Adopted Levels, Gammas

Type	Author	Citation	Literature Cutoff Date
	History		
Full Evaluation	C. M. Baglin[1], E. A. Mccutchan[2], S. Basunia[1]	NDS 153, 1 (2018)	1-Oct-2018

Q(β^-)=−1050 *30*; S(n)=7293 *17*; S(p)=4218 *17*; Q(α)=2157 *20* 2017Wa10
S(2n)=16381 *43*; S(2p)=10571 *17* (2017Wa10).

^{170}Lu Levels

For discussion of nuclear band configurations see, e.g., 1969Tr02, 1988So04, 1997Ka30, 1999Le45. 1988So04 also predict the existence of a 7^+ isomer with a several-second half-life and E=225 *25*.

Cross Reference (XREF) Flags

A	^{170}Lu IT decay	D	^{164}Dy(^{11}B,5nγ)
B	^{170}Hf ε decay	E	^{170}Yb(^{3}He,t)
C	^{160}Gd(^{14}N,4nγ)		

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$	XREF	Comments
0.0[l]	0^+[m]	2.012 d *30*	AB D	%ε+%β^+=100 J$^\pi$: J=0 from atomic beam magnetic resonance (1968Ek01); π=+ based on E1-E1 γ cascade to g.s. from π=+ 785 level. T$_{1/2}$: weighted average of 2.02 d *3* (1970Ka23), 1.99 d *3* (1971DzZT), 2.05 d *5* (1960Wi14).
0.0+x[@]	(4$^-$)		CD	
0.0+y[d]	(7$^+$)		CD	
0.0+z[t]	(5$^+$)		D	
0.0+u[v]	(5$^-$)		D	
0.0+v[o]	(4$^-$)		D	E(level): could be same level As the 93 level; see comment on (π 7/2[404])+(ν 1/2[521]), α=0 band.
40.75+x[&] *6*	(5$^-$)		D	
44.51[l] *5*	2^+[m]	3.00 ns *6*	AB D	J$^\pi$: E2 45γ to 0^+. T$_{1/2}$: from $\gamma\gamma$(t) in ^{170}Hf ε decay.
92.91 *9*	(4)$^-$[#]	0.67 s *10*	AB	%IT=100 T$_{1/2}$: from γ(t) in ^{170}Lu IT decay. Possible configuration (π 7/2[404])+(ν 1/2[521]) (1988So04,1969Tr02).
94.60+z[s] *10*	(6$^+$)		D	
96.03 *10*	(3)$^-$		B	J$^\pi$: M1 188γ from (2)$^-$; possible configuration (π 1/2[541])-(ν 7/2[633]) (1988So04) requires J=3. Configuration (π 7/2[404])-(ν 1/2[521]) suggested in 1969Tr02 not adopted (see discussion In 1988So04).
98.53[i] *4*	1^+[h]	2.6 ns *2*	B	J$^\pi$: M1 98γ to 0^+ g.s. T$_{1/2}$: from (^{11}B,5nγ).
100.80+x[@] *7*	(6$^-$)		D	
101.32+v[p] *25*	(5$^-$)		D	
107.20+u[u] *10*	(6$^-$)		D	
114.90[i] *5*	3^+[h]		BCD	J$^\pi$: M1 70γ to 2^+; band assignment; E2+(M3) 16γ to 1^+.
116.01 *7*	(1)$^+$		B	J$^\pi$: M1 71γ to 2^+; log *ft*=7.3 from 0^+; 116γ to 0^+.
123.83+y[c] *5*	(8$^+$)		CD	
152.07[l] *6*	4^+[m]		D	J$^\pi$: E2 108γ to 2^+.
164.73[y] *5*	1^-	3.90 ns *20*	B	J$^\pi$: E1 164γ to 0^+. T$_{1/2}$: from $\gamma\gamma$(t) in ^{170}Hf ε decay.
170.02 *6*	2^+		B	J$^\pi$: M1+E2 28γ from 1^+; M1+E2 55γ to 3^+.

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Adopted Levels, Gammas (continued)

^{170}Lu Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$	XREF	Comments
176.62[n] 9	3+[m]	<1 ns	B D	Jπ: M1+E2 intraband 132γ to 2+ 45; J=3 from proposed band assignment (based on E(level)). $T_{1/2}$: from (^{11}B,5nγ).
180.92+x[&] 7	(7−)		CD	
198.39 5	1+		B	Jπ: M1 198γ to 0+. Possible configuration (π 1/2[541])+(ν 1/2[521]) (1988So04); however, 1969Tr02 suggest that 349 level is bandhead for that configuration.
206.82[i] 6	5+[h]		CD	Jπ: E2 intraband 92γ to 3+.
209.58+z[t] 14	(7+)		D	
212.51[y] 6	1−,2−		B	Jπ: E1 168γ to 2+; M1+E 248γ to 1− from 0+ favors J=1 but suggested band assignment requires J=2.
223.71+v[o] 25	(6−)		D	
226.41+y[e] 3	(6+)		D	
233.88+u[v] 14	(7−)		D	
237.67[j] 10	(4+)		D	
244.84[x] 5	1−		B	Jπ: E1 146γ to 1+; M1+E2 32γ to 1−,2−; log *ft*=7.7 (log $f^{1u}t$=8.0, uncertainty >0.6) from 0+.
262.67[g] 6	4+[h]		D	
271.19+y[d] 6	(9+)		CD	
277.09+x[@] 7	(8−)		CD	
283.88[x] 6	(2)−		B	Jπ: M1(+E2) 119γ to 1−; 191γ to (4)−.
304.16 10	0−,1−,2−		B	Jπ: E1 481γ from 1+. E(level): order of 481γ-208γ cascade not established, so alternative E=577.33 16 is possible. However, E=304 is favored by the tentative placement of a 511γ from the 815 level.
311.85[n] 7	5+[m]		D	Jπ: M1+E2 intraband 160γ to 4+; band assignment.
315.64[r] 17	(3)+		D	Jπ: M1+E2 139γ to 3+; band assignment.
316.01[k] 7	(5)+		D	Jπ: M1+E2 164γ to 4+; band assignment.
327.95+y[f] 4	(7+)		D	
328.89[l] 6	6+[m]		D	Jπ: (E2) intraband 164γ to 4+; band assignment.
344.63+z[s] 21	(8+)		D	
349.00 10	1+		B	Jπ: M1 349γ to 0+. Possible configuration (π 5/2[402])-(ν 7/2[633]) bandhead (1988So04). 1969Tr02 suggest (π 1/2[541])+(ν 1/2[521]) instead, but 1988So04 assign 198 level instead As bandhead of that configuration.
368.7+v[p] 3	(7−)		D	
375.73[i] 6	7+[h]		CD	Jπ: E2 intraband 169γ to (5)+; band assignment.
378.82+u[u] 20	(8−)		D	
391.45[q] 18	(4+)		D	
397.13+x[&] 7	(9−)		CD	
407.49[w] 5	(0)−		B	Jπ: E1 309γ to 1+; log *ft*≈6.7 (log $f^{1u}t$≈7.0) from 0+ in ^{170}Hf ε decay; J=0 required for proposed bandhead assignment.
411.62[j] 7	(6)+		D	Jπ: stretched E2 174γ to (4+); M1+E2 100γ to (5)+.
428.08[g] 6	6+[h]		D	Jπ: M1+E2 intraband 221γ to (5)+; stretched E2 165γ to (4+).
436.90? 10	(0+)		B	Jπ: 437γ to 0+ is (E0). Possible configuration (π 1/2[541])-(ν 1/2[521]) (1969Tr02) not adopted because that configuration was assigned at a different energy by 1999Le45 In (^{11}B,5nγ).
439.50+y[a] 6	(8−)		D	
441.36+y[c] 6	(10+)		CD	
454.05+y[e] 4	(8+)		D	
470.26[w] 5	1−		B	Jπ: E1 470γ to 0+.
486.29[r] 16	(5+)		D	

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Adopted Levels, Gammas (continued)

^{170}Lu Levels (continued)

E(level)†	Jπ‡	XREF	Comments
498.88+z[t] 24	(9+)	D	
511.83[n] 7	7+[m]	D	
524.17[k] 7	(7)+	D	Jπ: stretched E2 intraband 208γ to (5)+.
527.51+x[@] 7	(10−)	CD	
532.7+v[o] 3	(8−)	D	
540.89+u[v] 23	(9−)	D	
553.92+y[b] 6	(9−)	D	
579.95[l] 7	8+[m]	D	
598.00[q] 16	(6+)	D	
603.43+y[f] 5	(9+)	D	
621.42[i] 7	9+[h]	CD	Jπ: stretched E2 intraband 246γ to (7)+.
634.15+y[d] 6	(11+)	CD	
659.14[j] 7	(8+)	D	
670.36[g] 7	8+[h]	D	Jπ: stretched E2 intraband 243γ to (6)+.
672.5+z[s] 3	(10+)	D	
691.92+y[a] 6	(10−)	D	
692.33+x[&] 7	(11−)	CD	
713.9+u[u] 3	(10−)	D	
719.4+v[p] 4	(9−)	D	
733.94[r] 16	(7+)	D	
777.14+y[e] 6	(10+)	D	
785.48 5	1+	B	Jπ: log ft≈5.0 from Jπ=0+ in ^{170}Hf ε decay; 786γ to 0+. Possible configuration (π 7/2[404])-(ν 5/2[642]) (1988So04).
786.39[n] 7	9+[m]	D	
801.70 10	(1−)	B	Jπ: probable E1 757γ to 2+; 801.7γ to 0+ However, probable 687γ to π=+ 115 is M1+E2, or E1+M2 with δ=0.55.
809.48[k] 7	(9+)	D	
814.61 8	(1)−	B	Jπ: M1 511γ to π=− 304; 814γ to 0+.
848.16+y[c] 7	(12+)	CD	
853.33+y[b] 6	(11−)	D	
855.42+x[@] 7	(12−)	CD	
863.0+z[t] 3	(11+)	D	
879.23[q] 21	(8+)	D	
906.93[l] 7	10+[m]	D	
923.13 13	2+	B	Jπ: 923γ to 0+; M1+E2 747γ to 3+. log ft<7.3 from 0+, but ε branch to this level is very weak and unplaced γ-rays plausibly could feed it from above.
924.8+v[o] 6	(10−)	D	
925.4+u[v] 4	(11−)	D	
940.68[i] 8	11+[h]	CD	Jπ: stretched E2 intraband 319γ to (9)+.
969.44+y[f] 6	(11+)	D	
979.96[j] 7	(10+)	D	
989.91[g] 7	10+[h]	D	Jπ: stretched E2 intraband 320γ to (8)+.
1038.05+y[a] 6	(12−)	D	
1064.6[r] 4	(9+)	D	
1069.60+x[&] 8	(13−)	CD	
1072.4+z[s] 4	(12+)	D	
1083.12+y[d] 8	(13+)	CD	
1116.0+u[u] 5	(12−)	D	
1139.37[n] 8	11+[m]	D	

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Adopted Levels, Gammas (continued)

^{170}Lu Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	XREF
1150.3+v[p] 6	(11$^-$)	D
1174.76[k] 8	(11$^+$)	D
1189.52+y[e] 7	(12$^+$)	D
1237.44[q] 22	(10$^+$)	D
1245.41+y[b] 7	(13$^-$)	D
1263.77+x[@] 8	(14$^-$)	CD
1294.8+z[t] 5	(13$^+$)	D
1310.53[l] 8	12$^+$[m]	D
1328.65[i] 9	13$^+$[h]	CD
1337.55+y[c] 8	(14$^+$)	CD
1364.0+u[v] 6	(13$^-$)	D
1369.73[j] 8	(12$^+$)	D
1385.99[g] 7	12$^+$[h]	D
1410.5+v[o] 6	(12$^-$)	D
1420.84+y[f] 8	(13$^+$)	D
1473.2[r] 4	(11$^+$)	D
1474.61+y[a] 7	(14$^-$)	D
1529.12+x[&] 9	(15$^-$)	CD
1536.3+z[s] 6	(14$^+$)	D
1568.98[n] 9	13$^+$[m]	D
1590.1+u[u] 7	(14$^-$)	D
1611.44+y[d] 10	(15$^+$)	CD
1618.87[k] 9	(13$^+$)	D
1661.3+v[p] 21	(13$^-$)	D
1670.04[q] 24	(12$^+$)	D
1683.23+y[e] 9	(14$^+$)	D
1725.38+y[b] 8	(15$^-$)	D
1753.74+x[@] 10	(16$^-$)	CD
1779.49[i] 12	15$^+$[h]	CD
1786.2+z[t] 6	(15$^+$)	D
1792.17[l] 10	14$^+$[m]	D
1825.76[j] 12	(14$^+$)	D
1855.23[g] 9	14$^+$[h]	D
1903.19+y[c] 11	(16$^+$)	CD
1994.80+y[a] 8	(16$^-$)	D
2057.1+z[s] 7	(16$^+$)	D
2068.63+x[&] 11	(17$^-$)	CD
2083.23[n] 12	15$^+$[m]	D
2137.67[k] 14	(15$^+$)	D
2168.2[q] 11	(14$^+$)	D
2212.05+y[d] 13	(17$^+$)	CD
2253.03+y[e] 22	(16$^+$)	D
2286.60+y[b] 9	(17$^-$)	D
2288.59[i] 16	17$^+$[h]	CD
2325.33+x[@] 12	(18$^-$)	CD
2341.16[j] 16	(16$^+$)	D
2353.16[l] 13	16$^+$[m]	D
2388.83[g] 14	16$^+$[h]	D

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Adopted Levels, Gammas (continued)

^{170}Lu Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	XREF	Comments
2536.47+y[c] 22	(18$^+$)	CD	
2591.02+y[a] 12	(18$^-$)	D	
2680.03[n] 24	17$^+$[m]	D	
2684.05+x[&] 13	(19$^-$)	CD	
2701.77[k] 24	(17$^+$)	D	
2853.8[i] 3	19$^+$[h]	CD	XREF: C(2850).
2877.3+y[d] 4	(19$^+$)	CD	
2886.2+y[e] 5	(18$^+$)	D	
2918.0[j] 3	(18$^+$)	D	
2921.50+y[b] 13	(19$^-$)	D	
2967.54[g] 25	18$^+$[h]	D	
2976.65+x[@] 21	(20$^-$)	CD	
2992.3[l] 4	18$^+$[m]	D	
3230.3+y[c] 4	(20$^+$)	CD	
3253.30+y[a] 14	(20$^-$)	D	
3298.0[k] 4	(19$^+$)	D	
3370.16+x[&] 21	(21$^-$)	CD	
3475.0[i] 4	21$^+$[h]	CD	XREF: C(3470).
3549.3[j] 4	(20$^+$)	D	
3568.5[g] 4	20$^+$[h]	D	
3598.0+y[d] 5	(21$^+$)	CD	
3619.2+y[b] 5	(21$^-$)	D	
3705.4+x[@] 4	(22$^-$)	CD	XREF: C(3703).
3907.1[k] 5	(21$^+$)	D	
3962.2+y[a] 6	(22$^-$)	D	
3971.4+y[c] 6	(22$^+$)	CD	
4122.7+x[&] 5	(23$^-$)	CD	
4153.6[i] 5	23$^+$[h]	CD	XREF: C(4148).
4203.2[g] 5	22$^+$[h]	D	
4235.3[j] 5	(22$^+$)	D	
4355.7+y[d] 6	(23$^+$)	CD	
4382.0+y[b] 7	(23$^-$)	D	
4508.4+x[@] 7	(24$^-$)	CD	XREF: C(4505).
4730.2+y[c] 7	(24$^+$)	D	
4859.6[g] 6	24$^+$[h]	D	
4890.5[i] 6	25$^+$[h]	CD	XREF: C(4884).
4935.4+x[&] 11	(25$^-$)	CD	XREF: C(4932).
4973.7[j] 6	(24$^+$)	D	
5126.8+y[d] 12	(25$^+$)	D	
5383.1+x[@] 9	(26$^-$)	D	
5524.3+y[c] 12	(26$^+$)	D	
5685.3[i] 8	27$^+$[h]	CD	XREF: C(5672).
5772.5[j] 8	(26$^+$)	D	
5803.3+x[&] 13	(27$^-$)	D	
5947.3+y[d] 16	(27$^+$)	D	
6323.8+x[@] 11	(28$^-$)	D	
6376.2+y[c] 16	(28$^+$)	D	

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Adopted Levels, Gammas (continued)

^{170}Lu Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$	XREF	Comments
6535.8[i] *10*	29^{+h}		CD	XREF: C(6519).
7324.8+x[@] *23*	(30^{-})		D	
7440.1[i] *12*	31^{+h}		CD	XREF: C(7422).
8375.1?[i]	33^{+h}		C	
12855 *20*	0^{+}	75 keV *21*	E	J^{π}: IAS of ^{170}Yb g.s. $T_{1/2}$: from (^{3}He,t).

