Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 114,1 (2013)	20-Oct-2012

Q(β^-)=4497 *6*; S(n)=7175 *6*; S(p)=9310 *6*; Q(α)=−5562 *7* 2012Wa38
Note: Current evaluation has used the following Q record 4496.5 54 *7174.6 55* 9310.1 *61* −5561.763 2011AuZZ.
S(2n)=13257.1 *55*, S(2p)=22398.6 *63* (2011AuZZ).
Values in 2003Au03: Q(β^-)=4497 *5*, S(n)=7175 *5*, S(p)=9309 *14*, Q(α)=−5527 *20*, S(2n)=13257 *5*, S(2p)=22434 *19*.
^{89}Rb isotope produced and identified in neutron fission of uranium by 1940Ha10 and 1940Gl05. Later studies of decay of ^{89}Rb isotope: 1956Ok06, 1969Ca03, 1972Eh02, 1973He01, 1997Gr09, and several others.
Mass measurements: 2002Ra23 (Penning trap), 1986Au02.
Theoretical calculations (isotope shifts, mean-square radii, etc.): 2010Ro03, 1996Ma57, 1987My01, 1984Kr06, 1980Ca23, 1979Kl03.
Additional information 1.

^{89}Rb Levels

Cross Reference (XREF) Flags

A	^{89}Kr β^- decay (3.15 min)	D	^{238}U(^{48}Ca,Xγ)
B	^{86}Kr(α,p)	E	^{238}U(^{82}Se,Xγ), ^{192}Os(^{82}Se,Xγ),
C	^{124}Sn(^{96}Zr,Xγ),^{176}Yb(^{36}S,Xγ)		

E(level)†	Jπ	$T_{1/2}$	XREF	Comments
0	3/2$^-$	15.32 min *10*	ABCDE	%β^-=100 μ=+2.3836 *7* (1981Th04,1989Ra17,2011StZZ) Q=+0.144 *26* (1981Th04,1989Ra17,2011StZZ) RMS charge radius: $(<r^2>)^{1/2}$=4.2420 fm *79* (2004An14 evaluation; and 2008 update available at http://cdfe.sinp.msu.ru). Jπ: spin from 1978Ek05 (hyperfine structure measurement by atomic-beam resonance method), parity from log $f^{1u}t$=10.2 to 7/2$^+$. $\sigma(\theta)$ in (α,p) is consistent with 3/2$^-$. $T_{1/2}$: from weighted average (using normalized-residuals method) of 15.60 min *9* (1972Eh02), 15.15 min *12* (1969Ca03), 14.9 min *3* (1956Ok06) and 15.4 min *2* (1940Gl05); reduced χ^2=2.6 with adjusted uncertainty of 0.16 min for value from 1972Eh02. Other averaging methods give: 15.39 min *13* (LWM method, χ^2=3.8) and 15.22 min *9* (Rajeval technique, χ^2=1.2 with adjusted uncertainty of 0.4 min for value from 1972Eh02). Other: 15.5 min (1940Ha10). μ: from hyperfine structure measurement of Rb by LASER spectroscopy (1981Th04). Others: 2.378 *4* (1979Ek02), 2.377 *5* (1979Kl03). Q: from hyperfine structure (1981Th04). Other: +0.16 *3* (1979Kl03).
220.948 *9*	5/2$^{(-)}$		ABCDE	XREF: B(227). Jπ: ΔJ=1, dipole γ to 3/2$^-$ from $\gamma\gamma(\theta)$ in (^{48}Ca,Xγ); 1/2 not allowed by anisotropic γ distribution; $\sigma(\theta)$ distribution in (α,p). Probable shell-model configuration= $\pi(p^4_{3/2},f^5_{5/2})\otimes\nu d^2_{5/2}$ (1973He01).
497.400 *17*	(1/2$^-$)		AB	XREF: B(500). Jπ: probable shell-model state with configuration= $\pi(p^2_{3/2},f^6_{5/2},p^1_{1/2})\otimes\nu d^2_{5/2}$ (1973He01).
577.07 *5*	(3/2,5/2,7/2$^-$)		Ab	XREF: b(600). Jπ: gammas to 3/2$^-$ and 5/2$^{(-)}$; γ from (5/2$^+$,7/2$^-$); log *ft*=7.6 from 3/2$^{(+)}$ disfavors 7/2$^+$. Possible weak 79.4γ to (1/2$^-$) disfavors 5/2$^+$,7/2$^-$.
586.00 *3*	7/2$^{(-)}$		AbCDE	XREF: b(600). Jπ: ΔJ=2 γ to 3/2$^-$; log *ft*=7.9 from 3/2$^{(+)}$.
867.11 *6*	(1/2 to 7/2$^-$)		AB	XREF: B(856). Jπ: γ to 3/2$^-$.

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Adopted Levels, Gammas (continued)

^{89}Rb Levels (continued)

E(level)†	Jπ	$T_{1/2}$	XREF	Comments
931.01 *5*	$(5/2^+,7/2^-)$		A CD	Jπ: γ to $3/2^-$; γ from $(9/2^+)$.
997.48 *5*	$(7/2^-)$		ABCDE	XREF: B(991). Jπ: γ to $3/2^-$. ΔJ=(0) γ to $7/2^{(-)}$; σ(θ) in (α,p) suggests 7/2,9/2.
1195.36‡ *5*	$(9/2^+)$	8 ns *2*	ABCDE	XREF: B(1186). Jπ: ΔJ=(2) γ to $(5/2^-)$; ΔJ=1 γ to $(7/2^-)$; nanosecond isomer from heavy-ion studies. log *ft*=7.9 from $3/2^{(+)}$ would be inconsistent. $T_{1/2}$: from analysis of the timing parameter in delayed coincidences between γ rays above and below the 1195.4,9/2^+ state in (^{48}Ca,Xγ) (2009Pa20). Others: 15.2 ns *28* (2010ToZY), few nanosecond in ^{238}U,^{192}Os(^{82}Se,Xγ) (2007Bu35). Note that value in 2010ToZY is almost twice as large as from 2009Pa20.
1324.35 *4*	$(3/2^-,5/2^-)$		A	Jπ: gammas to $3/2^-$, $(1/2^-)$ and $7/2^{(-)}$; log *ft*=7.4 from $3/2^{(+)}$.
1340.06 *18*	$(3/2^-,5/2,7/2^-)$		AB	XREF: B(1345). Jπ: gammas to $3/2^-$ and $7/2^{(-)}$; log *ft*=8.1 from $3/2^{(+)}$.
1488.31 *10*	$(3/2^-,5/2,7/2^-)$		A	Jπ: gammas to $3/2^-$ and $(7/2^-)$.
1530.24 *7*	$(3/2^-,5/2,7/2^-)$		AB	XREF: B(1515). Jπ: gammas to $3/2^-$ and $7/2^{(-)}$; log *ft*=7.35 from $3/2^{(+)}$.
1693.78 *4*	$(5/2^+)$		AB	XREF: B(1694). Jπ: gammas to $3/2^-$ and $(9/2^+)$. log *ft*=6.69 from $3/2^{(+)}$.
1821.69 *6*	$(5/2^+,7/2^-)$		AB	XREF: B(1833). Jπ: gammas to $5/2^{(-)}$ and $(9/2^+)$; log *ft*=7.9 from $3/2^{(+)}$.
1864.74 *8*	$(5/2^+)$		A	Jπ: gammas to $3/2^-$, $(1/2^-)$ and $(9/2^+)$; log *ft*=8.0 from $3/2^{(+)}$.
1998.55 *5*	$(3/2^-,5/2^-)$		AB	XREF: B(2004). Jπ: gammas to $3/2^-$, $(1/2^-)$ and $7/2^{(-)}$; log *ft*=7.15 from $3/2^{(+)}$.
2004.4‡ *3*	$(13/2^+)$		CDE	Jπ: ΔJ=2 γ to $(9/2^+)$.
2141.35 *15*	$(3/2^-,5/2,7/2^-)$		A	Jπ: gammas to $3/2^-$ and $7/2^{(-)}$.
2159.98 *4*	$(5/2^+)$		AB	XREF: B(2168). Jπ: gammas to $3/2^-$, $7/2^{(-)}$ and $(9/2^+)$; log *ft*=6.94 from $3/2^{(+)}$.
2218.71? *15*			A	
2269.7 *4*			A	Jπ: γ to $7/2^{(-)}$ suggests $3/2^-$ to $11/2^-$.
2365.25 *16*			A	Jπ: γ to $(5/2^+)$ suggests $1/2^+$ to $9/2^+$.
2387.98 *15*	$(1/2^-$ to $7/2^-)$		Ab	XREF: b(2395). Jπ: γ to $5/2^{(-)}$; log *ft*=7.8 from $3/2^{(+)}$.
2400.90 *5*	$1/2,3/2,5/2^{(-)}$		Ab	XREF: b(2395). Jπ: gamma to $(1/2^-)$; log *ft*=6.44 from $3/2^{(+)}$.
2512			B	
2598.10 *4*	$(3/2^-,5/2)$		AB	XREF: B(2614). Jπ: gamma to $7/2^{(-)}$; log *ft*=6.03 from $3/2^{(+)}$.
2782.04 *7*	$(3/2^-,5/2)$		A	Jπ: gammas to $7/2^{(-)}$ and $(5/2^+)$; log *ft*=6.83 from $3/2^{(+)}$.
2788.73 *25*	$(3/2^-,5/2,7/2^-)$		A	Jπ: gammas to $3/2^-$ and $(7/2^-)$; log *ft*=7.6 from $3/2^{(+)}$.
2840.4‡ *5*	$(17/2^+)$		BCDE	XREF: B(2842). Jπ: ΔJ=2 γ to $(13/2^+)$.
2866.13 *6*	$(3/2^-,5/2)$		A	Jπ: gammas to $3/2^-$ and $7/2^{(-)}$; log *ft*=6.32 from $3/2^{(+)}$.
3017.53 *11*	1/2,3/2,5/2		AB	XREF: B(3020). Jπ: log *ft*=7.0 from $3/2^{(+)}$.
3249.96 *20*			A	Jπ: γ to $5/2^{(-)}$ suggests $1/2^-$ to $9/2^-$.
3327.93 *8*	$(3/2^-,5/2)$		A	Jπ: γ to $7/2^{(-)}$; log *ft*=6.24 from $3/2^{(+)}$.
3361.40 *9*	$(3/2^-,5/2)$		A	Jπ: γ to $7/2^{(-)}$; log *ft*=6.31 from $3/2^{(+)}$.
3370.81 *9*	1/2,3/2,5/2		A	Jπ: log *ft*=6.20 from $3/2^{(+)}$.
3465.07 *20*	$(3/2^-,5/2)$		A	Jπ: γ to $7/2^{(-)}$; log *ft*=6.9 from $3/2^{(+)}$.
3532.88 *14*	$(3/2^-,5/2)$		A	Jπ: γ to $7/2^{(-)}$; log *ft*=6.16 from $3/2^{(+)}$.
3717.42 *13*	$(5/2^+)$		A	Jπ: γ to $(9/2^+)$; log *ft*=5.71 from $3/2^{(+)}$.

