^{96}Zr(^{48}Ca,4nγ) 2013Le22,2013Va10

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 154, 1 (2018)	20-Nov-2018

Dataset based on unevaluated XUNDL files compiled by E. McNeice and B. Singh (McMaster) from 2013Le22 and 2013Va10 and by B. Singh from 2015Pe10.

2013Le22,2013Va10: E(^{48}Ca)=180 MeV beam created by the K130 cyclotron and RITU separator at JYFL facility. Target=735 μg/cm^2 thick self-supporting ^{96}Zr foil. Measured Eγ, Iγ, $\gamma\gamma$, $\gamma\gamma$(t), $\gamma\gamma(\theta)$ using the EUROBALL setup for one experiment and the JUROGAM II + GREAT setup for the other. JUROGAM II array comprised 39 Compton-suppressed Ge detectors that included 24 clover detectors and 15 coaxial tapered detectors. Deduced levels, J, π, multipolarities, bands, configurations. Discussed bands using tilted axis cranking (TAC), and cranked Nilsson-Strutinsky (CNS) model calculations.

2015Pe10: same as 2013Le22 (and reanalyzing same data) but identifying the high-spin states near the fully aligned state of 27$^-$ discovered in this work at 11204 keV.

2005Pe24,2006PeZZ: same reaction, E=195 MeV. Measured Eγ, Iγ, $\gamma\gamma$, $\gamma\gamma$(DCO) with the EUROBALL spectrometer consisting of 30 single, tapered Ge detectors as well as 15 cluster and 26 clover composite Ge detectors, each surrounded by a BGO Compton-suppression shield.

2013Le22 and 2013Va10 are essentially superseding 2005Pe24 and 2006PeZZ. According to 2013Le22 the large majority of previously observed states are confirmed with some important changes of which the most important is the parity assignment of the 16$^+$, 6158 level (previously negative).

2013Le22 mention that four bands published previously by 2005Pe24 that are not linked to the low-lying states are not re-discussed in 2013Le22. As their validity is not questioned they are reproduced in the present dataset.

Of 2013Va10 and 2013Le22 the data of 2013Le22 which is somewhat more recent are taken. Band 12 in 2013Va10 is band Q10 and D10 in 2013Le22; with two units less spin value in 2013Va10 for Q10 and one unit less for band D10. Also some gamma-ray placements differ.

Unless noted otherwise the data are from 2013Va10.

^{140}Nd Levels

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$	Comments
0.0[#]	0$^+$		
774.00[#] *20*	2$^+$		
1802.6[#] *3*	4$^+$		
2222.4 *6*	7$^-$	0.60 ms *5*	%IT=100 T$_{1/2}$: from Adopted Levels.
3063.1 *6*	7$^-$		
3240.1 *7*	8$^-$		
3456.1 *7*	9$^-$		
3622.2 *7*	10$^+$	27 ns *5*	T$_{1/2}$: from Adopted Levels.
4031.9 *7*	10$^-$		
4176.3 *7*	10$^-$		
4324.3 *7*	11$^-$		
4515.3 *7*	12$^-$		
4703.3 *7*	13$^-$		
5099.0 *7*	12$^-$		
5311.9 *7*	13$^-$		
5431.7 *7*	14$^-$		
5613.6 *8*	15$^-$		
5643.6 *8*	15$^-$		
5901.6 *8*	16$^-$		
5966.6 *8*	(14$^-$)		
5969.5 *7*	15$^-$		
5987.6[k] *13*	(15$^-$)		
6158.0 *8*	16$^+$		
6183.4[k] *13*	(16$^-$)		

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^{96}Zr(^{48}Ca,4nγ) 2013Le22,2013Va10 (continued)

^{140}Nd Levels (continued)

E(level)[†]	Jπ[‡]	T1/2	Comments
6351.6 8	15(+)		
6406.9 8	17−		
6432.4[k] 13	(17−)		
6515.3[o] 8	(14+)		
6731.0[o] 8	15+		
6745.7[k] 13	(18−)		
6770.2 8	16(+)		
6807.2 8	16+		
6861.0 8	16+		
6891.8[o] 8	16+		
6966.7 8	17−		
7056.7[l] 8	17−		
7132.5[o] 8	17+		
7170.2[k] 13	(19−)		
7207.0[l] 8	18−		
7397.9 8	18+		
7434.9 8	20+	1.2 μs 1	$T_{1/2}$: γ(t) (2013Va10), 229, 258, 343, 433, 991, 1352, 1442, 1497 γ rays studied for half-life measurement.
7469.4[c] 8	(16−)		
7488.0[l] 8	19−		
7525.0[o] 8	18+		
7795.2[n] 8	18−		
7813.2[@] 8	18+		
7825.6 8	(18+)		
7949.8[n] 8	19−		
8040.1[l] 8	(20−)		
8048.4[o] 8	19+		
8168.7[q] 8	18(+)		
8190.4[n] 8	20−		
8322.8[q] 8	19(+)		
8338.5[c] 8	18(−)		
8438.3[@] 8	20+		
8524.8[n] 8	21−		
8549.0[p] 8	20+		
8604.8[q] 8	20(+)		
8632.5[m] 8	21−		
8777.1[m] 8	22−		
8905.9[p] 8	21+		
8981.3[c] 8	20(−)		
9010.5[m] 8	23−		
9011.0[n] 8	22−		
9034.7[q] 8	21(+)		
9173.0[a] 8	21(−)		
9266.5[@] 8	22+		
9323.1[n] 9	23−		
9347.1[p] 8	22+		
9523.8[n] 9	23−		
9566.3[q] 8	22(+)		
9569.1[c] 8	22(−)		
9646.5[&] 8	22+		

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$^{96}Zr(^{48}Ca,4n\gamma)$ 2013Le22,2013Va10 (continued)

^{140}Nd Levels (continued)

E(level)[†]	Jπ[‡]	Comments
9670.9[r] *8*	$22^{(-)}$	
9770.8[n] *9*	24^-	
9794.1[a] *8*	$23^{(-)}$	
9871.5[p] *8*	23^+	
9892.2[r] *8*	$23^{(-)}$	
10001.6[n] *9*	24^-	
10126.3[@] *8*	24^+	
10128.5[n] *12*	(24^-)	
10254.9 *13*	(24^-)	
10263.0[r] *8*	$24^{(-)}$	
10307.5[c] *8*	$24^{(-)}$	
10437.6 *11*	(24^-)	
10471.1[p] *8*	24^+	
10576.0[a] *8*	$25^{(-)}$	
10587.7[&] *8*	24^+	
10594.9[d] *8*	$24^{(-)}$	
10614.2[n] *13*	(25^-)	
10679.1 *17*	(25^-)	
10740.7[r] *8*	$25^{(-)}$	
10949.4[b] *9*	(25^-)	
11072.4[c] *8*	$26^{(-)}$	
11173.8[@] *9*	26^+	
11213.0 *11*	$27^{(-)}$	From 2015Pe10 from shell model calculations, this state is consistent with fully aligned state of configuration=$\pi h^1_{11/2}\otimes\nu h^{-2}_{11/2}$. The cranked Nilsson-Strutinsky (CNS) model calculations, however, suggest that this is the configuration of band D3.
11222.6 *10*	$25^{(-)}$	
11312.3[r] *9*	$26^{(-)}$	
11365.4[a] *8*	$27^{(-)}$	
11397.8[d] *8*	$26^{(-)}$	
11565.0[&] *9*	26^+	
11588.8 *11*	26^+	
11600.8[g] *9*	26^+	
11845.8[e] *9*	$27^{(-)}$	
11944.7[b] *9*	(27^-)	
11949.1[u] *18*	(25^-)	
11966.0[r] *9*	$27^{(-)}$	
12124.3[c] *9*	$28^{(-)}$	
12194.3[t] *18*	(26^-)	
12236.6 *18*	(26^-)	
12241.2[g] *9*	$28^{(+)}$	
12422.2[a] *10*	$29^{(-)}$	
12425.9 *10*	(28^+)	
12445.8[s] *9*	(28^+)	
12480.5[j] *11*	(29^+)	
12525.3[e] *9*	$29^{(-)}$	
12548.7[u] *18*	(27^-)	
12898.2[s] *9*	(29^+)	
12917.8[t] *18*	(28^-)	
12997.3[b] *10*	(29^-)	
13050.9[g] *9*	$30^{(+)}$	

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$^{96}Zr(^{48}Ca,4n\gamma)$ 2013Le22,2013Va10 (continued)

^{140}Nd Levels (continued)

