Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 146, 1 (2017)	30-Sep-2017

Q(β^-)=−7078 *29*; S(n)=10505 *17*; S(p)=6106 *14*; Q(α)=390 *23* 2017Wa10
S(2n)=18962 *17*, S(2p)=10088 *12*, Q(β^+)=1116 *16* (2017Wa10).
First identification of ^{138}Nd nuclide by 1964Gr32.
Mass measurements: 2000Be42, 2000Ra23, 1997Be63.
Nuclear Structure: 2001Ja20, 1999Pr03.
Isotopic shifts, rms radius, moments: 1992Le09, 1987Al25, 1988Al41, 1989Ku17, 1972Ek04.

^{138}Nd Levels

Cross Reference (XREF) Flags

A	^{138}Pm ε decay (3.24 min)	D	^{124}Te(^{19}F,p4nγ)
B	^{94}Zr(^{48}Ca,4nγ)	E	^{140}Ce(α,6nγ),^{141}Pr(p,4nγ)
C	^{123}Sb(^{19}F,4nγ)		

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$	XREF	Comments
0.0[#]	0$^+$	5.04 h *9*	ABCDE	%ε+%β^+=100 T$_{1/2}$: from 1970Ho28. Others: 5.2 h *1* (1966Gr15), 5.7 h *3* (1971Ju01). Evaluated nuclear charge radius <r^2>$^{1/2}$=4.912 fm *3* (2013An02).
520.75[#] *17*	2$^+$		ABCDE	J$^\pi$: 520.7γ E2 to 0$^+$ g.s.
1013.80[@] *19*	2$^+$		A CDE	J$^\pi$: 1013.9γ E2 to 0$^+$ g.s.
1249.70[#] *21*	4$^+$		ABCDE	J$^\pi$: 728.8γ stretched E2 to 2$^+$, band structure.
1451.43[@] *22*	(3)$^+$		A CDE	J$^\pi$: 437.7γ E2(+M1) to 2$^+$, 930.5γ M1(+E2) to 2$^+$, band structure.
1799.77[@] *24*	(4$^+$)		A D	E(level): see comments for 1843 level. J$^\pi$: 786.0γ and 1279.1γ Q to 2$^+$, band structure.
1842.81 *23*	(4$^+$)		A CD	E(level): 1994De11 in ^{123}Sb(^{19}F,4nγ) assign this level as the 4$^+$ member of the γ band, while 2013Li24 in ^{124}Te(^{19}F,p4nγ) assign a level at 1843 as the 4$^+$ member and extend this band. Placements by 2013Li24 is adopted. Note that 2013Li24 also report the 1843 level and assign it as the band head of a new band. J$^\pi$: 829.0γ Q (probable E2) to 2$^+$.
1990.15[&] *24*	5$^-$		ABC E	J$^\pi$: 740.3γ stretched E1 to 4$^+$, band structure.
2133.8[#] *3*	6$^+$		ABCDE	J$^\pi$: 884.1γ stretched E2 to 4$^+$, band structure.
2196.1 *4*			A	
2221.34[c] *25*	5$^{(-)}$		ABC E	J$^\pi$: 230.8γ D to 5$^-$, 971.9γ D to 4$^+$, 469.6γ E2 from 7$^{(-)}$, band structure.
2261.6[@] *3*	(5$^+$)		A D	J$^\pi$: 810.3γ Q to (3)$^+$, 1011.6γ D+Q to 4$^+$. Additional information 1.
2269.5 *11*	(5$^+$)		D	J$^\pi$: 818.1γ Q to (3)$^+$.
2273.0 *4*	(1,2$^+$)		A	J$^\pi$: 2273.0γ to 0$^+$.
2321.3[&] *3*	7$^-$	≈250 ps	BC E	J$^\pi$: 331.2γ E2 to 5$^-$, 186.9γ D to 6$^+$, band structure. T$_{1/2}$: from 1973VaYZ in ^{140}Ce(α,6nγ).
2323.7 *4*			A	
2484.7 *4*			A	
2623.0 *5*			A	
2625.5 *5*			A	
2691.1[c] *3*	7$^{(-)}$		BC E	J$^\pi$: 369.9γ D+Q to 7$^-$, 557.2γ D(+Q) to 6$^+$, 701.2γ Q to 5$^-$, band structure.
2695.2 *3*	(8$^+$)		C	J$^\pi$: 372.8γ D to 7$^-$, 562.2γ (Q) to 6$^+$.
2710.2 *4*			A	
2758.5 *4*			A	

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Adopted Levels, Gammas (continued)

^{138}Nd Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$	XREF	Comments
2934.4 *3*			A	
2940.6 *4*	(6$^+$)		A D	J^{π}: 1097.5γ Q to (4$^+$), band structure.
2960.8[@] *3*	(6$^+$)		A D	J^{π}: from ^{124}Te(^{19}F,p4nγ) based on band structure.
2980.3 *3*	(8$^-$)		BC	J^{π}: 659.0γ D to 7$^-$. Note that 2012Pe15 in ^{94}Zr(^{48}Ca,4nγ) propose 8$^-$ while 1994De11 in ^{123}Sb(^{19}F,4nγ) give 8$^+$.
2998.5[a] *3*	(8$^-$)		B	J^{π}: 677.0γ D+Q to 7$^-$, band head.
3107.3[#] *3*	8$^+$		BCDE	J^{π}: 973.3γ E2 6$^+$, band structure.
3174.5[i] *4*	10$^+$	370 ns *5*	BC E	μ=−1.74 *4* (1982Ri09) J^{π}: 66.6γ E2 to 8$^+$, band structure. $T_{1/2}$: from 2013Va10 in ^{96}Zr(^{48}Ca,6nγ). Other: 0.41 μs *5* from 1975Yo01 in ^{140}Ce(α,6nγ),^{141}Pr(p,4nγ) data set. μ: from 1982Ri09 by TDPAD. Configuration=$\nu h^{-2}_{11/2}$.
3239.8[&] *4*	9$^-$		BC	J^{π}: 918.5γ E2 to 7$^-$, band structure.
3247.0[c] *4*	9$^{(-)}$		BC E	J^{π}: 556.0γ E2 to 7$^{(-)}$, band structure.
3255.8 *11*			A	
3371.3[b] *3*	9$^{(-)}$		BC	J^{π}: 680.4γ Q to 7$^{(-)}$, 391.0γ D to (8$^-$), band structure.
3556.5[a] *4*	(10$^-$)		B	J^{π}: 558.0γ E2 to (8$^-$), band structure.
3700.6[d] *4*	(10$^+$)		BC E	J^{π}: 453.5γ D to 9$^{(-)}$, 329.3γ D to 9$^{(-)}$,143.7γ D+Q to (10$^-$); Configuration=$\pi h^2_{11/2}$.
3783.9 *4*			A	
3821.4[i] *4*	12$^+$		BC E	J^{π}: 646.9γ E2 to 10$^+$, band structure.
3854.8[b] *6*	11$^{(-)}$		B	J^{π}: 483.5γ E2 to 9$^{(-)}$, band structure.
3854.8 *4*			A	
3915.2[c] *3*	11$^{(-)}$		BC	J^{π}: 668.2γ E2 to 9$^{(-)}$, 543.8γ Q to 9$^{(-)}$, 740.4γ to 10$^+$, band structure.
3981.1 *3*			A	
4136.1 *4*	(11)		BC	J^{π}: 961.3γ D to 10$^+$.
4203.3[d] *4*	(12$^+$)		BC E	J^{π}: 502.7γ E2 to (10$^+$), band structure.
4205.8 *6*			A	
4210.3 *5*	(11$^-$)		C	J^{π}: 839.0γ Q to 9$^{(-)}$.
4212.4 *5*			A	
4218.4[&] *5*	11$^-$		BC	J^{π}: 978.6γ E2 to 9$^-$, band structure.
4344.8[o] *7*	10$^{(+)}$		B	J^{π}: 1238.0γ Q to 8$^+$, band head.
4381.7 *5*	(11)		B	J^{π}: 681.2γ D+Q to (10$^+$).
4395.4[a] *4*	(12$^-$)		B	J^{π}: 838.9γ E2 to (10$^-$), band structure.
4545.9[o] *5*	(11$^+$)		B	J^{π}: 201.2γ D+Q to 10$^{(+)}$, band structure.
4651.5 *5*	(13$^-$)		B	J^{π}: proposed in ^{94}Zr(^{48}Ca,4nγ); 736.4γ to 11$^{(-)}$, 925.6γ from (14$^-$).
4695.4[b] *6*	(13$^-$)		B	J^{π}: 840.6γ to 11$^{(-)}$, band structure.
4751.9[c] *4*	13$^{(-)}$		BC	J^{π}: 836.8γ E2 to 11$^{(-)}$, band structure.
4779.0[o] *6*	(12$^+$)		B	J^{π}: 233.0γ D+Q to (11$^+$), band structure.
4939.4 *4*	(12)		BC	J^{π}: 803.2γ D to (11), 1118.1γ D+Q to 12$^+$.
4974.5[j] *4*	(13$^+$)		BC E	J^{π}: 1152.8γ D+Q to 12$^+$, band head.
4990.2[g] *6*	(13)		B	J^{π}: 786.8γ D+Q to (12$^+$), band head.
4995.5[d] *4*	(14$^+$)		BC E	J^{π}: 792.1γ E2 to (12$^+$), band structure.
5028.8[i] *4*	14$^+$		BC E	J^{π}: 1207.8γ E2 to 12$^+$, band structure.
5069.4[o] *7*	(13$^+$)		B	J^{π}: 290.3γ D+Q to (12$^+$), band structure.
5118.5[&] *6*	(13$^-$)		BC	J^{π}: 900.1γ to 11$^-$, band structure.
5232.9 *6*			C	
5253.0 *4*	(13)		BC	J^{π}: 313.5γ D to (12), 278.0γ D to (13$^+$).
5349.3[e] *5*	(14$^+$)		BC E	XREF: E(?). J^{π}: 1146.3γ Q to (12$^+$), 353.4γ D+Q to (14$^+$), band structure.
5363.2[o] *7*	(14$^+$)		B	J^{π}: 293.8γ D+Q to (13$^+$), band structure.

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Adopted Levels, Gammas (continued)

^{138}Nd Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	XREF	Comments
5417.6[a] 7	(14$^-$)	B	J$^{\pi}$: 1022.2γ E2 to (12$^-$), band structure.
5430.2 8	(14$^+$)	B	J$^{\pi}$: 1608.7γ Q to 12$^+$.
5436.1 6	(13)	C	J$^{\pi}$: 1614.7γ D to 12$^+$.
5469.1[j] 4	(15$^+$)	BC	J$^{\pi}$: 494.7γ Q to (13$^+$), 440.2γ D+Q to 14$^+$, band structure.
5493.1[l] 7	(13$^-$)	B	J$^{\pi}$: proposed in ^{94}Zr(^{48}Ca,4nγ) as band head; 1670.9γ (D) to 12$^+$, 277.0γ from 15$^{(-)}$.
5527.5[f] 6	(14$^+$)	B	J$^{\pi}$: proposed in ^{94}Zr(^{48}Ca,4nγ) as band head; 532.1γ D+Q to (14$^+$), 537.3γ D+Q to (13), 1323.7γ to (12$^+$).
5576.9[l] 4	(14$^-$)	BC	J$^{\pi}$: 323.7γ D+Q to (13), 602.6γ D to (13$^+$), 83.6γ to (13$^-$), band structure.
5591.1 7	(14)	B	J$^{\pi}$: 838.8γ to 13$^{(-)}$, 939.5γ to (13$^-$).
5614.3 5	(14)	BC	J$^{\pi}$: 639.5γ D to (13$^+$).
5656.3[b] 8	(15$^-$)	B	J$^{\pi}$: 960.9γ to (13$^-$), band structure.
5678.2[o] 6	(15$^+$)	B	J$^{\pi}$: 314.9γ D+Q to (14$^+$), band structure.
5742.7[g] 5	(15)	BC	J$^{\pi}$: 747.4γ D+Q to (14$^+$), 752.3γ to (13), band structure.
5747.9[k] 5	(16)	BC	J$^{\pi}$: 278.5γ D+Q to (15$^+$), band head.
5759.5[c] 5	15$^{(-)}$	BC	J$^{\pi}$: 1007.6γ E2 to 13$^{(-)}$, band structure.
5770.6[l] 4	15$^{(-)}$	BC	J$^{\pi}$: 1019.1γ Q to 13$^{(-)}$, 193.6γ D+Q to (14$^-$), 179.0γ D+Q to (14), band structure.
5781.1[n] 7	(14)	B	J$^{\pi}$: 288.0γ (D+Q) to (13$^-$), 528.2γ (D+Q) to (13), band head.
5842.3[d] 5	(16$^+$)	BC E	J$^{\pi}$: 846.8γ E2 to (14$^+$), band structure.
5901.4[n] 13	(15)	B	J$^{\pi}$: 120.3γ D+Q to (14), band structure.
6001.4[l] 4	(16$^-$)	BC	J$^{\pi}$: 230.7γ D+Q to 15$^{(-)}$, 252.0γ D to (16), 424.0γ to (14), band structure.
6017.5[m] 7	(15)	B	J$^{\pi}$: 403.5γ D+Q to (14), 440.1γ D+Q to (14$^-$), band head.
6071.1[&] 9	(15$^-$)	B	J$^{\pi}$: 952.6γ to (13$^-$), band structure.
6071.8[h] 6	(15)	B	J$^{\pi}$: 708.4γ (D) to (14$^+$), 722.4γ (D+Q) to (14$^+$), band head.
6088.2[n] 14	(16)	B	J$^{\pi}$: 186.8γ D+Q to (15), band structure.
6152.1[e] 5	(16$^+$)	BC	J$^{\pi}$: 1156.6γ Q to (14$^+$), 803.0γ to (14$^+$), band structure.
6179.9[o] 8	(16$^+$)	B	J$^{\pi}$: 501.6γ to (15$^+$), band structure.
6233.4[f] 6	(16$^+$)	B	J$^{\pi}$: 705.8γ E2 to (14$^+$), 390.9γ to (16$^+$), band structure.
6241.9[j] 5	(17$^+$)	BC	J$^{\pi}$: 772.9γ E2 to (15$^+$), band structure.
6285.2[m] 6	(16)	B	J$^{\pi}$: 514.6γ D+Q to 15$^{(-)}$, 267.5γ to (15), band structure.
6287.6[l] 5	(17$^-$)	BC	J$^{\pi}$: 286.2γ D+Q to (16$^-$), 516.7γ to 15$^{(-)}$, band structure.
6395.5 6	(16$^+$)	B	J$^{\pi}$: 653.1γ D+Q to (15), 867.8γ to (14$^+$).
6409.5[a] 12	(16$^-$)	B	J$^{\pi}$: 991.9γ to (14$^-$), band structure.
6465.8[n] 15	(17)	B	J$^{\pi}$: 377.6γ D+Q to (16), band structure.
6470.2 6	(17)	C	J$^{\pi}$: 627.9γ D to (16$^+$).
6556.2[p] 10	(16)	B	J$^{\pi}$: proposed in ^{94}Zr(^{48}Ca,4nγ) as band head; 376.1γ (D+Q) to (16$^+$).
6560.4[m] 7	(17)	B	J$^{\pi}$: 275.2γ D+Q to (16), 559.2γ D+Q to (16$^-$), band structure.
6566.8[k] 5	(18)	BC	J$^{\pi}$: 818.8γ E2 to (16), 325.1γ to (17$^+$), band structure.
6627.8[h] 5	(17)	B	J$^{\pi}$: 556.6γ D+Q to (15), 785.4γ D+Q to (16$^+$), band structure.
6668.3[l] 5	(18$^-$)	BC	J$^{\pi}$: 380.7γ D+Q to (17$^-$), 667.0γ to (16$^-$), band structure.
6706.8 6	(16$^+$)	B	J$^{\pi}$: 864.5γ to (16$^+$), 1711.4γ to (14$^+$).
6760.5[o] 13	(17$^+$)	B	J$^{\pi}$: 580.6γ to (16$^+$), band structure.
6780.7[p] 10	(17)	B	J$^{\pi}$: 224.4γ to (16), band structure.
6810.8 5	(17)	B	J$^{\pi}$: 968.5γ (D) to (16$^+$), 738.9γ to (15).
6825.5 6	(17)	B E	XREF: E(?). J$^{\pi}$: proposed in ^{94}Zr(^{48}Ca,4nγ); 983.1γ to (16$^+$).
6829.2[d] 5	(18$^+$)	BC	J$^{\pi}$: 986.8γ E2 to (16$^+$), band structure.
6865.2 6	(17)	B	J$^{\pi}$: 1117.4γ D+Q to (16).
6909.4[m] 7	(18)	B	J$^{\pi}$: 349.0γ D+Q to (17), band structure.
6937.6[n] 18	(18)	B	J$^{\pi}$: 471.8γ D+Q to (17), band structure.
6997.9[e] 5	(18$^+$)	B	J$^{\pi}$: 1155.5γ (E2) to (16$^+$), band structure.

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Adopted Levels, Gammas (continued)

^{138}Nd Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	XREF	Comments
7047.2[l] 5	(19$^-$)	BC	J$^{\pi}$: 378.9γ D+Q to (18$^-$), 759.6γ to (17$^-$), band structure.
7091.4[p] 10	(18)	B	J$^{\pi}$: 310.6γ D+Q to (17), 280.9γ to (17), band structure.
7125.6 6	(18)	B	J$^{\pi}$: 315.2γ D+Q to (17), 300.0γ D+Q to (17).
7201.4[f] 5	(18$^+$)	B	J$^{\pi}$: 494.6γ Q to (16$^+$), 806.2γ Q to (16$^+$), 1358.6γ Q to (16$^+$), band structure.
7369.7 6	(20)	B	J$^{\pi}$: 322.4γ to (19$^-$), 193.6γ from (20$^-$), 643.6γ D+Q from (21$^-$).
7414.9[m] 10	(19)	B	J$^{\pi}$: 505.6γ D+Q to (18), band structure.
7422.4[h] 5	(19)	B	J$^{\pi}$: 794.6γ (E2) to (17), band structure.
7427.0[k] 6	(20)	BC	J$^{\pi}$: 860.2γ (E2) to (18), band structure.
7484.8[p] 11	(19)	B	J$^{\pi}$: 393.4γ D+Q to (18), band structure.
7503.6 6	(19)	B	J$^{\pi}$: 378.0γ D+Q to (18), band structure.
7564.3[l] 6	(20$^-$)	BC	J$^{\pi}$: 517.1γ D+Q to (19$^-$), 896.3γ to (18$^-$), band structure.
7601.1 6	(19)	B	J$^{\pi}$: 399.5γ D+Q to (18$^+$).
7689.9 8	(20)	B	J$^{\pi}$: 275.1γ to (19), 323.2γ from (21$^-$).
7764.6 5	(20$^+$)	B	J$^{\pi}$: 563.2γ Q to (18$^+$), 935.0γ to (18$^+$).
7777.1 9		B	J$^{\pi}$: 730.3γ to (19$^-$), 281.4γ from (20).
7830.1 8	(19)	B	J$^{\pi}$: 1262.8γ (D+Q) to (18), 228.0γ D+Q from (20).
7888.5[q] 8	(19)	B	J$^{\pi}$: 1322.4γ (D+Q) to (18), band head.
7933.8 6	(20)	B	J$^{\pi}$: 430.4γ D+Q to (19).
7962.8[p] 15	(20)	B	J$^{\pi}$: 478.0γ D+Q to (19), band structure.
7983.3[e] 5	(20$^+$)	B	J$^{\pi}$: 985.4γ to (18$^+$), 1154.2γ to (18$^+$), band structure.
8013.1[l] 6	(21$^-$)	B	J$^{\pi}$: 448.7γ D+Q to (20$^-$), 966.2γ to (19$^-$), band structure.
8049.7 9	(21)	B	J$^{\pi}$: 485.4γ to (20), 431.5γ D+Q from (22).
8058.2[q] 7	(20)	B	J$^{\pi}$: 169.9γ (D+Q) to (19), band structure.
8080.0[d] 8	(20$^+$)	B	J$^{\pi}$: 1251.0γ E2 to (18$^+$), band structure.
8091.8 9	(20)	B	J$^{\pi}$: 1044.7γ to (19$^-$), 493.8γ from (21).
8115.5 8	(20)	B	J$^{\pi}$: 514.4γ D+Q to (19).
8249.4 9	(20)	B	J$^{\pi}$: 826.7γ D+Q to (19).
8328.9[h] 7	(21)	B	J$^{\pi}$: 906.4γ (E2) to (19), band structure.
8351.6[q] 8	(21)	B	J$^{\pi}$: 293.4γ D+Q to (20), band structure.
8395.9[k] 8	(22)	B	J$^{\pi}$: 968.9γ (E2) to (20), band structure.
8396.3 7	(21)	B	J$^{\pi}$: 462.5γ D+Q to (20).
8438.0 7	(21)	B	J$^{\pi}$: 934.3γ to (19), 1015.2γ to (19), 504γ to (20), 483.1γ (D+Q) from (22).
8453.0[r] 6	(22)	B	J$^{\pi}$: 439.9γ D+Q to (21), band head.
8481.4[1] 8	(22)	B	J$^{\pi}$: 917.1γ Q to (20), band head.
8484.1[p] 18	(21)	B	J$^{\pi}$: 521.3γ to (20), band structure.
8489.0 7	(21)	C	J$^{\pi}$: 924.7γ D to (20).
8585.5 7	(21)	B	J$^{\pi}$: 335.9γ D+Q to (20), 651.9γ D+Q to (20).
8611.5[u] 5	(21)	B	J$^{\pi}$: 628.2γ (D) to (20$^+$), 846.9γ (D) to (20$^+$), band head.
8708.3[q] 10	(22)	B	J$^{\pi}$: 356.7γ D+Q to (21), band structure.
8837.6[z] 8	(22)	B	J$^{\pi}$: 757.7γ Q to (20$^+$), 508.7γ (D) to (21), band structure.
8878.5[p] 21	(22)	B	J$^{\pi}$: 394.4γ (D+Q) to (21), band structure.
8891.5 9		B	J$^{\pi}$: 410.4γ D+Q to (22), 841.8γ to (21).
8897.3[r] 8	(23)	B	J$^{\pi}$: 444.4γ D+Q to (22), band structure.
8921.2[3] 7	(22)	B	J$^{\pi}$: 524.9γ (D) to (21), 335.7γ (D) to (21), band structure.
9132.7[q] 11	(23)	B	J$^{\pi}$: 424.4γ D+Q to (22), band structure.
9261.1[1] 9	(24)	B	J$^{\pi}$: 779.5γ E2 to (22), band structure.
9348.7[h] 9	(23)	B	J$^{\pi}$: 1019.8γ to (21), band structure.
9351.8[u] 6	(23)	B	J$^{\pi}$: 740.3γ E2 to (21), band structure.
9356.4[p] 23	(23)	B	J$^{\pi}$: 477.9γ (D+Q) to (22), band structure.
9384.6[s] 8	(24)	B	J$^{\pi}$: 487.8γ D+Q to (23), 931.5γ to (22), band head.
9401.9[r] 9	(24)	B	J$^{\pi}$: 504.6γ D+Q to (23), band structure.

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Adopted Levels, Gammas (continued)

^{138}Nd Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	XREF	Comments
9513.6[t] *6*	(22)	B	J$^{\pi}$: 902.1γ (D+Q) to (21), band head.
9596.4[3] *7*	(24)	B	J$^{\pi}$: 675.2γ E2 to (22), band structure.
9620.6[q] *12*	(24)	B	J$^{\pi}$: 487.9γ D+Q to (23), band structure.
9685.8[z] *9*	(24)	B	J$^{\pi}$: 848.2γ E2 to (22), band structure.
9808.0[s] *9*	(25)	B	J$^{\pi}$: 423.4γ D+Q to (24), band structure.
9989.6[r] *11*	(25)	B	J$^{\pi}$: 587.7γ D+Q to (24), band structure.
10038.3[t] *6*	(24)	B	J$^{\pi}$: 524.8γ E2 to (22), band structure.
10232.2[q] *13*	(25)	B	J$^{\pi}$: 611.6γ to (24), band structure.
10243.3[u] *6*	(25)	B	J$^{\pi}$: 891.6γ E2 to (23), band structure.
10262.4[s] *14*	(26)	B	J$^{\pi}$: 454.4γ D+Q to (25), band structure.
10341.8[1] *10*	(26)	B	J$^{\pi}$: 1080.7γ E2 to (24), band structure.
10363.4 *11*	(25)	B	J$^{\pi}$: 767.1γ (D) to (24).
10413.9[3] *7*	(26)	B	J$^{\pi}$: 817.5γ E2 to (24), band structure.
10648.9[r] *15*	(26)	B	J$^{\pi}$: 659.3γ to (25), band structure.
10688.6[z] *11*	(26)	B	J$^{\pi}$: 1002.8γ E2 to (24), band structure.
10724.2[t] *6*	(26)	B	J$^{\pi}$: 685.8γ E2 to (24), band structure.
10741.8 *12*	(26)	B	J$^{\pi}$: 378.4γ D+Q to (25).
10798.4[s] *17*	(27)	B	J$^{\pi}$: 536.0γ to (26).
11284.2[4] *11*	(27)	B	J$^{\pi}$: 870.3γ (D) to (26), 542.4γ D+Q to (26), band head.
11286.2[u] *8*	(27)	B	J$^{\pi}$: 1042.9γ E2 to (25), band structure.
11368.5[2] *11*	(28)	B	J$^{\pi}$: 1026.7γ (E2) to (26), band head.
11404.3[3] *8*	(28)	B	J$^{\pi}$: 990.4γ E2 to (26), band structure.
11563.8[1] *14*	(28)	B	J$^{\pi}$: 1222.0γ to (26), band structure.
11725.4 *10*	(28)	B	J$^{\pi}$: 1001.9γ (E2) to (26).
11741.2[t] *8*	(28)	B	J$^{\pi}$: 1016.8γ E2 to (26), band structure.
11904.7[z] *15*	(28)	B	J$^{\pi}$: 1216.1γ E2 to (26), band structure.
11941.6[4] *12*	(29)	B	J$^{\pi}$: 657.4γ E2 to (27), band structure.
11962.3[x] *12*	(28)	B	J$^{\pi}$: 1238.1γ (E2) to (26), band head.
12184.9[w] *18*	(29)	B	J$^{\pi}$: 989.5γ E2 from (31), band head.
12490.2[u] *9*	(29)	B	J$^{\pi}$: 1204.0γ E2 to (27), band structure.
12580.4[y] *13*	(29)	B	J$^{\pi}$: 1294.2γ (E2) to (27), band head.
12584.7[3] *9*	(30)	B	J$^{\pi}$: 1180.4γ E2 to (28), band structure.
12668.0[v] *11*	(30)	B	J$^{\pi}$: 943.4γ (E2) to (28), band head.
12723.4[2] *15*	(30)	B	J$^{\pi}$: 1354.9γ to (28), band structure.
12852.7[4] *13*	(31)	B	J$^{\pi}$: 911.1γ E2 to (29), band structure.
12915.4[x] *16*	(30)	B	J$^{\pi}$: 953.1γ E2 to (28), band structure.
12944.4[t] *9*	(30)	B	J$^{\pi}$: 1203.2γ E2 to (28), band structure.
12970.8[1] *17*	(30)	B	J$^{\pi}$: 1407.0γ to (28), band structure.
13174.4[w] *15*	(31)	B	J$^{\pi}$: proposed in ^{94}Zr(^{48}Ca,4nγ); 506.4γ to (30).
13304.7[z] *18*	(30)	B	J$^{\pi}$: 1400.0γ to (28), band structure.
13514.7[y] *14*	(31)	B	J$^{\pi}$: 934.2γ E2 to (29), band structure.
13558.2[v] *12*	(32)	B	J$^{\pi}$: 890.1γ E2 to (30), band structure.
13846.4[u] *14*	(31)	B	J$^{\pi}$: 1356.1γ E2 to (29), band structure.
13936.1[3] *14*	(32)	B	J$^{\pi}$: 1351.4γ E2 to (30), band structure.
13991.3[4] *17*	(33)	B	J$^{\pi}$: 1138.6γ E2 to (31), band structure.
14012.7 *14*		B	J$^{\pi}$: 1428γ to (30).
14055.9[x] *19*	(32)	B	J$^{\pi}$: 1140.5γ E2 to (30), band structure.
14294.2[w] *18*	(33)	B	J$^{\pi}$: 1119.7γ E2 to (31), band structure.
14306.7[2] *18*	(32)	B	J$^{\pi}$: 1583.3γ to (30), band structure.
14335.0[t] *14*	(32)	B	J$^{\pi}$: 1390.6γ E2 to (30), band structure.
14609.5[v] *16*	(34)	B	J$^{\pi}$: 1051.3γ E2 to (32), band structure.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{138}Nd Levels (continued)

E(level)[†]	J^{π}[‡]	XREF	Comments
14678.8[y] *17*	(33)	B	J^{π}: 1164.1γ to (31), band structure.
14885[z] *3*	(32)	B	J^{π}: 1580.3γ to (30), band structure.
15261.4[u] *17*	(33)	B	J^{π}: 1415.0γ (E2) to (31), band structure.
15354.9[4] *20*	(35)	B	J^{π}: 1363.6γ E2 to (33), band structure.
15367.1[x] *21*	(34)	B	J^{π}: 1311.2γ E2 to (32), band structure.
15480.8[3] *17*	(34)	B	J^{π}: 1544.7γ to (32), band structure.
15552.0[w] *21*	(35)	B	J^{π}: 1257.8γ E2 to (33), band structure.
15796.9[v] *19*	(36)	B	J^{π}: 1187.4γ E2 to (34), band structure.
15877.2[t] *17*	(34)	B	J^{π}: 1542.2γ to (32), band structure.
16059.7[y] *20*	(35)	B	J^{π}: 1380.9γ to (33), band structure.
16694.6[u] *20*	(35)	B	J^{π}: 1433.2γ to (33), band structure.
16789.2[x] *23*	(36)	B	J^{π}: 1422.1γ E2 to (34), band structure.
16914.7[4] *22*	(37)	B	J^{π}: 1559.8γ to (35), band structure.
16954.7[w] *23*	(37)	B	J^{π}: band structure.
17064.0[3] *20*	(36)	B	J^{π}: 1583.2γ to (34), band structure.
17132.1[v] *21*	(38)	B	J^{π}: 1335.2γ to (36), band structure.
17451.6[t] *20*	(36)	B	J^{π}: 1356.1γ to (34), band structure.
18160.7[u] *22*	(37)	B	J^{π}: 1466.1γ to (35), band structure.
18292[x] *3*	(38)	B	J^{π}: 1503.2γ to (36), band structure.
18495.5[w] *25*	(39)	B	J^{π}: 1540.8γ to (37), band structure.
18613.1[v] *23*	(40)	B	J^{π}: 1481.0γ to (38), band structure.
18628.8[4] *24*	(39)	B	J^{π}: 1714.1γ to (37), band structure.
18672.0[3] *22*	(38)	B	J^{π}: 1608.0γ to (36), band structure.
18978.5[t] *22*	(38)	B	J^{π}: 1526.9γ to (36), band structure.
19686.3[u] *24*	(39)	B	J^{π}: 1525.6γ to (37), band structure.
20163[w] *3*	(41)	B	J^{π}: 1667.5γ to (39), band structure.
20231[v] *3*	(42)	B	J^{π}: 1618.4γ to (40), band structure.
20340.1[3] *24*	(40)	B	J^{π}: 1668.1γ to (38), band structure.
20422[4] *3*	(41)	B	J^{π}: 1793.5γ to (39), band structure.
20483.8[t] *24*	(40)	B	J^{π}: 1505.2γ to (38), band structure.
21294[u] *3*	(41)	B	J^{π}: 1607.4γ to (39), band structure.
21946[w] *3*	(43)	B	J^{π}: 1783γ to (41), band structure.
21991[v] *3*	(44)	B	J^{π}: 1759.9γ to (42), band structure.
22135[t] *3*	(42)	B	J^{π}: 1651.2γ to (40), band structure.
22260[4] *3*	(43)	B	J^{π}: 1837.5γ to (41), band structure.
23008[u] *3*	(43)	B	J^{π}: 1714.4γ to (41), band structure.
23853[v] *3*	(46)	B	J^{π}: 1861.7γ to (44), band structure.
24133[4] *3*	(45)	B	J^{π}: 1873γ to (43), band structure.
x[5]		B	Additional information 2.
894.4+x[5] *10*		B	
1976.7+x[5] *12*		B	
3239.9+x[5] *15*		B	
4674.6+x[5] *18*		B	
6294.6+x[5] *21*		B	
8111.6+x[5] *23*		B	
y[6]		B	Additional information 3.
842.1+y[6] *5*		B	
1833.3+y[6] *7*		B	
2983.0+y[6] *9*		B	
4290.0+y[6] *14*		B	
5751.0+y[6] *17*		B	

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Adopted Levels, Gammas (continued)

^{138}Nd Levels (continued)

E(level)†	Jπ‡	XREF	Comments
7374.8+y[6] *20*		B	
z[7]		B	Additional information 4.
814.9+z[7] *10*		B	
1791.8+z[7] *15*		B	
2958.8+z[7] *18*		B	
4330.1+z[7] *20*		B	
5907.2+z[7] *23*		B	
u[8]	(26^+)	B	Additional information 5.
968.9+u[8] *4*	(28^+)	B	
2005.3+u[8] *6*	(30^+)	B	
3074.3+u[8] *6*	(32^+)	B	
4201.5+u[8] *7*	(34^+)	B	
5405.5+u[8] *7*	(36^+)	B	
6679.0+u[8] *8*	(38^+)	B	
8012.4+u[8] *8*	(40^+)	B	
9413.3+u[8] *8*		B	
10880.8+u[8] *8*		B	
12421.0+u[8] *9*		B	
14040.6+u[8] *10*		B	
15748.5+u[8] *10*		B	
17546.8+u[8] *12*		B	
19444.7+u[8] *19*		B	
21438.8+u[8] *23*		B	

† From a least-squares fit to γ-ray energies, assuming $\Delta E\gamma$=1 keV when unknown.
‡ Deduced from γ-ray multipolarities, cascade patterns, band structures, unless otherwise noted.
# Band(A): Ground state band.
@ Band(B): γ-band.
& Band(C): Band N1 based on 5^-, 1990 level.
[a] Band(D): Band N2 based on (8^-), 2999 level.
[b] Band(E): Band N3 based on $9^{(-)}$, 3371 level.
[c] Band(F): Band N4 based on $5^{(-)}$, 2221 level.
[d] Band(G): Band L1 based on (10^+), 3701 level.
[e] Band(H): Band L2 based on (14^+), 5349 level.
[f] Band(I): Band L3 based on (14^+), 5527 level.
[g] Band(J): Band L4 based on (13), 4990 level.
[h] Band(K): Band L5 based on (15), 6072 level.
[i] Band(L): Band L6 based on 10^+, 3175 level.
[j] Band(M): Band L7 based on (13^+), 4974 level.
[k] Band(N): Band L8 based on (16), 5748 level.
[l] Band(O): Band D1 based on (13^-), 5493 level. Bands D1 and D2 are possible chiral partners.
[m] Band(P): Band D2 based on (15), 6017 level. Bands D1 and D2 are possible chiral partners.
[n] Band(Q): Band D3 based on (14), 5781 level.
[o] Band(R): Band D4 based on $10^{(+)}$, 4345 level.
[p] Band(S): Band D5 based on (16), 6556 level.
[q] Band(T): Band D6 based on (19), 7888 level.
[r] Band(U): Band D7 based on (22), 8453 level.

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Adopted Levels, Gammas (continued)

^{138}Nd Levels (continued)

[s] Band(V): Band D8 based on (24), 9384 level.
[t] Band(a): Band T1 based on (22), 9514 level; α=0. Bands T1 and T2 are signature partners.
[u] Band(b): Band T2 based on (21), 8611 level; α=1. Bands T1 and T2 are signature partners.
[v] Band(c): Band T3 based on (30), 12668 level.
[w] Band(d): Band T4 based on (29), 12185 level.
[x] Band(e): Band T5 based on (28), 11962 level.
[y] Band(f): Band T6 based on (29), 12580 level.
[z] Band(g): Band T9 based on (22), 8838 level.
[1] Band(h): Band T10 based on (22), 8481 level.
[2] Band(i): Band T11 based on (28), 11368 level.
[3] Band(j): Band T7 based on (22), 8921 level.
[4] Band(k): Band T8 based on (27), 11284 level.
[5] Band(l): Band T12 based on X level.
[6] Band(m): Band T13 based on Y level.
[7] Band(n): Band T14 based on Z level.
[8] Band(o): Highly-deformed (HD) band.

$\gamma(^{138}Nd)$

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]	α[#]	Comments
520.75	2^+	520.7 *2*	100	0.0	0^+	E2	0.0107	α(K)=0.0088 *3*; α(L)=0.00141 *5* E_γ: weighted average of 520.9 *2* from ^{138}Pm ε decay, 520.8 *2* from ^{94}Zr(^{48}Ca,4nγ), 520.8 *2* from ^{123}Sb(^{19}F,4nγ), and 520.1 *3* from ^{140}Ce(α,6nγ),^{141}Pr(p,4nγ). Mult.: also from ce data in ^{138}Pm ε decay, $\gamma\gamma$(DCO) in ^{123}Sb(^{19}F,4nγ) and ^{124}Te(^{19}F,p4nγ), $\gamma(\theta)$ in ^{140}Ce(α,6nγ),^{141}Pr(p,4nγ).
1013.80	2^+	493.1 *2*	100 *6*	520.75	2^+	E2(+M1)	0.0123	α(K)=0.0101 *3*; α(L)=0.00166 *5*; α(M)=0.00036 *1* E_γ: weighted average of 493.1 *2* from ^{138}Pm ε decay, 493.1 *2* from ^{123}Sb(^{19}F,4nγ), and 492.8 *5* from ^{140}Ce(α,6nγ),^{141}Pr(p,4nγ). I_γ: from ^{138}Pm ε decay. Other: 100 *1* from ^{124}Te(^{19}F,p4nγ). Mult.: E2 from ^{138}Pm ε decay based on ce data, M1+E2 from ^{124}Te(^{19}F,p4nγ) based on $\gamma\gamma$(DCO); E2(+M1) is adopted.
		1013.9 *3*	34 *3*	0.0	0^+	E2	0.00219	α=0.00219; α(K)=0.00185 *6*; α(L)=0.00025 *1* E_γ: weighted average of 1014.0 *3* from ^{138}Pm ε decay, 1014.0 *3* from ^{123}Sb(^{19}F,4nγ), and 1013.3 *5* from ^{140}Ce(α,6nγ),^{141}Pr(p,4nγ). I_γ: from ^{138}Pm ε decay. Other: 63 *8* from ^{124}Te(^{19}F,p4nγ). Mult.: from ce data in ^{138}Pm ε decay.
1249.70	4^+	728.8 *2*	100	520.75	2^+	E2	0.00458	α=0.00458; α(K)=0.00383 *12*; α(L)=0.00056 *2* E_γ: weighted average of 729.0 *2* from ^{138}Pm ε decay, 728.7 *2* from ^{94}Zr(^{48}Ca,4nγ), 729.0 *2* from ^{123}Sb(^{19}F,4nγ), and 728.3 *3* from ^{140}Ce(α,6nγ),^{141}Pr(p,4nγ). Mult.: also from ce data in ^{138}Pm ε decay, $\gamma\gamma$(DCO) in ^{123}Sb(^{19}F,4nγ) and ^{124}Te(^{19}F,p4nγ), ce data and $\gamma(\theta)$ in ^{140}Ce(α,6nγ),^{141}Pr(p,4nγ).

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Adopted Levels, Gammas (continued)

γ(^{138}Nd) (continued)

E$_i$(level)	J$^\pi_i$	E$_\gamma$†	I$_\gamma$†	E$_f$	J$^\pi_f$	Mult.‡	α#	Comments
1451.43	(3)$^+$	437.7 *2*	100 *6*	1013.80	2$^+$	E2(+M1)	0.021 *5*	α(K)=0.018 *4*; α(L)=0.0027 *3*; α(M)=0.00057 *6*; α(N+..)=0.00016 *2* E$_\gamma$: weighted average of 437.4 *2* from ^{138}Pm ε decay, 438.0 *2* from ^{123}Sb(^{19}F,4nγ), and 437.3 *5* from ^{140}Ce(α,6nγ),^{141}Pr(p,4nγ). I$_\gamma$: from ^{138}Pm ε decay. Other: 100 *4* from ^{124}Te(^{19}F,p4nγ). Mult.: E2(+M1) from ^{138}Pm ε decay based on ce data, M1+E2 from ^{124}Te(^{19}F,p4nγ) based on $\gamma\gamma$(DCO); E2(+M1) is adopted.
		930.5 *4*	49 *3*	520.75	2$^+$	M1(+E2)	0.0034 *8*	α=0.0034 *8*; α(K)=0.0029 *7*; α(L)=0.00038 *8* E$_\gamma$: weighted average of 930.6 *2* from ^{138}Pm ε decay and 929.6 *5* from ^{140}Ce(α,6nγ),^{141}Pr(p,4nγ). I$_\gamma$: from from ^{138}Pm ε decay. Other: 27.8 *6* from ^{124}Te(^{19}F,p4nγ). Mult.: M1(+E2) from ^{138}Pm ε decay based on ce data, M1+E2 from ^{124}Te(^{19}F,p4nγ) based on $\gamma\gamma$(DCO); M1(+E2) is adopted.
1799.77	(4$^+$)	786.0 *3*	8.2 *18*	1013.80	2$^+$	Q		E$_\gamma$,I$_\gamma$: from ^{138}Pm ε decay. Other: Iγ=100 *15* from. Mult.: E2 from ^{124}Te(^{19}F,p4nγ) based on $\gamma\gamma$(DCO); Q is adopted.
		1279.1 *3*	100 *7*	520.75	2$^+$	Q		E$_\gamma$,I$_\gamma$: from ^{138}Pm ε decay. Other: Iγ=100 *2* from ^{124}Te(^{19}F,p4nγ). Mult.: E2 from ^{124}Te(^{19}F,p4nγ) based on $\gamma\gamma$(DCO); Q is adopted.
1842.81	(4$^+$)	592.9 *3*	12.7 *14*	1249.70	4$^+$			E$_\gamma$,I$_\gamma$: seen only in ^{138}Pm ε decay.
		829.0 *2*	100 *7*	1013.80	2$^+$	Q		E$_\gamma$,I$_\gamma$: from ^{138}Pm ε decay. Other: 100 *10* in ^{124}Te(^{19}F,p4nγ). Mult.: M1 from ^{138}Pm ε decay based on ce data, E2 from ^{124}Te(^{19}F,p4nγ) based on $\gamma\gamma$(DCO); Q is adopted.
1990.15	5$^-$	740.3 *2*	100	1249.70	4$^+$	E1	0.00170	α=0.00170; α(K)=0.00145 *5*; α(L)=0.00019 *1* E$_\gamma$: weighted average of 740.6 *3* from ^{138}Pm ε decay, 740.2 *2* from ^{94}Zr(^{48}Ca,4nγ), 740.6 *3* from ^{123}Sb(^{19}F,4nγ), and 740.0 *3* from ^{140}Ce(α,6nγ),^{141}Pr(p,4nγ). Mult.: also from ce data in ^{138}Pm ε decay, $\gamma\gamma$(DCO) in ^{123}Sb(^{19}F,4nγ), ce data and $\gamma(\theta)$ in ^{140}Ce(α,6nγ),^{141}Pr(p,4nγ).
2133.8	6$^+$	884.1 *2*		1249.70	4$^+$	E2	0.00294	α=0.00294; α(K)=0.00248 *8*; α(L)=0.00035 *1* E$_\gamma$: weighted average of 884.4 *4* from ^{138}Pm ε decay, 883.9 *2* from ^{94}Zr(^{48}Ca,4nγ), 884.4 *2* from ^{123}Sb(^{19}F,4nγ), and 883.7 *3* from ^{140}Ce(α,6nγ),^{141}Pr(p,4nγ). Mult.: also from $\gamma\gamma$(DCO) in ^{123}Sb(^{19}F,4nγ) and ^{124}Te(^{19}F,p4nγ), ce data and $\gamma(\theta)$ in ^{140}Ce(α,6nγ),^{141}Pr(p,4nγ).
2196.1		1675.3 *3*	100	520.75	2$^+$			
2221.34	5$^{(-)}$	230.8 *2*	48 *5*	1990.15	5$^-$	D		E$_\gamma$: weighted average of 230.7 *2* from ^{94}Zr(^{48}Ca,4nγ) and 231.0 *3* from

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Adopted Levels, Gammas (continued)

γ(^{138}Nd) (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	α#	Comments
								^{123}Sb(^{19}F,4nγ). I_γ: other: 29 from ^{123}Sb(^{19}F,4nγ). Mult.: from $\gamma\gamma$(DCO) in ^{123}Sb(^{19}F,4nγ).
2221.34	5$^{(-)}$	971.9 *2*	100 *12*	1249.70	4$^+$	D		E_γ: weighted average of 972.1 *3* from ^{138}Pm ε decay, 971.7 *2* from ^{94}Zr(^{48}Ca,4nγ), 972.4 *3* from ^{123}Sb(^{19}F,4nγ), and 971.7 *3* from ^{140}Ce(α,6nγ),^{141}Pr(p,4nγ). Mult.: M1(+E2) in ^{140}Ce(α,6nγ), ^{141}Pr(p,4nγ). The results of 1994De11 in ^{123}Sb(^{19}F,4nγ) confirm a dipole nature, but it is interpreted as E1; ce data in ^{138}Pm ε decay support dipole.
2261.6	(5$^+$)	810.3 *3*	82 *8*	1451.43	(3)$^+$	Q	0.00570	α=0.00570; α(K)=0.00486 *15*; α(L)=0.00064 *2* E_γ,I_γ: from ^{138}Pm ε decay. Mult.: (M1) from ^{138}Pm ε decay based on ce data, E2 from ^{124}Te(^{19}F,p4nγ) based on $\gamma\gamma$(DCO); Q is adopted.
		1011.6 *3*	100 *13*	1249.70	4$^+$	D+Q		E_γ,I_γ: from ^{138}Pm ε decay. Mult.: M1+E2 from ^{124}Te(^{19}F,p4nγ) based on $\gamma\gamma$(DCO); D+Q is adopted.
2269.5	(5$^+$)	818.1	100	1451.43	(3)$^+$	Q		E_γ,I_γ: from ^{124}Te(^{19}F,p4nγ) only. Mult.: E2 from ^{124}Te(^{19}F,p4nγ) based on $\gamma\gamma$(DCO); Q is adopted.
2273.0	(1,2$^+$)	1259.2 *5*	83 *33*	1013.80	2$^+$			E_γ,I_γ: from ^{138}Pm ε decay only.
		2273.0 *4*	100 *33*	0.0	0$^+$			E_γ,I_γ: from ^{138}Pm ε decay only.
2321.3	7$^-$	186.9 *2*	9.1 *18*	2133.8	6$^+$	D		E_γ: weighted average of 186.5 *5* from ^{94}Zr(^{48}Ca,4nγ) and 187.0 *2* from ^{123}Sb(^{19}F,4nγ). I_γ: other: 4 from ^{123}Sb(^{19}F,4nγ). Mult.: from ^{123}Sb(^{19}F,4nγ) based on $\gamma\gamma$(DCO).
		331.2 *4*	100 *10*	1990.15	5$^-$	E2	0.0387	B(E2)(W.u.)≈12 α(K)=0.0309 *10*; α(L)=0.00606 *19*; α(M)=0.00132 *4*; α(N+..)=0.00035 *1* E_γ: weighted average of 331.5 *2* from ^{94}Zr(^{48}Ca,4nγ), 331.4 *3* from ^{123}Sb(^{19}F,4nγ), and 330.3 *3* from ^{140}Ce(α,6nγ),^{141}Pr(p,4nγ). Mult.: also from $\gamma\gamma$(DCO) in ^{123}Sb(^{19}F,4nγ), ce data and $\gamma(\theta)$ in ^{140}Ce(α,6nγ),^{141}Pr(p,4nγ); RUL.
2323.7		1802.9 *3*	100	520.75	2$^+$			E_γ: from ^{138}Pm ε decay only.
2484.7		1033.2 *4*	38 *13*	1451.43	(3)$^+$			E_γ,I_γ: from ^{138}Pm ε decay only.
		1470.9 *4*	100 *25*	1013.80	2$^+$			E_γ,I_γ: from ^{138}Pm ε decay only.
2623.0		1373.3 *4*	100	1249.70	4$^+$			E_γ: from ^{138}Pm ε decay only.
2625.5		1375.8 *4*	100	1249.70	4$^+$			E_γ: from ^{138}Pm ε decay only.
2691.1	7$^{(-)}$	369.9 *3*	10.5 *16*	2321.3	7$^-$	D+Q		E_γ: weighted average of 369.8 *2* from ^{94}Zr(^{48}Ca,4nγ), 369.3 *3* from ^{123}Sb(^{19}F,4nγ), and 370.6 *3* from ^{140}Ce(α,6nγ),^{141}Pr(p,4nγ). I_γ: others: 12 *8* from ^{140}Ce(α,6nγ),^{141}Pr(p,4nγ), 5 from ^{123}Sb(^{19}F,4nγ). Mult.: M1+E2 from ^{94}Zr(^{48}Ca,4nγ) based on $\gamma\gamma$(DCO), (Q) from ^{123}Sb(^{19}F,4nγ) based on $\gamma\gamma$(DCO); D+Q is adopted.

