *15* α(N)=0.0001636 *24*; α(O)=7.84×10^{-6} *12* B(E1)(W.u.)=2.8×10^{-5} *3* Mult.: from α(K)exp=0.084 *10* (1992PeZX); δ=0.20 *3* from α(K)exp, but B(M2)(W.u.)=2.5×10^2 *8* exceeds RUL(IV)=1 by more than 3 sigma.
185.0	(7/2$^+$)	185.1 *5*	100	0.0	(5/2$^+$)	M1+E2	−0.25 *6*	0.062 *3*	α(K)=0.0543 *22*; α(L)=0.0067 *4*; α(M)=0.00124 *7* α(N)=0.000198 *11*; α(O)=9.9×10^{-6} *4* Mult.,δ: from A_2/A_0=−0.16 *2*, A_4/A_0=0.01 *3* for (473γ)(185γ)(θ) (2009Go18). Other value: δ(E2/M1)=−2.0 *4* (2009Go18).
190.9	(3/2$^-$)	122.2[‡] *4*	100	68.75	(1/2$^+$)	E1		0.0780 *14*	α(K)=0.0683 *12*; α(L)=0.00801 *14*; α(M)=0.001460 *25* α(N)=0.000232 *4*; α(O)=1.099×10^{-5} *19* Mult.: α(K)exp=0.080 *14* (1992PeZX).
195.03	(3/2,5/2,7/2)$^+$	98.9[‡] *2*	2.6[‡] *4*	96.14	(5/2$^-$)	(E1)		0.1438	α(K)=0.1257 *19*; α(L)=0.01488 *23*; α(M)=0.00271 *5* α(N)=0.000429 *7*; α(O)=1.98×10^{-5} *3* B(E1)(W.u.)=3.7×10^{-5} *13* Mult.: α(K)exp=0.26 *5* for both 98.2γ and 98.9γ (1992PeZX).
		195.0[‡] *3*	100[‡] *2*	0.0	(5/2$^+$)	M1		0.0500	α(K)=0.0437 *7*; α(L)=0.00520 *8*; α(M)=0.000955 *14*

$^{109}_{44}Ru_{65}$-4

Adopted Levels, Gammas (continued)