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Adopted Levels, Gammas (continued)

^{89}Rb Levels (continued)

E(level)[†]	Jπ	XREF	Comments
3719.95 *15*	(3/2⁻,5/2)	A	Jπ: γ to (7/2⁻); log *ft*=6.5 from 3/2(+).
3833.9 *3*	1/2,3/2,5/2	A	Jπ: log *ft*=6.5 from 3/2(+).
3898.8 *3*	1/2,3/2,5/2	A	Jπ: log *ft*=6.6 from 3/2(+); possible γ to (9/2⁺) favors 5/2⁺.
3965.54 *18*	1/2(+),3/2,5/2	A	Jπ: γ to (5/2⁺,7/2⁻); log *ft*=6.2 from 3/2(+).
3977.38 *21*	1/2,3/2,5/2	A	Jπ: log *ft*=6.3 from 3/2(+).
4032.7[‡] *6*	(21/2⁺)	CDE	Jπ: ΔJ=2 γ to (17/2⁺). Shell-model calculations predict two states of 19/2⁺ and 21/2⁺ close in energy.
4048.63 *15*	(3/2⁻,5/2)	A	Jπ: γ to 7/2(−); log *ft*=6.0 from 3/2(+).
4058.5? *3*		A	Jπ: γ to 5/2(−) suggests 1/2⁻ to 9/2⁻.
4080.90 *15*	(1/2⁺,3/2⁺,5/2⁺)	A	Jπ: log *ft*=5.81 from 3/2(+).
4143.89 *17*	(1/2⁺,3/2⁺,5/2⁺)	A	Jπ: log *ft*=5.7 from 3/2(+).
4198.6 *4*	1/2,3/2,5/2	A	Jπ: log *ft*=6.2 from 3/2(+).
4216.9 *4*	1/2,3/2,5/2	A	Jπ: log *ft*=6.17 from 3/2(+).
4230.7 *4*	1/2(+),3/2,5/2	A	Jπ: γ to (5/2⁺,7/2⁻); log *ft*=6.1 from 3/2(+).
4307.2 *4*	(3/2⁻,5/2)	A	Jπ: γ to 7/2(−); log *ft*=6.1 from 3/2(+).
4338.75 *21*	(3/2⁻,5/2)	A	Jπ: γ to (7/2⁻); log *ft*=6.0 from 3/2(+).
4340.5 *4*	(1/2⁺,3/2⁺,5/2⁺)	A	Jπ: log *ft*=5.87 from 3/2(+).
4367.37 *13*	(5/2⁺)	A	Jπ: gammas to 3/2⁻, 7/2(−) and (9/2⁺); log *ft*=5.38 from 3/2(+).
4404.62 *23*	(3/2⁺,5/2⁺)	A	Jπ: γ to 5/2(−); log *ft*=5.7 from 3/2(+).
4478.15 *22*	(1/2⁺,3/2⁺,5/2⁺)	A	Jπ: log *ft*=5.42 from 3/2(+).
4487.8 *4*	(5/2⁺)	A	Jπ: γ to 7/2(−); log *ft*=5.1 from 3/2(+).
4631.25 *16*	(5/2⁺)	A	Jπ: γ to 7/2(−); log *ft*=4.7 from 3/2(+).
4686.2? *5*	(1/2⁺,3/2⁺,5/2⁺)	A	Jπ: log *ft*=5.5 from 3/2(+).
5327.7[‡] *5*	(23/2⁺)	D	Jπ: γ to (21/2⁺); possible band assignment.
5605.9[‡] *4*	(25/2⁺)	CD	Jπ: γ to (21/2⁺); possible band assignment.
6699.6 *6*		D	
6704.8 *5*		D	
7391.3 *6*		D	

[†] From least-squares fit to Eγ data.
[‡] Band(A): $\pi g_{9/2}$ band,α=+1/2.

Adopted Levels, Gammas (continued)

γ(^{89}Rb)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.	α[@]	Comments
220.948	$5/2^{(-)}$	220.948 *9*	100	0	$3/2^-$	D		
497.400	$(1/2^-)$	497.383 *18*	100	0	$3/2^-$			
577.07	$(3/2,5/2,7/2^-)$	79.4[b] *5*	0.50 *7*	497.400	$(1/2^-)$			
		356.16 *9*	73 *4*	220.948	$5/2^{(-)}$			
		576.96 *10*	100 *6*	0	$3/2^-$			
586.00	$7/2^{(-)}$	364.88 *10*	5.4 *4*	220.948	$5/2^{(-)}$			
		586.03 *4*	100 *5*	0	$3/2^-$	Q		
867.11	(1/2 to $7/2^-$)	867.08 *7*	100	0	$3/2^-$			
931.01	$(5/2^+,7/2^-)$	345.03 *10*	100 *7*	586.00	$7/2^{(-)}$			
		354.1[b] *4*	11.4 *25*	577.07	$(3/2,5/2,7/2^-)$			
		710.05 *20*	66 *5*	220.948	$5/2^{(-)}$			
		930.95 *10*	53 *3*	0	$3/2^-$			
997.48	$(7/2^-)$	411.42 *10*	100 *6*	586.00	$7/2^{(-)}$	D		
		776.49 *20*	44 *7*	220.948	$5/2^{(-)}$			
		997.37 *10*	25.8 *16*	0	$3/2^-$			
1195.36	$(9/2^+)$	197.9 *2*	153 *31*	997.48	$(7/2^-)$	(E1)	0.0129	B(E1)(W.u.)=2.5×10^{-6} *9* Additional information 2.
		264.348 *14*	67 *4*	931.01	$(5/2^+,7/2^-)$			
		610.2 *7*	1.8 *10*	586.00	$7/2^{(-)}$	[E1]		B(E1)(W.u.)=1.0×10^{-9} *7*
		974.39 *10*	100 *6*	220.948	$5/2^{(-)}$	(M2)[#]		B(M2)(W.u.)=0.067 *19*
		1195.1 *3*	8.6 *14*	0	$3/2^-$	[E3]		B(E3)(W.u.)=2.4 *8*
1324.35	$(3/2^-,5/2^-)$	738.39 *7*	100 *5*	586.00	$7/2^{(-)}$			
		747.4 *3*	2.7 *6*	577.07	$(3/2,5/2,7/2^-)$			
		826.75 *10*	18.1 *14*	497.400	$(1/2^-)$			
		1103.18 *20*	21.4 *14*	220.948	$5/2^{(-)}$			
		1324.28 *7*	73 *4*	0	$3/2^-$			
1340.06	$(3/2^-,5/2,7/2^-)$	753.5 *4*	23 *6*	586.00	$7/2^{(-)}$			
		763.3 *3*	100 *20*	577.07	$(3/2,5/2,7/2^-)$			
		1340.6 *3*	49 *6*	0	$3/2^-$			
1488.31	$(3/2^-,5/2,7/2^-)$	490.76 *20*	100 *13*	997.48	$(7/2^-)$			
		557.30 *20*	50 *5*	931.01	$(5/2^+,7/2^-)$			
		1267.2 *6*	7 *6*	220.948	$5/2^{(-)}$			
		1488.1 *4*	29 *6*	0	$3/2^-$			
1530.24	$(3/2^-,5/2,7/2^-)$	662.9 *4*	2.4 *5*	867.11	(1/2 to $7/2^-$)			
		944.19 *15*	4.9 *5*	586.00	$7/2^{(-)}$			
		953.18 *20*	3.2 *5*	577.07	$(3/2,5/2,7/2^-)$			
		1308.9 *3*	2.0 *4*	220.948	$5/2^{(-)}$			
		1530.04 *15*	100 *6*	0	$3/2^-$			
1693.78	$(5/2^+)$	205.03 *20*	1.8 *4*	1488.31	$(3/2^-,5/2,7/2^-)$			

$^{89}_{37}Rb_{52}$-4

Adopted Levels, Gammas (continued)