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Adopted Levels, Gammas (continued)

γ(^{138}Nd) (continued)

E$_i$(level)	J$^\pi_i$	E$_\gamma$†	I$_\gamma$†	E$_f$	J$^\pi_f$	Mult.‡	α#	Comments
2691.1	7$^{(-)}$	469.6 *2*	37 *4*	2221.34	5$^{(-)}$	E2		E$_\gamma$: weighted average of 469.8 *2* from ^{94}Zr(^{48}Ca,4nγ), 469.6 *2* from ^{123}Sb(^{19}F,4nγ), and 469.0 *3* from ^{140}Ce(α,6nγ),^{141}Pr(p,4nγ). I$_\gamma$: others: 29 *5* from ^{140}Ce(α,6nγ),^{141}Pr(p,4nγ), 32 from ^{123}Sb(^{19}F,4nγ). Mult.: Other: Q from $\gamma\gamma$(DCO) in ^{123}Sb(^{19}F,4nγ), $\gamma(\theta)$ in ^{140}Ce(α,6nγ),^{141}Pr(p,4nγ).
		557.2 *2*	100 *10*	2133.8	6$^+$	D(+Q)		E$_\gamma$: weighted average of 557.3 *2* from ^{94}Zr(^{48}Ca,4nγ), 556.9 *3* from ^{123}Sb(^{19}F,4nγ), and 557.2 *3* from ^{140}Ce(α,6nγ),^{141}Pr(p,4nγ). I$_\gamma$: others: 100 *5* from ^{140}Ce(α,6nγ),^{141}Pr(p,4nγ), 100 from ^{123}Sb(^{19}F,4nγ). Mult.: E1+M2 from ^{94}Zr(^{48}Ca,4nγ) based on $\gamma\gamma$(DCO), D(+Q) from ^{140}Ce(α,6nγ),^{141}Pr(p,4nγ) based on $\gamma(\theta)$; D(+Q) is adopted.
		701.2 *3*	4.1 *8*	1990.15	5$^-$	Q		E$_\gamma$: weighted average of 701.2 *5* from ^{94}Zr(^{48}Ca,4nγ) and 701.2 *3* from ^{123}Sb(^{19}F,4nγ). Other: 5 from ^{123}Sb(^{19}F,4nγ). Mult.: from $\gamma\gamma$(DCO) in ^{123}Sb(^{19}F,4nγ).
2695.2	(8$^+$)	372.8 *3*	100	2321.3	7$^-$	D		E$_\gamma$,I$_\gamma$,Mult.: from ^{123}Sb(^{19}F,4nγ) only.
		562.2 *2*	24	2133.8	6$^+$	(Q)		E$_\gamma$,I$_\gamma$,Mult.: from ^{123}Sb(^{19}F,4nγ) only.
2710.2		1258.8 *5*	50 *17*	1451.43	(3)$^+$			E$_\gamma$,I$_\gamma$: from ^{138}Pm ε decay only.
		1460.4 *5*	100 *50*	1249.70	4$^+$			E$_\gamma$,I$_\gamma$: from ^{138}Pm ε decay only.
2758.5		1508.7 *4*	36 *18*	1249.70	4$^+$			E$_\gamma$,I$_\gamma$: from ^{138}Pm ε decay only.
		1744.8 *4*	100 *18*	1013.80	2$^+$			E$_\gamma$,I$_\gamma$: from ^{138}Pm ε decay only.
2934.4		944.5 *3*	32 *8*	1990.15	5$^-$			E$_\gamma$,I$_\gamma$: from ^{138}Pm ε decay only.
		1091.9 *6*	32 *16*	1842.81	(4$^+$)			E$_\gamma$,I$_\gamma$: from ^{138}Pm ε decay only.
		1134.6 *3*	100 *12*	1799.77	(4$^+$)			E$_\gamma$,I$_\gamma$: from ^{138}Pm ε decay only.
		1482.8 *3*	100 *12*	1451.43	(3)$^+$			
2940.6	(6$^+$)	1097.5 *6*	100 *33*	1842.81	(4$^+$)	Q		E$_\gamma$,I$_\gamma$: from ^{138}Pm ε decay. Other: Iγ=68 *21* from ^{124}Te(^{19}F,p4nγ). Mult.: E2 from ^{124}Te(^{19}F,p4nγ) based on $\gamma\gamma$(DCO); Q is adopted.
		1140.9 *3*	67 *17*	1799.77	(4$^+$)			E$_\gamma$,I$_\gamma$: from ^{138}Pm ε decay. Other: Iγ=100 *47* from ^{124}Te(^{19}F,p4nγ).
2960.8	(6$^+$)	699.0 *6*	33 *7*	2261.6	(5$^+$)			E$_\gamma$,I$_\gamma$: from ^{138}Pm ε decay only.
		970.7 *4*	53 *20*	1990.15	5$^-$			E$_\gamma$,I$_\gamma$: from ^{138}Pm ε decay only.
		1117.8 *4*	47 *14*	1842.81	(4$^+$)			E$_\gamma$,I$_\gamma$: from ^{138}Pm ε decay only.
		1161.4 *4*	47 *14*	1799.77	(4$^+$)			E$_\gamma$,I$_\gamma$: from ^{138}Pm ε decay. Other: Iγ=55 *35* from ^{124}Te(^{19}F,p4nγ).
		1509.3 *4*	53 *27*	1451.43	(3)$^+$			E$_\gamma$,I$_\gamma$: from ^{138}Pm ε decay only.
		1711.1 *4*	100 *20*	1249.70	4$^+$			E$_\gamma$,I$_\gamma$: from ^{138}Pm ε decay. Other: Iγ=100 *25* from ^{124}Te(^{19}F,p4nγ).
2980.3	(8$^-$)	659.0 *2*	100	2321.3	7$^-$	D		E$_\gamma$: weighted average of 658.8 *2* from ^{94}Zr(^{48}Ca,4nγ) and 659.1 *2* from ^{123}Sb(^{19}F,4nγ). Mult.: from $\gamma\gamma$(DCO) in ^{94}Zr(^{48}Ca,4nγ) and ^{123}Sb(^{19}F,4nγ).
2998.5	(8$^-$)	677.0 *2*	100	2321.3	7$^-$	D+Q		
3107.3	8$^+$	973.2 *2*	100	2133.8	6$^+$	E2	0.00239	α=0.00239; α(K)=0.00202 *6*; α(L)=0.00028 *1* E$_\gamma$: weighted average of 972.9 *2* from

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Adopted Levels, Gammas (continued)

$\gamma(^{138}Nd)$ (continued)

E_i(level)	J^{π}_i	E_{γ}†	I_{γ}†	E_f	J^{π}_f	Mult.‡	α#	Comments
								$^{94}Zr(^{48}Ca,4n\gamma)$, 973.5 *2* from $^{123}Sb(^{19}F,4n\gamma)$, and 972.9 *3* from $^{140}Ce(\alpha,6n\gamma),^{141}Pr(p,4n\gamma)$. Mult.: also from $\gamma\gamma$(DCO) in $^{124}Te(^{19}F,p4n\gamma)$, ce data and $\gamma(\theta)$ in $^{140}Ce(\alpha,6n\gamma),^{141}Pr(p,4n\gamma)$.
3174.5	10^+	66.6 *3*	100	3107.3	8^+	E2	10.0	B(E2)(W.u.)=2.3 *3* E_{γ}: from $^{140}Ce(\alpha,6n\gamma)$, $^{141}Pr(p,4n\gamma)$ data set, also observed in $^{94}Zr(^{48}Ca,4n\gamma)$. Mult.: from ce data and $\gamma(\theta)$ in $^{140}Ce(\alpha,6n\gamma),^{141}Pr(p,4n\gamma)$.
3239.8	9^-	918.5 *3*	100	2321.3	7^-	E2		E_{γ}: weighted average of 918.1 *5* from $^{94}Zr(^{48}Ca,4n\gamma)$ and 918.6 *3* from $^{123}Sb(^{19}F,4n\gamma)$. Mult.: E2 from $^{94}Zr(^{48}Ca,4n\gamma)$ and Q from $^{123}Sb(^{19}F,4n\gamma)$ based on $\gamma\gamma$(DCO); E2 is adopted based on band structure.
3247.0	$9^{(-)}$	556.0 *4*	100	2691.1	$7^{(-)}$	E2	0.0090	α=0.0090; α(K)=0.00742 *23*; α(L)=0.00117 *4* E_{γ}: unweighted average of 556.7 *2* from $^{94}Zr(^{48}Ca,4n\gamma)$, 555.8 *3* from $^{123}Sb(^{19}F,4n\gamma)$, 555.5 *3* from $^{140}Ce(\alpha,6n\gamma),^{141}Pr(p,4n\gamma)$. Mult.: from $^{140}Ce(\alpha,6n\gamma),^{141}Pr(p,4n\gamma)$ based on $\gamma(\theta)$ and RUL; E2 from $^{94}Zr(^{48}Ca,4n\gamma)$ based on $\gamma\gamma(\theta)$; E2 is adopted.
3255.8		2242.0 *10*	100	1013.80	2^+			E_{γ}: from ^{138}Pm ε decay.
3371.3	$9^{(-)}$	372.7 *2*	100 *10*	2998.5	(8^-)	D+Q		
		391.0 *2*	44 *7*	2980.3	(8^-)	D		E_{γ}: weighted average of 391.0 *2* from $^{94}Zr(^{48}Ca,4n\gamma)$ and 390.9 *2* from $^{123}Sb(^{19}F,4n\gamma)$. I_{γ}: other: $I(391.0\gamma)/I(676.9\gamma)$=21/100 from $^{123}Sb(^{19}F,4n\gamma)$. Mult.: from $\gamma\gamma$(DCO) in $^{94}Zr(^{48}Ca,4n\gamma)$ and $^{123}Sb(^{19}F,4n\gamma)$.
		676.9 *3*		2695.2	(8^+)	D		E_{γ}: from $^{123}Sb(^{19}F,4n\gamma)$ only. I_{γ}: $I(391.0\gamma)/I(676.9\gamma)$=21/100 from $^{123}Sb(^{19}F,4n\gamma)$. Mult.: from $\gamma\gamma$(DCO) in $^{123}Sb(^{19}F,4n\gamma)$.
		680.4 *4*	93 *9*	2691.1	$7^{(-)}$	Q		E_{γ}: unweighted average of 680.0 *2* from $^{94}Zr(^{48}Ca,4n\gamma)$ and 680.8 *3* from $^{123}Sb(^{19}F,4n\gamma)$. I_{γ}: $I(680.4\gamma)/I(676.9\gamma)$=91/100 from $^{123}Sb(^{19}F,4n\gamma)$. Mult.: from $\gamma\gamma$(DCO) in $^{123}Sb(^{19}F,4n\gamma)$.
3556.5	(10^-)	186.7 *5*	12 *6*	3371.3	$9^{(-)}$			
		558.0 *2*	100 *10*	2998.5	(8^-)	E2		
		576.9 *5*	15 *7*	2980.3	(8^-)			
3700.6	(10^+)	143.7 *10*	1.7 *7*	3556.5	(10^-)	D+Q		E_{γ}: from $^{94}Zr(^{48}Ca,4n\gamma)$ only.
		329.3 *2*	76 *7*	3371.3	$9^{(-)}$	D		E_{γ}: weighted average of 329.1 *2* from $^{94}Zr(^{48}Ca,4n\gamma)$ and 329.6 *3* from $^{123}Sb(^{19}F,4n\gamma)$. I_{γ}: other: 31 from $^{123}Sb(^{19}F,4n\gamma)$. Mult.: from $\gamma\gamma$(DCO) in $^{94}Zr(^{48}Ca,4n\gamma)$ and $^{123}Sb(^{19}F,4n\gamma)$.

Adopted Levels, Gammas (continued)

$\gamma(^{138}Nd)$ (continued)

E_i(level)	J_i^π	E_γ†	I_γ†	E_f	J_f^π	Mult.‡	α#	Comments
		453.5 *2*	100 *10*	3247.0	$9^{(-)}$	D		E_γ: weighted average of 453.6 *2* from

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Adopted Levels, Gammas (continued)

$\gamma(^{138}Nd)$ (continued)

E_i(level)	J^π_i	E_γ †	I_γ †	E_f	J^π_f	Mult. ‡	α #	Comments
								$^{94}Zr(^{48}Ca,4n\gamma)$, 453.6 *2* from $^{123}Sb(^{19}F,4n\gamma)$, and 452.9 *3* from $^{140}Ce(\alpha,6n\gamma)$,$^{141}Pr(p,4n\gamma)$. Mult.: from $\gamma\gamma$(DCO) in $^{94}Zr(^{48}Ca,4n\gamma)$ and $^{123}Sb(^{19}F,4n\gamma)$, $\gamma(\theta)$ in $^{140}Ce(\alpha,6n\gamma)$,$^{141}Pr(p,4n\gamma)$.
3783.9		1984.0 *4*	100 *33*	1799.77	(4^+)			E_γ,I_γ: from ^{138}Pm ε decay.
		2332.8 *6*	50 *17*	1451.43	$(3)^+$			E_γ,I_γ: from ^{138}Pm ε decay.
3821.4	12^+	646.9 *2*	100	3174.5	10^+	E2	0.00611	α=0.00611; α(K)=0.00509 *16*; α(L)=0.00077 *2* E_γ: weighted average of 646.9 *2* from $^{94}Zr(^{48}Ca,4n\gamma)$, 647.1 *2* from $^{123}Sb(^{19}F,4n\gamma)$, and 646.4 *3* from $^{140}Ce(\alpha,6n\gamma)$,$^{141}Pr(p,4n\gamma)$. Mult.: from $\gamma\gamma$(DCO) in $^{94}Zr(^{48}Ca,4n\gamma)$ and $^{123}Sb(^{19}F,4n\gamma)$, $\gamma(\theta)$ and RUL in $^{140}Ce(\alpha,6n\gamma)$,$^{141}Pr(p,4n\gamma)$.
3854.8	$11^{(-)}$	483.5 *5*	100	3371.3	$9^{(-)}$	E2		
3854.8		2403.6 *6*	43 *13*	1451.43	$(3)^+$			E_γ,I_γ: from ^{138}Pm ε decay.
		2605.0 *4*	100 *17*	1249.70	4^+			E_γ,I_γ: from ^{138}Pm ε decay.
		2841.0 *4*	17 *7*	1013.80	2^+			E_γ,I_γ: from ^{138}Pm ε decay.
3915.2	$11^{(-)}$	359.0 *2*	38 *6*	3556.5	(10^-)	D+Q		E_γ: from $^{94}Zr(^{48}Ca,4n\gamma)$ only.
		543.8 *2*	39 *6*	3371.3	$9^{(-)}$	Q		E_γ: weighted average of 543.9 *2* from $^{94}Zr(^{48}Ca,4n\gamma)$ and 543.6 *2* from $^{123}Sb(^{19}F,4n\gamma)$. I_γ: other: I(543.8γ/740.4γ)>6/100 from $^{123}Sb(^{19}F,4n\gamma)$. Mult.: also from $\gamma\gamma$(DCO) in $^{123}Sb(^{19}F,4n\gamma)$.
		668.2 *2*	100 *13*	3247.0	$9^{(-)}$	E2		E_γ: weighted average of 668.0 *2* from $^{94}Zr(^{48}Ca,4n\gamma)$ and 668.3 *2* from $^{123}Sb(^{19}F,4n\gamma)$. I_γ: other: I(668.2γ/740.4γ)>23/100 from $^{123}Sb(^{19}F,4n\gamma)$.
		740.4 *2*	44 *6*	3174.5	10^+			E_γ: weighted average of 740.4 *2* from $^{94}Zr(^{48}Ca,4n\gamma)$ and 740.4 *3* from $^{123}Sb(^{19}F,4n\gamma)$.
3981.1		2138.0 *6*	10 *4*	1842.81	(4^+)			E_γ,I_γ: from ^{138}Pm ε decay.
		2731.3 *4*	38 *10*	1249.70	4^+			E_γ,I_γ: from ^{138}Pm ε decay.
		3460.5 *4*	100 *14*	520.75	2^+			E_γ,I_γ: from ^{138}Pm ε decay.
4136.1	(11)	961.3 *3*	100	3174.5	10^+	D		E_γ: weighted average of 961.1 *2* from $^{94}Zr(^{48}Ca,4n\gamma)$ and 961.7 *3* from $^{123}Sb(^{19}F,4n\gamma)$. Mult.: D+Q from $^{94}Zr(^{48}Ca,4n\gamma)$ and D from $\gamma\gamma$(DCO) in $^{123}Sb(^{19}F,4n\gamma)$.
4203.3	(12^+)	502.7 *2*	100	3700.6	(10^+)	E2	0.0117	E_γ: weighted average of 502.8 *2* from $^{94}Zr(^{48}Ca,4n\gamma)$, 502.8 *2* from $^{123}Sb(^{19}F,4n\gamma)$, and 502.2 *3* from $^{140}Ce(\alpha,6n\gamma)$,$^{141}Pr(p,4n\gamma)$. Mult.: from $\gamma\gamma$(DCO) in $^{94}Zr(^{48}Ca,4n\gamma)$ and $^{123}Sb(^{19}F,4n\gamma)$, $\gamma(\theta)$ and RUL in $^{140}Ce(\alpha,6n\gamma)$,$^{141}Pr(p,4n\gamma)$.
4205.8		2754.3 *5*	100	1451.43	$(3)^+$			E_γ: from ^{138}Pm ε decay.
4210.3	(11^-)	839.0 *3*	100	3371.3	$9^{(-)}$	Q		E_γ: from $^{123}Sb(^{19}F,4n\gamma)$. Mult.: from $\gamma\gamma$(DCO) in $^{123}Sb(^{19}F,4n\gamma)$.
4212.4		2369.3 *6*	78 *33*	1842.81	(4^+)			E_γ,I_γ: from ^{138}Pm ε decay.
		2962.9 *6*	100 *33*	1249.70	4^+			E_γ,I_γ: from ^{138}Pm ε decay.
4218.4	11^-	978.6 *3*	100	3239.8	9^-	E2		E_γ: weighted average of 978.2 *2* from

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Adopted Levels, Gammas (continued)

$\gamma(^{138}Nd)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	Comments
							$^{94}Zr(^{48}Ca,4n\gamma)$ and 978.8 *3* from $^{123}Sb(^{19}F,4n\gamma)$. Mult.: other: Q from $\gamma\gamma$(DCO) in $^{123}Sb(^{19}F,4n\gamma)$.
4344.8	$10^{(+)}$	1238.0 *10*	100	3107.3	8^+	Q	
4381.7	(11)	681.2 *5*	100	3700.6	(10^+)	D+Q	
4395.4	(12^-)	838.9 *2*	100	3556.5	(10^-)	E2	
4545.9	(11^+)	164.1 *10*	8 *4*	4381.7	(11)	D+Q	
		201.2 *5*	100 *20*	4344.8	$10^{(+)}$	D+Q	
		845.0 *5*	76 *36*	3700.6	(10^+)		
4651.5	(13^-)	736.4 *5*	100	3915.2	$11^{(-)}$		
4695.4	(13^-)	840.6 *5*	100	3854.8	$11^{(-)}$		
4751.9	$13^{(-)}$	836.8 *2*	100	3915.2	$11^{(-)}$	E2	E_γ: weighted average of 836.7 *2* from $^{94}Zr(^{48}Ca,4n\gamma)$ and 836.9 *3* from $^{123}Sb(^{19}F,4n\gamma)$. Mult.: other: Q from $\gamma\gamma$(DCO) in $^{123}Sb(^{19}F,4n\gamma)$.
4779.0	(12^+)	233.0 *5*	100 *21*	4545.9	(11^+)	D+Q	
		397.3 *5*	57 *12*	4381.7	(11)	D+Q	
4939.4	(12)	803.2 *2*	100 *13*	4136.1	(11)	D	E_γ: weighted average of 803.1 *2* from $^{94}Zr(^{48}Ca,4n\gamma)$ and 803.4 *3* from $^{123}Sb(^{19}F,4n\gamma)$. Mult.: also from $\gamma\gamma$(DCO) in $^{123}Sb(^{19}F,4n\gamma)$.
		1118.1 *5*	17 *3*	3821.4	12^+	D+Q	E_γ: weighted average of 1117.3 *5* from $^{94}Zr(^{48}Ca,4n\gamma)$ and 1118.4 *3* from $^{123}Sb(^{19}F,4n\gamma)$.
4974.5	(13^+)	1152.8 *4*	100	3821.4	12^+	D+Q	E_γ: weighted average of 1152.3 *5* from $^{94}Zr(^{48}Ca,4n\gamma)$, 1153.2 *4* from $^{123}Sb(^{19}F,4n\gamma)$, and 1152.7 *5* from $^{140}Ce(\alpha,6n\gamma),^{141}Pr(p,4n\gamma)$.
4990.2	(13)	786.8 *5*	100	4203.3	(12^+)	D+Q	
4995.5	(14^+)	792.1 *2*	100	4203.3	(12^+)	E2	E_γ: weighted average of 792.1 *2* from $^{94}Zr(^{48}Ca,4n\gamma)$, 792.5 *3* from $^{123}Sb(^{19}F,4n\gamma)$, and 791.6 *3* from $^{140}Ce(\alpha,6n\gamma),^{141}Pr(p,4n\gamma)$. Mult.: from $\gamma\gamma$(DCO) in $^{94}Zr(^{48}Ca,4n\gamma)$ and $^{123}Sb(^{19}F,4n\gamma)$, $\gamma(\theta)$ and RUL in $^{140}Ce(\alpha,6n\gamma),^{141}Pr(p,4n\gamma)$.
5028.8	14^+	1207.8 *3*	100	3821.4	12^+	E2	E_γ: weighted average of 1206.7 *10* from $^{94}Zr(^{48}Ca,4n\gamma)$, 1208.0 *3* from $^{123}Sb(^{19}F,4n\gamma)$, and 1207.6 *5* from $^{140}Ce(\alpha,6n\gamma),^{141}Pr(p,4n\gamma)$. Mult.: from $\gamma\gamma$(DCO) in $^{94}Zr(^{48}Ca,4n\gamma)$ and $^{123}Sb(^{19}F,4n\gamma)$, $\gamma(\theta)$ and RUL in $^{140}Ce(\alpha,6n\gamma),^{141}Pr(p,4n\gamma)$.
5069.4	(13^+)	290.3 *5*	100	4779.0	(12^+)	D+Q	
5118.5	(13^-)	900.1 *3*	100	4218.4	11^-		E_γ: weighted average of 900.0 *5* from $^{94}Zr(^{48}Ca,4n\gamma)$ and 900.1 *3* from $^{123}Sb(^{19}F,4n\gamma)$.
5232.9		1022.6 *4*	100	4210.3	(11^-)		E_γ: from $^{123}Sb(^{19}F,4n\gamma)$.
5253.0	(13)	278.0 *4*	4.5 *20*	4974.5	(13^+)	D	E_γ: weighted average of 278.0 *10* from $^{94}Zr(^{48}Ca,4n\gamma)$ and 278.0 *4* from $^{123}Sb(^{19}F,4n\gamma)$. Mult.: from $\gamma\gamma$(DCO) in $^{123}Sb(^{19}F,4n\gamma)$.
		313.5 *2*	100 *10*	4939.4	(12)	D	E_γ: weighted average of 313.4 *2* from $^{94}Zr(^{48}Ca,4n\gamma)$ and 313.5 *2* from $^{123}Sb(^{19}F,4n\gamma)$.
		1430.9 *10*	6 *3*	3821.4	12^+		
5349.3	(14^+)	353.4 *5*	72 *16*	4995.5	(14^+)	D+Q	
		1146.3 *5*	100 *19*	4203.3	(12^+)	Q	E_γ: weighted average of 1145.4 *5* from $^{94}Zr(^{48}Ca,4n\gamma)$ and 1146.6 *3* from $^{123}Sb(^{19}F,4n\gamma)$.
5363.2	(14^+)	293.8 *5*	100	5069.4	(13^+)	D+Q	
5417.6	(14^-)	1022.2 *5*	100	4395.4	(12^-)	E2	
5430.2	(14^+)	1608.7 *10*	100	3821.4	12^+	Q	
5436.1	(13)	1614.7 *4*	100	3821.4	12^+	D	E_γ,Mult.: from $^{123}Sb(^{19}F,4n\gamma)$.

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Adopted Levels, Gammas (continued)

$\gamma(^{138}Nd)$ (continued)

E_i(level)	J_i^π	E_γ †	I_γ †	E_f	J_f^π	Mult. ‡	Comments
5469.1	(15$^+$)	38.7 *10*	<16	5430.2	(14$^+$)		
		440.2 *2*	100 *16*	5028.8	14$^+$	D+Q	E_γ: weighted average of 440.2 *2* from $^{94}Zr(^{48}Ca,4n\gamma)$ and 440.1 *2* from $^{123}Sb(^{19}F,4n\gamma)$. Mult.: D+Q from $^{94}Zr(^{48}Ca,4n\gamma)$ and D from $\gamma\gamma$(DCO) in $^{123}Sb(^{19}F,4n\gamma)$.
		494.7 *2*	34 *6*	4974.5	(13$^+$)	E2	E_γ: weighted average of 494.7 *5* from $^{94}Zr(^{48}Ca,4n\gamma)$ and 494.7 *2* from $^{123}Sb(^{19}F,4n\gamma)$. Mult.: other: Q from $\gamma\gamma$(DCO) in $^{123}Sb(^{19}F,4n\gamma)$.
5493.1	(13$^-$)	1670.9 *10*	100	3821.4	12$^+$	(D)	
5527.5	(14$^+$)	532.1 *10*	100 *50*	4995.5	(14$^+$)	D+Q	
		537.3 *10*	83 *33*	4990.2	(13)	D+Q	
		1323.7 *10*	67 *33*	4203.3	(12$^+$)		
5576.9	(14$^-$)	83.6 *10*	1.0 *5*	5493.1	(13$^-$)		
		323.7 *2*	100 *10*	5253.0	(13)	D+Q	E_γ: weighted average of 323.7 *2* from $^{94}Zr(^{48}Ca,4n\gamma)$ and 323.7 *3* from $^{123}Sb(^{19}F,4n\gamma)$. Mult.: D+Q from $^{94}Zr(^{48}Ca,4n\gamma)$ and D from $\gamma\gamma$(DCO) in $^{123}Sb(^{19}F,4n\gamma)$.
		602.6 *2*	31 *6*	4974.5	(13$^+$)	D	E_γ: weighted average of 602.2 *5* from $^{94}Zr(^{48}Ca,4n\gamma)$ and 602.6 *2* from $^{123}Sb(^{19}F,4n\gamma)$.
		925.6 *5*	8 *4*	4651.5	(13$^-$)		
5591.1	(14)	838.8 *10*	100 *50*	4751.9	13$^{(-)}$		
		939.5 *10*	100 *50*	4651.5	(13$^-$)		
5614.3	(14)	639.5 *3*	100	4974.5	(13$^+$)	D	E_γ: weighted average of 639.3 *5* from $^{94}Zr(^{48}Ca,4n\gamma)$ and 639.5 *3* from $^{123}Sb(^{19}F,4n\gamma)$. Mult.: Other: Q from $^{123}Sb(^{19}F,4n\gamma)$.
5656.3	(15$^-$)	960.9 *5*	100	4695.4	(13$^-$)		
5678.2	(15$^+$)	314.9 *5*	100 *50*	5363.2	(14$^+$)	D+Q	
		328.9 *5*	56 *28*	5349.3	(14$^+$)		
5742.7	(15)	747.4 *3*	100 *50*	4995.5	(14$^+$)	D+Q	E_γ: weighted average of 747.0 *5* from $^{94}Zr(^{48}Ca,4n\gamma)$ and 747.5 *3* from $^{123}Sb(^{19}F,4n\gamma)$. Mult.: D+Q from $^{94}Zr(^{48}Ca,4n\gamma)$ and D from $\gamma\gamma$(DCO) in $^{123}Sb(^{19}F,4n\gamma)$.
		752.3 *10*	42 *17*	4990.2	(13)		
5747.9	(16)	278.5 *4*	100	5469.1	(15$^+$)	D+Q	E_γ: weighted average of 278.4 *5* from $^{94}Zr(^{48}Ca,4n\gamma)$ and 278.6 *4* from $^{123}Sb(^{19}F,4n\gamma)$. Mult.: D+Q from $^{94}Zr(^{48}Ca,4n\gamma)$ and D from $\gamma\gamma$(DCO) in $^{123}Sb(^{19}F,4n\gamma)$.
5759.5	15$^{(-)}$	1007.6 *3*	100	4751.9	13$^{(-)}$	E2	E_γ: weighted average of 1007.1 *5* from $^{94}Zr(^{48}Ca,4n\gamma)$ and 1007.8 *3* from $^{123}Sb(^{19}F,4n\gamma)$. Mult.: other: Q from $^{123}Sb(^{19}F,4n\gamma)$.
5770.6	15$^{(-)}$	156.1 *2*	12 *6*	5614.3	(14)	D+Q	E_γ: weighted average of 156.4 *5* from $^{94}Zr(^{48}Ca,4n\gamma)$ and 156.0 *2* from $^{123}Sb(^{19}F,4n\gamma)$.
		179.0 *10*	2.4 *8*	5591.1	(14)	D+Q	
		193.6 *2*	100 *10*	5576.9	(14$^-$)	D+Q	E_γ: weighted average of 193.4 *2* from $^{94}Zr(^{48}Ca,4n\gamma)$ and 193.8 *2* from $^{123}Sb(^{19}F,4n\gamma)$. Mult.: D+Q from $^{94}Zr(^{48}Ca,4n\gamma)$ and D from $\gamma\gamma$(DCO) in $^{123}Sb(^{19}F,4n\gamma)$.
		277.0 *10*	2.4 *8*	5493.1	(13$^-$)		
		1019.1 *5*	48 *7*	4751.9	13$^{(-)}$	Q	E_γ: weighted average of 1018.3 *5* from $^{94}Zr(^{48}Ca,4n\gamma)$ and 1019.4 *3* from $^{123}Sb(^{19}F,4n\gamma)$.
5781.1	(14)	288.0 *5*	100 *50*	5493.1	(13$^-$)	(D+Q)	
		528.2 *10*	42 *17*	5253.0	(13)	(D+Q)	
5842.3	(16$^+$)	846.8 *2*	100	4995.5	(14$^+$)	E2	E_γ: weighted average of 846.7 *2* from $^{94}Zr(^{48}Ca,4n\gamma)$,

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Adopted Levels, Gammas (continued)

γ(^{138}Nd) (continued)

E$_i$(level)	J$^\pi_i$	E$_\gamma$†	I$_\gamma$†	E$_f$	J$^\pi_f$	Mult.‡	Comments
							847.4 *3* from ^{123}Sb(^{19}F,4nγ), and 846.5 *3* from ^{140}Ce(α,6nγ),^{141}Pr(p,4nγ). Mult.: from $\gamma\gamma$(DCO) in ^{94}Zr(^{48}Ca,4nγ) and ^{123}Sb(^{19}F,4nγ), $\gamma(\theta)$ and RUL in ^{140}Ce(α,6nγ),^{141}Pr(p,4nγ).
5901.4	(15)	120.3 *10*	100	5781.1	(14)	D+Q	
6001.4	(16$^-$)	230.7 *2*	100 *10*	5770.6	15$^{(-)}$	D+Q	E$_\gamma$: weighted average of 230.6 *2* from ^{94}Zr(^{48}Ca,4nγ) and 230.8 *3* from ^{123}Sb(^{19}F,4nγ). Mult.: D+Q from ^{94}Zr(^{48}Ca,4nγ) and D from $\gamma\gamma$(DCO) in ^{123}Sb(^{19}F,4nγ).
		242.2 *10*	1.6 *6*	5759.5	15$^{(-)}$		
		252.9 *10*	0.22 *11*	5747.9	(16)	D	
		424.0 *5*	5.5 *28*	5576.9	(14$^-$)		
		973.3 *3*		5028.8	14$^+$		E$_\gamma$: only from ^{123}Sb(^{19}F,4nγ).
6017.5	(15)	403.5 *10*		5614.3	(14)	D+Q	
		440.1 *10*		5576.9	(14$^-$)	D+Q	
6071.1	(15$^-$)	952.6 *10*	100	5118.5	(13$^-$)		
6071.8	(15)	708.4 *10*	33 *17*	5363.2	(14$^+$)	(D)	
		722.4 *10*	100 *50*	5349.3	(14$^+$)	(D+Q)	
6088.2	(16)	186.8 *5*	100	5901.4	(15)	D+Q	
6152.1	(16$^+$)	803.0 *10*	43 *22*	5349.3	(14$^+$)		
		1156.6 *3*	100 *50*	4995.5	(14$^+$)	Q	E$_\gamma$: weighted average of 1156.4 *5* from ^{94}Zr(^{48}Ca,4nγ) and 1156.7 *3* from ^{123}Sb(^{19}F,4nγ). Mult.: from $\gamma\gamma$(DCO) in ^{123}Sb(^{19}F,4nγ).
6179.9	(16$^+$)	501.6 *5*	100	5678.2	(15$^+$)		
6233.4	(16$^+$)	390.9 *5*	100 *50*	5842.3	(16$^+$)		
		705.8 *10*	70 *30*	5527.5	(14$^+$)	E2	
		1237.7 *10*	100 *50*	4995.5	(14$^+$)		
6241.9	(17$^+$)	772.9 *2*	100	5469.1	(15$^+$)	E2	E$_\gamma$: weighted average of 772.4 *5* from ^{94}Zr(^{48}Ca,4nγ) and 773.0 *2* from ^{123}Sb(^{19}F,4nγ).
6285.2	(16)	267.5 *10*	12 *6*	6017.5	(15)	D+Q	
		514.6 *5*	100 *46*	5770.6	15$^{(-)}$	D+Q	
6287.6	(17$^-$)	286.2 *2*	100 *10*	6001.4	(16$^-$)	D+Q	E$_\gamma$: weighted average of 286.2 *2* from ^{94}Zr(^{48}Ca,4nγ) and 286.3 *2* from ^{123}Sb(^{19}F,4nγ). Mult.: D+Q from ^{94}Zr(^{48}Ca,4nγ) and D from $\gamma\gamma$(DCO) in ^{123}Sb(^{19}F,4nγ).
		516.7 *5*	9.8 *19*	5770.6	15$^{(-)}$		
6395.5	(16$^+$)	653.1 *5*	100 *50*	5742.7	(15)	D+Q	
		867.8 *10*	70 *30*	5527.5	(14$^+$)		
6409.5	(16$^-$)	991.9 *10*	100	5417.6	(14$^-$)		
6465.8	(17)	377.6 *5*	100	6088.2	(16)	D+Q	
6470.2	(17)	627.9 *3*	100	5842.3	(16$^+$)	D	E$_\gamma$,Mult.: from ^{123}Sb(^{19}F,4nγ).
6556.2	(16)	376.1 *10*	100	6179.9	(16$^+$)	(D+Q)	
6560.4	(17)	275.2 *5*	100 *47*	6285.2	(16)	D+Q	
		559.2 *10*	16 *5*	6001.4	(16$^-$)	D+Q	
6566.8	(18)	325.1 *3*	100 *20*	6241.9	(17$^+$)	D+Q	E$_\gamma$: weighted average of 324.8 *5* from ^{94}Zr(^{48}Ca,4nγ) and 325.2 *3* from ^{123}Sb(^{19}F,4nγ). Mult.: D+Q from ^{94}Zr(^{48}Ca,4nγ) and D from $\gamma\gamma$(DCO) in ^{123}Sb(^{19}F,4nγ).
		818.8 *3*	63 *30*	5747.9	(16)	E2	E$_\gamma$: weighted average of 818.6 *5* from ^{94}Zr(^{48}Ca,4nγ) and 818.8 *3* from ^{123}Sb(^{19}F,4nγ).
6627.8	(17)	556.6 *10*	3.4 *16*	6071.8	(15)		
		785.4 *2*	100 *15*	5842.3	(16$^+$)	(D+Q)	
6668.3	(18$^-$)	380.7 *2*	100 *11*	6287.6	(17$^-$)	D+Q	E$_\gamma$: weighted average of 380.8 *2* from ^{94}Zr(^{48}Ca,4nγ)

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Adopted Levels, Gammas (continued)

$\gamma(^{138}Nd)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	Comments
							and 380.5 *2* from $^{123}Sb(^{19}F,4n\gamma)$. Mult.: D+Q from $^{94}Zr(^{48}Ca,4n\gamma)$ and D from $\gamma\gamma$(DCO) in $^{123}Sb(^{19}F,4n\gamma)$.
6668.3	(18⁻)	667.0 *5*	5.3 *26*	6001.4	(16⁻)		
6706.8	(16⁺)	864.5 *5*	100 *20*	5842.3	(16⁺)		
		1711.4 *10*	35 *15*	4995.5	(14⁺)		
6760.5	(17⁺)	580.6 *10*	100	6179.9	(16⁺)		
6780.7	(17)	224.4 *5*	100	6556.2	(16)	D+Q	
6810.8	(17)	738.9 *5*	16 *8*	6071.8	(15)		
		968.5 *2*	100 *14*	5842.3	(16⁺)	(D)	
6825.5	(17)	983.1 *5*	100	5842.3	(16⁺)		
6829.2	(18⁺)	986.8 *2*	100	5842.3	(16⁺)	E2	E_γ: weighted average of 986.7 *2* from $^{94}Zr(^{48}Ca,4n\gamma)$ and 986.9 *3* from $^{123}Sb(^{19}F,4n\gamma)$. Mult.: also from $\gamma\gamma$(DCO) in $^{123}Sb(^{19}F,4n\gamma)$.
6865.2	(17)	1117.4 *5*	100	5747.9	(16)	D+Q	
6909.4	(18)	349.0 *5*	100 *50*	6560.4	(17)	D+Q	
		622.0 *10*	<6	6285.2	(16)		
6937.6	(18)	471.8 *10*	100	6465.8	(17)	D+Q	
6997.9	(18⁺)	845.9 *5*	100 *20*	6152.1	(16⁺)		
		1155.5 *5*	72 *36*	5842.3	(16⁺)	(E2)	
7047.2	(19⁻)	378.9 *2*	100 *13*	6668.3	(18⁻)	D+Q	E_γ: weighted average of 378.8 *2* from $^{94}Zr(^{48}Ca,4n\gamma)$ and 379.1 *3* from $^{123}Sb(^{19}F,4n\gamma)$.
		759.6 *5*	6 *3*	6287.6	(17⁻)		
7091.4	(18)	280.9 *10*	64 *27*	6810.8	(17)	(D)	
		310.6 *5*	100 *46*	6780.7	(17)	D+Q	
7125.6	(18)	300.0 *5*	56 *28*	6825.5	(17)	D+Q	
		315.2 *5*	100 *50*	6810.8	(17)	D+Q	
7201.4	(18⁺)	336.2 *5*	100 *20*	6865.2	(17)	D+Q	
		372.3 *5*	57 *12*	6829.2	(18⁺)		
		494.6 *5*	69 *14*	6706.8	(16⁺)	Q	
		806.2 *5*	63 *12*	6395.5	(16⁺)	Q	
		967.8 *5*	63 *12*	6233.4	(16⁺)		
		1358.6 *10*	29 *14*	5842.3	(16⁺)	Q	
7369.7	(20)	322.4 *5*	100	7047.2	(19⁻)		
7414.9	(19)	505.6 *10*	100	6909.4	(18)	D+Q	
7422.4	(19)	794.6 *2*	100	6627.8	(17)	(E2)	
7427.0	(20)	860.2 *3*	100	6566.8	(18)	(E2)	E_γ: weighted average of 859.7 *5* from $^{94}Zr(^{48}Ca,4n\gamma)$ and 860.4 *3* from $^{123}Sb(^{19}F,4n\gamma)$.
7484.8	(19)	393.4 *5*	100	7091.4	(18)	D+Q	
7503.6	(19)	378.0 *2*	100	7125.6	(18)	D+Q	
7564.3	(20⁻)	193.6 *10*	8 *4*	7369.7	(20)		
		517.1 *4*	100 *10*	7047.2	(19⁻)	D+Q	E_γ: unweighted average of 517.5 *2* from $^{94}Zr(^{48}Ca,4n\gamma)$ and 516.7 *2* from $^{123}Sb(^{19}F,4n\gamma)$. Mult.: D+Q from $^{94}Zr(^{48}Ca,4n\gamma)$ and D from $\gamma\gamma$(DCO) in $^{123}Sb(^{19}F,4n\gamma)$.
		896.3 *10*	6 *3*	6668.3	(18⁻)		
7601.1	(19)	399.5 *5*	100	7201.4	(18⁺)	D+Q	
7689.9	(20)	275.1 *10*	100	7414.9	(19)		
7764.6	(20⁺)	563.2 *2*	100 *10*	7201.4	(18⁺)	Q	
		935.0 *5*	16 *3*	6829.2	(18⁺)		
7777.1		730.3 *10*	100	7047.2	(19⁻)		
7830.1	(19)	1262.8 *10*	100	6566.8	(18)	(D+Q)	
7888.5	(19)	1322.4 *10*	100	6566.8	(18)	(D+Q)	
7933.8	(20)	430.4 *5*	100	7503.6	(19)	D+Q	
		1104.1 *10*		6829.2	(18⁺)		

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Adopted Levels, Gammas (continued)

$\gamma(^{138}Nd)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡
7962.8	(20)	478.0 *10*	100	7484.8	(19)	D+Q
7983.3	(20$^+$)	985.4 *5*	100 *20*	6997.9	(18$^+$)	
		1154.2 *5*	33 *17*	6829.2	(18$^+$)	
8013.1	(21$^-$)	323.2 *5*	23 *11*	7689.9	(20)	
		448.7 *2*	100 *15*	7564.3	(20$^-$)	D+Q
		643.6 *5*	83 *17*	7369.7	(20)	D+Q
		966.2 *10*	15 *8*	7047.2	(19$^-$)	
8049.7	(21)	485.4 *10*	100	7564.3	(20$^-$)	
8058.2	(20)	169.9 *5*	42 *21*	7888.5	(19)	(D+Q)
		228.0 *5*	62 *29*	7830.1	(19)	D+Q
		281.4 *10*	2.5 *13*	7777.1		
		456.9 *5*	100 *21*	7601.1	(19)	(D+Q)
8080.0	(20$^+$)	1251.0 *10*	100	6829.2	(18$^+$)	E2
8091.8	(20)	1044.7 *10*	100	7047.2	(19$^-$)	
8115.5	(20)	514.4 *5*	100	7601.1	(19)	D+Q
8249.4	(20)	826.7 *10*	100	7422.4	(19)	D+Q
8328.9	(21)	906.4 *5*	100	7422.4	(19)	(E2)
8351.6	(21)	293.4 *5*	100	8058.2	(20)	D+Q
8395.9	(22)	968.9 *5*	100	7427.0	(20)	(E2)
8396.3	(21)	462.5 *5*	100 *50*	7933.8	(20)	D+Q
		893.1 *10*	67 *33*	7503.6	(19)	
8438.0	(21)	504		7933.8	(20)	
		934.3 *10*		7503.6	(19)	
		1015.2 *10*		7422.4	(19)	
8453.0	(22)	439.9 *2*	100	8013.1	(21$^-$)	D+Q
8481.4	(22)	431.5 *10*	22 *13*	8049.7	(21)	D+Q
		917.1 *5*	100 *22*	7564.3	(20$^-$)	Q
8484.1	(21)	521.3 *10*	100	7962.8	(20)	
8489.0	(21)	924.7 *3*	100	7564.3	(20$^-$)	D
8585.5	(21)	335.9 *10*	18 *9*	8249.4	(20)	D+Q
		493.8 *10*	34 *16*	8091.8	(20)	
		651.9 *5*	100 *46*	7933.8	(20)	D+Q
8611.5	(21)	628.2 *2*	60 *91*	7983.3	(20$^+$)	(D)
		846.9 *2*	100 *10*	7764.6	(20$^+$)	(D)
8708.3	(22)	356.7 *5*	100	8351.6	(21)	D+Q
8837.6	(22)	508.7 *5*	32 *16*	8328.9	(21)	(D)
		757.7 *5*	100 *19*	8080.0	(20$^+$)	Q
8878.5	(22)	394.4 *10*	100	8484.1	(21)	(D+Q)
8891.5		410.4 *10*	64 *36*	8481.4	(22)	D+Q
		841.8 *5*	100 *50*	8049.7	(21)	
8897.3	(23)	444.4 *5*	100	8453.0	(22)	D+Q
8921.2	(22)	335.7 *2*	64 *10*	8585.5	(21)	(D)
		483.1 *2*	100 *15*	8438.0	(21)	(D+Q)
		524.9 *5*	24 *5*	8396.3	(21)	(D)
9132.7	(23)	424.4 *5*	100	8708.3	(22)	D+Q
9261.1	(24)	369.8 *5*	100 *50*	8891.5		D+Q
		779.5 *5*	88 *44*	8481.4	(22)	E2
9348.7	(23)	1019.8 *5*	100	8328.9	(21)	
9351.8	(23)	740.3 *2*	100	8611.5	(21)	E2
9356.4	(23)	477.9 *10*	100	8878.5	(22)	(D+Q)
9384.6	(24)	487.8 *10*	<50	8897.3	(23)	D+Q
		931.5 *5*	<100	8453.0	(22)	
9401.9	(24)	504.6 *5*	100	8897.3	(23)	D+Q
9513.6	(22)	902.1 *2*	100	8611.5	(21)	(D+Q)
9596.4	(24)	675.2 *2*	100	8921.2	(22)	E2
9620.6	(24)	487.9 *5*	100	9132.7	(23)	D+Q
9685.8	(24)	848.2 *5*	100	8837.6	(22)	E2

