

Adopted Levels, Gammas

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	E. A. McCutchan and A. A. Sonzogni		NDS 115, 135 (2014)	1-Nov-2013

$Q(\beta^-) = -3.49 \times 10^3$ e; $S(n) = 1.037 \times 10^4$ e; $S(p) = 4.12 \times 10^3$ e; $Q(\alpha) = -4.71 \times 10^3$ e 2012Wa38
 $S(2n) = 2.319 \times 10^4$ e; $S(2p) = 1.147 \times 10^4$ e (2012Wa38).

 ^{88}Nb LevelsCross Reference (XREF) Flags

- A ^{88}Mo ε decay (8.0 min)
 B $^{56}\text{Fe}(^{35}\text{Cl}, 2p\text{n}\gamma)$
 C $^{89}\text{Y}(\alpha, 5\text{n}\gamma)$

E(level) [†]	J ^π [‡]	T _{1/2}	XREF	Comments
0.0 [#]	(8 ⁺)	14.50 min 11	BC	$\% \varepsilon + \% \beta^+ = 100$ J^π : (8 ⁺ , 9 ⁺) from $\log ft = 5.7$ to 8 ⁺ and $\log ft = 6.9$, $\log f^{ut} = 8.1$ to 9 ⁺ . (8 ⁺) in analogy with ^{90}Nb g.s. $T_{1/2}$: weighted average of 14.56 min 11 (2009Ga02), 14.4 min 2 (1984Ox01), and 14.3 min 3 (1972Ia01). Others: 14.57 min 6 (1972TuZS, thesis work by second author of 1972Ia01), 1971Do01, 1966Fl03, 1966Hy03, 1964Ko08.
0.0+x	(4 ⁻)	7.7 min 1	A	$\% \varepsilon + \% \beta^+ = 100$ $T_{1/2}$: weighted average of 7.7 min 1 (1984Ox01) and 7.8 min 2 (1972Ia01). Others: 7.81 min 6 (1972TuZS, thesis work by second author of 1972Ia01) 1971Do01. J^π : 4 from $\log ft = 7.1$ to 3 ⁻ and $\log ft = 6.9$ to 5 ⁻ . (4 ⁻) in analogy with ^{90}Nb .
x+80.0 5			A	
x+170.7 5			A	
610.0 [#] 3	(9 ⁺)		B	
1089.41 [#] 10	(10 ⁺)		BC	
1553.8 3	(9 ⁻)		B	
1675.71 [#] 19	(11 ⁺)		B	
2006.20@ 19	(11 ⁻)		BC	
2077.33 [#] 20	(12 ⁺)		BC	
2216.8 3	(11 ⁻)		B	
2483.0 4	(12 ⁺)		B	
2553.69@ 24	(12 ⁻)		B	
2717.0 3	(12 ⁻)		B	
2770.33 [#] 25	(13 ⁺)		B	
2967.0@ 3	(13 ⁻)		B	
3085.4 3	(13 ⁺)		B	
3096.5 3	(13 ⁻)		B	
3206.9 3	(13 ⁻)		B	
3296.8 5			B	
3442.2 [#] 3	(14 ⁺)		B	
3626.1@ 3	(14 ⁻)		B	
3667.2 3	(14 ⁺)		B	
3671.4 [#] 3	(15 ⁺)		B	
3733.7 4	(14 ⁻)		B	
3965.7? 5			B	
3998.3 3	(15 ⁺)		B	
4086.0@ 4	(15 ⁻)		B	

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Adopted Levels, Gammas (continued) ^{88}Nb Levels (continued)

<u>E(level)[†]</u>	<u>J^π[‡]</u>	<u>XREF</u>	<u>E(level)[†]</u>	<u>J^π[‡]</u>	<u>XREF</u>	<u>E(level)[†]</u>	<u>XREF</u>
4391.7 4	(15 ⁻)	B	5589.3 15		B	7163.0 8	B
4707.7 [@] 4	(16 ⁻)	B	6264.3 [@] 5	(19 ⁻)	B	7335.8 6	B
4885.4 [#] 4	(16 ⁺)	B	6331.5 [#] 5	(19 ⁺)	B	7717.8 8	B
5075.0 [#] 4	(17 ⁺)	B	6590.6? 8		B	7924.4 8	B
5111.2 7		B	6795.5 7		B	9737.2 17	B
5114.1 [@] 4	(17 ⁻)	B	6811.7 7		B		
5433.0 [@] 5	(18 ⁻)	B	7017.7 8		B		

[†] From a least-squares fit to E_γ by evaluators.

