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.
Q(β^-)=2774 *20*; S(n)=7406 *12*; S(p)=13079 *13*; Q(α)=−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 (Jπ=2,3$^+$).

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Adopted Levels, Gammas (continued)

^{110}Ru Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	XREF	Comments
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.
1799.5 3	(2,3,4$^+$)	A	J$^\pi$: 1186.6γ to (2$^+$); direct population in ^{110}Tc β- decay (Jπ=2,3$^+$).
1820.49 10	(2,3,4$^+$)	AB	J$^\pi$: 424.2γ to 2$^+$,960.5γ to (3$^+$); direct population in ^{110}Tc β- decay (Jπ=2,3$^+$).
1860.8[a] 3	(5$^+$)	B	J$^\pi$: 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$^\pi$: 1642.6γ to 2$^+$; direct population in ^{110}Tc β- decay (Jπ=2,3$^+$).
1944.5[#] 4	8$^+$	BC E	J$^\pi$: 705.3γ to 6$^+$; member of the g.s. band.
1978.21 19	(2$^+$,3,4$^+$)	A	J$^\pi$: 1314.7γ to 4$^+$ and 1737.8γ to 2$^+$; direct population in ^{110}Tc β- decay (Jπ=2,3$^+$).
2003.57 22	(2,3,4$^+$)	A	J$^\pi$: 1390.7γ to (2$^+$); direct population in ^{110}Tc β- decay (Jπ=2,3$^+$).
2016.27[f] 24	(4$^-$)	B	J$^\pi$: 931.8γ to (4$^+$) and 1156.4γ to (3$^+$); band assignment; 226.5γ from (6$^-$).
2020.9[&] 4	(7$^+$)	BC E	J$^\pi$: 645.5γ to (5$^+$); member of the one-phonon γ-vibrational band.
2042.39 14	(2,3,4)	AB	J$^\pi$: direct population in ^{110}Tc β- decay (Jπ=2,3$^+$).
2047.03 23	(1,2$^+$)	A	J$^\pi$: 2046.8γ to 0$^+$ and 1806.4γ to 2$^+$; direct population in ^{110}Tc β- decay (Jπ=2,3$^+$).
2085.27 13	(2,3,4$^+$)	A	J$^\pi$: 1844.5γ to 2$^+$; direct population in ^{110}Tc β- decay (Jπ=2,3$^+$).
2110.8[a] 4	(6$^+$)	B	J$^\pi$: 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$^\pi$: 1902.4γ to 2$^+$; direct population in ^{110}Tc β- decay (Jπ=2,3$^+$).
2145.3[e] 3	(5$^-$)	B	J$^\pi$: 1481.9γ to 4$^+$; band assignment.
2152.69 18	(2,3,4$^+$)	A	J$^\pi$: 1539.5γ to 2$^+$, 1292.9γ to (3$^+$); direct population in ^{110}Tc β- decay (Jπ=2,3$^+$).
2204.6 4	(2,3,4$^+$)	A	J$^\pi$: 1963.9γ to 2$^+$, direct population in ^{110}Tc β- decay (Jπ=2,3$^+$).
2242.8[d] 4	(6$^-$)	B	J$^\pi$: 867.5γ D to (5$^+$); band assignment.
2266.3 4	(2,3,4$^+$)	A	J$^\pi$: 2025.6γ to 2$^+$; direct population in ^{110}Tc β- decay (Jπ=2,3$^+$).
2328.0[f] 3	(6$^-$)	B	J$^\pi$: 312.0γ to (4$^-$), 182.8γ to (5$^-$) and 1088.8γ to 6$^+$; band assignment.
2337.9 4	(2$^+$,3,4$^+$)	A	J$^\pi$: 2096.8 to 2$^+$, 1674.6γ to 4$^+$; direct population in ^{110}Tc β- decay (Jπ=2,3$^+$).
2367.0 5	(2,3,4$^+$)	A	J$^\pi$: 2126.2γ to 2$^+$; direct population in ^{110}Tc β- decay (Jπ=2,3$^+$).
2397.0[@] 4	(8$^+$)	BC E	J$^\pi$: 712.7γ to (6$^+$); member of the one-phonon γ-vibrational band.
2413.03 25		A	
2419.6 4	(1,2$^+$)	A	J$^\pi$: 1282.3γ to (0$^+$); direct population in ^{110}Tc β- decay (Jπ=2,3$^+$).
2426.5[c] 4	(7$^-$)	B	J$^\pi$: 1187.2γ D to 6$^+$; band assignment.
2491.4 6	(2,3,4$^+$)	A	J$^\pi$: 2250.6γ to 2$^+$; direct population in ^{110}Tc β- decay (Jπ=2,3$^+$).
2516.6[e] 4	(7$^-$)	B	J$^\pi$: 371.4γ to (5$^-$) and 832.3γ to (6$^+$); band assignment.
2552.04 23	(1,2$^+$)	A	J$^\pi$: 1414.7γ to (0$^+$); direct population in ^{110}Tc β- decay (Jπ=2,3$^+$).
2573.8 7	(2,3,4$^+$)	A	J$^\pi$: 2333.0 γ to 2$^+$; direct population in ^{110}Tc β- decay (Jπ=2,3$^+$).
2637.4[d] 4	(8$^-$)	B	J$^\pi$: 210.9γ to (7$^-$) and 394.5γ to (6$^-$); band assignment.
2759.5[#] 4	10$^+$	BC E	J$^\pi$: 815γ to 8$^+$; member of the g.s. band.