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Adopted Levels, Gammas (continued)

$\gamma(^{138}Nd)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡
9808.0	(25)	406 *10*	<5	9401.9	(24)	
		423.4 *5*	100 *20*	9384.6	(24)	D+Q
9989.6	(25)	587.7 *5*	100	9401.9	(24)	D+Q
10038.3	(24)	524.8 *2*	83 *12*	9513.6	(22)	E2
		686.4 *2*	100 *16*	9351.8	(23)	
10232.2	(25)	611.6 *5*	100	9620.6	(24)	
10243.3	(25)	891.6 *2*	100	9351.8	(23)	E2
10262.4	(26)	454.4 *10*	100	9808.0	(25)	D+Q
10341.8	(26)	1080.7 *5*	100	9261.1	(24)	E2
10363.4	(25)	767.1 *10*	100	9596.4	(24)	(D)
10413.9	(26)	817.5 *2*	100	9596.4	(24)	E2
10648.9	(26)	659.3 *10*	100	9989.6	(25)	
10688.6	(26)	1002.8 *5*	100	9685.8	(24)	E2
10724.2	(26)	481.4 *5*	258 *5*	10243.3	(25)	(D+Q)
		685.8 *2*	100 *10*	10038.3	(24)	E2
10741.8	(26)	378.4 *10*	100	10363.4	(25)	D+Q
10798.4	(27)	536.0 *10*	100	10262.4	(26)	
11284.2	(27)	542.4 *10*	<100	10741.8	(26)	D+Q
		870.3 *10*	100	10413.9	(26)	(D)
11286.2	(27)	1042.9 *5*	100	10243.3	(25)	E2
11368.5	(28)	1026.7 *5*	100	10341.8	(26)	(E2)
11404.3	(28)	990.4 *2*	100	10413.9	(26)	E2
11563.8	(28)	1222.0 *10*	100	10341.8	(26)	
11725.4	(28)	1001.9 *10*	100	10724.2	(26)	(E2)
11741.2	(28)	1016.8 *5*	100	10724.2	(26)	E2
11904.7	(28)	1216.1 *10*	100	10688.6	(26)	E2
11941.6	(29)	657.4 *5*	100	11284.2	(27)	E2
11962.3	(28)	1238.1 *10*	100	10724.2	(26)	(E2)
12490.2	(29)	1204.0 *5*	100	11286.2	(27)	E2
12580.4	(29)	1294.2 *10*	100	11286.2	(27)	(E2)
12584.7	(30)	1180.4 *5*	100	11404.3	(28)	E2
12668.0	(30)	926.1	<6	11741.2	(28)	
		943.4	100	11725.4	(28)	(E2)
12723.4	(30)	1354.9 *10*	100	11368.5	(28)	
12852.7	(31)	911.1 *5*	100	11941.6	(29)	E2
12915.4	(30)	953.1 *10*	100	11962.3	(28)	E2
12944.4	(30)	1203.2 *5*	100	11741.2	(28)	E2
12970.8	(30)	1407.0 *10*	100	11563.8	(28)	
13174.4	(31)	506.4 *10*	100	12668.0	(30)	
		989.5 *10*	100	12184.9	(29)	E2
13304.7	(30)	1400.0 *10*	100	11904.7	(28)	
13514.7	(31)	934.2 *5*	100	12580.4	(29)	E2
13558.2	(32)	890.1 *5*	100	12668.0	(30)	E2
13846.4	(31)	1356.1 *10*	100	12490.2	(29)	E2
13936.1	(32)	1351.4 *10*	100	12584.7	(30)	E2
13991.3	(33)	1138.6 *10*	100	12852.7	(31)	E2
14012.7		1428 *1*	100	12584.7	(30)	
14055.9	(32)	1140.5 *10*	100	12915.4	(30)	E2
14294.2	(33)	1119.7 *10*	100	13174.4	(31)	E2
14306.7	(32)	1583.3 *10*	100	12723.4	(30)	
14335.0	(32)	1390.6 *10*	100	12944.4	(30)	E2
14609.5	(34)	1051.3 *10*	100	13558.2	(32)	E2
14678.8	(33)	1164.1 *10*	100	13514.7	(31)	
14885	(32)	1580.3 *19*	100	13304.7	(30)	
15261.4	(33)	1415.0 *10*	100	13846.4	(31)	(E2)
15354.9	(35)	1363.6 *10*	100	13991.3	(33)	E2
15367.1	(34)	1311.2 *10*	100	14055.9	(32)	E2

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

γ(^{138}Nd) (continued)

E$_i$(level)	J$^\pi_i$	E$_\gamma$†	I$_\gamma$†	E$_f$	J$^\pi_f$	Mult.‡	Comments
15480.8	(34)	1544.7 *10*	100	13936.1	(32)		
15552.0	(35)	1257.8 *10*	100	14294.2	(33)	E2	
15796.9	(36)	1187.4 *10*	100	14609.5	(34)	E2	
15877.2	(34)	1542.2 *10*	100	14335.0	(32)		
16059.7	(35)	1380.9 *10*	100	14678.8	(33)		
16694.6	(35)	1433.2 *10*	100	15261.4	(33)		
16789.2	(36)	1422.1 *10*	100	15367.1	(34)	E2	
16914.7	(37)	1559.8 *10*	100	15354.9	(35)		
16954.7	(37)	1402.7 *10*	100	15552.0	(35)		
17064.0	(36)	1583.2 *10*	100	15480.8	(34)		
17132.1	(38)	1335.2 *10*	100	15796.9	(36)		
17451.6	(36)	1574.4 *10*	100	15877.2	(34)		
18160.7	(37)	1466.1 *10*	100	16694.6	(35)		
18292	(38)	1503.2 *10*	100	16789.2	(36)		
18495.5	(39)	1540.8 *10*	100	16954.7	(37)		
18613.1	(40)	1481.0 *10*	100	17132.1	(38)		
18628.8	(39)	1714.1 *10*	100	16914.7	(37)		
18672.0	(38)	1608.0 *10*	100	17064.0	(36)		
18978.5	(38)	1526.9 *10*	100	17451.6	(36)		
19686.3	(39)	1525.6 *10*	100	18160.7	(37)		
20163	(41)	1667.5 *10*	100	18495.5	(39)		
20231	(42)	1618.4 *10*	100	18613.1	(40)		
20340.1	(40)	1668.1 *10*	100	18672.0	(38)		
20422	(41)	1793.5 *10*	100	18628.8	(39)		
20483.8	(40)	1505.2 *10*	100	18978.5	(38)		
21294	(41)	1607.4 *10*	100	19686.3	(39)		
21946	(43)	1783 *1*	100	20163	(41)		Additional information 6.
21991	(44)	1759.9 *10*	100	20231	(42)		
22135	(42)	1651.2 *10*	100	20483.8	(40)		
22260	(43)	1837.5 *10*	100	20422	(41)		
23008	(43)	1714.4 *10*	100	21294	(41)		
23853	(46)	1861.7 *10*	100	21991	(44)		
24133	(45)	1873 *1*	100	22260	(43)		
894.4+x		894.4 *10*	100	x			
1976.7+x		1082.3 *5*	100	894.4+x			
3239.9+x		1263.2 *10*	100	1976.7+x			
4674.6+x		1434.7 *10*	100	3239.9+x			
6294.6+x		1620.0 *10*	100	4674.6+x			
8111.6+x		1817 *1*	100	6294.6+x			
842.1+y		842.1 *5*	100	y			
1833.3+y		991.2 *5*	100	842.1+y			
2983.0+y		1149.7 *5*	100	1833.3+y			
4290.0+y		1307.0 *10*	100	2983.0+y			
5751.0+y		1461.0 *10*	100	4290.0+y			
7374.8+y		1623.8 *10*	100	5751.0+y			
814.9+z		814.9 *10*	100	z			
1791.8+z		976.9 *10*	100	814.9+z			
2958.8+z		1167.0 *10*	100	1791.8+z			
4330.1+z		1371.3 *10*	100	2958.8+z			
5907.2+z		1577.1 *10*	100	4330.1+z			
968.9+u	(28$^+$)	968.9 *4*	100	u	(26$^+$)		
2005.3+u	(30$^+$)	1036.4 *4*	100	968.9+u	(28$^+$)		
3074.3+u	(32$^+$)	1069.0 *2*	100	2005.3+u	(30$^+$)		
4201.5+u	(34$^+$)	1127.2 *3*	100	3074.3+u	(32$^+$)		
5405.5+u	(36$^+$)	1204.0 *2*	100	4201.5+u	(34$^+$)		
6679.0+u	(38$^+$)	1273.5 *2*	100	5405.5+u	(36$^+$)		
8012.4+u	(40$^+$)	1333.4 *2*	100	6679.0+u	(38$^+$)		

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

γ(^{138}Nd) (continued)

E$_i$(level)	J$^\pi_i$	E$_\gamma$†	I$_\gamma$†	E$_f$	J$^\pi_f$	E$_i$(level)	E$_\gamma$†	I$_\gamma$†	E$_f$
9413.3+u		1400.9 *2*	100	8012.4+u	(40$^+$)	15748.5+u	1707.9 *4*	100	14040.6+u
10880.8+u		1467.4 *2*	100	9413.3+u		17546.8+u	1798.3 *6*	100	15748.5+u
12421.0+u		1540.2 *2*	100	10880.8+u		19444.7+u	1897.9 *15*	100	17546.8+u
14040.6+u		1619.6 *4*	100	12421.0+u		21438.8+u	1994.1 *13*	100	19444.7+u

† From ^{94}Zr(^{48}Ca,4nγ), unless otherwise noted.

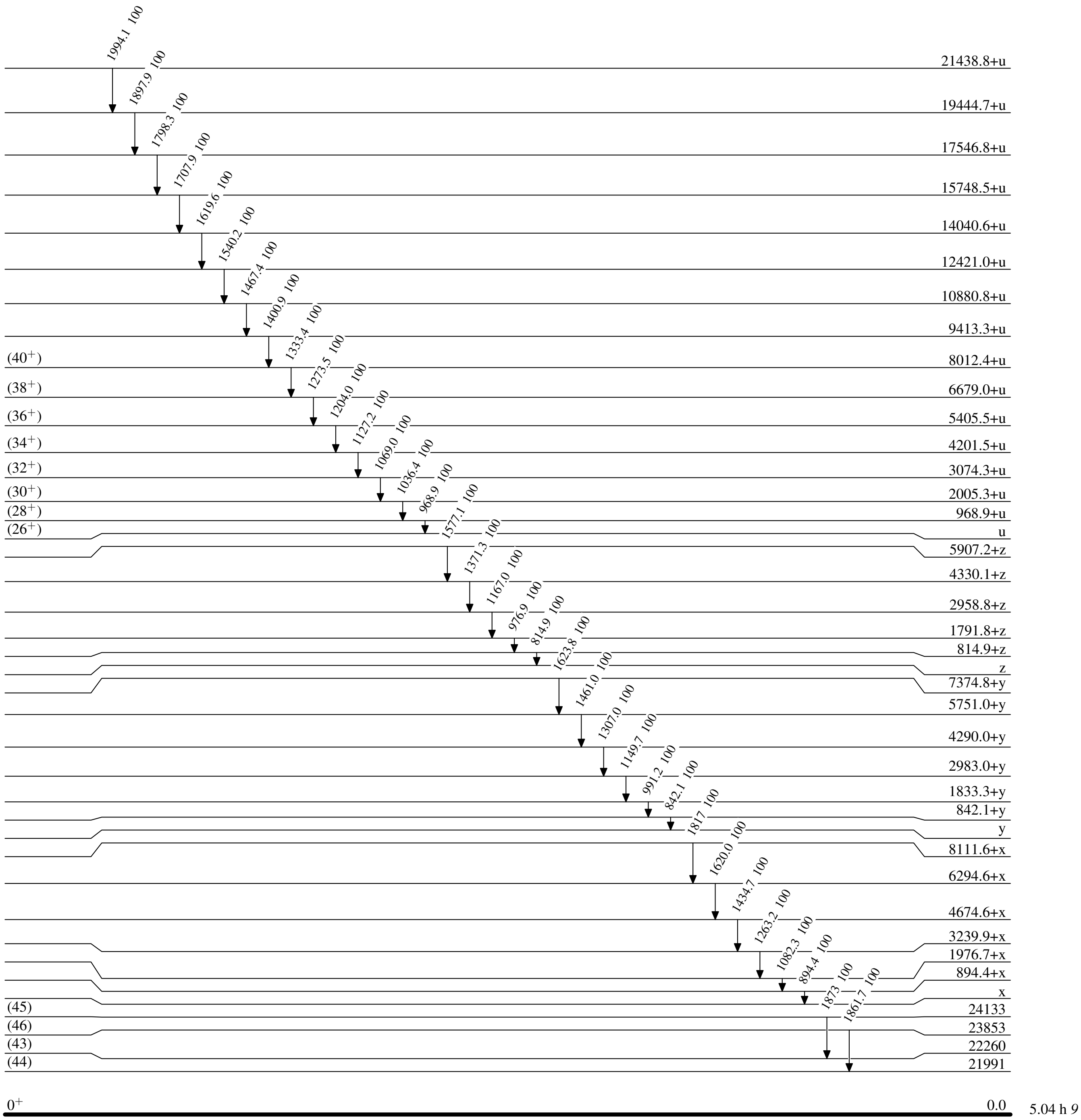
‡ From ^{94}Zr(^{48}Ca,4nγ) based on $\gamma\gamma$(DCO) and band structure, unless otherwise noted. Some are also from ce data in ^{138}Pm ε decay, $\gamma\gamma$(DCO) in ^{123}Sb(^{19}F,4nγ) and ^{124}Te(^{19}F,p4nγ), ce data and $\gamma(\theta)$ in ^{140}Ce(α,6nγ),^{141}Pr(p,4nγ). Note that some assignments for polarity in ^{94}Zr(^{48}Ca,4nγ) have no firm evidence and thus the evaluator has adopted D for M1 or E1 and Q for E2 in those cases.

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.

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level

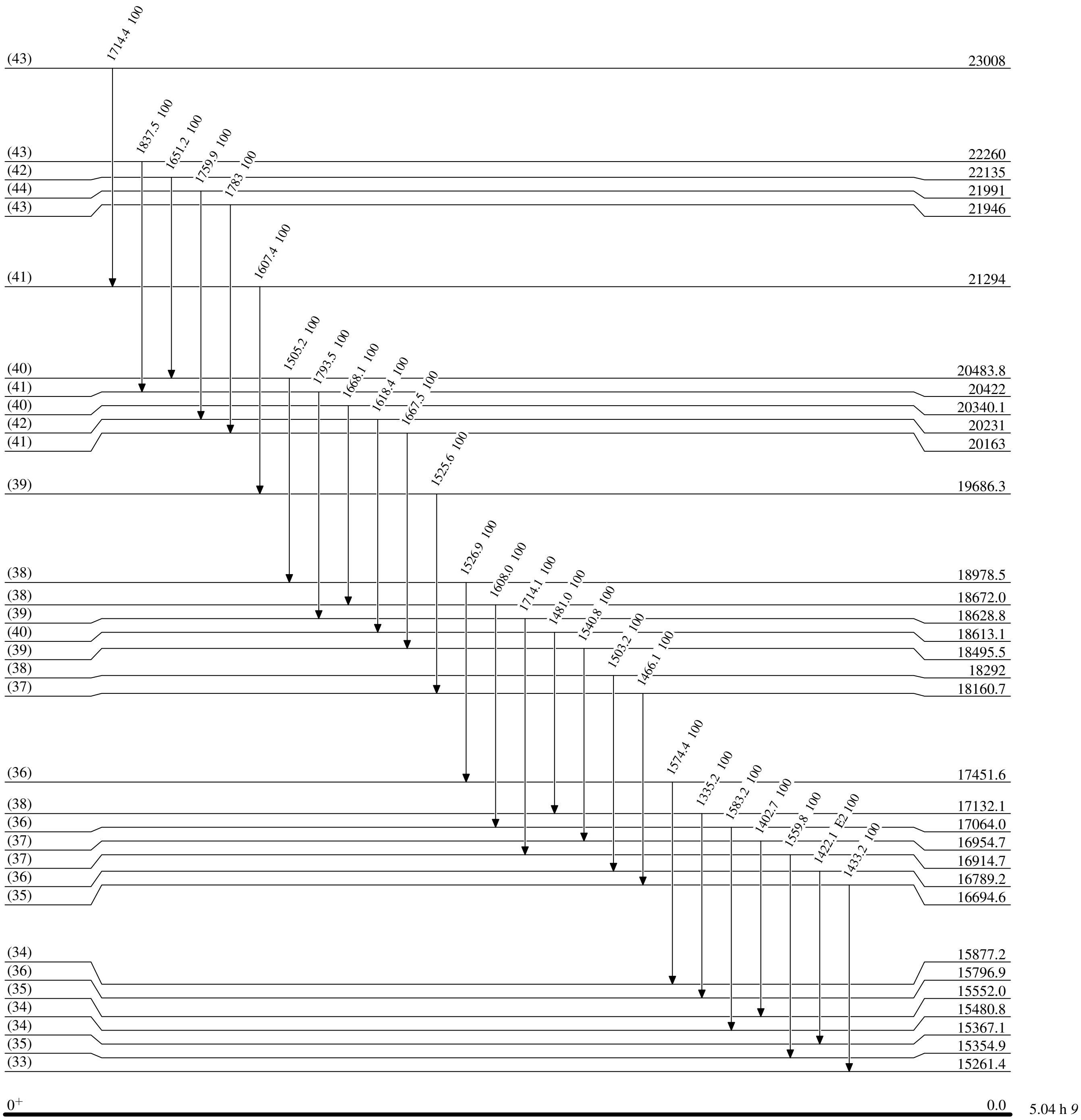


$^{138}_{60}Nd_{78}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

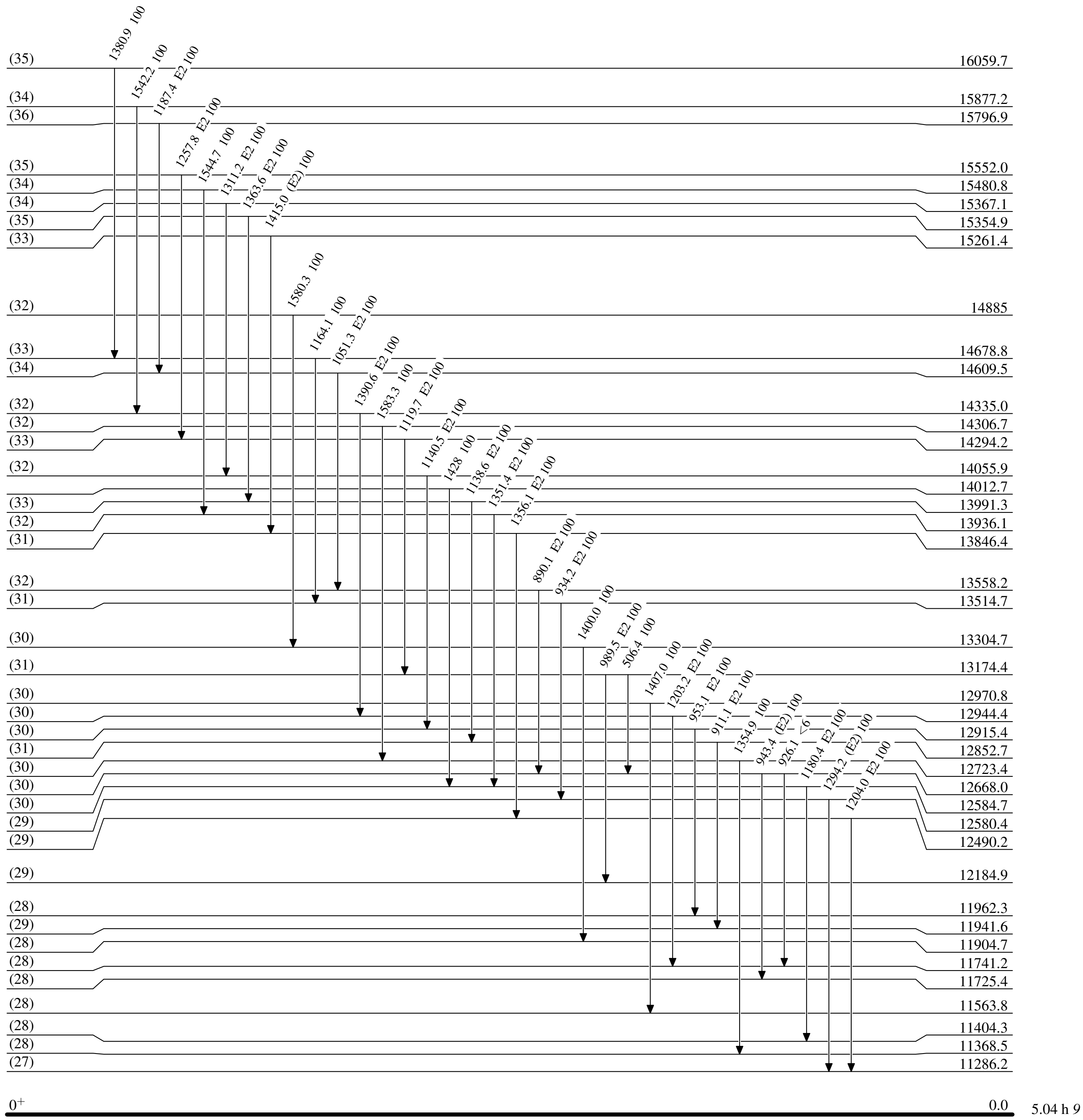


$^{138}_{60}Nd_{78}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

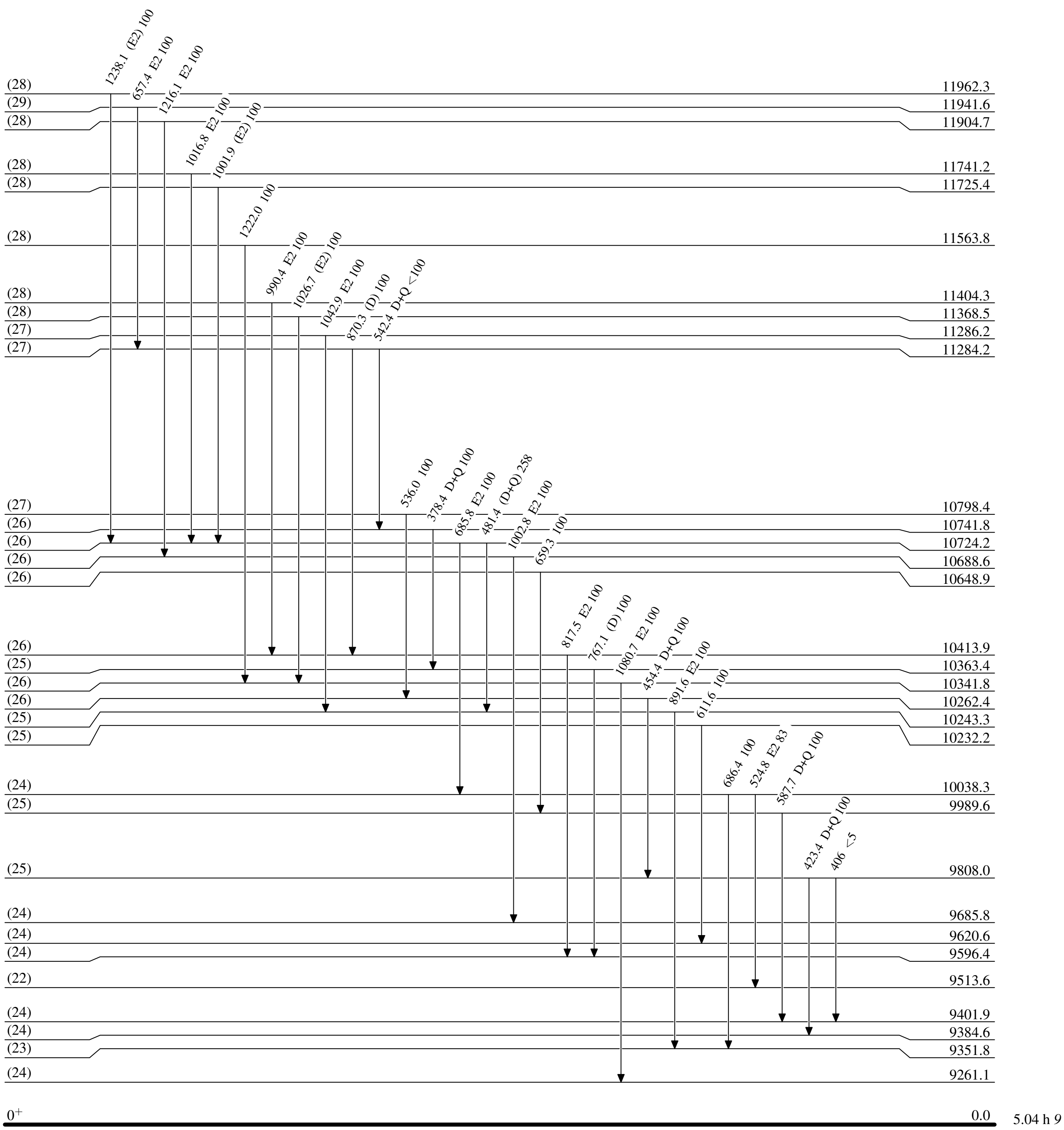


$^{138}_{60}Nd_{78}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

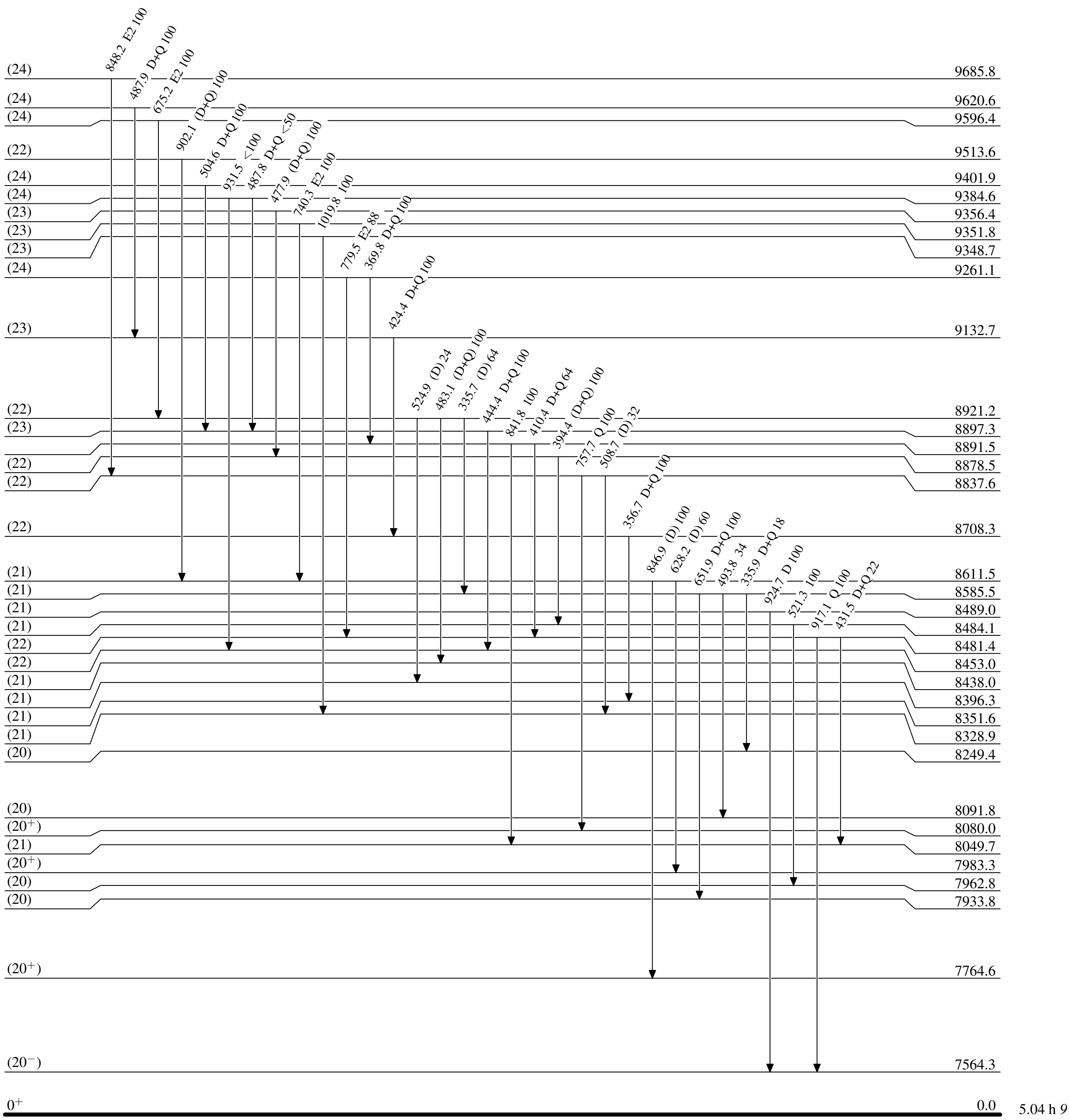


$^{138}_{60}Nd_{78}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

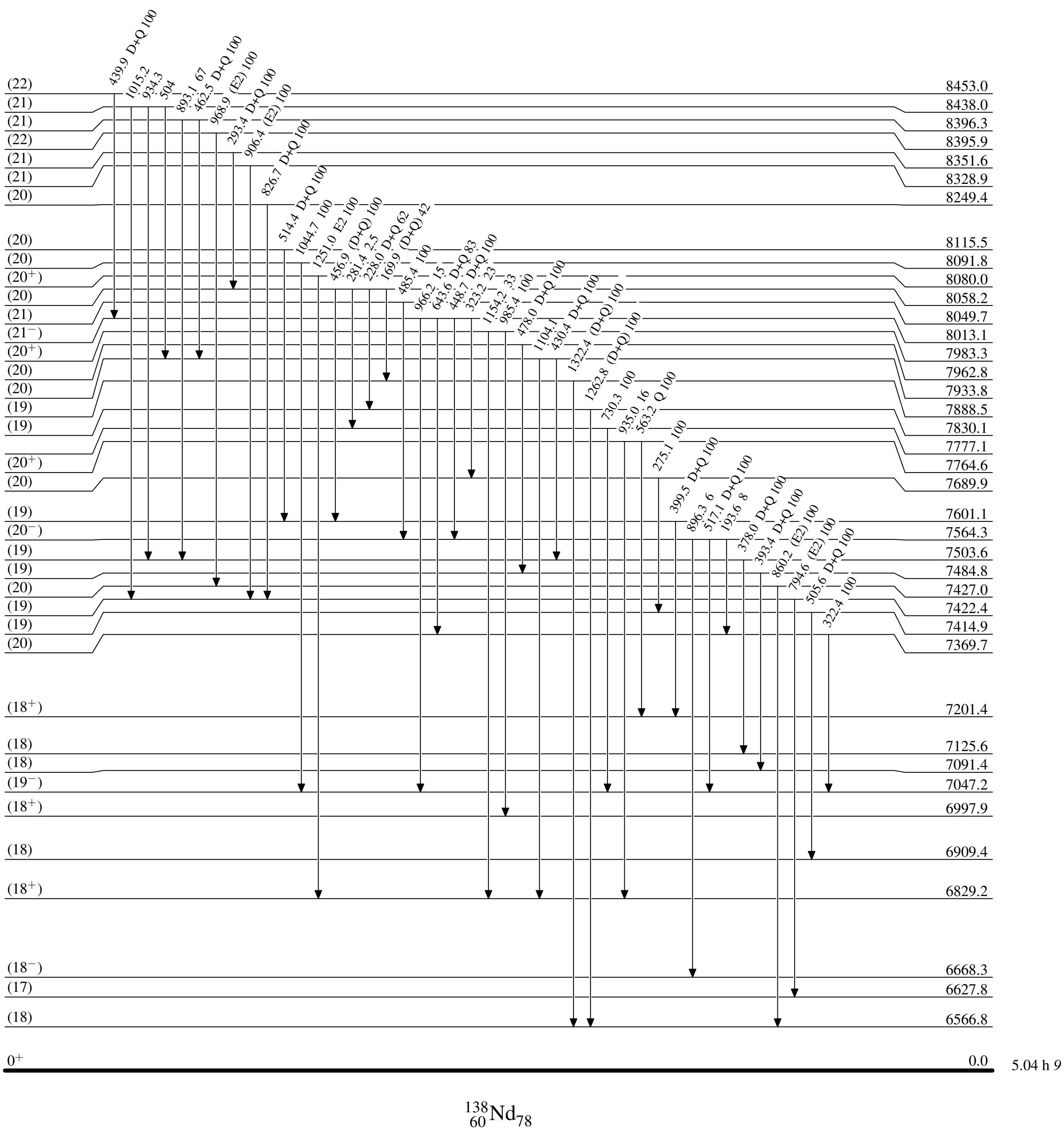


$^{138}_{60}Nd_{78}$

Adopted Levels, Gammas

Level Scheme (continued)

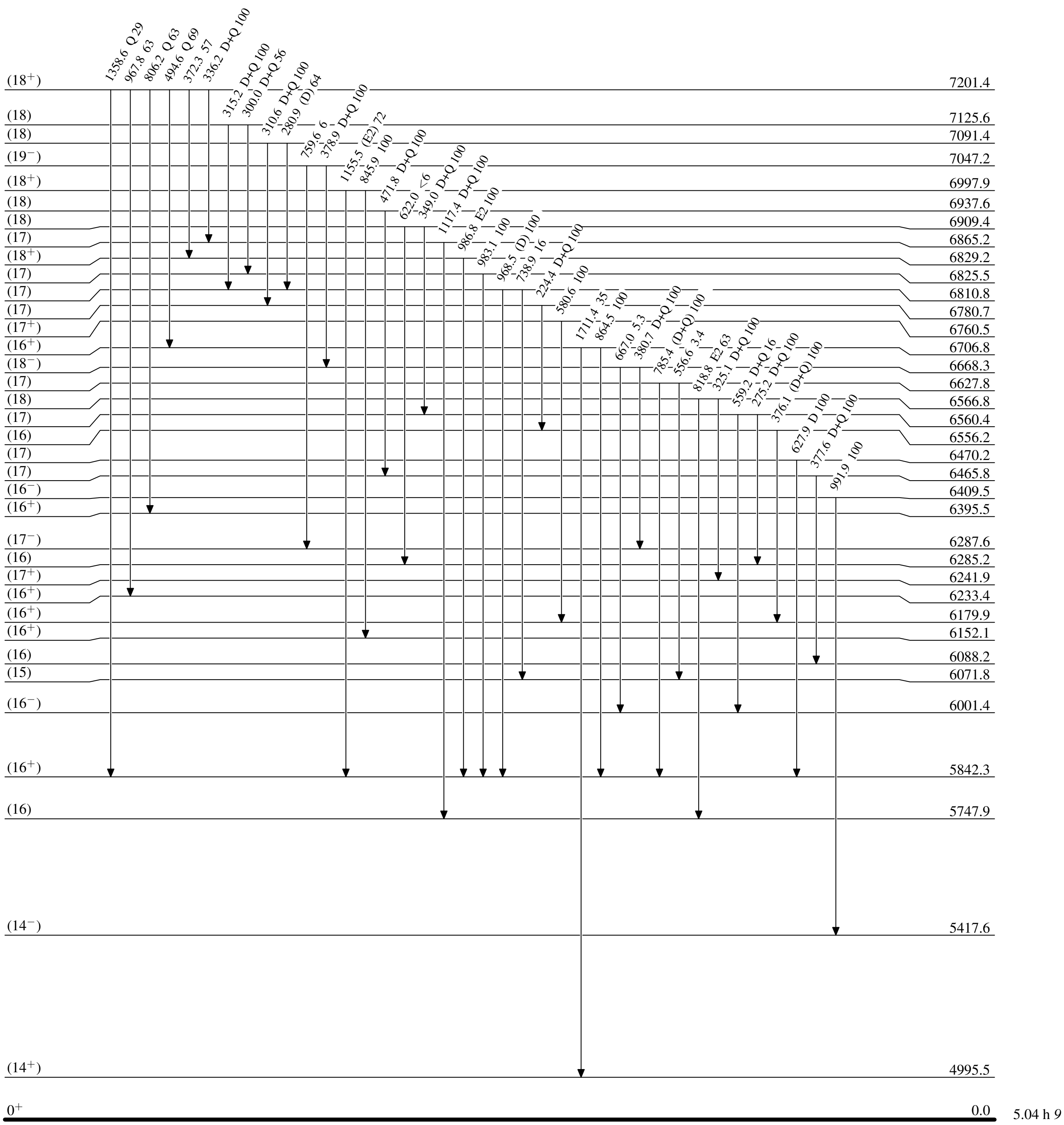
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

