Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 200,2 (2025)	22-Aug-2022

Q(β^-)=2687 *25*; S(n)=6320.5 *29*; S(p)=11300 *12*; Q(α)=−3158 *12* 2021Wa16
S(2n)=11573 *24*, S(2p)=21180 *200* (syst) (2021Wa16).
Additional information 1.
Additional information 2.

^{154}Nd Levels

Cross Reference (XREF) Flags

- A ^{154}Pr β^- decay
- B ^{252}Cf,^{248}Cm SF decay
- C ^{239}Pu(n,Fγ)

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$[#]	XREF	Comments
0.0[@]	0$^+$	25.9 s *2*	ABC	%β^-=100 T$_{1/2}$: From ^{154}Nd β^- decay (1987Gr12); other: 26 s *2*, from β^- decay (1985Ka17). The value of 1987Gr12 is also given by the same authors in 1986GrZZ, 1988GrZY and 1990An31. 1974Bu09 report 40 s *10*, but 1985Ka17 state that this half-life should not be assigned to ^{154}Nd and 1987Gr12 conclude it should be assigned to ^{155}Pm.
70.80[@] *10*	2$^+$	7.7 ns *20*	ABC	T$_{1/2}$: From ^{252}Cf SF decay (1974JaYY). Other: > 2 ns (1970Wi16).
233.24[@] *14*	4$^+$		ABC	
481.4[@] *4*	6$^+$		BC	
808.7[@] *5*	8$^+$		BC	
961.4[a] *5*	(1$^-$)		A C	J$^\pi$: probably the 1$^-$ bandhead of the K^π=(1$^-$) band, α=1 band in (n,Fγ) (2009Si21); compatible with γ's to 0$^+$ and 2$^+$ in ^{154}Pr β^- decay.
1002.83[&] *21*	(2$^-$)		ABC	
1027.68[a] *19*	(3$^-$)		A C	J$^\pi$: band member; compatible with γ's to 2$^+$ and 4$^+$ levels.
1128.26[&] *22*	(4$^-$)		ABC	
1162.9[a] *3*	(5$^-$)		C	
1209.1[@] *6*	10$^+$		BC	
1297.97[b] *22*	(4$^-$)	3.0 μs *3*	C	E(level): 1974ClZX in (^{252}Cf SF decay) report two isomeric decays, 162.6 *2* (T$_{1/2}$=1.300 μs 41) in ^{154}Nd that primarily decays to the 4$^+$ level and very little to the 6$^+$ level, and a 169.9 *2* (T$_{1/2}$=1.003 μs 37) assigned to mass 154. Similarly, 1970Jo20 also in (^{252}Cf SF decay) report two isomeric decays, 162.5 (T$_{1/2}$=2.1 μs) and 169.9 (T$_{1/2}$=1.7 μs) both in mass 154. In (n,Fγ) a 169.8 *3* γ ray was identified at this (4$^-$) isomer, but no 162 γ ray. Overall, despite the missing evidence, the evaluator would tentatively place the 162 transitions also to this isomer. T$_{1/2}$: weighted average of 3.2 μs *3* (2009Si21) and 2.7 μs *3* (2013YoZZ). All studies are from (n,Fγ) by fitting the summed time spectra of the most intense delayed γ rays. Dominant configuration=ν5/2[642]⊗ν3/2[521] (2009Si21, (n,Fγ)).
1325.4[&] *4*	(6$^-$)		BC	
1348.8? *8*	(5$^-$)		B	E(level): No evidence was found by 2009Si21 ((n,Fγ)) for a (5$^-$) isomer with T$_{1/2}$>1 μs reported in 1998Ga12 (^{252}Cf,^{248}Cm SF decay), reason for which the evaluator considers the existence of this level as questionable. J$^\pi$: From γ's to 4$^+$ and 6$^+$ levels which imply J^π=4$^+$,5,6$^+$. (5$^-$) is preferred by

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Adopted Levels, Gammas (continued)