[‡] From R(DCO) values and cascade patterns in $^{56}\text{Fe}(^{35}\text{Cl},2\text{pny})$, except where noted. Spin assignments are also supported by shell model calculations.

[#] Band(A): Positive parity yrast sequence.

[@] Band(B): Negative parity yrast sequence.

γ(^{88}Nb)

<u>E_i(level)</u>	<u>J_i^π</u>	<u>E_γ[†]</u>	<u>I_γ[†]</u>	<u>E_f</u>	<u>J_f^π</u>	<u>Mult.[‡]</u>
x+80.0		80.0 [#] 5	100 [#]	0.0+x	(4 ⁻)	
x+170.7		90.7 [#]		x+80.0		
		170.7 [#] 5		0.0+x	(4 ⁻)	
610.0	(9 ⁺)	610.0 8	100	0.0	(8 ⁺)	
1089.41	(10 ⁺)	479.4 5	1.00 10	610.0	(9 ⁺)	
		1089.4 1	100.0 8	0.0	(8 ⁺)	Q
1553.8	(9 ⁻)	464.3 6	55 3	1089.41	(10 ⁺)	
		943.7 6	62 3	610.0	(9 ⁺)	
		1553.7 10	100 7	0.0	(8 ⁺)	
1675.71	(11 ⁺)	586.3 2	100.0 24	1089.41	(10 ⁺)	D
		1065.7 5	18.3 12	610.0	(9 ⁺)	
2006.20	(11 ⁻)	330.5 4	11.9 3	1675.71	(11 ⁺)	
		452.4 4	13.0 3	1553.8	(9 ⁻)	
		916.8 2	100.0 11	1089.41	(10 ⁺)	D
2077.33	(12 ⁺)	401.7 10	1.02 20	1675.71	(11 ⁺)	
		987.9 2	100.0 10	1089.41	(10 ⁺)	Q
2216.8	(11 ⁻)	210.6 2	100	2006.20	(11 ⁻)	(D+Q)
2483.0	(12 ⁺)	405.7 5	56.8 23	2077.33	(12 ⁺)	
		1393.6 7	100 5	1089.41	(10 ⁺)	Q
2553.69	(12 ⁻)	336.9 5	3.0 3	2216.8	(11 ⁻)	
		547.5 2	100.0 10	2006.20	(11 ⁻)	D
2717.0	(12 ⁻)	500.2 3	96 4	2216.8	(11 ⁻)	D
		710.8 4	100 4	2006.20	(11 ⁻)	D
2770.33	(13 ⁺)	693.0 2	100.0 12	2077.33	(12 ⁺)	D
		1094.6 5	9.9 4	1675.71	(11 ⁺)	Q
2967.0	(13 ⁻)	250.0 5	5.4 8	2717.0	(12 ⁻)	
		413.3 2	100.0 8	2553.69	(12 ⁻)	D
		889.6 5	13.1 8	2077.33	(12 ⁺)	
		960.8 5	23.8 8	2006.20	(11 ⁻)	Q
3085.4	(13 ⁺)	315.1 6	16.4 16	2770.33	(13 ⁺)	
		602.5 7	42.6 16	2483.0	(12 ⁺)	D
		1008.1 5	100.0 16	2077.33	(12 ⁺)	D