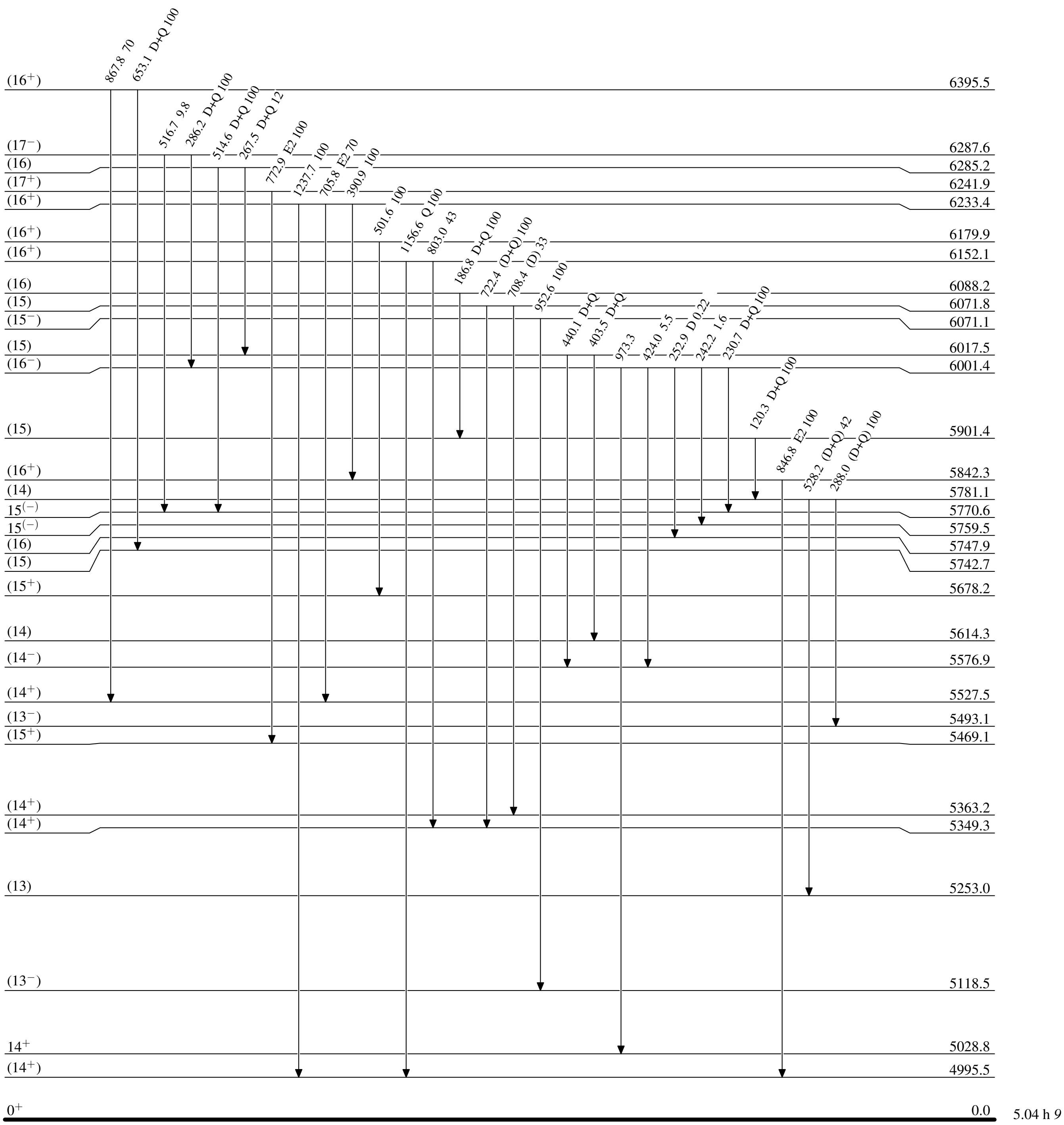


$^{138}_{60}Nd_{78}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

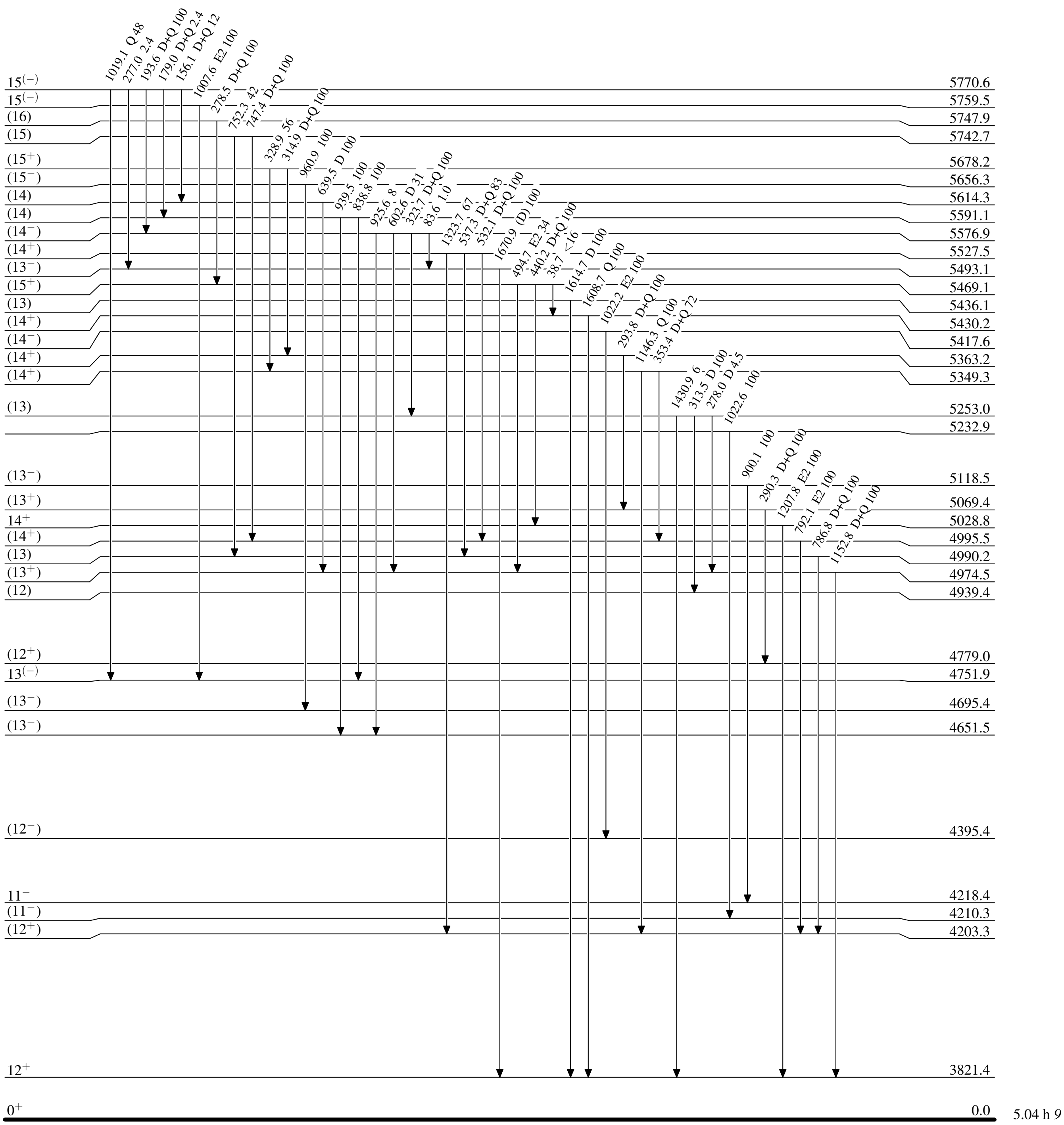


$^{138}_{60}Nd_{78}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

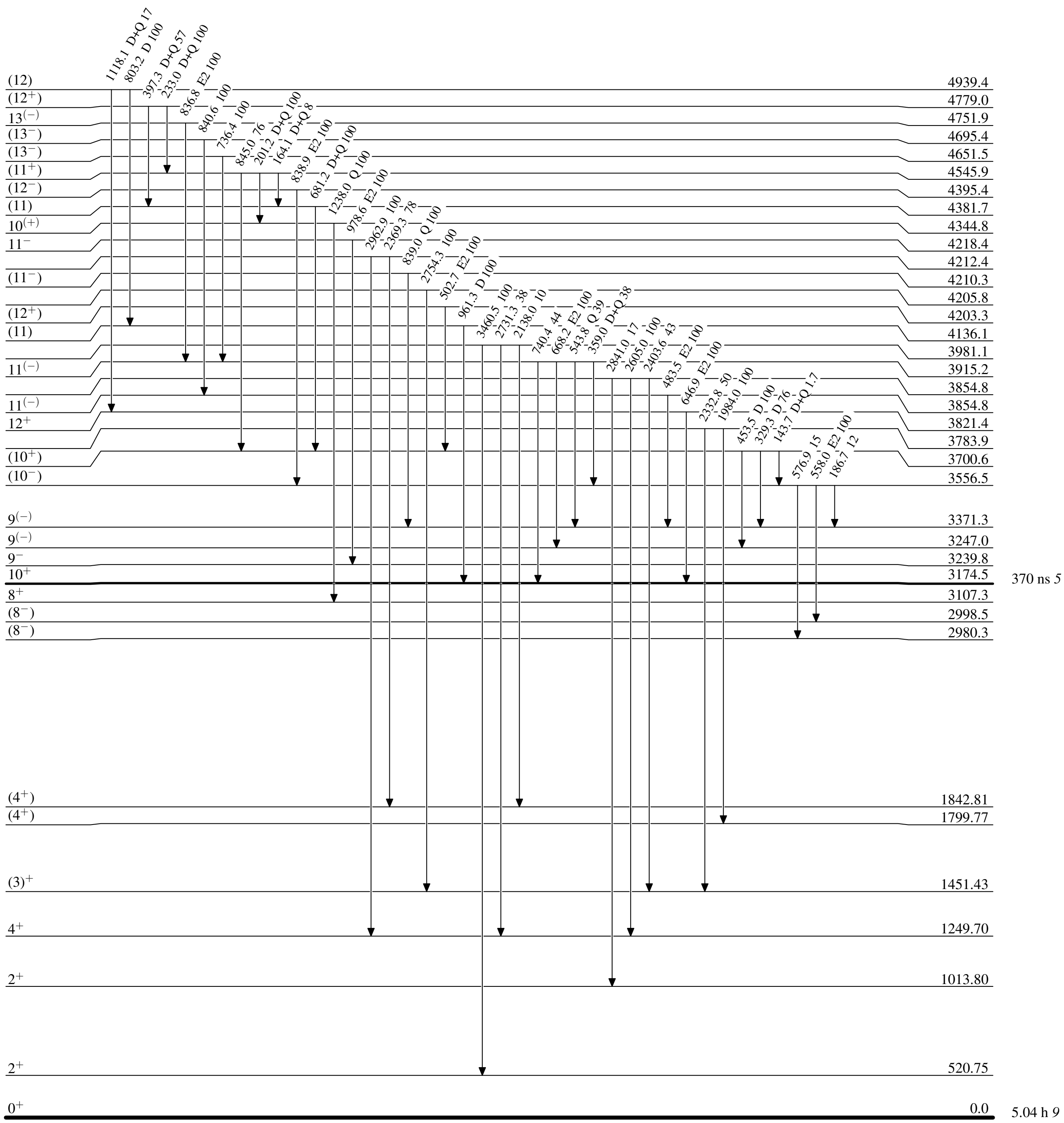


$^{138}_{60}Nd_{78}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

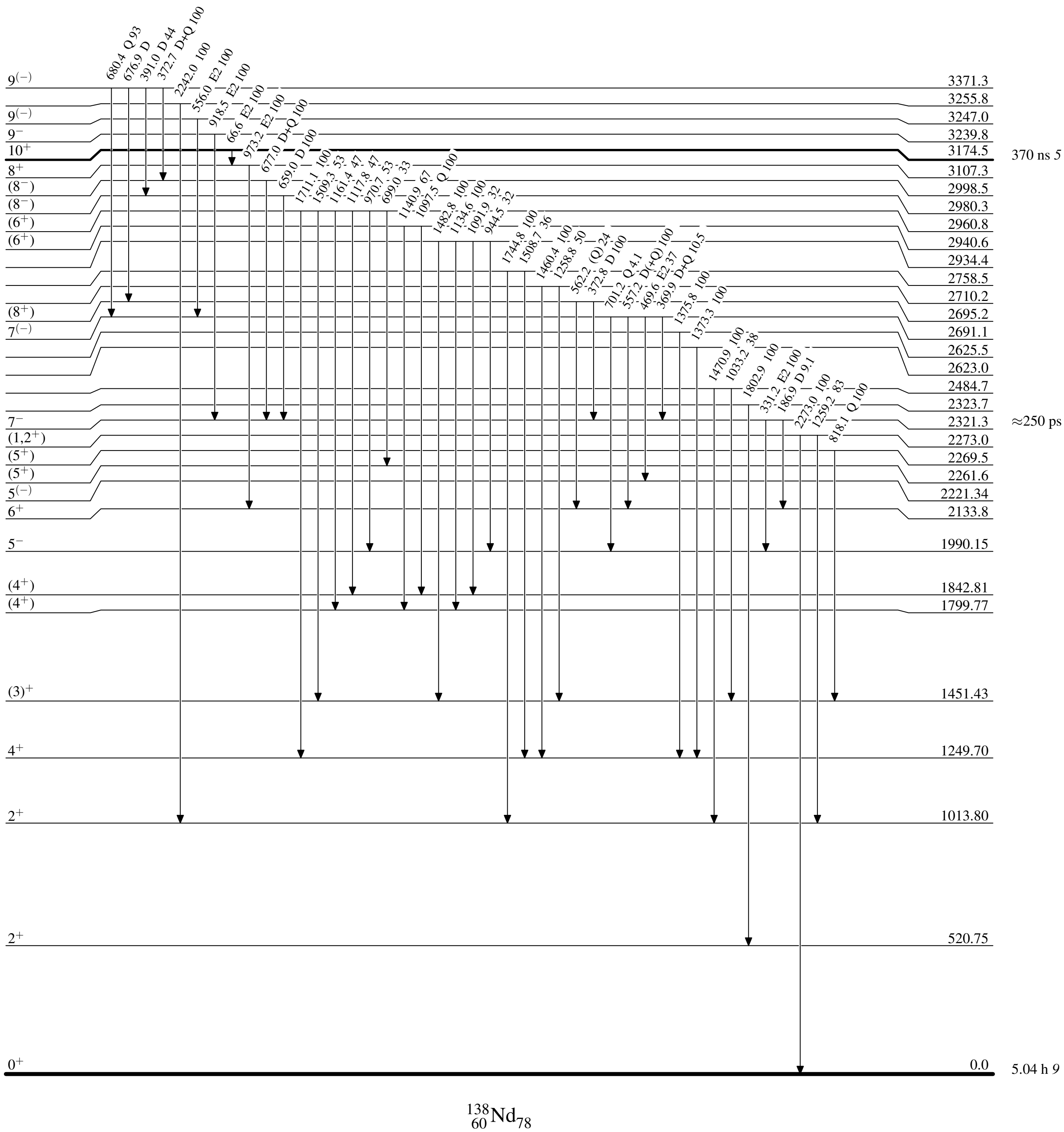


$^{138}_{60}Nd_{78}$

Adopted Levels, Gammas

Level Scheme (continued)

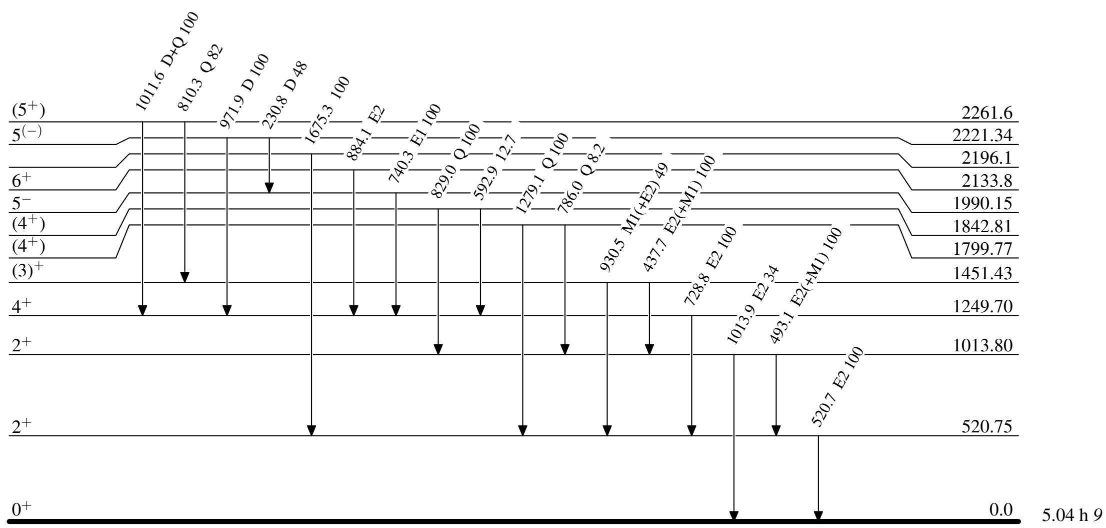
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

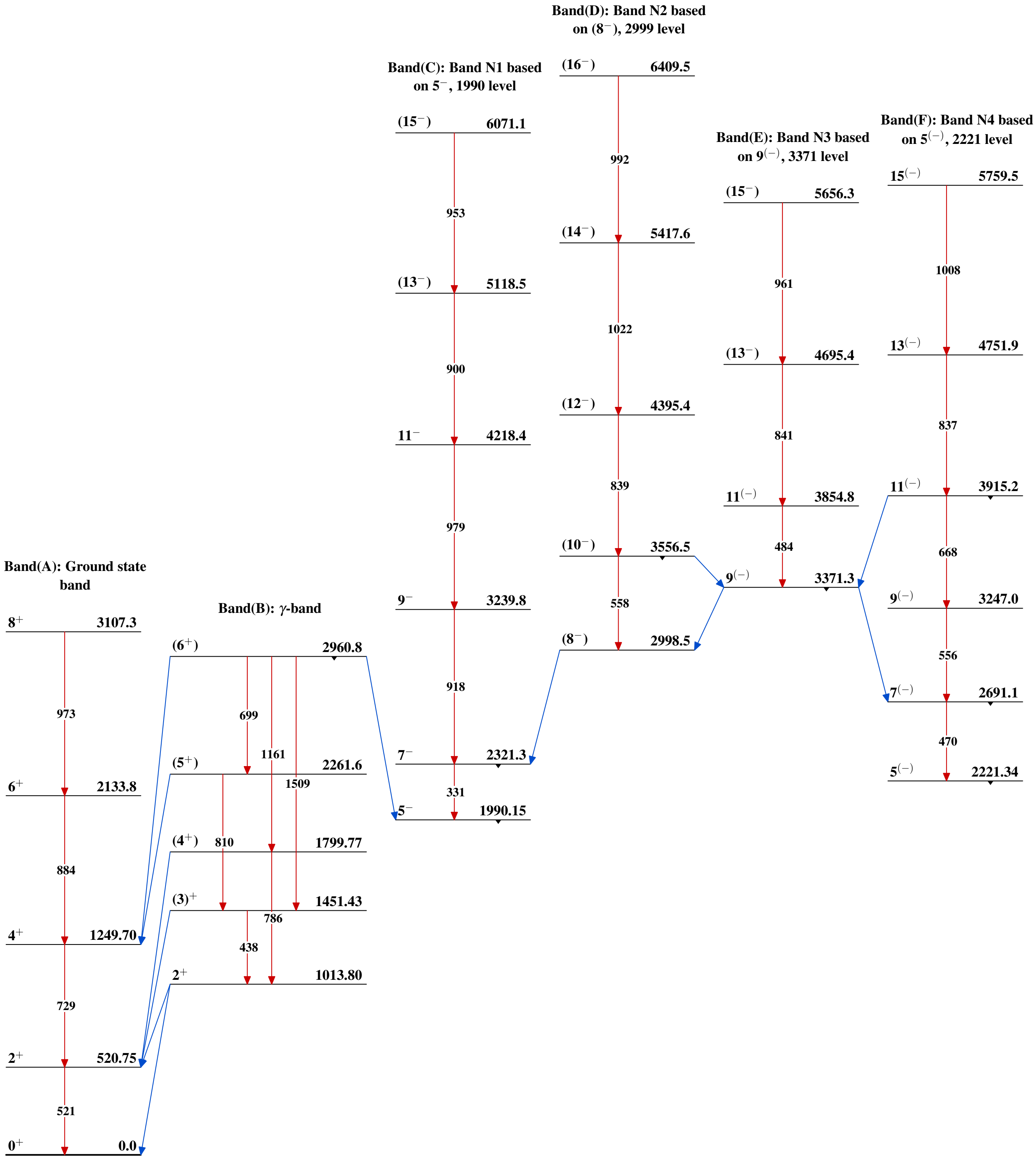
Level Scheme (continued)

Intensities: Relative photon branching from each level



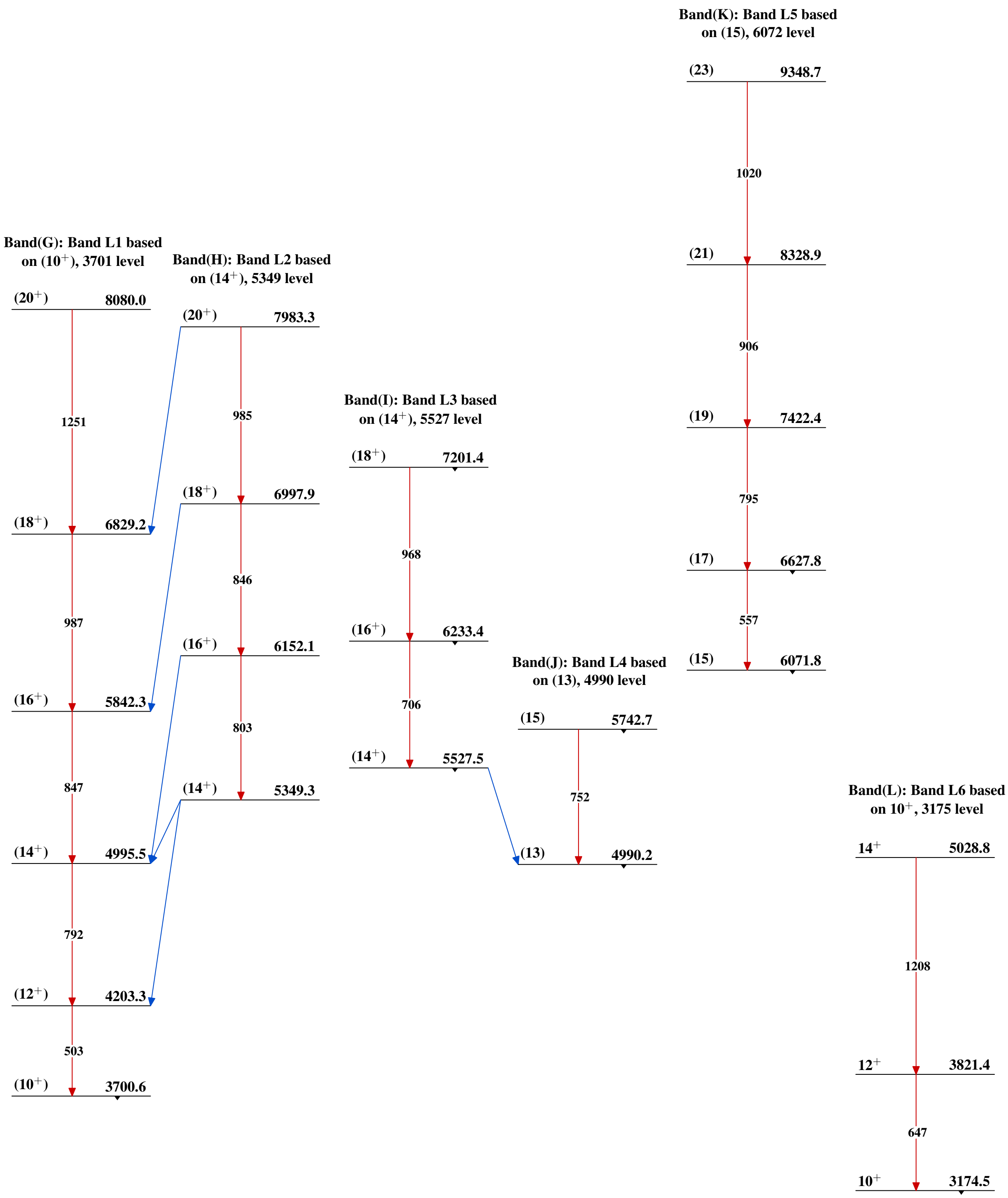
$^{138}_{60}Nd_{78}$

Adopted Levels, Gammas



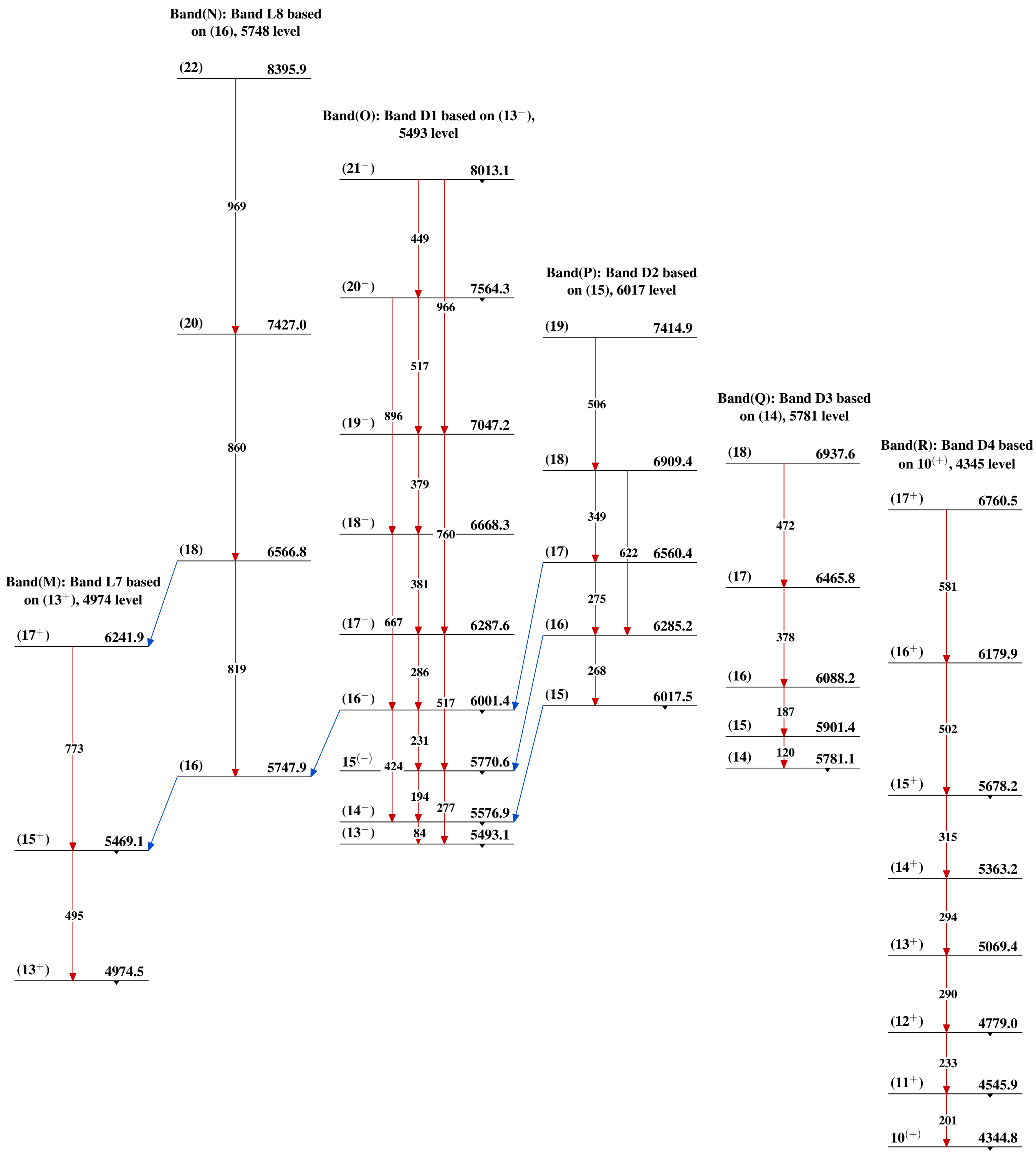
$^{138}_{60}Nd_{78}$

Adopted Levels, Gammas (continued)



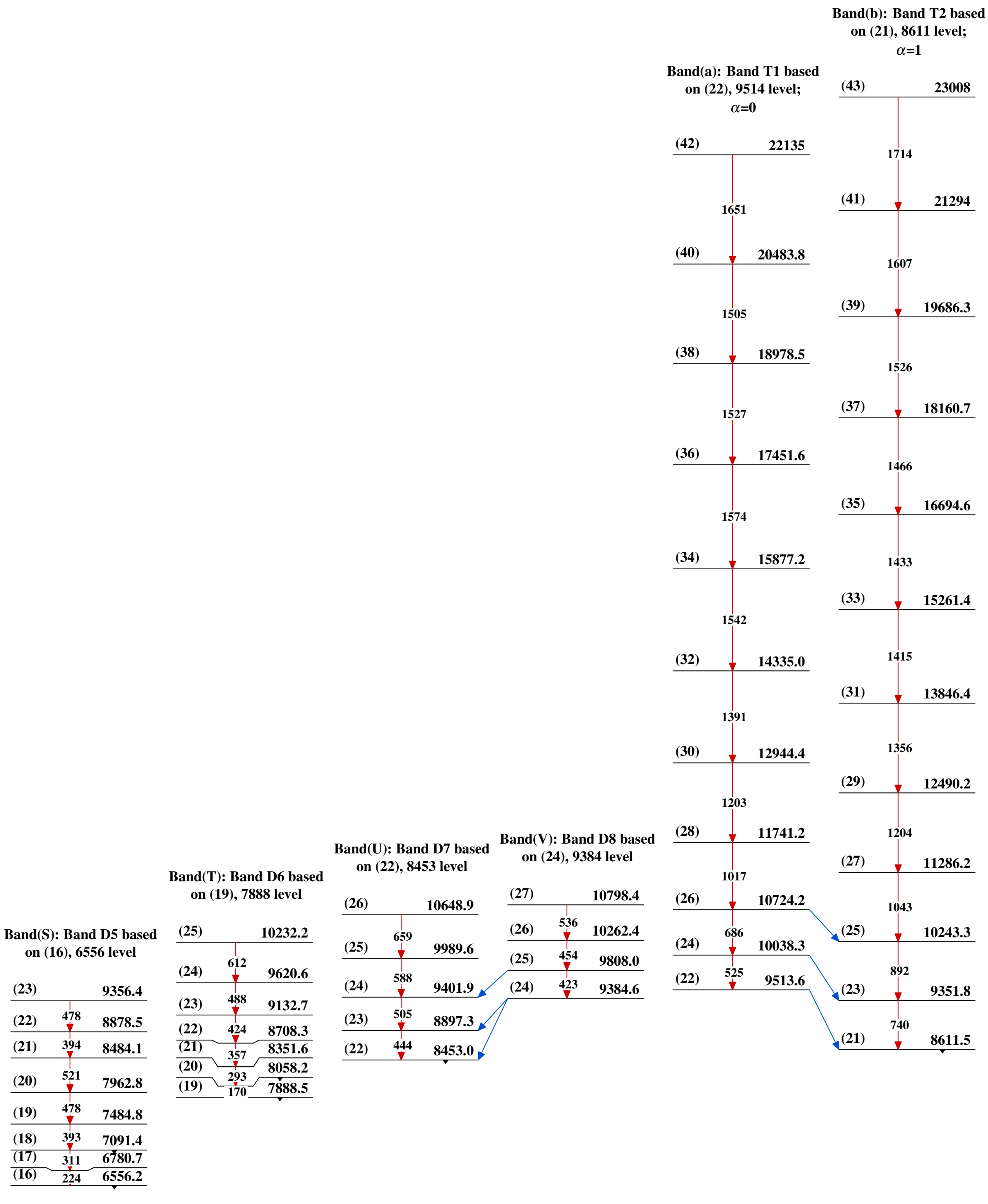
$^{138}_{60}Nd_{78}$

Adopted Levels, Gammas (continued)



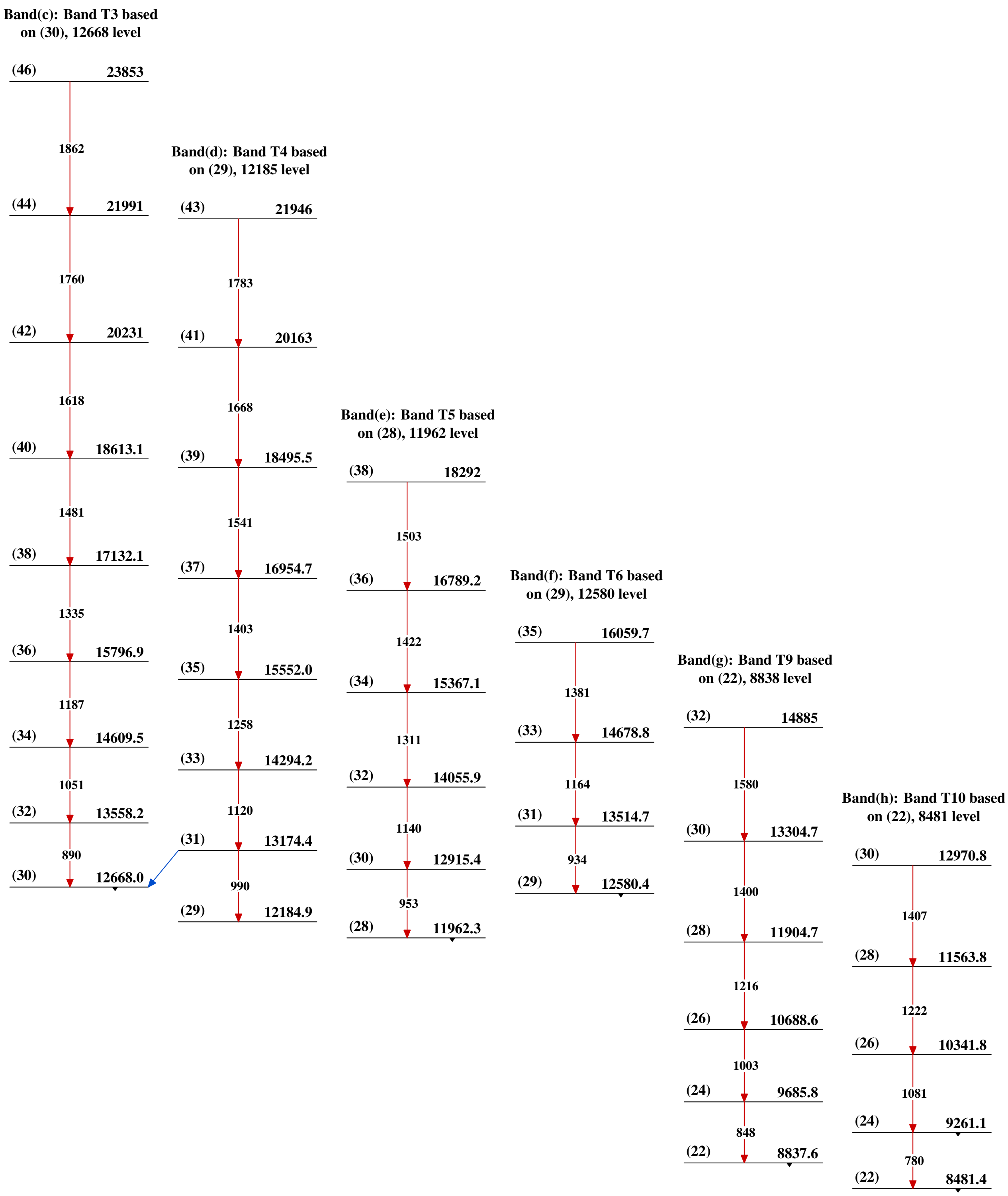
$^{138}_{60}Nd_{78}$

Adopted Levels, Gammas (continued)



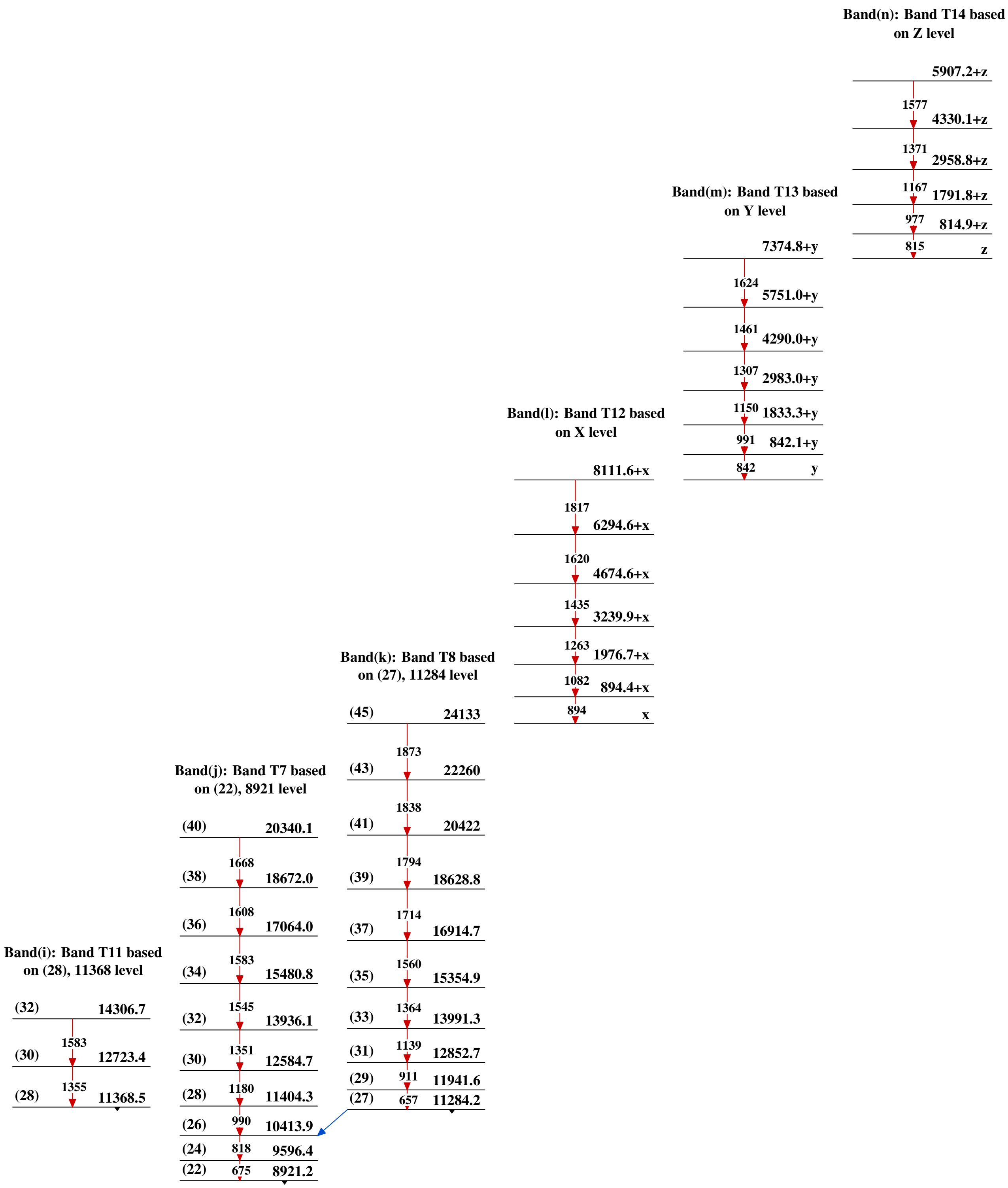
$^{138}_{60}Nd_{78}$

Adopted Levels, Gammas (continued)



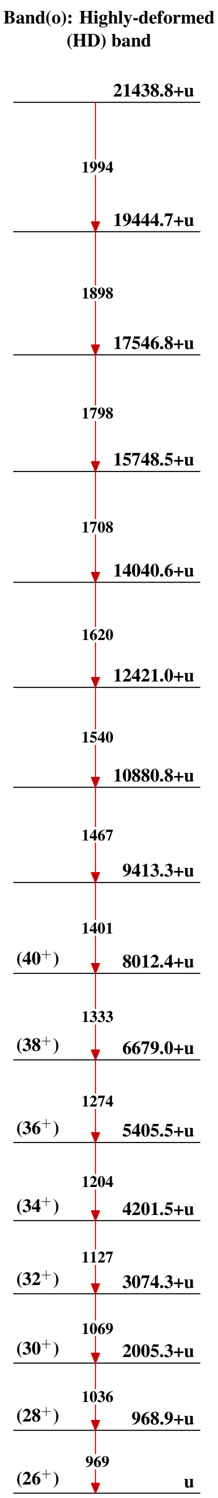
$^{138}_{60}Nd_{78}$

Adopted Levels, Gammas (continued)



$^{138}_{60}Nd_{78}$

Adopted Levels, Gammas (continued)



$^{138}_{60}Nd_{78}$

^{138}Pm ε decay (3.24 min) 1981De38

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 146, 1 (2017)	30-Sep-2017

Parent: ^{138}Pm: E=x; J$^{\pi}$=(5$^-$); $T_{1/2}$=3.24 min *5*; Q(ε)=7078 *29*; %ε+%β^+ decay=100.0

^{138}Pm-E: 20 *100* from observed β decay energy difference, between Q(ε)(2000Be42)=7105 *19* and Q(ε)(1983Al06)=7090 *100*. Note that 2000Be42 did not observe the g.s. level with $T_{1/2}$=10 s in 1983Al06 and thus this 3.24 min level observed in 2000Be42 could also be the g.s. of ^{138}Pm.

^{138}Pm-J$^{\pi}$,$T_{1/2}$: From Adopted Levels of ^{138}Pm.

^{138}Pm-Q(ε): From 2017Wa10.

1981De38: Measured: ^{138}Pm ions were produced via ^{142}Nd(d,5n) with 98% enriched Nd_2O_3 targets bombarded with proton beams and also via ^{144}Sm(p,α3n). γ rays were detected with two Ge(Li) detectors (FWHM=1.9 and 2.3 keV at 1.33 MeV) and low-energy γ rays and X rays were detected with an hyperpure Ge X-ray spectrometer (FWHM=490 eV at 122 keV); conversion electrons were detected with a "mini-orange" electron spectrometer consisting of a Si(Li) detector and a magnetic filter. Measured Eγ, Iγ, $\gamma\gamma$-coin, E(X-ray)γ, E(ce), $\beta\gamma$-coin. decay-time distribution. Deduced levels, J, π, parent $T_{1/2}$, conversion coefficients, γ-ray multipolarities, decay branching ratios, log *ft*. Systematics of N=77 isotones.

Others: 1995Ve08 and 1983Al06 (end-point energy); 1992Si22 (magnetic moment); 1983GaZT, 1973VaYZ, 1973WeZK (half-life).

The experimental work of 1981De38 presents 2 problems: a) Levels with J^{π}=2$^+$ to 6$^+$ are populated with log *ft*=5.8-6.5, b) the measured Q(ε)=5.4 MeV *2* is about 1.5 MeV lower than more recent measurements. The first problem may be explained by either, a combined decay of two ^{138}Pm isomers, or by an incomplete decay scheme, that is, the higher spin levels are not directly fed in the ε+β^+ decay, they are instead populated by unplaced γ rays. Due to these problems, the only information from this data that is adopted is the measured $T_{1/2}$ and γ multipolarities and no decay branching ratios and log *ft* values are given.

^{138}Nd Levels

E(level)†	J$^{\pi}$‡	E(level)†	J$^{\pi}$‡	E(level)†	E(level)†
0.0	0$^+$	1990.3 *3*	5$^-$	2484.8 *4*	2961.0 *3*
520.89 *17*	2$^+$	2134.3 *5*	6$^+$	2623.2 *5*	3256.0 *11*
1014.00 *18*	2$^+$	2196.2 *4*		2625.7 *5*	3784.1 *4*
1249.93 *21*	4$^+$	2222.0 *4*	(5$^-$)	2710.3 *4*	3855.0 *4*
1451.50 *20*	(3)$^+$	2261.7 *3*	(2$^+$,3$^+$,4$^+$)	2758.7 *4*	3981.3 *4*
1799.92 *24*		2273.1 *4*	(1,2$^+$)	2934.6 *3*	4205.8 *6*
1843.01 *25*	(4$^+$)	2323.8 *4*		2940.8 *4*	4212.6 *5*

† From a least-squares fit to γ-ray energies.
‡ From Adopted Levels.

^{138}Pm ε decay (3.24 min) 1981De38 (continued)

γ(^{138}Nd)

E_γ[‡]	I_γ[‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	α[†]	Comments
437.4 *2*	10.4 *6*	1451.50	(3)$^+$	1014.00	2$^+$	E2(+M1)	0.021 *5*	α(K)=0.018 *4*; α(L)=0.0027 *3*; α(M)=0.00057 *6* α(N)=0.000127 *13*; α(O)=1.89×10^{-5} *24*; α(P)=1.1×10^{-6} *3* Mult.: α(K)exp=0.0160 *15* (1981De38), α(K)exp=0.015 *3* (1973VaYZ).
493.1 *2*	21.6 *13*	1014.00	2$^+$	520.89	2$^+$	E2	0.01222	α(K)=0.01011 *15*; α(L)=0.001662 *24*; α(M)=0.000358 *5* α(N)=7.93×10^{-5} *12*; α(O)=1.156×10^{-5} *17*; α(P)=5.92×10^{-7} *9* Mult.: α(K)exp=0.0100 *10* (1981De38), α(K)exp=0.011 *3*, K/L=4.0 *15*(1973VaYZ).
520.9 *2*	100	520.89	2$^+$	0.0	0$^+$	E2	0.01055	α(K)=0.00876 *13*; α(L)=0.001412 *20*; α(M)=0.000304 *5* α(N)=6.73×10^{-5} *10*; α(O)=9.85×10^{-6} *14*; α(P)=5.15×10^{-7} *8* Mult.: α(K)exp=0.0093 *7* (1981De38), α(K)exp=0.009 *2* (1973VaYZ).
592.9 *3*	0.9 *1*	1843.01	(4$^+$)	1249.93	4$^+$			
699.0 *6*	0.5 *1*	2961.0		2261.7	(2$^+$,3$^+$,4$^+$)			
729.0 *2*	37.8 *23*	1249.93	4$^+$	520.89	2$^+$	E2	0.00455	α(K)=0.00384 *6*; α(L)=0.000561 *8*; α(M)=0.0001197 *17* α(N)=2.66×10^{-5} *4*; α(O)=3.96×10^{-6} *6*; α(P)=2.30×10^{-7} *4* Mult.: α(K)exp=0.0040 *4* (1981De38), α(K)exp=0.0040 *10*, K/L=5.5 *20* (1973VaYZ).
740.6 *3*	6.4 *5*	1990.3	5$^-$	1249.93	4$^+$	E1	1.68×10^{-3}	α(K)=0.001450 *21*; α(L)=0.000186 *3*; α(M)=3.90×10^{-5} *6* α(N)=8.71×10^{-6} *13*; α(O)=1.319×10^{-6} *19*; α(P)=8.53×10^{-8} *12* Mult.: α(K)exp<0.003 (1981De38).
786.0 *3*	0.9 *2*	1799.92		1014.00	2$^+$			
810.3 *3*	3.1 *3*	2261.7	(2$^+$,3$^+$,4$^+$)	1451.50	(3)$^+$	(M1)	0.00558	α(K)=0.00479 *7*; α(L)=0.000629 *9*; α(M)=0.0001327 *19* α(N)=2.97×10^{-5} *5*; α(O)=4.54×10^{-6} *7*; α(P)=3.02×10^{-7} *5* Mult.: α(K)exp=0.0055 *20* (1973VaYZ).
^{x}818.5 *4*	1.1 *3*							
829.0 *3*	7.1 *5*	1843.01	(4$^+$)	1014.00	2$^+$			Mult.: M1 from α(K)exp=0.0060 *10* (1981De38), α(K)exp=0.0041 *15* (1973VaYZ). This value is in conflict with the adopted J^π=(4$^+$).
884.4 *4*	0.8 *2*	2134.3	6$^+$	1249.93	4$^+$	E2	0.00293	α(K)=0.00248 *4*; α(L)=0.000349 *5*; α(M)=7.41×10^{-5} *11* α(N)=1.652×10^{-5} *24*; α(O)=2.48×10^{-6} *4*; α(P)=1.500×10^{-7} *21* Mult.: adopted value.
930.6 *2*	5.1 *3*	1451.50	(3)$^+$	520.89	2$^+$	M1(+E2)	0.0033 *7*	α(K)=0.0028 *7*; α(L)=0.00038 *7*; α(M)=8.0×10^{-5} *15* α(N)=1.8×10^{-5} *4*; α(O)=2.7×10^{-6} *6*; α(P)=1.8×10^{-7} *5* Mult.: α(K)exp=0.0031 *10* (1973VaYZ).
944.5 *3*	0.8 *2*	2934.6		1990.3	5$^-$			
970.7 *4*	0.8 *3*	2961.0		1990.3	5$^-$			
972.1 *3*	4.5 *3*	2222.0	(5$^-$)	1249.93	4$^+$	D		Mult.: α(K)exp=0.004 *2* (1981De38), α(K)exp=0.0018 *6* (1973VaYZ); α(K)exp is compatible with M1+E2 or E1+M2.

$^{138}_{60}$Nd$_{78}$-2

γ(^{138}Nd) (continued)

E_γ‡	I_γ‡	E_i(level)	J^π_i	E_f	J^π_f	Mult.#	α†	Comments
1011.6 3	3.8 5	2261.7	(2^+,3^+,4^+)	1249.93	4^+			
1014.0 3	7.4 7	1014.00	2^+	0.0	0^+	E2	0.00218	α(K)=0.00185 3; α(L)=0.000254 4; α(M)=5.39×10^{-5} 8 α(N)=1.202×10^{-5} 17; α(O)=1.81×10^{-6} 3; α(P)=1.123×10^{-7} 16 Mult.: α(K)exp=0.0022 5 (1981De38), α(K)exp=0.0018 6 (1973VaYZ).
1033.2 4	0.3 1	2484.8		1451.50	$(3)^+$			
1091.9 6	0.8 4	2934.6		1843.01	(4^+)			
1097.5 6	1.2 4	2940.8		1843.01	(4^+)			
1117.8 4	0.7 2	2961.0		1843.01	(4^+)			
1134.6 3	2.5 3	2934.6		1799.92				
1140.9 3	0.8 2	2940.8		1799.92				
1161.4 4	0.7 2	2961.0		1799.92				
^{x}1214.5 4	0.5 1							
1258.8 5	0.3 1	2710.3		1451.50	$(3)^+$			
1259.2 5	0.5 2	2273.1	(1,2^+)	1014.00	2^+			
1279.1 3	11.0 8	1799.92		520.89	2^+			
^{x}1318.0 4	0.6 2							
^{x}1322.0 4	0.6 2							
^{x}1360.0 4	0.6 2							
1373.3 4	1.3 3	2623.2		1249.93	4^+			
1375.8 4	1.1 3	2625.7		1249.93	4^+			
1460.4 5	0.6 3	2710.3		1249.93	4^+			
1470.9 4	0.8 2	2484.8		1014.00	2^+			
1482.8 3	2.5 3	2934.6		1451.50	$(3)^+$			
1508.7 4	0.4 2	2758.7		1249.93	4^+			
1509.3 4	0.8 4	2961.0		1451.50	$(3)^+$			
^{x}1576.6 4	0.9 2							
1675.3 3	3.2 4	2196.2		520.89	2^+			
1711.1 4	1.5 3	2961.0		1249.93	4^+			
^{x}1736.5 4	0.7 2							
1744.8 4	1.1 2	2758.7		1014.00	2^+			
^{x}1789.8 5	0.6 2							
^{x}1800.5 5	0.3 1							
1802.9 3	1.7 3	2323.8		520.89	2^+			
^{x}1851.1 4	0.5 1							
^{x}1951.1 4	1.1 2							
1984.0 4	0.6 2	3784.1		1799.92				
^{x}2029.5 5	0.6 2							
^{x}2036.0 5	0.4 2							
2138.0 6	0.3 1	3981.3		1843.01	(4^+)			
2242.0 10	1.4 5	3256.0		1014.00	2^+			
2273.0 4	0.6 2	2273.1	(1,2^+)	0.0	0^+			
^{x}2303.0 5	0.8 3							
2332.8 6	0.3 1	3784.1		1451.50	$(3)^+$			
2369.3 6	0.7 3	4212.6		1843.01	(4^+)			

$^{138}_{60}$Nd$_{78}$-3

^{138}Pm ε decay (3.24 min) 1981De38 (continued)

γ(^{138}Nd) (continued)

E_γ [‡]	I_γ [‡]	E_i(level)	J_i^π	E_f	J_f^π	E_γ [‡]	I_γ [‡]	E_i(level)	E_f	J_f^π	E_γ [‡]	I_γ [‡]	E_i(level)	E_f	J_f^π
2403.6 *6*	1.3 *4*	3855.0		1451.50	(3)$^+$	[x]2770.0 *10*	0.8 *4*				[x]3016.0 *10*	0.6 *2*			
2605.0 *4*	3.0 *5*	3855.0		1249.93	4$^+$	2841.0 *4*	0.5 *2*	3855.0	1014.00	2$^+$	[x]3139.0 *10*	0.4 *2*			
2731.3 *4*	1.1 *3*	3981.3		1249.93	4$^+$	2962.9 *6*	0.9 *3*	4212.6	1249.93	4$^+$	3460.5 *4*	2.9 *4*	3981.3	520.89	2$^+$
2754.3 *5*	0.2 *1*	4205.8		1451.50	(3)$^+$	[x]2966.0 *10*	0.5 *2*				[x]3479.9 *4*	1.0 *2*			

[†] Additional information 1.

[‡] From 1981De38. No ce with E=25-100, no Pm K x ray. Intensities are relative to Iγ(520.9γ)=100. Due to incomplete decay scheme and unplaced γ rays (see comments on the work of 1981De38 above), the absolute intensities cannot be deduced.

[#] From Adopted Gammas. Arguments from this dataset are α(K)exp values given under comments, which are derived from simultaneous measurements of Iγ and ce(K) (1981De38,1973VaYZ).

