Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. Browne, J. K. Tuli	NDS 145, 25 (2017)	1-Jul-2017

Q(β^-)=−2044 *7*; S(n)=7472 *7*; S(p)=8482 *4*; Q(α)=−2338.4 *4* 2017Wa10

Other reactions:
^{2}H(^{136}Xe,X), E=500 MeV/A, Isotopic yields (2015Al19).
^{1}H(^{208}Pb,F), E=500 MeV/A, Isotopic cross sections of fission fragments (2015Ro11).
^{136}Xe(p,X), E=1 GeV (2007Na31).
^{90}Zr(^{16}O,X), ^{90}Zr(^{18}O,X), E=90 MeV (2004Jh01).
^{100}Mo(^{32}S,^{33}P), E=180 MeV (1995He17).
^{99}Ru(γ,γ), E=89.8 keV, Mossbauer spectra (1994Ko35).

^{99}Ru Levels

Cross Reference (XREF) Flags

A	^{99}Tc β^- decay (2.111×10^5 y)	E	^{91}Zr(^{11}B,p2nγ)	I	^{76}Ge(^{34}S,4p7nγ)
B	^{99}Tc β^- decay (6.0072 h)	F	^{96}Mo(α,nγ)	J	Coulomb excitation
C	^{99}Rh β^+ decay (16.1 d)	G	^{98}Mo(^{3}He,2nγ)	K	^{70}Zn(^{36}S,α3nγ)
D	^{99}Rh β^+ decay (4.7 h)	H	^{98}Mo(α,3nγ)	L	^{100}Ru(d,t)

E(level)[@]	J$^\pi$[†]	T$_{1/2}$[‡]	XREF	Comments
0.0[&]	5/2$^+$	stable	ABCDEFGHIJKL	μ=−0.641 *5*; Q=+0.079 *4* (2014StZZ) μ: From atomic beam magnetic resonance; $\mu(^{99}Ru)/\mu(^{101}Ru)$=0.8922344 *4* (1982Br28). Q: From atomic beam magnetic resonance (1977Bu04). Mossbauer emission ($\gamma\gamma(\theta$,H,t): 1995Am09. Hyperfine interactions ($\gamma\gamma(\theta$,H,t): 1994Oh05, 1993Kr28, 1993Oh10. Gfactor: 1993Ok02. NMR: 1994Bu30, 1997Is10. Others: 1997Is10, 1994Bu30, 1994Oh05, 1993Kr28, 1993Oh10, 1993Ok02. J$^\pi$: from paramagnetic resonance (2013Ma15) and μ.
89.57[h] *6*	3/2$^+$	20.5 ns *1*	ABCD FGH J L	μ=−0.284 *6*; Q=+0.231 *12* (2015St03) μ: From time-differential perturbed angular correlations (see 1965Ma27,1978LeZA). Other: μ=−0.292 *7* from g-factor(89)/g-factor(g.s.)=0.759 *16* from Mossbauer spectra (1966Ki02). Q: Q(89)/Q(g.s.)=+2.93 *7* from Mossbauer (1976Ki02). Other: Q(89)/Q(g.s.)=+2.82 *9* from Mossbauer (1974Gi12). J$^\pi$: from Mossbauer spectra (1966Ki02,2013Ma15). E2+M1 γ to 5/2$^+$. T$_{1/2}$: from $\gamma\gamma$(t) in ^{99}Rh β^+ decay (16.1 d) (1972Gu01). Others: 18.9 ns *10* (1974En02), 21.0 ns *6* (1973Be72), 20.7 ns *3* (1965Ma27), 20 ns *1* (1965Ki01), 19.7 ns *4* (1964Bo28); 24.7 ns *27* (Coulex.,1967Ki02, 1974Er04).
321.99 *9*	3/2$^+$		BCD FGH J L	J$^\pi$: M1,E2 γ to 5/2$^+$. log *ft*=8.5, log $f^{1u}t$=7.8.
340.90[g] *6*	7/2$^+$		DEFGHIJKL	J$^\pi$: M1+E2 γ to 5/2$^+$; log *ft*=5.2 from 9/2$^+$.
442.59 *7*	(3/2)$^+$	11 ps *3*	C FG J L	J$^\pi$: M1+E2 γ to 3/2$^+$. J from $\gamma\gamma(\theta)$ in β^+ decay (16.1 d). L=0 in (d,t) suggests J$^\pi$=1/2$^+$. T$_{1/2}$: if B(E2)=0.012 *2* (see Coulomb excitation).
575.83 *11*	(5/2)$^+$	1.1 ps *3*	CD FG J L	J$^\pi$: γ from (7/2,9/2)$^+$. Excitation function in (α,nγ) suggests 5/2; M1+E2 γ's to 3/2$^+$, 5/2$^+$. T$_{1/2}$: from Doppler broadening in Coulomb excitation (1974Er04). Note that for the 617 and 719 levels, T$_{1/2}$ from Doppler broadening is significantly smaller than indicated by B(E2).
617.89[h] *7*	7/2$^+$	0.7 ps *3*	DEFGH J	J$^\pi$: log *ft*=5.7 from 9/2$^+$. M1+E2 γ to 5/2$^+$.

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Adopted Levels, Gammas (continued)

^{99}Ru Levels (continued)

E(level)[@]	Jπ[†]	$T_{1/2}$[‡]	XREF	Comments
				$T_{1/2}$: if B(E2)=0.082 *9* (see Coulomb excitation). $T_{1/2}$=2.5 ps *6* from Doppler broadening in Coulomb excitation (1974Er04).
618.13 *7*	$(1/2)^+$	1.04 ns *8*	C F L	Jπ: γ to $1/2^+$. log *ft*=7.1 from $(1/2^-)$. γγ(θ). E2 γ to π=+. $T_{1/2}$: from βγ(t) in β^+ decay (16.1 d) (1973Be72).
719.87[&] *7*	$9/2^+$	2.25 ps *23*	DEFGHIJKL	Jπ: E2 γ to $5/2^+$. log *ft*=6.9 from $9/2^+$. γ(θ) in (α,3nγ). $T_{1/2}$: if B(E2)=0.207 *21* (see Coul. ex), $T_{1/2}$=2.1 ps *5* (1974Er04); 3.5 ps *14* in (α,nγ) (1987Do15).
734.09 *19*	$(5/2)^+$		CD FG L	Jπ: γ from $(7/2^+,9/2^+)$. Excit and γ(θ) in (α,nγ) support 5/2.
896.85 *10*	$(1/2^+,3/2,5/2^+)$	<0.15 ns	C L	Jπ: log *ft*=8.3, log $f^{1u}t$=9.0 from $(1/2^-)$. γ to $5/2^+$. $T_{1/2}$: from ^{99}Rh β^+ decay (16.1 d).
998.71 *15*	$(1/2^+,3/2,5/2^+)$		C L	Jπ: log *ft*=8.6, log $f^{1u}t$=9.3 from $(1/2^-)$. γ to $5/2^+$. L=2 in (d,t) is not consistent with $J^\pi=1/2^+$.
1048.50[g] *8*	$11/2^+$	4.5 ps *25*	DEFGHI K	Jπ: E2 γ to $7/2^+$; γ(θ) in (α,3nγ).
1069.88[c] *7*	$11/2^-$	2.8 ns *2*	EFGHI KL	Jπ: E1 γ to $9/2^+$. γ(θ) in (α,3nγ). Possible doublet in (d,t). $T_{1/2}$: from centroid-shift of α,γ(t) in (α,3nγ) (1981Du06).
1118.4 *6*	$7/2^{(+)}$		D FG L	XREF: L(1093). Jπ: γ to $3/2^+$ is ΔJ=2, Q; γ to $5/2^+$ is ΔJ=1, D.
1200.8 *6*	$5/2^+$		FG	Jπ: γ to $5/2^+$ is ΔJ=0, M1+E2.
1261.30 *22*	$7/2^+$		D FG	Jπ: 7/2 from anisotropy on NMR resonance (1985Ed06,2013Ma15). log *ft*=5.2 from $9/2^+$.
1277.87 *10*	$9/2^+$		D FGH	Jπ: log *ft*=5.9 from $9/2^+$. γ to $7/2^+$ is ΔJ=1, M1+E2.
1290.78	$7/2^-$		G	Jπ: γ to $5/2^+$ is ΔJ=1, E1; excit.
1306.4 *7*	$(3/2^+,5/2,7/2^+)$		D G	Jπ: γ's to $3/2^+$ and $7/2^+$.
1319.67[h] *9*	$11/2^+$	2.4 ps *11*	D FGH	Jπ: γ to $7/2^+$ is ΔJ=2, E2; γ to $9/2^+$.
1382.95 *11*	$(1/2^+,3/2)$		C G L	Jπ: log *ft*=7.8, log $f^{1u}t$=8.1 from $(1/2^-)$. γ to $5/2^+$.
1407.5 *10*		0.21 ps *10*	F	
1414.05 *20*	$(1/2,3/2,5/2^+)$		C	Jπ: log *ft*=8.5, log $f^{1u}t$=8.8 from $(1/2^-)$.
1473.9 *10*	(7/2,5/2)	0.17 ps *10*	D FG	Jπ: excit.
1497.06[&] *9*	$13/2^+$	0.62 ps *21*	EFGHI K	Jπ: γ to $9/2^+$ is ΔJ=2, E2.
1499.2 *5*	$9/2^+$	0.24 ps *11*	D FG	Jπ: log *ft*=6.4, log $f^{1u}t$=6.6 from $9/2^+$. γ to $7/2^+$ is ΔJ=1, E2+M1.
1531.46 *11*	$(1/2^+,3/2)$		C	Jπ: log *ft*=7.9, log $f^{1u}t$=7.9 from $(1/2^-)$. γ to $5/2^+$.
1571.94[c] *12*	$15/2^-$		EFGHI K	
1583.2 *10*	(7/2,5/2)	0.14 ps *5*	D FG	Jπ: excit. $T_{1/2}$: from (α,nγ) (1987PaZQ).
1662.05 *15*	$(1/2^+,3/2)$		C	Jπ: log *ft*=8.1, log $f^{1u}t$=8.0 from $(1/2^-)$. γ to $5/2^+$.
1685.2 *10*	$7/2^+$		G	Jπ: γ to $9/2^+$ is ΔJ=1, M1+E2; excit.
1711.4 *10*			G	
1717.5 *10*	$9/2^-$		FG	Jπ: γ to $11/2^-$ is ΔJ=1, M1+E2; excit.
1749.9 *3*	$(1/2^+,3/2)$		C	Jπ: log *ft*=8.6, log $f^{1u}t$=8.3 from $(1/2^-)$. γ to $5/2^+$.
1822.9 *10*			G	
1847.0 *10*	$(11/2^+)$	0.32 ps *11*	FG	Jπ: γ to $9/2^+$ is ΔJ=1, M1+E2; no γ to J<9/2.
1861.76 *14*	$13/2^-$	0.49 ps *18*	FG	Jπ: γ to $11/2^-$ is ΔJ=1, M1+E2; excit.
1898.9 *12*			G	
1944.5 *10*	$11/2^-$		FG	Jπ: γ to $11/2^-$ is ΔJ=0, E2+M1; excit.
1966.2 *10*	$13/2^+$		G	Jπ: γ to $11/2^+$ is ΔJ=1, M1+E2; excit.
1975.68 *21*			H	
2020.29[g] *11*	$15/2^+$	0.35 ps *14*	EFGHI K	Jπ: E2 γ to $11/2^+$; excit.
2059.34 *13*	$(3/2^-)$		C	Jπ: log *ft*=5.3 from $(1/2^-)$. γ to $5/2^+$.
2112.5 *10*			G	
2169.9 *10*	(7/2)		G	Jπ: excit.
2223.96[h] *12*	$(15/2)^+$		G	Jπ: from γ(θ).
2254.25? *23*	$(19/2^-)$		H	Jπ: γ to $15/2^-$ is ΔJ=(2), (E2); no γ to J<$15/2^-$.
2268.29[c] *14*	$19/2^-$		EFGHI K	Jπ: E2 γ to $15/2^-$. Excit in (α,3nγ).