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Adopted Levels, Gammas (continued) $\gamma(^{88}\text{Nb})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\dagger	E_f	J_f^π	Mult.‡
3085.4	(13 ⁺)	1409.8 12	11.5 16	1675.71	(11 ⁺)	
3096.5	(13 ⁻)	379.4 6	20.5 13	2717.0	(12 ⁻)	
		542.8 4	100.0 13	2553.69	(12 ⁻)	D
		879.7 6	9.0 13	2216.8	(11 ⁻)	
3206.9	(13 ⁻)	489.9 5	9.5 16	2717.0	(12 ⁻)	
		653.2 4	100.0 16	2553.69	(12 ⁻)	D
3296.8		1219.4 10	100	2077.33	(12 ⁺)	
3442.2	(14 ⁺)	356.8 3	95.2 16	3085.4	(13 ⁺)	D
		671.9 3	100.0 16	2770.33	(13 ⁺)	D
		1364.9 7	52.4 16	2077.33	(12 ⁺)	Q
3626.1	(14 ⁻)	419.2 3	40.4 10	3206.9	(13 ⁻)	D
		659.1 3	100.0 10	2967.0	(13 ⁻)	D
		1072.4 5	15.4 10	2553.69	(12 ⁻)	
3667.2	(14 ⁺)	370.4 5	12.8 13	3296.8		
		896.8 3	100.0 13	2770.33	(13 ⁺)	D
		1184.2 10	11.5 13	2483.0	(12 ⁺)	
		1589.8 12	10.3 13	2077.33	(12 ⁺)	
3671.4	(15 ⁺)	229.2 2	100.0 10	3442.2	(14 ⁺)	D
		901.1 5	29.1 10	2770.33	(13 ⁺)	Q
3733.7	(14 ⁻)	637.2 5	100.0 24	3096.5	(13 ⁻)	D
		766.8 5	52.4 24	2967.0	(13 ⁻)	
3965.7?		232.0 @ 4	100	3733.7	(14 ⁻)	
3998.3	(15 ⁺)	326.9 5	13.5 11	3671.4	(15 ⁺)	
		331.1 3	100.0 11	3667.2	(14 ⁺)	D
		912.8 7	22.5 11	3085.4	(13 ⁺)	
		1228.0 5	85.4 11	2770.33	(13 ⁺)	Q
4086.0	(15 ⁻)	459.9 5	100 3	3626.1	(14 ⁻)	D
		1119.0 7	13 3	2967.0	(13 ⁻)	
4391.7	(15 ⁻)	657.9 5	32 3	3733.7	(14 ⁻)	
		765.6 5	100 3	3626.1	(14 ⁻)	D
		1295.2 7	70 3	3096.5	(13 ⁻)	Q
		1424.7 7	49 3	2967.0	(13 ⁻)	
4707.7	(16 ⁻)	316.1 2	100.0 15	4391.7	(15 ⁻)	D
		621.7 6	21.5 15	4086.0	(15 ⁻)	
		742.0 @ 5	33.8 15	3965.7?		
		1081.6 5	84.6 15	3626.1	(14 ⁻)	Q
4885.4	(16 ⁺)	887.1 5	100 8	3998.3	(15 ⁺)	D
		1214.0 7	75 8	3671.4	(15 ⁺)	
		1218.3 7	67 8	3667.2	(14 ⁺)	
5075.0	(17 ⁺)	189.6 3	15.4 8	4885.4	(16 ⁺)	D
		1076.7 2	100.0 8	3998.3	(15 ⁺)	Q
		1403.6 5	33.3 8	3671.4	(15 ⁺)	Q
5111.2		403.5 7	100	4707.7	(16 ⁻)	
5114.1	(17 ⁻)	406.4 2	100.0 9	4707.7	(16 ⁻)	D
		1028.1 7	9.5 9	4086.0	(15 ⁻)	
5433.0	(18 ⁻)	318.9 3	100	5114.1	(17 ⁻)	D
5589.3		1917.9 15	100	3671.4	(15 ⁺)	
6264.3	(19 ⁻)	831.2 5	100.0 22	5433.0	(18 ⁻)	D
		1150.1 5	10.9 22	5114.1	(17 ⁻)	
6331.5	(19 ⁺)	1256.5 3	100	5075.0	(17 ⁺)	Q
6590.6?		1515.6 @ 12	100	5075.0	(17 ⁺)	
6795.5		531.2 6	27 7	6264.3	(19 ⁻)	
		1681.3 12	100 7	5114.1	(17 ⁻)	
		1684.2 12	60 7	5111.2		
6811.7		480.2 5	100	6331.5	(19 ⁺)	