E(level)[†]	Jπ[‡]
13323.3[s] 9	(30+)
13335.8[u] 18	(29−)
13394.5[j] 12	(31+)
13406.6[c] 14	30(−)
13479.1[f] 9	(30+)
13583.4[e] 9	31(−)
13703.8[a] 14	31(−)
13769.2[t] 18	(30−)
13915.6[s] 10	(31+)
13960.1[g] 9	32(+)
14238.4[u] 18	(31−)
14247.0[h] 18	(31−)
14254.8[v] 9	(30+)
14410.4[f] 9	(32+)
14474.0[j] 13	(33+)
14540.4[w] 9	31(+)
14708.1[s] 10	(32+)
14761.5[t] 18	(32−)
14844.2[c] 17	(32−)
14858.0[v] 9	32(+)
14904.1[e] 14	33(−)
15027.1[h] 18	(33−)
15042.7[g] 9	34(+)
15141.3[i] 17	(33−)
15146.7[a] 17	(33−)
15315.3[w] 9	33(+)
15339.7[u] 18	(33−)
15605.0[f] 11	(34+)
15725.8[j] 16	(35+)
15774.0[v] 9	34(+)
15993.4[t] 18	(34−)
16036.2[i] 17	(35−)
16087.4[h] 19	(35−)
16278.3[g] 14	36(+)
16286.4[w] 9	35(+)
16343.7[e] 17	(35−)
16439.6[g] 14	36(+)
16894.5[f] 15	(36+)
16976.9[v] 10	36(+)
17079.4[i] 20	(37−)
17153.6[j] 19	(37+)
17407.1[h] 21	(37−)
17680.7[w] 9	37(+)
17881.8[g] 17	(38+)
18320.0[i] 22	(39−)
18474.4[v] 10	38(+)
18726.5[j] 22	(39+)
18951.1[h] 24	(39−)
19703.1[i] 25	(41−)

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$^{96}Zr(^{48}Ca,4n\gamma)$ 2013Le22,2013Va10 (continued)

^{140}Nd Levels (continued)

E(level)[†]	Jπ[‡]	Comments
20432.1[j] *24*	(41+)	
21218[i] *3*	(43−)	
22293[j] *3*	(43+)	
22885[i] *3*	(45−)	
24306[j] *3*	(45+)	
24716[i] *3*	(47−)	
26694[i] *4*	(49−)	
y[y]	(29)	Additional information 1.
y+1023.9[y] *10*	(31)	
y+2167.5[y] *15*	(33)	
y+3464.0[y] *18*	(35)	
y+4936.0[y] *20*	(37)	
y+6607.3[y] *23*	(39)	
y+8455.9[y] *25*	(41)	
z[z]	(29)	Additional information 2.
z+838.7[z] *10*	(31)	
z+1811.2[z] *15*	(33)	
z+2907.7[z] *18*	(35)	
z+4190.5[z] *20*	(37)	
z+5669.5[z] *23*	(39)	
z+7294.0[z] *25*	(41)	
u[x]	(29)	Additional information 3.
u+955.3[x] *10*	(31)	
u+2069.4[x] *15*	(33)	
u+3383.5[x] *18*	(35)	
u+4907.8[x] *20*	(37)	
u+6614.4[x] *23*	(39)	
v[1]	(29)	Additional information 4.
v+1026.9[1] *5*	(31)	
v+1826.1[1] *7*	(33)	
v+2843.3[1] *9*	(35)	
v+4087.6[1] *14*	(37)	
v+5574.2[1] *17*	(39)	
v+7293.4[1] *20*	(41)	
v+9221.0[1] *22*	(43)	
v+11357.2[1] *24*	(45)	

[†] From least-squares fit to Eγ data (with first two excited states added by compilers from Adopted Levels, Gammas dataset). Reduced χ^2=1.9 (critical χ^2=1.4).

[‡] Values of 2013Le22 (with few values from 2015Pe10) are given, which can differ from those in Adopted Levels, Gammas dataset.

[#] Band(a): g.s. band.

[@] Band(B): Band Q1,α=0 Configuration=$\pi[(s_{1/2}d_{3/2})^{-2}(h_{11/2})^{-2}\ (h_{9/2}f_{7/2})^2]\otimes\nu[(d_{5/2}g_{7/2})^8(h_{11/2})^2]$.

[&] Band(C): Band Q2,α=0.

[a] Band(D): Band Q3,α=1 Configuration=$\pi[(s_{1/2}d_{3/2})^{-2}(h_{11/2})^{-2}\ (h_{9/2}f_{7/2})^1_{1/2}(i_{13/2})^1_{1/2}]\otimes\ \nu[(d_{5/2}g_{7/2})^8(h_{11/2})^2]$.

[b] Band(E): Band Q4,α=1.

[c] Band(F): Band Q5,α=0 Configuration=$\pi[(s_{1/2}d_{3/2})^{-2}(h_{11/2})^{-2}\ (h_{9/2}f_{7/2})^1_{-1/2}(i_{13/2})^1_{1/2}]\otimes\ \nu[(d_{5/2}g_{7/2})^8(h_{11/2})^2]$.

[d] Band(G): Band Q6, α=0.

[e] Band(A): Band Q7, α=1 Configuration=$\pi[(s_{1/2}d_{3/2})^{-2}(h_{11/2})^{-2}\ (h_{9/2}f_{7/2})^2]\otimes\nu[(d_{5/2}g_{7/2})^7_{-1/2}\ (h_{11/2})^3_{-1/2}]$.

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^{96}Zr(^{48}Ca,4nγ) 2013Le22,2013Va10 (continued)

^{140}Nd Levels (continued)

[f] Band(H): Band Q8, α=1 Configuration=$\pi[(s_{1/2}d_{3/2})^{-2}(h_{11/2})^{-2}\ (h_{9/2}f_{7/2})^{1}_{-1/2}(i_{13/2})^{1}_{1/2}]\otimes\ \nu[(d_{5/2}g_{7/2})^{7}_{1/2}(h_{11/2})^{3}_{-1/2}]$.
[g] Band(I): Band Q9, α=0 Configuration=$\pi[(s_{1/2}d_{3/2})^{-3}_{-1/2}(h_{11/2})^{-2}\ (h_{9/2}f_{7/2})^{2}(i_{13/2})^{1}_{1/2}]\otimes\nu[(d_{5/2}g_{7/2})^{8}\ (h_{11/2})^{2}]$.
[h] Band(J): Band Q10, α=(1) Configuration=$\pi[(s_{1/2}d_{3/2})^{-3}_{1/2}(h_{11/2})^{-2}\ (h_{9/2}f_{7/2})^{2}(i_{13/2})^{1}_{1/2}]\otimes\ \nu[(d_{5/2}g_{7/2})^{7}_{1/2}(h_{11/2})^{3}_{-1/2}]$.
[i] Band(K): Band Q11, α=(1) Configuration=$\pi[(s_{1/2}d_{3/2})^{-3}_{-1/2}(h_{11/2})^{-2}\ (h_{9/2}f_{7/2})^{2}(i_{13/2})^{1}_{1/2}]\otimes\ \nu[(d_{5/2}g_{7/2})^{7}_{-1/2}(h_{11/2})^{3}_{-1/2}]$.
[j] Band(L): Band Q12, α=(0) Configuration=$\pi[(s_{1/2}d_{3/2})^{-2}(h_{11/2})^{-2}\ (h_{9/2}f_{7/2})^{1}_{-1/2}(i_{13/2})^{1}_{1/2}]\otimes\ \nu[(d_{5/2}g_{7/2})^{7}_{-1/2}(h_{11/2})^{3}_{-1/2}]$.
[k] Band(M): Band D1. Configuration=π(ABEF)$\otimes\nu$(AA−barBG).
[l] Band(N): Band D2. Configuration=π(AA−barBE)$\otimes\nu$(AA−barBC).
[m] Band(O): Band D3. Configuration=π(ABEH)$\otimes\nu$(ABCG).
[n] Band(P): Band D4. Configuration=π(ABEF)$\otimes\nu$(ABCH).
[o] Band(Q): Band D5. Configuration=π(ABEF)$\otimes\nu$(ABGH).
[p] Band(R): Band D6. Configuration=π(ABEG)$\otimes\nu$(ABGH).
[q] Band(S): Band D7. Configuration=π(ABEH)$\otimes\nu$(ABGH).
[r] Band(T): Band D8. Configuration=π(ABCE)$\otimes\nu$(ABGH).
[s] Band(U): Band D9. Configuration=π(ABCE)$\otimes\nu$(ABCG).
[t] Band(V): Band D10, even spin. Configuration=π(ABEF)$\otimes\nu$(ABCI).
[u] Band(v): Band D10, odd spin. Configuration=π(ABEF)$\otimes\nu$(ABCI).
[v] Band(W): Band D11, even spin. Configuration=π(ABCE)$\otimes\nu$(ABCI). Positive parity is taken from figure 1 in 2013Le22 (negative parity listed in authors′ table I is a misprint, as confirmed by e-mail reply of August 19, 2013 from C.M. Petrache to B. Singh).
[w] Band(w): Band D11, odd spin. Configuration=π(ABCE)$\otimes\nu$(ABCI). Positive parity is taken from figure 1 in 2013Le22 (negative parity listed in authors′ table I is a misprint, as confirmed by e-mail reply of August 19, 2013 from c.m. Petrache to B. Singh).
[x] Band(h): Rotational band based on (29). Population intensity=1% of ^{140}Nd channel (2005Pe24 only).
[y] Band(i): Rotational band based on (29). Population intensity=0.8% of ^{140}Nd channel (2005Pe24 only).
[z] Band(j): Rotational band based on (29). Population intensity=0.5% of ^{140}Nd channel (2005Pe24 only).
[1] Band(k): Rotational band based on (29). Population intensity=2% of ^{140}Nd channel (2005Pe24 only).