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Adopted Levels, Gammas (continued)

^{99}Ru Levels (continued)

E(level)[@]	Jπ[†]	$T_{1/2}$[‡]	XREF	Comments
2330.04 *15*	$(15/2)^-$		H	Jπ: γ from $(19/2^-)$.
2383.5 *10*	$9/2^{(+)}$	0.09 ps *3*	FG	Jπ: excit; γ to $11/2^+$; RUL excludes E1.
2392.76[f] *13*	$(15/2^-)$	0.17 ps *7*	FG K	Jπ: γ to $13/2^-$; γ to $15/2^-$ is M1+E2; excit.
2400.88[&] *10*	$(17/2)^+$	0.6 ps *3*	EFGHI K	Jπ: γ to $13/2^+$ is ΔJ=2, E2 in (α,3nγ); no γ to J<13/2.
2411.5 *10*			G	
2653.6 *4*			H	
2752.16 *11*	$(15/2,17/2)^+$		H K	
2822.27	$(17/2,19/2,21/2)^+$		H	
2851.97[e] *14*	$(19/2^-)$		H K	Additional information 1.
2874.52[a] *11*	$(19/2)^+$		HI K	Jπ: γ to $(17/2^+)$ is M1,E2; γ to 15/2 is stretched Q; member of the band.
2997.50 *12*	$(19/2)^+$		H K	Jπ: γ from $(23/2)^+$.
3019.97[&] *14*	$(21/2)^+$		H JK	Jπ: from γ(θ); member of the $J=5/2^+$ band.
3036.51[f] *15*	$(19/2)^-$	0.35 ps *+14−7*	F H K	Jπ: γ to $(17/2^-)$ is probably ΔJ=1 (M1), excit.
3094.45[g] *15*	$(19/2)^+$	0.42[#] ps *+35−17*	H K	
3200.19[c] *17*	$23/2^-$	0.42[#] ps *+14−7*	HI K	Jπ: stretched Q γ to $19/2^-$. Excit in (α,3nγ).
3207.5? *3*	$(23/2^-)$		H	Jπ: γ to $(19/2^-)$ is ΔJ=2, Q; no γ to J<19/2.
3324.31[h] *16*	$(19/2)^+$		H	
3353.2 *15*			G	
3459.6 *4*	$(17/2)^+$		H	Jπ: M1,E2 γ to $17/2^+$. γ(θ) in (α,3nγ).
3466.06 *25*	$(19/2,21/2,23/2)^-$	0.56[#] ps *+28−14*	H	
3483.89? *23*	$(21/2^+)$		H	Jπ: (E2) γ to $17/2^+$. Excit in (α,3nγ).
3534.19[e] *17*	$(23/2^-)$		H K	Jπ: E2 γ to $(19/2^-)$. Additional information 2.
3536.29 *19*	(17/2,19/2,21/2)		H	
3638.20[a] *15*	$(23/2)^+$		HI K	Jπ: from γ(θ); member of the $7/2^+$ band.
3982.8[f] *3*	$(23/2)^-$	>0.9 ps	H K	$T_{1/2}$: From Doppler Shift Attenuation in (α,3nγ) (1999Mr04).
4046.82 *20*	$(23/2,25/2)^-$		H	
4102.53[&] *17*	$(25/2)^+$	0.70[#] ps *14*	H K	
4222.9[c] *3*	$(27/2^-)$	0.59[#] ps *7*	HI K	Jπ: (E2) γ to $(23/2)^-$. Excit in (α,3nγ).
4233.00[g] *18*	$(23/2)^+$	0.7[#] ps *+21−4*	H K	
4292.38 *22*	$(23/2^+)$		K	
4323.8? *4*			H	
4380.91 *18*	$(25/2)^+$		H K	
4438.3[b] *4*	$(23/2^+)$		K	
4487.05[e] *20*	$(27/2)^-$	0.42[#] ps *14*	H K	
4518.3 *5*			H	
4590.9[a] *3*	$(27/2^+)$		K	
5005.3[f] *3*	$(27/2)^-$		H K	
5031.21[b] *23*	$(27/2^+)$		K	
5168.1 *4*	$(27/2,29/2)^-$	0.21[#] ps *+14−7*	H	$T_{1/2}$: From Doppler Shift Attenuation in (α,3nγ) (1999Mr04).
5357.4[c] *3*	$31/2^-$	0.28[#] ps *+14−7*	HI K	$T_{1/2}$: From Doppler Shift Attenuation in (α,3nγ) (1999Mr04). Jπ: from γ(θ), member of the $J=11/2^-$ band.
5574.3[a] *10*	$(31/2^+)$		K	
5603.3[e] *3*	$(31/2)^-$	0.21[#] ps *7*	H K	$T_{1/2}$: From Doppler Shift Attenuation in (α,3nγ) (1999Mr04).

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Adopted Levels, Gammas (continued)

^{99}Ru Levels (continued)

E(level)[@]	J$^{\pi}$[†]	XREF	Comments
5911.6[b] *9*	31/2$^+$	K	
5952.3[f] *8*	(31/2$^-$)	K	
6479.1[c] *7*	35/2$^-$	I K	J$^{\pi}$: from $\gamma(\theta)$, member of the J=11/2$^-$ band.
6595.7[d] *10*	35/2$^-$	K	
6746.0[a] *13*	(35/2$^+$)	K	
6875.3[b] *11*	35/2$^+$	K	
7181.3[f] *11*	(35/2$^-$)	I K	
7562.6[c] *10*	39/2$^-$	I K	J$^{\pi}$: from $\gamma(\theta)$, member of the J=11/2$^-$ band.
7831.1[d] *13*	39/2$^-$	K	
8005.2[b] *13*	39/2$^+$	K	
8499.0 *13*	(41/2$^-$)	K	
8737.6 *14*	(43/2$^-$)	I	J$^{\pi}$: from $\gamma(\theta)$.
8878.2[c] *12*	43/2$^-$	K	
9044.1[d] *15*	43/2$^-$	K	
9190.9[b] *16*	43/2$^+$	K	
10026.6 *18*	(47/2$^-$)	I	J$^{\pi}$: from $\gamma(\theta)$.
10166.6[c] *14*	47/2$^-$	K	
10453.2[b] *19*	47/2$^+$	K	
10483.9[d] *15*	47/2$^-$	K	
11341.9[c] *16*	51/2$^-$	K	
11424.6 *20*	(51/2$^-$)	I	J$^{\pi}$: from $\gamma(\theta)$, member of the J=11/2$^-$ band.
12092.5[b] *22*	51/2$^+$	K	
12110.9[d] *15*	51/2$^-$	K	
13150.1[c] *16*	55/2$^-$	K	
13766.0[b] *24*	55/2$^+$	K	
14780[b] *3*	59/2$^+$	K	
16178.2 *19*		K	
17385 *3*		K	
18179.2 *22*		K	
19254 *3*		K	

[†] Spin and parity assignments for levels with J>11/2 are based on rotational structure, $\gamma(\theta)$, and $\gamma\gamma(\theta)$ measured in high-spin nuclear reactions. Arguments for J$^{\pi}$ assignments are given for some individual levels.
[‡] From centroid-shift of α,γ(t) (1987Do15), unless otherwise specified.
[#] From Doppler Shift Attenuation in (α,3nγ) (1999Mr04).
[@] Deduced by evaluators from least-squares fit to γ-ray energies.
[&] Band(A): g.s. band.
[a] Band(B): Band based on 19/2$^+$.
[b] Band(C): Band based on 23/2$^+$.
[c] Band(D): Band based on 11/2$^-$.
[d] Band(E): Band based on 35/2$^-$.
[e] Band(F): Band based on 19/2$^-$.
[f] Band(G): Band based on (15/2$^-$).
[g] Band(H): Band based on 7/2$^+$.
[h] Band(I): Band based on 3/2$^+$.

Adopted Levels, Gammas (continued)

γ(^{99}Ru)

E_i(level)	J_i^π	E_γ †	I_γ †	E_f	J_f^π	Mult. @	δ &b	α a	Comments
89.57	3/2+	89.50 *20*	100	0.0	5/2+	E2+M1	−1.56 *2*	1.50 *3*	B(M1)(W.u.)=0.000175 *4*; B(E2)(W.u.)=50.1 *10* α(K)=1.174 *20*; α(L)=0.265 *5*; α(M)=0.0497 *9* α(N)=0.00745 *14*; α(O)=0.000173 *3* δ: Other value: −0.8 *+5−9*, (α,3nγ) (1999Mr04).
321.99	3/2+	232.72 *12*	7.9 *6*	89.57	3/2+	(M1+E2)		0.048 *17*	α(K)=0.041 *14*; α(L)=0.0055 *23*; α(M)=1.02×10^{-3} *42* α(N)=1.61×10^{-4} *64*; α(O)=7.0×10^{-6} *20*
		322.4 *1*	100 *5*	0.0	5/2+	(M1+E2)		0.017 *4*	α(K)=0.015 *4*; α(L)=0.00190 *51*; α(M)=3.50×10^{-4} *94* α(N)=5.6×10^{-5} *15*; α(O)=2.6×10^{-6} *5*
340.90	7/2+	251.0 *5*	0.72 *5*	89.57	3/2+	E2		0.0492 *8*	α(K)=0.0421 *7*; α(L)=0.00588 *10*; α(M)=0.001085 *18* α(N)=0.000170 *3*; α(O)=6.94×10^{-6} *11*
		340.81 *10*	100 *5*	0.0	5/2+	M1+E2	−0.020 *5*	0.01188	α(K)=0.01040 *15*; α(L)=0.001215 *17*; α(M)=0.000223 *4* α(N)=3.61×10^{-5} *5*; α(O)=1.91×10^{-6} *3* δ: other: −0.10 *6* or −3.2 *6*.
442.59	(3/2)+	353.05 *6*	100.0 *27*	89.57	3/2+	M1+E2	+0.16 *+4−6*	0.01100 *17*	B(M1)(W.u.)=0.041 *12*; B(E2)(W.u.)=8 *5* α(K)=0.00963 *15*; α(L)=0.001127 *19*; α(M)=0.000207 *4* α(N)=3.35×10^{-5} *6*; α(O)=1.76×10^{-6} *3*
		442.80 *20*	6.5 *11*	0.0	5/2+	[E2]		0.00769	B(E2)(W.u.)=6.7 *22* α(K)=0.00667 *10*; α(L)=0.000836 *12*; α(M)=0.0001537 *22* α(N)=2.45×10^{-5} *4*; α(O)=1.153×10^{-6} *17*
575.83	(5/2)+	486.19 *13*	100.0 *14*	89.57	3/2+	M1(+E2)	−0.02 *3*	0.00498	α(K)=0.00436 *7*; α(L)=0.000504 *7*; α(M)=9.24×10^{-5} *13* α(N)=1.497×10^{-5} *21*; α(O)=7.97×10^{-7} *12* B(M1)(W.u.)=0.11 *3*
		575.75 *21*	58.5 *13*	0.0	5/2+	M1+E2	−0.34 *6*	0.00336	B(M1)(W.u.)=0.035 *10*; B(E2)(W.u.)=11 *5* α(K)=0.00294 *5*; α(L)=0.000340 *5*; α(M)=6.24×10^{-5} *10* α(N)=1.010×10^{-5} *15*; α(O)=5.34×10^{-7} *8*
617.89	7/2+	277.01 *10*	12 *2*	340.90	7/2+	M1+E2		0.0276 *76*	α(K)=0.0238 *63*; α(L)=0.0031 *11*; α(M)=5.7×10^{-4} *19* α(N)=9.0×10^{-5} *29*; α(O)=4.1×10^{-6} *9*
		528.36 *10*	22 *3*	89.57	3/2+	E2#		0.00455	B(E2)(W.u.)=1.2×10^{2} *7* α(K)=0.00396 *6*; α(L)=0.000485 *7*; α(M)=8.91×10^{-5} *13* α(N)=1.425×10^{-5} *20*; α(O)=6.91×10^{-7} *10*
		617.89 *15*	1.0×10^{2} *4*	0.0	5/2+	M1+E2	−0.32 *7*	0.00283	B(M1)(W.u.)=0.09 *6*; B(E2)(W.u.)=23 *18* α(K)=0.00249 *4*; α(L)=0.000287 *5*; α(M)=5.25×10^{-5} *8* α(N)=8.50×10^{-6} *13*; α(O)=4.51×10^{-7} *7*
618.13	(1/2)+	175.43 *10*	5.3 *3*	442.59	(3/2)+	E2		0.1731	Mult.: α(K)exp=0.0025 *8* (1981Du06). B(E2)(W.u.)=5.3 *9* α(K)=0.1454 *21*; α(L)=0.0228 *4*; α(M)=0.00423 *6* α(N)=0.000653 *10*; α(O)=2.30×10^{-5} *4*
		295.70 *10*	3.5 *3*	321.99	3/2+	[M1,E2]		0.023 *6*	α(K)=0.020 *5*; α(L)=0.00250 *76*; α(M)=4.6×10^{-4} *14* α(N)=7.3×10^{-5} *22*; α(O)=3.4×10^{-6} *7*
		528.24 *7*	100 *16*	89.57	3/2+	M1+E2	+0.52 *+3−2*	0.00418	α(K)=0.00366 *6*; α(L)=0.000428 *7*; α(M)=7.85×10^{-5} *12* α(N)=1.268×10^{-5} *19*; α(O)=6.61×10^{-7} *10* B(M1)(W.u.)=9.3×10^{-5} *21*; B(E2)(W.u.)=0.085 *21*