γ(^{89}Rb) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.
1693.78	(5/2$^+$)	369.30 *10*	20.1 *12*	1324.35	(3/2$^-$,5/2$^-$)	
		498.6 *2*	17 *3*	1195.36	(9/2$^+$)	
		696.24 *10*	25.9 *17*	997.48	(7/2$^-$)	
		762.7 *5*	13.4 *17*	931.01	(5/2$^+$,7/2$^-$)	
		1107.78 *10*	42 *3*	586.00	7/2$^{(-)}$	
		1116.61 *7*	24.1 *15*	577.07	(3/2,5/2,7/2$^-$)	
		1472.76 *10*	100 *6*	220.948	5/2$^{(-)}$	
		1693.70 *10*	64 *4*	0	3/2$^-$	
1821.69	(5/2$^+$,7/2$^-$)	626.20 *10*	100 *7*	1195.36	(9/2$^+$)	
		891.0[b] *10*	83 *23*	931.01	(5/2$^+$,7/2$^-$)	
		1235.62 *10*	99 *8*	586.00	7/2$^{(-)}$	
		1600.7 *3*	12.0 *23*	220.948	5/2$^{(-)}$	
1864.74	(5/2$^+$)	668.6 *6*	12 *4*	1195.36	(9/2$^+$)	
		934.6 *5*	11 *4*	931.01	(5/2$^+$,7/2$^-$)	
		1278.5 *8*	9 *5*	586.00	7/2$^{(-)}$	
		1367.48 *20*	44 *5*	497.400	(1/2$^-$)	[M2]
		1643.82 *10*	100 *8*	220.948	5/2$^{(-)}$	
		1865.2 *5*	24 *4*	0	3/2$^-$	
1998.55	(3/2$^-$,5/2$^-$)	304.7 *7*	1.7 *9*	1693.78	(5/2$^+$)	
		468.4[b] *6*	7.3 *18*	1530.24	(3/2$^-$,5/2,7/2$^-$)	
		674.11 *20*	17.6 *17*	1324.35	(3/2$^-$,5/2$^-$)	
		1067.7 *4*	5.2 *12*	931.01	(5/2$^+$,7/2$^-$)	
		1131.51 *20*	12.1 *17*	867.11	(1/2 to 7/2$^-$)	
		1412.59 *15*	20.0 *17*	586.00	7/2$^{(-)}$	
		1421.64 *20*	17.0 *15*	577.07	(3/2,5/2,7/2$^-$)	
		1500.96 *10*	100 *8*	497.400	(1/2$^-$)	
		1777.60 *10*	58 *5*	220.948	5/2$^{(-)}$	
		1998.6 *5*	8.9 *17*	0	3/2$^-$	
2004.4	(13/2$^+$)	809.1 *2*	100	1195.36	(9/2$^+$)	Q
2141.35	(3/2$^-$,5/2,7/2$^-$)	1555.28 *20*	100 *12*	586.00	7/2$^{(-)}$	
		2140.5 *6*	41 *8*	0	3/2$^-$	
2159.98	(5/2$^+$)	295.5 *7*	1.5 *11*	1864.74	(5/2$^+$)	
		338.20 *10*	31.1 *25*	1821.69	(5/2$^+$,7/2$^-$)	
		466.13 *10*	73 *6*	1693.78	(5/2$^+$)	
		629.75 *20*	31.1 *24*	1530.24	(3/2$^-$,5/2,7/2$^-$)	
		835.53 *10*	100 *7*	1324.35	(3/2$^-$,5/2$^-$)	
		964.2 *4*	5.3 *13*	1195.36	(9/2$^+$)	
		1162.50 *10*	19.5 *18*	997.48	(7/2$^-$)	
		1228.8 *3*	13.1 *16*	931.01	(5/2$^+$,7/2$^-$)	
		1573.78 *20*	17.3 *16*	586.00	7/2$^{(-)}$	

$^{89}_{37}Rb_{52}$-5

Adopted Levels, Gammas (continued)

γ(^{89}Rb) (continued)

E_i(level)	J_i^π	E_γ †	I_γ †	E_f	J_f^π
2159.98	(5/2$^+$)	1582.9 *3*	8.2 *13*	577.07	(3/2,5/2,7/2$^-$)
		1939.11 *15*	58 *4*	220.948	5/2$^{(-)}$
		2160.02 *9*	48 *3*	0	3/2$^-$
2218.71?		1721.29&b *15*	100&	497.400	(1/2$^-$)
2269.7		1683.8 *4*	100	586.00	7/2$^{(-)}$
2365.25		671.40 *20*	100 *19*	1693.78	(5/2$^+$)
		1788.2 *3*	100 *15*	577.07	(3/2,5/2,7/2$^-$)
2387.98	(1/2$^-$ to 7/2$^-$)	523.5 *4*	24 *9*	1864.74	(5/2$^+$)
		1048.2 *3*	44 *9*	1340.06	(3/2$^-$,5/2,7/2$^-$)
		1063.1 *4*	50 *11*	1324.35	(3/2$^-$,5/2$^-$)
		1810.73 *20*	100 *11*	577.07	(3/2,5/2,7/2$^-$)
		2167.9b *6*	30 *10*	220.948	5/2$^{(-)}$
2400.90	1/2,3/2,5/2$^{(-)}$	242.2 *11*	0.23 *16*	2159.98	(5/2$^+$)
		402.25 *20*	6.2 *7*	1998.55	(3/2$^-$,5/2$^-$)
		707.01 *20*	9.7 *7*	1693.78	(5/2$^+$)
		870.42 *20*	3.1 *4*	1530.24	(3/2$^-$,5/2,7/2$^-$)
		1076.48 *20*	4.6 *5*	1324.35	(3/2$^-$,5/2$^-$)
		1533.68 *15*	100 *6*	867.11	(1/2 to 7/2$^-$)
		1823.6 *4*	1.3 *3*	577.07	(3/2,5/2,7/2$^-$)
		1903.40 *10*	20.3 *20*	497.400	(1/2$^-$)
		2400.99 *9*	14.1 *12*	0	3/2$^-$
2598.10	(3/2$^-$,5/2)	197.1 *3*	7.0 *14*	2400.90	1/2,3/2,5/2$^{(-)}$
		438.08 *10*	13.4 *8*	2159.98	(5/2$^+$)
		599.52 *20*	1.23 *17*	1998.55	(3/2$^-$,5/2$^-$)
		904.27 *7*	100 *6*	1693.78	(5/2$^+$)
		1273.73 *10*	18.9 *11*	1324.35	(3/2$^-$,5/2$^-$)
		1729.9b *6*	0.42 *17*	867.11	(1/2 to 7/2$^-$)
		2012.23 *10*	21.7 *14*	586.00	7/2$^{(-)}$
		2021.04 *15*	3.4 *3*	577.07	(3/2,5/2,7/2$^-$)
		2100.63 *8*	13.1 *8*	497.400	(1/2$^-$)
		2377.4 *9*	11.1 *8*	220.948	5/2$^{(-)}$
		2597.92 *20*	1.50 *22*	0	3/2$^-$
2782.04	(3/2$^-$,5/2)	380.7 *3*	6.1 *16*	2400.90	1/2,3/2,5/2$^{(-)}$
		783.5 *9*	2.9 *18*	1998.55	(3/2$^-$,5/2$^-$)
		917.78 *20*	9.7 *16*	1864.74	(5/2$^+$)
		1088.07 *10*	47 *4*	1693.78	(5/2$^+$)
		1251.0& *7*	5.0& *21*	1530.24	(3/2$^-$,5/2,7/2$^-$)
		1458.3 *7*	10 *3*	1324.35	(3/2$^-$,5/2$^-$)
		1850.6 *4*	6.6 *16*	931.01	(5/2$^+$,7/2$^-$)
		2195.8 *4*	16 *8*	586.00	7/2$^{(-)}$

$^{89}_{37}Rb_{52}$-6

Adopted Levels, Gammas (continued)

γ(^{89}Rb) (continued)

E_i(level)	J_i^π	E_γ †	I_γ †	E_f	J_f^π	Mult.
2782.04	(3/2$^-$,5/2)	2782.11 *10*	100 *8*	0	3/2$^-$	
2788.73	(3/2$^-$,5/2,7/2$^-$)	1464.2 *3*	100 *14*	1324.35	(3/2$^-$,5/2$^-$)	
		1791.4 *6*	26 *8*	997.48	(7/2$^-$)	
		2789.2 *6*	29 *10*	0	3/2$^-$	
2840.4	(17/2$^+$)	836.0 *2*	100	2004.4	(13/2$^+$)	Q
2866.13	(3/2$^-$,5/2)	83.4[b] *6*	0.69 *23*	2782.04	(3/2$^-$,5/2)	
		267.7 *3*	4.8 *10*	2598.10	(3/2$^-$,5/2)	
		465.4[b] *5*	13.8 *23*	2400.90	1/2,3/2,5/2$^{(-)}$	
		1044.40 *10*	23.5 *16*	1821.69	(5/2$^+$,7/2$^-$)	
		1172.33 *20*	56 *5*	1693.78	(5/2$^+$)	
		1335.4 *3*	7.6 *15*	1530.24	(3/2$^-$,5/2,7/2$^-$)	
		1868.47 *25*	11.3 *10*	997.48	(7/2$^-$)	
		1935.1 *6*	2.0 *7*	931.01	(5/2$^+$,7/2$^-$)	
		2280.2 *3*	11.7 *23*	586.00	7/2$^{(-)}$	
		2645.26 *15*	24.1 *17*	220.948	5/2$^{(-)}$	
		2866.23 *10*	100 *6*	0	3/2$^-$	
3017.53	1/2,3/2,5/2	419.2 *3*	13 *4*	2598.10	(3/2$^-$,5/2)	
		857.37 *15*	100 *8*	2159.98	(5/2$^+$)	
		1152.2 *4*	22 *6*	1864.74	(5/2$^+$)	
		1692.0 *12*	91 *35*	1324.35	(3/2$^-$,5/2$^-$)	
		2150.1 *8*	7 *4*	867.11	(1/2 to 7/2$^-$)	
		2440.9 *4*	16 *6*	577.07	(3/2,5/2,7/2$^-$)	
		3017.9 *3*	89 *10*	0	3/2$^-$	
3249.96		652.6 *5*	14 *5*	2598.10	(3/2$^-$,5/2)	
		1251.0[&b] *7*	14[&] *6*	1998.55	(3/2$^-$,5/2$^-$)	
		1925.3 *9*	6 *4*	1324.35	(3/2$^-$,5/2$^-$)	
		3029.16 *25*	100 *9*	220.948	5/2$^{(-)}$	
3327.93	(3/2$^-$,5/2)	729.63 *20*	36 *4*	2598.10	(3/2$^-$,5/2)	
		1058.6 *8*	3.7 *20*	2269.7		
		1167.4 *6*	4.2 *17*	2159.98	(5/2$^+$)	
		1186.54 *20*	22.4 *22*	2141.35	(3/2$^-$,5/2,7/2$^-$)	
		1506.2 *3*	13.7 *24*	1821.69	(5/2$^+$,7/2$^-$)	
		1634.06 *10*	100 *7*	1693.78	(5/2$^+$)	
		1839.72 *25*	43 *4*	1488.31	(3/2$^-$,5/2,7/2$^-$)	
		2330.0 *8*	4.4 *17*	997.48	(7/2$^-$)	
		2742.3 *8*	3.4 *15*	586.00	7/2$^{(-)}$	
		2750.9 *3*	15.1 *17*	577.07	(3/2,5/2,7/2$^-$)	
		3107.26 *25*	23.7 *22*	220.948	5/2$^{(-)}$	
3361.40	(3/2$^-$,5/2)	960.42 *10*	31.0 *25*	2400.90	1/2,3/2,5/2$^{(-)}$	
		1200.6 *11*	1.7 *12*	2159.98	(5/2$^+$)	