^{154}Nd Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	T$_{1/2}$[#]	XREF	Comments
				1998Ga12 on the basis of similarity with the 5$^-$ isomer in the isotone ^{156}Sm.
1384.3[c] *3*	(5$^-$)		C	
1488.0[b] *4*	(6$^-$)		C	
1523.7 *4*			A	
1583.8 *8*			A	
1593.7[&] *5*	(8$^-$)		BC	
1608.7[c] *4*	(7$^-$)		C	
1675.5[@] *6*	12$^+$	1.9 ps	BC	
1746.8[b] *5*	(8$^-$)		C	
1902.4[c] *5*	(9$^-$)		C	
1931.8[&] *6*	(10$^-$)		BC	
2074.6[b] *6*	(10$^-$)		C	
2194.1 *10*			A	
2200.8[@] *7*	14$^+$	1.0 ps	BC	
2263.8[c] *6*	(11$^-$)		C	
2337.4[&] *7*	(12$^-$)		BC	
2468.0[b] *6*	(12$^-$)		C	
2691.6[c] *7*	(13$^-$)		C	
2777.3[@] *8*	16$^+$	0.69 ps	BC	
2807.3[&] *7*	(14$^-$)		BC	
2950.3[b] *7*	(14$^-$)		C	
3337.8[&] *8*	(16$^-$)		BC	
3399.3?[@]	(18$^+$)		BC	

[†] From a least-squares fit to the listed γ energies.
[‡] For the members of the yrast and the side bands: from (n,Fγ) based on considerations of the expected band structure and the deexcitation characteristics of spontaneous-fission fragments. Individual arguments are given for levels reported only in the ^{154}Pr β^- decay.
[#] From 1994Sm07 in ^{252}Cf,^{248}Cm SF decay unless noted otherwise.
[@] Band(A): $K^{\pi}=0^+$ band.
[&] Band(B): $K^{\pi}=(1^-)$ band, $\alpha=0$.
[a] Band(b): $K^{\pi}=(1^-)$ band, $\alpha=1$.
[b] Band(C): $K^{\pi}=(4^-)$ band, $\alpha=0$.
[c] Band(c): $K^{\pi}=(4^-)$ band, $\alpha=1$.

$\gamma(^{154}Nd)$

E$_i$(level)	J$_i^{\pi}$	E$_{\gamma}$[†]	I$_{\gamma}$[†]	E$_f$	J$_f^{\pi}$	Mult.	α[‡]	Comments
70.80	2$^+$	70.8 *1*	100	0.0	0$^+$	[E2]	7.79	B(E2)(W.u.)=95 *25* α(K)=2.96 *5*; α(L)=3.76 *6*; α(M)=0.861 *14* α(N)=0.186 *3*; α(O)=0.0235 *4*; α(P)=0.0001258 *18* E$_{\gamma}$: from ^{154}Pr β^- decay. Others: 70.8 *1* from ^{252}Cf,^{248}Cm SF decay and 70.8 *3* from (n,Fγ).
233.24	4$^+$	162.4 *1*	100	70.80	2$^+$	[E2]	0.398	α(K)=0.279 *4*; α(L)=0.0931 *14*; α(M)=0.0209 *3* α(N)=0.00454 *7*; α(O)=0.000607 *9*; α(P)=1.353×10^{-5} *19* E$_{\gamma}$: from ^{154}Pr β^- decay. Others: 162.4 *1* from ^{252}Cf,^{248}Cm SF decay and 162.4 *3* from (n,Fγ).

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Adopted Levels, Gammas (continued)