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Adopted Levels, Gammas (continued) $\gamma(^{88}\text{Nb})$ (continued)

$E_i(\text{level})$	E_γ^\dagger	I_γ^\dagger	E_f	J_f^π	$E_i(\text{level})$	E_γ^\dagger	I_γ^\dagger	E_f	J_f^π
7017.7	427.1 @ 5	100	6590.6?		7717.8	382.0 5	100	7335.8	
7163.0	367.5 5	100	6795.5		7924.4	761.4 5	100 6	7163.0	
7335.8	318.2 5	24 3	7017.7			1660.1 10	71 6	6264.3 (19 ⁻)	
	1004.3 5	100 3	6331.5 (19 ⁺)		9737.2	1812.8 15	100	7924.4	

† From $^{56}\text{Fe}(^{35}\text{Cl}, 2\text{pn}\gamma)$, except where noted.

‡ From R(DCO) values in $^{56}\text{Fe}(^{35}\text{Cl}, 2\text{pn}\gamma)$.

From ^{88}Mo ε decay (8.0 min).

@ Placement of transition in the level scheme is uncertain.

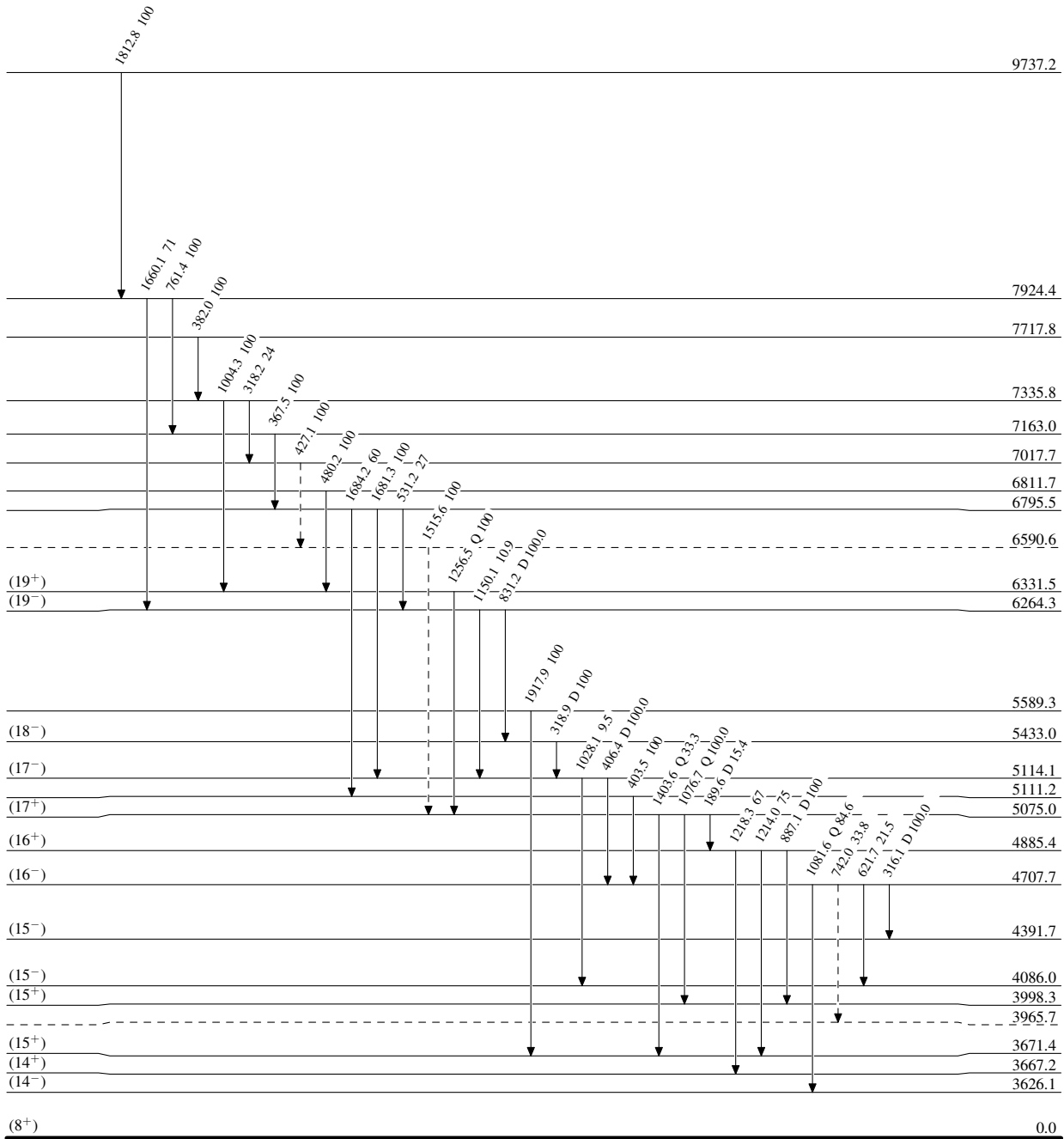
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