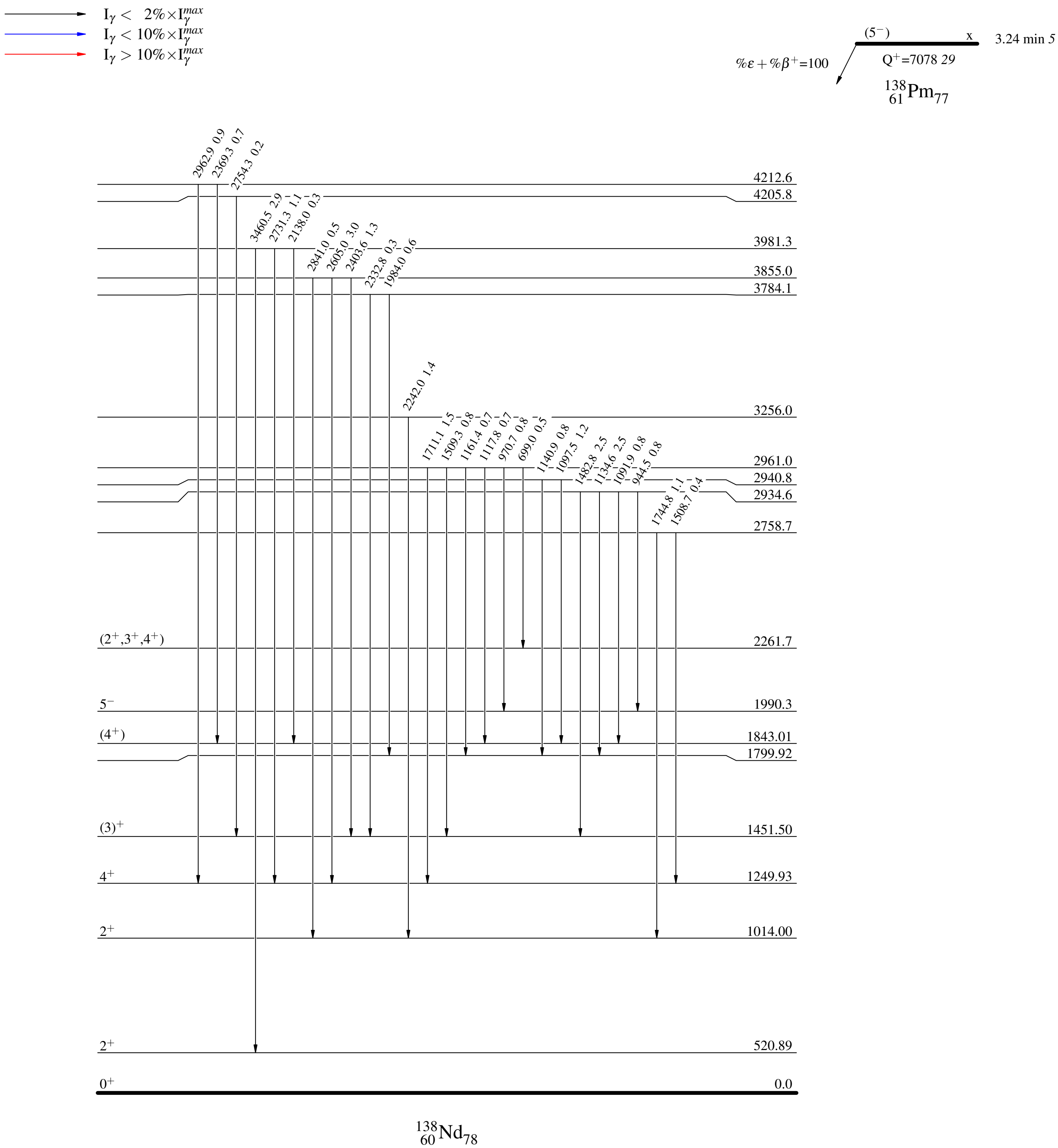
[x] γ ray not placed in level scheme.

$^{138}_{60}Nd_{78}$-4

^{138}Pm ε decay (3.24 min) 1981De38

Decay Scheme

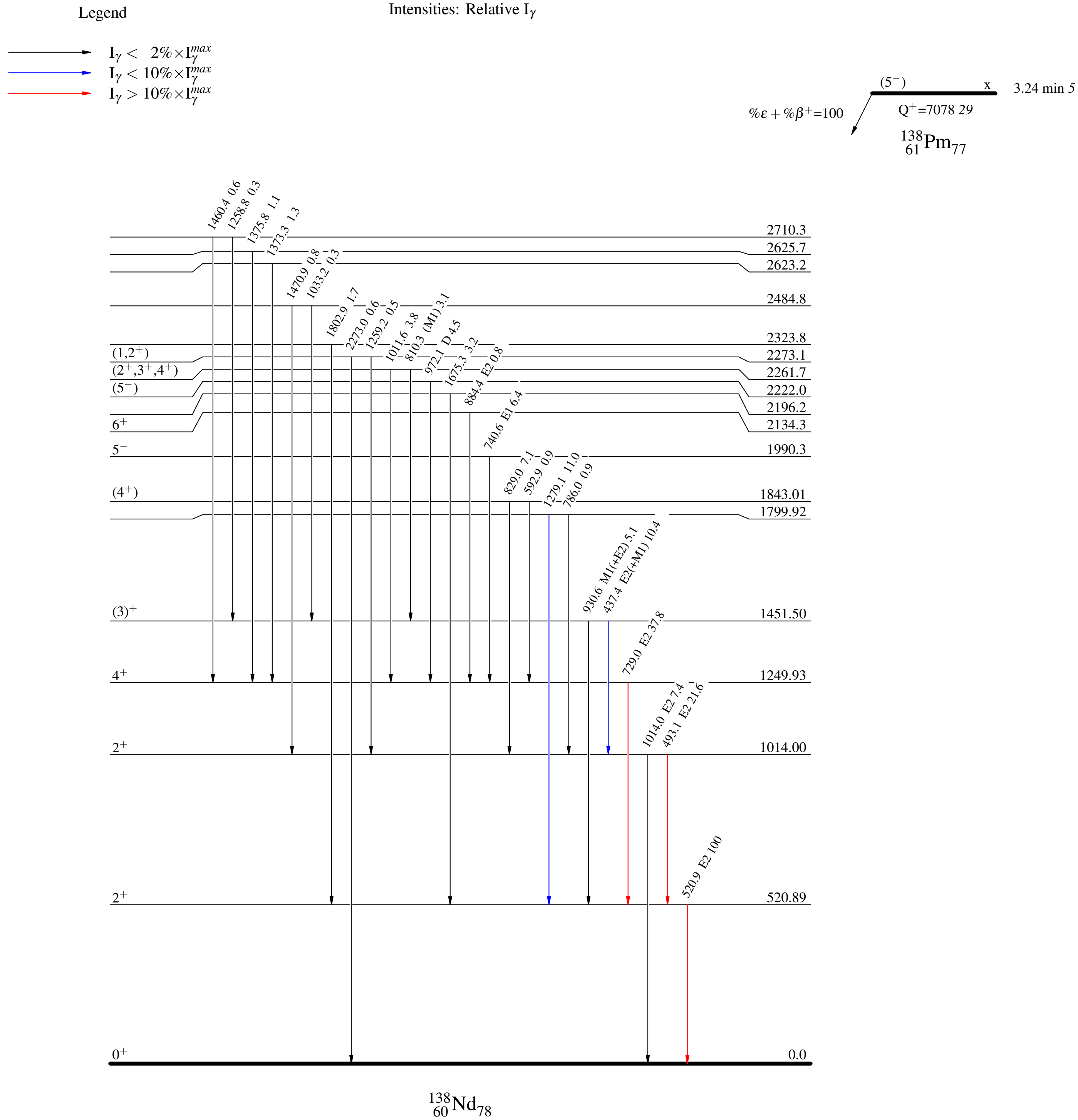
Intensities: Relative I_γ



^{138}Pm ε decay (3.24 min) 1981De38

Decay Scheme (continued)

Intensities: Relative I_γ



^{94}Zr(^{48}Ca,4nγ) 2012Pe15,2015Pe03

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 146, 1 (2017)	30-Sep-2017

Also includes $T_{1/2}$ from ^{96}Zr(^{48}Ca,6nγ) (2013Va10).

2012Pe15,2015Pe03 (also 2013Pe25): E=188, 195 MeV ^{48}Ca beam was provided by the XTU Tandem accelerator of the Laboratori Nazionali di Legnaro, incident on a 400 μg/cm^2 ^{94}Zr target. γ rays were detected by the GASP array containing 40 Compton suppressed HPGe detectors and the 80-element BGO ball. Measured Eγ, Iγ, $\gamma\gamma$-coin, $\gamma\gamma(\theta)$(DCO). Deduced levels, J, π, bands, configurations, γ-ray multipolarities. Calculated single-particle Routhians and moments of inertia using cranked shell-model. Bands are discussed in terms of CSM, TAC and RPA calculations. 2012Pe15 report data for low- and medium-spin bands and 2015Pe03 for high-spin bands. See also 2000Pe01, and 2004Lu07 for the earlier work by the same experimental group as 2012Pe15 and 2015Pe03.

2013Va10: ^{96}Zr(^{48}Ca,6nγ) E=180 MeV ^{48}Ca beam was produced from K130 cyclotron at JYFL facility with RITU recoil separator. Recoils were detected with the GREAT spectrometer (MWPC, DSSD detectors) and γ rays were detected with the JUROGAM array (39 Compton-suppressed Ge detectors, 24 Clovers and 15 coaxial tapered detectors). Measured γ(t), (recoil)γ-coin. Deduced $T_{1/2}$.

^{138}Nd Levels

Level scheme is from 2012Pe15 for low- and medium-spin bands, up to 10798,(27$^-$) (band N1-N4,L1-L8,D1-D8,GS) and from 2015Pe03 for high-spin bands above 7764,20$^+$ level (band T1-T14,HD), unless otherwise noted.

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$	E(level)[†]	J$^\pi$[‡]	E(level)[†]	J$^\pi$[‡]
0.0[a]	0^+		4695.1[d] 8	(13^-)	5842.0[f] 5	16^+
520.80[a] 20	2^+		4751.7[e] 4	13^-	5901.0[p] 13	$15^{(-)}$
1249.5[a] 3	4^+		4778.7[q] 6	12^+	6000.4[n] 5	16^-
1989.8[b] 4	5^-		4939.1 5	12^-	6016.8[o] 8	15^-
2133.6[a] 4	6^+		4974.1[l] 5	13^+	6070.0[b] 14	(15^-)
2220.9[e] 4	5^-		4990.0[i] 6	13^+	6071.3[j] 6	$15^{(-)}$
2321.1[b] 4	7^-		4995.3[f] 5	14^+	6087.8[p] 14	$16^{(-)}$
2690.8[e] 4	7^-		5028.6[k] 6	14^+	6151.7[g] 6	(16^+)
2979.9 4	8^-		5069.0[q] 7	13^+	6179.4[q] 8	(16^+)
2998.3[c] 4	8^-		5117.4[b] 10	(13^-)	6233.0[h] 6	16^+
3106.5[a] 4	8^+		5252.6 5	13^-	6241.2[l] 7	17^+
3174.7[k] 4	10^+	370[&] ns 5	5348.7[g] 6	14^+	6284.4[o] 6	16^-
3239.2[b] 6	9^-		5362.8[q] 7	14^+	6286.6[n] 5	17^-
3247.1[e] 4	9^-		5417.4[c] 7	(14^-)	6395.0 6	16^+
3371.0[d] 4	9^-		5430.3 9	14^+	6409.3[c] 12	(16^-)
3556.3[c] 4	10^-		5468.9[l] 6	15^+	6465.4[p] 15	$17^{(-)}$
3700.4[f] 4	10^+		5492.7[n] 7	(13^-)	6555.8[r] 10	$16^{(+)}$
3821.7[k] 5	12^+		5527.2[h] 7	14^+	6559.6[o] 7	17^-
3854.5[d] 6	11^-		5576.4[n] 5	14^-	6566.0[m] 7	18^+
3915.1[e] 4	11^-		5590.7 7	14^-	6627.5[j] 5	$17^{(-)}$
4135.9 5	11^+		5613.4 6	14^-	6667.4[n] 6	18^-
4203.2[f] 5	12^+		5656.0[d] 10	(15^-)	6706.5 6	16^+
4217.4[b] 8	11^-		5677.7[q] 7	15^+	6760.0[q] 13	(17^+)
4344.4[q] 7	10^+		5742.1[i] 6	15^+	6780.3[r] 10	$17^{(+)}$
4381.5 6	11^+		5747.3[m] 6	16^+	6810.4 5	$17^{(-)}$
4395.2[c] 5	12^-		5758.7[e] 6	15^-	6825.2 6	$17^{(-)}$
4545.6[q] 6	11^+		5769.8[n] 5	15^-	6828.8[f] 5	18^+
4651.1 6	(13^-)		5780.7[p] 8	$14^{(-)}$	6864.8 6	17^+

Continued on next page (footnotes at end of table)

$^{94}Zr(^{48}Ca,4n\gamma)$ 2012Pe15,2015Pe03 (continued)

^{138}Nd Levels (continued)

E(level)[†]	J$^\pi$[‡]	E(level)[†]	J$^\pi$[‡]
6908.6[o] 8	18$^-$	9383.9[u] 8	24$^{(-)}$
6937.2[p] 18	18$^{(-)}$	9401.2[t] 10	24$^{(-)}$
6997.5[g] 6	(18$^+$)	9513.1[v] 6	22$^{(-)}$
7046.2[n] 6	19$^-$	9596.0[5] 7	24$^{(+)}$
7091.0[r] 10	18$^{(+)}$	9619.9[s] 13	24$^{(+)}$
7125.3 6	18$^{(-)}$	9685.5[2] 10	24$^+$
7201.0[h] 5	18$^+$	9807.3[u] 10	25$^{(-)}$
7368.8 7	20$^-$	9988.9[t] 11	25$^{(-)}$
7414.1[o] 10	19$^-$	10037.9[v] 6	24$^{(-)}$
7422.1[j] 6	(19$^-$)	10231.5[s] 14	(25$^+$)
7425.7[m] 8	(20$^+$)	10242.9[w] 6	25$^{(-)}$
7484.4[r] 11	19$^{(+)}$	10261.7[u] 14	26$^{(-)}$
7503.2 6	19$^{(-)}$	10341.1[3] 10	26$^+$
7563.7[n] 6	20[@]	10363.0 11	25$^{(-)}$
7600.5 7	19$^+$	10413.5[5] 8	26$^{(+)}$
7689.2 8	(20$^-$)	10648.2[t] 15	(26$^-$)
7764.1 6	20$^+$	10688.3[2] 11	26$^+$
7776.3 9	(20$^+$)	10723.8[v] 6	26$^{(-)}$
7829.4 8	19$^{(+)}$	10741.4 13	26$^{(-)}$
7887.8[s] 8	19$^{(+)}$	10797.7[u] 17	(27$^-$)
7933.4 7	20$^{(-)}$	11283.8[6] 12	27$^{(-)}$
7962.4[r] 15	20$^{(+)}$	11285.8[w] 8	27$^{(-)}$
7982.9[g] 6	(20$^+$)	11367.8[4] 11	(28$^+$)
8012.4[n] 6	21$^-$	11403.9[5] 8	28$^{(+)}$
8049.0 9	21$^+$	11563.1[3] 14	(28$^+$)
8057.5[s] 7	20$^{(+)}$	11725.0 11	(28$^-$)
8079.6[f] 9	20$^+$	11740.8[v] 8	28$^{(-)}$
8091.1 9	(20)	11904.4[2] 15	28$^+$
8114.9 9	20$^+$	11941.2[6] 13	29$^{(-)}$
8249.0 9	20$^{(-)}$	11961.9[z] 12	(28$^-$)
8328.5[j] 7	(21$^-$)	12184.5[y] 18	(29$^-$)
8350.9[s] 9	21$^{(+)}$	12489.8[w] 10	29$^{(-)}$
8394.6[m] 10	(22$^+$)	12580.0[1] 13	29$^{(-)}$
8395.9 7	21$^{(-)}$	12584.3[5] 9	30$^{(+)}$
8437.6 7	21[#]	12667.6[x] 11	(30$^-$)
8452.3[t] 7	22$^{(-)}$	12722.7[4] 15	(30$^+$)
8480.8[3] 8	22$^+$	12852.3[6] 14	31$^{(-)}$
8483.7[r] 18	(21$^+$)	12915.0[z] 16	(30$^-$)
8585.1 7	21$^{(-)}$	12944.0[v] 10	30$^{(-)}$
8611.1[w] 6	21$^{(-)}$	12970.1[3] 17	(30$^+$)
8707.6[s] 10	22$^{(+)}$	13174.0[y] 15	(31$^-$)
8837.3[2] 8	22$^+$	13304.4[2] 18	(30$^+$)
8878.1[r] 21	(22$^+$)	13514.2[1] 14	31$^{(-)}$
8890.8 9	23$^+$	13557.7[x] 12	(32$^-$)
8896.6[t] 8	23$^{(-)}$	13845.9[w] 14	31$^{(-)}$
8920.8[5] 7	22$^{(+)}$	13935.7[5] 14	32$^{(+)}$
9132.0[s] 11	23$^{(+)}$	13990.9[6] 17	33$^{(-)}$
9260.4[3] 9	24$^+$	14012.3 14	(32$^+$)
9348.3[j] 9	(23$^-$)	14055.5[z] 19	(32$^-$)
9351.4[w] 6	23$^{(-)}$	14293.7[y] 18	(33$^-$)

$^{94}Zr(^{48}Ca,4n\gamma)$ 2012Pe15,2015Pe03 (continued)

^{138}Nd Levels (continued)

E(level)[†]	J$^\pi$[‡]	E(level)[†]	J$^\pi$[‡]
9356.0[r] *23*	(23$^+$)	14306.1[4] *18*	(32$^+$)

Continued on next page (footnotes at end of table)

$^{94}Zr(^{48}Ca,4n\gamma)$ 2012Pe15,2015Pe03 (continued)

^{138}Nd Levels (continued)

E(level)[†]	J^{π}[‡]	Comments
14334.6[v] *14*	$32^{(-)}$	
14609.0[x] *16*	(34^-)	
14678.3[1] *17*	(33^-)	
14885[2] *3*	(32^+)	
15260.9[w] *17*	(33^-)	
15354.5[6] *20*	$35^{(-)}$	
15366.7[z] *21*	(34^-)	
15480.4[5] *17*	(34^+)	
15551.5[y] *21*	(35^-)	
15796.4[x] *19*	(36^-)	
15876.8[v] *17*	(34^-)	
16059.2[1] *20*	(35^-)	
16694.1[w] *20*	(35^-)	
16788.8[z] *24*	(36^-)	
16914.3[6] *22*	(37^-)	
16954.2[y] *23*	(37^-)	
17063.6[5] *20*	(36^+)	
17131.6[x] *21*	(38^-)	
17451.2[v] *20*	(36^-)	
18160.3[w] *22*	(37^-)	
18292[z] *3*	(38^-)	
18495.1[y] *25*	(39^-)	
18612.7[x] *24*	(40^-)	
18628.4[6] *24*	(39^-)	
18671.6[5] *22*	(38^+)	
18978.1[v] *22*	(38^-)	
19685.9[w] *25*	(39^-)	
20163[y] *3*	(41^-)	
20231[x] *3*	(42^-)	
20339.7[5] *24*	(40^+)	
20422[6] *3*	(41^-)	
20483.3[v] *25*	(40^-)	
21293[w] *3*	(41^-)	
21946[y] *3*	(43^-)	
21991[x] *3*	(44^-)	
22135[v] *3*	(42^-)	
22259[6] *3*	(43^-)	
23008[w] *3*	(43^-)	
23853[x] *3*	(46^-)	
24132[6] *3*	(45^-)	
x[7]		Additional information 1.
894.4+x[7] *10*		
1976.7+x[7] *12*		
3239.9+x[7] *15*		
4674.6+x[7] *18*		
6294.6+x[7] *21*		
8111.6+x[7] *23*		
y[8]		Additional information 2.
842.1+y[8] *5*		
1833.3+y[8] *7*		
2983.0+y[8] *9*		

Continued on next page (footnotes at end of table)

$^{94}Zr(^{48}Ca,4n\gamma)$ 2012Pe15,2015Pe03 (continued)

^{138}Nd Levels (continued)

E(level)†	Jπ‡	Comments
4290.0+y[8] *14*		
5751.0+y[8] *17*		
7374.8+y[8] *20*		
z[9]		Additional information 3.
814.9+z[9] *10*		
1791.8+z[9] *15*		
2958.8+z[9] *18*		
4330.1+z[9] *20*		
5907.2+z[9] *23*		
u[!]	(26^+)	Additional information 4.
968.9+u[!] *4*	(28^+)	
2005.3+u[!] *6*	(30^+)	
3074.3+u[!] *6*	(32^+)	
4201.5+u[!] *7*	(34^+)	
5405.5+u[!] *7*	(36^+)	
6679.0+u[!] *8*	(38^+)	
8012.4+u[!] *8*	(40^+)	
9413.3+u[!] *8*		
10880.8+u[!] *8*		
12421.0+u[!] *9*		
14040.6+u[!] *10*		
15748.5+u[!] *10*		
17546.8+u[!] *12*		
19444.7+u[!] *19*		
21438.8+u[!] *23*		

† From a least-squares fit to γ-ray energies.

‡ From 2012Pe15 and 2015Pe03 based on deduced γ-ray multipolarities and band structures. Please refer to Adopted Levels for adopted assignments.

Note discrepancy in J^π assignment: $21^{(+)}$ in 2015Pe03 but $21^{(-)}$ in 2012Pe15.

@ Note discrepancy in J^π assignment: 20^+ in 2015Pe03 but 20^- in 2012Pe15, former assignment is based on cranking shell model predictions of positive-parity for T10 band.

& From (68γ,521γ,884γ,972γ)(t) (2013Va10).

a Band(A): Ground state band.

b Band(B): Band N1 based on 5^-, 1990 level.

c Band(C): Band N2 based on 8^-, 2998 level.

d Band(D): Band N3 based on 9^-, 3371 level.

e Band(E): Band N4 based on 5^-, 2221 level.

f Band(F): Band L1 based on 10^+, 3700 level.

g Band(G): Band L2 based on 14^+, 5349 level.

h Band(H): Band L3 based on 14^+, 5527 level.

i Band(I): Band L4 based on 13^+, 4990 level.

j Band(J): Band L5 based on $15^{(-)}$, 6071 level.

k Band(K): Band L6 based on 10^+, 3176 level.

l Band(L): Band L7 based on 13^+, 4975 level.

m Band(M): Band L8 based on 16^+, level.

n Band(N): Band D1 based on (13^-), 5493 level. Bands D1 and D2 are possible chiral partners.

Continued on next page (footnotes at end of table)

$^{94}Zr(^{48}Ca,4n\gamma)$ 2012Pe15,2015Pe03 (continued)

^{138}Nd Levels (continued)

[o] Band(O): Band D2 based on 15^-, 6017 level. Bands D1 and D2 are possible chiral partners.
[p] Band(P): Band D3 based on $14^{(-)}$, 5781 level.
[q] Band(Q): Band D4 based on 10^+, 4344 level.
[r] Band(R): Band D5 based on 16^+, 6555 level.
[s] Band(S): Band D6 based on $19^{(+)}$, 7888 level.
[t] Band(T): Band D7 based on $22^{(-)}$, 8453 level.
[u] Band(U): Band D8 based on $24^{(-)}$, 9385 level.
[v] Band(a): Band T1 based on $22^{(-)}$, 9513 level; α=0. Bands T1 and T2 are signature partners.
[w] Band(V): Band T2 based on $21^{(-)}$, 8611 level; α=1. Bands T1 and T2 are signature partners.
[x] Band(b): Band T3 based on (30^-), 12668 level.
[y] Band(c): Band T4 based on (29^-), 12185 level.
[z] Band(d): Band T5 based on (28^-), 11962 level.
[1] Band(e): Band T6 based on $29^{(-)}$, 12580 level.
[2] Band(f): Band T9 based on 22^+, 8837 level.
[3] Band(g): Band T10 based on 22^+, 8481 level.
[4] Band(h): Band T11 based on (28^+), 11368 level.
[5] Band(i): Band T7 based on $22^{(+)}$, 8921 level.
[6] Band(j): Band T8 based on $27^{(-)}$, 11284 level.
[7] Band(k): Band T12 based on X level.
[8] Band(l): Band T13 based on Y level.
[9] Band(m): Band T14 based on Z level.
[!] Band(n): Highly-deformed (HD) band.

$\gamma(^{138}Nd)$

DCO(Q) corresponds to gate on stretched quadrupole, and DCO(D) to gate on stretched dipole. Expected values are DCO(D)≈2.0 and DCO(Q)≈1.0 for stretched quadrupole, and DCO(D)≈1.0 and DCO(Q)≈0.5 for stretched dipole (2012Pe15,2015Pe03).

E_γ[†]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[@]	Comments
38.7 *10*	<1	5468.9	15^+	5430.3	14^+		
66.6		3174.7	10^+	3106.5	8^+		E_γ: not observed; energy is rounded value from Adopted Gammas.
83.6 *10*	0.16 *8*	5576.4	14^-	5492.7	(13^-)		
120.3 *10*	0.10 *5*	5901.0	$15^{(-)}$	5780.7	$14^{(-)}$	M1+E2	DCO(D)=1.19 *16* (2012Pe15)
143.7 *10*	0.7 *3*	3700.4	10^+	3556.3	10^-	E1+M2	DCO(Q)=0.6 *4* (2012Pe15)
156.4 *5*	1.5 *7*	5769.8	15^-	5613.4	14^-	M1+E2	DCO(Q)=0.63 *17* (2012Pe15)
164.1 *10*	0.2 *1*	4545.6	11^+	4381.5	11^+	M1+E2	DCO(D)=0.46 *18* (2012Pe15)
169.9 *5*	1.0 *5*	8057.5	$20^{(+)}$	7887.8	$19^{(+)}$	(M1+E2)	
179.0 *10*	0.3 *1*	5769.8	15^-	5590.7	14^-	M1+E2	DCO(Q)=0.97 *12* (2012Pe15)
186.5 *5*	3.5 *7*	2321.1	7^-	2133.6	6^+		
186.7 *5*	1.2 *6*	3556.3	10^-	3371.0	9^-		
186.8 *5*	1.2 *6*	6087.8	$16^{(-)}$	5901.0	$15^{(-)}$	M1+E2	DCO(D)=1.4 *4* (2012Pe15)
193.4 *2*	12.3 *12*	5769.8	15^-	5576.4	14^-	M1+E2	DCO(Q)=0.60 *7*; DCO(D)=0.90 *13* (2012Pe15)
193.6 *10*	0.8 *4*	7563.7	20	7368.8	20^-		
201.2 *5*	2.5 *5*	4545.6	11^+	4344.4	10^+	M1+E2	DCO(Q)=0.73 *25* (2012Pe15)
224.4 *5*	1.1 *5*	6780.3	$17^{(+)}$	6555.8	$16^{(+)}$	M1+E2	DCO(D)=0.97 *15* (2012Pe15)
228.0 *5*	1.5 *7*	8057.5	$20^{(+)}$	7829.4	$19^{(+)}$	M1+E2	DCO(D)=1.22 *18* (2012Pe15)
230.6 *2*	18.2 *18*	6000.4	16^-	5769.8	15^-	M1+E2	DCO(Q)=0.57 *9*; DCO(D)=0.87 *4* (2012Pe15)
230.7 *2*	12.5 *13*	2220.9	5^-	1989.8	5^-		
233.0 *5*	4.9 *10*	4778.7	12^+	4545.6	11^+	M1+E2	DCO(D)=0.90 *23* (2012Pe15)
242.2 *10*	0.3 *1*	6000.4	16^-	5758.7	15^-		

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^{94}Zr(^{48}Ca,4nγ) 2012Pe15,2015Pe03 (continued)

γ(^{138}Nd) (continued)

E_γ [†]	I_γ [†]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [@]	Comments
252.9 *10*	0.04 *2*	6000.4	16^-	5747.3	16^+	E1	DCO(D)=0.92 *20* (2012Pe15)
267.5 *10*	0.13 *6*	6284.4	16^-	6016.8	15^-	M1+E2	DCO(D)=1.05 *10* (2012Pe15)
275.1 *10*	<1	7689.2	(20^-)	7414.1	19^-		
275.2 *5*	1.9 *9*	6559.6	17^-	6284.4	16^-	M1+E2	DCO(D)=1.06 *10* (2012Pe15)
277.0 *10*	0.3 *1*	5769.8	15^-	5492.7	(13^-)		
278.0 *10*	0.7 *3*	5252.6	13^-	4974.1	13^+		
278.4 *5*	4.0 *8*	5747.3	16^+	5468.9	15^+	M1+E2	DCO(Q)=0.36 *7* (2012Pe15)
280.9 *10*	0.7 *3*	7091.0	$18^{(+)}$	6810.4	$17^{(-)}$	(E1)	DCO(D)=0.99 *20* (2012Pe15)
281.4 *10*	0.06 *3*	8057.5	$20^{(+)}$	7776.3	(20^+)		
286.2 *2*	21.4 *21*	6286.6	17^-	6000.4	16^-	M1+E2	DCO(Q)=0.61 *5* (2012Pe15)
288.0 *5*	1.2 *6*	5780.7	$14^{(-)}$	5492.7	(13^-)	(M1+E2)	DCO(D)=0.88 *19* (2012Pe15)
290.3 *5*	4.7 *9*	5069.0	13^+	4778.7	12^+	M1+E2	DCO(D)=0.93 *10* (2012Pe15)
293.4 *5*	3.9 *8*	8350.9	$21^{(+)}$	8057.5	$20^{(+)}$	M1+E2	DCO(Q)=0.20 *14*; DCO(D)=1.0 *6* (2012Pe15)
293.8 *5*	4.0 *8*	5362.8	14^+	5069.0	13^+	M1+E2	DCO(D)=0.84 *15* (2012Pe15)
300.0 *5*	1.0 *5*	7125.3	$18^{(-)}$	6825.2	$17^{(-)}$	M1+E2	DCO(D)=1.4 *5* (2012Pe15)
310.6 *5*	1.1 *5*	7091.0	$18^{(+)}$	6780.3	$17^{(+)}$	M1+E2	DCO(D)=1.09 *16* (2012Pe15)
313.4 *2*	15.4 *15*	5252.6	13^-	4939.1	12^-	M1+E2	DCO(Q)=0.77 *19* (2012Pe15)
314.9 *5*	1.8 *9*	5677.7	15^+	5362.8	14^+	M1+E2	DCO(D)=1.1 *3* (2012Pe15)
315.2 *5*	1.8 *9*	7125.3	$18^{(-)}$	6810.4	$17^{(-)}$	M1+E2	DCO(D)=1.04 *25* (2012Pe15)
322.4 *5*	3.3 *7*	7368.8	20^-	7046.2	19^-		
323.2 *5*	1.2 *6*	8012.4	21^-	7689.2	(20^-)		
323.7 *2*	15.8 *16*	5576.4	14^-	5252.6	13^-	M1+E2	DCO(Q)=0.60 *10* (2012Pe15)
324.8 *5*	3.0 *6*	6566.0	18^+	6241.2	17^+	M1+E2	DCO(Q)=0.39 *12* (2012Pe15)
328.9 *5*	1.0 *5*	5677.7	15^+	5348.7	14^+		
329.1 *2*	32 *3*	3700.4	10^+	3371.0	9^-	E1+M2	DCO(Q)=0.69 *5* (2012Pe15)
331.5 *2*	38.5 *39*	2321.1	7^-	1989.8	5^-	E2	DCO(Q)=1.03 *5* (2012Pe15)
335.7[‡] *2*	5.4[‡] *8*	8920.8	$22^{(+)}$	8585.1	$21^{(-)}$	(E1)	DCO(D)=0.70 *30* (2015Pe03)
335.9 *10*	0.2 *1*	8585.1	$21^{(-)}$	8249.0	$20^{(-)}$	M1+E2	DCO(Q)=0.61 *5* (2012Pe15)
336.2 *5*	3.5 *7*	7201.0	18^+	6864.8	17^+	M1+E2	DCO(D)=1.4 *3* (2012Pe15)
349.0 *5*	1.0 *5*	6908.6	18^-	6559.6	17^-	M1+E2	DCO(D)=0.95 *10* (2012Pe15)
353.4 *5*	2.3 *5*	5348.7	14^+	4995.3	14^+	M1+E2	DCO(Q)=0.74 *15*; DCO(D)=0.8 *5* (2012Pe15)
356.7 *5*	3.8 *8*	8707.6	$22^{(+)}$	8350.9	$21^{(+)}$	M1+E2	DCO(Q)=0.3 *3* (2012Pe15)
359.0 *2*	6 *1*	3915.1	11^-	3556.3	10^-	M1+E2	DCO(Q)=0.8 *5* (2012Pe15)
369.8 *2*	6.6 *10*	2690.8	7^-	2321.1	7^-	M1+E2	DCO(Q)=1.08 *10* (2012Pe15)
369.8[‡] *5*	1.6[‡] *8*	9260.4	24^+	8890.8	23^+	M1+E2	DCO(Q)=0.25 *25* (2015Pe03)
372.3 *5*	2.0 *4*	7201.0	18^+	6828.8	18^+		
372.7 *2*	18.5 *19*	3371.0	9^-	2998.3	8^-	M1+E2	DCO(Q)=0.58 *4* (2012Pe15)
376.1 *10*	0.5 *2*	6555.8	$16^{(+)}$	6179.4	(16^+)	(M1+E2)	DCO(D)=1.3 *5* (2012Pe15)
377.6 *5*	1.0 *5*	6465.4	$17^{(-)}$	6087.8	$16^{(-)}$	M1+E2	DCO(D)=0.75 *8* (2012Pe15)
378.0 *2*	5.9 *9*	7503.2	$19^{(-)}$	7125.3	$18^{(-)}$	M1+E2	DCO(Q)=1.11 *11*; DCO(D)=0.73 *15* (2012Pe15)
378.4[‡] *10*	<1[‡]	10741.4	$26^{(-)}$	10363.0	$25^{(-)}$	M1+E2	DCO(Q)=0.62 *14* (2015Pe03)
378.8 *2*	16 *2*	7046.2	19^-	6667.4	18^-	M1+E2	DCO(Q)=0.54 *7* (2012Pe15)
380.8 *2*	19 *2*	6667.4	18^-	6286.6	17^-	M1+E2	DCO(Q)=0.58 *5* (2012Pe15)
390.9 *5*	1.0 *5*	6233.0	16^+	5842.0	16^+		
391.0 *2*	8.2 *12*	3371.0	9^-	2979.9	8^-	M1+E2	DCO(Q)=0.66 *10* (2012Pe15)
393.4 *5*	1.0 *5*	7484.4	$19^{(+)}$	7091.0	$18^{(+)}$	M1+E2	DCO(D)=1.00 *12* (2012Pe15)
394.4 *10*	0.2 *1*	8878.1	(22^+)	8483.7	(21^+)	(M1+E2)	DCO(D)=1.00 *12* (2012Pe15)
397.3 *5*	2.8 *6*	4778.7	12^+	4381.5	11^+	M1+E2	DCO(D)=0.78 *11* (2012Pe15)
399.5 *5*	3.5 *7*	7600.5	19^+	7201.0	18^+	M1+E2	DCO(D)=0.73 *15* (2012Pe15)
403.5 *10*	<0.1	6016.8	15^-	5613.4	14^-	M1+E2	DCO(D)=0.97 *25* (2012Pe15)
406 *10*	<0.1	9807.3	$25^{(-)}$	9401.2	$24^{(-)}$		
410.4[‡] *10*	0.9[‡] *5*	8890.8	23^+	8480.8	22^+	M1+E2	DCO(Q)=0.33 *6* (2015Pe03)
423.4 *5*	2.0 *4*	9807.3	$25^{(-)}$	9383.9	$24^{(-)}$	M1+E2	DCO(D)=0.95 *20* (2012Pe15)

Continued on next page (footnotes at end of table)

$^{94}Zr(^{48}Ca,4n\gamma)$ 2012Pe15,2015Pe03 (continued)

$\gamma(^{138}Nd)$ (continued)

E_γ †	I_γ †	E_i(level)	J^π_i	E_f	J^π_f	Mult. @	Comments
424.0 *5*	1.0 *5*	6000.4	16^-	5576.4	14^-		
424.4 *5*	4.3 *9*	9132.0	$23^{(+)}$	8707.6	$22^{(+)}$	M1+E2	DCO(D)=1.00 *15* (2012Pe15)
430.4 *5*	2.3 *5*	7933.4	$20^{(-)}$	7503.2	$19^{(-)}$	M1+E2	DCO(D)=0.68 *17* (2012Pe15)
431.5‡ *10*	0.5‡ *3*	8480.8	22^+	8049.0	21^+	M1+E2	DCO(Q)=0.27 *15* (2015Pe03)
439.9 *2*	6.7 *10*	8452.3	$22^{(-)}$	8012.4	21^-	M1+E2	DCO(D)=0.87 *5* (2012Pe15)
440.1 *10*	<0.1	6016.8	15^-	5576.4	14^-	M1+E2	DCO(D)=0.94 *20* (2012Pe15)
440.2 *2*	6.4 *10*	5468.9	15^+	5028.6	14^+	M1+E2	DCO(Q)=0.61 *17* (2012Pe15)
444.4 *5*	2.7 *5*	8896.6	$23^{(-)}$	8452.3	$22^{(-)}$	M1+E2	DCO(D)=0.87 *5* (2012Pe15)
448.7 *2*	5.3 *8*	8012.4	21^-	7563.7	20	M1+E2	DCO(D)=0.83 *5* (2012Pe15)
453.6 *2*	42 *4*	3700.4	10^+	3247.1	9^-	E1+M2	DCO(Q)=0.62 *2* (2012Pe15)
454.4 *10*	0.8 *4*	10261.7	$26^{(-)}$	9807.3	$25^{(-)}$	M1+E2	DCO(D)=1.12 *20* (2012Pe15)
456.9 *5*	2.4 *5*	8057.5	$20^{(+)}$	7600.5	19^+	(M1+E2)	DCO(D)=0.95 *12*
462.5 *5*	1.2 *6*	8395.9	$21^{(-)}$	7933.4	$20^{(-)}$	M1+E2	DCO(D)=0.94 *7* (2012Pe15)
469.8 *2*	23.4 *23*	2690.8	7^-	2220.9	5^-	E2	DCO(Q)=1.02 *13* (2012Pe15)
471.8 *10*	0.10 *5*	6937.2	$18^{(-)}$	6465.4	$17^{(-)}$	M1+E2	DCO(D)=0.86 *25* (2012Pe15)
477.9 *10*	0.2 *1*	9356.0	(23^+)	8878.1	(22^+)	(M1+E2)	DCO(D)=1.0 *6* (2012Pe15)
478.0 *10*	0.5 *2*	7962.4	$20^{(+)}$	7484.4	$19^{(+)}$	M1+E2	DCO(D)=1.0 *6* (2012Pe15)
481.4‡ *5*	3.8‡ *8*	10723.8	$26^{(-)}$	10242.9	$25^{(-)}$	(M1+E2)	DCO(Q)=0.76 *15* (2015Pe03)
483.1‡ *2*	8.5‡ *13*	8920.8	$22^{(+)}$	8437.6	21	(M1+E2)	DCO(Q)=0.81 *7* (2015Pe03)
483.5 *5*	2.0 *4*	3854.5	11^-	3371.0	9^-	E2	DCO(Q)=0.86 *15* (2012Pe15)
485.4‡ *10*	0.3‡ *2*	8049.0	21^+	7563.7	20		
487.8 *10*	<1	9383.9	$24^{(-)}$	8896.6	$23^{(-)}$	M1+E2	DCO(D)=1.06 *16* (2012Pe15)
487.9 *5*	3.0 *6*	9619.9	$24^{(+)}$	9132.0	$23^{(+)}$	M1+E2	DCO(D)=0.91 *15* (2012Pe15)
493.8 *10*	0.37 *18*	8585.1	$21^{(-)}$	8091.1	(20)		
494.6 *5*	2.4 *5*	7201.0	18^+	6706.5	16^+	E2	DCO(Q)=0.95 *11* (2012Pe15)
494.7 *5*	2.2 *4*	5468.9	15^+	4974.1	13^+	E2	DCO(Q)=1.0 *4* (2012Pe15)
501.6 *5*	2.8 *6*	6179.4	(16^+)	5677.7	15^+		
502.8 *2*	64 *6*	4203.2	12^+	3700.4	10^+	E2	DCO(Q)=0.87 *10*; DCO(D)=1.55 *9* (2012Pe15)
504		8437.6	21	7933.4	$20^{(-)}$		E_γ: γ from level-scheme figure 1 of 2012Pe15, not listed in table I.
504.6 *5*	2.3 *5*	9401.2	$24^{(-)}$	8896.6	$23^{(-)}$	M1+E2	DCO(D)=1.05 *25* (2012Pe15)
505.6 *10*	0.8 *4*	7414.1	19^-	6908.6	18^-	M1+E2	DCO(D)=0.9 *3* (2012Pe15)
506.4 *10*	0.5	13174.0	(31^-)	12667.6	(30^-)		
508.7‡ *5*	1.0‡ *5*	8837.3	22^+	8328.5	(21^-)	(E1)	DCO(Q)=0.40 *17* (2015Pe03)
514.4 *5*	1.0 *5*	8114.9	20^+	7600.5	19^+	M1+E2	DCO(D)=1.06 *18* (2012Pe15)
514.6 *5*	1.1 *5*	6284.4	16^-	5769.8	15^-	M1+E2	DCO(D)=0.86 *23* (2012Pe15)
516.7 *5*	2.1 *4*	6286.6	17^-	5769.8	15^-		
517.5 *2*	10 *1*	7563.7	20	7046.2	19^-	M1+E2	DCO(D)=0.91 *8* (2012Pe15)
520.8 *2*	100 *10*	520.80	2^+	0.0	0^+	E2	DCO(Q)=0.90 *5* (2012Pe15)
521.3 *10*	<0.2	8483.7	(21^+)	7962.4	$20^{(+)}$		
524.8‡ *2*	7.5‡ *11*	10037.9	$24^{(-)}$	9513.1	$22^{(-)}$	E2	DCO(Q)=1.03 *26* (2015Pe03)
524.9‡ *5*	2.0‡ *4*	8920.8	$22^{(+)}$	8395.9	$21^{(-)}$	(E1)	DCO(D)=1.27 *52* (2015Pe03)
528.2 *10*	0.5 *2*	5780.7	$14^{(-)}$	5252.6	13^-	(M1+E2)	DCO(D)=1.0 *4* (2012Pe15)
532.1 *10*	0.6 *3*	5527.2	14^+	4995.3	14^+	M1+E2	DCO(Q)=1.09 *25* (2012Pe15)
536.0 *10*	<0.3	10797.7	(27^-)	10261.7	$26^{(-)}$		
537.3 *10*	0.5 *2*	5527.2	14^+	4990.0	13^+	M1+E2	DCO(Q)=0.58 *25* (2012Pe15)
542.4 *10*	<1	11283.8	$27^{(-)}$	10741.4	$26^{(-)}$	M1+E2	DCO(Q)=0.66 *45* (2015Pe03)
543.9 *2*	6.3 *9*	3915.1	11^-	3371.0	9^-	E2	DCO(Q)=1.0 *6* (2012Pe15)
556.6 *10*	0.25 *12*	6627.5	$17^{(-)}$	6071.3	$15^{(-)}$		
556.7 *2*	88.6 *89*	3247.1	9^-	2690.8	7^-	E2	DCO(Q)=0.96 *12* (2012Pe15)
557.3 *2*	63 *6*	2690.8	7^-	2133.6	6^+	E1+M2	DCO(D)=1.21 *8* (2012Pe15)
558.0 *2*	10 *1*	3556.3	10^-	2998.3	8^-	E2	DCO(Q)=0.95 *18* (2012Pe15)

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^{94}Zr(^{48}Ca,4nγ) 2012Pe15,2015Pe03 (continued)

γ(^{138}Nd) (continued)