$^{89}_{37}Rb_{52}$-7

Adopted Levels, Gammas (continued)

γ(^{89}Rb) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π
3361.40	(3/2$^-$,5/2)	1667.51 *20*	12.3 *14*	1693.78	(5/2$^+$)
		1831.3 *3*	8.3 *12*	1530.24	(3/2$^-$,5/2,7/2$^-$)
		2775.7 *11*	2.9 *19*	586.00	7/2$^{(-)}$
		3361.70 *20*	100 *8*	0	3/2$^-$
3370.81	1/2,3/2,5/2	969.7 *3*	13.8 *21*	2400.90	1/2,3/2,5/2$^{(-)}$
		1210.2 *9*	3.2 *21*	2159.98	(5/2$^+$)
		1372.16 *20*	18.5 *24*	1998.55	(3/2$^-$,5/2$^-$)
		1676.9 *3*	21 *3*	1693.78	(5/2$^+$)
		2046.47 *15*	39 *3*	1324.35	(3/2$^-$,5/2$^-$)
		2503.0 *5*	7.4 *18*	867.11	(1/2 to 7/2$^-$)
		2793.75 *20*	100 *6*	577.07	(3/2,5/2,7/2$^-$)
		2873.8[&] *4*	14[&] *3*	497.400	(1/2$^-$)
		3371.1 *4*	91 *9*	0	3/2$^-$
3465.07	(3/2$^-$,5/2)	1977.7 *5*	12 *4*	1488.31	(3/2$^-$,5/2,7/2$^-$)
		2467.3 *11*	5 *3*	997.48	(7/2$^-$)
		2878.69 *25*	100 *9*	586.00	7/2$^{(-)}$
3532.88	(3/2$^-$,5/2)	1710.7 *6*	2.5 *9*	1821.69	(5/2$^+$,7/2$^-$)
		2001.6 *9*	2.7 *12*	1530.24	(3/2$^-$,5/2,7/2$^-$)
		2534.9 *3*	7.0 *10*	997.48	(7/2$^-$)
		2946.9 *4*	5.8 *10*	586.00	7/2$^{(-)}$
		3532.88 *20*	100 *6*	0	3/2$^-$
3717.42	(5/2$^+$)	1119.6[b] *7*	37 *10*	2598.10	(3/2$^-$,5/2)
		2522.0 *5*	4.8 *12*	1195.36	(9/2$^+$)
		3140.26 *20*	100 *8*	577.07	(3/2,5/2,7/2$^-$)
		3219.84 *20*	41 *3*	497.400	(1/2$^-$)
		3717.8 *4*	81 *6*	0	3/2$^-$
3719.95	(3/2$^-$,5/2)	1721.29[&b] *15*	93[&] *8*	1998.55	(3/2$^-$,5/2$^-$)
		1897.8 *7*	13 *5*	1821.69	(5/2$^+$,7/2$^-$)
		2190.0 *9*	11 *6*	1530.24	(3/2$^-$,5/2,7/2$^-$)
		2721.9 *7*	15 *6*	997.48	(7/2$^-$)
		2853.3 *3*	100 *14*	867.11	(1/2 to 7/2$^-$)
3833.9	1/2,3/2,5/2	1468.5[&b] *3*	360[&] *50*	2365.25	
		2510.8[b] *20*	4.6×10^2 *19*	1324.35	(3/2$^-$,5/2$^-$)
		3257.0 *5*	100 *23*	577.07	(3/2,5/2,7/2$^-$)
3898.8	1/2,3/2,5/2	2703.2[b] *9*	49 *20*	1195.36	(9/2$^+$)
		3321.9 *5*	100 *23*	577.07	(3/2,5/2,7/2$^-$)
		3677.7 *4*	94 *17*	220.948	5/2$^{(-)}$
		3898.4 *10*	49 *26*	0	3/2$^-$
3965.54	1/2$^{(+)}$,3/2,5/2	716.2[b] *5*	125 *29*	3249.96	

$^{89}_{37}Rb_{52}$-8

Adopted Levels, Gammas (continued)

γ(^{89}Rb) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.
3965.54	1/2$^{(+)}$,3/2,5/2	1804.4[b] *6*	14 *6*	2159.98	(5/2$^+$)	
		2143.8 *4*	31 *6*	1821.69	(5/2$^+$,7/2$^-$)	
		3098.8 *7*	18 *6*	867.11	(1/2 to 7/2$^-$)	
		3965.5 *4*	100 *8*	0	3/2$^-$	
3977.38	1/2,3/2,5/2	1707.9 *8*	9 *4*	2269.7		
		3399.9 *3*	50 *5*	577.07	(3/2,5/2,7/2$^-$)	
		3756.5 *13*	6 *4*	220.948	5/2$^{(-)}$	
		3977.5[a] *4*	100[a] *19*	0	3/2$^-$	
4032.7	(21/2$^+$)	1192.9 *3*	100	2840.4	(17/2$^+$)	Q
4048.63	(3/2$^-$,5/2)	687.3 *4*	42 *11*	3361.40	(3/2$^-$,5/2)	
		1182.38 *20*	100 *13*	2866.13	(3/2$^-$,5/2)	
		3463.3 *12*	25 *15*	586.00	7/2$^{(-)}$	
		3827.4 *4*	83 *10*	220.948	5/2$^{(-)}$	
		4048.0 *5*	70 *7*	0	3/2$^-$	
4058.5?		1657.6[b] *5*	49 *15*	2400.90	1/2,3/2,5/2$^{(-)}$	
		3837.6 *5*	100 *12*	220.948	5/2$^{(-)}$	
4080.90	(1/2$^+$,3/2$^+$,5/2$^+$)	546.9 *5*	12 *5*	3532.88	(3/2$^-$,5/2)	
		1298.0 *5*	17 *5*	2782.04	(3/2$^-$,5/2)	
		1481.9 *6*	17 *8*	2598.10	(3/2$^-$,5/2)	
		1680.3 *5*	32 *8*	2400.90	1/2,3/2,5/2$^{(-)}$	
		2082.5 *5*	22 *5*	1998.55	(3/2$^-$,5/2$^-$)	
		2549.9 *9*	12 *5*	1530.24	(3/2$^-$,5/2,7/2$^-$)	
		2756.6 *5*	26 *5*	1324.35	(3/2$^-$,5/2$^-$)	
		3503.6 *14*	8 *5*	577.07	(3/2,5/2,7/2$^-$)	
		3583.9 *3*	100 *8*	497.400	(1/2$^-$)	
		4081.4 *5*	29 *4*	0	3/2$^-$	
4143.89	(1/2$^+$,3/2$^+$,5/2$^+$)	1545.2[b] *15*	24 *15*	2598.10	(3/2$^-$,5/2)	
		2321.7 *5*	13 *3*	1821.69	(5/2$^+$,7/2$^-$)	
		2804.1[b] *8*	10 *4*	1340.06	(3/2$^-$,5/2,7/2$^-$)	
		2819.58 *25*	32 *4*	1324.35	(3/2$^-$,5/2$^-$)	
		3213.2 *9*	8 *3*	931.01	(5/2$^+$,7/2$^-$)	
		3567.9 *7*	14 *4*	577.07	(3/2,5/2,7/2$^-$)	
		3923.0 *4*	100 *7*	220.948	5/2$^{(-)}$	
		4143.0 *12*	6.3 *19*	0	3/2$^-$	
4198.6	1/2,3/2,5/2	2335.2[b] *20*	143 *86*	1864.74	(5/2$^+$)	
		2858.9[b] *15*	77 *11*	1340.06	(3/2$^-$,5/2,7/2$^-$)	
		3977.5[a] *4*	100[a] *17*	220.948	5/2$^{(-)}$	
4216.9	1/2,3/2,5/2	3639.1 *8*	27 *9*	577.07	(3/2,5/2,7/2$^-$)	
		3996.0 *4*	100 *9*	220.948	5/2$^{(-)}$	

$^{89}_{37}Rb_{52}$-9

Adopted Levels, Gammas (continued)