-----▶ γ Decay (Uncertain)



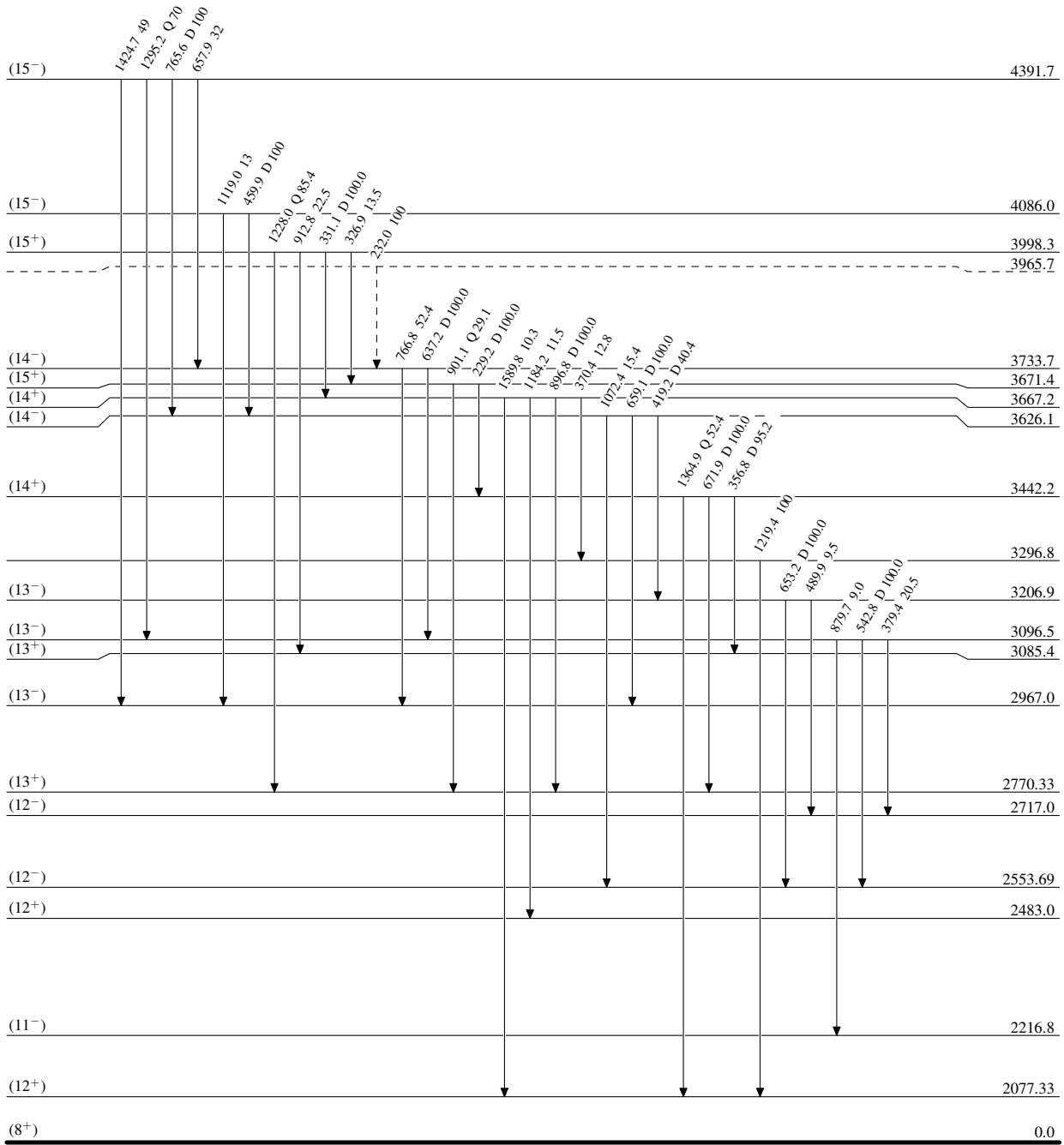
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