E_γ[†]	I_γ[†]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[@]	Comments
559.2 *10*	0.3 *1*	6559.6	17$^-$	6000.4	16$^-$	M1+E2	DCO(D)=0.7 *4* (2012Pe15)
563.2[‡] *2*	18.8[‡] *19*	7764.1	20$^+$	7201.0	18$^+$	E2	DCO(Q)=0.92 *10* (2015Pe03)
576.9 *5*	1.5 *7*	3556.3	10$^-$	2979.9	8$^-$		
580.6 *10*	0.9 *4*	6760.0	(17$^+$)	6179.4	(16$^+$)		
587.7 *5*	1.5 *7*	9988.9	25$^{(-)}$	9401.2	24$^{(-)}$	M1+E2	DCO(D)=1.1 *4* (2012Pe15)
602.2 *5*	4.9 *10*	5576.4	14$^-$	4974.1	13$^+$	E1	DCO(Q)=0.52 *6* (2012Pe15)
611.6 *5*	3.7 *7*	10231.5	(25$^+$)	9619.9	24$^{(+)}$		
622.0 *10*	<0.06	6908.6	18$^-$	6286.6	17$^-$		
628.2[‡] *2*	7.5[‡] *11*	8611.1	21$^{(-)}$	7982.9	(20$^+$)	(E1)	DCO(Q)=0.74 *25* (2015Pe03)
639.3 *5*	3.4 *7*	5613.4	14$^-$	4974.1	13$^+$	E1	DCO(Q)=0.53 *15* (2012Pe15)
643.6 *5*	4.4 *9*	8012.4	21$^-$	7368.8	20$^-$	M1+E2	DCO(D)=1.04 *15* (2012Pe15)
646.9 *2*	24 *2*	3821.7	12$^+$	3174.7	10$^+$	E2	DCO(Q)=0.87 *13*; DCO(D)=2.4 *4* (2012Pe15)
651.9 *5*	1.1 *5*	8585.1	21$^{(-)}$	7933.4	20$^{(-)}$	M1+E2	DCO(D)=1.10 *25* (2012Pe15)
653.1 *5*	1.0 *5*	6395.0	16$^+$	5742.1	15$^+$	M1+E2	DCO(Q)=0.29 *19* (2012Pe15)
657.4 *5*	2.6	11941.2	29$^{(-)}$	11283.8	27$^{(-)}$	E2	DCO(Q)=0.93 *7* (2015Pe03)
658.8 *2*	16.9 *17*	2979.9	8$^-$	2321.1	7$^-$	M1+E2	DCO(Q)=0.52 *7* (2012Pe15)
659.3 *10*	<1	10648.2	(26$^-$)	9988.9	25$^{(-)}$		
667.0 *5*	1.0 *5*	6667.4	18$^-$	6000.4	16$^-$		
668.0 *2*	16 *2*	3915.1	11$^-$	3247.1	9$^-$	E2	DCO(Q)=1.09 *9* (2012Pe15)
675.2[‡] *2*	16.8[‡] *17*	9596.0	24$^{(+)}$	8920.8	22$^{(+)}$	E2	DCO(D)=1.88 *19* (2015Pe03)
677.0 *2*	14.2 *14*	2998.3	8$^-$	2321.1	7$^-$	M1+E2	DCO(Q)=0.6 *4* (2012Pe15)
680.0 *2*	17.2 *17*	3371.0	9$^-$	2690.8	7$^-$	E2	DCO(Q)=0.7 *4* (2012Pe15)
681.2 *5*	3.0 *6*	4381.5	11$^+$	3700.4	10$^+$	M1+E2	DCO(D)=0.77 *12* (2012Pe15)
685.8[‡] *2*	15.0[‡] *15*	10723.8	26$^{(-)}$	10037.9	24$^{(-)}$	E2	DCO(Q)=0.93 *20* (2015Pe03)
686.4[‡] *2*	9.0[‡] *14*	10037.9	24$^{(-)}$	9351.4	23$^{(-)}$		
701.2 *5*	2.6 *5*	2690.8	7$^-$	1989.8	5$^-$		
705.8 *10*	0.7 *3*	6233.0	16$^+$	5527.2	14$^+$	E2	DCO(D)=2.1 *6* (2012Pe15)
708.4 *10*	0.06 *3*	6071.3	15$^{(-)}$	5362.8	14$^+$	(E1)	DCO(D)=0.5 *3* (2012Pe15)
722.4 *10*	0.18 *9*	6071.3	15$^{(-)}$	5348.7	14$^+$	(E1+M2)	DCO(D)=1.4 *3* (2012Pe15) Given from 6627 level in table.
728.7 *2*	100 *10*	1249.5	4$^+$	520.80	2$^+$	E2	DCO(Q)=0.99 *5* (2012Pe15)
730.3 *10*	0.06 *3*	7776.3	(20$^+$)	7046.2	19$^-$		
736.4 *5*	1.0 *5*	4651.1	(13$^-$)	3915.1	11$^-$		
738.9 *5*	1.0 *5*	6810.4	17$^{(-)}$	6071.3	15$^{(-)}$		
740.2 *2*	52 *5*	1989.8	5$^-$	1249.5	4$^+$	E1	DCO(Q)=0.55 *12* (2012Pe15)
740.3[‡] *2*	15.5[‡] *16*	9351.4	23$^{(-)}$	8611.1	21$^{(-)}$	E2	DCO(Q)=1.10 *30* (2015Pe03)
740.4 *2*	7 *1*	3915.1	11$^-$	3174.7	10$^+$		
747.0 *5*	1.2 *6*	5742.1	15$^+$	4995.3	14$^+$	M1+E2	DCO(Q)=0.27 *4* (2012Pe15)
752.3 *10*	0.5 *2*	5742.1	15$^+$	4990.0	13$^+$		
757.7[‡] *5*	3.1[‡] *6*	8837.3	22$^+$	8079.6	20$^+$	E2	DCO(Q)=1.11 *34* (2015Pe03)
759.6 *5*	1.0 *5*	7046.2	19$^-$	6286.6	17$^-$		
767.1[‡] *10*	<1[‡]	10363.0	25$^{(-)}$	9596.0	24$^{(+)}$	(E1)	
772.4 *5*	2.7 *5*	6241.2	17$^+$	5468.9	15$^+$	E2	DCO(Q)=1.0 *3* (2012Pe15)
779.5[‡] *5*	1.4[‡] *7*	9260.4	24$^+$	8480.8	22$^+$	E2	DCO(Q)=0.94 *25* (2015Pe03)
785.4 *2*	7.4 *11*	6627.5	17$^{(-)}$	5842.0	16$^+$	(E1+M2)	DCO(Q)=0.68 *6* (2012Pe15)
786.8 *5*	1.9 *9*	4990.0	13$^+$	4203.2	12$^+$	M1+E2	DCO(D)=0.50 *20* (2012Pe15)
792.1 *2*	49.4 *49*	4995.3	14$^+$	4203.2	12$^+$	E2	DCO(Q)=1.10 *15* (2012Pe15)
794.6 *2*	6.9 *10*	7422.1	(19$^-$)	6627.5	17$^{(-)}$	(E2)	DCO(D)=2.0 *18* (2012Pe15)
803.0 *10*	0.6 *3*	6151.7	(16$^+$)	5348.7	14$^+$		
803.1 *2*	15 *2*	4939.1	12$^-$	4135.9	11$^+$	E1	DCO(D)=0.93 *9* (2012Pe15)
806.2 *5*	2.2 *4*	7201.0	18$^+$	6395.0	16$^+$	E2	DCO(Q)=0.88 *19* (2012Pe15)
814.9 *10*	1	814.9+z		z			
817.5[‡] *2*	11.9[‡] *12*	10413.5	26$^{(+)}$	9596.0	24$^{(+)}$	E2	DCO(Q)=1.00 *6*; DCO(D)=2.08 *22* (2015Pe03)

Continued on next page (footnotes at end of table)

^{94}Zr(^{48}Ca,4nγ) 2012Pe15,2015Pe03 (continued)

γ(^{138}Nd) (continued)

E_γ†	I_γ†	E_i(level)	J^π_i	E_f	J^π_f	Mult.@	Comments
818.6 *5*	1.9 *9*	6566.0	18^+	5747.3	16^+	E2	DCO(D)=1.7 *3* (2012Pe15)
826.7 *10*	0.2 *1*	8249.0	$20^{(-)}$	7422.1	(19^-)	M1+E2	DCO(D)=1.7 *8* (2012Pe15)
836.7 *2*	7.4 *11*	4751.7	13^-	3915.1	11^-	E2	DCO(Q)=0.9 *3*; DCO(D)=1.47 *17* (2012Pe15)
838.8 *10*	0.2 *1*	5590.7	14^-	4751.7	13^-		
838.9 *2*	6 *1*	4395.2	12^-	3556.3	10^-	E2	DCO(Q)=0.91 *18* (2012Pe15)
840.6 *5*	2.0 *4*	4695.1	(13^-)	3854.5	11^-		
841.8‡ *5*	1.4‡ *7*	8890.8	23^+	8049.0	21^+		
842.1 *5*	2	842.1+y		y			
845.0 *5*	1.9 *9*	4545.6	11^+	3700.4	10^+		
845.9 *5*	2.5 *5*	6997.5	(18^+)	6151.7	(16^+)		
846.7 *2*	33 *3*	5842.0	16^+	4995.3	14^+	E2	DCO(D)=2.0 *5* (2012Pe15)
846.9‡ *2*	12.5‡ *13*	8611.1	$21^{(-)}$	7764.1	20^+	(E1)	DCO(Q)=0.43 *20* (2015Pe03)
848.2‡ *5*	3.4‡ *7*	9685.5	24^+	8837.3	22^+	E2	DCO(Q)=0.82 *20* (2015Pe03)
859.7 *5*	2.6 *5*	7425.7	(20^+)	6566.0	18^+	(E2)	DCO(D)=1.4 *6* (2012Pe15)
864.5 *5*	2.0 *4*	6706.5	16^+	5842.0	16^+		
867.8 *10*	0.7 *3*	6395.0	16^+	5527.2	14^+		
870.3 *10*	1.0	11283.8	$27^{(-)}$	10413.5	$26^{(+)}$	(E1)	DCO(Q)=0.53 *6*; DCO(D)=1.36 *30* (2015Pe03)
883.9 *2*	70 *7*	2133.6	6^+	1249.5	4^+	E2	DCO(Q)=1.03 *4* (2012Pe15)
890.1 *5*	2.5	13557.7	(32^-)	12667.6	(30^-)	E2	DCO(Q)=0.85 *40* (2015Pe03)
891.6‡ *2*	13.7‡ *14*	10242.9	$25^{(-)}$	9351.4	$23^{(-)}$	E2	DCO(Q)=1.03 *35* (2015Pe03)
893.1 *10*	0.8 *4*	8395.9	$21^{(-)}$	7503.2	$19^{(-)}$		
894.4 *10*	0.8	894.4+x		x			
896.3 *10*	0.6 *3*	7563.7	20	6667.4	18^-		
900.0 *5*	2.1 *4*	5117.4	(13^-)	4217.4	11^-		
902.1‡ *2*	6.2‡ *9*	9513.1	$22^{(-)}$	8611.1	$21^{(-)}$	(M1+E2)	DCO(Q)=0.61 *15* (2015Pe03)
906.4 *5*	2.5 *5*	8328.5	(21^-)	7422.1	(19^-)	(E2)	DCO(D)=1.3 *4*
911.1 *5*	2.4	12852.3	$31^{(-)}$	11941.2	$29^{(-)}$	E2	DCO(Q)=0.99 *11* (2015Pe03)
917.1‡ *5*	2.3‡ *5*	8480.8	22^+	7563.7	20	E2	
918.1 *5*	4.9 *10*	3239.2	9^-	2321.1	7^-	E2	DCO(Q)=1.1 *3*; DCO(D)=1.5 *3* (2012Pe15)
925.6 *5*	1.2 *6*	5576.4	14^-	4651.1	(13^-)		
926.1	<0.1	12667.6	(30^-)	11740.8	$28^{(-)}$		
931.5 *5*	<2	9383.9	$24^{(-)}$	8452.3	$22^{(-)}$		
934.2 *5*	2.7	13514.2	$31^{(-)}$	12580.0	$29^{(-)}$	E2	DCO(Q)=0.92 *24* (2015Pe03)
934.3 *10*		8437.6	21	7503.2	$19^{(-)}$		
935.0‡ *5*	3.0‡ *6*	7764.1	20^+	6828.8	18^+		
939.5 *10*	0.2 *1*	5590.7	14^-	4651.1	(13^-)		
943.4	1.8	12667.6	(30^-)	11725.0	(28^-)	(E2)	DCO(Q)=0.91 *41* (2015Pe03)
952.6 *10*	0.8 *4*	6070.0	(15^-)	5117.4	(13^-)		
953.1 *10*	0.9	12915.0	(30^-)	11961.9	(28^-)	E2	DCO(Q)=0.93 *46* (2015Pe03)
960.9 *5*	1.8 *9*	5656.0	(15^-)	4695.1	(13^-)		
961.1 *2*	15 *2*	4135.9	11^+	3174.7	10^+	M1+E2	DCO(D)=0.61 *5* (2012Pe15)
966.2 *10*	0.8 *4*	8012.4	21^-	7046.2	19^-		
967.8 *5*	2.2 *4*	7201.0	18^+	6233.0	16^+		
968.5 *2*	6.3 *9*	6810.4	$17^{(-)}$	5842.0	16^+	(E1)	DCO(Q)=0.50 *12* (2012Pe15)
968.9# *4*	0.18‡ *9*	968.9+u	(28^+)	u	(26^+)		
968.9 *5*	2.9 *6*	8394.6	(22^+)	7425.7	(20^+)	(E2)	DCO(Q)=0.9 *6* (2012Pe15)
971.7 *2*	26 *3*	2220.9	5^-	1249.5	4^+	E1	DCO(Q)=0.57 *7* (2012Pe15)
972.9 *2*	7.7 *12*	3106.5	8^+	2133.6	6^+	E2	DCO(D)=1.7 *9* (2012Pe15)
976.9 *10*	1	1791.8+z		814.9+z			
978.2 *5*	3.7 *7*	4217.4	11^-	3239.2	9^-	E2	DCO(Q)=1.2 *4* (2012Pe15)
983.1 *5*	1.5 *7*	6825.2	$17^{(-)}$	5842.0	16^+		
985.4 *5*	3.0 *6*	7982.9	(20^+)	6997.5	(18^+)		
986.7 *2*	17.5 *18*	6828.8	18^+	5842.0	16^+	E2	DCO(Q)=1.01 *16* (2012Pe15)

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$^{94}Zr(^{48}Ca,4n\gamma)$ 2012Pe15,2015Pe03 (continued)

$\gamma(^{138}Nd)$ (continued)

E_γ †	I_γ †	E_i(level)	J^π_i	E_f	J^π_f	Mult. @	Comments
989.5 *10*	0.5	13174.0	(31^-)	12184.5	(29^-)	E2	DCO(Q)=1.06 *40* (2015Pe03)
990.4 *2*	5.8	11403.9	$28^{(+)}$	10413.5	$26^{(+)}$	E2	DCO(Q)=1.05 *16*; DCO(D)=2.06 *51* (2015Pe03)
991.2 *5*	2	1833.3+y		842.1+y			
991.9 *10*	<1	6409.3	(16^-)	5417.4	(14^-)		
1001.9 *10*	0.35	11725.0	(28^-)	10723.8	$26^{(-)}$	(E2)	DCO(Q)=0.63 *33* (2015Pe03)
1002.8‡ *5*	3.6‡ *7*	10688.3	26^+	9685.5	24^+	E2	DCO(Q)=1.18 *24* (2015Pe03)
1007.1 *5*	3.0 *6*	5758.7	15^-	4751.7	13^-	E2	DCO(Q)=0.90 *25* (2012Pe15)
1015.2 *10*		8437.6	21	7422.1	(19^-)		
1016.8 *5*	7.6	11740.8	$28^{(-)}$	10723.8	$26^{(-)}$	E2	DCO(Q)=0.85 *17* (2015Pe03)
1018.3 *5*	5.9 *9*	5769.8	15^-	4751.7	13^-	E2	DCO(Q)=1.06 *20*; DCO(D)=1.8 *8* (2012Pe15)
1019.8 *5*	1.6 *8*	9348.3	(23^-)	8328.5	(21^-)		
1022.2 *5*	1.5 *7*	5417.4	(14^-)	4395.2	12^-	E2	DCO(Q)=1.05 *4* (2012Pe15)
1026.7 *5*	1.3	11367.8	(28^+)	10341.1	26^+	(E2)	DCO(Q)=1.15 *40* (2015Pe03)
1036.4# *4*	0.20‡ *10*	2005.3+u	(30^+)	968.9+u	(28^+)		
1042.9 *5*	7.8	11285.8	$27^{(-)}$	10242.9	$25^{(-)}$	E2	DCO(Q)=0.94 *15* (2015Pe03)
1044.7 *10*	0.4 *2*	8091.1	(20)	7046.2	19^-		
1051.3 *10*	0.7	14609.0	(34^-)	13557.7	(32^-)	E2	DCO(Q)=0.96 *35* (2015Pe03)
1069.0# *2*	0.23‡ *12*	3074.3+u	(32^+)	2005.3+u	(30^+)		
1080.7‡ *5*	2.0‡ *4*	10341.1	26^+	9260.4	24^+	E2	DCO(Q)=1.00 *20* (2015Pe03)
1082.3 *5*	1.0	1976.7+x		894.4+x			
1104.1 *10*		7933.4	$20^{(-)}$	6828.8	18^+		
1117.3 *5*	2.6 *5*	4939.1	12^-	3821.7	12^+	E1+M2	DCO(Q)=0.75 *15* (2012Pe15)
1117.4 *5*	2.0 *4*	6864.8	17^+	5747.3	16^+	M1+E2	DCO(D)=0.57 *25* (2012Pe15)
1119.7 *10*	0.5	14293.7	(33^-)	13174.0	(31^-)	E2	DCO(Q)=0.94 *30* (2015Pe03)
1127.2# *3*	0.40‡ *20*	4201.5+u	(34^+)	3074.3+u	(32^+)		
1138.6 *10*	0.7	13990.9	$33^{(-)}$	12852.3	$31^{(-)}$	E2	DCO(Q)=1.00 *25* (2015Pe03)
1140.5 *10*	1.3	14055.5	(32^-)	12915.0	(30^-)	E2	DCO(Q)=0.90 *30* (2015Pe03)
1145.4 *5*	3.2 *6*	5348.7	14^+	4203.2	12^+	E2	DCO(Q)=1.5 *4*; DCO(D)=2.9 *16* (2012Pe15)
1149.7 *5*	2.2	2983.0+y		1833.3+y			
1152.3 *5*	10.7 *11*	4974.1	13^+	3821.7	12^+	M1+E2	DCO(Q)=0.37 *4* (2012Pe15)
1154.2 *5*	1.0 *5*	7982.9	(20^+)	6828.8	18^+		
1155.5 *5*	1.8 *9*	6997.5	(18^+)	5842.0	16^+	(E2)	DCO(Q)=0.9 *4* (2012Pe15)
1156.4 *5*	1.4 *7*	6151.7	(16^+)	4995.3	14^+		
1164.1 *10*	0.9	14678.3	(33^-)	13514.2	$31^{(-)}$		
1167.0 *10*	0.5	2958.8+z		1791.8+z			
1180.4 *5*	2.8	12584.3	$30^{(+)}$	11403.9	$28^{(+)}$	E2	DCO(Q)=0.95 *12* (2015Pe03)
1187.4 *10*	0.5	15796.4	(36^-)	14609.0	(34^-)	E2	DCO(Q)=1.07 *58* (2015Pe03)
1203.2 *5*	3.8	12944.0	$30^{(-)}$	11740.8	$28^{(-)}$	E2	DCO(Q)=1.02 *15* (2015Pe03)
1204.0# *2*	0.69‡ *35*	5405.5+u	(36^+)	4201.5+u	(34^+)		
1204.0 *5*	7	12489.8	$29^{(-)}$	11285.8	$27^{(-)}$	E2	DCO(Q)=0.97 *22* (2015Pe03)
1206.7 *10*	7.2 *11*	5028.6	14^+	3821.7	12^+	E2	DCO(Q)=1.00 *11* (2012Pe15)
1216.1 *10*	1.7	11904.4	28^+	10688.3	26^+	E2	DCO(Q)=0.79 *25* (2015Pe03)
1222.0 *10*	0.8	11563.1	(28^+)	10341.1	26^+		
1237.7 *10*	1.0 *5*	6233.0	16^+	4995.3	14^+		
1238.0 *10*	0.7 *3*	4344.4	10^+	3106.5	8^+	E2	DCO(D)=2.0 *10* (2012Pe15)
1238.1 *10*	1.6	11961.9	(28^-)	10723.8	$26^{(-)}$	(E2)	DCO(Q)=0.97 *68* (2015Pe03)
1251.0 *10*	1.3 *6*	8079.6	20^+	6828.8	18^+	E2	DCO(Q)=1.0 *4* (2012Pe15)
1257.8 *10*	0.2	15551.5	(35^-)	14293.7	(33^-)	E2	DCO(Q)=0.76 *40* (2015Pe03)
1262.8 *10*	1.1 *5*	7829.4	$19^{(+)}$	6566.0	18^+	(M1+E2)	DCO(Q)=0.4 *3*; DCO(D)=0.7 *5* (2012Pe15)
1263.2 *10*	1.3	3239.9+x		1976.7+x			
1273.5# *2*	0.90‡ *45*	6679.0+u	(38^+)	5405.5+u	(36^+)		
1294.2 *10*	2.3	12580.0	$29^{(-)}$	11285.8	$27^{(-)}$	(E2)	DCO(Q)=0.71 *22* (2015Pe03)
1307.0 *10*	1.3	4290.0+y		2983.0+y			

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^{94}Zr(^{48}Ca,4nγ) 2012Pe15,2015Pe03 (continued)

γ(^{138}Nd) (continued)

E_γ [†]	I_γ [†]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [@]	Comments
1311.2 *10*	0.9	15366.7	(34⁻)	14055.5	(32⁻)	E2	DCO(Q)=0.90 *45* (2015Pe03)
1322.4 *10*	1.0 *5*	7887.8	19⁽⁺⁾	6566.0	18⁺	(M1+E2)	
1323.7 *10*	0.4 *2*	5527.2	14⁺	4203.2	12⁺		
1333.4[#] *2*	0.80[‡] *40*	8012.4+u	(40⁺)	6679.0+u	(38⁺)		
1335.2 *10*	0.3	17131.6	(38⁻)	15796.4	(36⁻)		
1351.4 *10*	1.2	13935.7	32⁽⁺⁾	12584.3	30⁽⁺⁾	E2	DCO(Q)=0.95 *30* (2015Pe03)
1354.9 *10*		12722.7	(30⁺)	11367.8	(28⁺)		
1356.1 *10*	1.7	13845.9	31⁽⁻⁾	12489.8	29⁽⁻⁾	E2	DCO(Q)=1.07 *30* (2015Pe03)
1358.6 *10*	1.0 *5*	7201.0	18⁺	5842.0	16⁺	E2	DCO(Q)=0.88 *20* (2012Pe15)
1363.6 *10*	0.4	15354.5	35⁽⁻⁾	13990.9	33⁽⁻⁾	E2	DCO(Q)=0.99 *35* (2015Pe03)
1371.3 *10*	0.4	4330.1+z		2958.8+z			
1380.9 *10*	0.3	16059.2	(35⁻)	14678.3	(33⁻)		
1390.6 *10*	2.2	14334.6	32⁽⁻⁾	12944.0	30⁽⁻⁾	E2	DCO(Q)=1.51 *80* (2015Pe03)
1400.0 *10*	0.2	13304.4	(30⁺)	11904.4	28⁺		
1400.9[#] *2*	0.78[‡] *39*	9413.3+u		8012.4+u	(40⁺)		
1402.7 *10*	0.15	16954.2	(37⁻)	15551.5	(35⁻)		
1407.0 *10*	<0.2	12970.1	(30⁺)	11563.1	(28⁺)		
1415.0 *10*	0.8	15260.9	(33⁻)	13845.9	31⁽⁻⁾	(E2)	DCO(Q)=0.81 *29* (2015Pe03)
1422.1 *10*	0.5	16788.8	(36⁻)	15366.7	(34⁻)	E2	DCO(Q)=1.07 *50* (2015Pe03)
1428 *1*		14012.3	(32⁺)	12584.3	30⁽⁺⁾		E_γ: γ shown only in level-scheme figure 1.
1430.9 *10*	1.0 *5*	5252.6	13⁻	3821.7	12⁺		
1433.2 *10*	0.5	16694.1	(35⁻)	15260.9	(33⁻)		
1434.7 *10*	1.0	4674.6+x		3239.9+x			
1461.0 *10*	1.4	5751.0+y		4290.0+y			
1466.1 *10*	0.3	18160.3	(37⁻)	16694.1	(35⁻)		
1467.4[#] *2*	0.78[‡] *39*	10880.8+u		9413.3+u			
1481.0 *10*	0.2	18612.7	(40⁻)	17131.6	(38⁻)		
1503.2 *10*	0.2	18292	(38⁻)	16788.8	(36⁻)		
1505.2 *10*	0.35	20483.3	(40⁻)	18978.1	(38⁻)		
1525.6 *10*	0.2	19685.9	(39⁻)	18160.3	(37⁻)		
1526.9 *10*	0.6	18978.1	(38⁻)	17451.2	(36⁻)		
1540.2[#] *2*	0.50[‡] *25*	12421.0+u		10880.8+u			
1540.8 *10*	0.08	18495.1	(39⁻)	16954.2	(37⁻)		
1542.2 *10*	0.7	15876.8	(34⁻)	14334.6	32⁽⁻⁾		
1544.7 *10*	0.3	15480.4	(34⁺)	13935.7	32⁽⁺⁾		
1559.8 *10*	0.1	16914.3	(37⁻)	15354.5	35⁽⁻⁾		
1574.4 *10*	0.5	17451.2	(36⁻)	15876.8	(34⁻)		
1577.1 *10*	0.3	5907.2+z		4330.1+z			
1580.3 *19*	<0.1	14885	(32⁺)	13304.4	(30⁺)		
1583.2 *10*	0.2	17063.6	(36⁺)	15480.4	(34⁺)		
1583.3 *10*		14306.1	(32⁺)	12722.7	(30⁺)		
1607.4 *10*	0.1	21293	(41⁻)	19685.9	(39⁻)		
1608.0 *10*	0.1	18671.6	(38⁺)	17063.6	(36⁺)		
1608.7 *10*	3.4 *7*	5430.3	14⁺	3821.7	12⁺	E2	DCO(Q)=0.90 *15*; DCO(D)=1.3 *3* (2012Pe15)
1618.4 *10*	0.1	20231	(42⁻)	18612.7	(40⁻)		
1619.6[#] *4*	0.45[‡] *23*	14040.6+u		12421.0+u			
1620.0 *10*	0.6	6294.6+x		4674.6+x			
1623.8 *10*	0.3	7374.8+y		5751.0+y			
1651.2 *10*	0.2	22135	(42⁻)	20483.3	(40⁻)		
1667.5 *10*	<0.5	20163	(41⁻)	18495.1	(39⁻)		
1668.1 *10*	0.05	20339.7	(40⁺)	18671.6	(38⁺)		
1670.9 *10*	1.2 *6*	5492.7	(13⁻)	3821.7	12⁺	(E1)	DCO(Q)=0.8 *5*; DCO(D)=1.5 *5* (2012Pe15)
1707.9[#] *4*	0.30[‡] *15*	15748.5+u		14040.6+u			
1711.4 *10*	0.7 *3*	6706.5	16⁺	4995.3	14⁺		

Continued on next page (footnotes at end of table)

$^{94}Zr(^{48}Ca,4n\gamma)$ 2012Pe15,2015Pe03 (continued)

$\gamma(^{138}Nd)$ (continued)

E_γ †	I_γ †	E_i(level)	J^π_i	E_f	J^π_f	Comments
1714.1 *10*	0.05	18628.4	(39⁻)	16914.3	(37⁻)	
1714.4 *10*	0.05	23008	(43⁻)	21293	(41⁻)	
1759.9 *10*	<0.1	21991	(44⁻)	20231	(42⁻)	
1783 *1*	<0.5	21946	(43⁻)	20163	(41⁻)	Additional information 5.
1793.5 *10*	<0.05	20422	(41⁻)	18628.4	(39⁻)	
1798.3# *6*	0.23‡ *12*	17546.8+u		15748.5+u		
1817 *1*	<0.1	8111.6+x		6294.6+x		
1837.5 *10*	<0.05	22259	(43⁻)	20422	(41⁻)	
1861.7 *10*	<0.1	23853	(46⁻)	21991	(44⁻)	
1873 *1*	<0.05	24132	(45⁻)	22259	(43⁻)	
1897.9# *15*	0.08‡ *4*	19444.7+u		17546.8+u		
1994.1# *13*	0.06‡ *3*	21438.8+u		19444.7+u		

† From 2012Pe15 (low- and medium-spin bands, up to 10798,(27⁻) level), and 2015Pe03 (high-spin bands above 7764,20⁺ level), unless otherwise noted. No uncertainties are given γ-ray intensities in 2012Pe15 and 2015Pe03. But based on an e-mail reply of Oct 23, 2012 from the author of 2012Pe15 and 2015Pe03, C. M. Petrache, following uncertainties are assigned: 10% for $I\gamma>10$, 15% for $I\gamma$=5-10, 20% for $I\gamma$=2-5, and 50% for $I\gamma<2$. Since data in 2012Pe15 and 2015Pe03 are from the same experiments, the evaluator has assumed their normalizations for intensities are the same.

‡ From 2015Pe03.

From 2004Lu07. Values from 2012Pe15 are less precise.

@ From 2012Pe15 or 2015Pe03, based on measured DCO ratios and band structures. Some firm assignments for polarity by the authors could not have been made based on their measurements and thus the evaluator has adopted D for M1 or E1 and Q for E2 in Adopted Gammas for these cases.

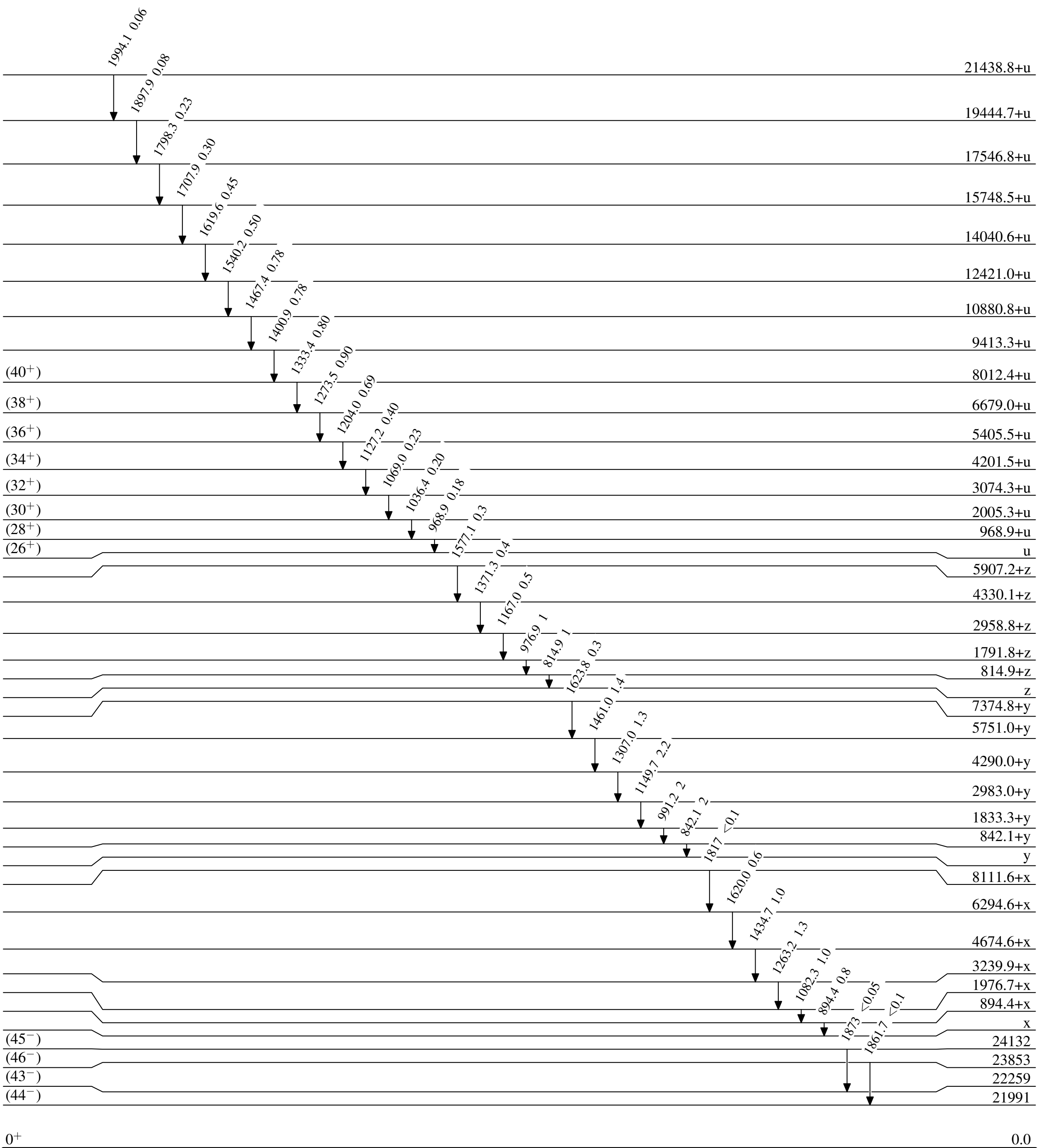
$^{94}Zr(^{48}Ca,4n\gamma)$ 2012Pe15,2015Pe03

Level Scheme

Intensities: Relative I_γ

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$

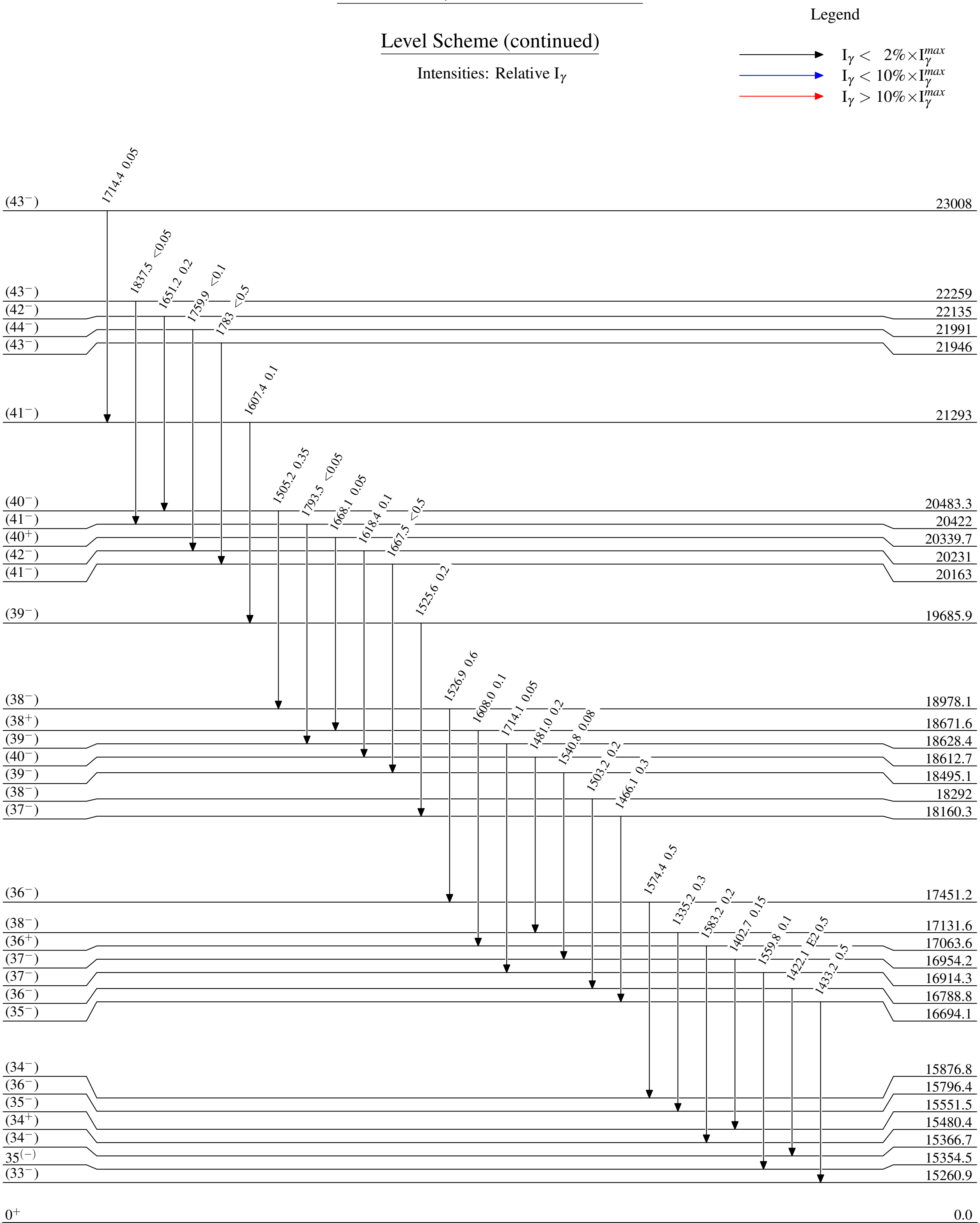


$^{138}_{60}Nd_{78}$

$^{94}Zr(^{48}Ca,4n\gamma)$ 2012Pe15,2015Pe03

Level Scheme (continued)

Intensities: Relative I_γ



$^{138}_{60}Nd_{78}$

$^{94}Zr(^{48}Ca,4n\gamma)$ 2012Pe15,2015Pe03

Legend

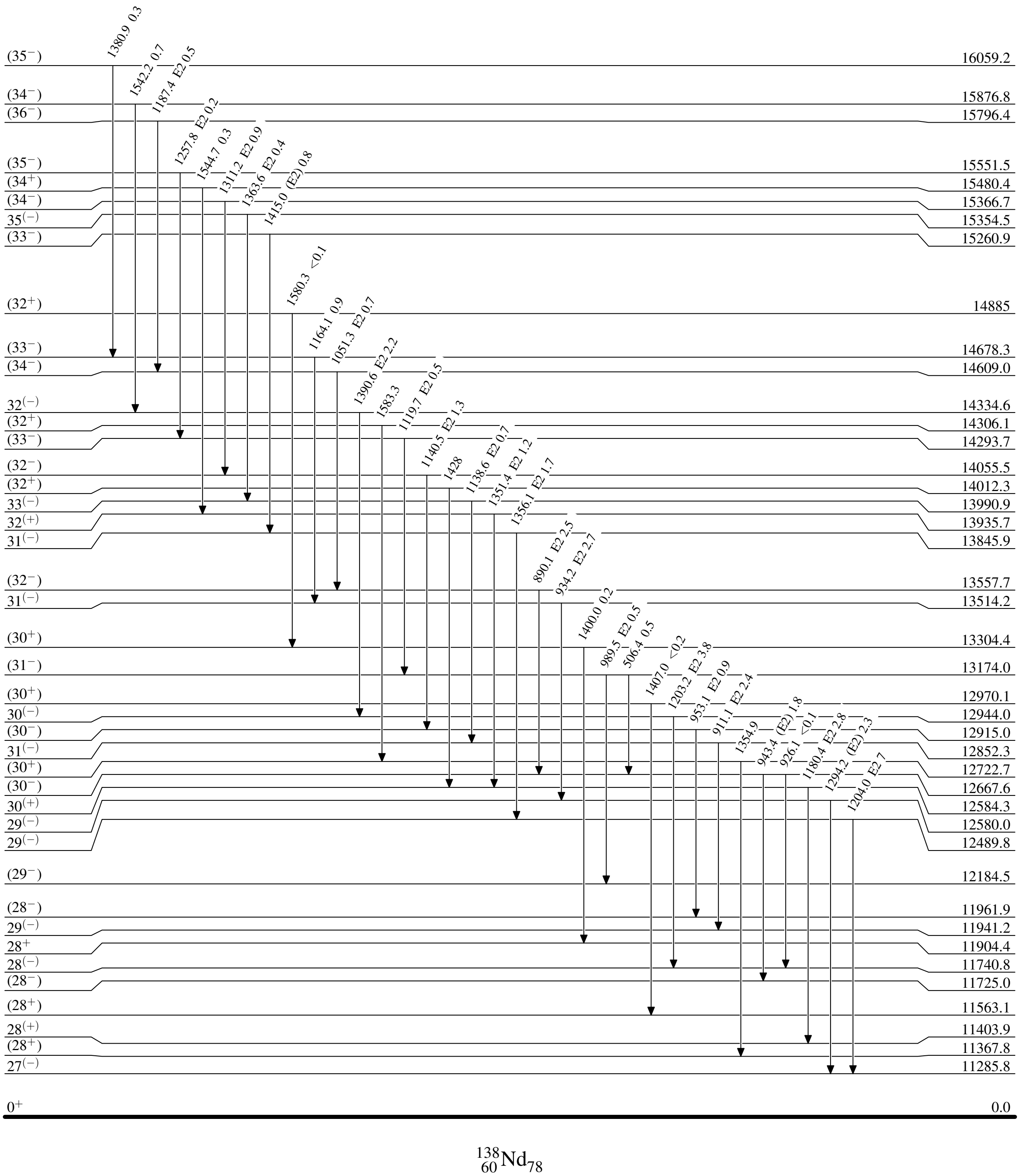
Level Scheme (continued)

Intensities: Relative I_γ

$I_\gamma < 2\% \times I_\gamma^{max}$

$I_\gamma < 10\% \times I_\gamma^{max}$

$I_\gamma > 10\% \times I_\gamma^{max}$



^{94}Zr(^{48}Ca,4nγ) 2012Pe15,2015Pe03

Level Scheme (continued)

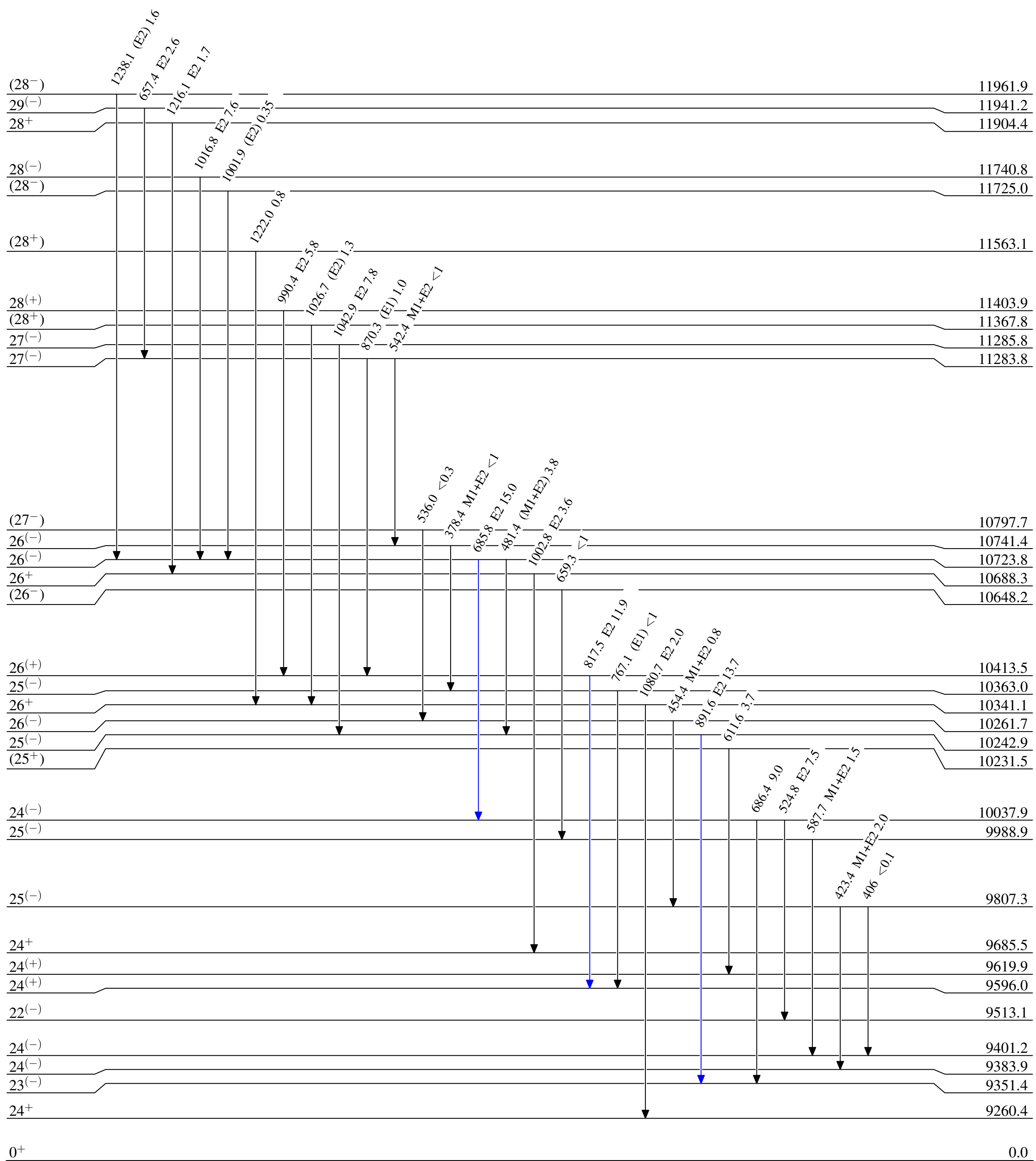
Intensities: Relative I_γ

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$

$I_\gamma < 10\% \times I_\gamma^{max}$

$I_\gamma > 10\% \times I_\gamma^{max}$

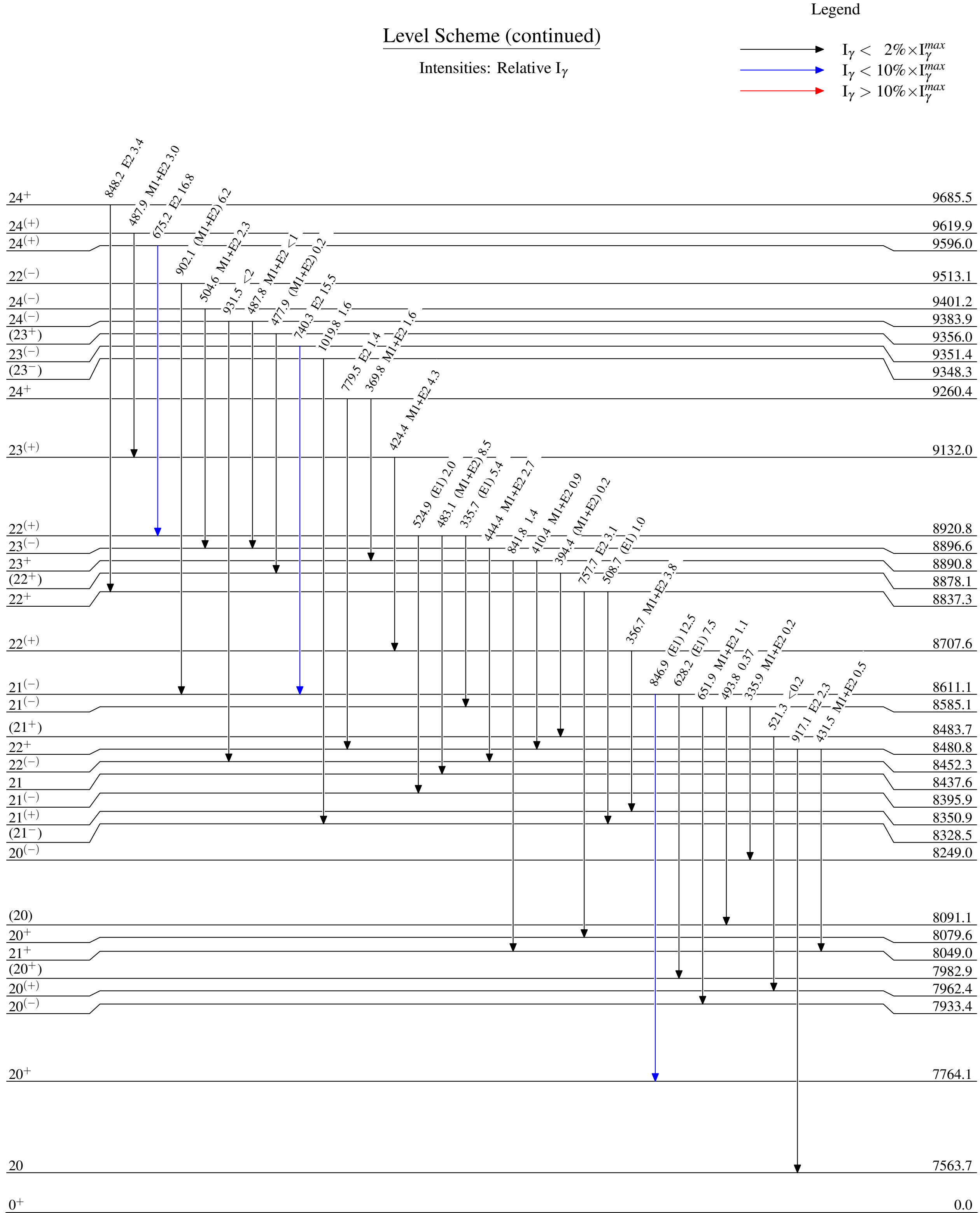


$^{138}_{60}$Nd$_{78}$

^{94}Zr(^{48}Ca,4nγ) 2012Pe15,2015Pe03

Level Scheme (continued)