γ(^{89}Rb) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π
4230.7	1/2$^{(+)}$,3/2,5/2	2232.6 *8*	17 *7*	1998.55	(3/2$^-$,5/2$^-$)
		3300.0 *6*	28 *9*	931.01	(5/2$^+$,7/2$^-$)
		3732.5 *6*	100 *36*	497.400	(1/2$^-$)
4307.2	(3/2$^-$,5/2)	1441.3 *8*	42 *21*	2866.13	(3/2$^-$,5/2)
		3439.6 *6*	92 *25*	867.11	(1/2 to 7/2$^-$)
		3721.5 *9*	100 *42*	586.00	7/2$^{(-)}$
		3809.5 *8*	42 *17*	497.400	(1/2$^-$)
		4307.4 *11*	21 *13*	0	3/2$^-$
4338.75	(3/2$^-$,5/2)	1010.84 *20*	100 *13*	3327.93	(3/2$^-$,5/2)
		3340.8 *9*	33 *13*	997.48	(7/2$^-$)
		4117.7 *11*	13 *6*	220.948	5/2$^{(-)}$
4340.5	(1/2$^+$,3/2$^+$,5/2$^+$)	3842.7 *4*	100 *11*	497.400	(1/2$^-$)
		4341.1 *6*	95 *9*	0	3/2$^-$
4367.37	(5/2$^+$)	286.3 *4*	20 *6*	4080.90	(1/2$^+$,3/2$^+$,5/2$^+$)
		318.3 *3*	33 *11*	4048.63	(3/2$^-$,5/2)
		1966.55 *20*	100 *11*	2400.90	1/2,3/2,5/2$^{(-)}$
		2207.2 *5*	35 *11*	2159.98	(5/2$^+$)
		2545.4 *6*	38 *11*	1821.69	(5/2$^+$,7/2$^-$)
		3172.1 *3*	76 *11*	1195.36	(9/2$^+$)
		3781.4 *4*	100 *9*	586.00	7/2$^{(-)}$
		4146.9 *13*	12 *6*	220.948	5/2$^{(-)}$
		4368.4 *8*	32 *5*	0	3/2$^-$
4404.62	(3/2$^+$,5/2$^+$)	939.4 *3*	100 *21*	3465.07	(3/2$^-$,5/2)
		2039.5 *10*	27 *15*	2365.25	
		2873.8[&] *4*	145[&] *27*	1530.24	(3/2$^-$,5/2,7/2$^-$)
		2917.4 *7*	45 *15*	1488.31	(3/2$^-$,5/2,7/2$^-$)
		4184.3 *6*	76 *12*	220.948	5/2$^{(-)}$
		4405.1 *12*	12 *6*	0	3/2$^-$
4478.15	(1/2$^+$,3/2$^+$,5/2$^+$)	1461.3 *5*	77 *15*	3017.53	1/2,3/2,5/2
		1879.80 *25*	100 *10*	2598.10	(3/2$^-$,5/2)
		3154.4 *10*	17 *9*	1324.35	(3/2$^-$,5/2$^-$)
		4478.3 *9*	8.9 *25*	0	3/2$^-$
4487.8	(5/2$^+$)	428.5[b] *4*	81 *19*	4058.5?	
		509.1[b] *5*	113 *30*	3977.38	1/2,3/2,5/2
		1115.0[b] *8*	120 *45*	3370.81	1/2,3/2,5/2
		1468.5[&‡] *3*	140[&] *19*	3017.53	1/2,3/2,5/2
		2622.8 *10*	16 *9*	1864.74	(5/2$^+$)
		2998.4 *6*	33 *9*	1488.31	(3/2$^-$,5/2,7/2$^-$)
		3901.7 *4*	100 *15*	586.00	7/2$^{(-)}$

$^{89}_{37}Rb_{52}$-10

Adopted Levels, Gammas (continued)

γ(^{89}Rb) (continued)

E_i(level)	J_i^π	E_γ †	I_γ †	E_f	J_f^π
4487.8	(5/2$^+$)	4267.7 *6*	21 *5*	220.948	5/2$^{(-)}$
		4489.2 *8*	100 *9*	0	3/2$^-$
4631.25	(5/2$^+$)	488.5 *6*	68 *30*	4143.89	(1/2$^+$,3/2$^+$,5/2$^+$)
		665.72 *20*	100 *14*	3965.54	1/2$^{(+)}$,3/2,5/2
		1098.1 *5*	56 *21*	3532.88	(3/2$^-$,5/2)
		1302.7 *3*	88 *12*	3327.93	(3/2$^-$,5/2)
		1381.9 *5*	51 *14*	3249.96	
		1766.1 *4*	42 *11*	2866.13	(3/2$^-$,5/2)
		2487.8 *8*	21 *9*	2141.35	(3/2$^-$,5/2,7/2$^-$)
		2630.1[b] *15*	121 *40*	1998.55	(3/2$^-$,5/2$^-$)
		3634.4 *9*	33 *10*	997.48	(7/2$^-$)
		4043.8 *10*	18 *7*	586.00	7/2$^{(-)}$
		4631.5 *8*	25 *5*	0	3/2$^-$
4686.2?	(1/2$^+$,3/2$^+$,5/2$^+$)	542.2 *5*	65 *26*	4143.89	(1/2$^+$,3/2$^+$,5/2$^+$)
		2285.6 *8*	100 *44*	2400.90	1/2,3/2,5/2$^{(-)}$
		4685.6 *12*	17 *9*	0	3/2$^-$
5327.7	(23/2$^+$)	1294.1 *3*	100	4032.7	(21/2$^+$)
5605.9	(25/2$^+$)	1572.3 *2*	100	4032.7	(21/2$^+$)
6699.6		1371.9 *3*	100	5327.7	(23/2$^+$)
6704.8		1098.9 *3*	100	5605.9	(25/2$^+$)
7391.3		686.5 *3*	100	6704.8	

† Primarily from ^{89}Kr β^- decay. Weighted averages taken when data from in-beam γ-ray studies are available.
‡ Poor fit. Level energy difference=1470.3 *4*.
# ΔJ=2, Q from γγ(θ) in (^{48}Ca,Xγ), ΔJ^π requires M2.
@ 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.

$^{89}_{37}Rb_{52}$-11

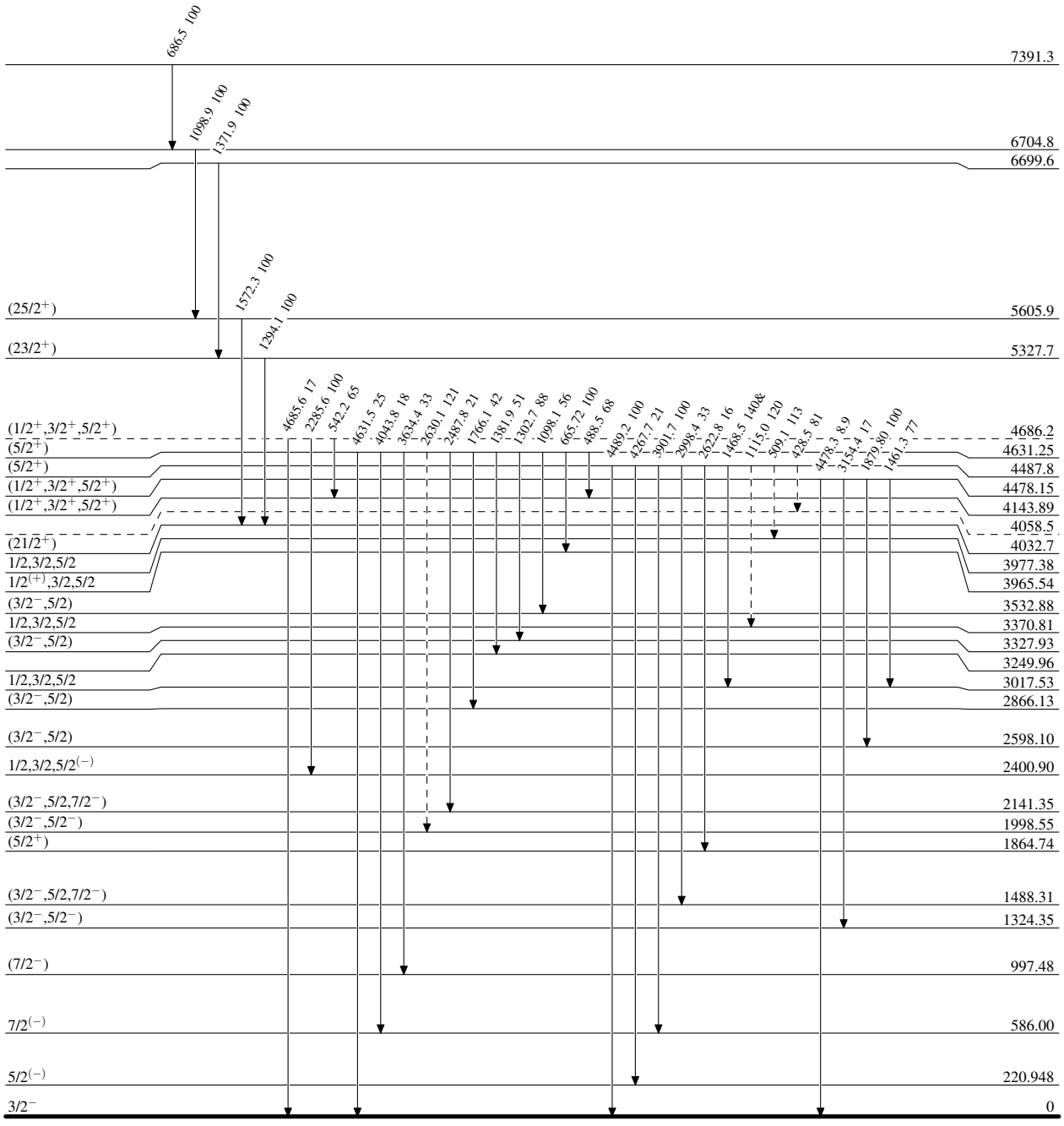
Adopted Levels, Gammas

Legend

Level Scheme

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

γ Decay (Uncertain)