γ(^{140}Nd)

Eγ values from 2013Le22 are in disagreement with those from other measurements, as 1987Gu22 (^{126}Te(^{18}O,4nγ) dataset) and 2009Wi18 and 1975Ke09 (both ^{140}Pm ε decay datasets), being systematically higher. A similar situation was encountered for the Eγ data from 2006Pe25 (see comment in the ^{126}Te(^{18}O,4nγ) dataset). For this reason the evaluator recalibrated the Eγ′s from 2013Le22 following the same procedure as described in ^{126}Te(^{18}O,4nγ) dataset using the formula Eγ(recal) = a×Eγ+b, with a=1.001117 and b=−0.277197.

Anisotropy ratio R was obtained from gated matrices for 90° and for forward/backward angles. Expected ratios were 0.61 *3* for stretched quadrupoles and 0.28 *5* for stretched dipoles. All the values listed in the table are obtained by the same procedure although they are given in two different references based on the same work. Most of them (given without a key number) are from 2013Le22, while the fewer ones are from 2015Pe10.

E_γ[†]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[‡]	Comments
36.8	7434.9	20^+	7397.9	18^+		
119.9 *2*	5431.7	14^-	5311.9	13^-		
144.6 *2*	8777.1	22^-	8632.5	21^-	M1+E2	R=0.23 *15*.
150.1 *2*	7207.0	18^-	7056.7	17^-	M1+E2	R=0.35 *7*.
154.1 *2*	8322.8	$19^{(+)}$	8168.7	$18^{(+)}$	M1+E2	R=0.33 *5*.
154.6 *2*	7949.8	19^-	7795.2	18^-	M1+E2	R=0.33 *5*.
160.4 *2*	6891.8	16^+	6731.0	15^+	M1+E2	R=0.26 *2*.
165.9 *2*	3622.2	10^+	3456.1	9^-		
176.9 *2*	3240.1	8^-	3063.1	7^-		
181.9 *2*	5613.6	15^-	5431.7	14^-	M1+E2[&]	Mult.: DCO=0.96 *19*.
187.9 *2*	4703.3	13^-	4515.3	12^-		

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^{96}Zr(^{48}Ca,4nγ) 2013Le22,2013Va10 (continued)

γ(^{140}Nd) (continued)

E_γ[†]	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	Comments
190.9 *2*		4515.3	12⁻	4324.3	11⁻	M1+E2[&]	Mult.: DCO=0.68 *2*.
195.8 *2*		6183.4	(16⁻)	5987.6	(15⁻)	M1+E2	R=0.36 *11*.
212.0 *2*		5643.6	15⁻	5431.7	14⁻	M1+E2[&]	Mult.: DCO=0.59 *3*.
213.0 *2*		5311.9	13⁻	5099.0	12⁻		
215.3 *2*		6731.0	15⁺	6515.3	(14⁺)		
216.0 *2*		3456.1	9⁻	3240.1	8⁻		
221.6 *2*		9892.2	23⁽⁻⁾	9670.9	22⁽⁻⁾	M1+E2	R=0.31 *5*.
228.0 *2*		7434.9	20⁺	7207.0	18⁻		
233.4 *2*		9010.5	23⁻	8777.1	22⁻	M1+E2	R=0.33 *5*.
240.2 *2*		7207.0	18⁻	6966.7	17⁻	M1+E2	R=0.31 *4*.
240.6 *2*		7132.5	17⁺	6891.8	16⁺	M1+E2	R=0.25 *5*.
240.6 *2*		8190.4	20⁻	7949.8	19⁻	M1+E2	R=0.25 *6*.
245.4 *2*		12194.3	(26⁻)	11949.1	(25⁻)	M1+E2	R=0.33 *6*.
249.0 *2*		6432.4	(17⁻)	6183.4	(16⁻)		
252.2 *2*		8777.1	22⁻	8524.8	21⁻	M1+E2	R=0.27 *3*.
258.0 *2*		5901.6	16⁻	5643.6	15⁻	M1+E2[&]	Mult.: DCO=0.57 *8*.
271.6 *2*		7132.5	17⁺	6861.0	16⁺		
280.6 *2*		7488.0	19⁻	7207.0	18⁻	M1+E2	R=0.26 *4*.
282.0 *2*		8604.8	20⁽⁺⁾	8322.8	19⁽⁺⁾	M1+E2	R=0.24 *2*.
285.5 *2*		14540.4	31⁽⁺⁾	14254.8	(30⁺)		
287.1 *2*		10594.9	24⁽⁻⁾	10307.5	24⁽⁻⁾		
287.4 *2*		12236.6	(26⁻)	11949.1	(25⁻)		
292.0 *2*		4324.3	11⁻	4031.9	10⁻		
312.1 *2*		9323.1	23⁻	9011.0	22⁻	M1+E2	R=0.36 *7*.
312.3 *2*		12548.7	(27⁻)	12236.6	(26⁻)	M1+E2	R=0.27 *6*.
313.3 *2*		6745.7	(18⁻)	6432.4	(17⁻)	M1+E2	R=0.37 *4*.
317.3 *2*		14858.0	32⁽⁺⁾	14540.4	31⁽⁺⁾	M1+E2	R=0.25 *3*.
324.7 *2*		7813.2	18⁺	7488.0	19⁻	E1	R=0.26 *5*.
325.4 *2*		7132.5	17⁺	6807.2	16⁺	M1+E2	R=0.21 *3*.
325.5 *2*		11397.8	26⁽⁻⁾	11072.4	26⁽⁻⁾	M1+E2	R=0.30 *5*.
325.8 *2*		9892.2	23⁽⁻⁾	9566.3	22⁽⁺⁾	(E1)	R=0.29 *5*. Mult.: while 2013Le22 adopted M1+E2 (Table 1) they contradict both their Δπ=yes (Table 1) and their level scheme (Fig. 1); this should be E1.
334.4 *2*		8524.8	21⁻	8190.4	20⁻	M1+E2	R=0.35 *5*.
354.4 *2*		12548.7	(27⁻)	12194.3	(26⁻)	(M1+E2)	
356.7 *2*		8905.9	21⁺	8549.0	20⁺	M1+E2	R=0.38 *12*.
362.2 *2*		7132.5	17⁺	6770.2	16⁽⁺⁾	M1+E2	R=0.21 *3*.
366.1[@]		11588.8	26⁺	11222.6	25⁽⁻⁾	E1[a]	R=0.26 *2* (2015Pe10).
369.0 *2*		12917.8	(28⁻)	12548.7	(27⁻)	M1+E2	R=0.34 *15*.
370.8 *2*		10263.0	24⁽⁻⁾	9892.2	23⁽⁻⁾	M1+E2	R=0.32 *5*.
376.1[@]		11588.8	26⁺	11213.0	27⁽⁻⁾	(E1)[a]	
378.1[@]		11600.8	26⁺	11222.6	25⁽⁻⁾	E1[a]	R=0.31 *2* (2015Pe10).
379.3 *2*		6731.0	15⁺	6351.6	15⁽⁺⁾	M1+E2	R=0.23 *5*.
380.0 *2*		9646.5	22⁺	9266.5	22⁺	M1+E2	R=0.36 *5*.
385.4 *2*		6351.6	15⁽⁺⁾	5966.6	(14⁻)	(E1)	R=0.34 *4*.
388.2[@]		11600.8	26⁺	11213.0	27⁽⁻⁾	E1[a]	R=0.28 *5* (2015Pe10).
392.3 *2*		7525.0	18⁺	7132.5	17⁺	M1+E2	R=0.27 *4*.
401.1 *10*	0.3	12525.3	29⁽⁻⁾	12124.3	28⁽⁻⁾		
415.3 *2*		10307.5	24⁽⁻⁾	9892.2	23⁽⁻⁾	(M1+E2)	Mult.: while 2013Le22 adopted E1, based on their level scheme (Fig. 1) this should be M1+E2.
417.7 *2*		13335.8	(29⁻)	12917.8	(28⁻)	M1+E2	R=0.26 *7*.
418.4 *2*		6770.2	16⁽⁺⁾	6351.6	15⁽⁺⁾	M1+E2	R=0.31 *5*.