γ(^{109}Ru) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[@]	δ[&b]	α[a]	Comments
									α(N)=0.0001544 *23*; α(O)=8.07×10^{-6} *12* B(M1)(W.u.)=0.014 *5* Mult.: α(K)exp=0.039 *4* (1992PeZX).
197.41	(3/2$^-$)	128.7[‡] *2*	100[‡] *2*	68.75	(1/2$^+$)	E1+M2	0.152 *+21−24*	0.095 *8*	α(K)=0.082 *7*; α(L)=0.0105 *11*; α(M)=0.00193 *20* α(N)=0.00031 *4*; α(O)=1.46×10^{-5} *15* Mult.,δ: α(K)exp=0.087 *7* (1992PeZX).
		197.4[‡] *2*	15.1[‡] *22*	0.0	(5/2$^+$)				
230.07	(9/2$^-$)	98.2[‡] *2*	100[‡]	131.84	(7/2$^-$)	(M1)		0.326	α(K)=0.284 *5*; α(L)=0.0344 *6*; α(M)=0.00632 *10* α(N)=0.001021 *16*; α(O)=5.27×10^{-5} *8* B(M1)(W.u.)=0.0171 *10* Mult.: α(K)exp=0.26 *5* for both 98.2γ and 98.9γ (1992PeZX).
		134.2 *5*	7	96.14	(5/2$^-$)	[E2]		0.452 *9*	α(K)=0.372 *8*; α(L)=0.0660 *14*; α(M)=0.0123 *3* α(N)=0.00188 *4*; α(O)=5.67×10^{-5} *11* B(E2)(W.u.)=21.7 *13*
255.57	(3/2$^+$)	58.2[‡] *2*	25[‡] *3*	197.41	(3/2$^-$)	E1		0.657 *12*	α(K)=0.572 *10*; α(L)=0.0703 *13*; α(M)=0.01278 *22* α(N)=0.00200 *4*; α(O)=8.45×10^{-5} *15* Mult.: α(K)exp=0.6 *3* (1992PeZX).
		117.7[‡] *2*	62[‡] *6*	137.83	(3/2$^-$)	E1		0.0870	α(K)=0.0761 *12*; α(L)=0.00894 *14*; α(M)=0.001629 *25* α(N)=0.000259 *4*; α(O)=1.220×10^{-5} *18* Mult.: α(K)exp=0.09 *5* (1992PeZX).
		186.8[‡] *2*	100[‡] *4*	68.75	(1/2$^+$)	M1+E2	0.5 *3*	0.073 *16*	α(K)=0.063 *13*; α(L)=0.0082 *23*; α(M)=0.00152 *43* α(N)=2.41×10^{-4} *65*; α(O)=1.10×10^{-5} *19* Mult.,δ: α(K)exp=0.066 *12* (1992PeZX); other: E1+M2 with δ = 0.42 *7*.
		255.6[‡] *3*	54[‡] *4*	0.0	(5/2$^+$)				
304.2	(11/2$^-$)	74.2 *5*	100 *10*	230.07	(9/2$^-$)	[M1]		0.720 *18*	α(K)=0.627 *15*; α(L)=0.0763 *19*; α(M)=0.0140 *4* α(N)=0.00227 *6*; α(O)=0.000117 *3* B(M1)(W.u.)=0.038 *7* I_γ: From 1981SeZW in ^{254}Cf SF decay.
		172.3 *5*	26 *10*	131.84	(7/2$^-$)	(E2)		0.185 *4*	α(K)=0.155 *3*; α(L)=0.0244 *5*; α(M)=0.00454 *9* α(N)=0.000700 *13*; α(O)=2.45×10^{-5} *5* B(E2)(W.u.)=22 *9* I_γ: From 1981SeZW in ^{254}Cf SF decay. Mult.: A_2/A_0=0.12 *3*, A_4/A_0=0.03 *3* for (374γ)(172γ)(θ)(1995Bu14).
332.20	(7/2$^+$)	147.4 *5*	10	185.0	(7/2$^+$)				
		332.5 *5*	100	0.0	(5/2$^+$)				
405.42	(3/2,5/2,7/2$^-$)	208.0[‡] *2*	100[‡] *5*	197.41	(3/2$^-$)				
		267.7[‡] *3*	18[‡] *3*	137.83	(3/2$^-$)				

$^{109}_{44}Ru_{65}$-5

Adopted Levels, Gammas (continued)