$^{99}_{44}Ru_{55}$-5

Adopted Levels, Gammas (continued)

γ(^{99}Ru) (continued)

E_i(level)	J_i^π	E_γ †	I_γ †	E_f	J_f^π	Mult. @	δ &b	α a	Comments
618.13	$(1/2)^+$	618.13 *10*	11.0 *14*	0.0	$5/2^+$	[E2]		0.00293	B(E2)(W.u.)=0.020 *4* α(K)=0.00256 *4*; α(L)=0.000308 *5*; α(M)=5.64×10^{-5} *8* α(N)=9.06×10^{-6} *13*; α(O)=4.49×10^{-7} *7*
719.87	$9/2^+$	102.00 *20*	1.24 *6*	617.89	$7/2^+$	[M1,E2]		0.75 *46*	α(K)=0.61 *36*; α(L)=0.118 *87*; α(M)=0.022 *17* α(N)=0.0033 *25*; α(O)=9.4×10^{-5} *47*
		379.07 *10*	2.88 *11*	340.90	$7/2^+$	M1+E2	+0.3 *2*	0.0094 *5*	B(M1)(W.u.)=0.0045 *8* α(K)=0.0082 *4*; α(L)=0.00097 *6*; α(M)=0.000178 *11* α(N)=2.87×10^{-5} *16*; α(O)=1.49×10^{-6} *5*
		719.81 *10*	100 *3*	0.0	$5/2^+$	E2		0.00196	α(K)=0.001711 *24*; α(L)=0.000203 *3*; α(M)=3.72×10^{-5} *6* α(N)=5.98×10^{-6} *9*; α(O)=3.02×10^{-7} *5* B(E2)(W.u.)=45 *5* Mult.: α(K)exp=0.0016 *3* (1981Du06).
734.09	$(5/2)^+$	411.7 *10*	9.5 *14*	321.99	$3/2^+$				
		644.64	33 *2*	89.57	$3/2^+$				
		734.10 *20*	100.0 *9*	0.0	$5/2^+$	M1+E2	−1.8 *1*	0.00187	α(K)=0.001637 *23*; α(L)=0.000192 *3*; α(M)=3.52×10^{-5} *5* α(N)=5.68×10^{-6} *8*; α(O)=2.91×10^{-7} *4*
896.85	$(1/2^+,3/2,5/2^+)$	807.25 *10*	100 *7*	89.57	$3/2^+$				
		896.90 *15*	70 *10*	0.0	$5/2^+$				
998.71	$(1/2^+,3/2,5/2^+)$	910.8 d *10*	<6.2	89.57	$3/2^+$				
		998.70 *15*	100	0.0	$5/2^+$				
1048.50	$11/2^+$	328.57 *10*	9.5 *6*	719.87	$9/2^+$	M1+E2	+0.17 *2*	0.01321	α(K)=0.01156 *17*; α(L)=0.001358 *20*; α(M)=0.000249 *4* α(N)=4.03×10^{-5} *6*; α(O)=2.11×10^{-6} *3* B(M1)(W.u.)=0.012 *7*; B(E2)(W.u.)=2.9 *18* Mult.: α(K)exp=0.0020 *8* (1981Du06).
		707.56 *10*	100 *3*	340.90	$7/2^+$	E2 #		0.00205	α(K)=0.00179 *3*; α(L)=0.000212 *3*; α(M)=3.89×10^{-5} *6* α(N)=6.26×10^{-6} *9*; α(O)=3.16×10^{-7} *5* B(E2)(W.u.)=24 *14* Mult.: α(K)exp=0.0023 *4* (1981Du06).
1069.88	$11/2^-$	350.01 *10*	100 *6*	719.87	$9/2^+$	E1		0.00411	B(E1)(W.u.)=2.5×10^{-6} *3* α(K)=0.00361 *5*; α(L)=0.000414 *6*; α(M)=7.56×10^{-5} *11* α(N)=1.217×10^{-5} *17*; α(O)=6.24×10^{-7} *9* Mult.: α(K)exp=0.0057 *20* (1981Du06).
		728.82 *10*	5.8 *8*	340.90	$7/2^+$	M2		0.00526	α(K)=0.00460 *7*; α(L)=0.000549 *8*; α(M)=0.0001011 *15* α(N)=1.637×10^{-5} *23*; α(O)=8.62×10^{-7} *12* B(M2)(W.u.)=0.136 *23*

$^{99}_{44}Ru_{55}$-6

Adopted Levels, Gammas (continued)

γ(^{99}Ru) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[@]	δ[&b]	α[a]	Comments
1069.88	11/2$^-$	1070.03 *10*	0.8 *5*	0.0	5/2$^+$	[E3]		1.55×10^{-3}	α(K)=0.001349 *19*; α(L)=0.0001635 *23*; α(M)=3.01×10^{-5} *5* α(N)=4.83×10^{-6} *7*; α(O)=2.43×10^{-7} *4* B(E3)(W.u.)=3.5 *22*
1118.4	7/2$^{(+)}$	542.6 *10*	100 *4*	575.83	(5/2)$^+$				
		1028.8 *10*	93 *4*	89.57	3/2$^+$	Q			
		1118.4 *10*	81 *4*	0.0	5/2$^+$	D			
1200.8	5/2$^+$	466.6 *10*	18 *5*	734.09	(5/2)$^+$				
		860.1 *10*	36 *3*	340.90	7/2$^+$	M1+E2	−2.4 *8*	1.27×10^{-3} *2*	α(K)=0.001111 *19*; α(L)=0.0001293 *20*; α(M)=2.37×10^{-5} *4* α(N)=3.82×10^{-6} *6*; α(O)=1.98×10^{-7} *4*
		1200.6 *10*	100 *2*	0.0	5/2$^+$	M1+E2	−0.9 *1*	6.27×10^{-4} *10*	α(K)=0.000545 *9*; α(L)=6.19×10^{-5} *10*; α(M)=1.133×10^{-5} *17* α(N)=1.84×10^{-6} *3*; α(O)=9.80×10^{-8} *15*; α(IPF)=6.82×10^{-6} *18*
1261.30	7/2$^+$	528.7	44 *10*	734.09	(5/2)$^+$				
		644.0 *6*	1.0 *3*	617.89	7/2$^+$				
		685.6 *4*	7.6 *12*	575.83	(5/2)$^+$				
		920.0 *4*	6.8 *4*	340.90	7/2$^+$				
		1172.2 *10*	0.9 *3*	89.57	3/2$^+$				
		1261.2 *4*	100.0 *7*	0.0	5/2$^+$	M1+E2	−0.07 *3*	5.94×10^{-4}	α(K)=0.000510 *8*; α(L)=5.75×10^{-5} *8*; α(M)=1.053×10^{-5} *15* α(N)=1.709×10^{-6} *24*; α(O)=9.22×10^{-8} *13*; α(IPF)=1.451×10^{-5} *22*
1277.87	9/2$^+$	542.8[d] *10*	59.3 *22*	734.09	(5/2)$^+$				
		558.2 *6*	9.2 *20*	719.87	9/2$^+$				
		660.01 *15*	23 *2*	617.89	7/2$^+$	M1(+E2)		0.00244	α(K)=0.00214 *4*; α(L)=0.000250 *8*; α(M)=4.58×10^{-5} *14* α(N)=7.40×10^{-6} *19*; α(O)=3.83×10^{-7} *8*
		702.0 *6*	7.7 *20*	575.83	(5/2)$^+$				
		936.95 *10*	100 *25*	340.90	7/2$^+$				
		1277.7 *10*	5.2 *15*	0.0	5/2$^+$				
1290.78	7/2$^-$	1290.78	100	0.0	5/2$^+$	E1		3.31×10^{-4}	α(K)=0.000209 *3*; α(L)=2.33×10^{-5} *4*; α(M)=4.25×10^{-6} *6* α(N)=6.89×10^{-7} *10*; α(O)=3.69×10^{-8} *6*; α(IPF)=9.42×10^{-5} *14*
1306.4	(3/2$^+$,5/2,7/2$^+$)	689.2	100 *17*	617.89	7/2$^+$				
		965.7 *6*	62 *14*	340.90	7/2$^+$				
		983.7	77 *23*	321.99	3/2$^+$				
		1306.2 *10*	39 *10*	0.0	5/2$^+$				
1319.67	11/2$^+$	271.07 *10*	19 *2*	1048.50	11/2$^+$	[M1,E2]		0.0295 *84*	α(K)=0.0255 *70*; α(L)=0.0033 *12*;

$^{99}_{44}Ru_{55}$-7

Adopted Levels, Gammas (continued)