2764.6[f] 4	(8$^-$)	B	J$^\pi$: 436.7γ to (6$^-$), 247.9γ to (7$^-$) and 820.2γ to 8$^+$; band assignment.
2776.9[&] 5	(9$^+$)	BC E	J$^\pi$: 756.0γ to (7$^+$); member of the one-phonon γ-vibrational band.
2892.7[c] 4	(9$^-$)	B	J$^\pi$: 466.3γ to (7$^-$), 255.4γ to (8$^-$) and 948.2γ to 8$^+$; band assignment.
2942.8 4	(3$^-$)	A	J$^\pi$: 2082.8γ to (3$^+$); nonobservation of γ to 2$^+$ and 0$^+$; direct population in ^{110}Tc β- decay (Jπ=2,3$^+$).
3006.06 23	(1,2$^+$)	A	J$^\pi$: 1868.6γ to (0$^+$) and 2393.0γ to (2$^+$); direct population in ^{110}Tc β- decay (Jπ=2,3$^+$).
3019.5 8	(2,3,4$^+$)	A	J$^\pi$: 2406.6γ to (2$^+$); direct population in ^{110}Tc β- decay (Jπ=2,3$^+$).
3041.3[e] 4	(9$^-$)	B	J$^\pi$: 524.7γ to (7$^-$) 276.8γ to (8$^-$) and 1096.8γ to 8$^+$; band assignment.
3072.2 3	(2,3,4$^+$)	A	J$^\pi$: 2459.4γ to 2$^+$; direct population in ^{110}Tc β- decay (Jπ=2,3$^+$).
3091.39 14		A	
3113.0 7	(9,10$^+$)	B	J$^\pi$: 716.0γ to (8$^+$).
3175.3[d] 5	(10$^-$)	B	J$^\pi$: 537.9γ to (8$^-$) and 282.6γ to (9$^-$); band assignment.
3193.3[b] 4	(9,10$^+$)	B	J$^\pi$: 416.4γ to (9$^+$) and 796.3γ to (8$^+$); band assignment.
3254.2[@] 6	(10$^+$)	B E	J$^\pi$: 857.3γ to (8$^+$); member of the one-phonon γ-vibrational band.
3337.1[f] 5	(10$^-$)	B	J$^\pi$: 572.4γ to (8$^-$) and 295.9γ to (9$^-$); band assignment.
3485.3[c] 5	(11$^-$)	B	J$^\pi$: 592.6γ to (9$^-$) and 309.9γ to (10$^-$); band assignment.
3627.1[&] 7	(11$^+$)	B E	J$^\pi$: 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^{π}[‡]	XREF	Comments
3647.1[#] 6	12^+	B E	J^{π}: 887.6γ to 10^+; member of the g.s. band.
3689.8[e] 5	(11^-)	B	J^{π}: 648.5γ to (9^-), 352.8γ to (10^-) and 930.3γ to 10^+; band assignment.
3700.1 6	(12^+)	B	J^{π}: 940.5γ to 10^+.
3719.0[b] 5	(12^+)	B	J^{π}: 959.5γ to 10^+.
3818.6[d] 5	(12^-)	B	J^{π}: 643.2γ to (10^-) and 333.3γ to (11^-); band assignment.
3956.9 8	(12^+)	B	J^{π}: 843.9γ to 10^+.
4038.7[f] 6	(12^-)	B	J^{π}: 701.7γ to (10^-) and 348.8γ to (11^-); band assignment.
4153.8[@] 8	(12^+)	B E	J^{π}: 899.6γ to (10^+); member of the one-phonon γ-vibrational band.
4195.5[c] 6	(13^-)	B	J^{π}: 710.2γ to (11^-) and 376.8γ to (12^-); band assignment.
4351.0[#] 7	14^+	B E	J^{π}: 705γ to 12^+; member of the g.s. band.
4370.5[b] 6	(14^+)	B	J^{π}: 651.5γ to (12^+); band assignment.
4446.3[e] 7	(13^-)	B	J^{π}: 756.4γ to (11^-); band assignment.
4556.1[&] 9	(13^+)	B E	J^{π}: 929γ to (11^+); member of the one-phonon γ-vibrational band.
4566.4[d] 7	(14^-)	B	J^{π}: 747.9γ to (12^-) and 370.9γ to (11^-); band assignment.
4874.0[f] 8	(14^-)	B	J^{π}: 835.3γ to (12^-); band assignment.
5010.8[c] 8	(15^-)	B	J^{π}: 815.3γ to (13^-); band assignment.
5124.8[@] 13	(14^+)	E	J^{π}: 971γ to (12^+); member of the one-phonon γ-vibrational band.
5143.0[b] 8	(16^+)	B	J^{π}: 772.5γ to (14^+); band assignment.
5150.7[#] 8	16^+	B E	J^{π}: 799.7γ to 14^+; member of the g.s. band.
5302.5[e] 9	(15^-)	B	J^{π}: 856.2γ to (13^-); band assignment.
5412.7[d] 8	(16^-)	B	J^{π}: 846.3γ to (14^-); band assignment.
5544.1[&] 14	(15^+)	E	J^{π}: 988γ to (13^+); member of the one-phonon γ-vibrational band.
6017.4[b] 9	(18^+)	B	J^{π}: 874.4γ to (16^+); band assignment.
6050.8[#] 10	18^+	B E	J^{π}: 900.1γ to 16^+; member of the g.s. band.
7053.8[#] 14	(20^+)	E	J^{π}: 1003γ to 18^+; member of the g.s. band.
8159.8[#] 17	(22^+)	E	J^{π}: 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 Jπ 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). Jπ 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.