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$^{96}Zr(^{48}Ca,4n\gamma)$ 2013Le22,2013Va10 (continued)

$\gamma(^{140}Nd)$ (continued)

E_γ [†]	I_γ	E_i(level)	J^π_i	E_f	J^π_f	Mult. [‡]	Comments
419.8[#] *5*		2222.4	7⁻	1802.6	4⁺		
424.2[@]		10679.1	(25⁻)	10254.9	(24⁻)		
424.5 *2*		7170.2	(19⁻)	6745.7	(18⁻)	M1+E2	R=0.29 *5*.
424.9 *2*		13323.3	(30⁺)	12898.2	(29⁺)	M1+E2	R=0.23 *15*.
429.7 *2*		9034.7	$21^{(+)}$	8604.8	$20^{(+)}$	M1+E2	R=0.23 *5*.
431.2 *2*		7397.9	18⁺	6966.7	17⁻		
433.5 *2*		13769.2	(30⁻)	13335.8	(29⁻)	M1+E2	R<0.4.
437.2 *2*		6406.9	17⁻	5969.5	15⁻		
441.0 *2*		9347.1	22⁺	8905.9	21⁺	M1+E2	R=0.30 *4*.
442.2 *2*		8632.5	21⁻	8190.4	20⁻	M1+E2	R=0.34 *5*.
447.4 *10*	0.3	11845.8	$27^{(-)}$	11397.8	$26^{(-)}$	M1+E2	R=0.27 *3*.
447.7 *2*		9770.8	24⁻	9323.1	23⁻	M1+E2	R=0.31 *5*.
449.7 *5*	4.4	10576.0	$25^{(-)}$	10126.3	24⁺	E1	R=0.31 *5*.
452.1 *2*		12898.2	(29⁺)	12445.8	(28⁺)	M1+E2	R=0.29 *4*.
455.7 *2*		6807.2	16⁺	6351.6	$15^{(+)}$	M1+E2	R=0.23 *3*.
457.4 *2*		15315.3	$33^{(+)}$	14858.0	$32^{(+)}$		
458.4 *2*		15774.0	$34^{(+)}$	15315.3	$33^{(+)}$	M1+E2	R=0.34 *10*.
469.1 *2*		14238.4	(31⁻)	13769.2	(30⁻)	M1+E2	R=0.31 *10*.
472.3 *2*		12898.2	(29⁺)	12425.9	(28⁺)	M1+E2	R=0.26 *3*.
477.2 *2*		14247.0	(31⁻)	13769.2	(30⁻)		
477.7 *2*		10740.7	$25^{(-)}$	10263.0	$24^{(-)}$	M1+E2	R=0.37 *7*.
477.8 *2*		10001.6	24⁻	9523.8	23⁻	M1+E2	R=0.25 *7*.
483.3 *2*		4515.3	12⁻	4031.9	10⁻	E2[&]	Mult.: DCO=1.03 *5*.
486.2 *2*		9011.0	22⁻	8524.8	21⁻	M1+E2	R=0.35 *14*.
486.2 *2*		9034.7	$21^{(+)}$	8549.0	20⁺	M1+E2	R=0.33 *2*.
486.3[@]		10614.2	(25⁻)	10128.5	(24⁻)		
500.7 *2*		8549.0	20⁺	8048.4	19⁺	M1+E2	R=0.34 *10*.
505.3 *2*		6406.9	17⁻	5901.6	16⁻	M1+E2	R=0.55 *8*.
509.7 *2*		6861.0	16⁺	6351.6	$15^{(+)}$	M1+E2	R=0.30 *2*.
512.0 *2*		16286.4	$35^{(+)}$	15774.0	$34^{(+)}$	M1+E2	R=0.33 *5*.
512.8 *2*		9523.8	23⁻	9011.0	22⁻	M1+E2	R=0.26 *4*.
514.3 *2*		6158.0	16⁺	5643.6	15⁻		
514.4 *2*		14761.5	(32⁻)	14247.0	(31⁻)		
522.6 *2*		14761.5	(32⁻)	14238.4	(31⁻)		
523.3 *2*		8048.4	19⁺	7525.0	18⁺	M1+E2	R=0.29 *5*.
524.4 *2*		9871.5	23⁺	9347.1	22⁺	M1+E2	R=0.27 *7*.
527.6 *2*	8.2	9794.1	$23^{(-)}$	9266.5	22⁺	E1	R=0.33 *5*.
531.6 *2*		9566.3	$22^{(+)}$	9034.7	$21^{(+)}$	M1+E2	R=0.24 *7*.
533.9 *5*	4.1	9569.1	$22^{(-)}$	9034.7	$21^{(+)}$	E1	R=0.25 *3*.
536.3[d] *1*		16976.9	$36^{(+)}$	16439.6	$36^{(+)}$		
540.3 *2*		6891.8	16⁺	6351.6	$15^{(+)}$	M1+E2	R<0.4.
543.0 *2*		8981.3	$20^{(-)}$	8438.3	20⁺	E1	R=0.26 *10*.
544.3 *2*		6158.0	16⁺	5613.6	15⁻	[E1]	Mult.: M1+E2 based on DCO (2005Pe24) also compatible with E1 – the latter better supported by theory (2006Pe25, 2013Le22).
545.0 *2*		9892.2	$23^{(-)}$	9347.1	22⁺	(E1)	R=0.32 *3*. Mult.: while 2013Le22 adopted M1+E2 (Table 1) they contradict both their $\Delta\pi$=yes (Table 1) and their level scheme (Fig. 1); this should be E1.
548.3 *2*		6515.3	(14⁺)	5966.6	(14⁻)	(E1)	R=0.67 *15*. Mult.: while 2013Le22 adopted M1+E2, based on their level scheme (Fig. 1) this should be E1.
552.1 *2*		8040.1	(20⁻)	7488.0	19⁻		

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^{96}Zr(^{48}Ca,4nγ) 2013Le22,2013Va10 (continued)

γ(^{140}Nd) (continued)

E_γ †	I_γ	E_i(level)	J^π_i	E_f	J^π_f	Mult. ‡	Comments
553.3 *5*		4176.3	10^-	3622.2	10^+		
556.2 *2*		8604.8	$20^{(+)}$	8048.4	19^+	M1+E2	R=0.40 *6*.
558.4 *2*		7525.0	18^+	6966.7	17^-		
571.6 *2*		11312.3	$26^{(-)}$	10740.7	$25^{(-)}$	M1+E2	R=0.36 *5*.
575.4 *2*		4031.9	10^-	3456.1	9^-		
578.1 *2*		15339.7	(33^-)	14761.5	(32^-)	(M1+E2)	
588.0 *5*	2.2	9569.1	$22^{(-)}$	8981.3	$20^{(-)}$	E2	R=0.84 *10*.
592.3 *2*		13915.6	(31^+)	13323.3	(30^+)	M1+E2	R=0.27 *4*.
599.4 @		11213.0	$27^{(-)}$	10614.2	(25^-)		
599.5 *2*		12548.7	(27^-)	11949.1	(25^-)		
599.6 *2*		10471.1	24^+	9871.5	23^+	M1+E2	R=0.26 *4*.
603.4 *2*		14858.0	$32^{(+)}$	14254.8	(30^+)		
605.4 @		10128.5	(24^-)	9523.8	23^-		
606.0 *10*	0.5	7813.2	18^+	7207.0	18^-	E1	R=0.40 *15*.
613.1 *5*	2.7	8438.3	20^+	7825.6	(18^+)		Initial $J^\pi=18^+$ in table I is a misprint.
621.1 *2*	5.5	9794.1	$23^{(-)}$	9173.0	$21^{(-)}$	E2	R=0.68 *4*.
625.0 *2*	20.5	8438.3	20^+	7813.2	18^+	E2	R=0.65 *3*.
636.4 *2*		9670.9	$22^{(-)}$	9034.7	$21^{(+)}$	(E1)	R=0.29 *5*. Mult.: while 2013Le22 adopted M1+E2, based on their level scheme (Fig. 1) this should be E1.
640.4		12241.2	$28^{(+)}$	11600.8	26^+	E2	R=0.62 *3*.
642.8 *2*		8981.3	$20^{(-)}$	8338.5	$18^{(-)}$	E2	R=0.72 *10*.
652.5		12241.2	$28^{(+)}$	11588.8	26^+	E2	R=0.61 *3*.
653.7 *2*		11966.0	$27^{(-)}$	11312.3	$26^{(-)}$	M1+E2	R=0.29 *4*.
653.7 *2*		15993.4	(34^-)	15339.7	(33^-)	M1+E2	R<0.4.
660.4 *2*		9566.3	$22^{(+)}$	8905.9	21^+		
676.3 *5*	1.9	12241.2	$28^{(+)}$	11565.0	26^+	E2	R=0.65 *7*.
679.5 *5*	3.6	12525.3	$29^{(-)}$	11845.8	$27^{(-)}$	E2	R=0.60 *9*.
680.8 *2*		12917.8	(28^-)	12236.6	(26^-)		
690.6 *2*		16976.9	$36^{(+)}$	16286.4	$35^{(+)}$	(M1+E2)	R<0.4.
701.5 *5*		4324.3	11^-	3622.2	10^+		
703.3 *10*	0.3	17680.7	$37^{(+)}$	16976.9	$36^{(+)}$	M1+E2	R=0.34 *10*.
720.5 *2*		4176.3	10^-	3456.1	9^-		
723.8 *2*		12917.8	(28^-)	12194.3	(26^-)		
728.5 *2*		5431.7	14^-	4703.3	13^-	M1+E2 &	Mult.: DCO=0.66 *2*.
731.1 *2*		15774.0	$34^{(+)}$	15042.7	$34^{(+)}$		
734.7 *2*	6.0	9173.0	$21^{(-)}$	8438.3	20^+	E1	R=0.33 *5*.
738.0 *2*	6.8	10307.5	$24^{(-)}$	9569.1	$22^{(-)}$	E2	R=0.76 *5*.
755.7 *2*		8190.4	20^-	7434.9	20^+	(E1)	R=0.68 *8*. Mult.: while 2013Le22 adopted M1+E2, based on their level scheme (Fig. 1) this should be E1.
756.4 *5*	2.7	7813.2	18^+	7056.7	17^-	(E1)	
765.0 *2*	5.5	11072.4	$26^{(-)}$	10307.5	$24^{(-)}$	E2	R=0.68 *3*.
769.0 *2*		7825.6	(18^+)	7056.7	17^-		
773.5 *5*	2.7	11845.8	$27^{(-)}$	11072.4	$26^{(-)}$	M1+E2	R=0.38 *10*.
774.0 # *2*		774.00	2^+	0.0	0^+		
775.0 *2*		15315.3	$33^{(+)}$	14540.4	$31^{(+)}$		
779.7 *2*		15027.1	(33^-)	14247.0	(31^-)	E2	R=0.73 *11*.
781.9 *2*	19.2	10576.0	$25^{(-)}$	9794.1	$23^{(-)}$	E2	R=0.68 *3*.
785.6 @		11222.6	$25^{(-)}$	10437.6	(24^-)		
787.4 *2*		13335.8	(29^-)	12548.7	(27^-)	E2	R=0.64 *14*.
789.1 *2*		15027.1	(33^-)	14238.4	(31^-)	E2	R=0.63 *10*.