[†] From least-squares fit to adopted Eγ.

[‡] Values given without further comment are from ^{164}Dy(^{11}B,5nγ); they are based on observed band structure, γ multipolarity from DCO ratios, analogy to neighboring nuclides and cranked-shell model arguments (see 1997Ka30).

[#] M2 48γ to 2^{+}; if J=3, the competing E1 transition to the 2^{+} state would have B(E1)(W.u.)<1.21×10^{-14} for 48γ if δ>0.17 (assuming a 10% uncertainty in the L1/L2 ratio); this value of B(E1)(W.u.) is extremely small and disfavors J=3. Possible $K^{\pi}=4^{-}$ configuration=((π 7/2[404])+(ν 1/2[521])) bandhead (1969Tr02); if so, ΔK=4 for the 48-keV transition. Apparent feeding of this level in ε decay from 0^{+} could plausibly result from an as yet unobserved ΔK=1 transition connecting the 96 and 93 levels.

[@] Band(A): (π $h_{9/2}$)⊗(ν $i_{13/2}$), α=0 (1999Le45).

[&] Band(a): (π $h_{9/2}$)⊗(ν $i_{13/2}$), α=1 (1999Le45).

[a] Band(B): (π 9/2[514])⊗(ν $i_{13/2}$), α=0 band (1999Le45). Transition energies resemble those of 9/2[514] bands in ^{169}Lu and ^{171}Lu; exhibits signature inversion at J=12, characteristic of 9/2[514].

[b] Band(b): (π 9/2[514])⊗(ν $i_{13/2}$), α=1 band (1999Le45). Transition energies resemble those of 9/2[514] bands in ^{169}Lu and ^{171}Lu; exhibits signature inversion at J=12, characteristic of 9/2[514].

[c] Band(C): (π 7/2[404])⊗(ν $i_{13/2}$), α=0 band (1999Le45). Transition energies closely resemble those of 7/2[404] bands in ^{169}Lu and ^{171}Lu. However, in (^{14}N,4nγ), a $K^{\pi}=4^{-}$ (π $g_{7/2}$)⊗(ν $p_{3/2}$), α=1 assignment was proposed.

[d] Band(c): (π 7/2[404])⊗(ν $i_{13/2}$), α=1 band (1999Le45). Signature partner of (π 7/2[404])⊗(ν $i_{13/2}$), α=0 band; please see comments on that band.

[e] Band(D): (π 5/2[402])⊗(ν $i_{13/2}$), α=0 band (1999Le45). Transition energies resemble those of 5/2[402] bands in ^{169}Lu and ^{171}Lu.

[f] Band(d): (π 5/2[402])⊗(ν $i_{13/2}$), α=1 band (1999Le45). Transition energies resemble those of 5/2[402] bands in ^{169}Lu and ^{171}Lu.

[g] Band(E): (π $h_{9/2}$)-(ν 1/2[521]), α=0 band (1999Le45). Doubly-decoupled band. Model calculations yield decoupling parameters close to those for (π 1/2[541]) bands in ^{169}Lu and ^{171}Lu and for (ν 1/2[521]) in ^{169}Yb and ^{171}Hf; observed Newby shift (−36.8 *8*) is close to value calculated (−34 keV; 1988Fr16) for the ^{172}Lu (π 1/2[541])-(ν 1/2[521]) configuration. J=0 and 2 band members not identified.

[h] Definite J^{π} assigned to members of (π $h_{9/2}$)-(ν 1/2[521]) band based on progression of level energies and independently-established $J^{\pi}=1^{+}$ for bandhead and E2 multipolarity for J=5 to 3, 92γ.

[i] Band(e): (π $h_{9/2}$)-(ν 1/2[521]), α=1 band (1999Le45). Signature partner of (π $h_{9/2}$)⊗(ν 1/2[521]), α=0 band; see comments on that band.

[j] Band(F): ((π 1/2[411])+(ν $i_{13/2}$))4^{+}, favored, α=0 (1999Le45). Semidecoupled band, twin of band based on 3^{+} 315.6 level; assignment supported by similarity of transition energies to those for 7/2[633] band In ^{169}Yb, additivity of inertia parameters and agreement between calculated and observed In-band branching by J≈8.

[k] Band(f): ((π 1/2[411])+(ν $i_{13/2}$))4^{+}, favored, α=1 (1999Le45). Signature partner of ((π 1/2[411])+(ν $i_{13/2}$))4^{+}, favored, α=0 band; please see comments on that band.

[l] Band(G): $K^{\pi}=0^{+}$, (π 7/2[404])-(ν 7/2[633]), α=0 g.s. band (1999Le45). Rotational parameter α=7.4 (J even), 7.5 (J odd). Doubly-decoupled band; exhibits marked dipolar staggering; Newby shift (+40 *4*) matches that calculated (+36 keV; 1988Fr16) for this configuration.

[m] Definite J^{π} assigned to members of (π 7/2[404])-(ν 7/2[633]) band based on progression of level energies and independently-established $J^{\pi}=0^{+}$ for bandhead and E2 multipolarity for J=0 to 2, 45γ.

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Adopted Levels, Gammas (continued)

^{170}Lu Levels (continued)

[n] Band(g): $K^{\pi}=0^{+}$, (π 7/2[404])-(ν 7/2[633]), α=1 band (1999Le45). Signature partner of $K^{\pi}=0^{+}$, (π 7/2[404])-(ν 7/2[633]), α=0 band; please see comments on that band. 1969Tr02 and 1988So04 identify the 98.5 level As the J=1 member of this band but 1999Le45 assign that level to the (π $h_{9/2}$)-(ν 1/2[521]) band instead and do not identify the J=1 member of this band.

[o] Band(H): (π 7/2[404])+(ν 1/2[521]), α=0 band (?) (1999Le45). Semidecoupled band. Transition energy ratios suggest mixture of K=4 and 3 configurations, disfavoring (π 1/2[411])$\otimes$(ν 5/2[512]) and (π $h_{9/2}$)$\otimes$(ν 5/2[512]) configurations. note that 1969Tr02 and 1988So04 assign the same configuration to the 93-keV 4^{-} isomer; this suggests that the 93 level and the 0.0+v level of 1999Le45 could be the same state, but 1999Le45 do not comment on this.

[p] Band(h): (π 7/2[404])+(ν 1/2[521]), α=1 band (?) (1999Le45). Signature partner of (π 7/2[404])+(ν 1/2[521]), α=0 band; please see comments on that band.

[q] Band(I): ((π 1/2[411])-(ν $i_{13/2}$))3^{+}, unfavored, α=0 band (?). Semidecoupled band, twin of band based on 4^{+} 238 level; assignment supported by similarity of transition energies to those for 7/2[633] band In ^{169}Yb and additivity of inertia parameters.

[r] Band(i): ((π 1/2[411])-(ν $i_{13/2}$))3^{+}, unfavored, α=1 band (?). Signature partner of ((π 1/2[411])-(ν $i_{13/2}$))3^{+}, unfavored, α=0 band; please see comments on that band.

[s] Band(J): (π 9/2[514])$\otimes$(ν 1/2[521]), α=0 band (?) (1999Le45). Semidecoupled band. Strong dipolar cascade suggests presence of 9/2[514] orbital and branching is similar to that in odd-proton neighbors; transition energy ratios suggest mixture of K=4 and 5 states.

[t] Band(j): (π 9/2[514])$\otimes$(ν 1/2[521]), α=1 band (?) (1999Le45). Signature partner of (π 9/2[514])$\otimes$(ν 1/2[521]), α=0 band; please see comments on that band.

[u] Band(K): (π 5/2[402])$\otimes$(ν 5/2[512]), α=0 band (?) (1999Le45). Dipolar staggering occurring near 173.0 transition is similar to that observed for (π 5/2[402]) bands in ^{169}Lu and ^{171}Lu; branchings favor (ν 5/2[512]) over (ν 1/2[521]).

[v] Band(k): (π 5/2[402])$\otimes$(ν 5/2[512]), α=1 band (?) (1999Le45). Dipolar staggering occurring near 173.0 transition is similar to that observed for (π 5/2[402]) bands in ^{169}Lu and ^{171}Lu; branchings favor (ν 5/2[512]) over (ν 1/2[521]).

[w] Band(L): possible $K^{\pi}=0^{-}$ band (1969Tr02,1988So04). Proposed configuration (π 1/2[411])-(ν 1/2[521]). Band exhibits Newby shift so band parameter A cannot be deduced from J=0 and J=1 energies.

[x] Band(M): possible $K^{\pi}=1^{-}$ band (1969Tr02). Configuration (π 1/2[411])+(ν 1/2[521]). Rotational parameter α=9.8.

[y] Band(N): possible $K^{\pi}=1^{-}$ band (1969Tr02,1988So04). Configuration (π 7/2[404])-(ν 5/2[512]) (1969Tr02,1988So04). Rotational parameter α=11.9.

Adopted Levels, Gammas (continued)

γ(^{170}Lu)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[†]	δ[‡]	α[&]	Comments
40.75+x	(5⁻)	40.56 *7*		0.0+x	(4⁻)	[M1(+E2)]		9.×10¹ *9*	
44.51	2⁺	44.52[@] *10*	100[@]	0.0	0⁺	E2[@]		114.6 *21*	B(E2)(W.u.)=163 *7*
92.91	(4)⁻	48.42[@] *10*	100[@]	44.51	2⁺	M2[@]		223	B(M2)(W.u.)=2.4×10⁻⁵ *4*
94.60+z	(6⁺)	94.6 *1*	100	0.0+z	(5⁺)				
98.53	1⁺	54.03[@] *10*	33[@]	44.51	2⁺	M1[@]		3.67	
		98.55 *4*	100	0.0	0⁺	M1		3.84	E_γ: weighted average of 98.55 *10* in ε decay and 98.55 *5* in (^{11}B,5nγ). I_γ,Mult.: from ε decay. Some E2 admixture indicated by DCO ratio and intensity balance in (^{11}B,5nγ), inconsistent with 1⁺ to 0⁺ transition.
100.80+x	(6⁻)	60.5 *5*		40.75+x	(5⁻)	[M1(+E2)]		14 *12*	E_γ: Masked by Kβ x ray(Lu) in (^{11}B,5nγ); existence inferred from spectra coincident with 140γ and 101γ, and from distortion of x-ray intensity relations in spectra coincident with 60.5γ.
		101.2 *1*		0.0+x	(4⁻)	[E2]		3.21	
101.32+v	(5⁻)	101.6 *3*	100	0.0+v	(4⁻)	[M1+E2]		3.34 *19*	
107.20+u	(6⁻)	107.2 *1*	100	0.0+u	(5⁻)				
114.90	3⁺	16.39[@] *10*	≈0.085[@]	98.53	1⁺	E2+(M3)	≈0.03	≈2.52×10⁴	I_γ,Mult.,δ: ce subshell ratios in ε decay are consistent with E2+M3 or M1+E2 multipolarity; Iγ was calculated from Ice in ε decay assuming E2+M3 and δ≈0.03 (so α≈25800). The M1+E2 option was rejected because band structure deduced in (^{11}B,5nγ) requires a ΔJ=2 transition.
		70.38 *5*	100	44.51	2⁺	M1		10.10	E_γ: weighted average of 70.42 *10* in ε decay and 70.36 *6* in (^{11}B,5nγ). I_γ,Mult.: from ε decay.
116.01	(1)⁺	71.48[@] *10*	34[@]	44.51	2⁺	M1[@]		9.66	
		115.95[@] *10*	100[@]	0.0	0⁺	[M1][@]		2.41	Mult.: E2(+M1) from α(K)exp, but K/L1 favors M1.
123.83+y	(8⁺)	124.01 *6*	100	0.0+y	(7⁺)	(M1+E2)		1.7 *3*	
152.07	4⁺	107.58 *4*	100	44.51	2⁺	E2		2.54	
164.73	1⁻	120.19[@] *10*	57[@]	44.51	2⁺	E1[@]		0.216	B(E1)(W.u.)=1.04×10⁻⁵ *6*
		164.71[@] *10*	100[@]	0.0	0⁺	E1[@]		0.0946	B(E1)(W.u.)=7.0×10⁻⁶ *4*
170.02	2⁺	55.19[@] *10*	100[@]	114.90	3⁺	M1+E2[@]	0.13	4.06 *7*	
		71.58[@] *10*	7.8[@]	98.53	1⁺	E2[@]		12.99	
176.62	3⁺	132.09 *8*	100	44.51	2⁺	M1+E2		1.42 *24*	E_γ: weighted average of 132.20 *10* in ε decay and 132.04 *7* in (^{11}B,5nγ).
180.92+x	(7⁻)	80.17 *4*	100 *12*	100.80+x	(6⁻)	(M1+E2)		7.5 *6*	E_γ: other: 79.8 in (^{14}N,4nγ).
		140.13 *3*	40	40.75+x	(5⁻)	[E2]		0.954	
198.39	1⁺	28.38[@] *10*	10[@]	170.02	2⁺	M1+E2[@]	0.079	30.9 *6*	

$^{170}_{71}Lu_{99}$-8

Adopted Levels, Gammas (continued)

γ(^{170}Lu) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[†]	δ[‡]	α[&]	Comments
198.39	1$^+$	99.93[@] *10*	100[@]	98.53	1$^+$	M1+E2[@]	0.61	3.60 *6*	
		153.9[@] *1*	3.3[@]	44.51	2$^+$	M1+E2[@]	0.84	0.905	
		198.48[@] *10*	6.9[@]	0.0	0$^+$	M1[@]		0.529	
206.82	5$^+$	91.95 *5*	100	114.90	3$^+$	E2		4.67	
209.58+z	(7$^+$)	115.0 *1*	>70	94.60+z	(6$^+$)				I_γ: >110 *40*.
		210[a] *1*	100	0.0+z	(5$^+$)				
212.51	1$^-$,2$^-$	47.80[@] *10*	100[@]	164.73	1$^-$	M1+E2[@]	0.048	5.43 *9*	
		168.0[@] *1*	13.5[@]	44.51	2$^+$	E1[@]		0.0898	
223.71+v	(6$^-$)	122.4 *1*	56 *13*	101.32+v	(5$^-$)	[M1+E2]		1.8 *3*	
		223.2 *4*	100	0.0+v	(4$^-$)	[E2]		0.193	
226.41+y	(6$^+$)	226.36 *3*	100	0.0+y	(7$^+$)	M1+E2		0.28 *10*	
233.88+u	(7$^-$)	126.7 *1*	90 *30*	107.20+u	(6$^-$)				
		234 *1*	100	0.0+u	(5$^-$)				
237.67	(4$^+$)	61[a] *1*	100	176.62	3$^+$				
244.84	1$^-$	32.35[@] *10*	5.8[@]	212.51	1$^-$,2$^-$	M1+E2[@]	0.09	20.9 *4*	
		74.9[@] *1*	15[@]	170.02	2$^+$				
		80.13[@] *10*	54[@]	164.73	1$^-$	M1[@]		6.96	
		146.32[@] *10*	100[@]	98.53	1$^+$	E1[@]		0.1290	
262.67	4$^+$	56.0[a]		206.82	5$^+$				E_γ: existence of γ inferred from observed distortion of Lu x-ray intensity relations in (^{11}B,5nγ).
		147.75 *3*		114.90	3$^+$				
271.19+y	(9$^+$)	147.35 *4*	100 *7*	123.83+y	(8$^+$)	(M1+E2)		1.01 *22*	
		271.3 *2*	33	0.0+y	(7$^+$)	(E2)		0.1040	
277.09+x	(8$^-$)	96.16 *4*	100 *9*	180.92+x	(7$^-$)	(M1(+E2))		4.02 *12*	
		176.30 *4*	55	100.80+x	(6$^-$)	E2		0.426	
283.88	(2)$^-$	39.06[@] *10*	≈0.3[@]	244.84	1$^-$	E2[@]		218 *5*	
		113.9[@a] *1*	21.1[@]	170.02	2$^+$				
		119.15[@] *10*	100[@]	164.73	1$^-$	M1(+E2)[@]	<1.3	2.07 *16*	
		169.0[@] *1*	71[@]	114.90	3$^+$	E1[@]		0.0885	
		185.4[@] *1*	25.0[@]	98.53	1$^+$				
		187.87[@] *10*	10.5[@]	96.03	(3)$^-$	M1[@]		0.616	
		191.0[@] *1*	7.9[@]	92.91	(4)$^-$				
304.16	0$^-$,1$^-$,2$^-$	208.1[@] *1*	100[@]	96.03	(3)$^-$	M1(+E2)[@]	≤0.8	0.42 *5*	
311.85	5$^+$	73.18		237.67	(4$^+$)				E_γ: from level energy difference.
		134.8 *2*		176.62	3$^+$				
		159.83 *5*		152.07	4$^+$	M1+E2		0.78 *19*	
315.64	(3)$^+$	139.3 *2*	100	176.62	3$^+$	M1+E2		1.20 *23*	
316.01	(5)$^+$	77.9		237.67	(4$^+$)				
		164.02 *4*		152.07	4$^+$	M1+E2		0.72 *18*	