Adopted Levels, Gammas (continued)

$\gamma(^{110}Ru)$

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 γ(θ) 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=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 γγ(θ) but A_2 and A_4 values were not given by the authors.

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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$^+$
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$^-$)

Continued on next page (footnotes at end of table)

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
2145.3	(5⁻)	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:(867.5γ)(515.5γ)(θ): 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. (867.5γ)(394.5γ)(θ): 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⁺)		
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⁺		

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Adopted Levels, Gammas (continued)

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

E_i(level)	J^π_i	E_γ‡	I_γ‡	E_f	J^π_f
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+)
3175.3	(10−)	282.6 5	14.5 7	2892.7	(9−)
		537.9 5	100	2637.4	(8−)
3193.3	(9,10+)	416.4 5	100	2776.9	(9+)
		796.3 5	24 5	2397.0	(8+)
		1249.0 5	51 5	1944.5	8+
3254.2	(10+)	857.3 5	100	2397.0	(8+)
3337.1	(10−)	295.9 5	21 5	3041.3	(9−)
		572.4 5	100	2764.6	(8−)
		577.7#	0.1	2759.5	10+
3485.3	(11−)	309.9 5	19 3	3175.3	(10−)
		592.6 5	100	2892.7	(9−)
		725.9 5	87 9	2759.5	10+
3627.1	(11+)	850.2 5	100	2776.9	(9+)
3647.1	12+	887.6 5	100	2759.5	10+
3689.8	(11−)	352.8 5	8.6 23	3337.1	(10−)
		648.5 5	100	3041.3	(9−)
		930.3 5	37 9	2759.5	10+
3700.1	(12+)	940.5 5	100	2759.5	10+
3719.0	(12+)	464.9 5	≤2.9	3254.2	(10+)
		525.7 5	100	3193.3	(9,10+)
		959.5 5	7.1 12	2759.5	10+
3818.6	(12−)	333.3 5	9.9 10	3485.3	(11−)
		643.2 5	100	3175.3	(10−)
3956.9	(12+)	843.9 5	100	3113.0	(9,10+)
4038.7	(12−)	348.8 5	15 4	3689.8	(11−)
		701.7 5	100	3337.1	(10−)
4153.8	(12+)	899.6 5	100	3254.2	(10+)
4195.5	(13−)	376.8 5	≤22.5	3818.6	(12−)
		710.2 5	100	3485.3	(11−)
4351.0	14+	650.9 5	14.0 4	3700.1	(12+)
		703.9 5	100	3647.1	12+
4370.5	(14+)	651.5 5	100	3719.0	(12+)
		670.4 5	≤1.8	3700.1	(12+)
4446.3	(13−)	756.4 5	100	3689.8	(11−)
4556.1	(13+)	929.0 5	100	3627.1	(11+)

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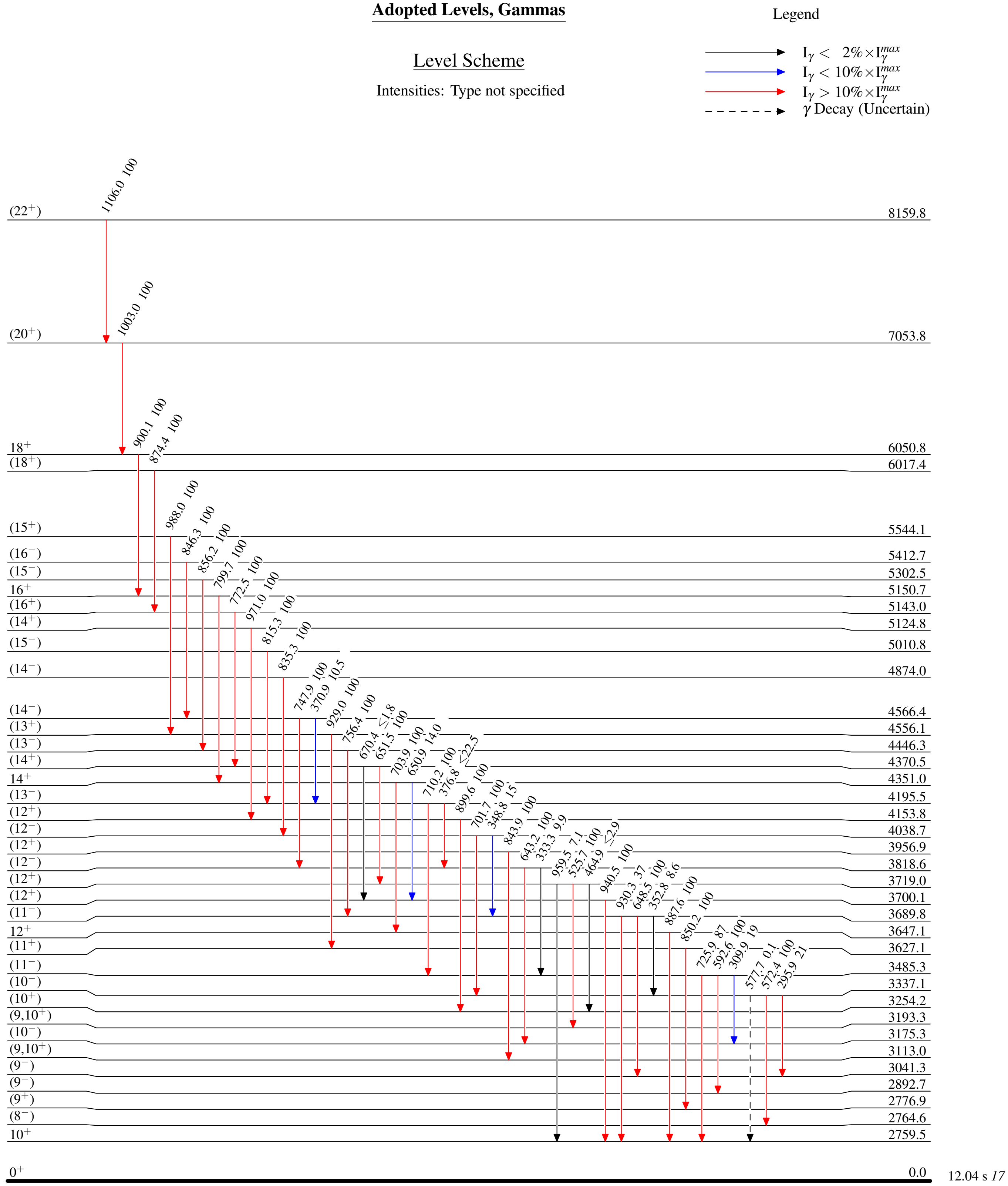
Adopted Levels, Gammas (continued)