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^{96}Zr(^{48}Ca,4nγ) 2013Le22,2013Va10 (continued)

γ(^{140}Nd) (continued)

E_γ [†]	I_γ	E_i(level)	J^π_i	E_f	J^π_f	Mult. [‡]	Comments
789.3 *2*	13.7	11365.4	$27^{(-)}$	10576.0	$25^{(-)}$	E2	R=0.71 *4*.
792.5 *2*		14708.1	(32^+)	13915.6	(31^+)		
793.6[d] *1*		18474.4	$38^{(+)}$	17680.7	$37^{(+)}$		
797.7 *2*		8322.8	$19^{(+)}$	7525.0	18^+	M1+E2	R=0.30 *5*.
799.2 *5*	2.2 *2*	v+1826.1	(33)	v+1026.9	(31)		
802.8 *2*		11397.8	$26^{(-)}$	10594.9	$24^{(-)}$		
808.6 *2*		6966.7	17^-	6158.0	16^+		
809.7 *2*	11.0	13050.9	$30^{(+)}$	12241.2	$28^{(+)}$	E2	R=0.66 *3*.
827.0 *2*		14410.4	(32^+)	13583.4	$31^{(-)}$		
828.2 *2*	21.9	9266.5	22^+	8438.3	20^+	E2	R=0.67 *9*.
838.7 *10*	0.50 *25*	z+838.7	(31)	z	(29)		
840.7 *2*		3063.1	7^-	2222.4	7^-		
846.5 *2*	6.0	7813.2	18^+	6966.7	17^-	E1	R=0.26 *5*.
851.2 *2*		13769.2	(30^-)	12917.8	(28^-)	E2	R=0.54 *10*.
859.8 *2*	8.2	10126.3	24^+	9266.5	22^+	E2	R=0.80 *10*.
867.9 *5*		5966.6	(14^-)	5099.0	12^-		
868.7 *2*		4324.3	11^-	3456.1	9^-	E2[&]	
869.1 *2*		8338.5	$18^{(-)}$	7469.4	(16^-)		
875.7 *5*	4.1	12241.2	$28^{(+)}$	11365.4	$27^{(-)}$	E1	R=0.37 *4*.
877.7 *2*		13323.3	(30^+)	12445.8	(28^+)	E2	R=0.54 *8*.
889.5 *10*	0.7	16036.2	(35^-)	15146.7	(33^-)		
894.9 *10*	0.8	16036.2	(35^-)	15141.3	(33^-)	E2	R=0.50 *20*.
898.0 *2*		14858.0	$32^{(+)}$	13960.1	$32^{(+)}$		
902.6 *2*		14238.4	(31^-)	13335.8	(29^-)	E2	R=0.63 *15*.
909.1 *2*	9.6	13960.1	$32^{(+)}$	13050.9	$30^{(+)}$	E2	R=0.71 *4*.
911.2 *2*		14247.0	(31^-)	13335.8	(29^-)	E2	R=0.64 *5*.
914.1 *5*	1.0	13394.5	(31^+)	12480.5	(29^+)		
915.9 *2*		15774.0	$34^{(+)}$	14858.0	$32^{(+)}$		
922.8 *2*		5099.0	12^-	4176.3	10^-	E2[&]	Mult.: DCO=1.04 *5*.
931.3 *2*		14410.4	(32^+)	13479.1	(30^+)		
931.8[@]		10254.9	(24^-)	9323.1	23^-		
933.0 *2*		8981.3	$20^{(-)}$	8048.4	19^+	(E1)	
941.2 *2*		10587.7	24^+	9646.5	22^+	E2	R=0.72 *5*.
952.4 *2*		7813.2	18^+	6861.0	16^+	E2	R=0.83 *13*.
953.7 *2*		13479.1	(30^+)	12525.3	$29^{(-)}$		
955.3 *10*	0.8 *4*	u+955.3	(31)	u	(29)		
971.4 *2*		16286.4	$35^{(+)}$	15315.3	$33^{(+)}$	(E2)	
972.0 *10*	0.8	13394.5	(31^+)	12422.2	$29^{(-)}$		
972.5 *10*	0.50 *25*	z+1811.2	(33)	z+838.7	(31)		
977.3 *5*	2.7	11565.0	26^+	10587.7	24^+	E2	R=0.70 *6*.
990.8 *2*		7397.9	18^+	6406.9	17^-		
993.1[b] *2*		14761.5	(32^-)	13769.2	(30^-)		E_γ: somewhat poor fit, level-energy difference=991.7.
995.3 *2*		11944.7	(27^-)	10949.4	(25^-)	E2	R=0.74 *10*.
1009.1 *5*		16036.2	(35^-)	15027.1	(33^-)	E2	R=0.71 *10*.
1012.9[@]		11600.8	26^+	10587.7	24^+	E2[a]	
1017.2 *5*	1.9 *2*	v+2843.3	(35)	v+1826.1	(33)		
1017.9 *5*		3240.1	8^-	2222.4	7^-	M1+E2[&]	Mult.: DCO=0.44 *5*.
1023.9 *10*	0.30 *15*	y+1023.9	(31)	y	(29)		
1024.4 *5*		8549.0	20^+	7525.0	18^+		
1024.9[@]		11600.8	26^+	10576.0	$25^{(-)}$	E1[a]	
1026.9 *5*	1.4 *2*	v+1026.9	(31)	v	(29)		
1027.4[b] *5*		10594.9	$24^{(-)}$	9569.1	$22^{(-)}$	E2	R=0.68 *4*.
1027.9 *5*		7434.9	20^+	6406.9	17^-		

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^{96}Zr(^{48}Ca,4nγ) 2013Le22,2013Va10 (continued)

γ(^{140}Nd) (continued)