γ(^{154}Nd) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.	α[‡]	Comments
481.4	6^+	248.4 *3*	100	233.24	4^+	[E2]	0.0957	α(K)=0.0738 *11*; α(L)=0.0172 *3*; α(M)=0.00379 *6* α(N)=0.000830 *13*; α(O)=0.0001150 *17*; α(P)=3.92×10^{-6} *6* E_γ: from (n,Fγ). Other: 248.6 from ^{252}Cf,^{248}Cm SF decay.
808.7	8^+	327.3 *3*	100	481.4	6^+	[E2]	0.0400	α(K)=0.0320 *5*; α(L)=0.00630 *9*; α(M)=0.001375 *20* α(N)=0.000303 *5*; α(O)=4.29×10^{-5} *7*; α(P)=1.78×10^{-6} *3* E_γ: from (n,Fγ). Other: 328.2 from ^{252}Cf,^{248}Cm SF decay.
961.4	(1^-)	891.2 *10*	100 *19*	70.80	2^+			E_γ: from ^{154}Pr β$^-$ decay.
		961.8 *10*	48 *14*	0.0	0^+			E_γ: from ^{154}Pr β$^-$ decay.
1002.83	(2^-)	932.11 *24*	100	70.80	2^+			E_γ: weighted average of 932.3 *4* from ^{154}Pr β$^-$ decay and 932.0 *3* from (n,Fγ). Other: 931.8 (^{252}Cf,^{248}Cm SF decay).
1027.68	(3^-)	794.4 *3*	100 *7*	233.24	4^+			E_γ: weighted average of 794.3 *4* from ^{154}Pr β$^-$ decay and 794.5 *3* from (n,Fγ). I_γ: weighted average of 100 *7* from ^{154}Pr β$^-$ decay and 100 *23* from (n,Fγ).
		956.90 *21*	92 *22*	70.80	2^+			E_γ: weighted average of 956.9 *3* from ^{154}Pr β$^-$ decay and 956.9 *3* from (n,Fγ). I_γ: weighted average of 91 *30* from ^{154}Pr β$^-$ decay and 92 *31* from (n,Fγ).
1128.26	(4^-)	125.5 *3*	18 *3*	1002.83	(2^-)			E_γ: from (n,Fγ). Other: 125.8 from ^{252}Cf,^{248}Cm SF decay. I_γ: from (n,Fγ).
		895.04 *24*	100 *18*	233.24	4^+			E_γ: weighted average of 895.1 *4* from ^{154}Pr β$^-$ decay and 895.0 *3* from (n,Fγ). I_γ: from (n,Fγ).
1162.9	(5^-)	682[#]		481.4	6^+			I_γ: from (n,Fγ).
		929.4 *3*	100	233.24	4^+			E_γ,I_γ: from (n,Fγ).
1209.1	10^+	400.4 *3*	100	808.7	8^+	[E2]	0.0219	α(K)=0.0179 *3*; α(L)=0.00319 *5*; α(M)=0.000692 *10* α(N)=0.0001528 *22*; α(O)=2.20×10^{-5} *4*; α(P)=1.023×10^{-6} *15* E_γ,I_γ: from (n,Fγ). Other: 400.7 from ^{252}Cf,^{248}Cm SF decay.
1297.97	(4^-)	134.8 *3*	17.8 *22*	1162.9	(5^-)	[M1+E2]	0.68 *8*	α(K)=0.506 *13*; α(L)=0.138 *67*; α(M)=0.031 *16* α(N)=0.0067 *34*; α(O)=9.2×10^{-4} *41*; α(P)=2.8×10^{-5} *6*
		169.8 *3*	100 *16*	1128.26	(4^-)	[M1+E2]	0.330 *13*	α(K)=0.257 *15*; α(L)=0.057 *20*; α(M)=0.0126 *47* α(N)=0.0028 *10*; α(O)=3.9×10^{-4} *12*; α(P)=1.5×10^{-5} *3*
		270.3 *3*	47 *9*	1027.68	(3^-)	[M1+E2]	0.081 *9*	α(K)=0.067 *10*; α(L)=0.0115 *11*; α(M)=0.0025 *3* α(N)=0.00055 *6*; α(O)=8.0×10^{-5} *5*; α(P)=4.0×10^{-6} *10*
		295.3 *3*	33 *7*	1002.83	(2^-)	[E2]	0.0550	α(K)=0.0435 *7*; α(L)=0.00907 *14*; α(M)=0.00199 *3*

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Adopted Levels, Gammas (continued)