γ(^{109}Ru) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[@]	δ[&b]	α[a]	Comments
407.7	(9/2$^+$)	222.7 *5*	34	185.0	(7/2$^+$)	M1+E2	−0.35 *6*	0.0396 *15*	α(K)=0.0344 *13*; α(L)=0.00425 *21*; α(M)=0.00078 *4* α(N)=0.000125 *6*; α(O)=6.19×10^{-6} *19* I_γ: Other: 72 *6* in ^{238}U(α,Fγ) (2006Wu01). Mult.,δ: from A_2/A_0=−0.20 *3*,A_4/A_0=−0.03 *2* for (540.7γ)(222.7γ)(θ) (2009Go18). Other value: δ(E2/M1)=−1.8 *4* (2009Go18).
		407.8 *5*	100	0.0	(5/2$^+$)	(E2)		0.00991	α(K)=0.00859 *13*; α(L)=0.001089 *16*; α(M)=0.000200 *3* α(N)=3.19×10^{-5} *5*; α(O)=1.476×10^{-6} *22* Mult.: A_2/A_0=−0.08 *7*, A_4/A_0=−0.06 *11* for (369.5γ)(407.8γ)(θ) (2008Di11).
514.57	(3/2,5/2$^+$)	324.0[‡] *5*	≤10[‡]	190.9	(3/2$^-$)				
		376.7[‡] *3*	76[‡] *3*	137.83	(3/2$^-$)				
		445.8[‡] *2*	90[‡] *4*	68.75	(1/2$^+$)				
		514.5[‡] *3*	100[‡] *5*	0.0	(5/2$^+$)				
553.4	(9/2$^+$)	368.5 *5*	100	185.0	(7/2$^+$)				
618.9	(13/2$^-$)	314.7 *5*	100	304.2	(11/2$^-$)				I_γ: Other: 74 in ^{238}U(α,Fγ) (2006Wu01).
		388.9 *5*	63	230.07	(9/2$^-$)				I_γ: Other: 100 in ^{238}U(α,Fγ) (2006Wu01).
627.94	(3/2$^+$,5/2,7/2$^-$)	295.7[‡] *3*		332.20	(7/2$^+$)				
		490.2[‡] *2*	100[‡] *5*	137.83	(3/2$^-$)				
		627.9[‡] *3*	31[‡] *4*	0.0	(5/2$^+$)				
657.8	(11/2$^+$)	250.1 *5*	54	407.7	(9/2$^+$)				I_γ: Other: 31 *9* in ^{238}U(α,Fγ) (2006Wu01).
		472.8 *5*	100	185.0	(7/2$^+$)				
678.9	(15/2$^-$)	60.0 *5*		618.9	(13/2$^-$)	[M1]		1.33 *4*	α(K)=1.15 *4*; α(L)=0.141 *4*; α(M)=0.0259 *8* α(N)=0.00418 *12*; α(O)=0.000214 *6*
		374.7 *5*	100	304.2	(11/2$^-$)	(E2)		0.01295	α(K)=0.01120 *17*; α(L)=0.001440 *22*; α(M)=0.000265 *4* α(N)=4.21×10^{-5} *7*; α(O)=1.91×10^{-6} *3* B(E2)(W.u.)≈16 E_γ: 374.2 (1973Ho22), 374.2 (1981SeZW). Mult.: A_2/A_0=0.12 *3*, A_4/A_0=0.03 *3* for (374γ)(172γ)(θ) and A_2/A_0=0.12 *2*, A_4/A_0=−0.01 *2* (541γ)(374γ)(θ) (1995Bu14).
777.1	(11/2$^+$)	223.7 *5*	16	553.4	(9/2$^+$)				
		369.5 *5*	100	407.7	(9/2$^+$)	(M1)		0.00971	α(K)=0.00851 *13*; α(L)=0.000991 *15*; α(M)=0.000182 *3* α(N)=2.94×10^{-5} *5*; α(O)=1.559×10^{-6} *23* Mult.: A_2=−0.08 *7*, A_4=−0.06 *11* (369.5γ)(407.8)γ(θ) (2009Di12).
		444.8 *5*	74	332.20	(7/2$^+$)				
948.4	(13/2$^+$)	290.6 *5*	41	657.8	(11/2$^+$)				I_γ: Other: 14 *13* in ^{238}U(α,Fγ) (2006Wu01).
		540.7 *5*	100	407.7	(9/2$^+$)				

$^{109}_{44}Ru_{65}$-6

Adopted Levels, Gammas (continued)