E_γ[†]	I_γ	E_i(level)	J^π_i	E_f	J^π_f	Mult.[‡]	Comments
1028.6[#] *2*		1802.6	4^+	774.00	2^+		
1036.2 *5*		8168.7	$18^{(+)}$	7132.5	17^+		
1042.8 *5*		7813.2	18^+	6770.2	$16^{(+)}$	E2	R=0.79 *8*.
1043.2 *10*	0.8	17079.4	(37^-)	16036.2	(35^-)	E2	R=0.59 *6*.
1047.6 *5*	6.3	11173.8	26^+	10126.3	24^+	E2	R=0.65 *15*.
1051.9 *5*	2.7	12124.3	$28^{(-)}$	11072.4	$26^{(-)}$	E2	R=0.78 *10*.
1052.8 *5*		12997.3	(29^-)	11944.7	(27^-)		
1056.7 *5*	9.6	12422.2	$29^{(-)}$	11365.4	$27^{(-)}$	E2	R=0.74 *6*.
1058.1 *5*	4.1	13583.4	$31^{(-)}$	12525.3	$29^{(-)}$	E2	R=0.74 *7*.
1060.3 *5*		16087.4	(35^-)	15027.1	(33^-)	E2	R=0.77 *12*.
1079.5 *5*	2.2	14474.0	(33^+)	13394.5	(31^+)	E2	R=0.57 *14*.
1082.0 *5*	7.7	15042.7	$34^{(+)}$	13960.1	$32^{(+)}$	E2	R=0.75 *8*.
1087.1 *2*		14410.4	(32^+)	13323.3	(30^+)		
1096.5 *10*	0.50 *25*	z+2907.7	(35)	z+1811.2	(33)		
1101.3 *5*		15339.7	(33^-)	14238.4	(31^-)		
1114.1[c] *10*	1.0[c] *5*	u+2069.4	(33)	u+955.3	(31)		
1115.4 *10*	0.05	12480.5	(29^+)	11365.4	$27^{(-)}$		
1118.1 *5*		7525.0	18^+	6406.9	17^-		
1143.6 *10*	0.8 *4*	y+2167.5	(33)	y+1023.9	(31)		
1155.5 *5*		10949.4	(25^-)	9794.1	$23^{(-)}$		
1156.6 *5*		6770.2	$16^{(+)}$	5613.6	15^-		
1194.6 *5*		15605.0	(34^+)	14410.4	(32^+)	(E2)	
1196.8 *5*		8632.5	21^-	7434.9	20^+	(E1)	
1202.4 *10*		16976.9	$36^{(+)}$	15774.0	$34^{(+)}$		
1204.2 *10*		14254.8	(30^+)	13050.9	$30^{(+)}$		
1208.2 *10*		9646.5	22^+	8438.3	20^+	E2	R=0.65 *10*.
1218.2 *10*		6861.0	16^+	5643.6	15^-		
1232.8 *10*		15993.4	(34^-)	14761.5	(32^-)		
1235.6 *10*		16278.3	$36^{(+)}$	15042.7	$34^{(+)}$	E2	R=0.67 *10*.
1239.1[d] *1*		17680.7	$37^{(+)}$	16439.6	$36^{(+)}$		
1240.6 *10*	1.1	18320.0	(39^-)	17079.4	(37^-)	E2	R=0.76 *15*.
1244.3 *10*	1.6 *2*	v+4087.6	(37)	v+2843.3	(35)		
1244.6 *10*	3.3	16286.4	$35^{(+)}$	15042.7	$34^{(+)}$	M1+E2	R=0.38 *8*.
1247.4 *10*		6861.0	16^+	5613.6	15^-		
1251.8 *10*	2.2	15725.8	(35^+)	14474.0	(33^+)	E2	R=0.66 *8*.
1252.8 *10*		12425.9	(28^+)	11173.8	26^+		
1266.1 *1*		5969.5	15^-	4703.3	13^-		
1271.9 *10*	1.9	12445.8	(28^+)	11173.8	26^+		
1274.9 *10*		14858.0	$32^{(+)}$	13583.4	$31^{(-)}$		
1281.6 *10*	4.4	13703.8	$31^{(-)}$	12422.2	$29^{(-)}$	E2	R=0.70 *10*.
1282.3 *10*	1.4	13406.6	$30^{(-)}$	12124.3	$28^{(-)}$	E2	R=0.61 *9*.
1282.8 *10*	0.50 *25*	z+4190.5	(37)	z+2907.7	(35)		
1284.3 *10*		5987.6	(15^-)	4703.3	13^-		
1289.5 *10*		16894.5	(36^+)	15605.0	(34^+)		
1296.5 *10*	0.7 *3*	y+3464.0	(35)	y+2167.5	(33)		
1314.1 *10*	0.50 *25*	u+3383.5	(35)	u+2069.4	(33)		
1319.7 *10*		17407.1	(37^-)	16087.4	(35^-)	E2	R=0.79 *16*.
1320.7 *10*	1.4	14904.1	$33^{(-)}$	13583.4	$31^{(-)}$	E2	R=0.72 *15*.
1321.1 *10*		10587.7	24^+	9266.5	22^+	E2	R=0.65 *7*.
1339.4 *10*		6770.2	$16^{(+)}$	5431.7	14^-		
1350.2[@]		11222.6	$25^{(-)}$	9871.5	23^+		
1353.2 *1*		6966.7	17^-	5613.6	15^-		
1355.2 *10*		15315.3	$33^{(+)}$	13960.1	$32^{(+)}$		

Continued on next page (footnotes at end of table)

^{96}Zr(^{48}Ca,4nγ) 2013Le22,2013Va10 (continued)

γ(^{140}Nd) (continued)

E_γ [†]	I_γ	E_i(level)	J^π_i	E_f	J^π_f	Mult. [‡]	Comments
1367.5 *10*		7525.0	18^+	6158.0	16^+	E2	R=0.60 *8*.
1368.9 *10*		11944.7	(27^-)	10576.0	$25^{(-)}$		
1383.1 *10*	1.1	19703.1	(41^-)	18320.0	(39^-)		
1387.8 *10*		7795.2	18^-	6406.9	17^-		
1394.3 *1*	0.7	17680.7	$37^{(+)}$	16286.4	$35^{(+)}$	E2	R=0.65 *10*.
1396.9 *10*		16439.6	$36^{(+)}$	15042.7	$34^{(+)}$	E2	R=0.83 *17*.
1405.4 *10*	1.9	7813.2	18^+	6406.9	17^-	(E1)	
1417.1 *10*		7825.6	(18^+)	6406.9	17^-		
1427.3 [@]		10437.6	(24^-)	9011.0	22^-		
1427.8 *10*	1.6	17153.6	(37^+)	15725.8	(35^+)		
1437.5 *10*	1.4	15141.3	(33^-)	13703.8	$31^{(-)}$		
1437.6 *10*	0.5	14844.2	(32^-)	13406.6	$30^{(-)}$		
1439.6 *10*	0.5	16343.7	(35^-)	14904.1	$33^{(-)}$		
1442.2 *10*		17881.8	(38^+)	16439.6	$36^{(+)}$		
1442.6 *10*		7056.7	17^-	5613.6	15^-	E2	R=0.61 *10*.
1442.9 *10*	0.8	15146.7	(33^-)	13703.8	$31^{(-)}$		
1472.0 *10*	0.50 *25*	y+4936.0	(37)	y+3464.0	(35)		
1479.0 *10*	0.50 *25*	z+5669.5	(39)	z+4190.5	(37)		
1486.6 *10*	1.4 *2*	v+5574.2	(39)	v+4087.6	(37)		
1489.4 [d] *1*		14540.4	$31^{(+)}$	13050.9	$30^{(+)}$		
1496.4 *1*		7397.9	18^+	5901.6	16^-		
1497.4 *1*		18474.4	$38^{(+)}$	16976.9	$36^{(+)}$		
1514.8 *10*	1.1	21218	(43^-)	19703.1	(41^-)		
1524.3 *10*	0.4 *2*	u+4907.8	(37)	u+3383.5	(35)		
1542.6 *10*		7949.8	19^-	6406.9	17^-	E2	R=0.84 *20*.
1544.0 *10*		18951.1	(39^-)	17407.1	(37^-)	(E2)	
1567.9 *10*		7469.4	(16^-)	5901.6	16^-		
1572.9 *10*	1.1	18726.5	(39^+)	17153.6	(37^+)		
1624.5 *10*	0.30 *15*	z+7294.0	(41)	z+5669.5	(39)		
1631.2 *10*		12997.3	(29^-)	11365.4	$27^{(-)}$		
1655.3 *10*	9.6	7813.2	18^+	6158.0	16^+	E2	R=0.84 *22*.
1666.6 *10*		7825.6	(18^+)	6158.0	16^+		
1667.2 *10*	0.5	22885	(45^-)	21218	(43^-)		
1671.3 *10*	0.4 *2*	y+6607.3	(39)	y+4936.0	(37)		
1705.6 *10*	0.5	20432.1	(41^+)	18726.5	(39^+)		
1706.6 *10*	0.30 *15*	u+6614.4	(39)	u+4907.8	(37)		
1719.2 *10*	1.1 *1*	v+7293.4	(41)	v+5574.2	(39)		
1831.1 *10*	0.3	24716	(47^-)	22885	(45^-)		
1848.6 *10*	0.30 *15*	y+8455.9	(41)	y+6607.3	(39)		
1861.3 *10*	0.3	22293	(43^+)	20432.1	(41^+)		
1927.5 *10*	0.50 *25*	v+9221.0	(43)	v+7293.4	(41)		
1977.3 *10*	0.1	26694	(49^-)	24716	(47^-)		
2012.2 *10*	0.1	24306	(45^+)	22293	(43^+)		
2136.2 *10*	0.30 *15*	v+11357.2	(45)	v+9221.0	(43)		

[†] Uncertainties are assigned based on a general comment in 2013Le22.

[‡] Unless noted otherwise multipolarities are those adopted by 2013Le22 based solely on anisotropy ratio measurements that do not include polarization measurements. It is likely that the ΔJ=2 quadrupole transitions be E2; however the ΔJ=1 dipole transitions being assigned either M1+E2 or E1 by 2013Le22 are rather tentative (theoretical arguments or assumptions were considered by authors). Some of these assignments can differ from those in Adopted Levels, Gammas dataset.