γ(^{154}Nd) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.	α[‡]	Comments
								α(N)=0.000437 *7*; α(O)=6.14×10^{-5} *9*; α(P)=2.38×10^{-6} *4*
1325.4	(6$^-$)	197.2 *3*	100	1128.26	(4$^-$)			E_γ: from (n,Fγ). Other: 197.5 from ^{252}Cf,^{248}Cm SF decay. I_γ: from ^{252}Cf,^{248}Cm SF decay.
		843.8	57	481.4	6$^+$			E_γ,I_γ: from ^{252}Cf,^{248}Cm SF decay.
1348.8?	(5$^-$)	870	100	481.4	6$^+$			E_γ,I_γ: from ^{252}Cf,^{248}Cm SF decay.
		1113	≈14	233.24	4$^+$			E_γ,I_γ: from ^{252}Cf,^{248}Cm SF decay.
1384.3	(5$^-$)	86.3 *2*	100	1297.97	(4$^-$)			
1488.0	(6$^-$)	103.8 *2*	100 *50*	1384.3	(5$^-$)			
		190[#]	7	1297.97	(4$^-$)			
1523.7		520.7 *4*	36.1 *24*	1002.83	(2$^-$)			E_γ,I_γ: from ^{154}Pr β$^-$ decay.
		562.5 *4*	100 *4*	961.4	(1$^-$)			E_γ,I_γ: from ^{154}Pr β$^-$ decay.
1583.8		581.0 *7*	100	1002.83	(2$^-$)			E_γ,I_γ: from ^{154}Pr β$^-$ decay.
1593.7	(8$^-$)	268.3 *3*	100	1325.4	(6$^-$)			E_γ: from (n,Fγ). Other: 268.5 from ^{252}Cf,^{248}Cm SF decay. I_γ: from ^{252}Cf,^{248}Cm SF decay.
		784.8[#]		808.7	8$^+$			E_γ: from ^{252}Cf,^{248}Cm SF decay.
1608.7	(7$^-$)	120.7 *2*	100 *50*	1488.0	(6$^-$)			
		224	8	1384.3	(5$^-$)			
1675.5	12$^+$	466.4 *3*	100	1209.1	10$^+$	[E2]	0.01423	B(E2)(W.u.)=2.7×10^2 α(K)=0.01173 *17*; α(L)=0.00197 *3*; α(M)=0.000425 *6* α(N)=9.40×10^{-5} *14*; α(O)=1.366×10^{-5} *20*; α(P)=6.83×10^{-7} *10* E_γ: from (n,Fγ). Other: 466.5 from ^{252}Cf,^{248}Cm SF decay.
1746.8	(8$^-$)	138.1 *2*	100 *40*	1608.7	(7$^-$)			
		259[#]	18	1488.0	(6$^-$)			
1902.4	(9$^-$)	155.6 *2*	100 *29*	1746.8	(8$^-$)			
		293	71	1608.7	(7$^-$)			
1931.8	(10$^-$)	338.1 *3*	100	1593.7	(8$^-$)			E_γ: from (n,Fγ). Other: 338.3 from ^{252}Cf,^{248}Cm SF decay.
2074.6	(10$^-$)	172.2 *2*	100 *33*	1902.4	(9$^-$)			
		328	25	1746.8	(8$^-$)			
2194.1		670.4 *9*	100	1523.7				E_γ,I_γ: from ^{154}Pr β$^-$ decay.
2200.8	14$^+$	525.3 *3*	100	1675.5	12$^+$	[E2]	0.01032	B(E2)(W.u.)=2.9×10^2 α(K)=0.00857 *12*; α(L)=0.001378 *20*; α(M)=0.000296 *5* α(N)=6.57×10^{-5} *10*; α(O)=9.61×10^{-6} *14*; α(P)=5.04×10^{-7} *7* E_γ: from (n,Fγ). Other: 525.1 from ^{252}Cf,^{248}Cm SF decay.
2263.8	(11$^-$)	189.2 *2*	100 *50*	2074.6	(10$^-$)			
		361[#]	56	1902.4	(9$^-$)			
2337.4	(12$^-$)	405.6 *3*	100	1931.8	(10$^-$)			E_γ: from (n,Fγ). Other: 405.8 from ^{252}Cf,^{248}Cm SF decay.
2468.0	(12$^-$)	204.2 *2*	100 *50*	2263.8	(11$^-$)			
		394	14	2074.6	(10$^-$)			
2691.6	(13$^-$)	223.5 *2*	100 *40*	2468.0	(12$^-$)			
		428	100	2263.8	(11$^-$)			
2777.3	16$^+$	576.5 *3*	100	2200.8	14$^+$	[E2]	0.00810	B(E2)(W.u.)=2.6×10^2

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Adopted Levels, Gammas (continued)