γ(^{99}Ru) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[@]	δ[&b]	α[a]	Comments
									α(M)=6.1×10^{-4} *21* α(N)=9.7×10^{-5} *32*; α(O)=4.4×10^{-6} *10*
1319.67	11/2$^+$	599.84 *10*	92 *19*	719.87	9/2$^+$	M1+E2	+0.8 *5*	0.00309 *7*	α(K)=0.00270 *6*; α(L)=0.000317 *11*; α(M)=5.81×10^{-5} *19* α(N)=9.4×10^{-6} *3*; α(O)=4.85×10^{-7} *7* B(M1)(W.u.)=0.011 *8*; B(E2)(W.u.)=19 *18*
		701.70 *20*	100 *13*	617.89	7/2$^+$	E2		0.00209	α(K)=0.00183 *3*; α(L)=0.000217 *3*; α(M)=3.98×10^{-5} *6* α(N)=6.40×10^{-6} *9*; α(O)=3.23×10^{-7} *5* B(E2)(W.u.)=24 *12*
1382.95	(1/2$^+$,3/2)	940.40 *20*	100 *9*	442.59	(3/2)$^+$				
		1060.75 *15*	17.6 *29*	321.99	3/2$^+$				
		1293.50 *15*	23.5 *29*	89.57	3/2$^+$				
		1383.5 *5*	5.9 *29*	0.0	5/2$^+$				
1407.5		1066.6	100	340.90	7/2$^+$				
1414.05	(1/2,3/2,5/2$^+$)	796.0 *5*	29 *14*	618.13	(1/2)$^+$				
		1324.50 *20*	100 *14*	89.57	3/2$^+$				
1473.9	(7/2,5/2)	898.1	100	575.83	(5/2)$^+$				
1497.06	13/2$^+$	177.32 *10*	2.6 *1*	1319.67	11/2$^+$				α(K)=0.1401 *20*; α(L)=0.0219 *3*; α(M)=0.00405 *6*; α(N+..)=0.000649 *10* α(N)=0.000627 *9*; α(O)=2.22×10^{-5} *4*
		448.59 *10*	4.5 *3*	1048.50	11/2$^+$	(M1,E2)		0.0067 *7*	α(K)=0.0059 *6*; α(L)=0.00071 *10*; α(M)=0.000130 *18* α(N)=2.1×10^{-5} *3*; α(O)=1.04×10^{-6} *8* Mult.: α(K)exp=0.007 *3* (1981Du06).
		777.25 *10*	100 *12*	719.87	9/2$^+$	(E2)[#]		1.61×10^{-3}	α(K)=0.001409 *20*; α(L)=0.0001660 *24*; α(M)=3.04×10^{-5} *5* α(N)=4.90×10^{-6} *7*; α(O)=2.50×10^{-7} *4* B(E2)(W.u.)=1.1×10^2 *5* Mult.: α(K)exp=0.0010 *4* (1981Du06).
1499.2	9/2$^+$	779.1 *6*	95 *26*	719.87	9/2$^+$				
		1158.5 *7*	100.0 *10*	340.90	7/2$^+$	E2+M1	−10 *1*	6.42×10^{-4}	α(K)=0.000561 *8*; α(L)=6.43×10^{-5} *9*; α(M)=1.177×10^{-5} *17* α(N)=1.90×10^{-6} *3*; α(O)=1.000×10^{-7} *14*; α(IPF)=3.16×10^{-6} *7* B(M1)(W.u.)=0.00025 *13*; B(E2)(W.u.)=18 *9*
		1499.5 *10*	37 *11*	0.0	5/2$^+$	[E2]		4.57×10^{-4}	α(K)=0.000329 *5*; α(L)=3.73×10^{-5} *6*; α(M)=6.82×10^{-6} *10* α(N)=1.105×10^{-6} *16*; α(O)=5.88×10^{-8} *9*; α(IPF)=8.26×10^{-5} *13* B(E2)(W.u.)=1.8 *11*
1531.46	(1/2$^+$,3/2)	1088.80 *20*	64 *7*	442.59	(3/2)$^+$				

$^{99}_{44}Ru_{55}$-8

Adopted Levels, Gammas (continued)

γ(^{99}Ru) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[@]	δ[&b]	α[a]	Comments
1531.46	(1/2$^+$,3/2)	1209.32 *15*	36 *5*	321.99	3/2$^+$				
		1441.8 *3*	10 *4*	89.57	3/2$^+$				
		1531.80 *20*	100 *7*	0.0	5/2$^+$				
1571.94	15/2$^-$	502.07 *10*	100	1069.88	11/2$^-$	E2[#]		0.00528	α(K)=0.00459 *7*; α(L)=0.000566 *8*; α(M)=0.0001039 *15* α(N)=1.661×10^{-5} *24*; α(O)=7.99×10^{-7} *12* Mult.: α(K)exp=0.0047 *10* (1981Du06).
1583.2	(7/2,5/2)	1242.3 *10*	100	340.90	7/2$^+$				
1662.05	(1/2$^+$,3/2)	1572.5 *2*	100 *11*	89.57	3/2$^+$				
		1662.0 *2*	36 *8*	0.0	5/2$^+$				
1685.2	7/2$^+$	965.28	100	719.87	9/2$^+$	M1+E2	−0.45	1.02×10^{-3}	α(K)=0.000895 *13*; α(L)=0.0001018 *15*; α(M)=1.86×10^{-5} *3* α(N)=3.02×10^{-6} *5*; α(O)=1.617×10^{-7} *23*
1711.4		991.5	100	719.87	9/2$^+$				
1717.5	9/2$^-$	647.6 *10*	100	1069.88	11/2$^-$	M1+E2	+0.30 *30*	0.00254	α(K)=0.00223 *4*; α(L)=0.000256 *5*; α(M)=4.69×10^{-5} *9* α(N)=7.60×10^{-6} *13*; α(O)=4.04×10^{-7} *6*
1749.9	(1/2$^+$,3/2)	1749.9 *3*	100	0.0	5/2$^+$				
1822.9		1482.0	100	340.90	7/2$^+$				
1847.0	(11/2$^+$)	1127.1 *10*	100	719.87	9/2$^+$	M1+E2	−0.3 *1*	7.33×10^{-4}	α(K)=0.000643 *10*; α(L)=7.28×10^{-5} *11*; α(M)=1.333×10^{-5} *20* α(N)=2.16×10^{-6} *4*; α(O)=1.163×10^{-7} *18*; α(IPF)=1.12×10^{-6} *4* B(M1)(W.u.)=0.044 *16*; B(E2)(W.u.)=2.9 *21*
1861.76	13/2$^-$	791.83 *20*	100	1069.88	11/2$^-$	M1+E2	+0.18 *12*	1.60×10^{-3}	α(K)=0.001404 *20*; α(L)=0.0001602 *23*; α(M)=2.93×10^{-5} *5* α(N)=4.76×10^{-6} *7*; α(O)=2.55×10^{-7} *4* B(M1)(W.u.)=0.09 *4*
1898.9		698.1	100	1200.8	5/2$^+$				
1944.5	11/2$^-$	874.6 *10*	100	1069.88	11/2$^-$	E2+M1	+1.37 *35*	1.23×10^{-3} *2*	α(K)=0.001081 *19*; α(L)=0.0001250 *19*; α(M)=2.29×10^{-5} *4* α(N)=3.70×10^{-6} *6*; α(O)=1.94×10^{-7} *4*
1966.2	13/2$^+$	917.7	100	1048.50	11/2$^+$	M1+E2	+0.39 *30*	1.14×10^{-3} *2*	α(K)=0.001003 *19*; α(L)=0.0001143 *19*; α(M)=2.09×10^{-5} *4* α(N)=3.39×10^{-6} *6*; α(O)=1.81×10^{-7} *4*
1975.68		1255.8 *2*	100	719.87	9/2$^+$				
2020.29	15/2$^+$	701.0[d] *3*	13 *3*	1319.67	11/2$^+$				
		971.95 *10*	100 *3*	1048.50	11/2$^+$	(E2)[#]		9.43×10^{-4}	B(E2)(W.u.)=61 *25* α(K)=0.000827 *12*; α(L)=9.58×10^{-5} *14*; α(M)=1.754×10^{-5} *25* α(N)=2.83×10^{-6} *4*; α(O)=1.471×10^{-7} *21* Mult.: α(K)exp=0.0017 *8* (1981Du06).
2059.34	(3/2$^-$)	1483.20 *20*	74 *13*	575.83	(5/2)$^+$				

$^{99}_{44}Ru_{55}$-9

Adopted Levels, Gammas (continued)

γ(^{99}Ru) (continued)

E_i(level)	J_i^π	E_γ †	I_γ †	E_f	J_f^π	Mult. @	δ &b	α a	Comments
2059.34	(3/2$^-$)	1616.80 *20*	100 *11*	442.59	(3/2)$^+$				
		1970.0 *3*	74 *93*	89.57	3/2$^+$				
		2059.2 *3*	11 *4*	0.0	5/2$^+$				
2112.5		1064.0	100	1048.50	11/2$^+$				
2169.9	(7/2)	1450.0	100	719.87	9/2$^+$				
2223.96	(15/2)$^+$	904.30 *25*	1.0×10^2 *4*	1319.67	11/2$^+$				Doublet. Multipolarity assignment is not definite.
		1175.45 *10*	1.0×10^2 *4*	1048.50	11/2$^+$				
2254.25?	(19/2$^-$)	682.3[d] *2*	100	1571.94	15/2$^-$	(E2)		0.00225	α(K)=0.00196 *3*; α(L)=0.000234 *4*; α(M)=4.29×10^{-5} *6* α(N)=6.90×10^{-6} *10*; α(O)=3.47×10^{-7} *5* Mult.: α(K)exp=0.0049 *25* (1981Du06).
2268.29	19/2$^-$	696.33 *10*	100	1571.94	15/2$^-$	E2#		0.00213	α(K)=0.00186 *3*; α(L)=0.000222 *4*; α(M)=4.06×10^{-5} *6* α(N)=6.53×10^{-6} *10*; α(O)=3.29×10^{-7} *5* Mult.: α(K)exp=0.0019 *4* (1981Du06).
2330.04	(15/2)$^-$	468.26 *10*	100	1861.76	13/2$^-$				
2383.5	9/2$^{(+)}$	1335.0	100	1048.50	11/2$^+$				
2392.76	(15/2$^-$)	531.01 *10*	4.0 *4*	1861.76	13/2$^-$				
		820.86 *10*	100 *3*	1571.94	15/2$^-$	M1+E2	−1.2 *7*	0.00144 *4*	α(K)=0.00126 *3*; α(L)=0.0001458 *24*; α(M)=2.67×10^{-5} *5* α(N)=4.32×10^{-6} *8*; α(O)=2.25×10^{-7} *8* B(M1)(W.u.)=0.09 *8*; B(E2)(W.u.)=1.9×10^2 *12*
2400.88	(17/2)$^+$	380.81 *10*	5.7 *5*	2020.29	15/2$^+$				
		903.91 *15*	100 *8*	1497.06	13/2$^+$	(E2)		1.12×10^{-3}	B(E2)(W.u.)=5.E+1 *3* α(K)=0.000978 *14*; α(L)=0.0001139 *16*; α(M)=2.09×10^{-5} *3* α(N)=3.37×10^{-6} *5*; α(O)=1.738×10^{-7} *25*
		1352.18[d] *10*	6.5 *5*	1048.50	11/2$^+$				Placement not consistent with Δ(J^π).
2411.5		1363.0	100	1048.50	11/2$^+$				
2653.6		791.8[d] *3*	100	1861.76	13/2$^-$				
2752.16	(15/2,17/2)$^+$	351.48 *20*	100 *21*	2400.88	(17/2)$^+$				
		731.7[d] *3*	11 *7*	2020.29	15/2$^+$				
		1255.08 *10*	91 *6*	1497.06	13/2$^+$				
2822.27	(17/2,19/2,21/2)$^+$	421.27 *10*	100	2400.88	(17/2)$^+$				
2851.97	(19/2$^-$)	459.26 *10*	58 *3*	2392.76	(15/2$^-$)				
		521.90 *10*	31 *3*	2330.04	(15/2)$^-$				
		1280.00 *10*	100 *8*	1571.94	15/2$^-$				
2874.52	(19/2)$^+$	122.44 *10*	25 *1*	2752.16	(15/2,17/2)$^+$				

$^{99}_{44}Ru_{55}$-10

Adopted Levels, Gammas (continued)