γ(^{109}Ru) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[@]	α[a]	Comments
995.01	(3/2,5/2,7/2[−])	589.7[‡] *3*	100[‡] *10*	405.42	(3/2,5/2,7/2[−])			
		804.0[‡] *3*	97[‡] *13*	190.9	(3/2[−])			
		995.0[‡] *5*	65[‡] *11*	0.0	(5/2[+])			
1056.0	(13/2[+])	398.2 *5*	89	657.8	(11/2[+])			
		502.5 *5*	100	553.4	(9/2[+])			
		648.3 *5*	64	407.7	(9/2[+])			
1159.0	(3/2,5/2,7/2)	531.2[‡] *3*		627.94	(3/2[+],5/2,7/2[−])			
		964.6[‡c] *3*		195.03	(3/2,5/2,7/2)[+]			
		1158.7[‡] *5*	100[‡]	0.0	(5/2[+])			
1184.0	(17/2[−])	505.1 *5*	54	678.9	(15/2[−])			I_γ: Other: 66 *10* in ^{238}U(α,Fγ) (2006Wu01).
		565.1 *5*	100	618.9	(13/2[−])			
1220.5	(19/2[−])	36.5 *5*		1184.0	(17/2[−])			
		541.6 *5*	100	678.9	(15/2[−])	(E2)	0.00424	α(K)=0.00369 *6*; α(L)=0.000451 *7*; α(M)=8.27×10^{-5} *12* α(N)=1.324×10^{-5} *19*; α(O)=6.45×10^{-7} *10* Mult.: A_2/A_0=0.19 *5*, A_4/A_0=−0.05 *5* for (691γ)(541γ)(θ) and A_2/A_0=0.12 *2*, A_4/A_0=−0.01 *2* (541γ)(374γ)(θ) (1995Bu14).
1256.2	(15/2[+])	307.8 *5*	14	948.4	(13/2[+])			
		598.4 *5*	100	657.8	(11/2[+])			
1267.8	(3/2,5/2,7/2)	1073.5[‡c] *3*		195.03	(3/2,5/2,7/2)[+]			
		1267.8[‡] *5*	100[‡]	0.0	(5/2[+])			
1350.5	(15/2[+])	402.2 *5*	25	948.4	(13/2[+])			
		573.4 *5*	100	777.1	(11/2[+])			
		692.8 *5*	15	657.8	(11/2[+])			
1502.6	(3/2,5/2,7/2)	1502.6[‡] *3*		0.0	(5/2[+])			
1600.1	(17/2[+])	343.9 *5*	6	1256.2	(15/2[+])			
		651.7 *5*	100	948.4	(13/2[+])			
1677.0	(17/2[+])	420.8 *5*	25	1256.2	(15/2[+])			
		621.0 *5*	84	1056.0	(13/2[+])			
		728.6 *5*	100	948.4	(13/2[+])			
1890.6	(21/2[−])	670.1 *5*	8	1220.5	(19/2[−])			
		706.6 *5*	100	1184.0	(17/2[−])			
1911.5	(23/2[−])	691.0 *5*	100	1220.5	(19/2[−])	(E2)	0.00218	α(K)=0.00190 *3*; α(L)=0.000226 *4*; α(M)=4.15×10^{-5} *6* α(N)=6.67×10^{-6} *10*; α(O)=3.35×10^{-7} *5* B(E2)(W.u.)=80 *13* Mult.: A_2/A_0=0.19 *5*, A_4/A_0=−0.05 *5* for (691γ)(541γ)(θ) (1995Bu14).
1964.57	(3/2[+],5/2,7/2)	1632.6[‡] *3*		332.20	(7/2[+])			
		1964.3[‡] *3*		0.0	(5/2[+])			
1965.9	(19/2[+])	709.7 *5*	100	1256.2	(15/2[+])			
2011.8	(19/2[+])	411.7 *5*	21	1600.1	(17/2[+])			

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Adopted Levels, Gammas (continued)

$\gamma(^{109}Ru)$ (continued)

E_i(level)	J_i^π	E_γ †	I_γ †	E_f	J_f^π	Mult. @	α [a]	Comments
2011.8	(19/2$^+$)	661.2 *5*	100	1350.5	(15/2$^+$)			
		755.6 *5*	15	1256.2	(15/2$^+$)			
2328.6	(21/2$^+$)	651.6 *5*	31	1677.0	(17/2$^+$)			
		728.5 *5*	100	1600.1	(17/2$^+$)			
2364.3	(21/2$^+$)	764.2 *5*	100	1600.1	(17/2$^+$)			
2693.1	(23/2$^+$)	328.8 *5*	100	2364.3	(21/2$^+$)			
		681.3 *5*	75	2011.8	(19/2$^+$)			
2715.0	(25/2$^-$)	803.5 *5*	5	1911.5	(23/2$^-$)			
		824.4 *5*	100	1890.6	(21/2$^-$)			
2733.5	(27/2$^-$)	822.0 *5*	100	1911.5	(23/2$^-$)	[E2]	1.40×10^{-3}	B(E2)(W.u.)=87 *13*
2773.3	(23/2$^+$)	807.4 *5*	100	1965.9	(19/2$^+$)			
2994.7	(25/2$^+$)	630.4 *5*	100	2364.3	(21/2$^+$)			
		666.1 *5*	41	2328.6	(21/2$^+$)			
3179.3	(25/2$^+$)	815.0 *5*	100	2364.3	(21/2$^+$)			
3390.9	(27/2$^+$)	697.8 *5*	100	2693.1	(23/2$^+$)			
3635.9	(29/2$^-$)	920.9 *5*	100	2715.0	(25/2$^-$)			
3662.3	(27/2$^+$)	889.0 *5*	100	2773.3	(23/2$^+$)			
3666.6	(31/2$^-$)	933.1 *5*	100	2733.5	(27/2$^-$)			
4022.5	(29/2$^+$)	843.2 *5*	100	3179.3	(25/2$^+$)			
4167.2	(31/2$^+$)	776.3 *5*	100	3390.9	(27/2$^+$)			
4622.3	(31/2$^+$)	960# *1*	100	3662.3	(27/2$^+$)			
4639.0	(33/2$^-$)	1003# *1*	100	3635.9	(29/2$^-$)			
4693.7	(35/2$^-$)	1027# *1*	100	3666.6	(31/2$^-$)			
5804.7	(39/2$^-$)	1111# *1*	100	4693.7	(35/2$^-$)			