Intensities: Relative I_γ

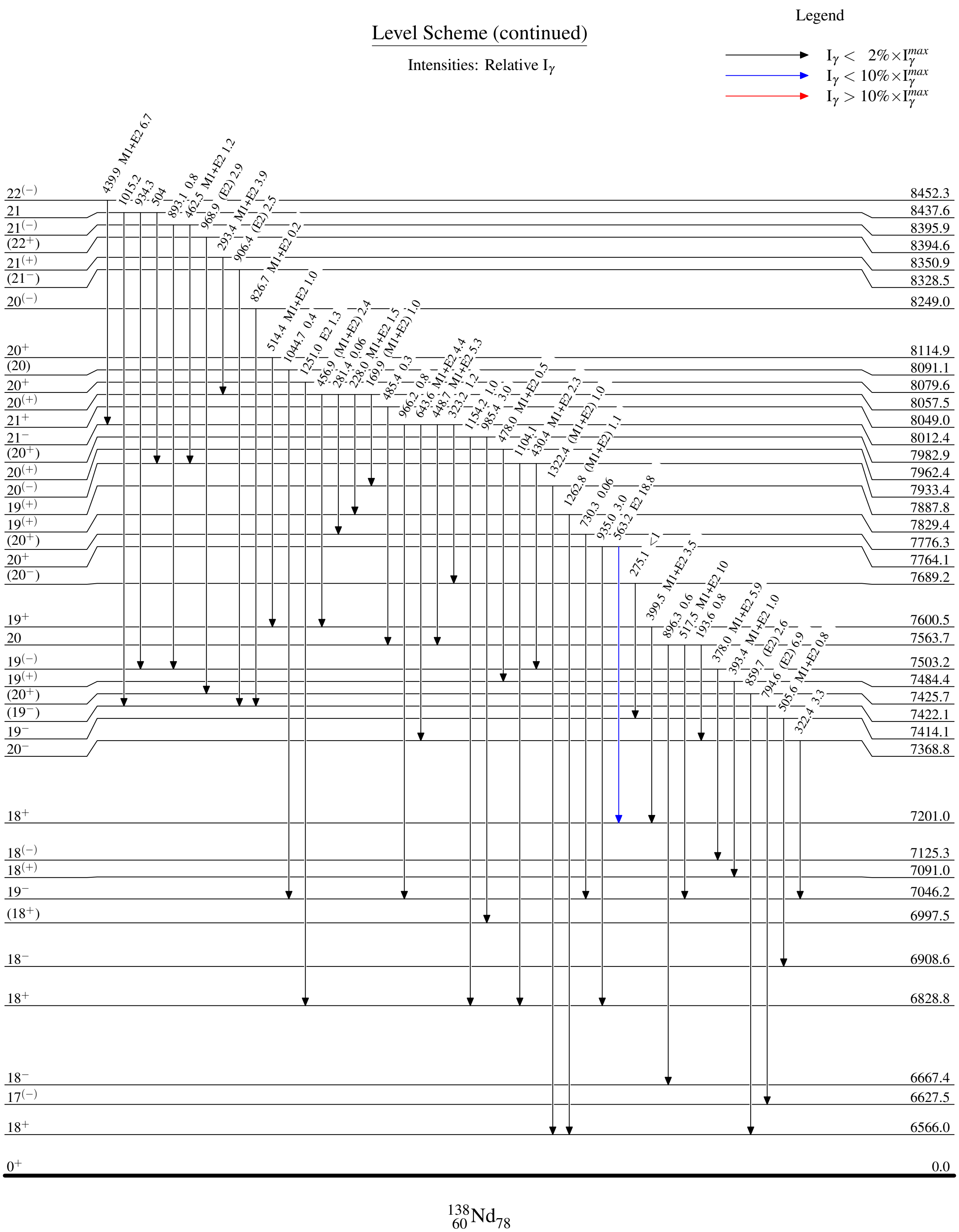


$^{138}_{60}Nd_{78}$

$^{94}Zr(^{48}Ca,4n\gamma)$ 2012Pe15,2015Pe03

Level Scheme (continued)

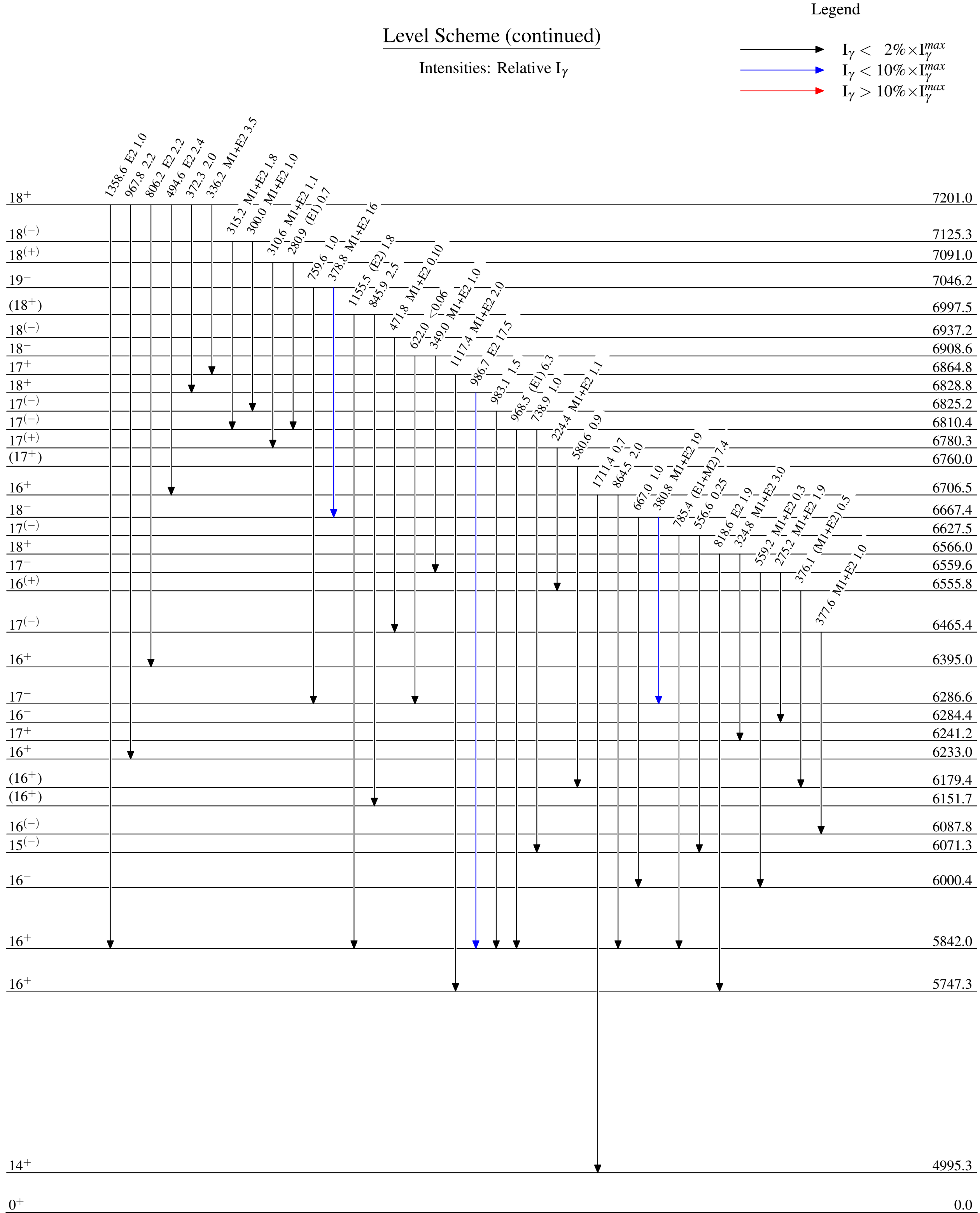
Intensities: Relative I_γ



$^{94}Zr(^{48}Ca,4n\gamma)$ 2012Pe15,2015Pe03

Level Scheme (continued)

Intensities: Relative I_γ



$^{138}_{60}Nd_{78}$

$^{94}Zr(^{48}Ca,4n\gamma)$ 2012Pe15,2015Pe03

Level Scheme (continued)

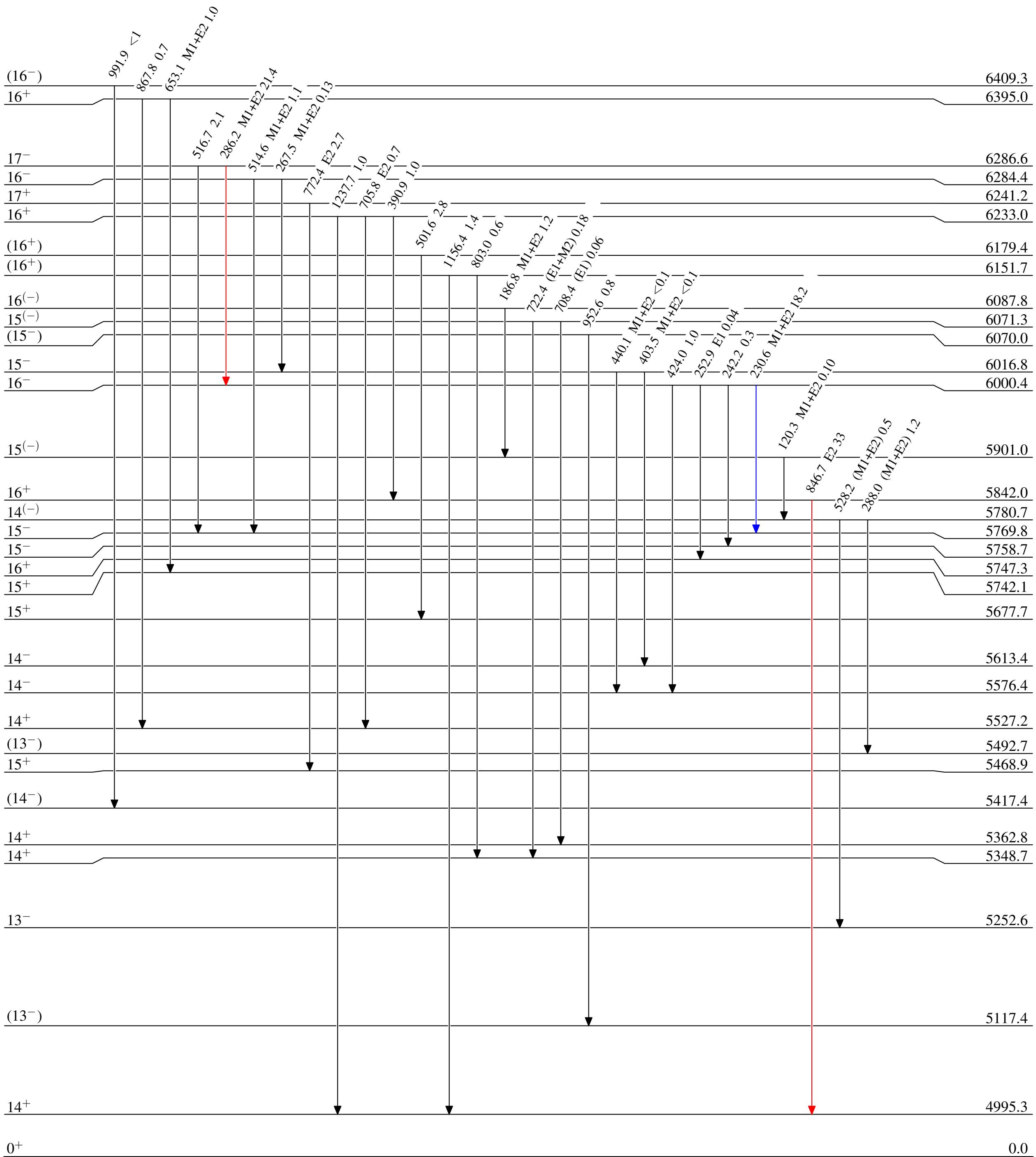
Intensities: Relative I_γ

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$

$I_\gamma < 10\% \times I_\gamma^{max}$

$I_\gamma > 10\% \times I_\gamma^{max}$

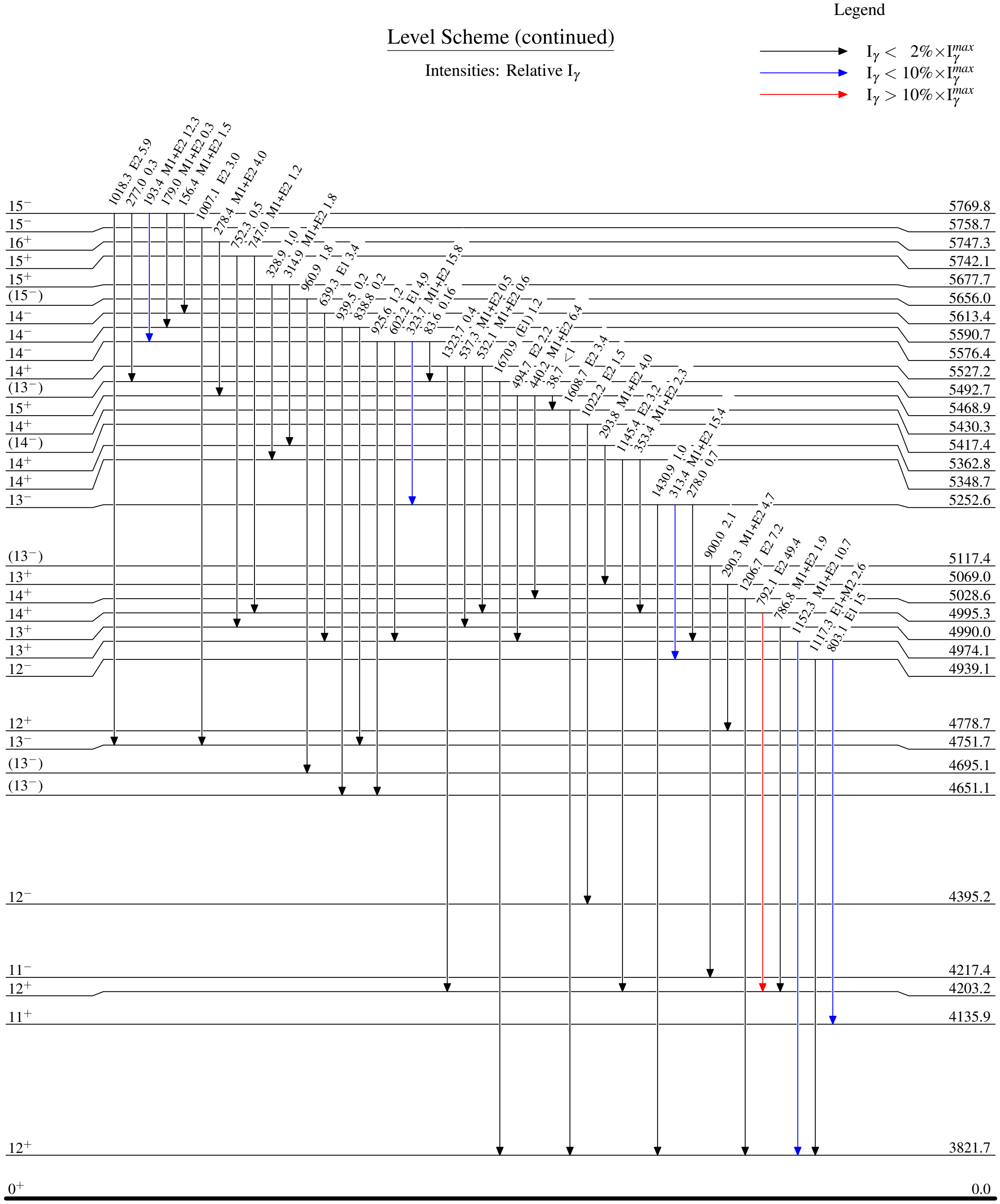


$^{138}_{60}Nd_{78}$

^{94}Zr(^{48}Ca,4nγ) 2012Pe15,2015Pe03

Level Scheme (continued)

Intensities: Relative I_γ



$^{138}_{60}Nd_{78}$

$^{94}Zr(^{48}Ca,4n\gamma)$ 2012Pe15,2015Pe03

Level Scheme (continued)

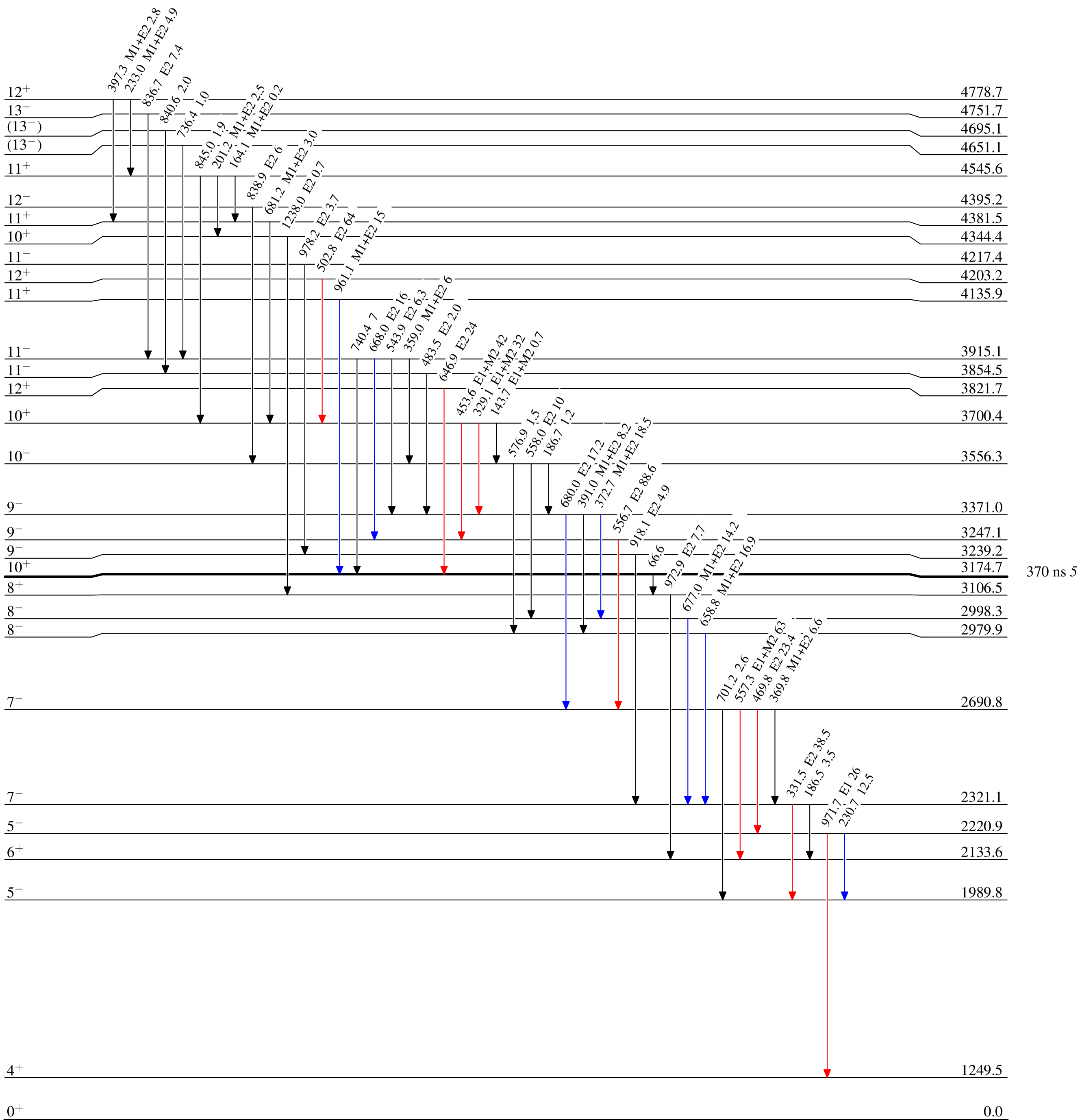
Intensities: Relative I_γ

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$

$I_\gamma < 10\% \times I_\gamma^{max}$

$I_\gamma > 10\% \times I_\gamma^{max}$



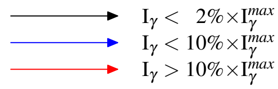
$^{138}_{60}Nd_{78}$

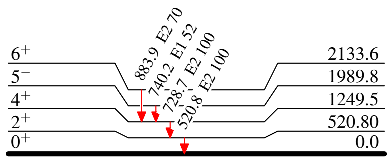
$^{94}Zr(^{48}Ca,4n\gamma)$ 2012Pe15,2015Pe03

Level Scheme (continued)

Intensities: Relative I_γ

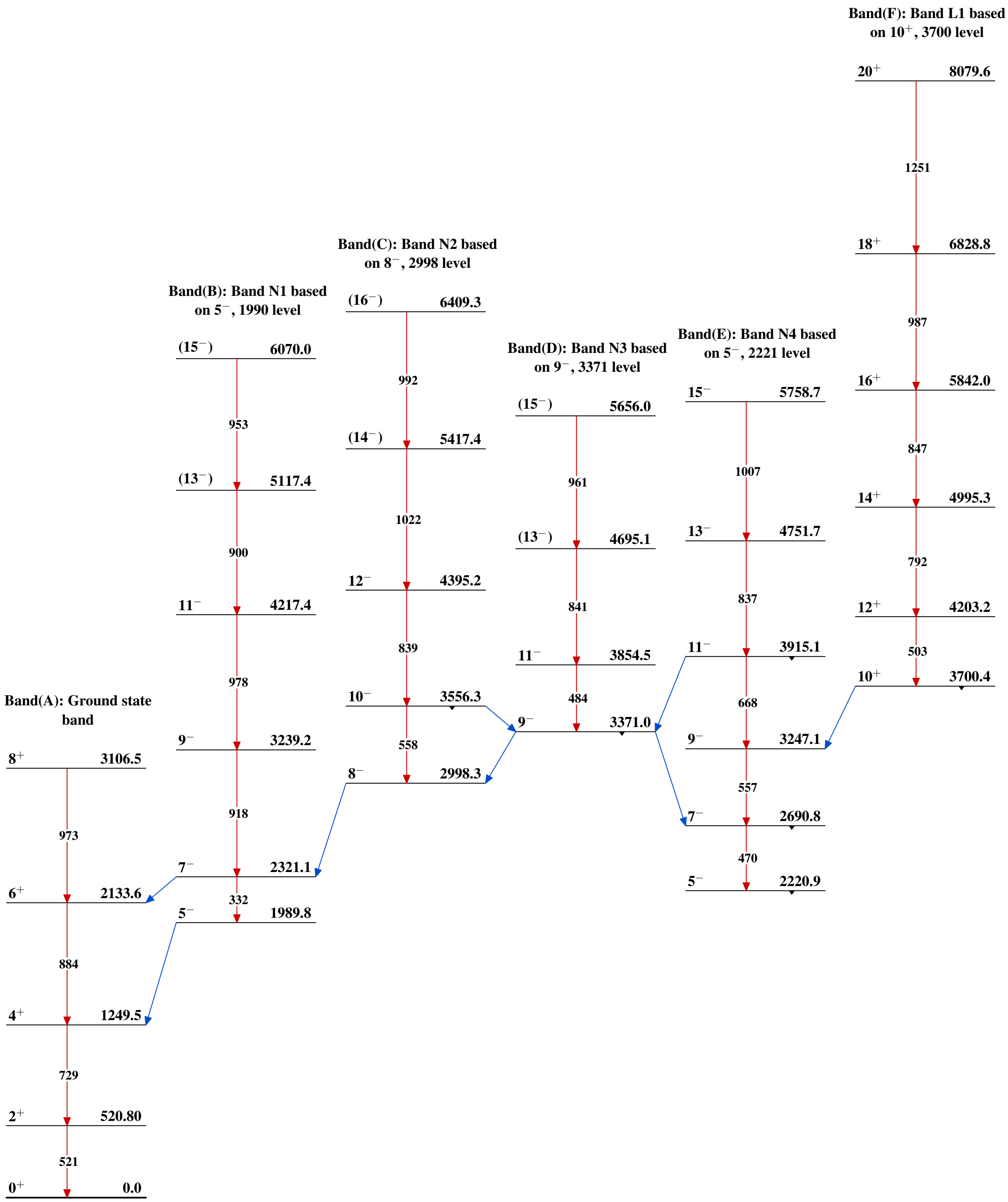
Legend





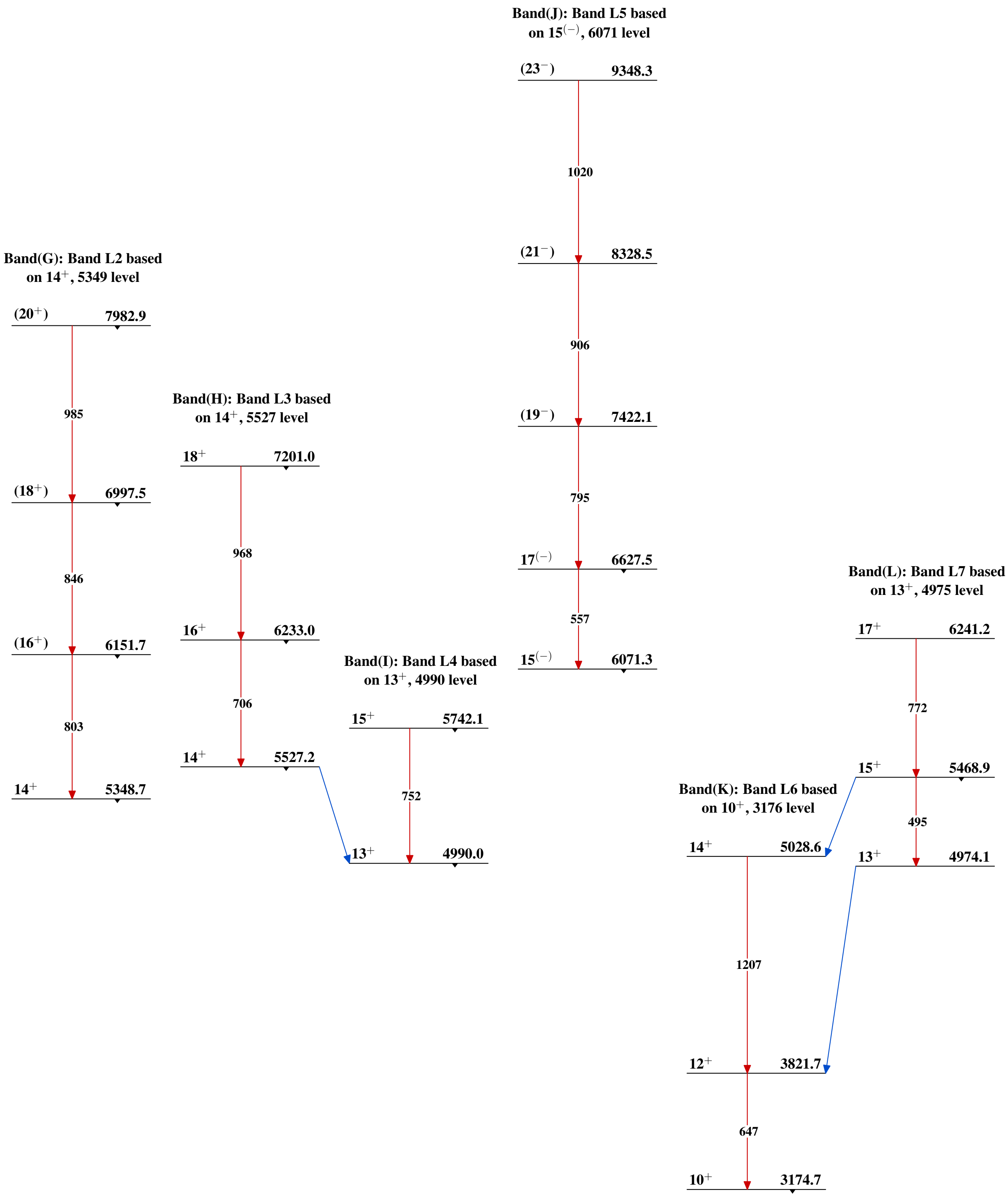
$^{138}_{60}Nd_{78}$

$^{94}Zr(^{48}Ca,4n\gamma)$ 2012Pe15,2015Pe03



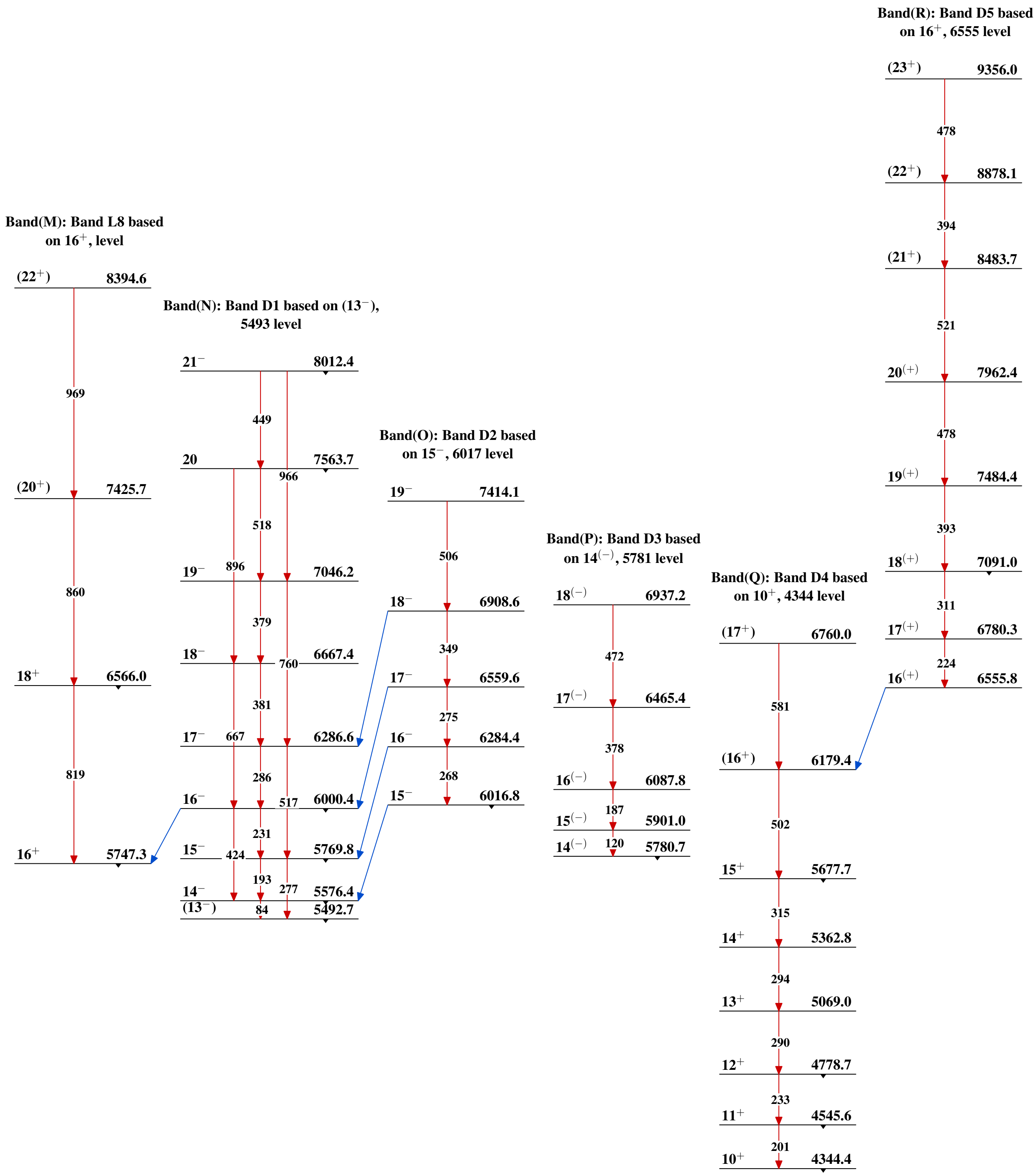
$^{138}_{60}Nd_{78}$

$^{94}Zr(^{48}Ca,4n\gamma)$ 2012Pe15,2015Pe03 (continued)



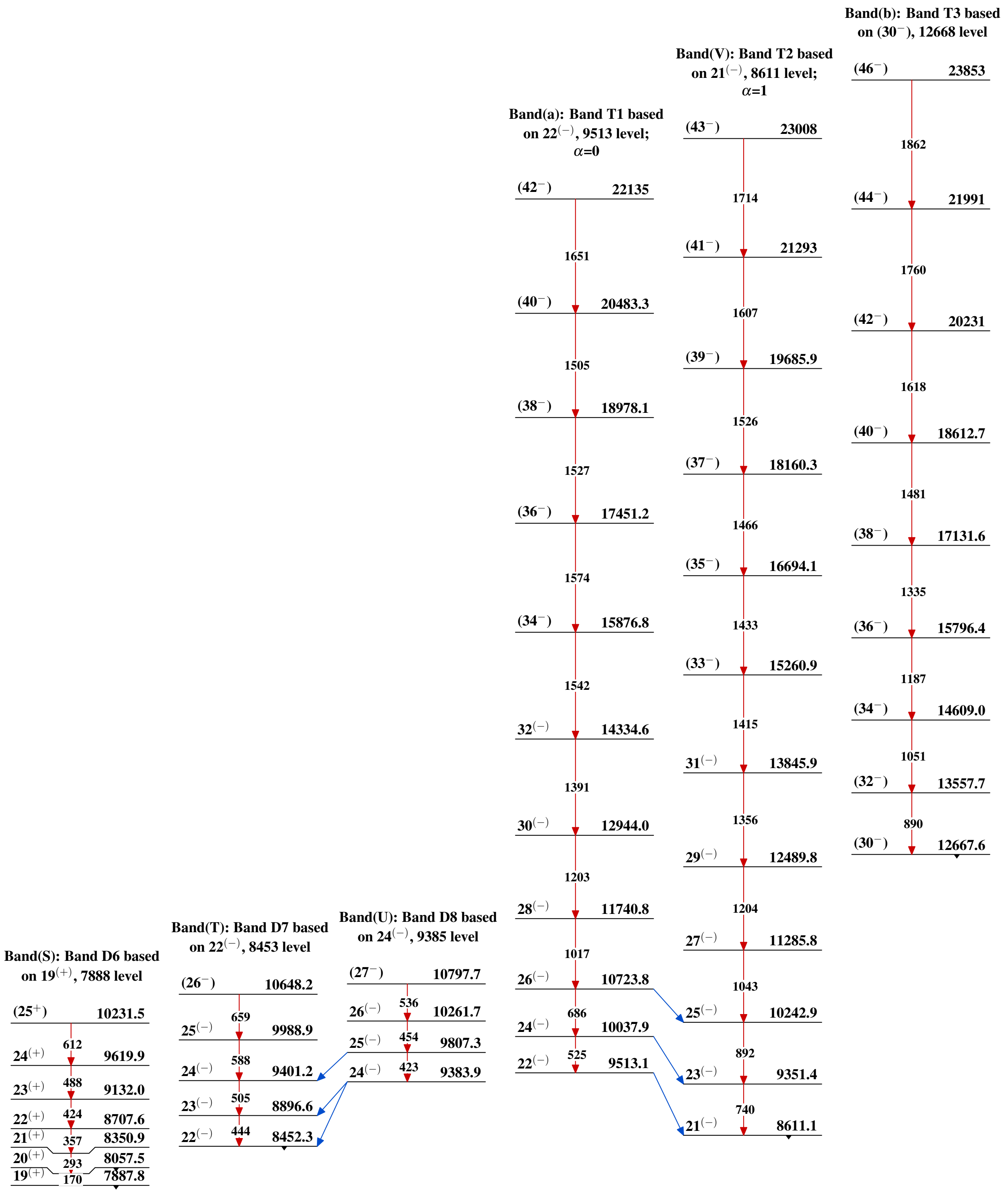
$^{138}_{60}Nd_{78}$

$^{94}Zr(^{48}Ca,4n\gamma)$ 2012Pe15,2015Pe03 (continued)



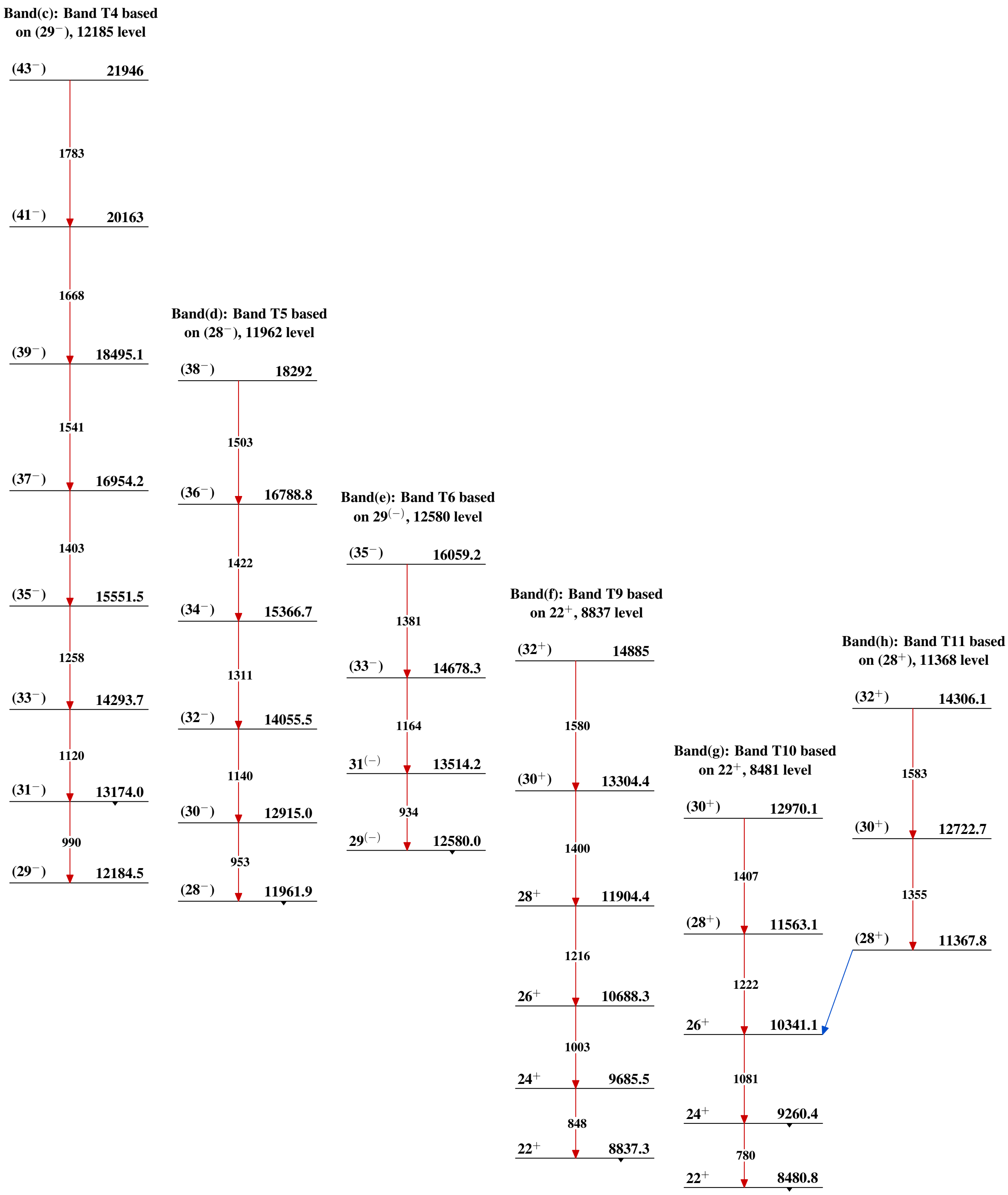
$^{138}_{60}Nd_{78}$

$^{94}Zr(^{48}Ca,4n\gamma)$ 2012Pe15,2015Pe03 (continued)



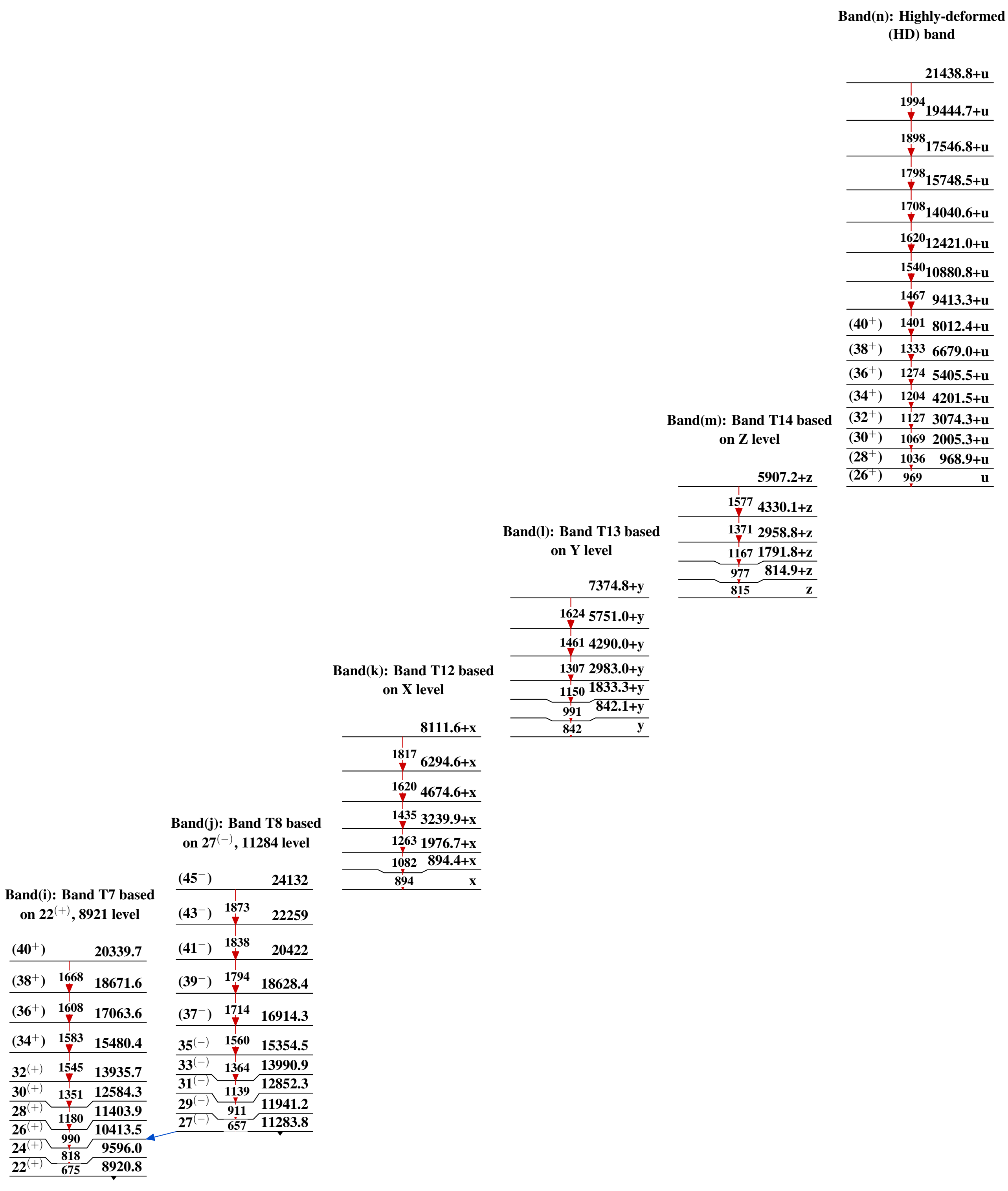
$^{138}_{60}Nd_{78}$

$^{94}Zr(^{48}Ca,4n\gamma)$ 2012Pe15,2015Pe03 (continued)



$^{138}_{60}Nd_{78}$

$^{94}Zr(^{48}Ca,4n\gamma)$ 2012Pe15,2015Pe03 (continued)



$^{138}_{60}Nd_{78}$

^{123}Sb(^{19}F,4nγ) 1994De11

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 146, 1 (2017)	30-Sep-2017

1994De11: E=75 MeV ^{19}F beam was produced from the XTU Legnaro tandem accelerator. Target was 1 mg/cm^2 isotropically enriched ^{123}Sb rolled on a 5 mg/cm^2 natural Au backing. γ rays were detected with an array of six Ge detectors with BGO anti-Compton shields and with a multiplicity filer of fourteen hexagonally shaped BaF_2 crystals in two groups. Measured Eγ, Iγ, $\gamma\gamma$-coin, $\gamma\gamma$(DCO). Deduced levels, J, π. Comparisons with Total Routhian surface (TRS) and Interacting boson model (IBM) calculations.

^{138}Nd Levels

E(level)[†]	J$^{\pi}$[‡]	$T_{1/2}$[#]	Comments
0[@]	0$^+$		
520.82[@] *18*	2$^+$		
1013.95[&] *21*	2$^+$		
1249.8[@] *3*	4$^+$		
1451.9[&] *3*	3$^+$		
1842.9[&] *3*	4$^+$		
1990.5 *4*	5$^-$		
2134.3[@] *4*	6$^+$		
2221.8 *4*	5$^-$		
2321.9 *4*	7$^-$		
2691.4 *4*	7$^-$		
2695.8 *4*	8$^+$		
2981.1 *4*	8$^+$		
3108.0[@] *4*	8$^+$		
3175.0 *4*	10$^+$	370 ns *5*	Configuration=(ν $h_{11/2})^{-2}_{10+}$.
3240.5 *5*	9$^-$		
3247.4 *4*	9$^-$		
3372.1 *4*	9$^-$		
3701.2[a] *4*	10$^+$		Configuration=(π $h_{11/2})^{2}_{10+}$.
3822.0 *5*	12$^+$		
3915.6 *4*	11$^-$		
4136.8 *5*	11		
4204.0[a] *5*	12$^+$		
4211.1 *5*	11$^-$		
4219.3 *6*	11$^-$		
4752.4 *5*	13$^-$		
4940.4 *5*	12		
4975.5 *5*	13		
4996.5[a] *6*	14$^+$		
5029.9 *5*	14$^+$		
5119.4 *7*			
5233.7 *6*			
5253.9 *5*	13		
5350.6 *6*	14		
5436.7 *6*	13		
5470.1 *5*	15		
5577.9 *5*	14		
5615.5 *5*	14		
5744.0 *7*	15		
5749.0 *6*	16		
5760.2 *6*	15		
5771.7 *5*	15		

Continued on next page (footnotes at end of table)

$^{123}Sb(^{19}F,4n\gamma)$ 1994De11 (continued)

^{138}Nd Levels (continued)

E(level)[†]	J^{π}[‡]	E(level)[†]	J^{π}[‡]	E(level)[†]	J^{π}[‡]
5843.9[a] 7	16+	6289.2 6	(17)	6830.8[a] 7	18+
6002.9 5	16+	6471.8 7	(17)	7048.8 7	(19)
6153.2 7	16	6568.0 6	(18)	7428.4 7	(19)
6243.0 5	17	6669.7 6	(18)	7565.5 7	(20)
				8490.2 8	(21)

[†] From a least-squares fit to γ-ray energies, assuming ΔEγ=1 keV when unknown.
[‡] From 1994De11 based on γγ(DCO) and band structure. Please refer to Adopted Levels for adopted assignments.
[#] From Adopted Levels.
[@] Band(A): Ground state band.
[&] Band(B): γ band.
[a] Band(C): Band based on 3701,10+ level.