[#] From Adopted Levels, Gammas dataset (not given in 2013Le22).

[@] From 2015Pe10.

Continued on next page (footnotes at end of table)

$^{96}Zr(^{48}Ca,4n\gamma)$ 2013Le22,2013Va10 (continued)

$\gamma(^{140}Nd)$ (continued)

[&] From 2005Pe24 and 2006PeZZ only based on measured DCO ratios (plus same extra considerations as for assignments from 2013Le22).

[a] From 2015Pe10 based on anisotropy ratios (given as R values in comments). 2015Pe10 adopt plainly E2′s for R=0.61 *3* and E1′s for R=0.28 *5* based on the fact that these values are typical for other transitions measured in the same reaction known to be E2 or E1. Same values are listed for stretched Q and D respectively by 2013Le22, making the assignments of pure D as M1 or E1 very weak (for pure Q most transitions are E2 and not M2, which makes the assignments stronger). For adopted multipolarities see the Adopted Lavels, Gammas dataset.

[b] Differ by 3σ or more from calculated value.

[c] Multiply placed with intensity suitably divided.

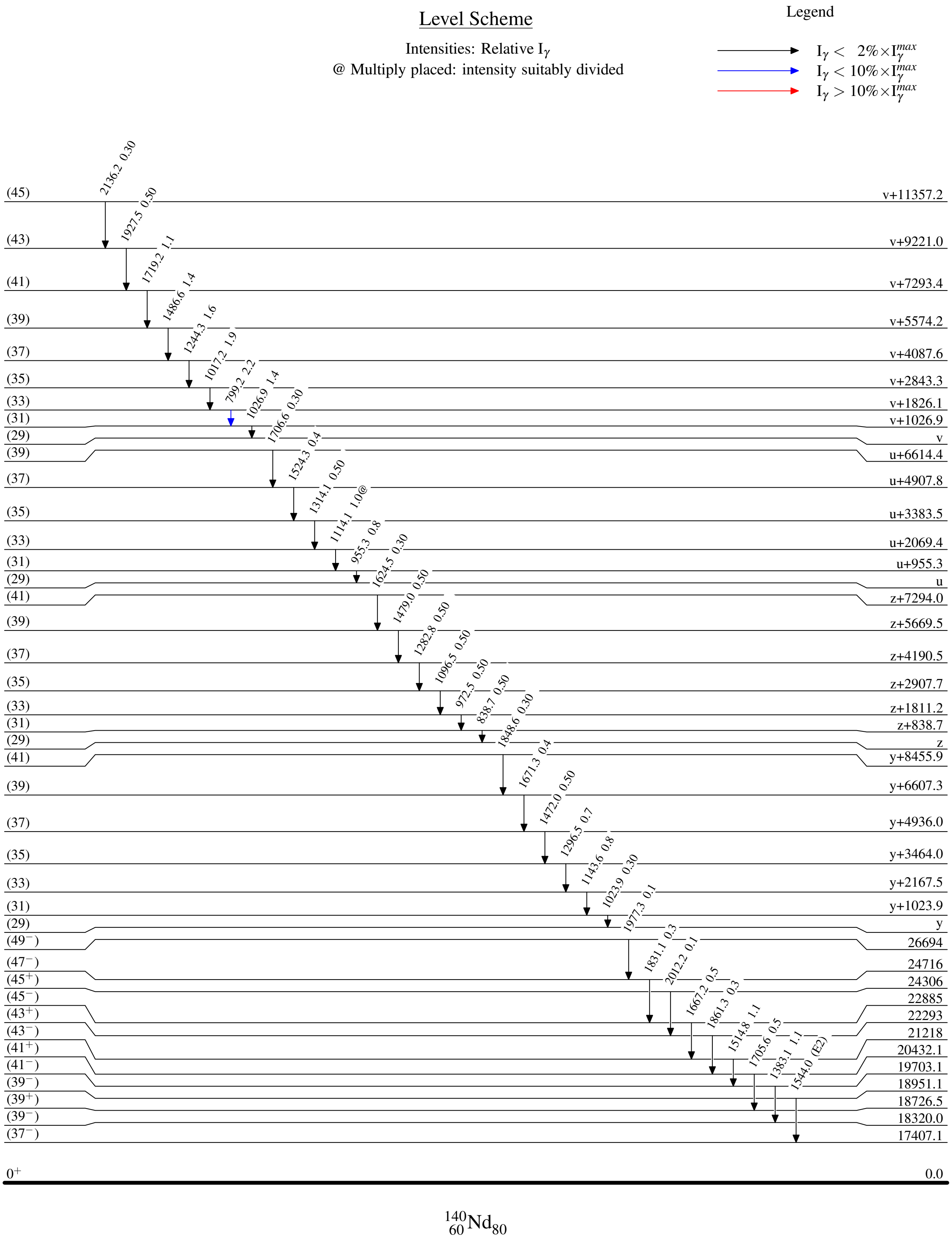
[d] Placement of transition in the level scheme is uncertain.

^{96}Zr(^{48}Ca,4nγ) 2013Le22,2013Va10

Level Scheme

Intensities: Relative I_γ

@ Multiply placed: intensity suitably divided



$^{96}Zr(^{48}Ca,4n\gamma)$ 2013Le22,2013Va10

Level Scheme (continued)

Intensities: Relative I_γ

@ Multiply placed: intensity suitably divided

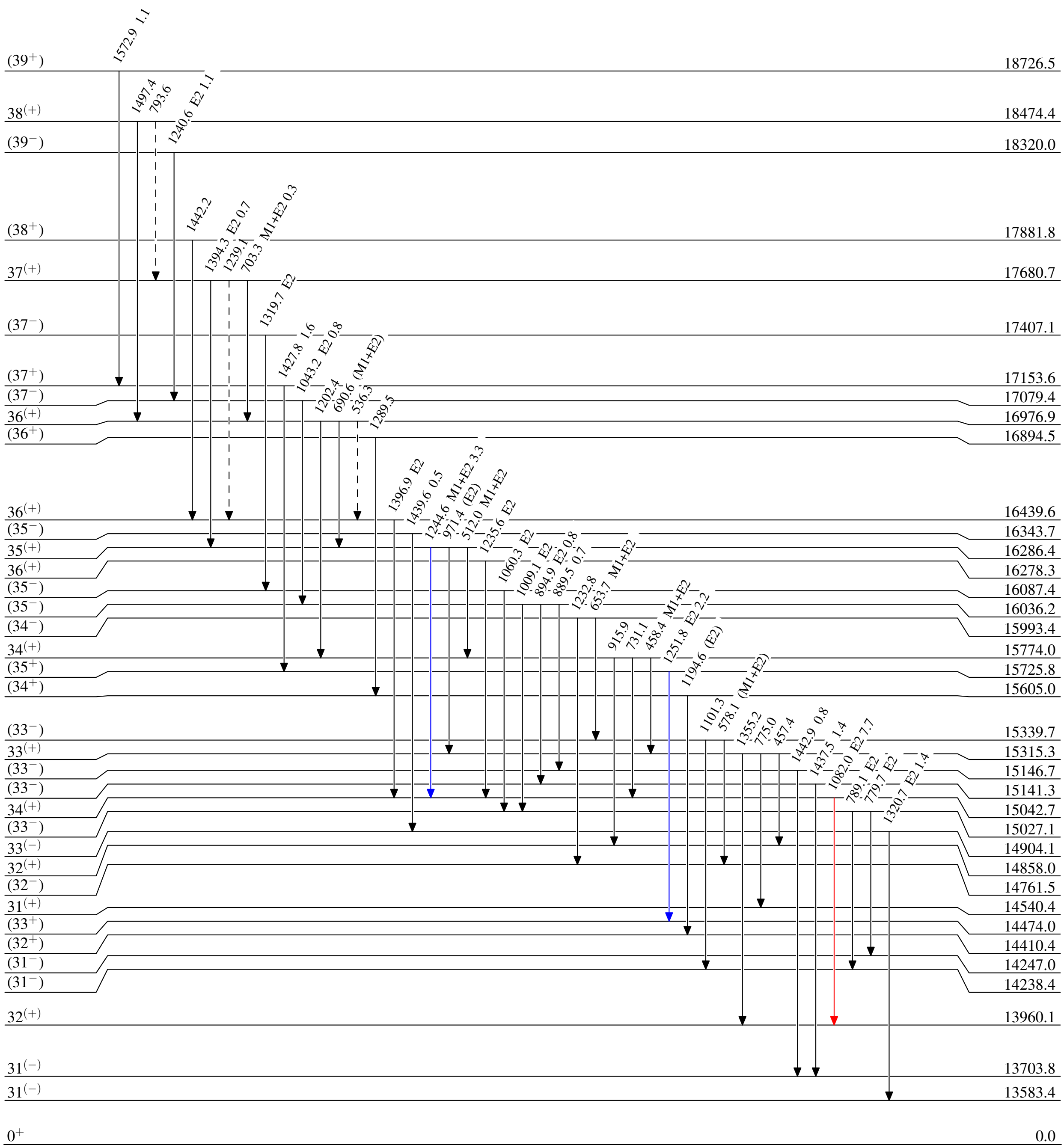
Legend

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

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

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

γ Decay (Uncertain)