† From ^{252}Cf SF decay (2009Di12,2008Di11), unless otherwise stated. $\Delta E\gamma$=0.5 keV was estimated by the evaluators.
‡ From ^{109}Tc β^- decay (1992PeZX,1989Gr23).
# From ^{238}U(α,Fγ) (2006Wu01).
@ Based on ce data in ^{109}Tc β^- decay (1992PeZX) and $\gamma\gamma(\theta)$ in ^{252}Cf SF decay (1995Bu14,2009Go18).
& Deduced by evaluators from ce data in ^{109}Tc β^- decay (1992PeZX) using the BrIccMixing program, unless otherwise stated.
[a] Additional information 1.
[b] If No value given it was assumed δ=1.00 for E2/M1, δ=1.00 for E3/M2 and δ=0.10 for the other multipolarities.
[c] Placement of transition in the level scheme is uncertain.

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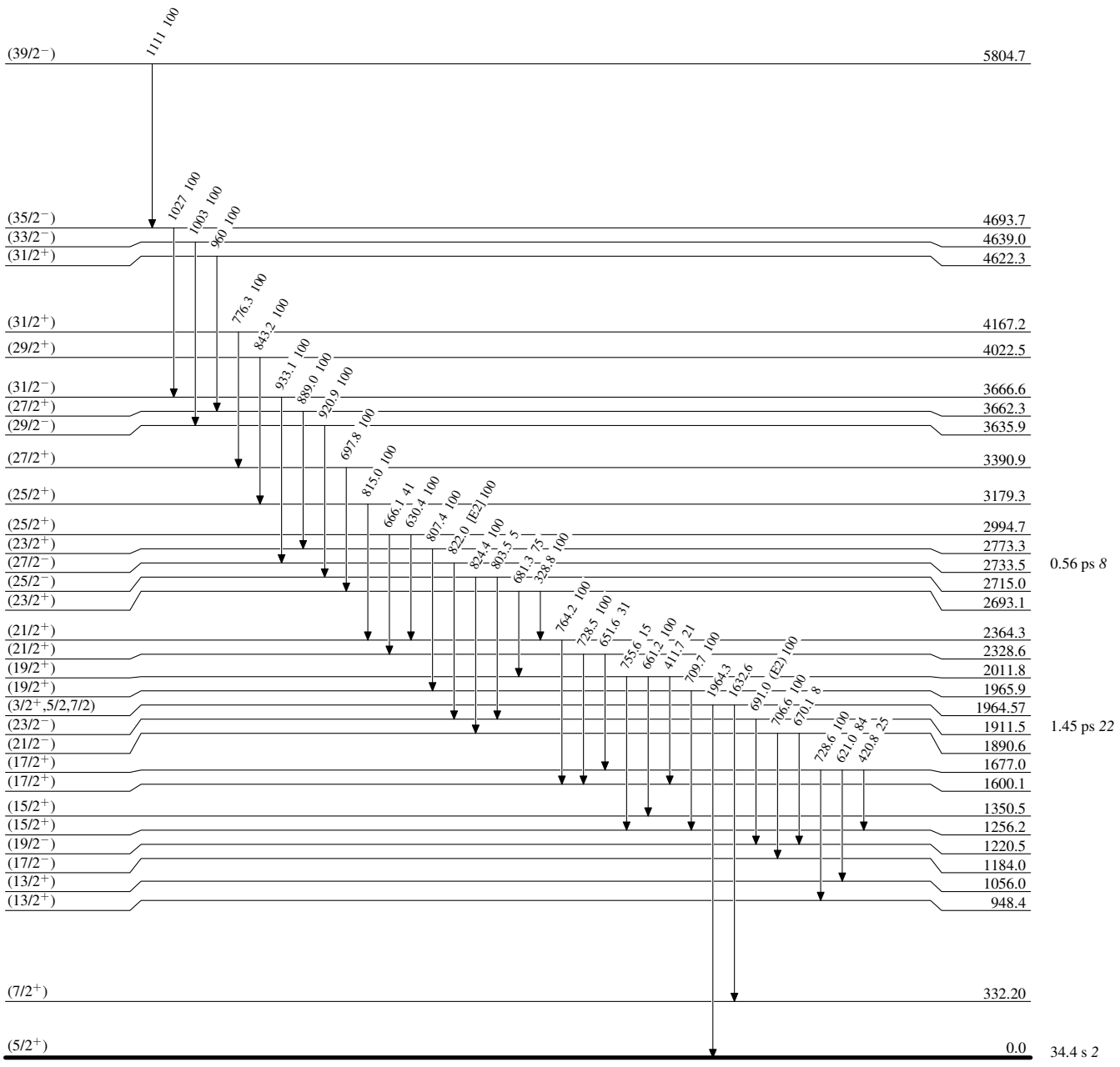
Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level