$\gamma(^{110}Ru)$ (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
4566.4	(14⁻)	370.9 *5*	10.5 *23*	4195.5	(13⁻)	5302.5	(15⁻)	856.2 *5*	100	4446.3	(13⁻)
		747.9 *5*	100	3818.6	(12⁻)	5412.7	(16⁻)	846.3 *5*	100	4566.4	(14⁻)
4874.0	(14⁻)	835.3 *5*	100	4038.7	(12⁻)	5544.1	(15⁺)	988.0[&] *10*	100[&]	4556.1	(13⁺)
5010.8	(15⁻)	815.3 *5*	100	4195.5	(13⁻)	6017.4	(18⁺)	874.4 *5*	100	5143.0	(16⁺)
5124.8	(14⁺)	971.0[&] *10*	100[&]	4153.8	(12⁺)	6050.8	18⁺	900.1 *5*	100	5150.7	16⁺
5143.0	(16⁺)	772.5 *5*	100	4370.5	(14⁺)	7053.8	(20⁺)	1003.0[&] *10*	100[&]	6050.8	18⁺
5150.7	16⁺	799.7 *5*	100	4351.0	14⁺	8159.8	(22⁺)	1106.0[&] *10*	100[&]	7053.8	(20⁺)

† 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).
@ 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