$^{170}_{71}Lu_{99}$-9

Adopted Levels, Gammas (continued)

γ(^{170}Lu) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[†]	α[&]	Comments
327.95+y	(7$^+$)	101.78 *6*		226.41+y	(6$^+$)	[M1(+E2)]	3.32 *19*	
		204.4 *2*		123.83+y	(8$^+$)	M1+E2	0.37 *12*	
		328.2 *2*		0.0+y	(7$^+$)	[M1(+E2)]	0.10 *4*	
328.89	6$^+$	17.0[a]		311.85	5$^+$			
		176.77 *3*		152.07	4$^+$	(E2)	0.422	
344.63+z	(8$^+$)	135.2 *2*	100	209.58+z	(7$^+$)			
		249.6 *5*	100	94.60+z	(6$^+$)			
349.00	1$^+$	349.0[@] *1*	100[@]	0.0	0$^+$	M1[@]	0.1140	
368.7+v	(7$^-$)	145.0 *1*		223.71+v	(6$^-$)	[M1+E2]	1.06 *22*	
		267.4 *1*		101.32+v	(5$^-$)	[E2]	0.1088	
375.73	7$^+$	168.88 *3*	100	206.82	5$^+$	E2	0.494	
378.82+u	(8$^-$)	145.0 *2*	83 *21*	233.88+u	(7$^-$)			
		271.4 *3*	100	107.20+u	(6$^-$)			
391.45	(4$^+$)	75.8 *1*	100	315.64	(3)$^+$	[M1(+E2)]	9.2 *11*	
397.13+x	(9$^-$)	120.05 *3*	106 *7*	277.09+x	(8$^-$)	(M1(+E2))	1.9 *3*	
		216.22 *4*	100	180.92+x	(7$^-$)	E2	0.215	
407.49	(0)$^-$	123.6[@a] *1*	1.38[@]	283.88	(2)$^-$			
		162.65[@] *10*	66[@]	244.84	1$^-$	[M1][@]	0.922	Mult.,δ: M1+E2 from α(K)exp for complex line, but E2 component inconsistent with placement.
		209.3[@] *1*	24.5[@]	198.39	1$^+$	(E1)[@]	0.0509	
		242.75[@] *10*	3.8[@]	164.73	1$^-$	M1[@]	0.304	
		291.4[@] *1*	51[@]	116.01	(1)$^+$	E1[@]	0.0222	
		308.9[@] *1*	100[@]	98.53	1$^+$	E1[@]	0.0192	
411.62	(6)$^+$	95.68 *7*	11 *11*	316.01	(5)$^+$	M1+E2	4.08 *11*	
		99.84 *7*		311.85	5$^+$	M1+E2	3.54 *17*	
		173.95 *7*	100	237.67	(4$^+$)	E2	0.446	E_γ: other: 175.8 in (^{14}N,4nγ).
428.08	6$^+$	52.5[a]		375.73	7$^+$			
		165.37 *4*		262.67	4$^+$	E2	0.531	
		221.29 *3*		206.82	5$^+$	M1+E2	0.30 *10*	
436.90?	(0$^+$)	436.9[a] *1*		0.0	0$^+$	(E0)		E_γ,Mult.: from ε decay.
439.50+y	(8$^-$)	168.20 *5*		271.19+y	(9$^+$)	E1	0.0896	
		315.63 *4*		123.83+y	(8$^+$)	E1	0.0182	
		439.3 *2*		0.0+y	(7$^+$)	(E1)	0.00841 *12*	
441.36+y	(10$^+$)	170.28 *5*	10 *8*	271.19+y	(9$^+$)	(M1+E2)	0.65 *17*	
		317.58 *4*	100	123.83+y	(8$^+$)	(E2)	0.0646	
454.05+y	(8$^+$)	126.14 *3*		327.95+y	(7$^+$)	[M1(+E2)]	1.65 *25*	
		227.54 *3*		226.41+y	(6$^+$)	[E2]	0.182	
		330.5 *3*		123.83+y	(8$^+$)			
470.26	1$^-$	62.8[@] *1*	12.6[@]	407.49	(0)$^-$	M1[@]	2.36	
		186.5[@] *1*	7.6[@]	283.88	(2)$^-$			
		225.5[@] *1*	98[@]	244.84	1$^-$	M1[@]	0.372	

$^{170}_{71}Lu_{99}$-10

Adopted Levels, Gammas (continued)

γ(^{170}Lu) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[†]	δ[‡]	α[&]	Comments
470.26	1⁻	257.8[@] *1*	10.1[@]	212.51	1⁻,2⁻	M1+E2[@]	≈1.5	≈0.1638	
		425.7[@] *1*	100[@]	44.51	2⁺	E1[@]		0.00904	
		470.2[@] *1*	61[@]	0.0	0⁺	E1[@]			
486.29	(5⁺)	94.8 *2*	100 *52*	391.45	(4⁺)	(M1(+E2))		4.21 *10*	
		171.0 *2*	43	315.64	(3)⁺	[E2]		0.473	
498.88+z	(9⁺)	154.2 *2*	100 *41*	344.63+z	(8⁺)				
		289.1 *3*	37	209.58+z	(7⁺)				
511.83	7⁺	182.93 *3*	100 *25*	328.89	6⁺	M1+E2		0.52 *15*	
		199.9 *1*	13	311.85	5⁺	[E2]		0.278	
524.17	(7)⁺	112.48 *9*	72 *36*	411.62	(6)⁺	M1+E2		2.38 *25*	
		195.18 *4*		328.89	6⁺	(M1(+E2))		0.43 *13*	
		208.38 *8*	100	316.01	(5)⁺	E2		0.242	
527.51+x	(10⁻)	130.37 *3*	69.8 *23*	397.13+x	(9⁻)	(M1+E2)		1.48 *25*	
		250.40 *3*	100	277.09+x	(8⁻)	(E2)		0.1337	E_γ: other: 249.5 in (^{14}N,4nγ).
532.7+v	(8⁻)	164.5 *4*		368.7+v	(7⁻)	[M1,E2]		0.72 *18*	
		309.0 *1*		223.71+v	(6⁻)	[E2]		0.0700	
540.89+u	(9⁻)	162.0 *2*	21	378.82+u	(8⁻)				
		307.1 *3*	100	233.88+u	(7⁻)				
553.92+y	(9⁻)	114.43 *4*		439.50+y	(8⁻)	[M1(+E2)]		2.25 *25*	
		282.70 *4*		271.19+y	(9⁺)	[E1]		0.0239	
		430.4 *1*		123.83+y	(8⁺)	[E1]		0.00881	
579.95	8⁺	68.08 *5*	22 *3*	511.83	7⁺	[M1(+E2)]		13.6 *25*	
		251.08 *4*	100	328.89	6⁺	(E2)		0.1325	
598.00	(6⁺)	111.3 *2*	100 *40*	486.29	(5⁺)	(M1(+E2))		2.47 *24*	
		186.0 *2*		411.62	(6)⁺	[M1(+E2)]		0.49 *14*	
		206.5 *3*	67	391.45	(4⁺)	[E2]		0.250	
603.43+y	(9⁺)	149.32 *3*	100 *17*	454.05+y	(8⁺)	[M1(+E2)]		0.97 *21*	
		275.52 *4*	95	327.95+y	(7⁺)	[E2]		0.0992	
		332.6 *1*		271.19+y	(9⁺)	[M1(+E2)]		0.09 *4*	
621.42	9⁺	245.63 *3*	100	375.73	7⁺	E2		0.1421	
634.15+y	(11⁺)	192.75 *5*	17.1 *11*	441.36+y	(10⁺)	(M1(+E2))		0.44 *13*	E_γ: other: 192.1 in (^{14}N,4nγ).
		362.92 *5*	100	271.19+y	(9⁺)	(E2)		0.0439	
659.14	(8⁺)	134.96 *7*	11 *5*	524.17	(7)⁺				
		147.0 *1*		511.83	7⁺				
		247.65 *5*	100	411.62	(6)⁺				
670.36	8⁺	242.5 *1*		428.08	6⁺	E2		0.1480	
		294.71 *5*		375.73	7⁺	M1+E2		0.13 *5*	
672.5+z	(10⁺)	173.5 *2*		498.88+z	(9⁺)				
		328.2 *3*		344.63+z	(8⁺)				
691.92+y	(10⁻)	137.99 *5*	100 *13*	553.92+y	(9⁻)	(M1+E2)		1.24 *23*	
		250.77 *4*		441.36+y	(10⁺)	[E1]		0.0322	
		251.7 *1*	26	439.50+y	(8⁻)	(E2)		0.1315	

$^{170}_{71}Lu_{99}$-11

Adopted Levels, Gammas (continued)

γ(^{170}Lu) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[†]	δ[‡]	α[&]
691.92+y	(10⁻)	420.88		271.19+y	(9⁺)	[E1]		0.00927 *13*
692.33+x	(11⁻)	164.82 *3*	53.9 *20*	527.51+x	(10⁻)	(M1+E2)		0.71 *18*
		295.21 *3*	100	397.13+x	(9⁻)	(E2)		0.0803
713.9+u	(10⁻)	173.0 *2*		540.89+u	(9⁻)			
		335.2 *3*		378.82+u	(8⁻)			
719.4+v	(9⁻)	350.7 *2*	100	368.7+v	(7⁻)	[E2]		0.0484
733.94	(7⁺)	135.89 *5*	100 *33*	598.00	(6⁺)	[M1(+E2)]		1.30 *24*
		247.71 *6*	83	486.29	(5⁺)	[E2]		0.1383
777.14+y	(10⁺)	173.68 *5*	100 *25*	603.43+y	(9⁺)	[M1(+E2)]		0.61 *16*
		323.06 *6*	84	454.05+y	(8⁺)	[E2]		0.0614
785.48	1⁺	315.4[@] *1*	0.6[@]	470.26	1⁻			
		378.0[@] *1*	0.69[@]	407.49	(0)⁻			
		481.3[@] *1*	20.4[@]	304.16	0⁻,1⁻,2⁻	E1[@]		
		501.6[@] *1*	20.6[@]	283.88	(2)⁻	E1[@]		
		540.7[@] *1*	13.6[@]	244.84	1⁻	E1[@]		
		572.9[@] *1*	81[@]	212.51	1⁻,2⁻	E1[@]		
		587.1[@] *1*	1.47[@]	198.39	1⁺	M1[@]		0.0294
		608.8[@a] *1*	0.92[@]	176.62	3⁺			
		615.5[@] *1*	2.08[@]	170.02	2⁺	M1[@]		0.0260
		620.7[@] *1*	100[@]	164.73	1⁻	E1[@]		
		669.4[@a] *1*	0.92[@]	116.01	(1)⁺			
		740.8[@] *1*	1.02[@]	44.51	2⁺	E2(+M1)[@]	≈1.5	≈0.01009
		785.5[@a] *1*	0.24[@]	0.0	0⁺			
786.39	9⁺	206.47 *3*		579.95	8⁺	(M1(+E2))		0.36 *12*
		274.78 *8*		511.83	7⁺	(E2)		0.1000
801.70	(1⁻)	686.7[@a] *1*	64[@]	114.90	3⁺			
		757.1[@a] *1*	100[@]	44.51	2⁺	E1[@]		
		801.7[@] *1*	65[@]	0.0	0⁺			
809.48	(9⁺)	150.50 *9*	90 *54*	659.14	(8⁺)	[M1(+E2)]		0.94 *21*
		229.58 *4*		579.95	8⁺	(M1(+E2))		0.27 *9*
		285.20 *6*	100	524.17	(7)⁺	(E2)		0.0892
814.61	(1)⁻	510.9[@a] *1*	100[@]	304.16	0⁻,1⁻,2⁻	M1[@]		0.0420
		770.2[@] *1*	76[@]	44.51	2⁺			
		814.5[@] *1*	37[@]	0.0	0⁺			
848.16+y	(12⁺)	214.4 *1*	6 *4*	634.15+y	(11⁺)	(M1+E2)		0.32 *11*
		406.65 *9*	100	441.36+y	(10⁺)	(E2)		0.0320
853.33+y	(11⁻)	161.45 *3*	100 *9*	691.92+y	(10⁻)	(M1+E2)		0.76 *19*
		299.6 *1*	52	553.92+y	(9⁻)	(E2)		0.0768
		411.83 *7*		441.36+y	(10⁺)	[E1]		0.00974

$^{170}_{71}Lu_{99}$-12

Adopted Levels, Gammas (continued)