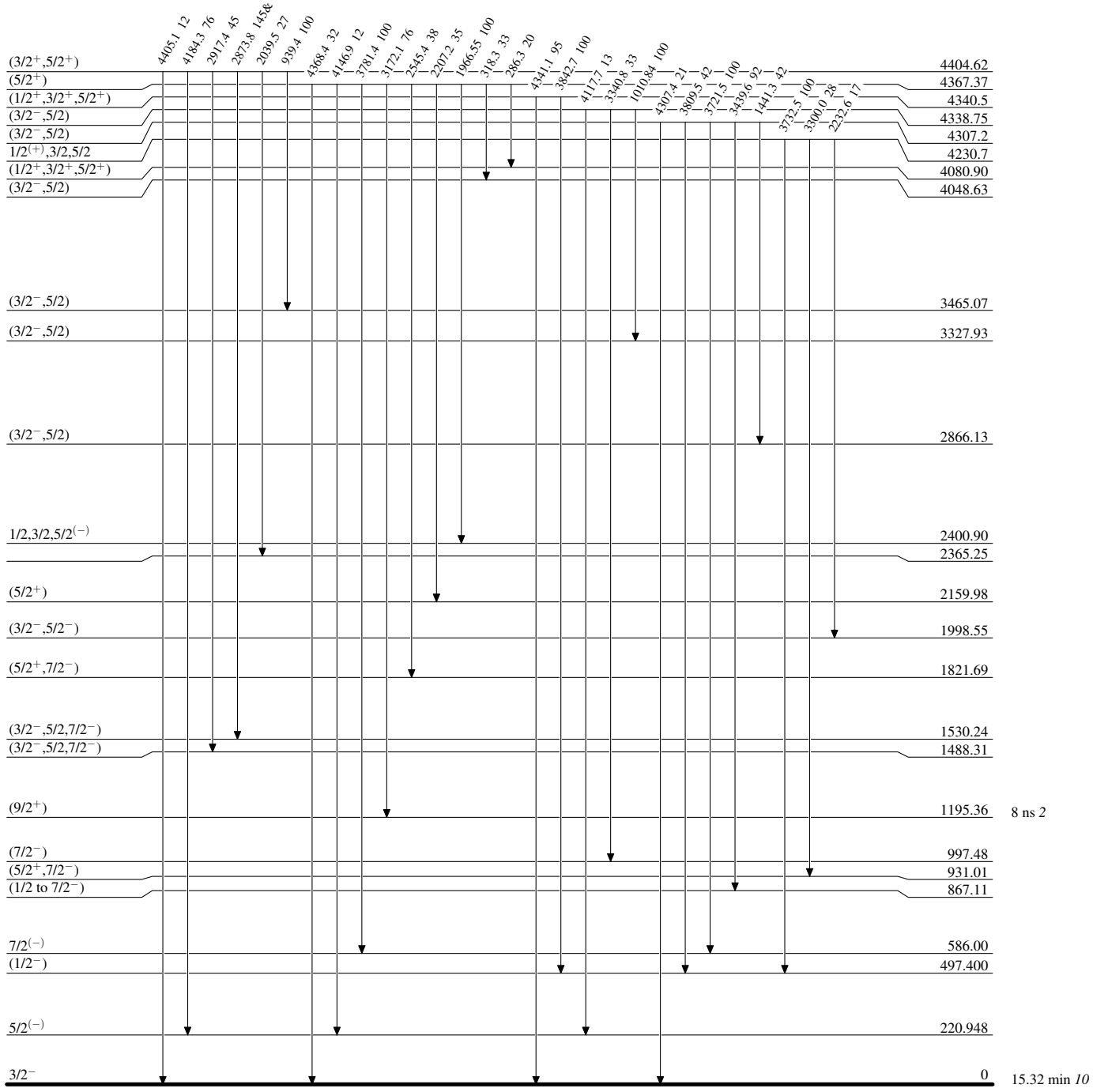


$^{89}_{37}Rb_{52}$

Adopted Levels, Gammas

Level Scheme (continued)

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



$^{89}_{37}Rb_{52}$

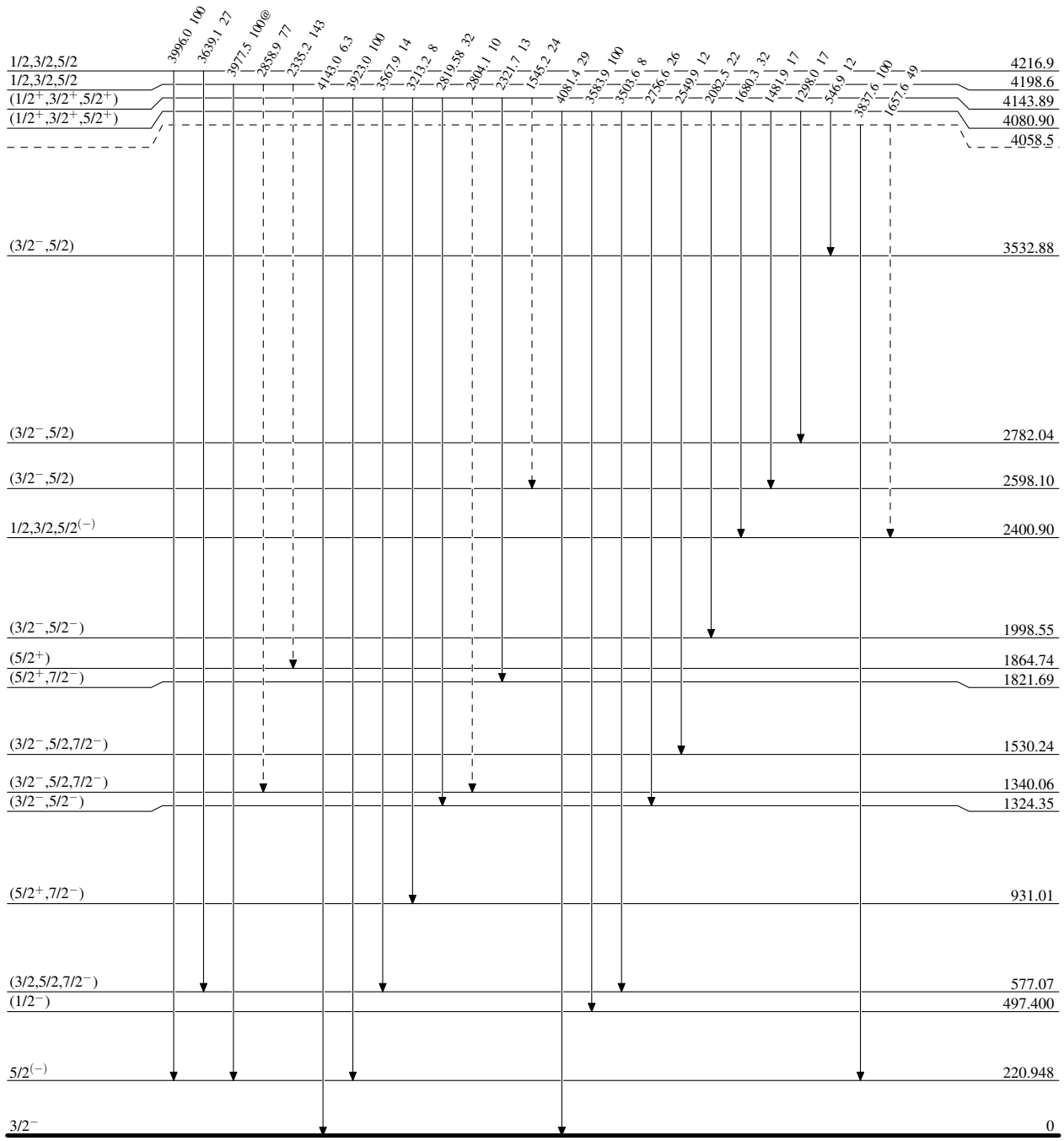
Adopted Levels, Gammas

Level Scheme (continued)

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

Legend

- - - - - - ► γ Decay (Uncertain)