$\gamma(^{154}Nd)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Comments
						α(K)=0.00676 *10*; α(L)=0.001054 *15*; α(M)=0.000226 *4* α(N)=5.02×10^{-5} *7*; α(O)=7.38×10^{-6} *11*; α(P)=4.01×10^{-7} *6* E_γ: from (n,Fγ). Other: 576.6 from ^{252}Cf,^{248}Cm SF decay.
2807.3	(14^-)	469.9 *3*	100	2337.4	(12^-)	E_γ: from (n,Fγ). Other: 470.0 from ^{252}Cf,^{248}Cm SF decay.
2950.3	(14^-)	258.7 *2*	100	2691.6	(13^-)	
3337.8	(16^-)	530.5 *3*	100	2807.3	(14^-)	E_γ: from (n,Fγ). Other: 530.7 from ^{252}Cf,^{248}Cm SF decay.
3399.3?	(18^+)	619.6[#] *9*	100	2777.3	16^+	E_γ: from (n,Fγ). Other: 620.4 from ^{252}Cf,^{248}Cm SF decay.

[†] For the $K^\pi=(4^-)$ bands all data are from (n,Fγ).
[‡] Additional information 3.
[#] Placement of transition in the level scheme is uncertain.

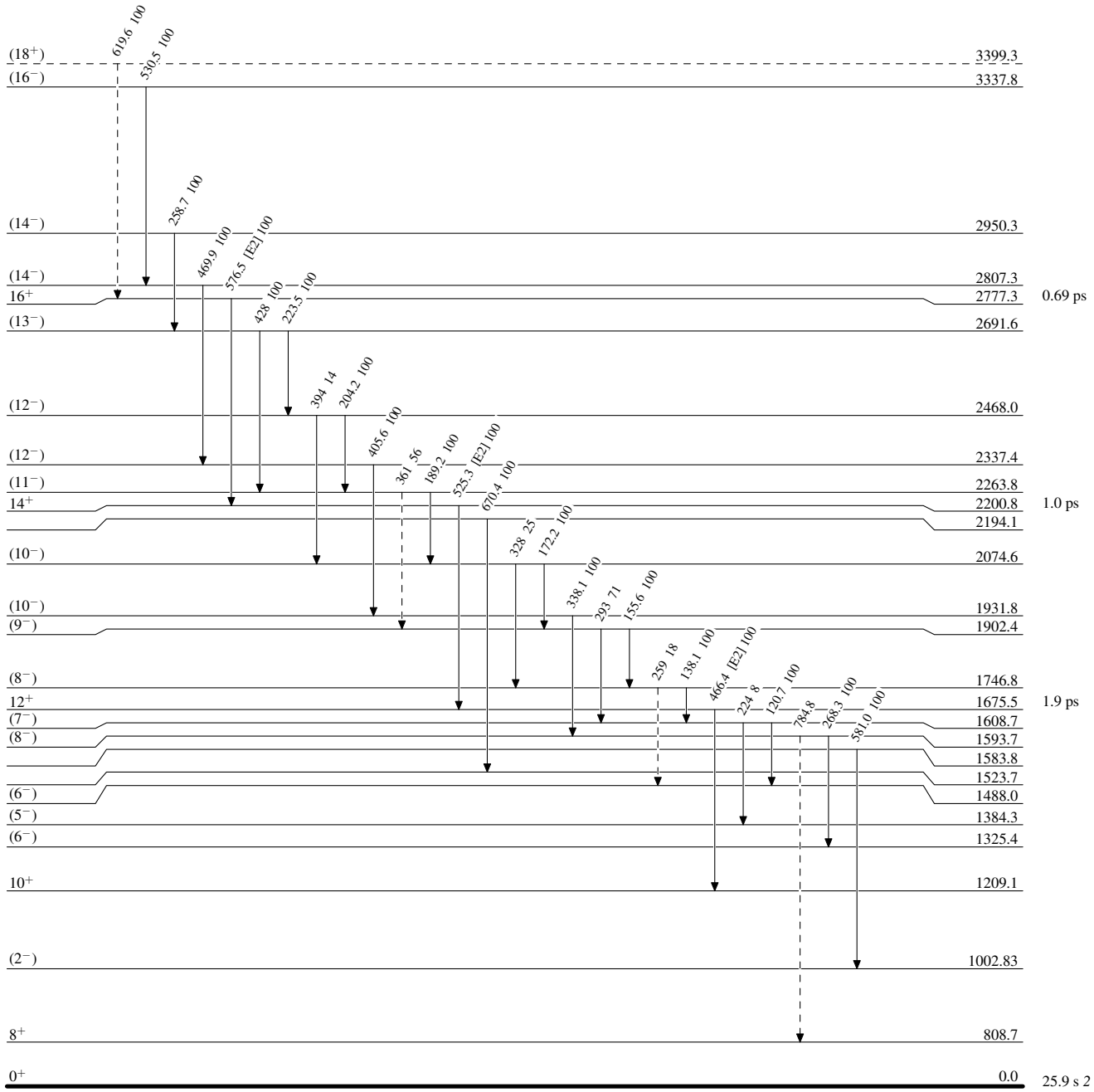
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{154}_{60}Nd_{94}$