γ(^{170}Lu) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[†]	δ[‡]	α[&]	Comments
855.42+x	(12$^-$)	163.13 *3*	41.2 *11*	692.33+x	(11$^-$)	(M1+E2)		0.74 *18*	
		327.90 *3*	100	527.51+x	(10$^-$)	(E2)		0.0588	
863.0+z	(11$^+$)	190.5 *2*		672.5+z	(10$^+$)				
		364.1 *3*		498.88+z	(9$^+$)				
879.23	(8$^+$)	145.2 *2*		733.94	(7$^+$)	[E2]		1.05 *22*	
		220.3 *3*		659.14	(8$^+$)	M1+E2		0.30 *10*	Mult.: DCO ratio analysis in (^{11}B,5nγ) indicates a ΔJ=0 transition.
		281 *1*		598.00	(6$^+$)				
906.93	10$^+$	120.61 *4*		786.39	9$^+$	(M1+E2)		1.9 *3*	
		326.75 *6*		579.95	8$^+$	(E2)		0.0594	
923.13	2$^+$	639.4[@a] *1*	21.1[@]	283.88	(2)$^-$				
		746.5[@] *1*	100[@]	176.62	3$^+$	M1+E2[@]	≈1.7	≈0.0095	
		808.1[@a] *1*	18.4[@]	114.90	3$^+$				
		878.7[@a] *1*	34[@]	44.51	2$^+$				
		923.1[@a] *1*	13.2[@]	0.0	0$^+$				
924.8+v	(10$^-$)	392.1 *5*	100	532.7+v	(8$^-$)	(E2)		0.0353	
925.4+u	(11$^-$)	211.5 *3*		713.9+u	(10$^-$)				
		384.5		540.89+u	(9$^-$)				E_γ: value expected from sum of relevant cascade Eγ values in (^{11}B,5nγ).
940.68	11$^+$	319.28 *4*	100	621.42	9$^+$	E2		0.0636	
969.44+y	(11$^+$)	192.19 *6*	86 *43*	777.14+y	(10$^+$)	[M1(+E2)]		0.45 *13*	
		366.05 *4*	100	603.43+y	(9$^+$)	[E2]		0.0428	
979.96	(10$^+$)	170.8	7 *4*	809.48	(9$^+$)				
		309.65 *5*		670.36	8$^+$	[E2]		0.0696	
		320.77 *6*	100	659.14	(8$^+$)	[E2]		0.0627	
		359.0 *2*		621.42	9$^+$	[E2]		0.0452	
989.91	10$^+$	180.34 *5*		809.48	(9$^+$)				
		319.61 *4*		670.36	8$^+$	E2		0.0634	
		330.82 *8*		659.14	(8$^+$)				
		368.16 *6*		621.42	9$^+$				
1038.05+y	(12$^-$)	184.76 *2*	100 *9*	853.33+y	(11$^-$)	(M1+E2)		0.50 *15*	
		346.15 *4*	82	691.92+y	(10$^-$)	(E2)		0.0502	
		403.60 *6*		634.15+y	(11$^+$)	[E1]		0.01021	
1064.6	(9$^+$)	185.3 *3*		879.23	(8$^+$)	[E2]		0.50 *14*	
		332 *2*		733.94	(7$^+$)				
1069.60+x	(13$^-$)	214.31 *4*	33.5 *13*	855.42+x	(12$^-$)	(M1+E2)		0.32 *11*	
		377.22 *4*	100	692.33+x	(11$^-$)	(E2)		0.0393	
1072.4+z	(12$^+$)	209.3 *3*		863.0+z	(11$^+$)				
		400.0 *5*		672.5+z	(10$^+$)				
1083.12+y	(13$^+$)	235.11 *6*	10.0 *7*	848.16+y	(12$^+$)	[M1(+E2)]		0.25 *9*	
		449.1 *1*	100	634.15+y	(11$^+$)	(E2)		0.0245	
1116.0+u	(12$^-$)	402.1 *4*	100	713.9+u	(10$^-$)				

$^{170}_{71}Lu_{99}$-13

Adopted Levels, Gammas (continued)

γ(^{170}Lu) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[†]	α[&]	Comments
1139.37	11$^+$	232.47 *4*		906.93	10$^+$	(M1+E2)	0.26 *9*	
		353.03 *5*		786.39	9$^+$	(E2)	0.0475	
1150.3+v	(11$^-$)	430.9 *5*	100	719.4+v	(9$^-$)			
1174.76	(11$^+$)	365.41 *5*	100	809.48	(9$^+$)			
1189.52+y	(12$^+$)	220.11 *7*	9 *9*	969.44+y	(11$^+$)	[M1(+E2)]	0.30 *10*	
		412.42 *5*	100	777.14+y	(10$^+$)	[E2]	0.0308	
1237.44	(10$^+$)	358.21 *7*	100	879.23	(8$^+$)	[E2]	0.0455	
1245.41+y	(13$^-$)	207.41 *4*	63 *6*	1038.05+y	(12$^-$)	(M1+E2)	0.36 *12*	
		391.96 *5*	100	853.33+y	(11$^-$)	(E2)	0.0354	
		397.10 *9*		848.16+y	(12$^+$)	[E1]	0.01060	
1263.77+x	(14$^-$)	194.21 *3*	18.7 *6*	1069.60+x	(13$^-$)	(M1+E2)	0.43 *13*	
		408.25 *5*	100	855.42+x	(12$^-$)	(E2)	0.0316	
1294.8+z	(13$^+$)	222.4 *2*		1072.4+z	(12$^+$)			
		432[a] *1*		863.0+z	(11$^+$)			
1310.53	12$^+$	171.19 *3*	100 *17*	1139.37	11$^+$	(M1+E2)	0.64 *17*	
		403.28 *9*	43	906.93	10$^+$	(E2)	0.0327	
1328.65	13$^+$	387.98 *4*	100	940.68	11$^+$	[E2]	0.0364	
1337.55+y	(14$^+$)	254.42 *8*	1.8 *18*	1083.12+y	(13$^+$)	(M1+E2)	0.20 *7*	
		489.37 *9*	100	848.16+y	(12$^+$)	(E2)	0.0196	
1364.0+u	(13$^-$)	438.6 *4*	100	925.4+u	(11$^-$)			
1369.73	(12$^+$)	379.70 *6*		989.91	10$^+$	[E2]	0.0386	
		389.89 *8*		979.96	(10$^+$)	[E2]	0.0359	
		429.5 *3*		940.68	11$^+$			
1385.99	12$^+$	211.38 *6*		1174.76	(11$^+$)	M1+E2	0.34 *11*	
		396.00 *4*		989.91	10$^+$	(E2)	0.0344	
1410.5+v	(12$^-$)	485.7 *1*	100	924.8+v	(10$^-$)			
1420.84+y	(13$^+$)	231.34 *6*		1189.52+y	(12$^+$)	[M1(+E2)]	0.26 *9*	
		451.2 *1*		969.44+y	(11$^+$)	[E2]	0.0242	
1473.2	(11$^+$)	408.6 *1*	100	1064.6	(9$^+$)	[E2]	0.0316	
1474.61+y	(14$^-$)	229.17 *3*	52 *5*	1245.41+y	(13$^-$)	(M1+E2)	0.27 *9*	
		391.82 *7*		1083.12+y	(13$^+$)	[E1]	0.01093	
		436.48 *7*	100	1038.05+y	(12$^-$)	(E2)	0.0264	
1529.12+x	(15$^-$)	265.33 *7*	23.7 *18*	1263.77+x	(14$^-$)	(M1+E2)	0.17 *7*	
		459.5 *1*	100	1069.60+x	(13$^-$)	(E2)	0.0231	
1536.3+z	(14$^+$)	241.5 *3*	100	1294.8+z	(13$^+$)			
1568.98	13$^+$	258.35 *6*	100 *18*	1310.53	12$^+$	[M1(+E2)]	0.19 *7*	
		429.7 *1*	77	1139.37	11$^+$	[E2]	0.0276	
1590.1+u	(14$^-$)	474.1 *5*	100	1116.0+u	(12$^-$)			
1611.44+y	(15$^+$)	274.0 *1*	4.0 *15*	1337.55+y	(14$^+$)	[M1(+E2)]	0.16 *6*	E_γ: other: 275.9 in (^{14}N,4nγ).
		528.2 *1*	100	1083.12+y	(13$^+$)	[E2]	0.01619	
1618.87	(13$^+$)	444.15 *7*	100	1174.76	(11$^+$)	[E2]	0.0252	
1661.3+v	(13$^-$)	511 *2*	100	1150.3+v	(11$^-$)	[E2]	0.0176 *3*	
1670.04	(12$^+$)	432.6 *1*	100	1237.44	(10$^+$)			

$^{170}_{71}Lu_{99}$-14

Adopted Levels, Gammas (continued)

γ(^{170}Lu) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[†]	α[&]	Comments
1683.23+y	(14$^+$)	262.35 *5*		1420.84+y	(13$^+$)	[M1(+E2)]	0.18 *7*	
		494.3 *2*		1189.52+y	(12$^+$)			
1725.38+y	(15$^-$)	250.80 *4*	49 *6*	1474.61+y	(14$^-$)	[M1(+E2)]	0.21 *8*	
		387.75 *7*		1337.55+y	(14$^+$)			
		479.92 *9*	100	1245.41+y	(13$^-$)	[E2]	0.0206	
1753.74+x	(16$^-$)	224.61 *4*	9.6 *4*	1529.12+x	(15$^-$)	(M1+E2)	0.28 *10*	
		490.02 *9*	100	1263.77+x	(14$^-$)	(E2)	0.0196	
1779.49	15$^+$	450.84 *8*	100	1328.65	13$^+$	[E2]	0.0243	
1786.2+z	(15$^+$)	249.9 *3*	100	1536.3+z	(14$^+$)			
1792.17	14$^+$	223.15 *5*	30 *4*	1568.98	13$^+$	[M1(+E2)]	0.29 *10*	
		481.8 *1*	100	1310.53	12$^+$	[E2]	0.0204	
1825.76	(14$^+$)	455.97 *9*		1369.73	(12$^+$)	[E2]	0.0235	
		497.8 *3*		1328.65	13$^+$			
1855.23	14$^+$	236.40 *6*		1618.87	(13$^+$)	M1+E2	0.24 *9*	
		469.18 *8*		1385.99	12$^+$	[E2]	0.0219	
1903.19+y	(16$^+$)	291.76 *4*	11.1 *17*	1611.44+y	(15$^+$)	[M1(+E2)]	0.13 *5*	E_γ: other: 290.0 in (^{14}N,4nγ).
		565.8	100	1337.55+y	(14$^+$)			E_γ: other: 564.5 in (^{14}N,4nγ).
1994.80+y	(16$^-$)	269.42 *4*	41 *5*	1725.38+y	(15$^-$)	(M1(+E2))	0.17 *7*	
		520.2 *1*	100	1474.61+y	(14$^-$)	(E2)	0.01682	
2057.1+z	(16$^+$)	270.9 *3*	100	1786.2+z	(15$^+$)			
2068.63+x	(17$^-$)	314.91 *6*	13.0 *7*	1753.74+x	(16$^-$)	(M1+E2)	0.11 *5*	
		539.5 *1*	100	1529.12+x	(15$^-$)	(E2)	0.01537	
2083.23	15$^+$	291.02 *8*		1792.17	14$^+$	[M1(+E2)]	0.13 *5*	
		514.2 *2*		1568.98	13$^+$	[E2]	0.01731	
2137.67	(15$^+$)	518.8 *1*	100	1618.87	(13$^+$)			
2168.2	(14$^+$)	498.2	100	1670.04	(12$^+$)			
2212.05+y	(17$^+$)	308.89 *6*	5.3 *11*	1903.19+y	(16$^+$)	[M1(+E2)]	0.11 *5*	
		600.3 *2*	100	1611.44+y	(15$^+$)			
2253.03+y	(16$^+$)	569.8 *2*	100	1683.23+y	(14$^+$)			
2286.60+y	(17$^-$)	291.80 *3*	36 *9*	1994.80+y	(16$^-$)	(M1+E2)	0.13 *5*	
		561.4 *2*	100	1725.38+y	(15$^-$)	(E2)	0.01394	
2288.59	17$^+$	509.1 *1*	100	1779.49	15$^+$			
2325.33+x	(18$^-$)	256.72 *7*	5.6 *6*	2068.63+x	(17$^-$)	(M1+E2)	0.19 *7*	
		571.4 *2*	100	1753.74+x	(16$^-$)	(E2)	0.01336	
2341.16	(16$^+$)	515.4 *1*	100	1825.76	(14$^+$)			
2353.16	16$^+$	269.91 *6*		2083.23	15$^+$	[M1(+E2)]	0.17 *6*	
		561.3 *2*		1792.17	14$^+$			
2388.83	16$^+$	533.6 *1*	100	1855.23	14$^+$			
2536.47+y	(18$^+$)	324.8		2212.05+y	(17$^+$)			E_γ: other: 323.0 in (^{14}N,4nγ).
		633.3 *2*		1903.19+y	(16$^+$)			
2591.02+y	(18$^-$)	304.5 *1*	19 *4*	2286.60+y	(17$^-$)	[M1(+E2)]	0.12 *5*	
		595.9 *2*	100	1994.80+y	(16$^-$)			
2680.03	17$^+$	596.8 *2*	100	2083.23	15$^+$			

$^{170}_{71}Lu_{99}$-15

Adopted Levels, Gammas (continued)

γ(^{170}Lu) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[†]	α[&]	Comments
2684.05+x	(19$^-$)	358.73 *5*	9.9 *10*	2325.33+x	(18$^-$)	(M1+E2)	0.08 *3*	E_γ: other: 357.5 in (^{14}N,4nγ).
		615.4 *2*	100	2068.63+x	(17$^-$)	(E2)	0.01120	
2701.77	(17$^+$)	564.1 *2*	100	2137.67	(15$^+$)	[E2]	0.01378	
2853.8	19$^+$	565.2 *2*	100	2288.59	17$^+$	[E2]	0.01372	
2877.3+y	(19$^+$)	341.7		2536.47+y	(18$^+$)			
		665.2 *3*		2212.05+y	(17$^+$)			
2886.2+y	(18$^+$)	633.2 *4*	100	2253.03+y	(16$^+$)			
2918.0	(18$^+$)	576.8 *2*	100	2341.16	(16$^+$)	[E2]	0.01306	
2921.50+y	(19$^-$)	330.47 *6*		2591.02+y	(18$^-$)	[M1(+E2)]	0.09 *4*	
		634.9 *2*		2286.60+y	(17$^-$)			
2967.54	18$^+$	578.7 *2*	100	2388.83	16$^+$	[E2]	0.01296	
2976.65+x	(20$^-$)	291.7 *5*		2684.05+x	(19$^-$)	(M1+E2)	0.13 *5*	E_γ: other: 294.6 in (^{14}N,4nγ).
		651.0 *3*		2325.33+x	(18$^-$)	(E2)	0.00983	
2992.3	18$^+$	639.1 *3*	100	2353.16	16$^+$	[E2]	0.01025	
3230.3+y	(20$^+$)	693.8 *3*	100	2536.47+y	(18$^+$)			E_γ: other: 692.7 in (^{14}N,4nγ).
3253.30+y	(20$^-$)	331.80 *6*		2921.50+y	(19$^-$)	[M1(+E2)]	0.09 *4*	
		662.3 *3*		2591.02+y	(18$^-$)			
3298.0	(19$^+$)	596.2 *2*	100	2701.77	(17$^+$)			
3370.16+x	(21$^-$)	393.48 *6*		2976.65+x	(20$^-$)	[M1(+E2)]	0.059 *24*	
		686.4 *2*		2684.05+x	(19$^-$)			E_γ: other: 685.2 in (^{14}N,4nγ).
3475.0	21$^+$	621.2 *2*	100	2853.8	19$^+$			
3549.3	(20$^+$)	631.3 *2*	100	2918.0	(18$^+$)			
3568.5	20$^+$	601.0 *2*	100	2967.54	18$^+$	[E2]	0.01184	
3598.0+y	(21$^+$)	720.7 *3*	100	2877.3+y	(19$^+$)			
3619.2+y	(21$^-$)	697.7 *4*	100	2921.50+y	(19$^-$)			
3705.4+x	(22$^-$)	336.0[#]		3370.16+x	(21$^-$)			
		728.7 *3*		2976.65+x	(20$^-$)			E_γ: other: 727.8 in (^{14}N,4nγ).
3907.1	(21$^+$)	609.1 *3*	100	3298.0	(19$^+$)	[E2]	0.01147	
3962.2+y	(22$^-$)	708.9 *5*	100	3253.30+y	(20$^-$)			
3971.4+y	(22$^+$)	741.1 *4*	100	3230.3+y	(20$^+$)			
4122.7+x	(23$^-$)	752.5 *4*	100	3370.16+x	(21$^-$)			
4153.6	23$^+$	678.6 *3*	100	3475.0	21$^+$			E_γ: other: 677.8 in (^{14}N,4nγ).
4203.2	22$^+$	634.7 *3*	100	3568.5	20$^+$			
4235.3	(22$^+$)	686.0 *3*	100	3549.3	(20$^+$)			
4355.7+y	(23$^+$)	757.7 *4*	100	3598.0+y	(21$^+$)			E_γ: other: 756.4 in (^{14}N,4nγ).
4382.0+y	(23$^-$)	762.8 *5*	100	3619.2+y	(21$^-$)			
4508.4+x	(24$^-$)	803.0 *5*	100	3705.4+x	(22$^-$)			
4730.2+y	(24$^+$)	758.8 *4*	100	3971.4+y	(22$^+$)			
4859.6	24$^+$	656.4 *4*	100	4203.2	22$^+$			
4890.5	25$^+$	736.9 *4*	100	4153.6	23$^+$			E_γ: other: 735.7 in (^{14}N,4nγ).