$^{89}_{37}Rb_{52}$

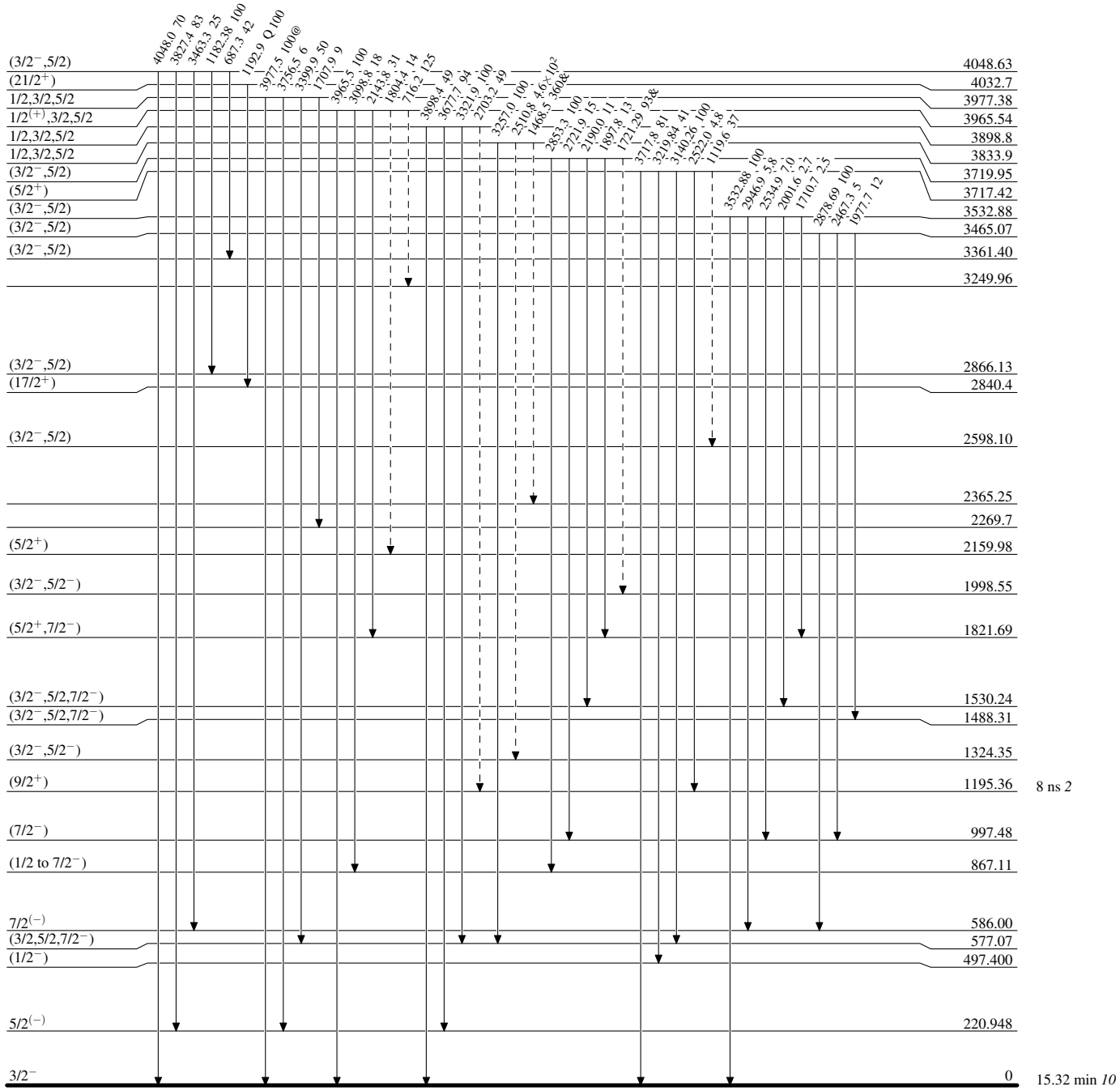
Adopted Levels, Gammas

Level Scheme (continued)

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

Legend

- - - - - - ► γ Decay (Uncertain)



$^{89}_{37}Rb_{52}$

Adopted Levels, Gammas

Level Scheme (continued)

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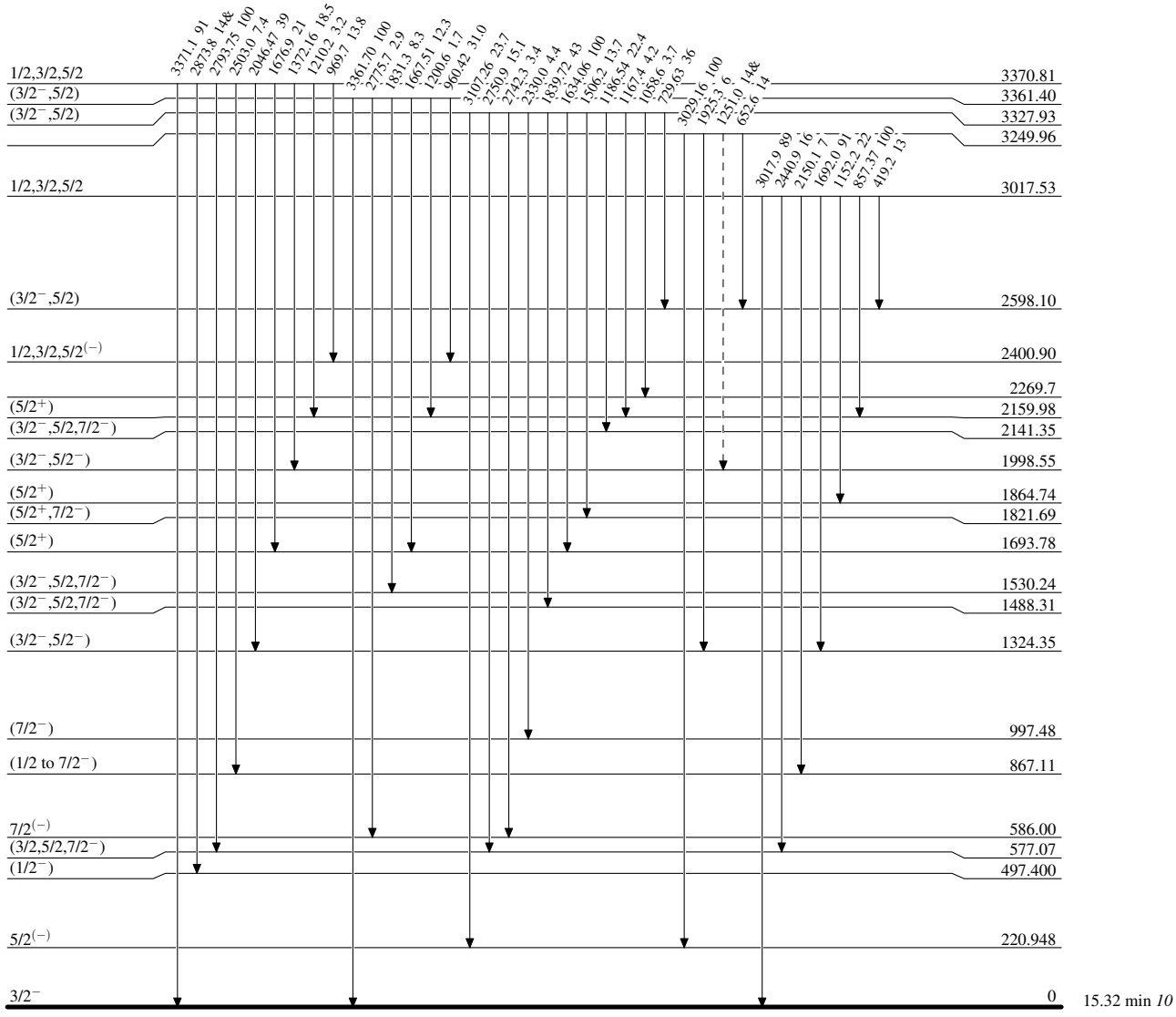
Legend

- - - - - - ► γ Decay (Uncertain)



$^{89}_{37}Rb_{52}$

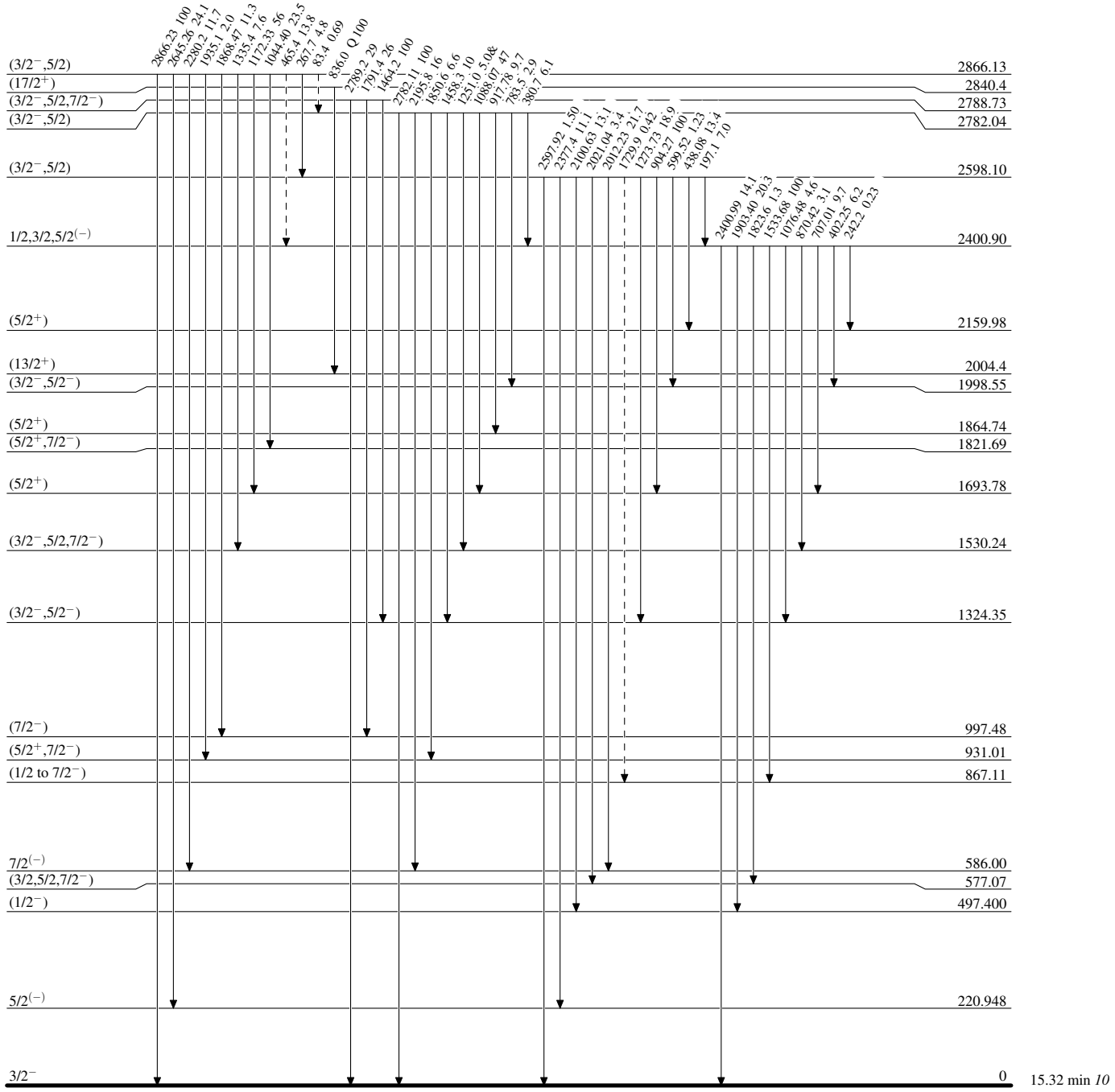
Adopted Levels, Gammas

Level Scheme (continued)