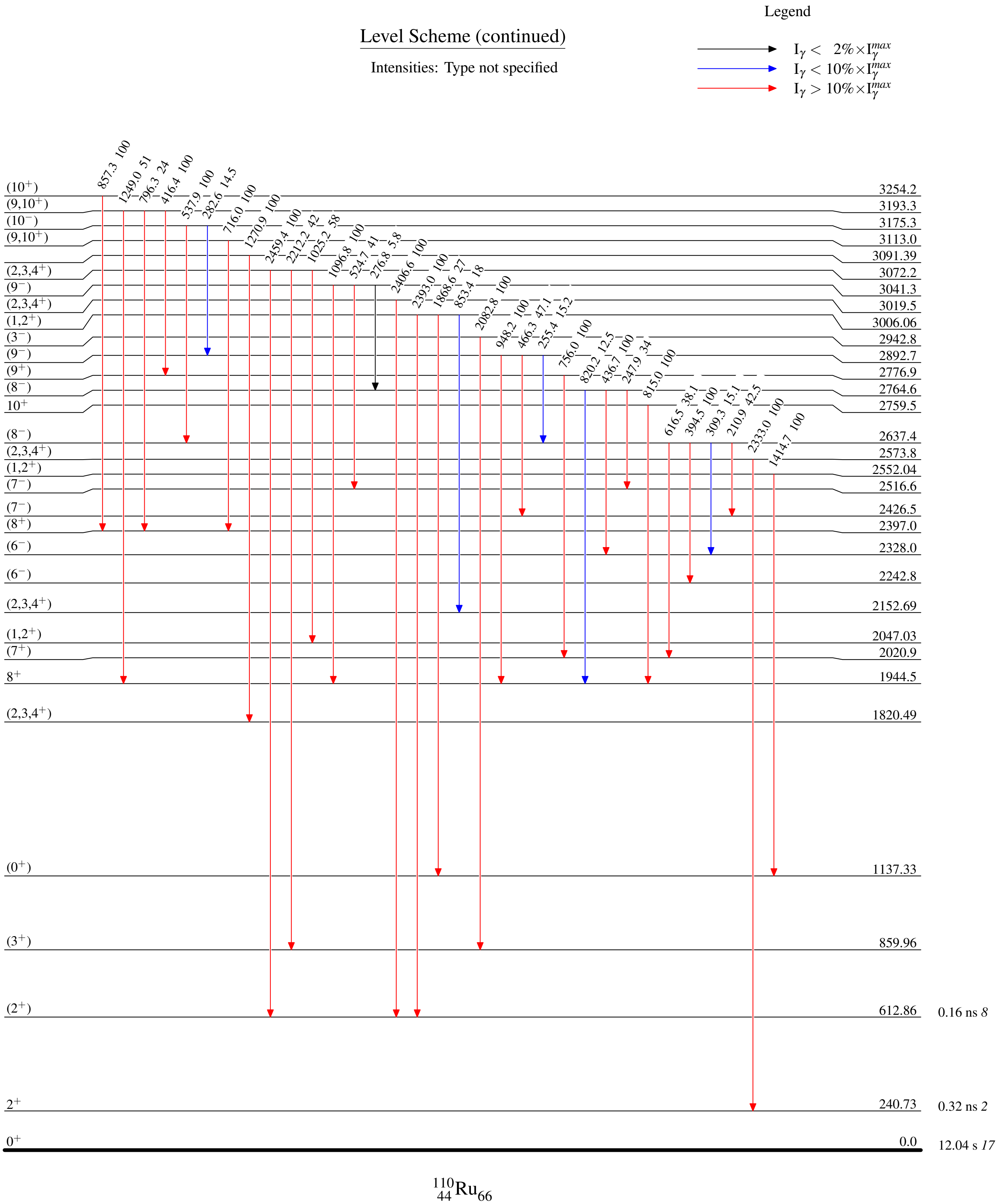


$^{110}_{44}Ru_{66}$

Adopted Levels, Gammas

Level Scheme (continued)