γ(^{99}Ru) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[@]	α[a]	Comments
2874.52	(19/2)$^+$	473.67 *10*	100 *4*	2400.88	(17/2)$^+$	M1,E2	0.0058 *5*	α(K)=0.0050 *4*; α(L)=0.00061 *7*; α(M)=0.000111 *13* α(N)=1.79×10^{-5} *20*; α(O)=9.0×10^{-7} *5* Mult.: α(K)exp=0.0071 *20* (1981Du06).
		650.91[‡d] *25*	1.9 *1*	2223.96	(15/2)$^+$			
		854.18 *10*	43 *1*	2020.29	15/2$^+$			
2997.50	(19/2)$^+$	175.12 *10*	35 *2*	2822.27	(17/2,19/2,21/2)$^+$			
		245.31 *10*	100 *6*	2752.16	(15/2,17/2)$^+$			
		596.95 *15*	73 *14*	2400.88	(17/2)$^+$			
3019.97	(21/2)$^+$	145.45 *10*	100 *5*	2874.52	(19/2)$^+$			
		618.75 *25*	35 *24*	2400.88	(17/2)$^+$			
3036.51	(19/2)$^-$	643.76 *10*	39 *2*	2392.76	(15/2$^-$)			
		768.19 *10*	100 *5*	2268.29	19/2$^-$			
3094.45	(19/2)$^+$	1074.14 *10*	100	2020.29	15/2$^+$	(E2)	7.53×10^{-4}	α(K)=0.000661 *10*; α(L)=7.61×10^{-5} *11*; α(M)=1.392×10^{-5} *20* α(N)=2.25×10^{-6} *4*; α(O)=1.177×10^{-7} *17* B(E2)(W.u.)=35 *+14−29*
3200.19	23/2$^-$	931.89 *10*	100	2268.29	19/2$^-$	E2[#]	1.04×10^{-3}	α(K)=0.000911 *13*; α(L)=0.0001059 *15*; α(M)=1.94×10^{-5} *3* α(N)=3.13×10^{-6} *5*; α(O)=1.620×10^{-7} *23* B(E2)(W.u.)=70 *+12−24* Mult.: α(K)exp=0.0009 *2* (1981Du06).
3207.5?	(23/2$^-$)	953.2[d] *2*	100	2254.25?	(19/2$^-$)	(E2)	9.87×10^{-4}	α(K)=0.000865 *13*; α(L)=0.0001003 *14*; α(M)=1.84×10^{-5} *3* α(N)=2.97×10^{-6} *5*; α(O)=1.538×10^{-7} *22*
3324.31	(19/2)$^+$	1100.34 *10*	100	2223.96	(15/2)$^+$			
3353.2		1770	100	1583.2	(7/2,5/2)			
3459.6	(17/2)$^+$	1058.7[c] *3*	100[c]	2400.88	(17/2)$^+$	M1,E2	0.00081 *4*	α(K)=0.00071 *3*; α(L)=8.1×10^{-5} *3*; α(M)=1.49×10^{-5} *6* α(N)=2.41×10^{-6} *9*; α(O)=1.28×10^{-7} *7*
3466.06	(19/2,21/2,23/2)$^-$	1197.76 *20*	100	2268.29	19/2$^-$			
3483.89?	(21/2$^+$)	1083.0 *2*	100	2400.88	(17/2)$^+$	(E2)	7.40×10^{-4}	α(K)=0.000649 *9*; α(L)=7.47×10^{-5} *11*; α(M)=1.367×10^{-5} *20* α(N)=2.21×10^{-6} *3*; α(O)=1.156×10^{-7} *17* Mult.: α(K)exp=0.005 *3* (1981Du06).
3534.19	(23/2$^-$)	682.22 *10*	100	2851.97	(19/2$^-$)	E2[#]	0.00225	α(K)=0.00197 *3*; α(L)=0.000234 *4*; α(M)=4.30×10^{-5} *6* α(N)=6.90×10^{-6} *10*; α(O)=3.47×10^{-7} *5*
3536.29	(17/2,19/2,21/2)	661.76[d] *15*	100	2874.52	(19/2)$^+$	(E2)	0.00244	α(K)=0.00213 *3*; α(L)=0.000254 *4*; α(M)=4.67×10^{-5} *7* α(N)=7.50×10^{-6} *11*; α(O)=3.75×10^{-7} *6*

$^{99}_{44}Ru_{55}$-11

Adopted Levels, Gammas (continued)

γ(^{99}Ru) (continued)

E_i(level)	J_i^π	E_γ [†]	I_γ [†]	E_f	J_f^π	Mult. [@]	α [a]	Comments
3638.20	$(23/2)^+$	617.94 *25*	39 *23*	3019.97	$(21/2)^+$			
		641.0	8.3	2997.50	$(19/2)^+$			
		763.73 *10*	100 *5*	2874.52	$(19/2)^+$			
3982.8	$(23/2)^-$	783.1 *7*		3200.19	$23/2^-$	(M1)	1.64×10^{-3}	α(K)=0.001441 *21*; α(L)=0.0001643 *24*; α(M)=3.01×10^{-5} *5* α(N)=4.88×10^{-6} *7*; α(O)=2.62×10^{-7} *4*
		946.2 *3*	100	3036.51	$(19/2)^-$			
4046.82	$(23/2,25/2)^-$	846.63 *10*	100	3200.19	$23/2^-$			
4102.53	$(25/2)^+$	1082.56[‡] *10*	100	3019.97	$(21/2)^+$			
4222.9	$(27/2^-)$	1022.62[‡] *20*	100	3200.19	$23/2^-$	(E2)	8.40×10^{-4}	B(E2)(W.u.)=32 *4* α(K)=0.000737 *11*; α(L)=8.51×10^{-5} *12*; α(M)=1.558×10^{-5} *22* α(N)=2.52×10^{-6} *4*; α(O)=1.312×10^{-7} *19* Mult.: α(K)exp=0.0006 *2* (1981Du06).
4233.00	$(23/2)^+$	1138.49 *10*	100	3094.45	$(19/2)^+$			
4292.38	$(23/2^+)$	1198.1 *2*	100	3094.45	$(19/2)^+$			
4323.8?		1116.3[d] *2*	100	3207.5?	$(23/2^-)$			Mult.: α(K)exp=0.0010 *5* (1981Du06).
4380.91	$(25/2)^+$	742.70 *10*	100	3638.20	$(23/2)^+$			
4438.3	$(23/2^+)$	800.2 *3*	100	3638.20	$(23/2)^+$	D		
4487.05	$(27/2)^-$	952.87 *10*	100	3534.19	$(23/2^-)$	(E2)[#]	9.87×10^{-4}	B(E2)(W.u.)=63 *21* α(K)=0.000865 *13*; α(L)=0.0001004 *14*; α(M)=1.84×10^{-5} *3* α(N)=2.97×10^{-6} *5*; α(O)=1.539×10^{-7} *22*
4518.3		1058.7[cd] *3*	100[c]	3459.6	$(17/2)^+$			
4590.9	$(27/2^+)$	210.0 *2*		4380.91	$(25/2)^+$			
		488.5		4102.53	$(25/2)^+$			
		953.9 *12*		3638.20	$(23/2)^+$			
5005.3	$(27/2)^-$	782.48 *10*	100	4222.9	$(27/2^-)$			
		1023.3 *16*		3982.8	$(23/2)^-$			
5031.21	$(27/2^+)$	593.6 *9*		4438.3	$(23/2^+)$	E2	0.00327	α(K)=0.00285 *5*; α(L)=0.000345 *5*; α(M)=6.33×10^{-5} *10* α(N)=1.015×10^{-5} *15*; α(O)=5.01×10^{-7} *8*
		739.0 *2*		4292.38	$(23/2^+)$			
		798.0 *2*		4233.00	$(23/2)^+$	E2	1.51×10^{-3}	α(K)=0.001320 *19*; α(L)=0.0001552 *22*; α(M)=2.84×10^{-5} *4* α(N)=4.58×10^{-6} *7*; α(O)=2.34×10^{-7} *4*
5168.1	$(27/2,29/2)^-$	945.2 *3*	100	4222.9	$(27/2^-)$			
5357.4	$31/2^-$	1134.55 *10*	100	4222.9	$(27/2^-)$	(E2)[#]	6.70×10^{-4}	α(K)=0.000586 *9*; α(L)=6.73×10^{-5} *10*; α(M)=1.231×10^{-5} *18* α(N)=1.99×10^{-6} *3*; α(O)=1.045×10^{-7} *15*; α(IPF)=1.689×10^{-6} *25* B(E2)(W.u.)=39 *+10–20*
5574.3	$(31/2^+)$	983.3 *12*	100	4590.9	$(27/2^+)$			
5603.3	$(31/2)^-$	1116.30[‡] *20*	100	4487.05	$(27/2)^-$			
5911.6	$31/2^+$	880.4	100	5031.21	$(27/2^+)$	E2	1.19×10^{-3}	α(K)=0.001041 *15*; α(L)=0.0001215 *17*; α(M)=2.23×10^{-5} *4* α(N)=3.59×10^{-6} *5*; α(O)=1.85×10^{-7} *3*
5952.3	$(31/2^-)$	946.9	100	5005.3	$(27/2)^-$			
6479.1	$35/2^-$	526.7	7	5952.3	$(31/2^-)$			

$^{99}_{44}Ru_{55}$-12

Adopted Levels, Gammas (continued)

γ(^{99}Ru) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[@]	α[a]	Comments
6479.1	35/2⁻	876.4	28	5603.3	(31/2)⁻	E2	1.20×10^{-3}	α(K)=0.001052 *15*; α(L)=0.0001228 *18*; α(M)=2.25×10^{-5} *4* α(N)=3.63×10^{-6} *5*; α(O)=1.87×10^{-7} *3*
		1120.8	100	5357.4	31/2⁻	E2	6.87×10^{-4}	α(K)=0.000602 *9*; α(L)=6.91×10^{-5} *10*; α(M)=1.265×10^{-5} *18* α(N)=2.05×10^{-6} *3*; α(O)=1.073×10^{-7} *15*; α(IPF)=1.127×10^{-6} *16*
6595.7	35/2⁻	1238.5	100	5357.4	31/2⁻	E2	5.67×10^{-4}	α(K)=0.000486 *7*; α(L)=5.55×10^{-5} *8*; α(M)=1.016×10^{-5} *15* α(N)=1.644×10^{-6} *23*; α(O)=8.67×10^{-8} *13*; α(IPF)=1.344×10^{-5} *19*
6746.0	(35/2⁺)	1171.6	100	5574.3	(31/2⁺)			
6875.3	35/2⁺	963.7	100	5911.6	31/2⁺	E2	9.62×10^{-4}	α(K)=0.000843 *12*; α(L)=9.77×10^{-5} *14*; α(M)=1.79×10^{-5} *3* α(N)=2.89×10^{-6} *4*; α(O)=1.500×10^{-7} *21*
		1301.2	21	5574.3	(31/2⁺)			
7181.3	(35/2⁻)	1229.0	100	5952.3	(31/2⁻)			
7562.6	39/2⁻	381.2	4	7181.3	(35/2⁻)			
		1083.3	100	6479.1	35/2⁻	E2	7.39×10^{-4}	α(K)=0.000648 *9*; α(L)=7.46×10^{-5} *11*; α(M)=1.366×10^{-5} *20* α(N)=2.21×10^{-6} *3*; α(O)=1.155×10^{-7} *17*
7831.1	39/2⁻	1235.6	100	6595.7	35/2⁻	E2	5.70×10^{-4}	α(K)=0.000489 *7*; α(L)=5.58×10^{-5} *8*; α(M)=1.022×10^{-5} *15* α(N)=1.653×10^{-6} *24*; α(O)=8.72×10^{-8} *13*; α(IPF)=1.295×10^{-5} *19*
8005.2	39/2⁺	1130.1	100	6875.3	35/2⁺	E2	6.75×10^{-4}	α(K)=0.000591 *9*; α(L)=6.79×10^{-5} *10*; α(M)=1.242×10^{-5} *18* α(N)=2.01×10^{-6} *3*; α(O)=1.054×10^{-7} *15*; α(IPF)=1.487×10^{-6} *21*
		1259.0	30	6746.0	(35/2⁺)	E2	5.52×10^{-4}	α(K)=0.000470 *7*; α(L)=5.36×10^{-5} *8*; α(M)=9.81×10^{-6} *14* α(N)=1.588×10^{-6} *23*; α(O)=8.38×10^{-8} *12*; α(IPF)=1.715×10^{-5} *24*
8499.0	(41/2⁻)	936.4	100	7562.6	39/2⁻			
8737.6	(43/2⁻)	1175	100	7562.6	39/2⁻			
8878.2	43/2⁻	379.1	25	8499.0	(41/2⁻)			
		1315.5	100	7562.6	39/2⁻	E2	5.17×10^{-4}	α(K)=0.000429 *6*; α(L)=4.88×10^{-5} *7*; α(M)=8.94×10^{-6} *13* α(N)=1.447×10^{-6} *21*; α(O)=7.65×10^{-8} *11*; α(IPF)=2.88×10^{-5} *4*
9044.1	43/2⁻	1213.2	100	7831.1	39/2⁻	E2	5.88×10^{-4}	α(K)=0.000508 *8*; α(L)=5.81×10^{-5} *9*; α(M)=1.063×10^{-5} *15* α(N)=1.719×10^{-6} *24*; α(O)=9.06×10^{-8} *13*; α(IPF)=9.37×10^{-6} *14*
9190.9	43/2⁺	1185.7	100	8005.2	39/2⁺	E2	6.13×10^{-4}	α(K)=0.000533 *8*; α(L)=6.10×10^{-5} *9*; α(M)=1.117×10^{-5} *16* α(N)=1.81×10^{-6} *3*; α(O)=9.51×10^{-8} *14*; α(IPF)=5.75×10^{-6} *8*
10026.6	(47/2⁻)	1289	100	8737.6	(43/2⁻)			
10166.6	47/2⁻	1288.2	100	8878.2	43/2⁻	E2	5.33×10^{-4}	α(K)=0.000448 *7*; α(L)=5.11×10^{-5} *8*; α(M)=9.34×10^{-6} *13* α(N)=1.512×10^{-6} *22*; α(O)=7.99×10^{-8} *12*; α(IPF)=2.29×10^{-5} *4*
10453.2	47/2⁺	1262.3	100	9190.9	43/2⁺	E2	5.50×10^{-4}	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(IPF)=1.777×10^{-5} *25*
10483.9	47/2⁻	1440.0	100	9044.1	43/2⁻	E2	4.69×10^{-4}	α(K)=0.000357 *5*; α(L)=4.05×10^{-5} *6*; α(M)=7.41×10^{-6} *11* α(N)=1.199×10^{-6} *17*; α(O)=6.37×10^{-8} *9*; α(IPF)=6.23×10^{-5} *9*
11341.9	51/2⁻	1175.2	100	10166.6	47/2⁻	E2	6.24×10^{-4}	α(K)=0.000544 *8*; α(L)=6.22×10^{-5} *9*; α(M)=1.139×10^{-5} *16* α(N)=1.84×10^{-6} *3*; α(O)=9.69×10^{-8} *14*; α(IPF)=4.63×10^{-6} *7*
11424.6	(51/2⁻)	1398	100	10026.6	(47/2⁻)			
12092.5	51/2⁺	1639.2	100	10453.2	47/2⁺	E2	4.54×10^{-4}	α(K)=0.000277 *4*; α(L)=3.12×10^{-5} *5*; α(M)=5.71×10^{-6} *8* α(N)=9.26×10^{-7} *13*; α(O)=4.94×10^{-8} *7*; α(IPF)=0.0001387 *20*