Legend

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

γ Decay (Uncertain)



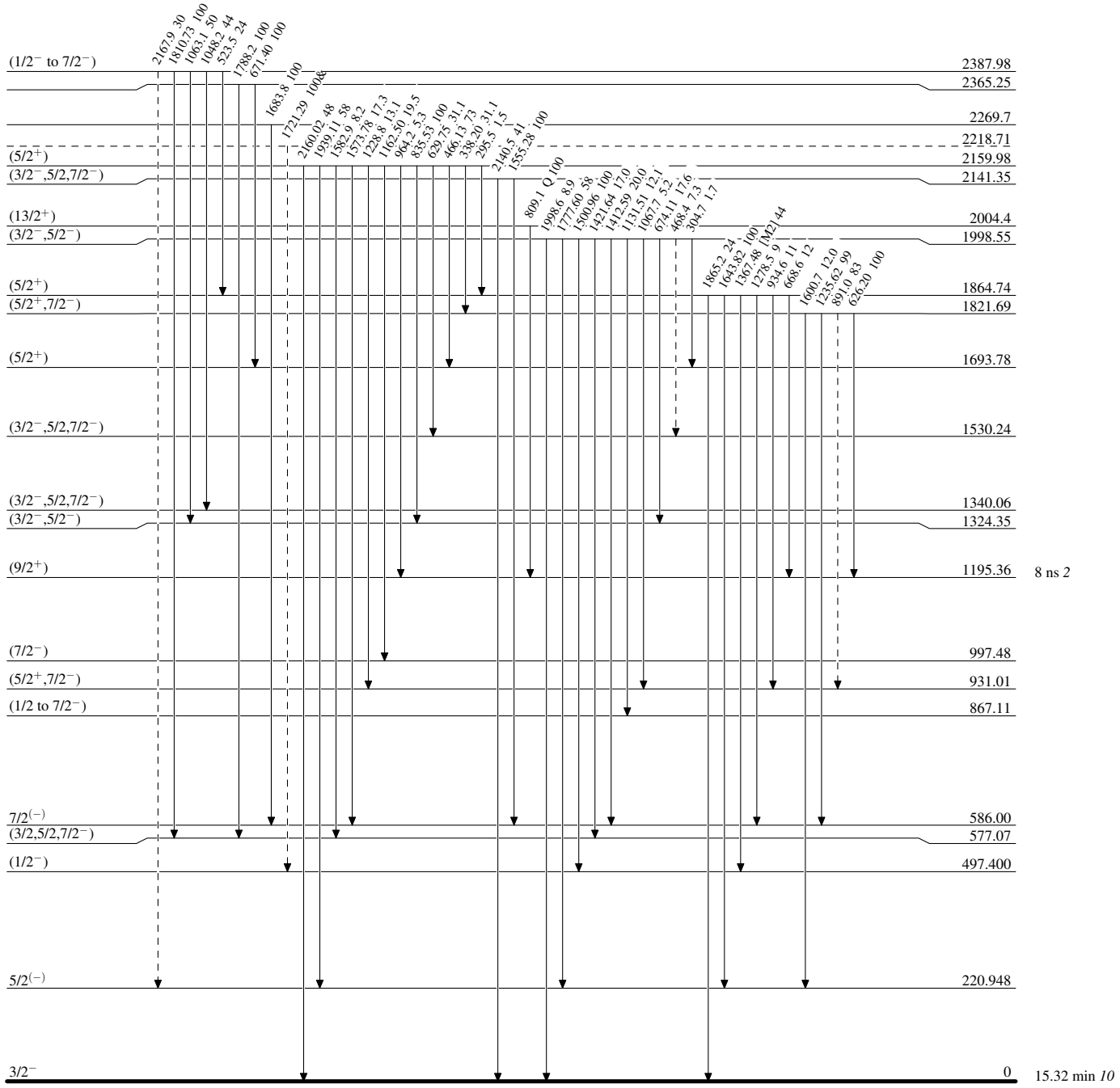
$^{89}_{37}Rb_{52}$

Adopted Levels, Gammas

Level Scheme (continued)

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

Legend: ► γ Decay (Uncertain)



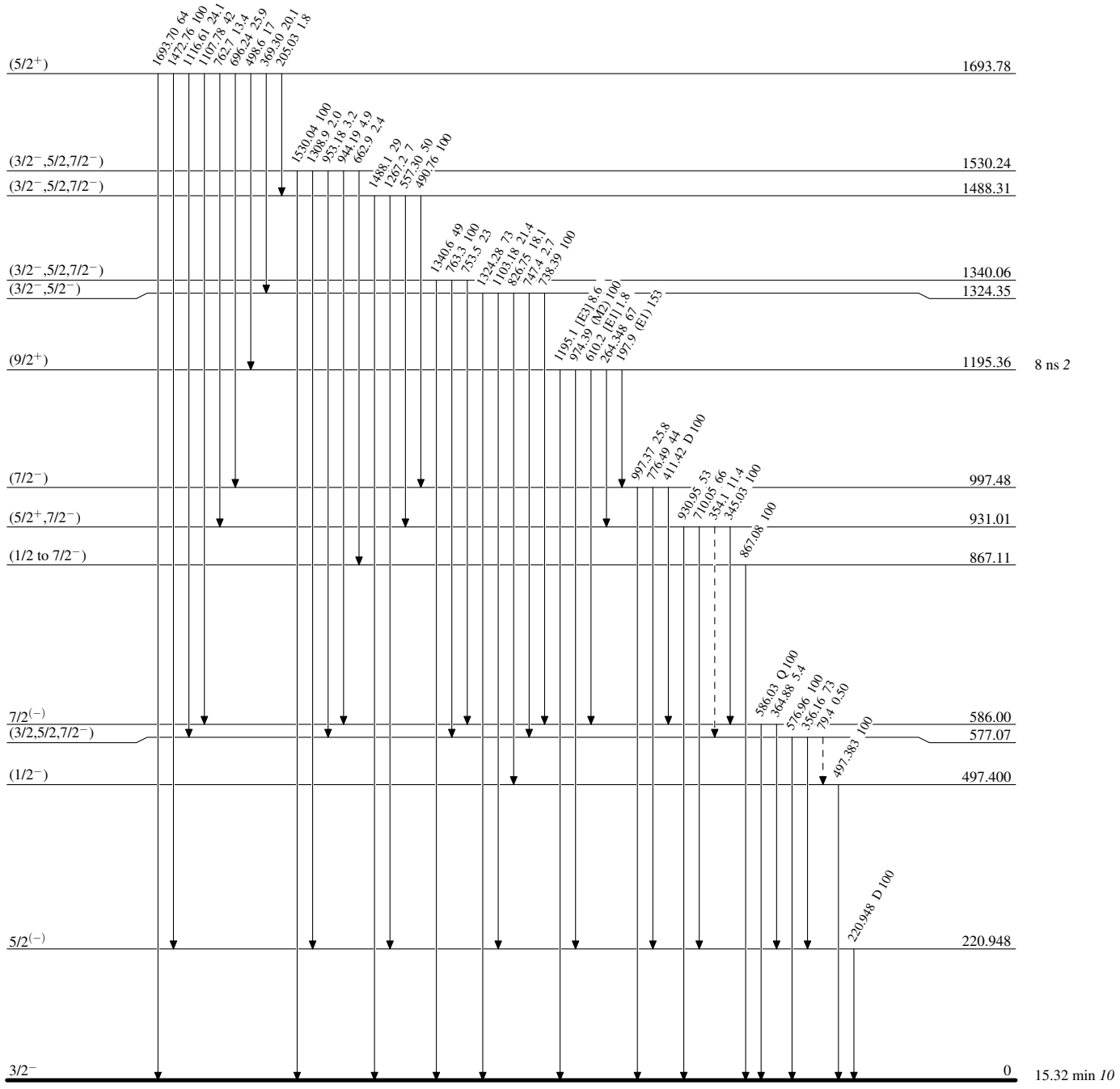
$^{89}_{37}Rb_{52}$

Adopted Levels, Gammas

Level Scheme (continued)

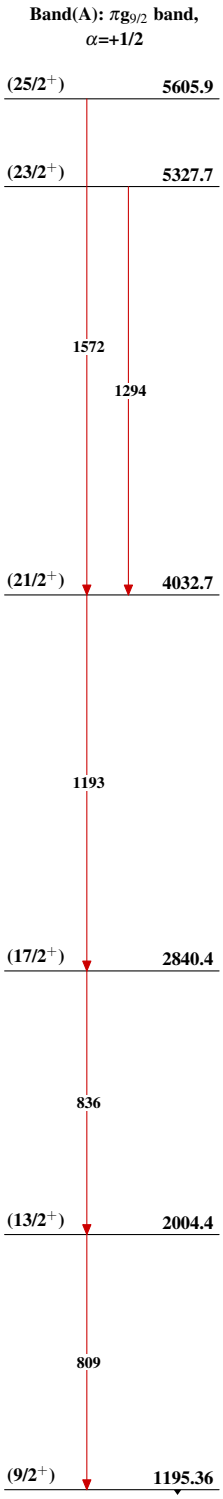
Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

Legend
- - - - - - ► γ Decay (Uncertain)



$^{89}_{37}Rb_{52}$

Adopted Levels, Gammas



$^{89}_{37}Rb_{52}$