$\gamma(^{138}Nd)$

E_γ[†]	I_γ[†]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[‡]	Comments
33[#&]		5470.1	15	5436.7	13		
67[#]		3175.0	10+	3108.0	8+		
127[#&]		3108.0	8+	2981.1	8+		
144[#&]		2134.3	6+	1990.5	5−		
156.0 2	7	5771.7	15	5615.5	14		
187.0 2	10	2321.9	7−	2134.3	6+	D	DCO=0.70 9.
193.8 2	29	5771.7	15	5577.9	14	D	DCO=0.45 5.
230.8 3	40	6002.9	16+	5771.7	15	D	DCO=0.38 5.
231.0 3	28	2221.8	5−	1990.5	5−	D	DCO=0.61 7.
278.0 4	49	5253.9	13	4975.5	13	D	DCO=0.70 8.
278.6 4	30	5749.0	16	5470.1	15	D	DCO=0.64 8.
286.3 2	41	6289.2	(17)	6002.9	16+	D	DCO=0.37 5.
313.5 2	46	5253.9	13	4940.4	12	D	DCO=0.68 7.
323.7 3	35	5577.9	14	5253.9	13	D	DCO=0.51 6.
325.2 3	22	6568.0	(18)	6243.0	17	D	DCO=0.69 8.
329.6 3	54	3701.2	10+	3372.1	9−	D	DCO=0.68 7.
331.4 3	250	2321.9	7−	1990.5	5−	Q	DCO=0.95 10.
369.3 3	19	2691.4	7−	2321.9	7−	(Q)	DCO=0.88 10.
372.8 3	37	2695.8	8+	2321.9	7−	D	DCO=0.58 7.
379.1 3	30	7048.8	(19)	6669.7	(18)		
380.5 2	49	6669.7	(18)	6289.2	(17)	D	DCO=0.66 8.
390.9 2	19	3372.1	9−	2981.1	8+	D	DCO=0.68 8.
438.0 2	9	1451.9	3+	1013.95	2+		
440.1 2	32	5470.1	15	5029.9	14+	D	DCO=0.37 5.
453.6 2	176	3701.2	10+	3247.4	9−	D	DCO=0.51 5.
469.6 2	118	2691.4	7−	2221.8	5−	Q	DCO=0.90 10.
493.1 2	9	1013.95	2+	520.82	2+		
494.7 2	16	5470.1	15	4975.5	13	Q	DCO=1.09 13.
502.8 2	227	4204.0	12+	3701.2	10+	E2	DCO=0.99 10.
516.7 2	15	7565.5	(20)	7048.8	(19)	D	DCO=0.40 6.
520.8 2	1000	520.82	2+	0	0+	Q	DCO=1.00 7.
543.6 2	20	3915.6	11−	3372.1	9−	(Q)	DCO=0.88 10.
555.8 3	345	3247.4	9−	2691.4	7−		
556.9 3	368	2691.4	7−	2134.3	6+		

Continued on next page (footnotes at end of table)

^{123}Sb(^{19}F,4nγ) 1994De11 (continued)

γ(^{138}Nd) (continued)

E_γ †	I_γ †	E_i(level)	J^π_i	E_f	J^π_f	Mult.‡	Comments
562.2 *2*	9	2695.8	8^+	2134.3	6^+	(Q)	DCO=0.88 *11*.
602.6 *2*	8	5577.9	14	4975.5	13		
627.9 *3*	10	6471.8	(17)	5843.9	16^+	D	DCO=0.70 *9*.
639.5 *3*	52	5615.5	14	4975.5	13	Q	DCO=1.09 *12*.
647.1 *2*	108	3822.0	12^+	3175.0	10^+	Q	DCO=1.09 *11*.
659.1 *2*	56	2981.1	8^+	2321.9	7^-	D	DCO=0.51 *6*.
668.3 *2*	80	3915.6	11^-	3247.4	9^-	Q	DCO=0.99 *10*.
676.9 *3*	92	3372.1	9^-	2695.8	8^+	D	DCO=0.40 *5*.
680.8 *3*	84	3372.1	9^-	2691.4	7^-	Q	DCO=0.90 *10*.
701.2 *3*	19	2691.4	7^-	1990.5	5^-	Q	DCO=0.89 *11*.
729.0 *2*	1000	1249.8	4^+	520.82	2^+	Q	DCO=1.02 *6*.
740.4@ *3*	353@	3915.6	11^-	3175.0	10^+		DCO=0.60 *7* for the 740.6+740.4 doublet.
740.6@ *3*	353@	1990.5	5^-	1249.8	4^+		DCO=0.60 *7* for the 740.6+740.4 doublet.
747.5 *3*	13	5744.0	15	4996.5	14^+	D	DCO=0.65 *12*.
773.0 *2*	26	6243.0	17	5470.1	15	Q	DCO=0.92 *12*.
792.5 *3*	163	4996.5	14^+	4204.0	12^+	E2	DCO=1.08 *11*.
803.4 *3*	66	4940.4	12	4136.8	11	D	DCO=0.70 *8*.
818.8 *3*	9	6568.0	(18)	5749.0	16		
829.0 *2*	8	1842.9	4^+	1013.95	2^+		
836.9 *3*	69	4752.4	13^-	3915.6	11^-	Q	DCO=0.93 *10*.
839.0 *3*	18	4211.1	11^-	3372.1	9^-	Q	DCO=0.93 *12*.
847.4 *3*	99	5843.9	16^+	4996.5	14^+	E2	DCO=0.95 *11*.
860.4 *3*	14	7428.4	(19)	6568.0	(18)		
884.4 *2*	467	2134.3	6^+	1249.8	4^+	Q	DCO=0.99 *8*.
900.1 *3*	6	5119.4		4219.3	11^-		
918.6 *3*	51	3240.5	9^-	2321.9	7^-	Q	DCO=0.99 *10*.
924.7 *3*	10	8490.2	(21)	7565.5	(20)	D	DCO=0.70 *10*.
961.7 *3*	116	4136.8	11	3175.0	10^+	D	DCO=0.41 *5*.
972.4 *3*	98	2221.8	5^-	1249.8	4^+	D	DCO=0.52 *6*.
973.3@ *3*	119@	6002.9	16^+	5029.9	14^+		
973.5@ *2*	119@	3108.0	8^+	2134.3	6^+		
978.8 *3*	22	4219.3	11^-	3240.5	9^-	Q	DCO=0.96 *13*.
986.9 *3*	30	6830.8	18^+	5843.9	16^+	E2	DCO=0.95 *12*.
1007.8 *3*	28	5760.2	15	4752.4	13^-	Q	DCO=1.06 *14*.
1014.0 *3*	10	1013.95	2^+	0	0^+		
1019.4 *3*	18	5771.7	15	4752.4	13^-	Q	DCO=0.96 *15*.
1022.6 *4*	10	5233.7		4211.1	11^-		
1118.4 *3*	10	4940.4	12	3822.0	12^+		
1146.6 *3*	22	5350.6	14	4204.0	12^+	Q	DCO=0.98 *16*.
1153.2 *4*	61	4975.5	13	3822.0	12^+	D	DCO=0.47 *8*.
1156.7 *3*	23	6153.2	16	4996.5	14^+	Q	DCO=1.02 *20*.
1208.0 *3*	86	5029.9	14^+	3822.0	12^+	Q	DCO=1.06 *19*.
1614.7 *4*	35	5436.7	13	3822.0	12^+	D	DCO=0.64 *15*.

† From 1994De11, unless noted otherwise. Error on intensities ΔIγ=10-40% depending on intensity and complexity of the peak (1994De11).

‡ Not given in 1994De11, deduced by evaluator based on E2-gated DCO values in 1994De11. Expected E2-gated DCO values are ≈1 for stretched quadrupole transitions and ≈0.5 for stretched dipole transitions. For many γ rays with DCO values ≈0.7, the corresponding multipolarity is assigned as D, even though, a Q component may be present.

\# A transition, presumably highly converted, is indicated in the 1994De11 level scheme, but is not listed in the table of γ rays.

@ Multiply placed with undivided intensity.

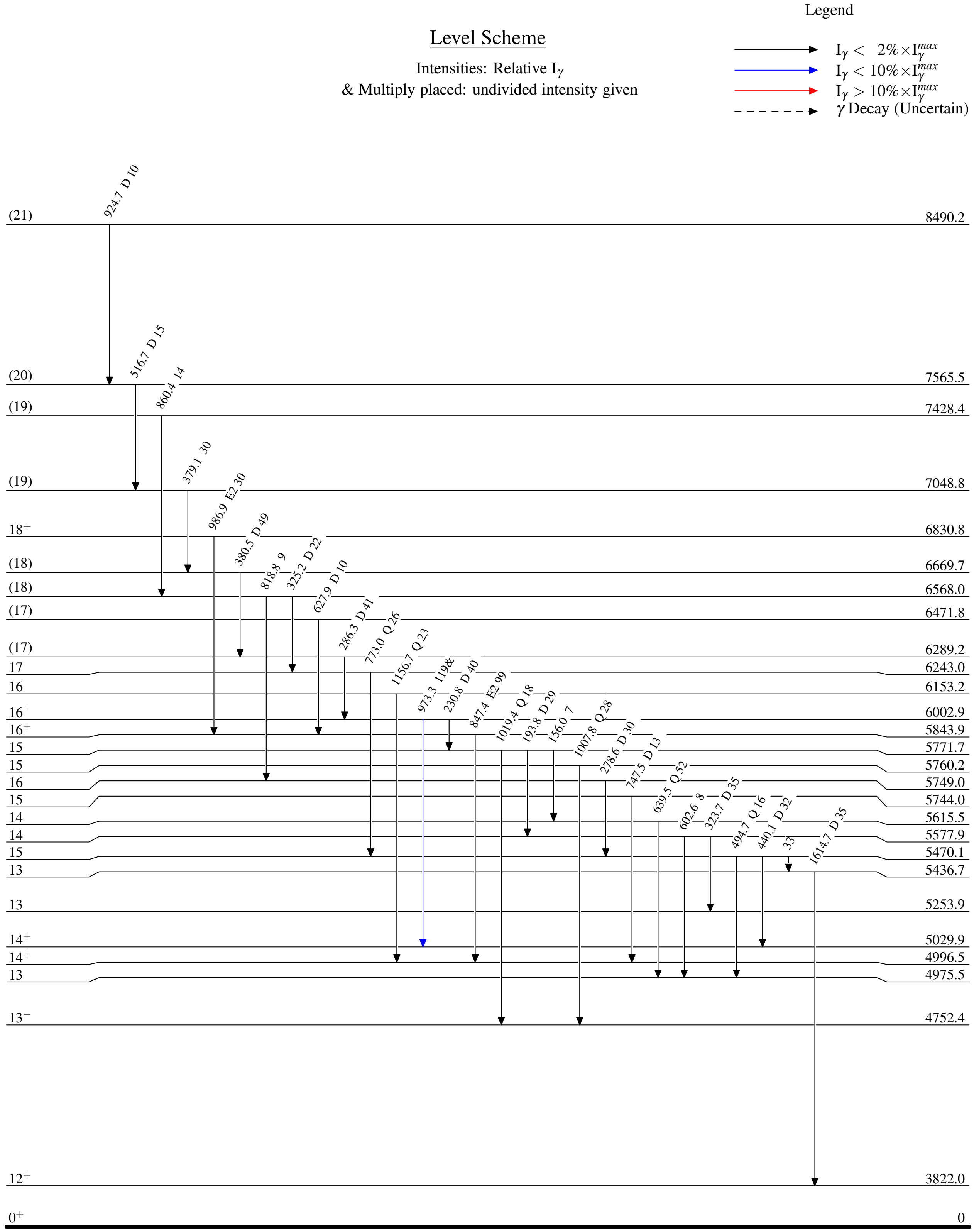
& Placement of transition in the level scheme is uncertain.

^{123}Sb(^{19}F,4nγ) 1994De11

Level Scheme

Intensities: Relative I_γ

& Multiply placed: undivided intensity given



$^{138}_{60}Nd_{78}$

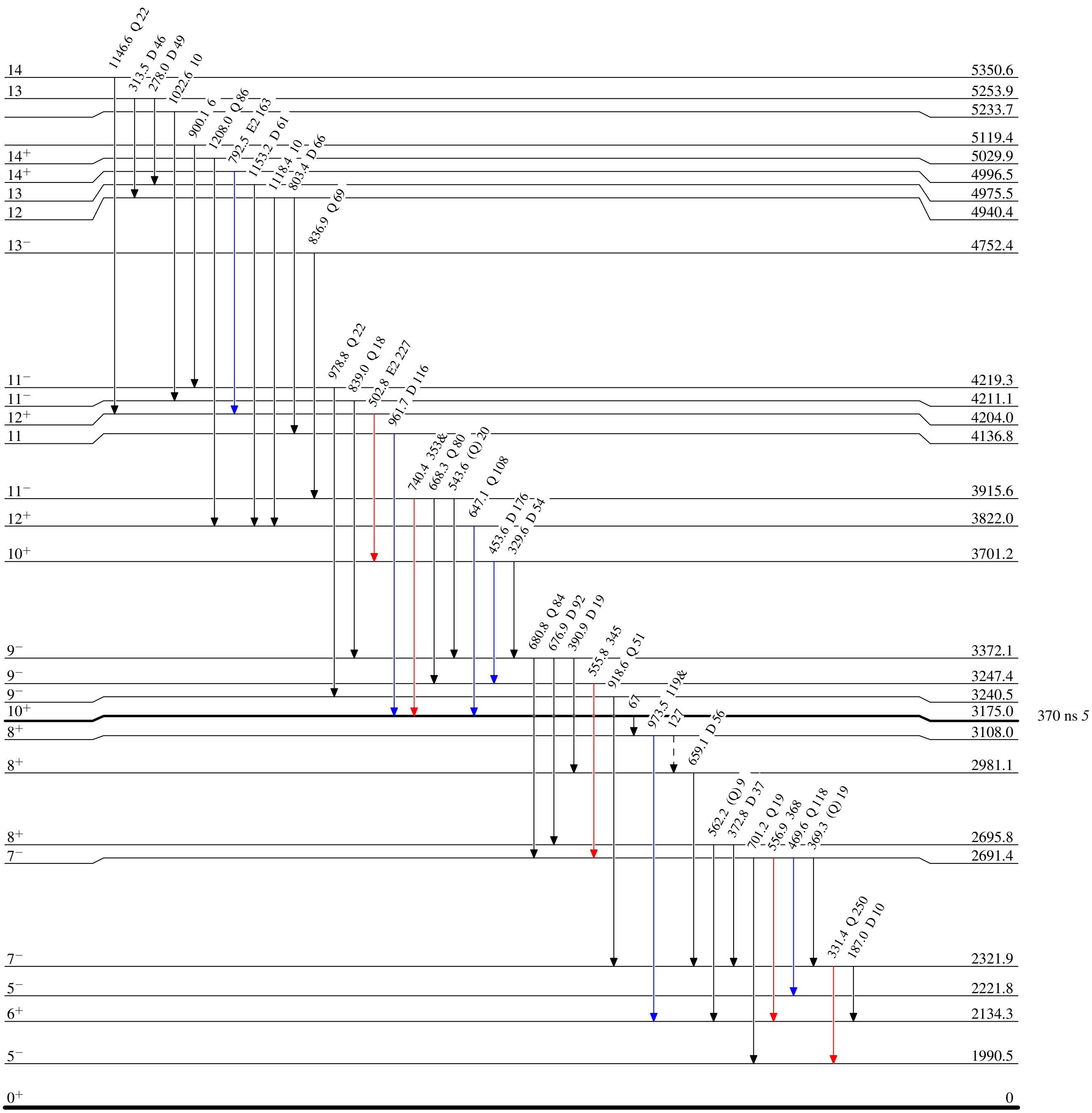
^{123}Sb(^{19}F,4nγ) 1994De11

Level Scheme (continued)

Intensities: Relative I_γ
& Multiply placed: undivided intensity given

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$
γ Decay (Uncertain)

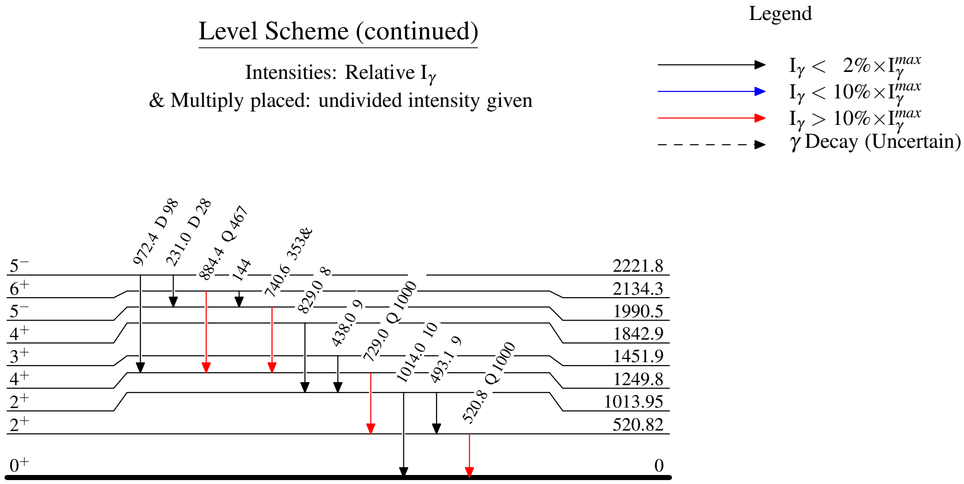


$^{138}_{60}Nd_{78}$

^{123}Sb(^{19}F,4nγ) 1994De11

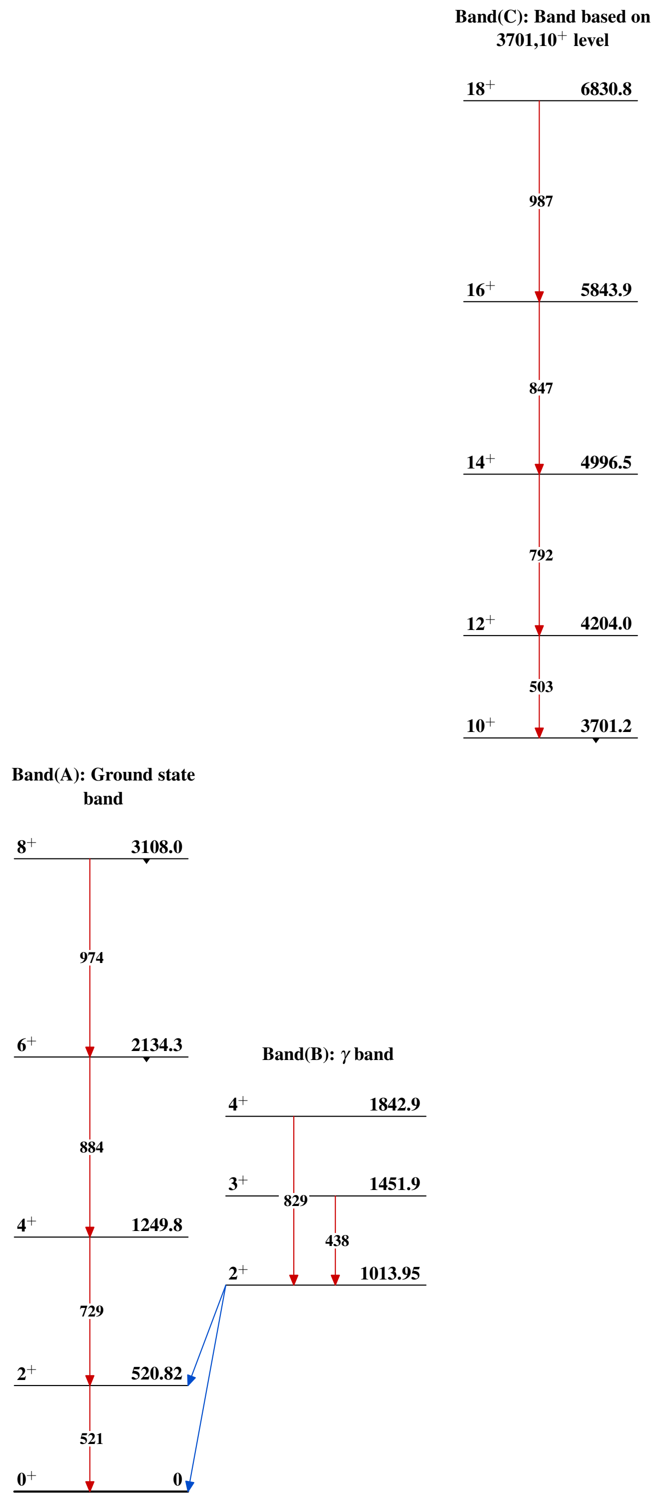
Level Scheme (continued)

Intensities: Relative I_γ
& Multiply placed: undivided intensity given



$^{138}_{60}Nd_{78}$

$^{123}Sb(^{19}F,4n\gamma)$ 1994De11



$^{138}_{60}Nd_{78}$

^{124}Te(^{19}F,p4nγ) 2013Li24

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 146, 1 (2017)	30-Sep-2017

2013Li24: E=103 MeV ^{19}F beam was produced from the HI-13 tandem accelerator at CIAE facility in China. Target was 3 mg/cm^2 ^{124}Te on a 4 mg/cm^2 gold foil backing. γ rays were detected with an array of nine Compton-suppressed HPGe detectors, two planar HPGe detectors, and one Clover detector. Measured Eγ, Iγ, $\gamma\gamma$-coin, $\gamma\gamma(\theta)$(DCO). Deduced levels, J, π, bands, configurations, γ-ray multipolarity. Comparisons with Triaxial projected shell-model calculations.

^{138}Nd Levels

E(level)†	J$^\pi$‡	E(level)†	J$^\pi$‡	E(level)†	J$^\pi$‡
0.0#	0$^+$	1450.9@ *3*	3$^+$	2261.1@ *4*	5$^+$
520.70# *23*	2$^+$	1799.6@ *3*	4$^+$	2269.0& *5*	5$^+$
1013.70@ *23*	2$^+$	1842.7& *3*	4$^+$	2940.3& *4*	6$^+$
1249.5# *4*	4$^+$	2133.8# *5*	6$^+$	2960.6@ *4*	(6$^+$)
				3106.9# *6*	8$^+$

† From a least-squares fit γ-ray energies, assuming ΔEγ=0.3 keV.
‡ From 2013Li24 based on deduced γ-ray multipolarities and band structures. Please refer to Adopted Levels for adopted assignments.
# Band(A): Ground state band.
@ Band(B): γ band.
& Band(C): Band based on 4$^+$. Quasi-2γ band.

γ(^{138}Nd)

DCO values correspond to gate on stretched quadrupole transitions.

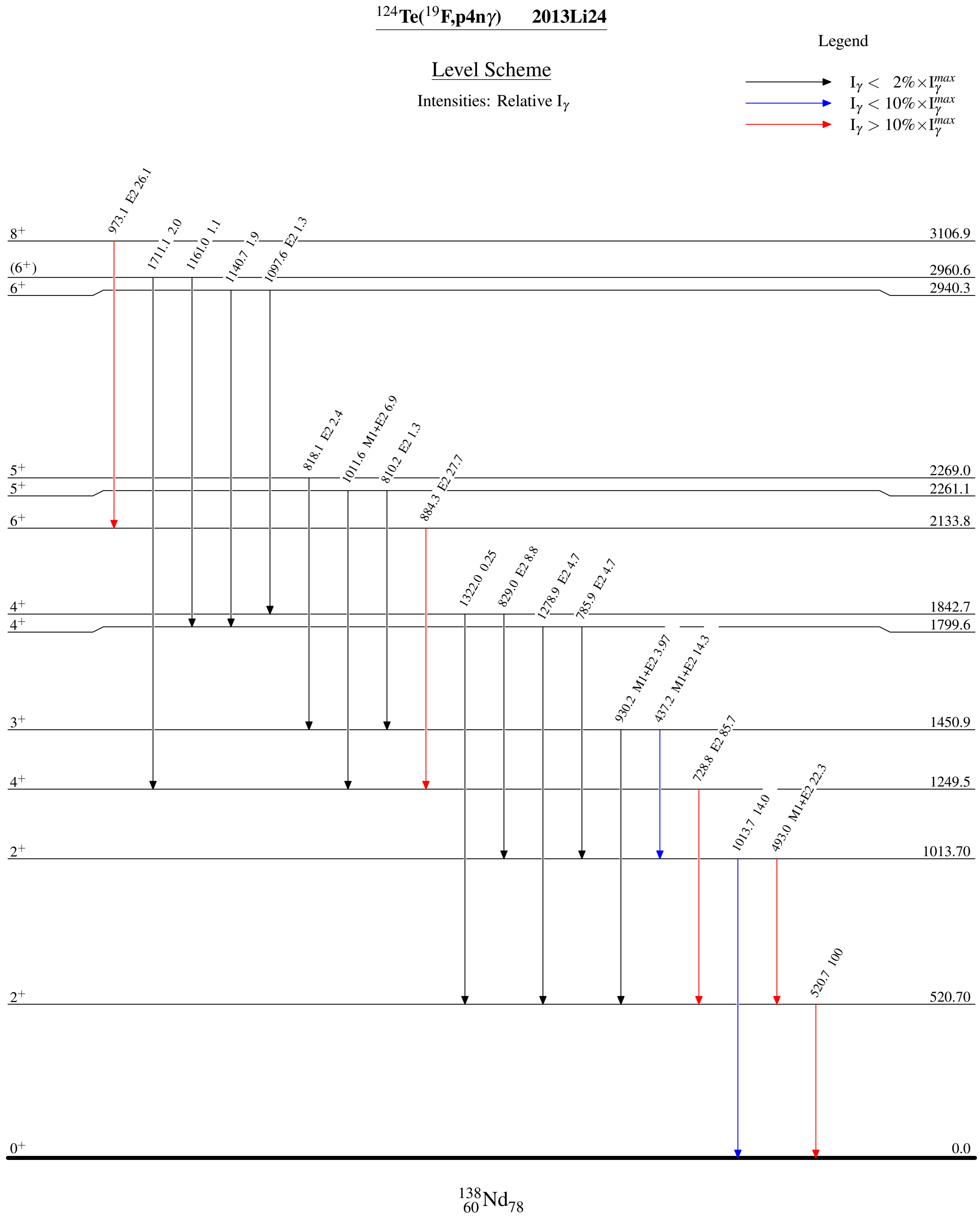
E$_\gamma$†	I$_\gamma$†	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$	Mult.‡	Comments
437.2	14.3 *6*	1450.9	3$^+$	1013.70	2$^+$	M1+E2	DCO=1.76 *10*
493.0	22.3 *2*	1013.70	2$^+$	520.70	2$^+$	M1+E2	DCO=1.16 *4*
520.7	100	520.70	2$^+$	0.0	0$^+$		
728.8	85.7 *4*	1249.5	4$^+$	520.70	2$^+$	E2	DCO=0.97 *2*
785.9	4.7 *7*	1799.6	4$^+$	1013.70	2$^+$	E2	DCO=1.19 *11*
810.2	1.3 *2*	2261.1	5$^+$	1450.9	3$^+$	E2	DCO=0.89 *8*
818.1	2.4 *6*	2269.0	5$^+$	1450.9	3$^+$	E2	DCO=1.11 *11*
829.0	8.8 *9*	1842.7	4$^+$	1013.70	2$^+$	E2	DCO=1.14 *10*
884.3	27.7 *14*	2133.8	6$^+$	1249.5	4$^+$	E2	DCO=1.08 *4*
930.2	3.97 *9*	1450.9	3$^+$	520.70	2$^+$	M1+E2	DCO=1.31 *10*
973.1	26.1 *17*	3106.9	8$^+$	2133.8	6$^+$	E2	DCO=1.14 *4*
1011.6	6.9 *8*	2261.1	5$^+$	1249.5	4$^+$	M1+E2	DCO=1.67 *16*
1013.7	14.0 *18*	1013.70	2$^+$	0.0	0$^+$		
1097.6	1.3 *4*	2940.3	6$^+$	1842.7	4$^+$	E2	DCO=0.92 *13*
1140.7	1.9 *9*	2940.3	6$^+$	1799.6	4$^+$		
1161.0	1.1 *7*	2960.6	(6$^+$)	1799.6	4$^+$		
1278.9	4.7 *1*	1799.6	4$^+$	520.70	2$^+$	E2	DCO=1.17 *7*
1322.0	0.25 *3*	1842.7	4$^+$	520.70	2$^+$		
1711.1	2.0 *5*	2960.6	(6$^+$)	1249.5	4$^+$		

Continued on next page (footnotes at end of table)

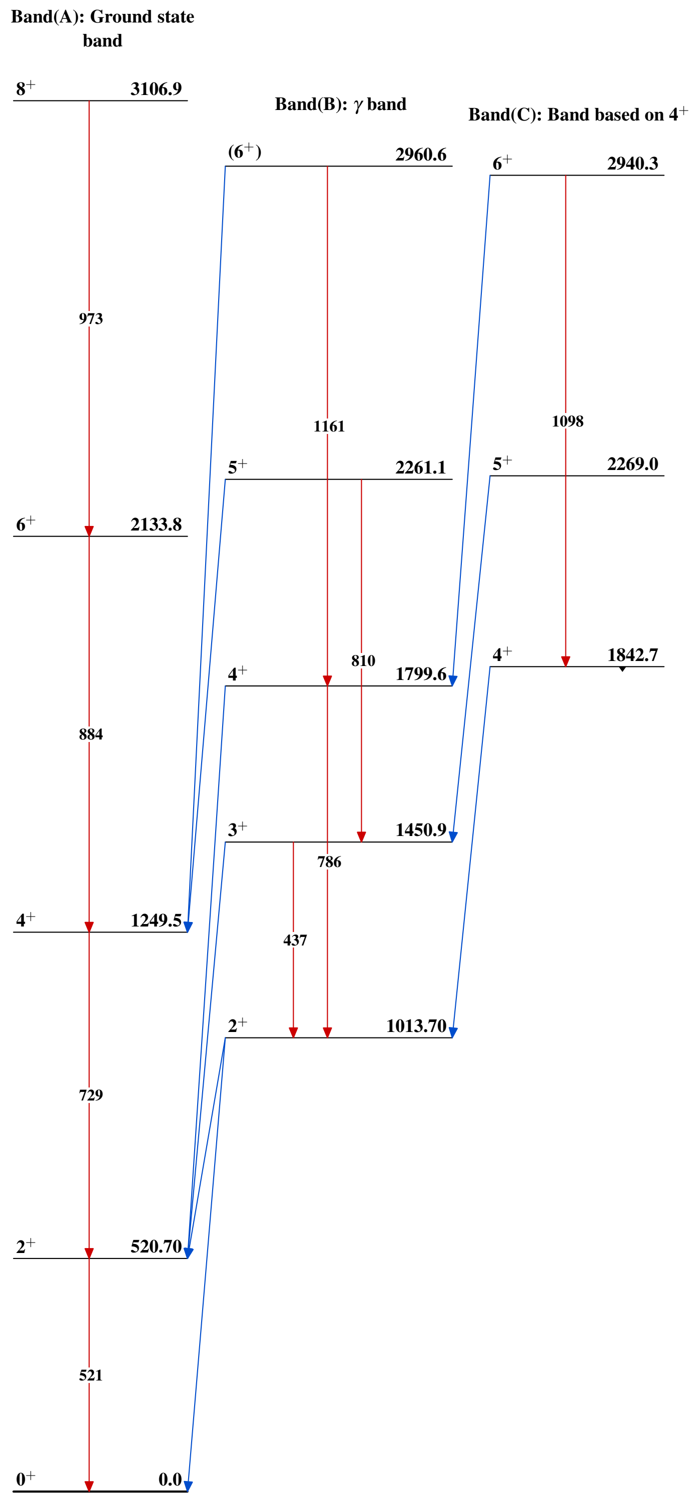
^{124}Te(^{19}F,p4nγ) 2013Li24 (continued)

γ(^{138}Nd) (continued)

† From 2013Li24.
‡ From 2013Li24 based on measured DCO ratios and band structures.


^{124}Te(^{19}F,p4nγ) 2013Li24
Level Scheme
Intensities: Relative Iγ
Legend
Iγ < 2%×Iγ max
Iγ < 10%×Iγ max
Iγ > 10%×Iγ max
8+ 3106.9
(6+) 2960.6
6+ 2940.3
5+ 2269.0
5+ 2261.1
6+ 2133.8
4+ 1842.7
4+ 1799.6
3+ 1450.9
4+ 1249.5
2+ 1013.70
2+ 520.70
0+ 0.0
973.1 E2 26.1
1711.1 2.0
1161.0 1.1
1140.7 1.9
1097.6 E2 1.3
818.1 E2 2.4
1011.6 M1+E2 6.9
810.2 E2 1.3
884.3 E2 27.7
1322.0 0.25
829.0 E2 8.8
1278.9 E2 4.7
785.9 E2 4.7
930.2 M1+E2 3.97
437.2 M1+E2 14.3
728.8 E2 85.7
1013.7 14.0
493.0 M1+E2 22.3
520.7 100
$^{138}_{60}Nd_{78}$

^{124}Te(^{19}F,p4nγ) 2013Li24



$^{138}_{60}Nd_{78}$

^{140}Ce(α,6nγ),^{141}Pr(p,4nγ) 1980Mu10,1975Yo01

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 146, 1 (2017)	30-Sep-2017

1980Mu10 (also 1979Mu03): ^{140}Ce(α,6nγ) E=85 MeV α beam was produced from the Julich isochronous cyclotron JULIC. Target was about 10 mg/cm^2 thick CeO_2 (99.7% enriched in ^{140}Ce) deposited onto a 3 μm mylar foil. γ rays were detected with Ge(Li) detectors. Measured Eγ, Iγ, $\gamma\gamma$-coin, $\gamma(\theta)$, γ(t). Deduced levels, J, π, $T_{1/2}$, configurations. Systematics of neighbouring nuclei. Comparisons with the triaxial rotor-plus-particle model calculations.

1975Yo01: ^{141}Pr(p,4nγ) E=44 MeV proton beam was produced from the INS synchrocyclotron. Target was oxide powders of ^{141}Pr, with a thickness of 35 mg/cm^2 on a 4 μm thick Mylar film. γ rays were detected with a Ge(Li) detector (FWHM=2.7 keV at 1332 keV) and electrons were detected with a multigap reaction conversion electron spectrometer (M-Race). Measured Eγ, Iγ, $\gamma(\theta)$, γ(t), E(ce), I(ce). Deduced levels, J, π, $T_{1/2}$, γ-ray multipolarities. Systematics of neighbouring nuclei.

Other: 1973VaYZ (E(α)=104 MeV).

^{138}Nd Levels

E(level)†	J^{π}@	$T_{1/2}$#	Comments
0.0	0^+		
520.2 *3*	2^+	≤3 ns	
1013.0 *4*	2^+&		
1248.5 *4*	4^+	≤3 ns	
1450.1 *5*	3^+&		
1988.5 *5*	5^-	≤3 ns	
2132.2 *5*	6^+	≤3 ns	
2220.3 *5*	5	≤3 ns	
2318.8 *5*	7^-	≈250 ps	$T_{1/2}$: from 1973VaYZ.
2689.3 *5*	7	≤3 ns	
3105.1 *6*	8^+	≤3 ns	
3171.7 *7*	10^+	0.41 μs *5*	Configuration=$(\nu\ h_{11/2})^{-2}_{10+}$. $T_{1/2}$: from 1975Yo01, using γ(t) following timing with beam pulses.
3244.7 *6*	(9)	≤3 ns	
3697.6 *7*	(10)	≤3 ns	
3818.1 *7*	$12^{(+)}$	≤3 ns	
4199.8 *7*	(12)	≤3 ns	
4970.4 *9*	(13)	≤3 ns	
4991.4 *8*	(14)	≤3 ns	
5026.0 *9*	(13)	≤3 ns	J^{π}: (14^+) in Adopted Levels.
5348.8‡ *9*	(14)	≤3 ns	
5837.9 *9*		≤3 ns	
6309.8‡ *10*	(15)	≤3 ns	
6539.7‡ *10*	(16)	≤3 ns	
6824.4 *10*	(17)	≤3 ns	
7016.2‡ *11*	(18)	≤3 ns	
7327.8‡ *11*	(19)	≤3 ns	

† From a least-squares fit to γ-ray energies.
‡ Level not included in Adopted Levels.
# Experimental limit from (α,6nγ) (1980Mu10), unless otherwise noted.
@ From 1980Mu10 based on deduced γ-ray multipolarities, unless otherwise noted. Please refer to Adopted Levels for adopted assignments.
& From 1975Yo01 based on anisotropy.

^{140}Ce(α,6nγ),^{141}Pr(p,4nγ) 1980Mu10,1975Yo01 (continued)

γ(^{138}Nd)

E_γ‡	I_γ‡	E_i(level)	J^π_i	E_f	J^π_f	Mult.†	α&	Comments
66.6 *3*	49 *17*	3171.7	10+	3105.1	8+	E2	10.0	α(K)=3.44; α(L)=5.06; α(M)=1.15; α(N+..)=0.306 Mult.: A_2=+0.04 *7*, A_4=+0.03 *11* (1980Mu10); α(exp)=7.4 *34* (Iγ balance); level scheme.
191.8 *3*	72 *13*	7016.2	(18)	6824.4	(17)	D+Q		Mult.: A_2=−0.36 *10*, A_4=+0.05 *15* (1980Mu10).
229.9 *3*	67 *12*	6539.7	(16)	6309.8	(15)	D+Q		Mult.: A_2=−0.42 *10*, A_4=−0.02 *15* (1980Mu10).
x276.6 *3*	25 *6*					D+Q		Mult.: A_2=−0.26 *12*, A_4=−0.12 *18* (1980Mu10).
284.7 *3*	79 *12*	6824.4	(17)	6539.7	(16)	D+Q		Mult.: A_2=−0.23 *7*, A_4=+0.03 *11* (1980Mu10).
311.6 *3*	90 *30*	7327.8	(19)	7016.2	(18)	D+Q		Mult.: A_2=−0.39 *7*, A_4=+0.04 *11* (1980Mu10).
322.4 *5*	36 *5*	5348.8	(14)	5026.0	(13)	D+Q		Mult.: A_2=−0.57 *11*, A_4=+0.05 *16* (1980Mu10).
330.3 *3*	300 *36*	2318.8	7−	1988.5	5−	E2	0.0391	α(K)=0.0313; α(L)=0.00613; α(M)=0.00133; α(N+..)=0.00036 Additional information 6. Mult.: α(K)exp=0.035 *3*, A_2=+0.23 *5*, A_4=−0.05 *8* (1975Yo01); A_2=+0.17 *10*, A_4=+0.015 (1980Mu10).
370.6 *3*	30 *20*	2689.3	7	2318.8	7−			
378.7 *5*	31 *5*	5348.8	(14)	4970.4	(13)	D+Q		Mult.: A_2=−0.41 *13*, A_4=−0.07 *19* (1980Mu10).
437.3# *5*		1450.1	3+	1013.0	2+			
452.9 *3*	157 *16*	3697.6	(10)	3244.7	(9)	D(+Q)		Mult.: A_2=−0.24 *4*, A_4=+0.02 *6*.
469.0 *3*	71 *11*	2689.3	7	2220.3	5	Q		Mult.: A_2=+0.26 *10*, A_4=+0.10 *15* (1980Mu10).
492.8# *5*		1013.0	2+	520.2	2+			
502.2 *3*	161 *16*	4199.8	(12)	3697.6	(10)	E2	0.0118	α(K)=0.0097; α(L)=0.00157 Mult.: A_2=+0.26 *6*, A_4=−0.07 *9* (1980Mu10).
520.1 *3*	1000 *80*	520.2	2+	0.0	0+	E2	0.0107	α(K)=0.0088; α(L)=0.00142 Additional information 1. Mult.: A_2=+0.15 *1*, A_4=+0.01 *5* (1975Yo01); A_2=+0.16 *2*, A_4=+0.02 *3* (1980Mu10).
555.4 *3*	150 *23*	3244.7	(9)	2689.3	7	E2	0.0090	α=0.0090; α(K)=0.00743; α(L)=0.00117 Mult.: A_2=+0.33 *7*, A_4=−0.02 *11* (1980Mu10).
x555.9 *3*	125 *38*					(Q)		Mult.: A_2=+0.13, A_4=−0.03 *14* (1980Mu10).
557.2 *3*	242 *36*	2689.3	7	2132.2	6+	D(+Q)		Mult.: A_2=−0.16 *6*, A_4=+0.01 *9* (1980Mu10).
646.4 *3*	196 *20*	3818.1	12(+)	3171.7	10+	E2	0.00612	α=0.00612; α(K)=0.00510; α(L)=0.00077 Mult.: A_2=+0.31 *5*, A_4=−0.05 *8* (1980Mu10).
x676.7 *3*	93 *12*					D+Q		Mult.: A_2=−0.92 *10*, A_4=+0.13 *15* (1980Mu10).
728.3 *3*	1017 *82*	1248.5	4+	520.2	2+	E2	0.00459	α=0.00459; α(K)=0.00384; α(L)=0.00056 Additional information 2. Mult.: α(K)exp=0.0028 *3*, A_2=+0.19 *5*, A_4=−0.01 *7* (1975Yo01); A_2=+0.16 *2*, A_4=+0.01 *3* (1980Mu10).
740.0 *3*	288 *29*	1988.5	5−	1248.5	4+	E1	0.00170	α=0.00170; α(K)=0.00145; α(L)=0.00019 Additional information 3. Mult.: α(K)exp=0.0016 *3*, A_2=−0.05 *6*, A_4=−0.03 *11* (1975Yo01); A_2=−0.21 *6*, A_4=+0.02 *9* (1980Mu10).
791.6 *3*	105 *11*	4991.4	(14)	4199.8	(12)	E2	0.00378	α=0.00378; α(K)=0.00317; α(L)=0.00046 Mult.: A_2=+0.36 *15*, A_4=−0.03 *12* (1980Mu10); RUL.
846.5 *3*	87 *9*	5837.9		4991.4	(14)	(Q)		Mult.: A_2=+0.42 *10*; A_4=+0.17 *15* (1980Mu10).
883.7 *3*	641 *51*	2132.2	6+	1248.5	4+	E2	0.00295	α=0.00295; α(K)=0.00248; α(L)=0.00035 Additional information 4. Mult.: α(K)exp=0.0021 *4*, A_2=+0.21 *11*, A_4=−0.07 *14* (1975Yo01); A_2=+0.11 *2*, A_4=+0.03 *3* (1980Mu10).
x917.9 *3*	36 *7*					(Q)		Mult.: A_2=+0.36 *15*, A_4=+0.12 *23* (1980Mu10).
929.6# *5*		1450.1	3+	520.2	2+			Iγ(437.3γ)/Iγ(929.6γ)=5/3 (1975Yo01).

Continued on next page (footnotes at end of table)

^{140}Ce(α,6nγ),^{141}Pr(p,4nγ) 1980Mu10,1975Yo01 (continued)

γ(^{138}Nd) (continued)

E_γ ‡	I_γ ‡	E_i(level)	J^π_i	E_f	J^π_f	Mult.†	α &	Comments
961.0 *3*	89 *18*	6309.8	(15)	5348.8	(14)	D+Q		Mult.: A_2=−0.63 *10*, A_4=+0.09 *15* (1980Mu10).
971.7@ *3*	152 *41*	2220.3	5	1248.5	4^+			Additional information 5. Mult.: M1(+E2) from reanalysis of ce data of α(K)exp=0.0018 *6* for the 971.8γ in 1975Yo01 (1980Mu10). A Dipole value was adopted.
972.9@ *3*	4.1×10^2 *11*	3105.1	8^+	2132.2	6^+	E2	0.00239	α=0.00239; α(K)=0.00202; α(L)=0.00028 Additional information 7. Mult.: α(K)exp=0.0018 *6*, A_2=−0.02 *12*, A_4=−0.03 *18* (1975Yo01); A_2=−0.01 *6*, A_4=+0.01 *9* (1980Mu10).
1013.3# *5*		1013.0	2^+	0.0	0^+			Iγ(492.8γ)/Iγ(1013.3γ)=11/4 (1975Yo01).
1152.7 *5*	93 *14*	4970.4	(13)	3818.1	$12^{(+)}$	D+Q		Mult.: A_2=−0.79 *11*, A_4=−0.04 *16* (1980Mu10).
1207.6 *5*	122 *18*	5026.0	(13)	3818.1	$12^{(+)}$	Q		Mult.: A_2=+0.19 *11*, A_4=−0.10 *16* (1980Mu10).

† From α(K)exp, normalized to α(K)(E2)=0.0087 for 520γ (1975Yo01), $\gamma(\theta)$ (1980Mu10) and RUL.

‡ From 1980Mu10, unless noted otherwise. Intensities are for transitions observed in ^{140}Ce(α,6nγ) and relative to Iγ(520.1γ)=1000 *80*.

Observed only in (p,4nγ) (1975Yo01).

@ Unresolved doublet in 1980Mu10. 1975Yo01 observed a line at 971.8, with α(K)exp=0.0018 *6*, but not recognized it as a doublet and assigned it as a transition from the 3105, 8^+ level.

& 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.

^{x} γ ray not placed in level scheme.

^{140}Ce(α,6nγ),^{141}Pr(p,4nγ) 1980Mu10,1975Yo01

Level Scheme

Intensities: Relative I_γ