$^{99}_{44}Ru_{55}$-13

Adopted Levels, Gammas (continued)

γ(^{99}Ru) (continued)

E_i(level)	J_i^π	E_γ [†]	I_γ [†]	E_f	J_f^π	Mult. [@]	α [a]	Comments
12110.9	51/2$^-$	1627.2	100	10483.9	47/2$^-$	E2	4.53×10^{-4}	α(K)=0.000281 *4*; α(L)=3.17×10^{-5} *5*; α(M)=5.80×10^{-6} *9* α(N)=9.39×10^{-7} *14*; α(O)=5.01×10^{-8} *7*; α(IPF)=0.0001336 *19*
		1944.0	100	10166.6	47/2$^-$	E2	5.06×10^{-4}	α(K)=0.000201 *3*; α(L)=2.25×10^{-5} *4*; α(M)=4.12×10^{-6} *6* α(N)=6.67×10^{-7} *10*; α(O)=3.58×10^{-8} *5*; α(IPF)=0.000277 *4*
13150.1	55/2$^-$	1039.3	50	12110.9	51/2$^-$			
		1808.2	100	11341.9	51/2$^-$	E2	4.75×10^{-4}	α(K)=0.000230 *4*; α(L)=2.58×10^{-5} *4*; α(M)=4.72×10^{-6} *7* α(N)=7.65×10^{-7} *11*; α(O)=4.10×10^{-8} *6*; α(IPF)=0.000214 *3*
13766.0	55/2$^+$	1673.5	100	12092.5	51/2$^+$	E2	4.56×10^{-4}	α(K)=0.000266 *4*; α(L)=3.00×10^{-5} *5*; α(M)=5.48×10^{-6} *8* α(N)=8.89×10^{-7} *13*; α(O)=4.75×10^{-8} *7*; α(IPF)=0.0001534 *22*
14780	59/2$^+$	1013.8	100	13766.0	55/2$^+$	E2	8.57×10^{-4}	α(K)=0.000752 *11*; α(L)=8.68×10^{-5} *13*; α(M)=1.590×10^{-5} *23* α(N)=2.57×10^{-6} *4*; α(O)=1.338×10^{-7} *19*
16178.2		3028	100	13150.1	55/2$^-$			
17385		2605	100	14780	59/2$^+$			
18179.2		2001	100	16178.2				
19254		1869	100	17385				

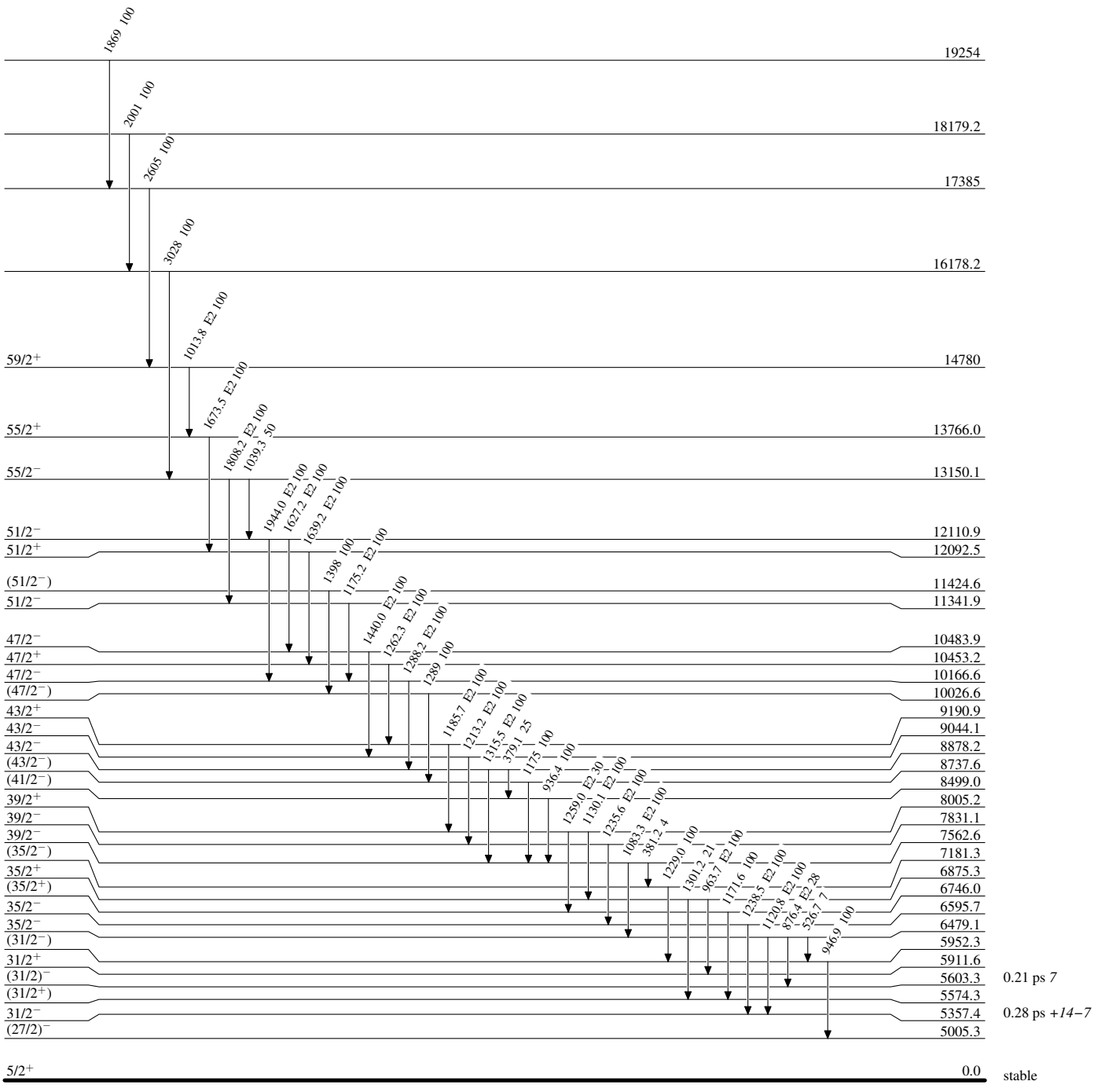
[†] From high-spin nuclear reactions for transitions from levels with J>11/2, others based on ^{99}Tc and ^{99}Rh decays, (^{3}He,2nγ), (α,3nγ).
[‡] Possible doublet (1999Mr04).
[#] ΔJ=2, stretched quadrupole from γ(θ) data (1999Mr04).
[@] From α,γ(θ) and α(K)exp. α(K)exp alone does not allow to distinguish between M1 and E2. Quadrupole γ′s are E2 for $T_{1/2}$<0.5 ns as determined by 1981Du06.
[&] From (^{3}He,2nγ), except as noted.
[a] Additional information 3.
[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] Multiply placed with intensity suitably divided.
[d] Placement of transition in the level scheme is uncertain.

$^{99}_{44}Ru_{55}$-14

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level



$^{99}_{44}Ru_{55}$

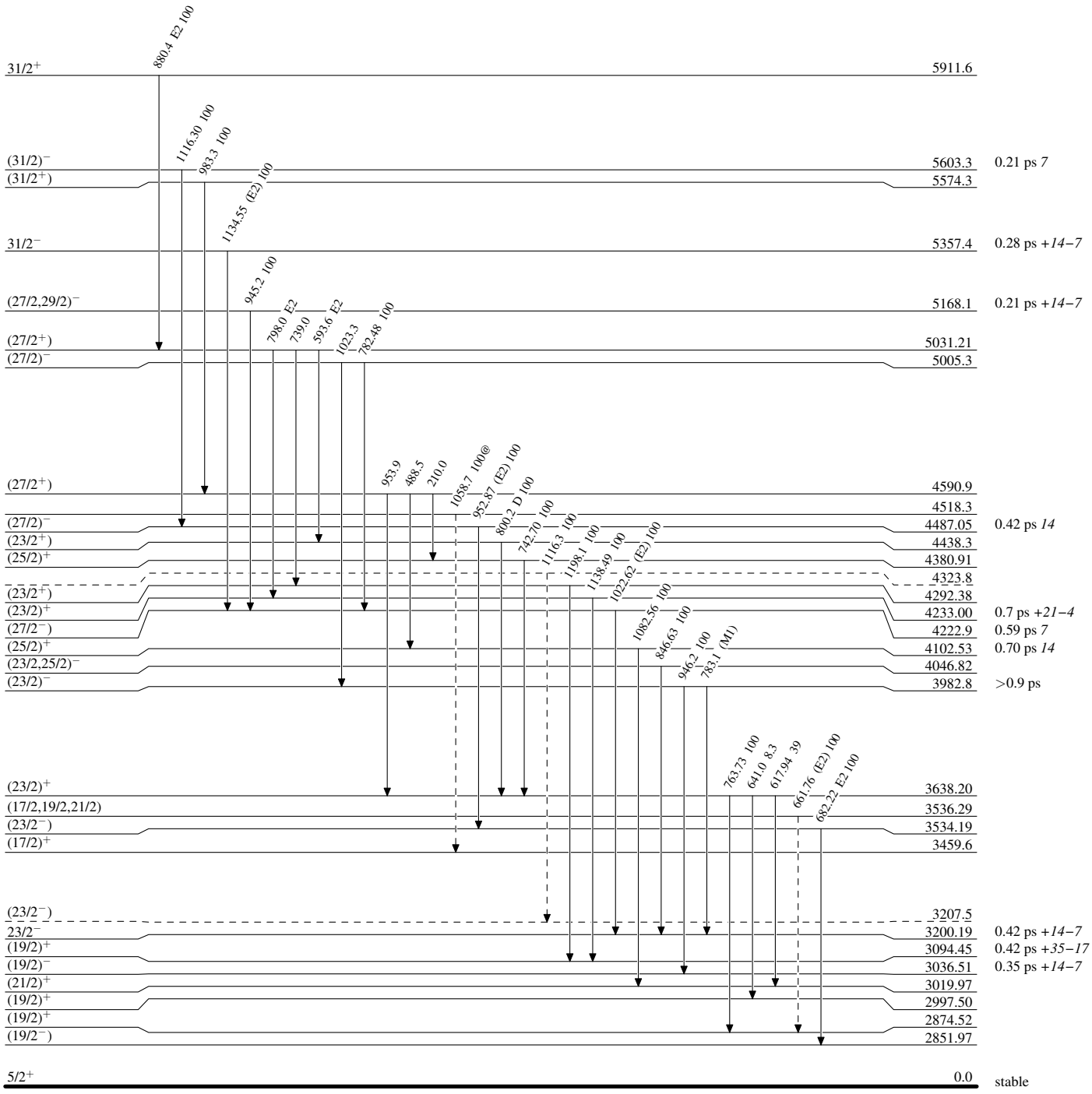
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level
@ Multiply placed: intensity suitably divided