$^{170}_{71}Lu_{99}$-16

Adopted Levels, Gammas (continued)

$\gamma(^{170}Lu)$ (continued)

E_i(level)	J_i^π	E_γ †	I_γ †	E_f	J_f^π	Comments
4935.4+x	(25$^-$)	812.7	100	4122.7+x	(23$^-$)	
4973.7	(24$^+$)	738.4 *4*	100	4235.3	(22$^+$)	
5126.8+y	(25$^+$)	771.1	100	4355.7+y	(23$^+$)	E_γ: other: 770.0γ seen in (^{14}N,4nγ), but placed differently.
5383.1+x	(26$^-$)	874.7 *6*	100	4508.4+x	(24$^-$)	
5524.3+y	(26$^+$)	794.1	100	4730.2+y	(24$^+$)	
5685.3	27$^+$	794.8 *5*	100	4890.5	25$^+$	E_γ: other: 788.2 in (^{14}N,4nγ).
5772.5	(26$^+$)	798.8 *5*	100	4973.7	(24$^+$)	
5803.3+x	(27$^-$)	867.9 *7*	100	4935.4+x	(25$^-$)	
5947.3+y	(27$^+$)	820.5	100	5126.8+y	(25$^+$)	
6323.8+x	(28$^-$)	940.7 *7*	100	5383.1+x	(26$^-$)	
6376.2+y	(28$^+$)	851.9	100	5524.3+y	(26$^+$)	E_γ: other: 851.0γ seen in (^{14}N,4nγ), but placed differently.
6535.8	29$^+$	850.5 *5*	100	5685.3	27$^+$	E_γ: other: 846.8 in (^{14}N,4nγ).
7324.8+x	(30$^-$)	1001 *2*	100	6323.8+x	(28$^-$)	
7440.1	31$^+$	904.3 *7*	100	6535.8	29$^+$	E_γ: other: 903.1 in (^{14}N,4nγ).
8375.1?	33$^+$	935.0#*a*	100	7440.1	31$^+$	

† From ^{164}Dy(^{11}B,5nγ), except as noted.
‡ From ^{170}Hf ε decay, except as noted.
# From ^{160}Gd(^{14}N,4nγ); uncertainty unstated by authors.
@ From ^{170}Hf ε decay. Authors do not state uncertainty in relative photon branching.
& 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.
a Placement of transition in the level scheme is uncertain.

$^{170}_{71}Lu_{99}$-17

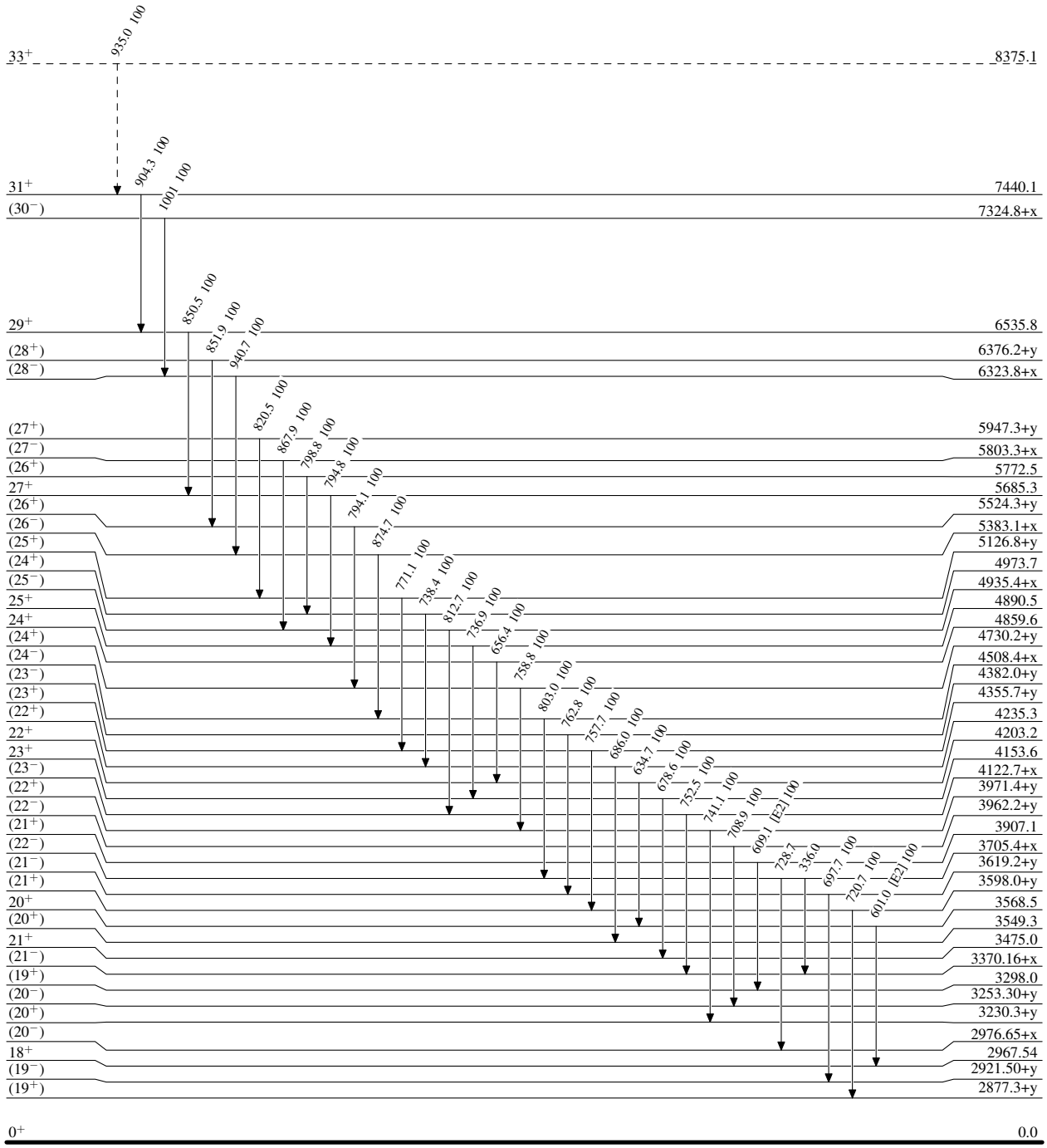
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

γ Decay (Uncertain)

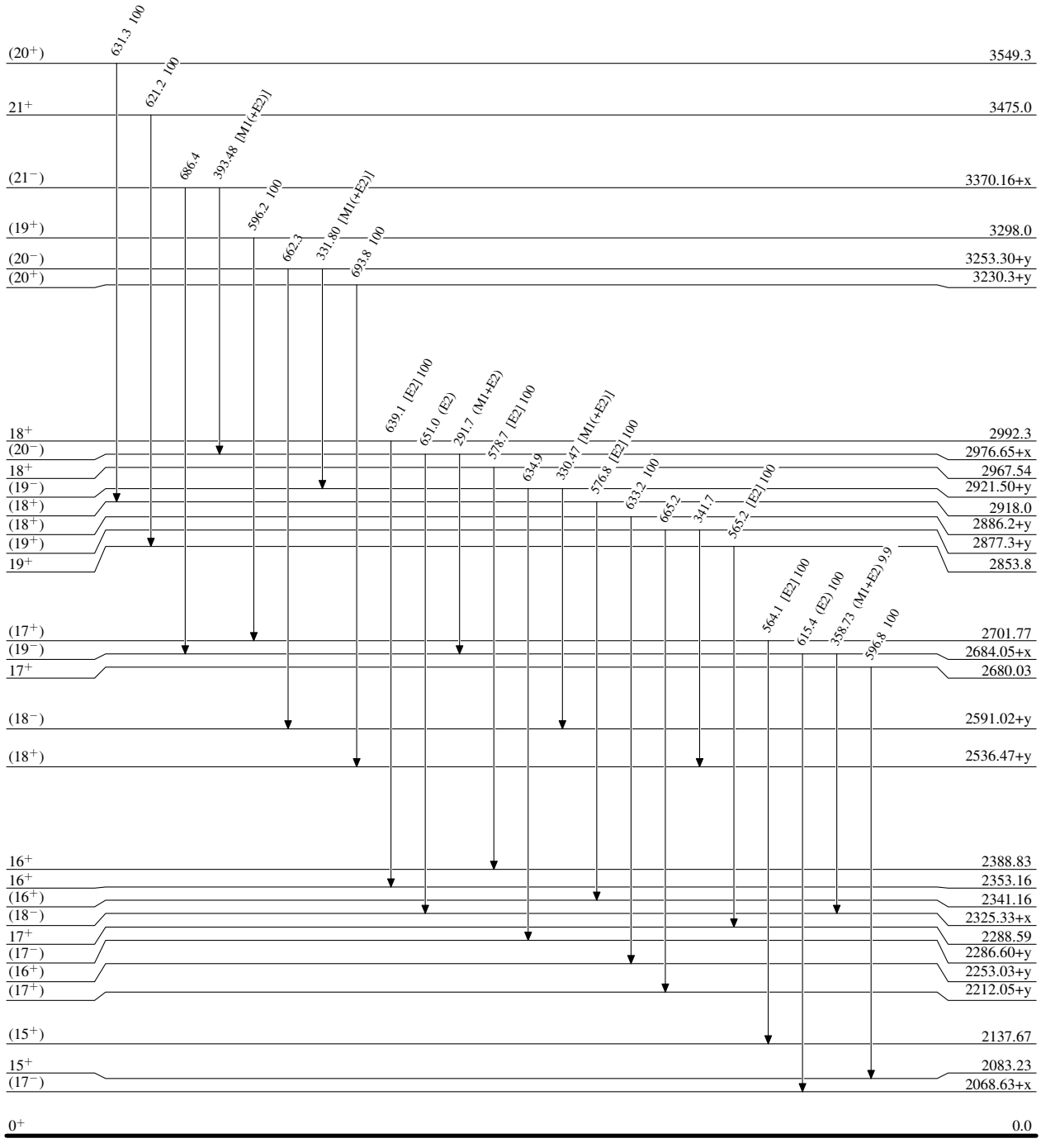


$^{170}_{71}Lu_{99}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



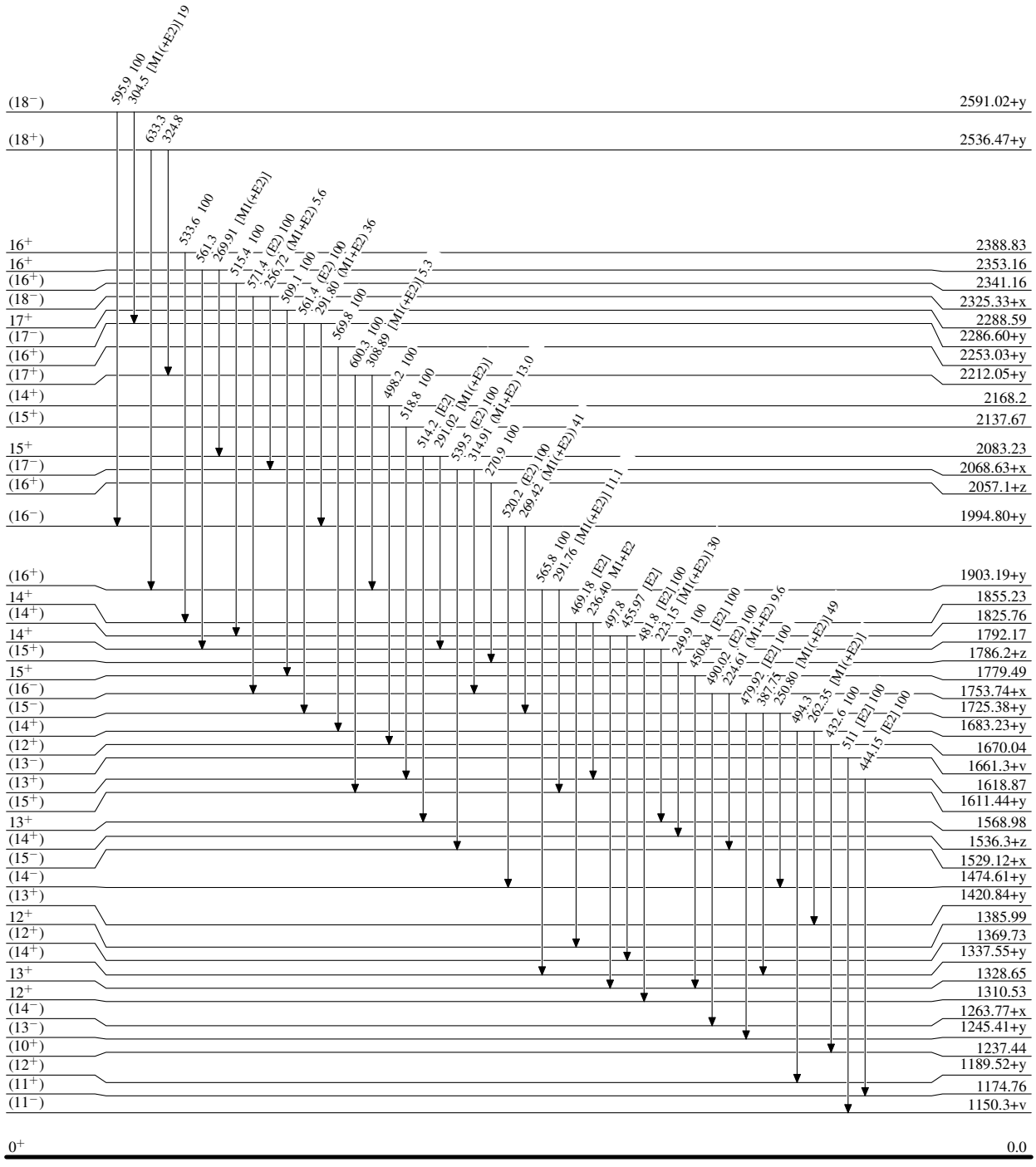
2.012 d *30*

$^{170}_{71}Lu_{99}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{170}_{71}Lu_{99}$

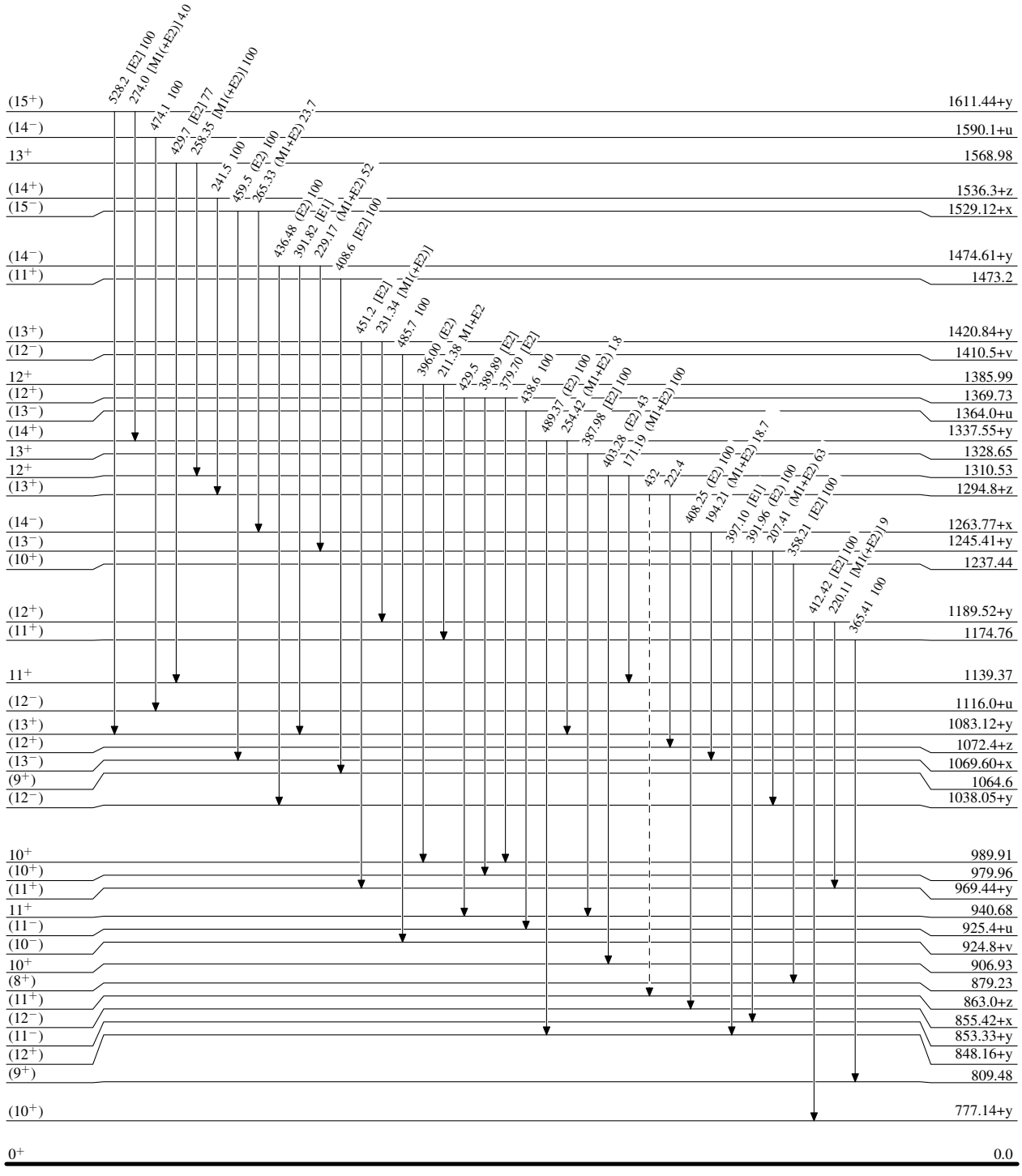
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{170}_{71}Lu_{99}$