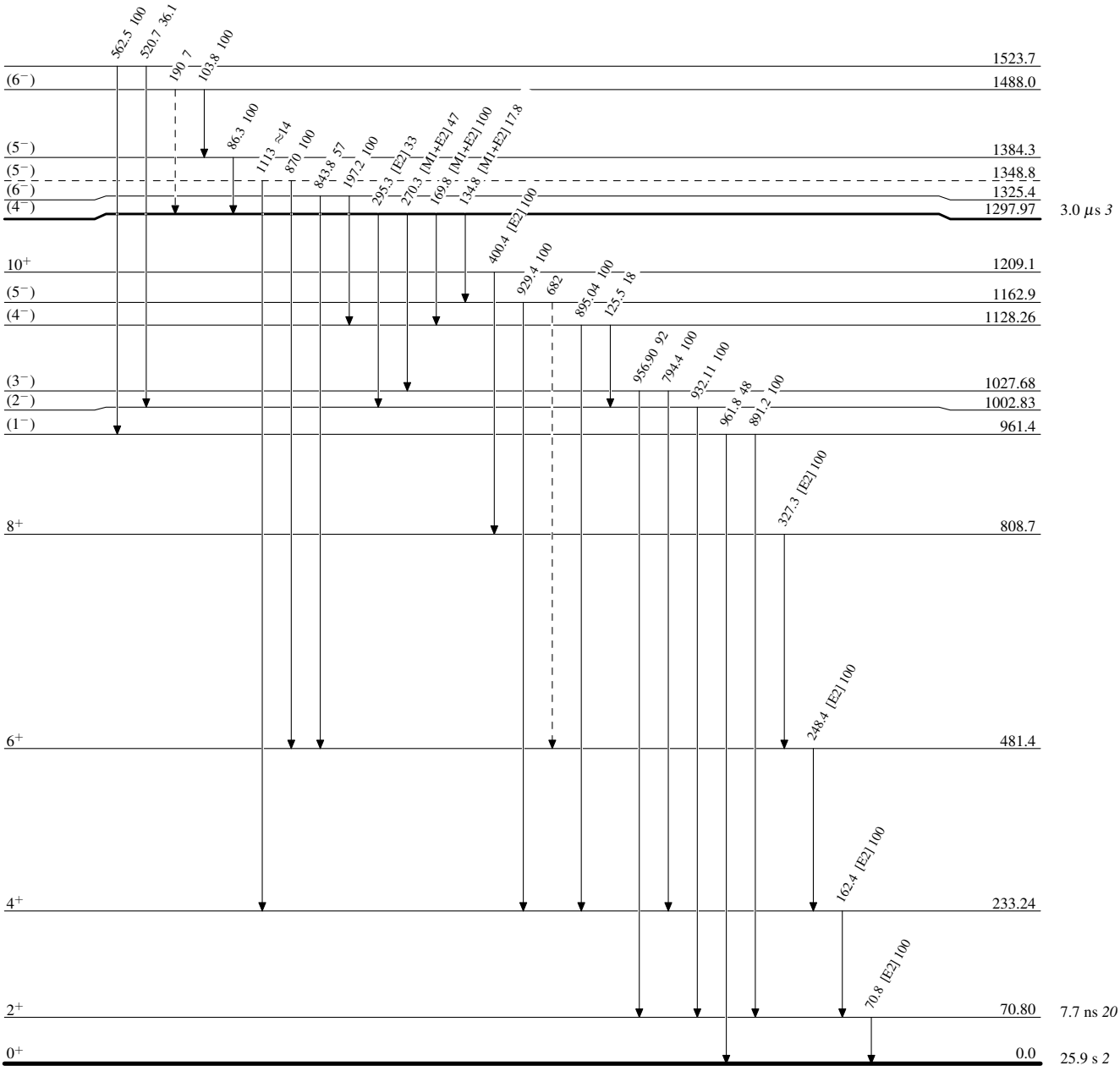
Adopted Levels, Gammas

Legend

Level Scheme (continued)