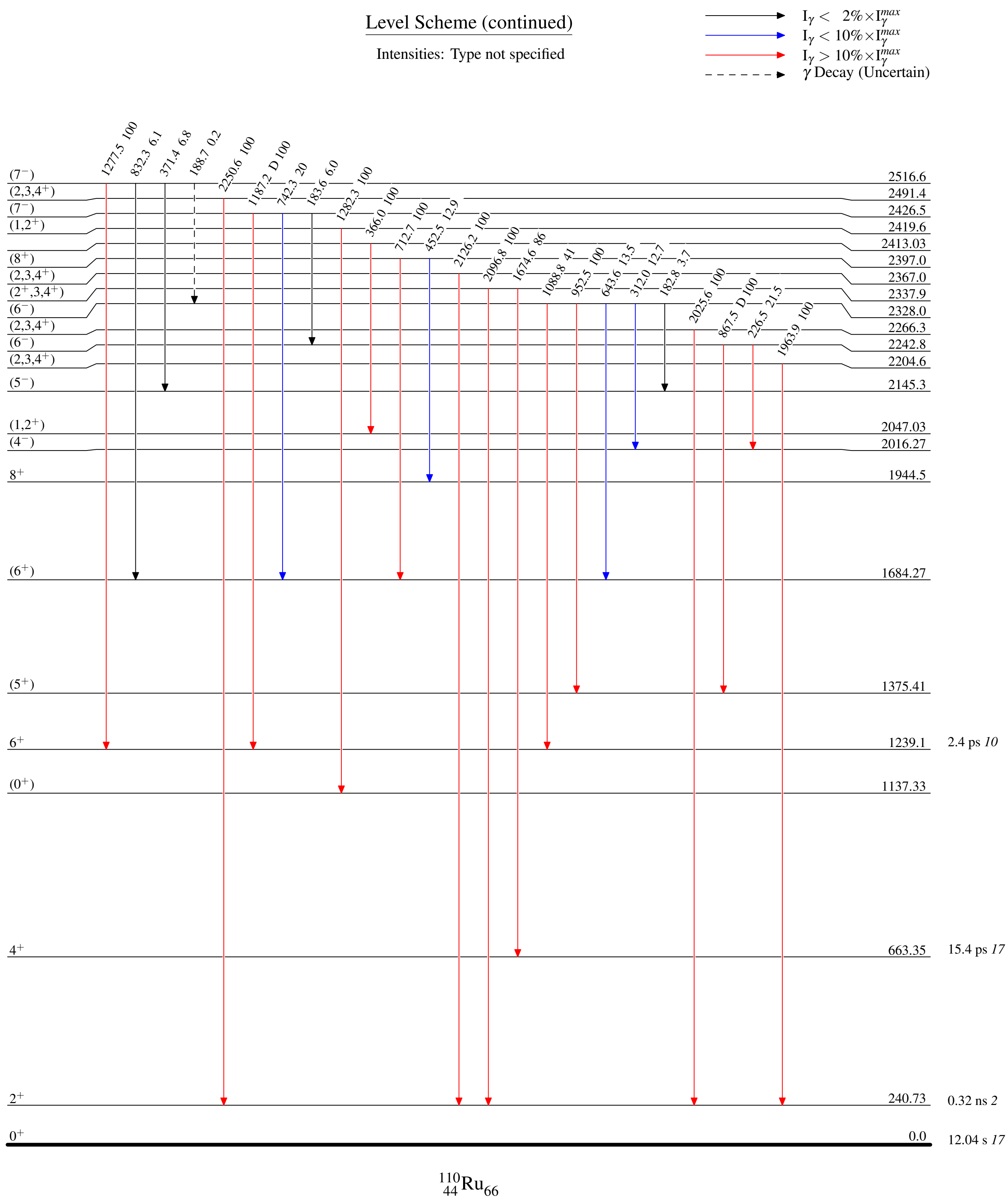
Intensities: Type not specified



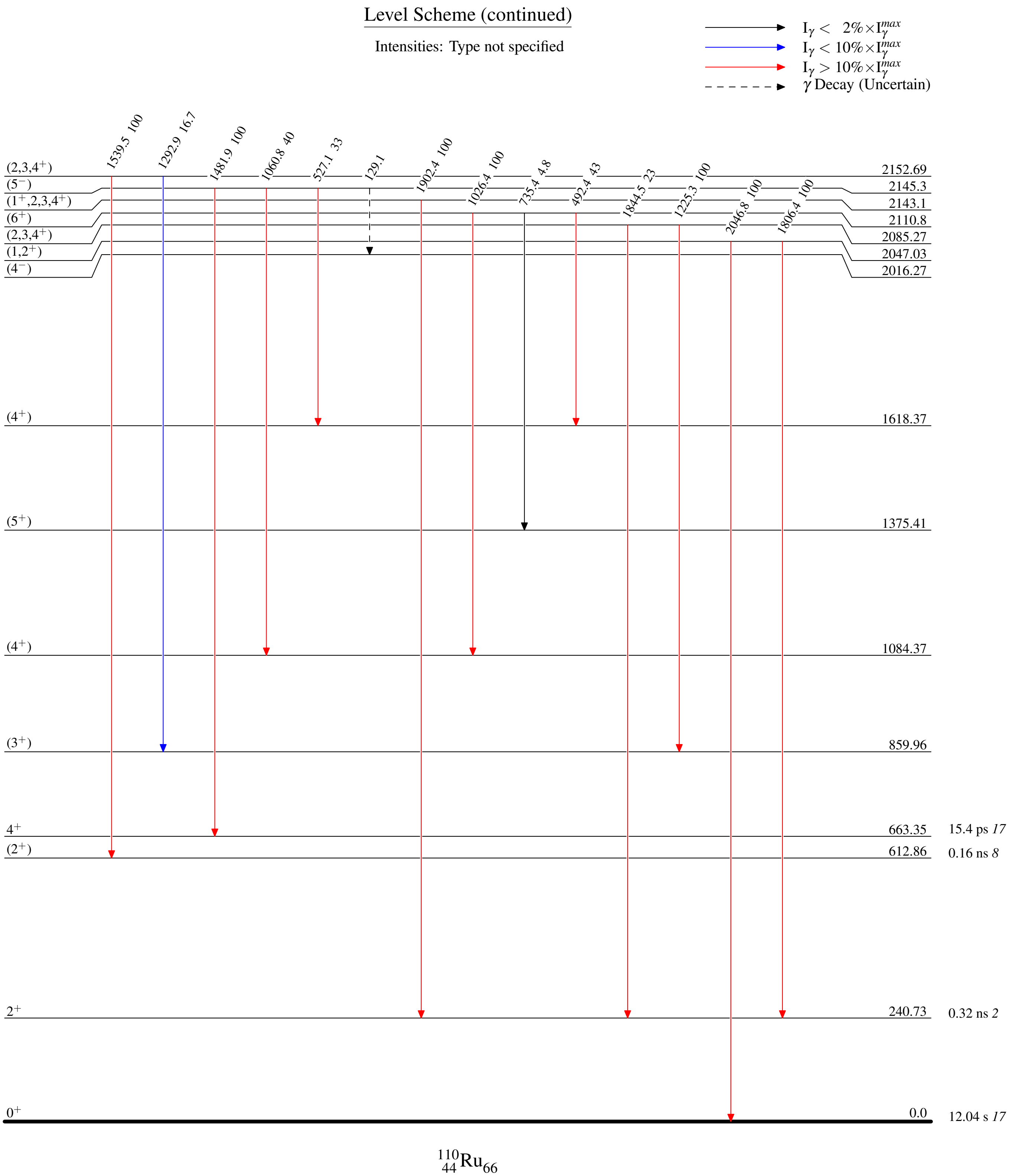
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified



Adopted Levels, Gammas



Adopted Levels, Gammas

Level Scheme (continued)