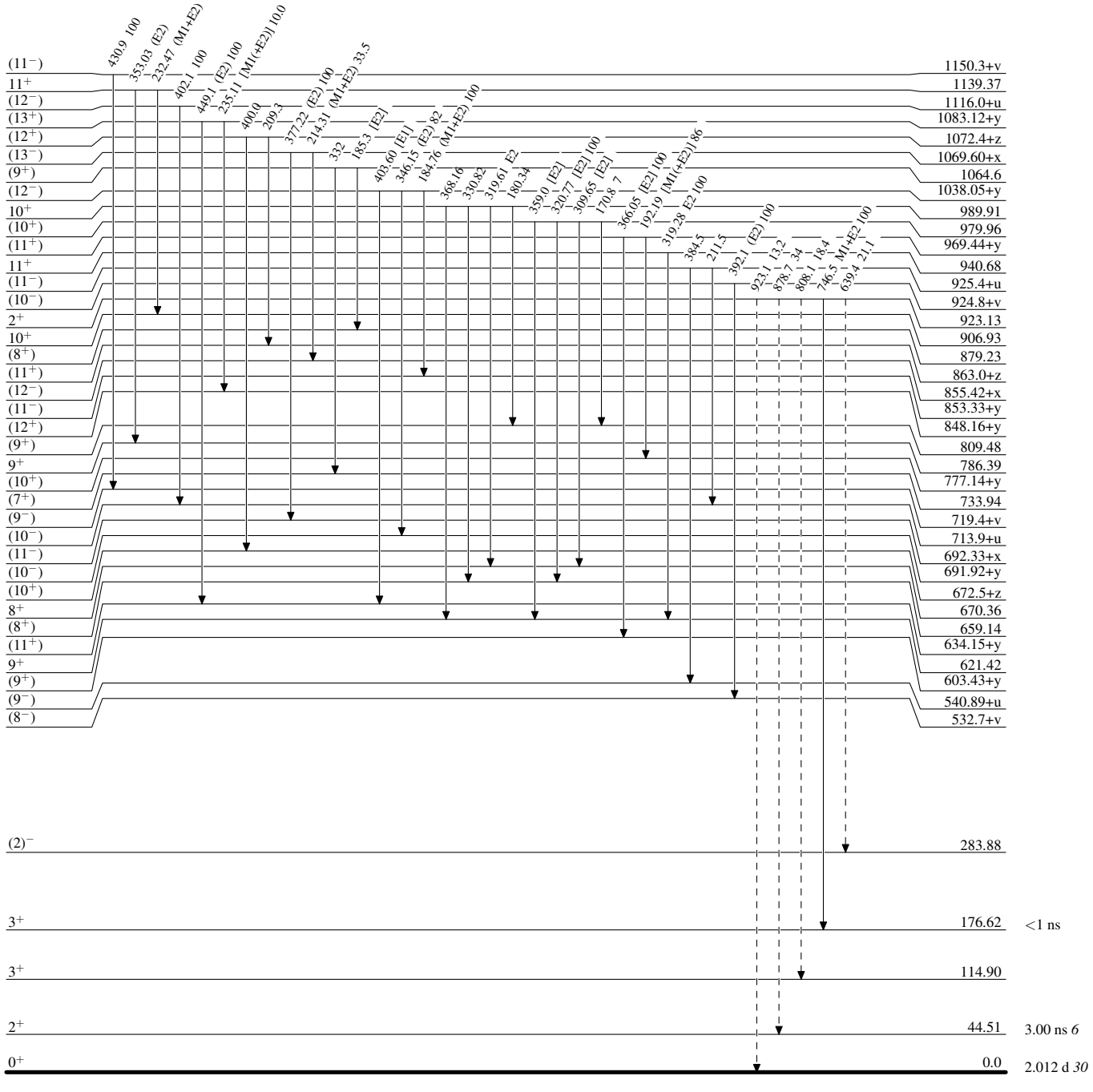
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{170}_{71}Lu_{99}$

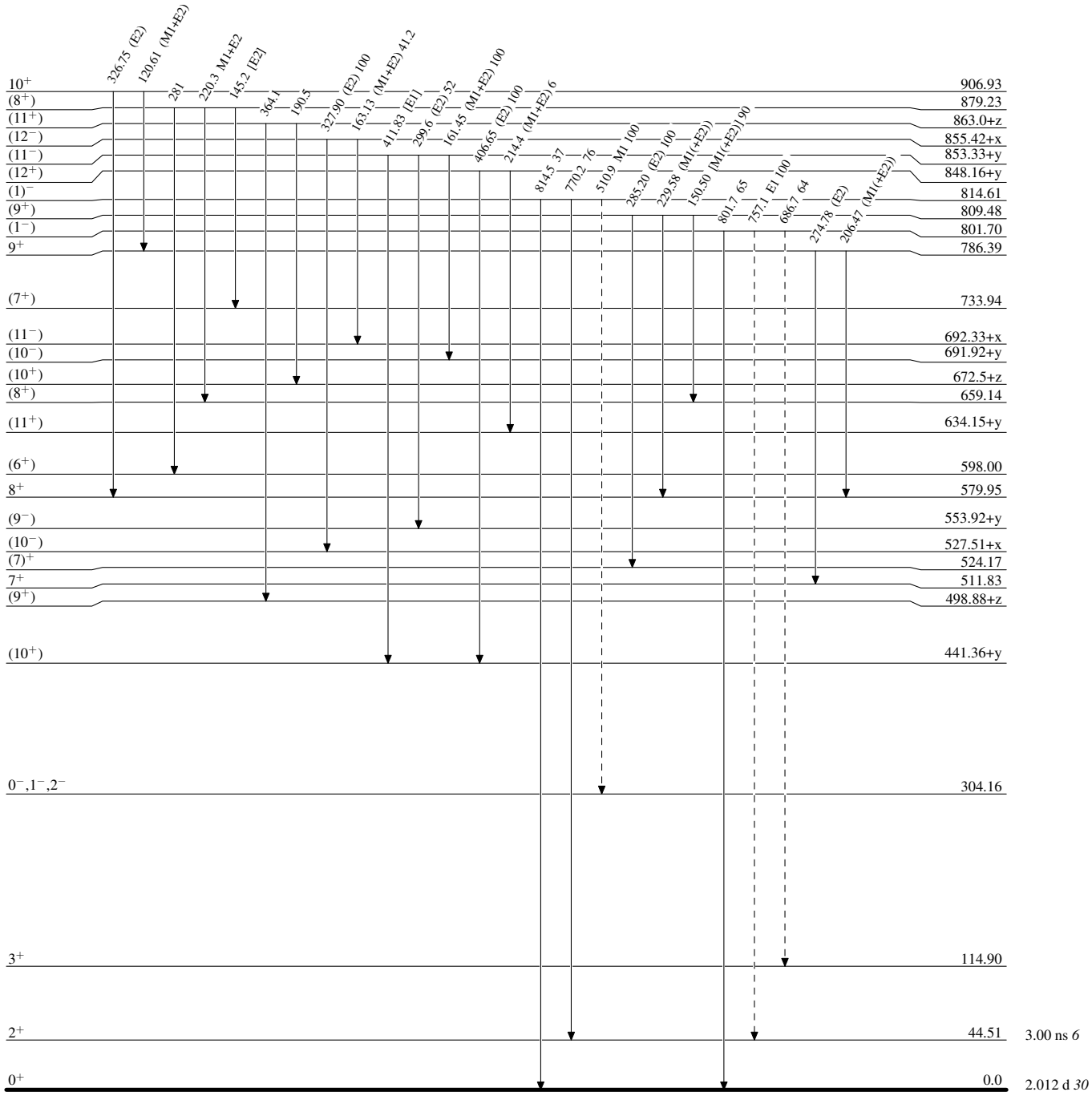
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



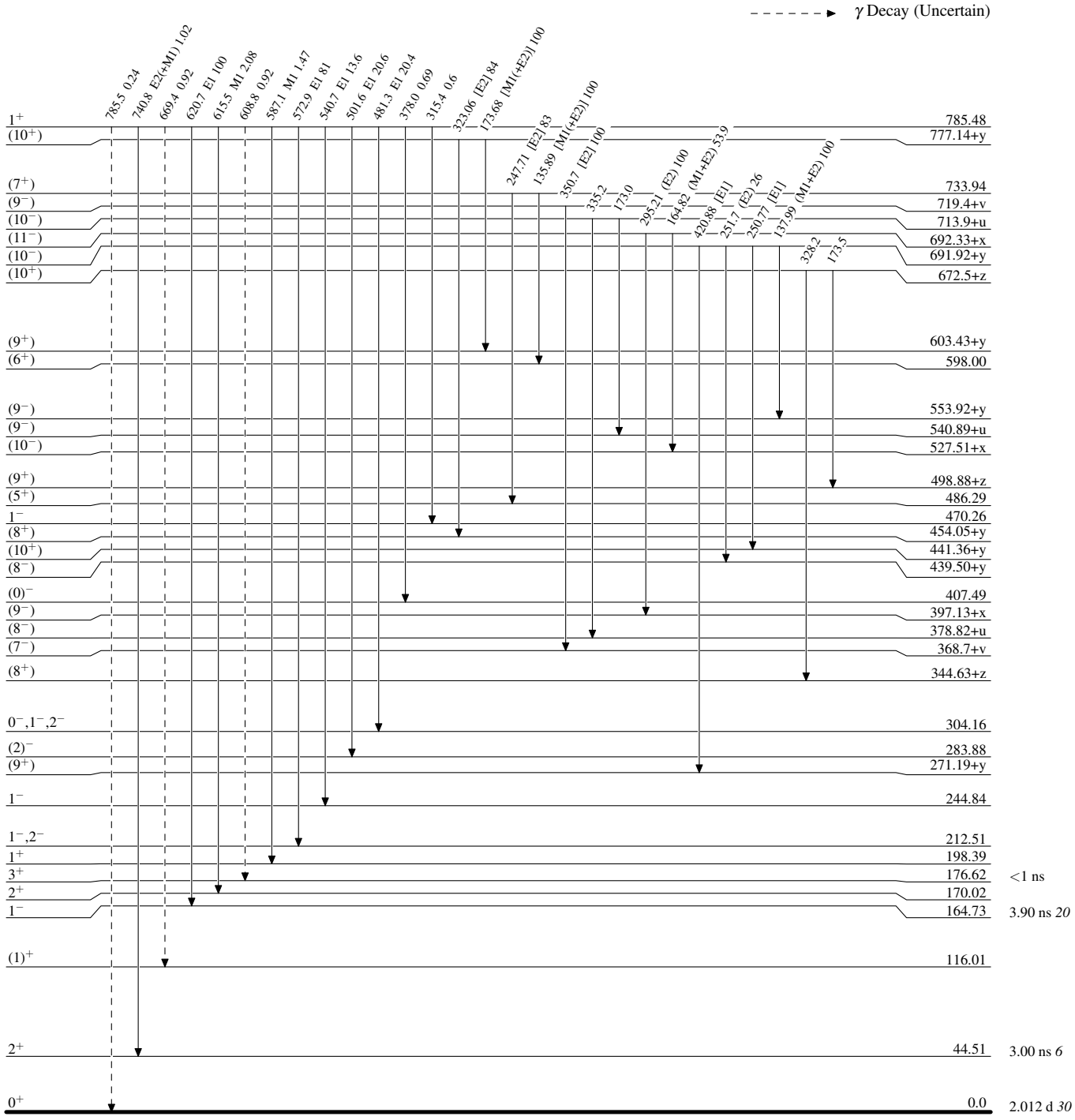
$^{170}_{71}Lu_{99}$

Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

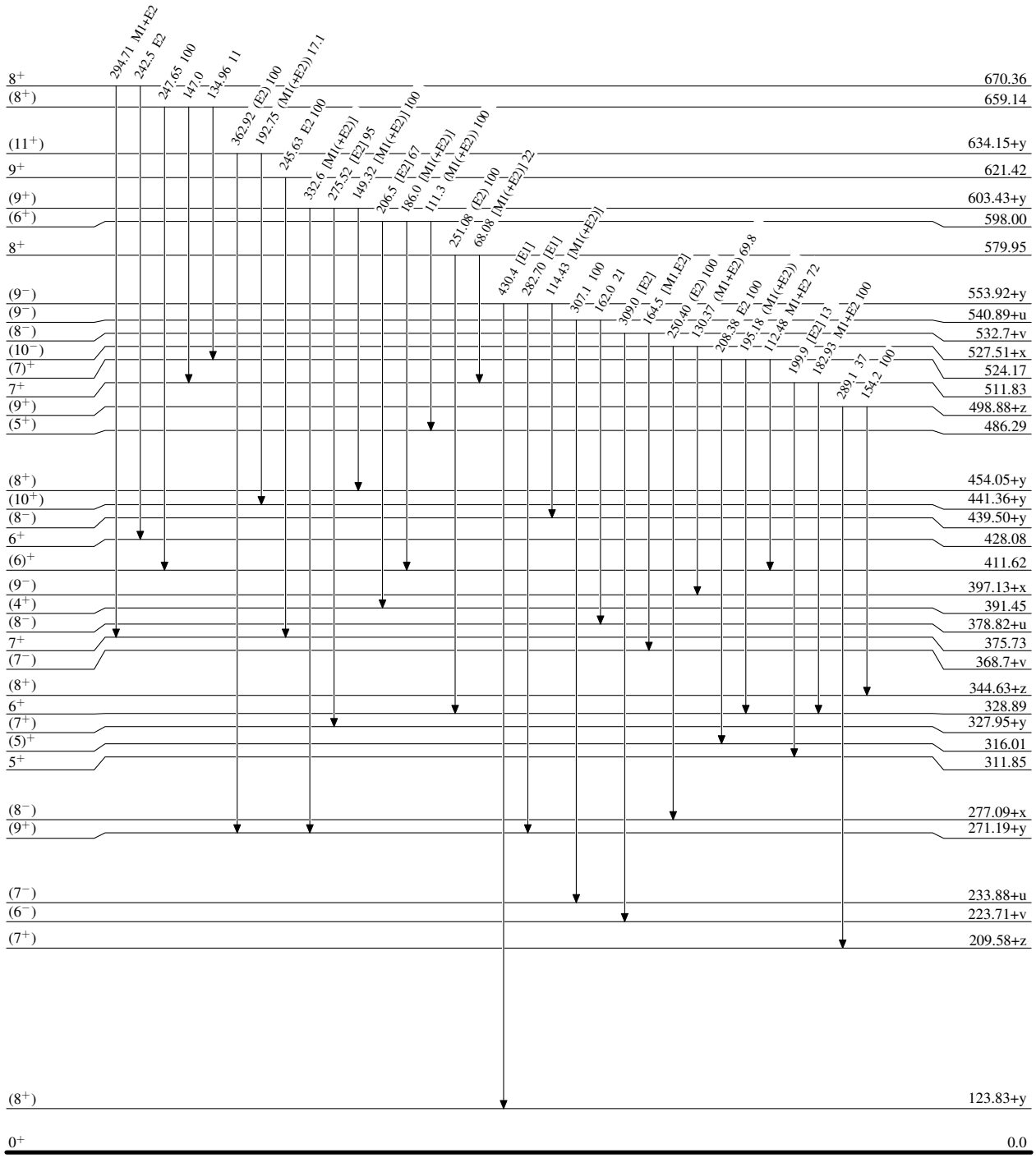


$^{170}_{71}Lu_{99}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{170}_{71}Lu_{99}$