- - - - - - ► γ Decay (Uncertain)

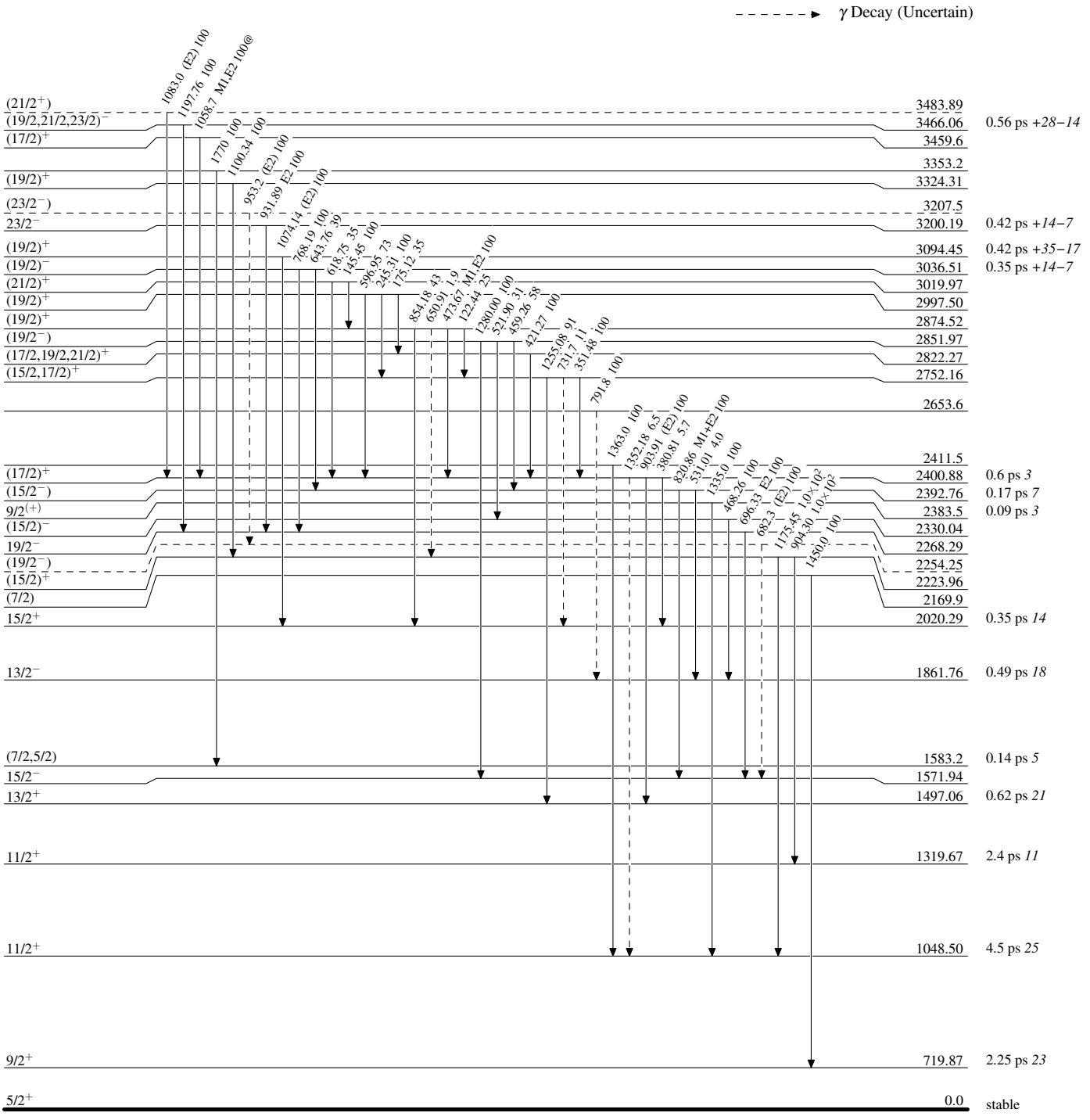


$^{99}_{44}Ru_{55}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
@ Multiply placed: intensity suitably divided



$^{99}_{44}Ru_{55}$

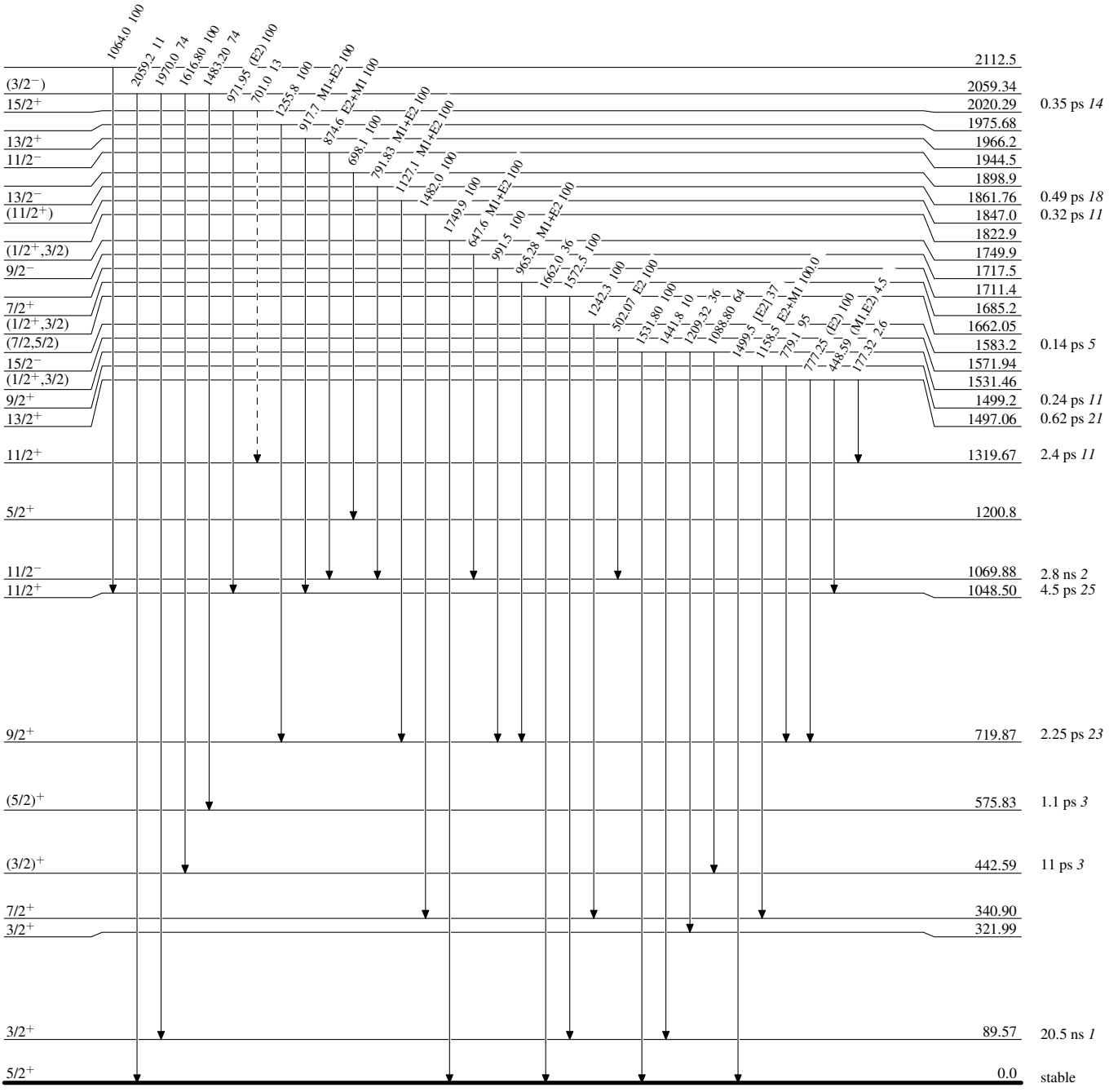
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level
@ Multiply placed: intensity suitably divided

- - - - - - ► γ Decay (Uncertain)



$^{99}_{44}Ru_{55}$

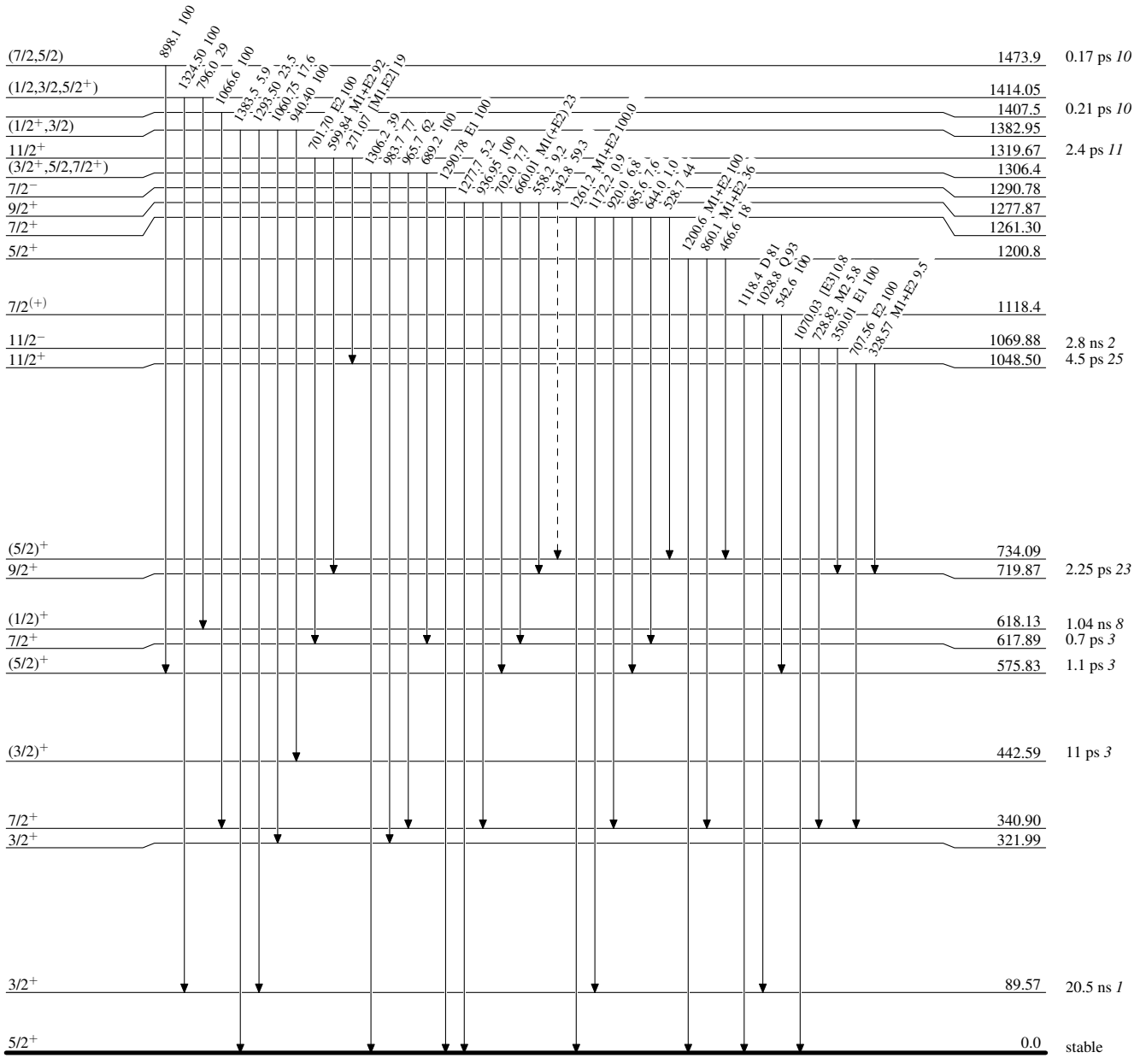
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level
@ Multiply placed: intensity suitably divided