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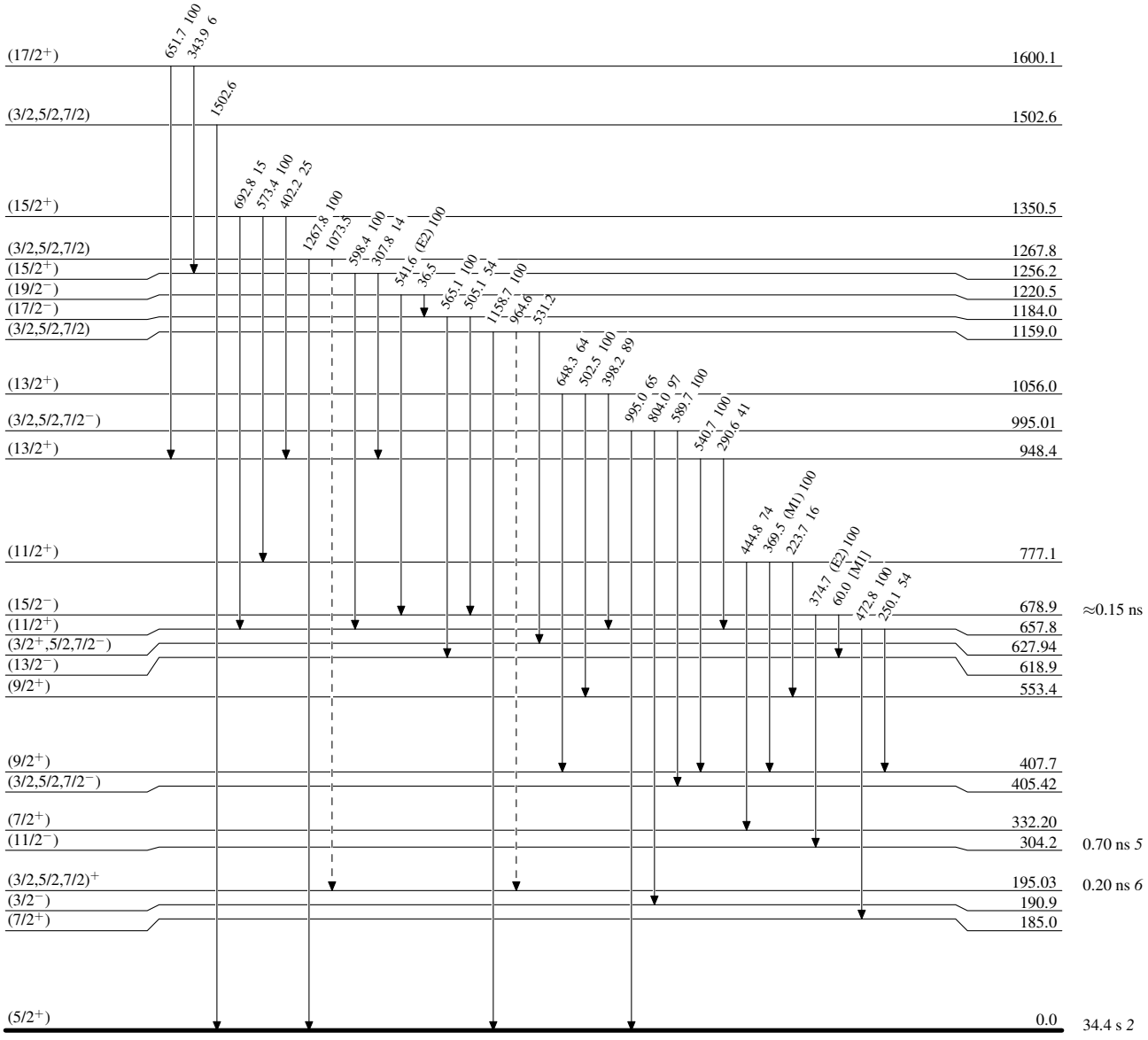
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