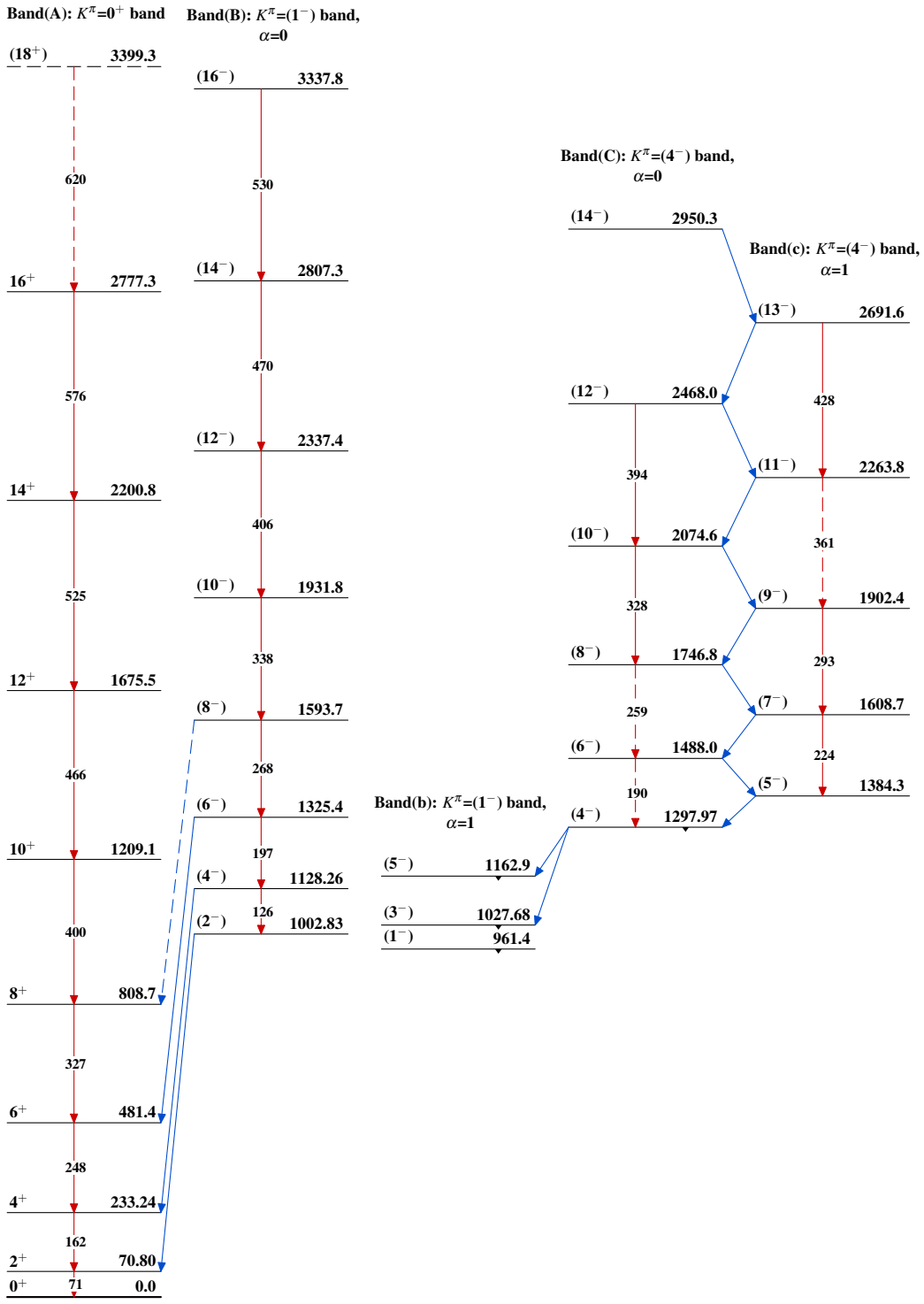
Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{154}_{60}Nd_{94}$

Adopted Levels, Gammas



$^{154}_{60}Nd_{94}$