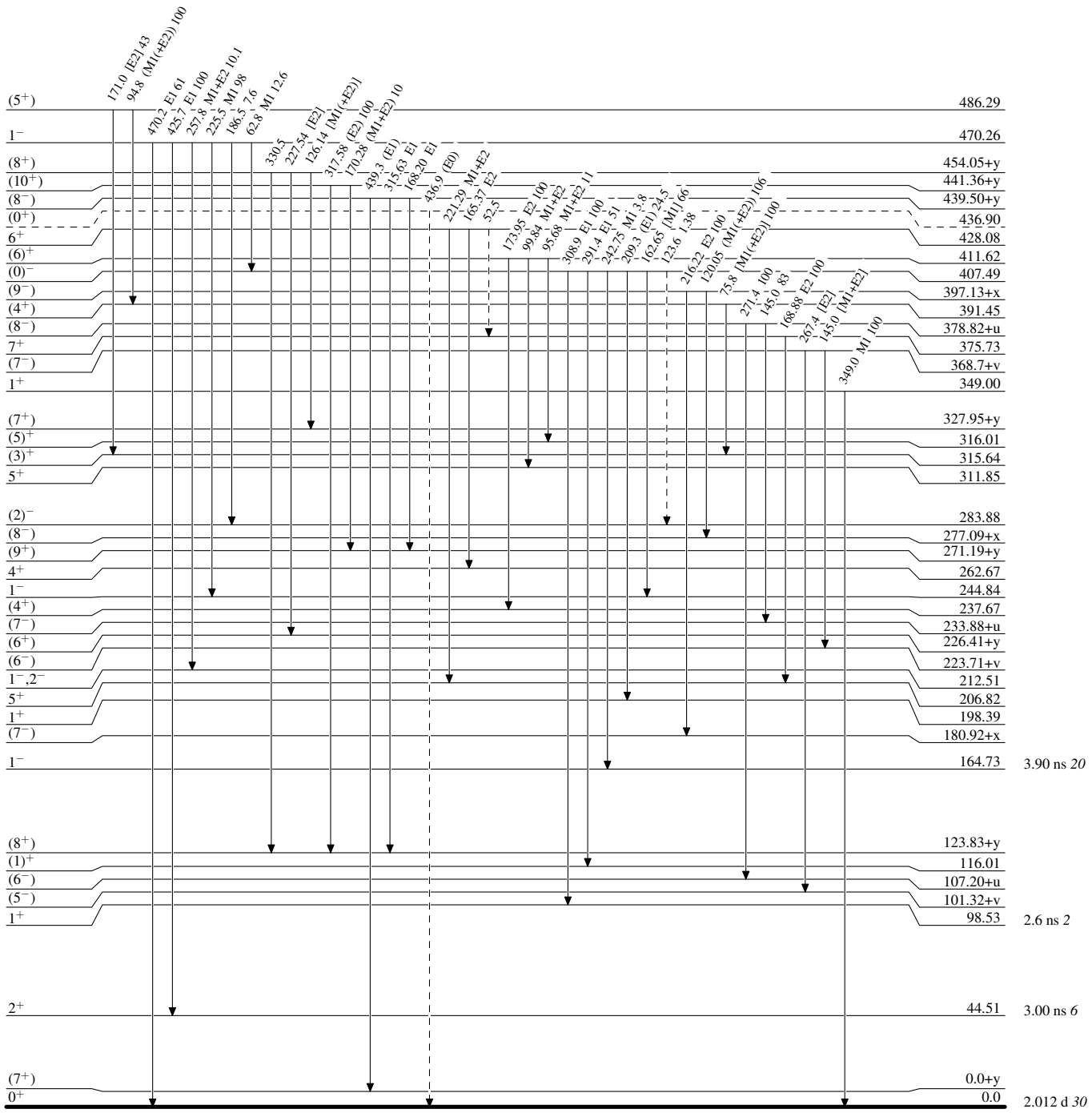
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{170}_{71}Lu_{99}$

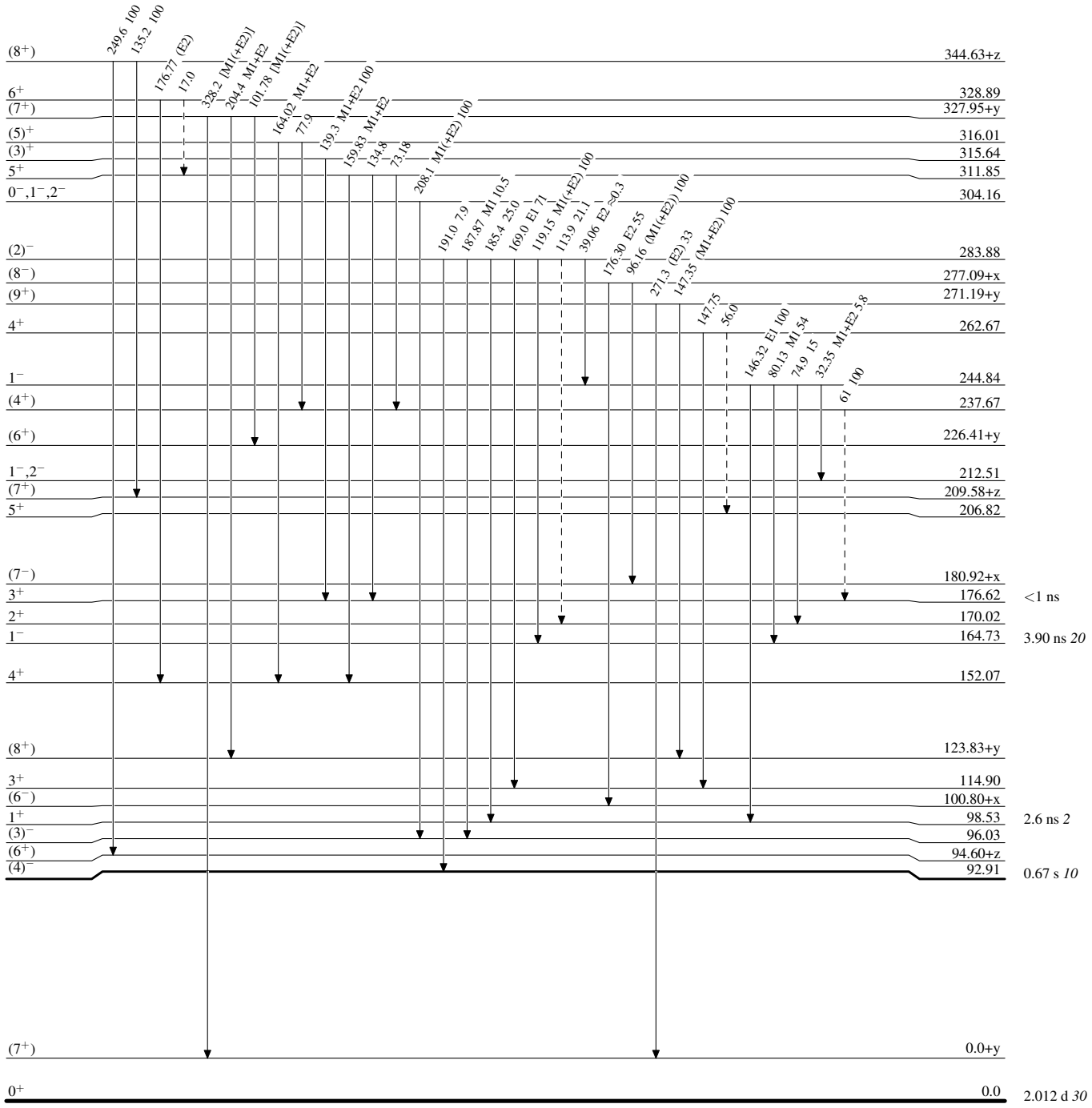
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

- - - - - - ► γ Decay (Uncertain)



$^{170}_{71}Lu_{99}$

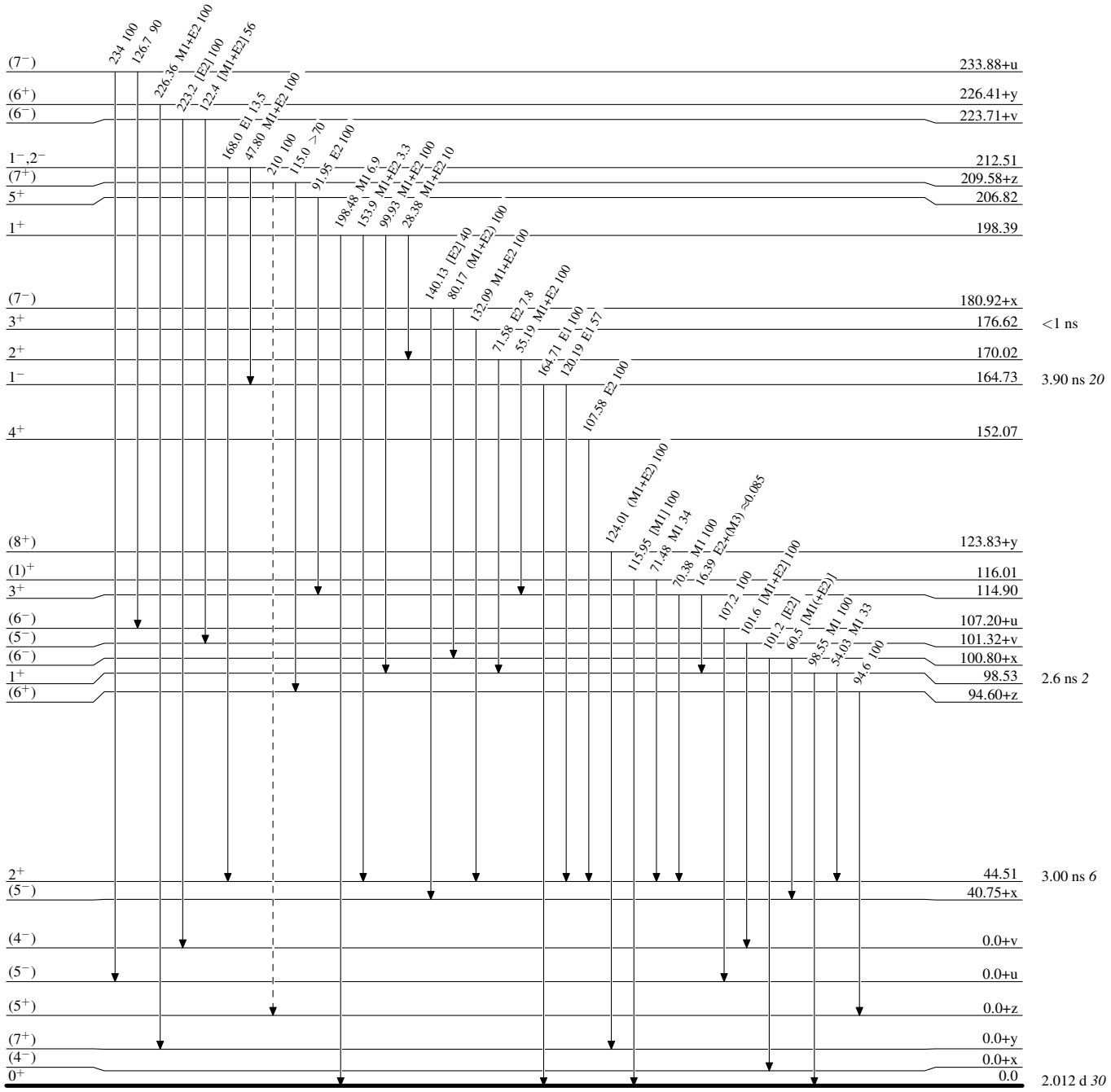
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)

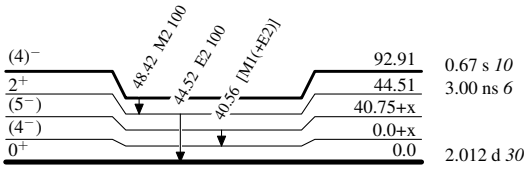


$^{170}_{71}Lu_{99}$

Adopted Levels, Gammas

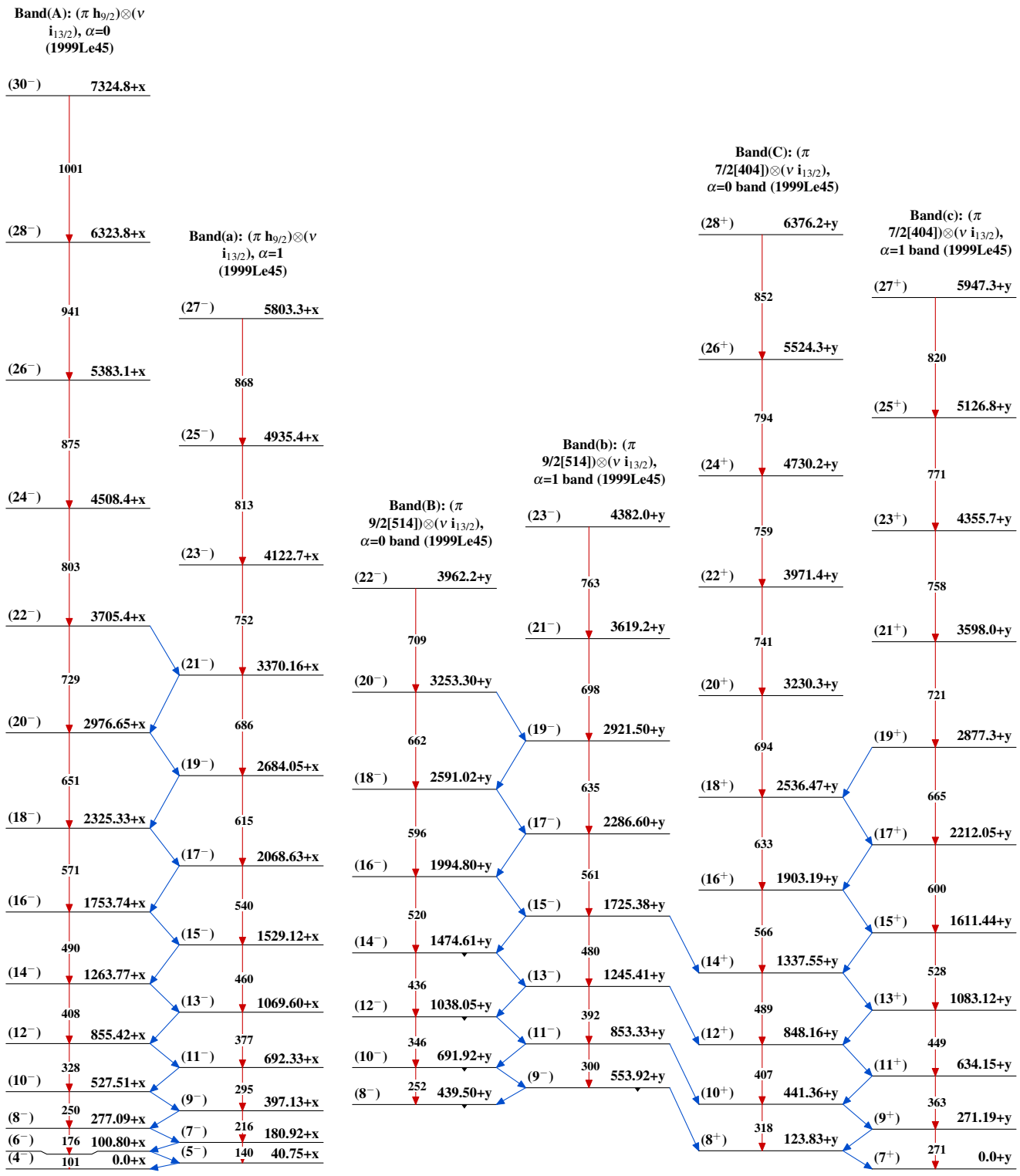
Level Scheme (continued)