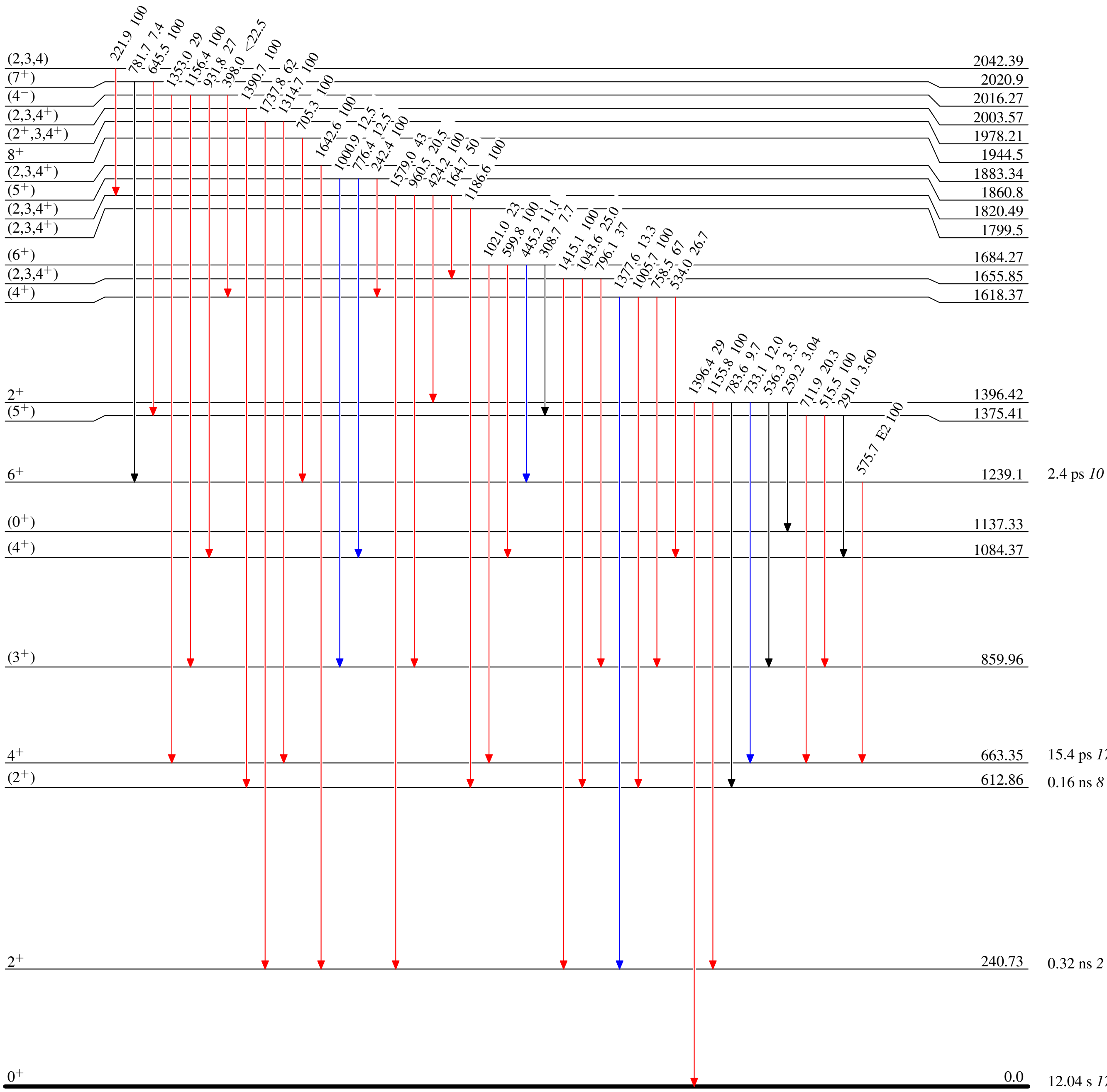
Intensities: Type not specified

Legend

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

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

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

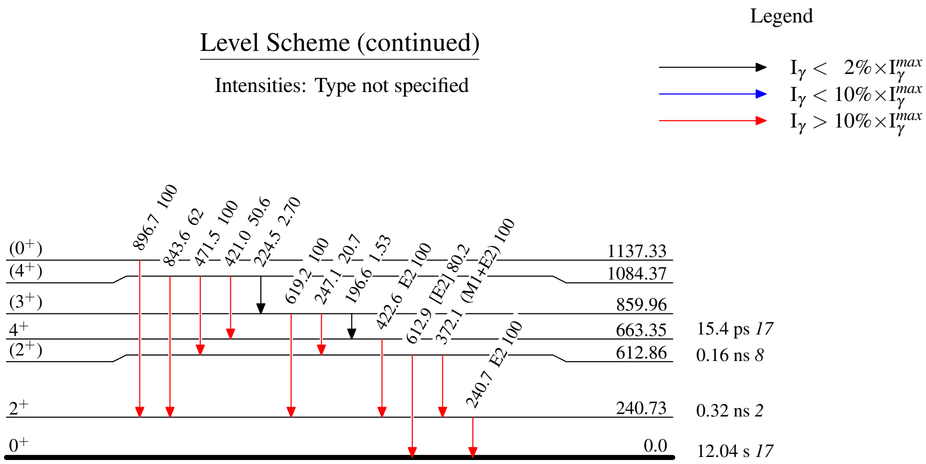


$^{110}_{44}Ru_{66}$

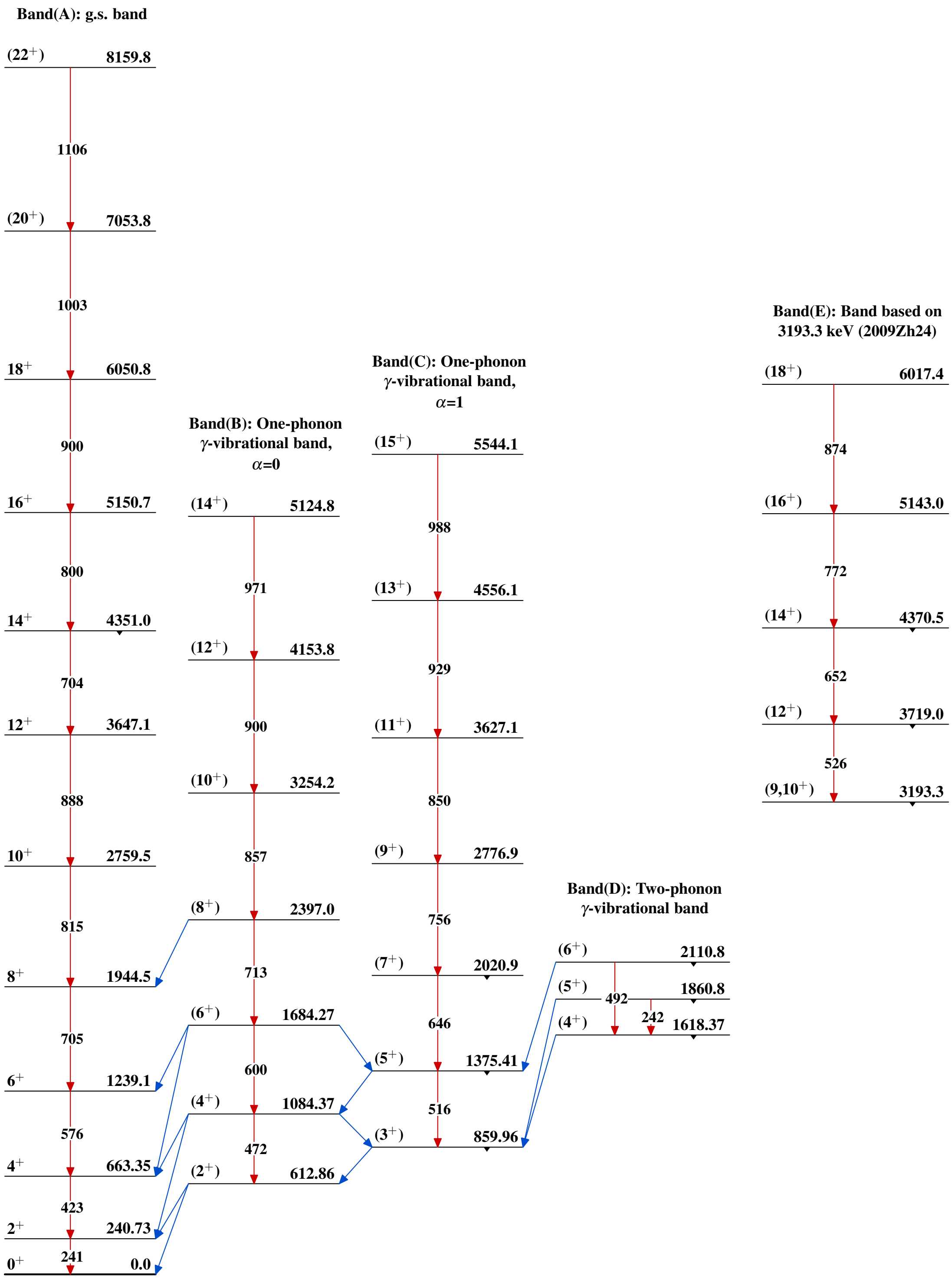
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified

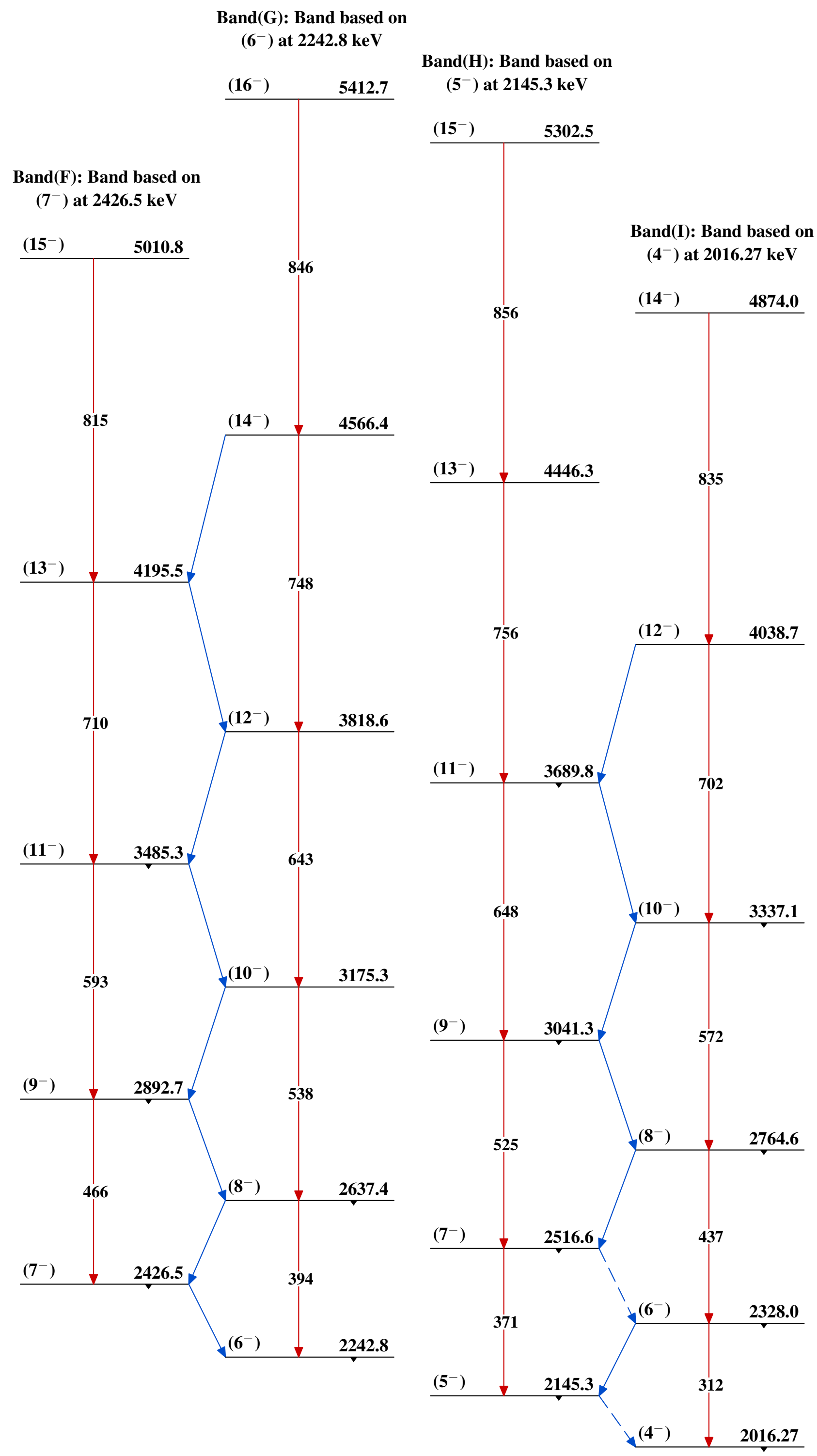


Adopted Levels, Gammas



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

Adopted Levels, Gammas (continued)



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