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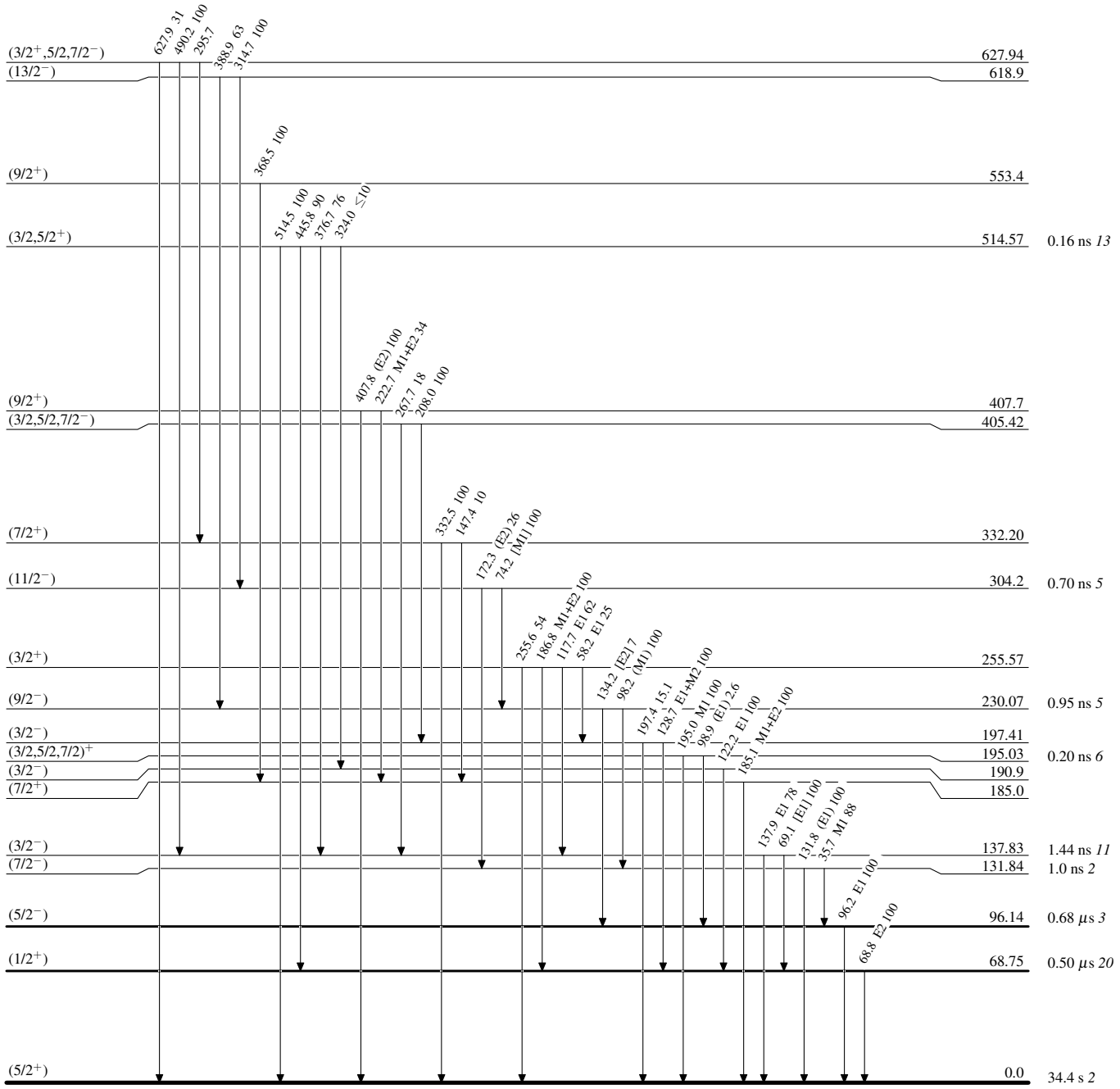
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