Intensities: Relative photon branching from each level

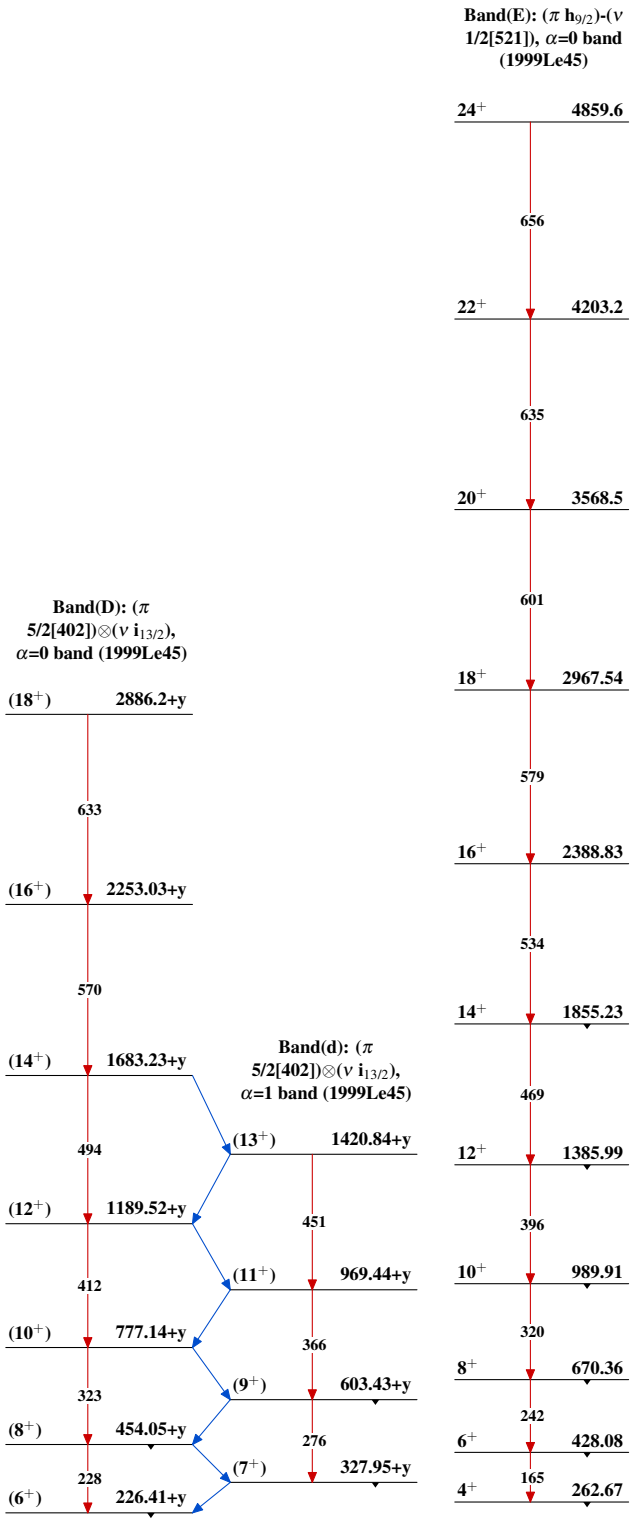


$^{170}_{71}Lu_{99}$

Adopted Levels, Gammas

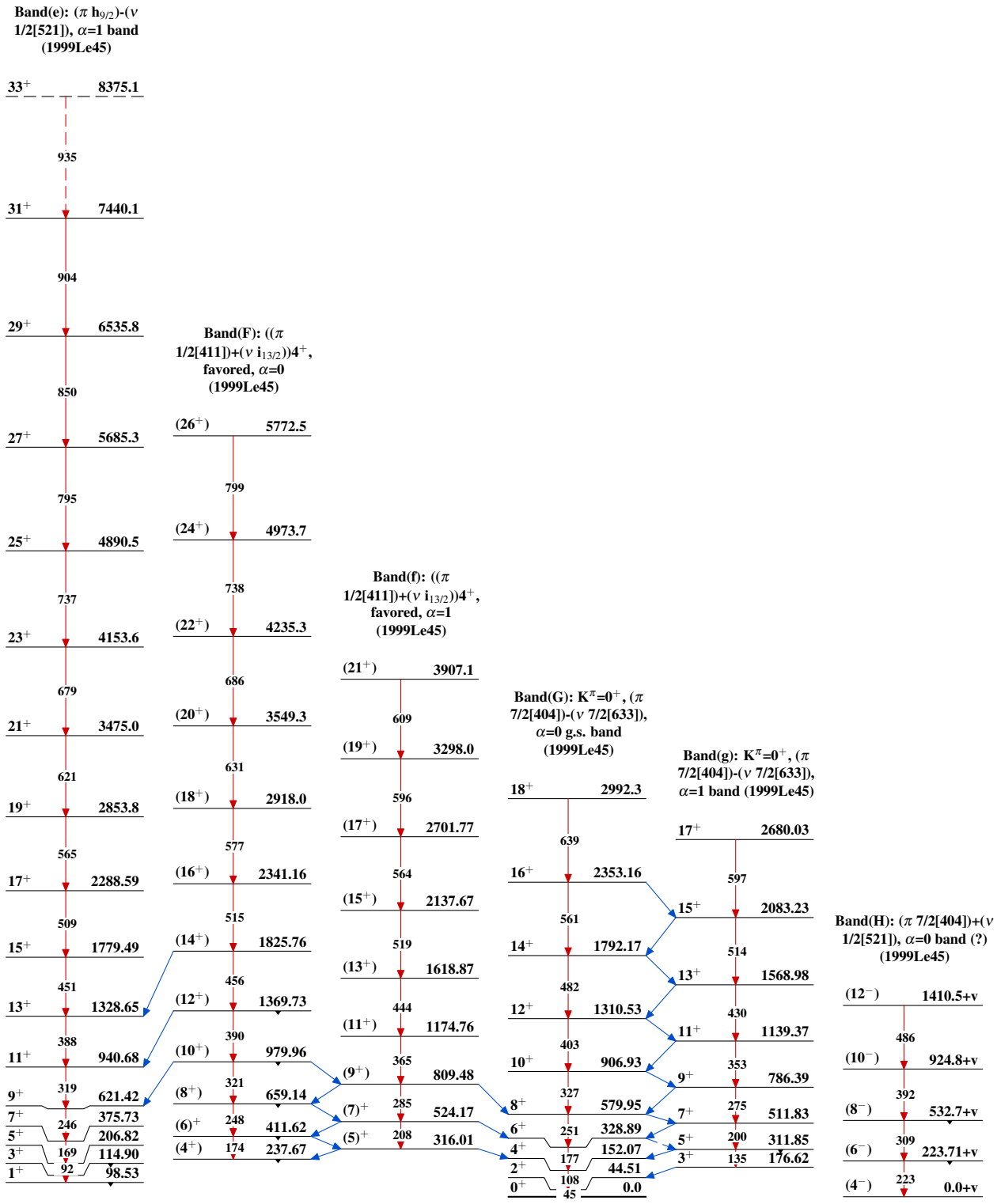


Adopted Levels, Gammas (continued)



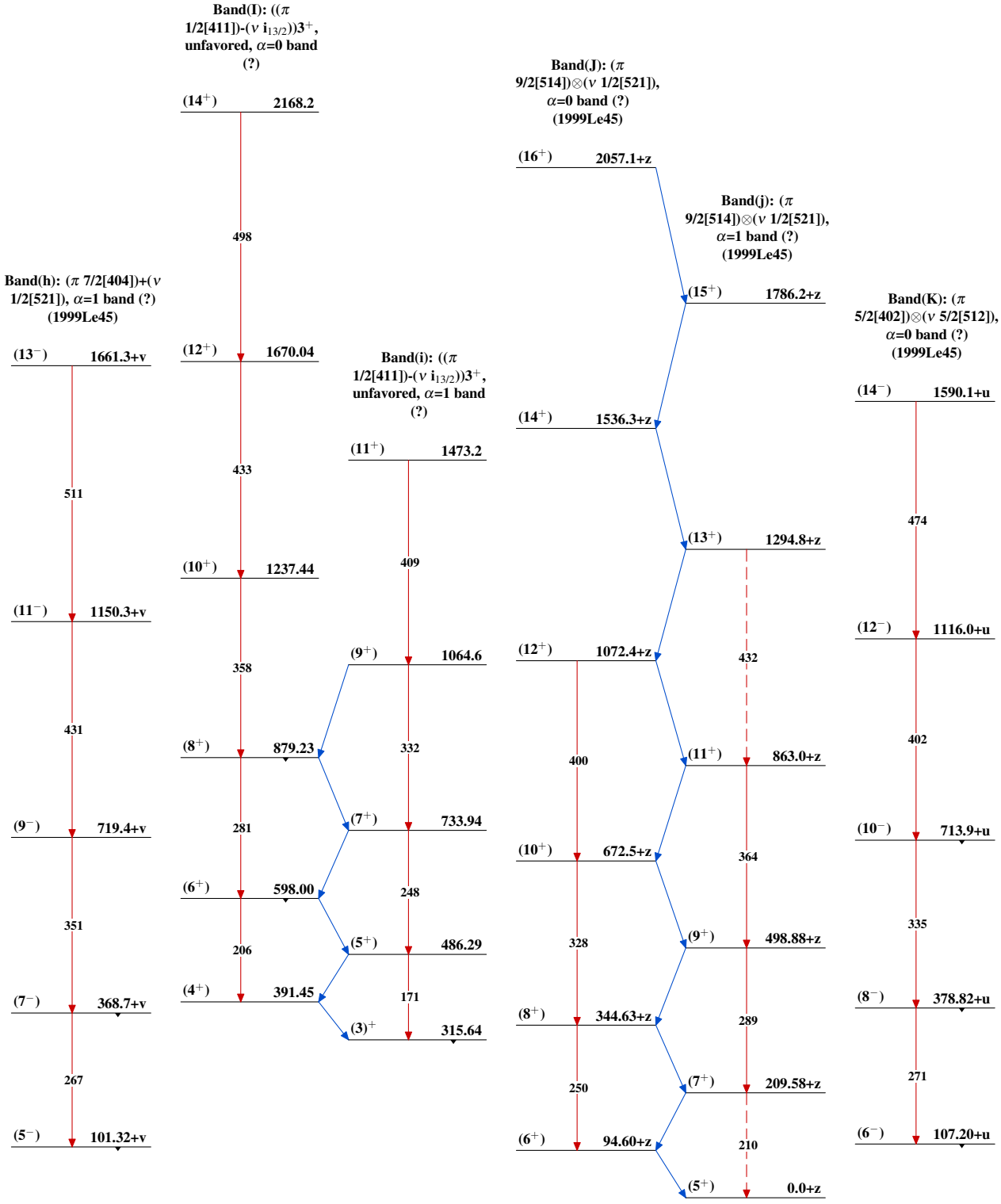
$^{170}_{71}Lu_{99}$

Adopted Levels, Gammas (continued)



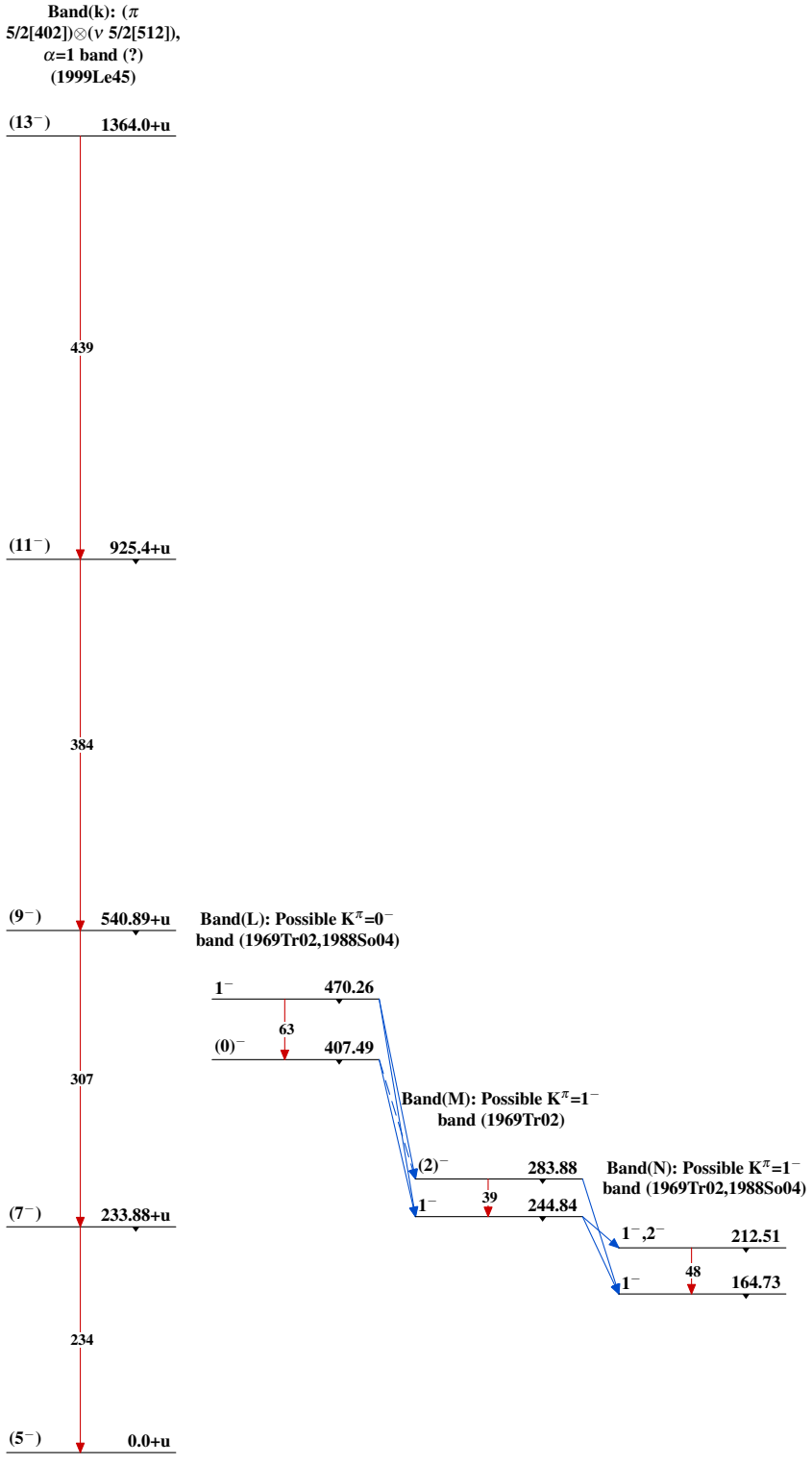
$^{170}_{71}Lu_{99}$

Adopted Levels, Gammas (continued)



$^{170}_{71}Lu_{99}$

Adopted Levels, Gammas (continued)



$^{170}_{71}Lu_{99}$