- - - - - - ► γ Decay (Uncertain)



$^{99}_{44}Ru_{55}$

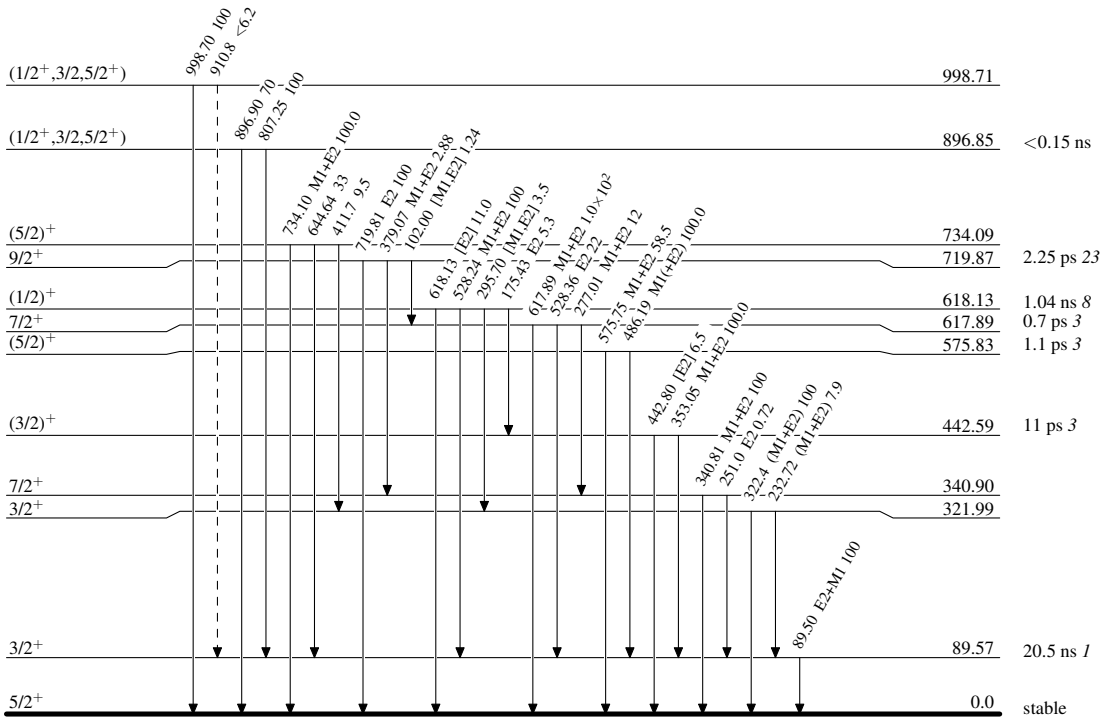
Adopted Levels, Gammas

Legend

Level Scheme (continued)

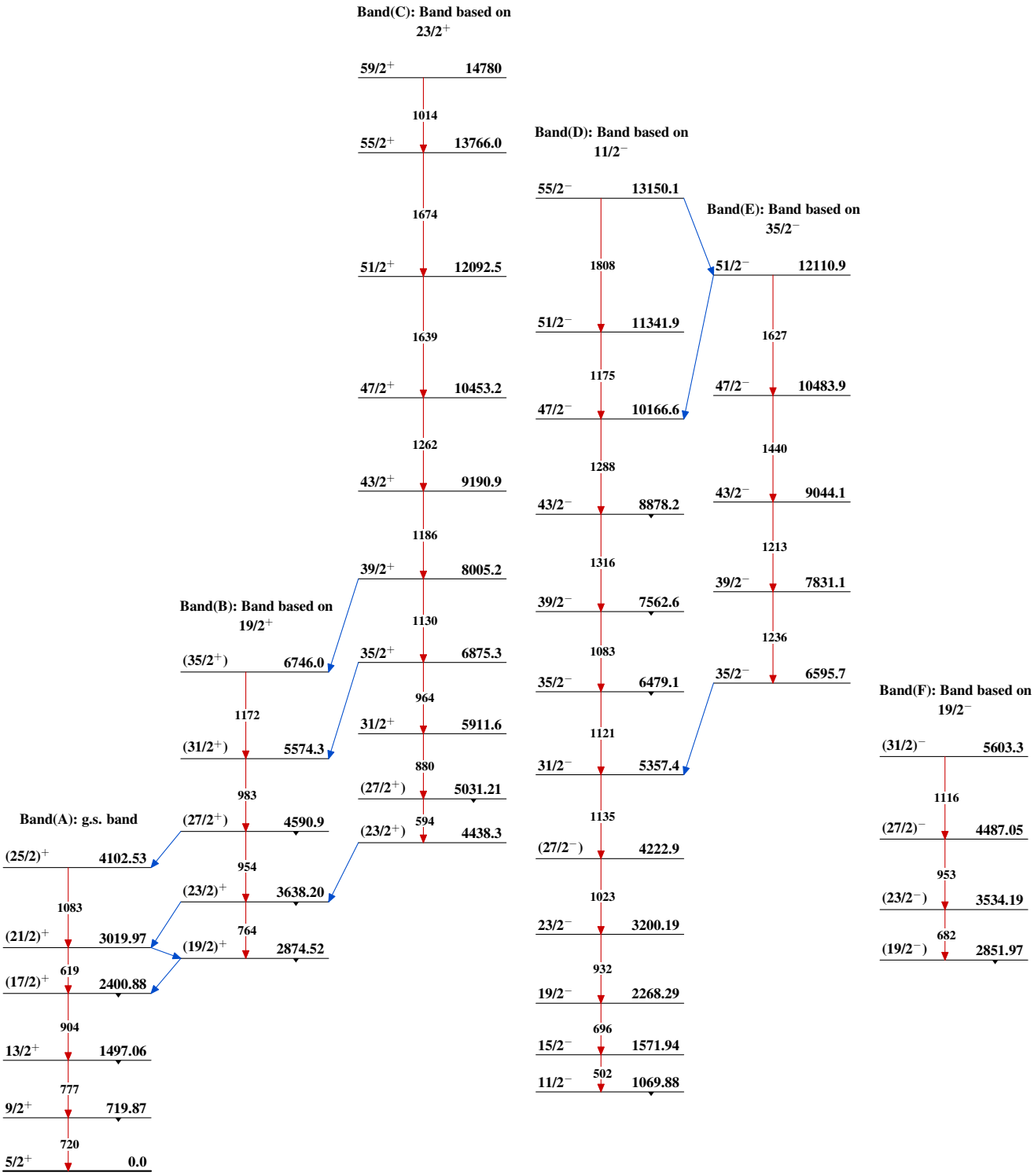
Intensities: Relative photon branching from each level
@ Multiply placed: intensity suitably divided

γ Decay (Uncertain)

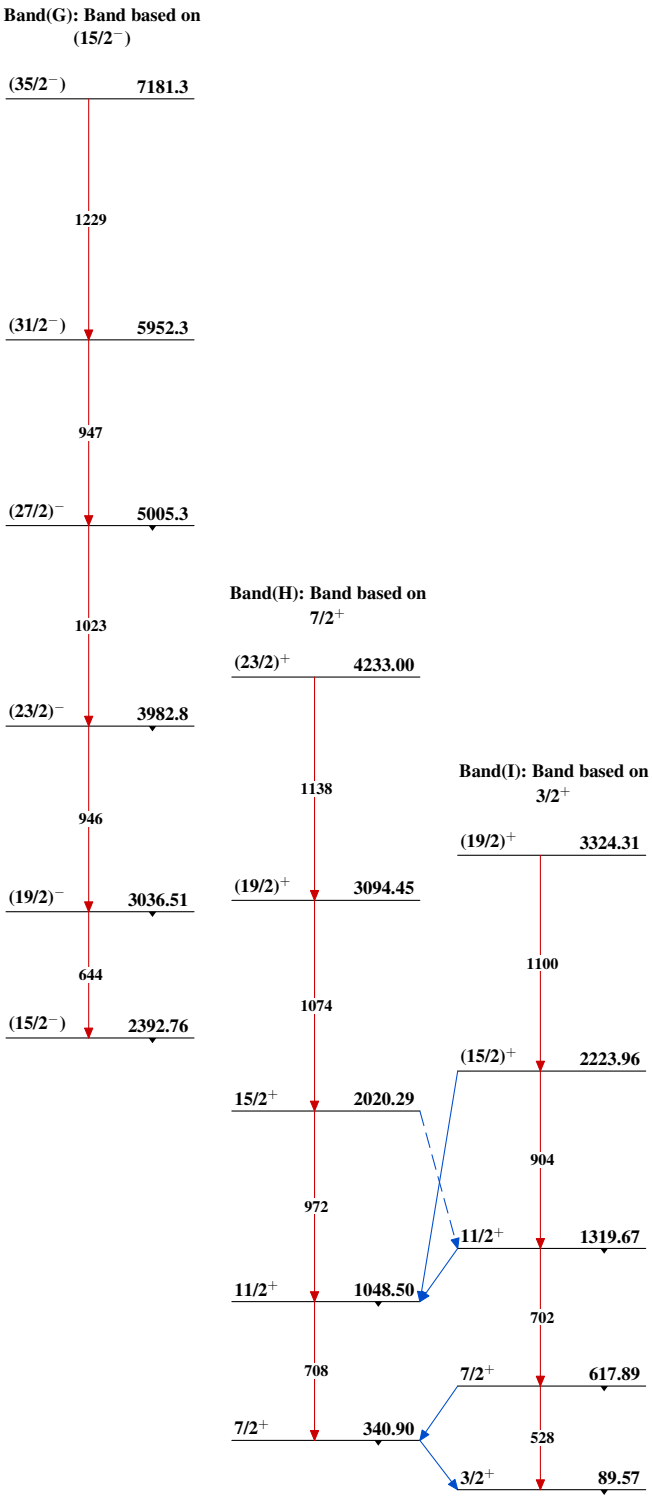


$^{99}_{44}Ru_{55}$

Adopted Levels, Gammas



Adopted Levels, Gammas (continued)



$^{99}_{44}Ru_{55}$