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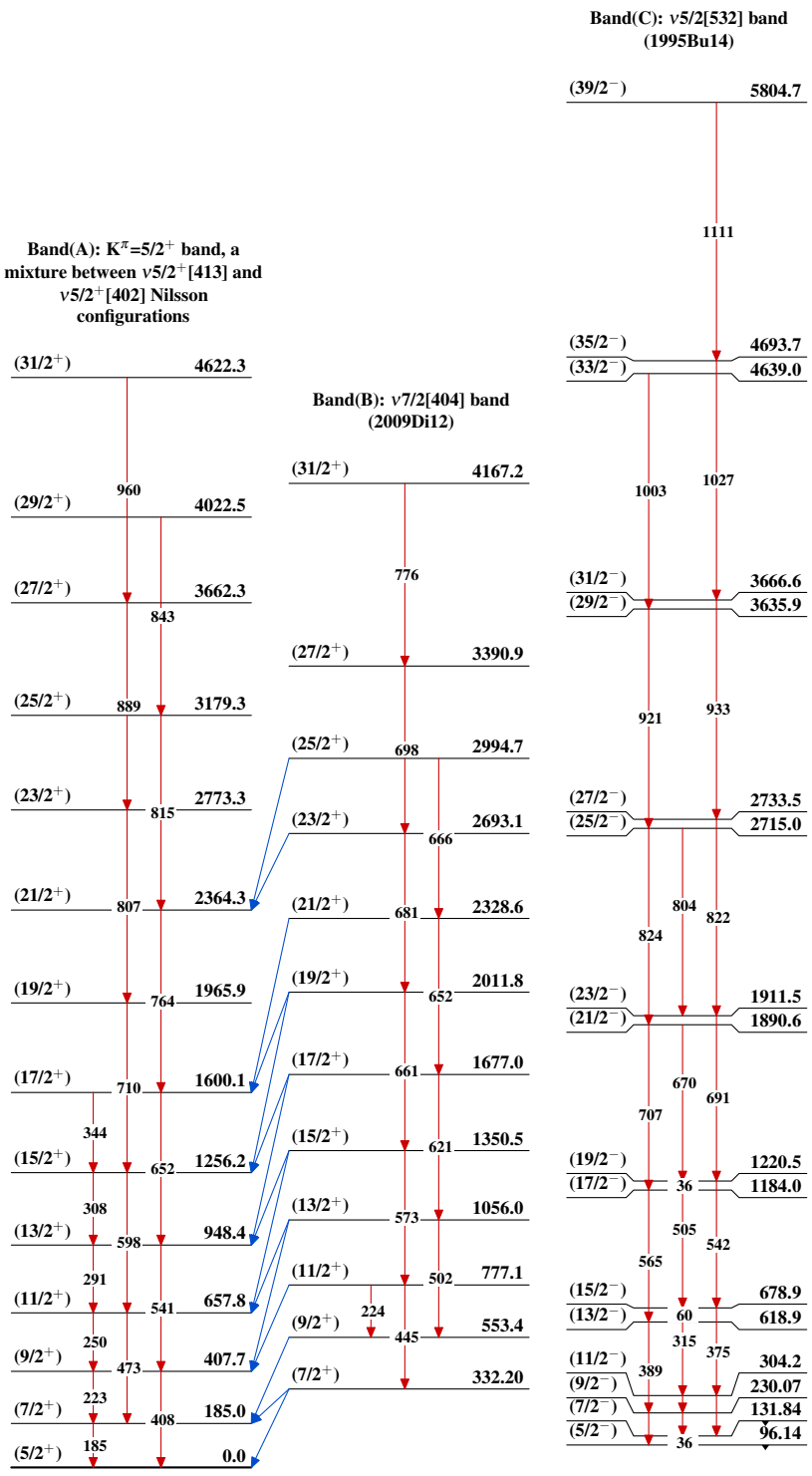
Adopted Levels, Gammas



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