-----▶ γ Decay (Uncertain)



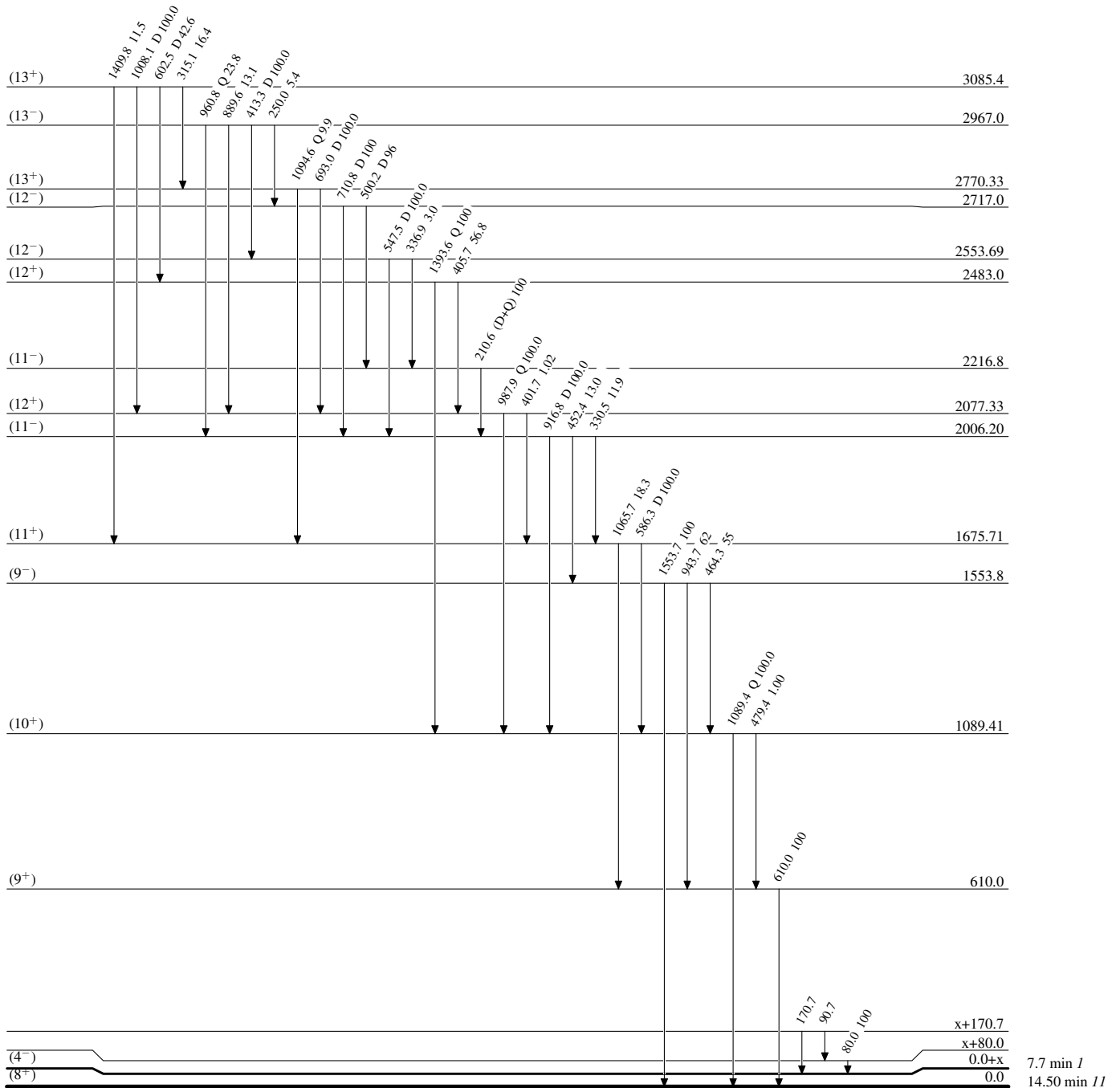
⁸⁸Nb₄₇

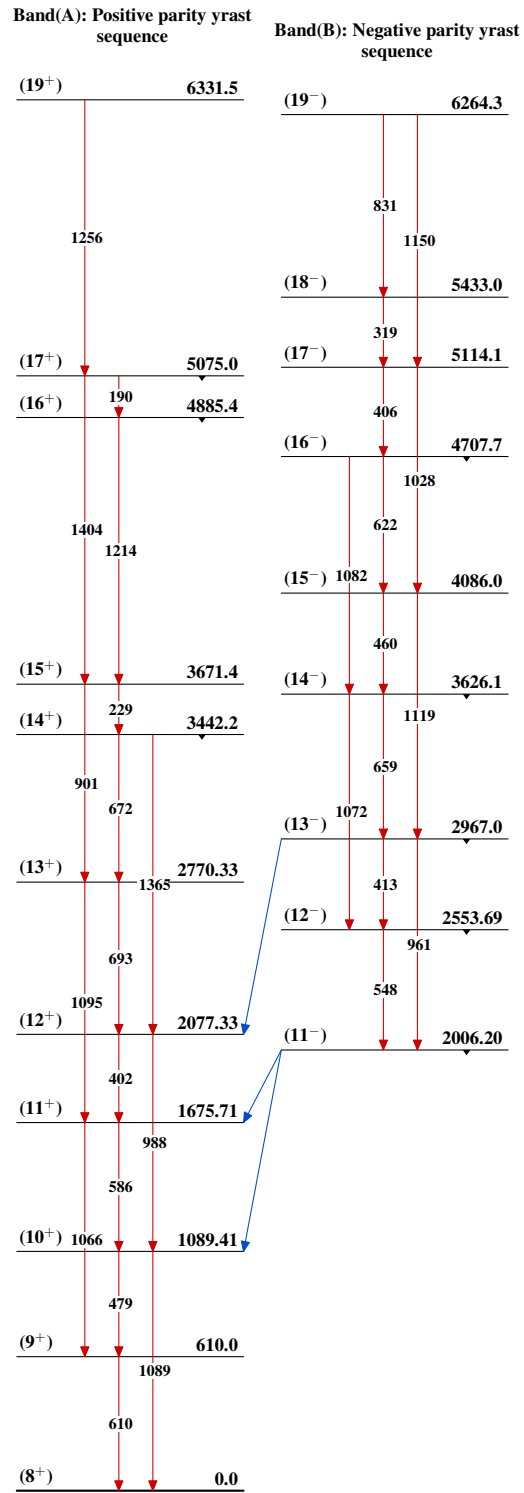
14.50 min 11

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



Adopted Levels, Gammas $^{88}_{41}\text{Nb}_{47}$