$^{140}_{60}Nd_{80}$

$^{96}Zr(^{48}Ca,4n\gamma)$ 2013Le22,2013Va10

Level Scheme (continued)

Intensities: Relative I_γ

@ Multiply placed: intensity suitably divided

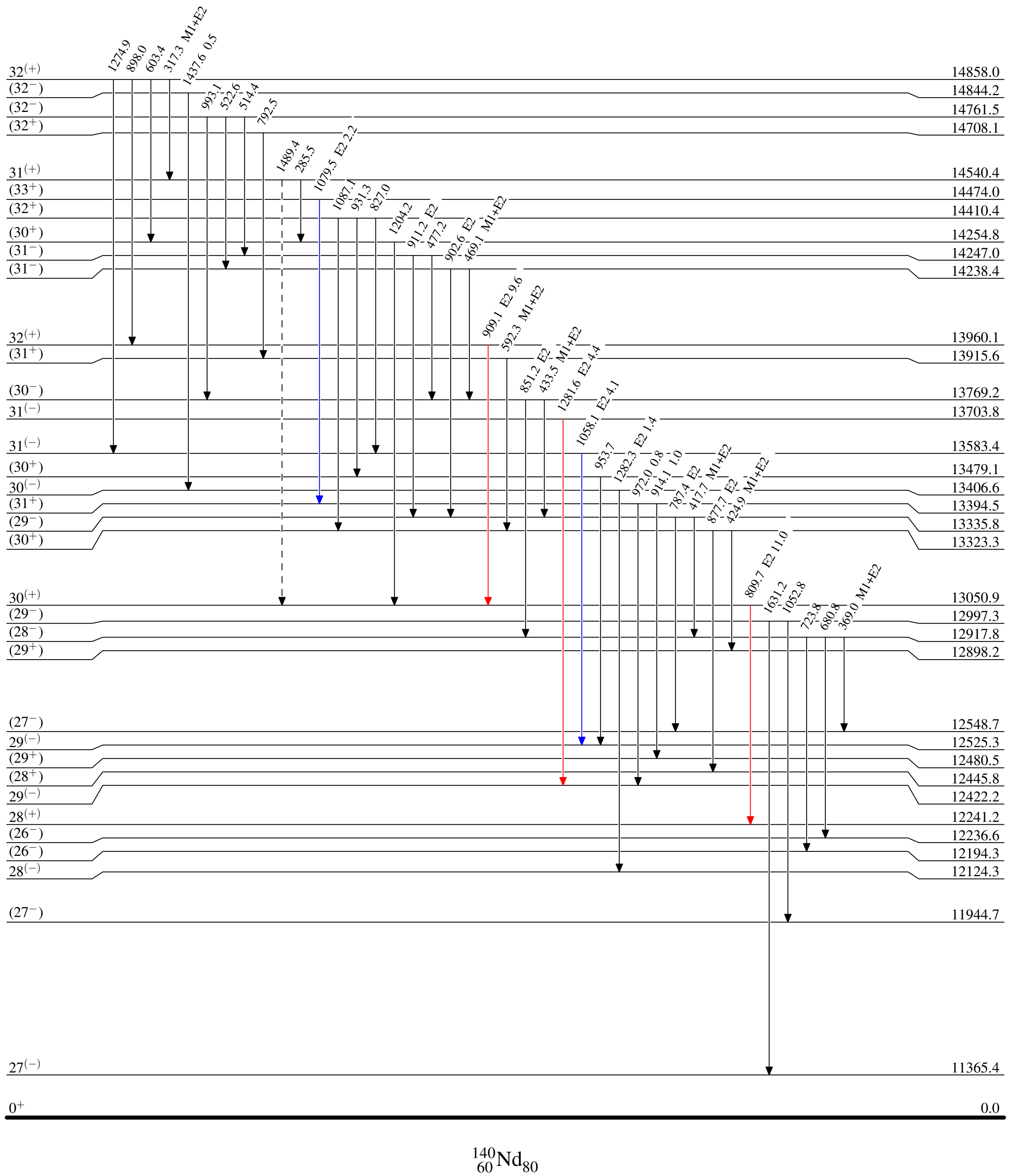
Legend

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

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

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

γ Decay (Uncertain)



$^{96}Zr(^{48}Ca,4n\gamma)$ 2013Le22,2013Va10

Level Scheme (continued)

Intensities: Relative I_γ

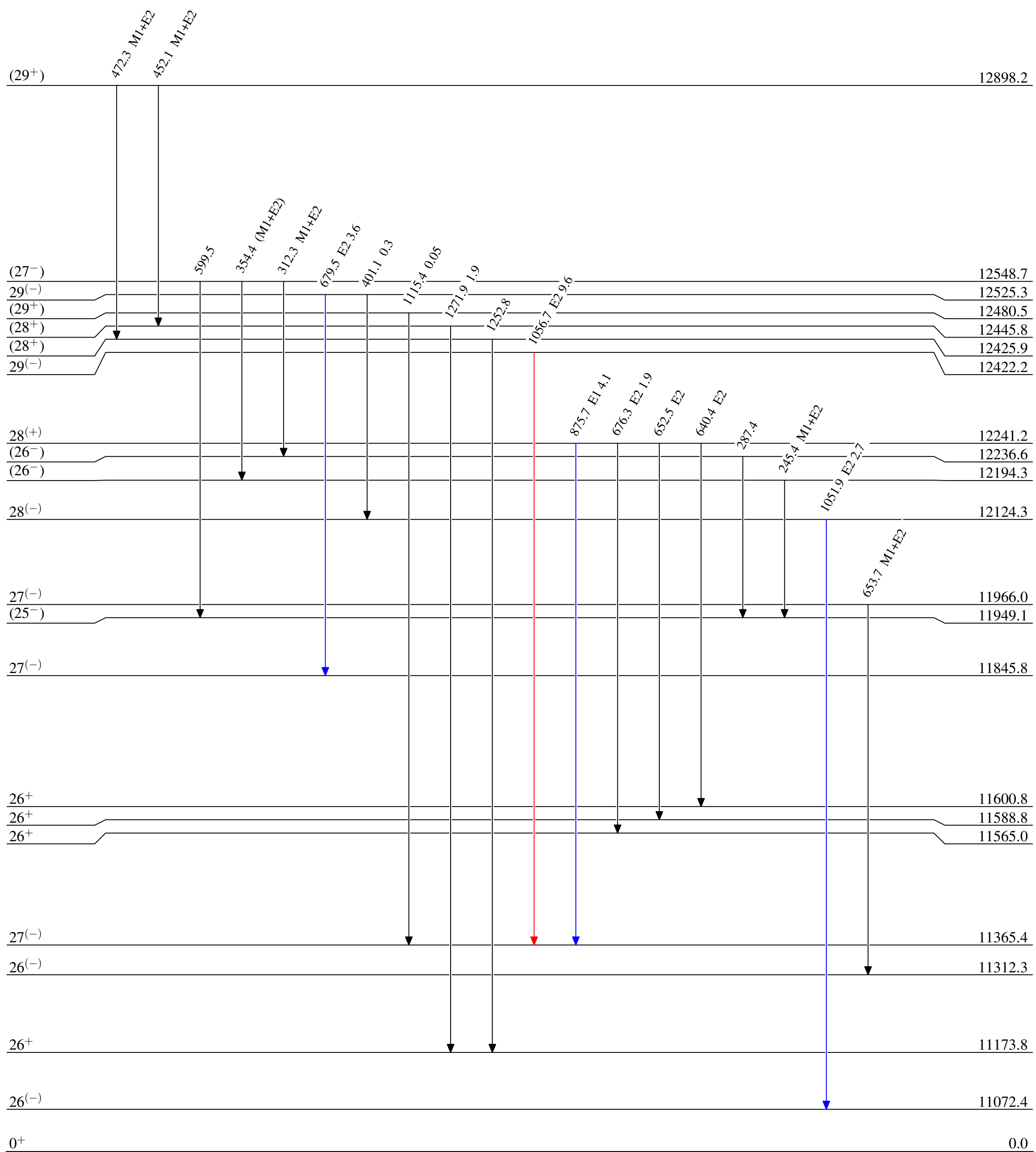
@ Multiply placed: intensity suitably divided

Legend

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

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

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



$^{140}_{60}Nd_{80}$

$^{96}Zr(^{48}Ca,4n\gamma)$ 2013Le22,2013Va10

Level Scheme (continued)

Intensities: Relative I_γ

@ Multiply placed: intensity suitably divided

Legend

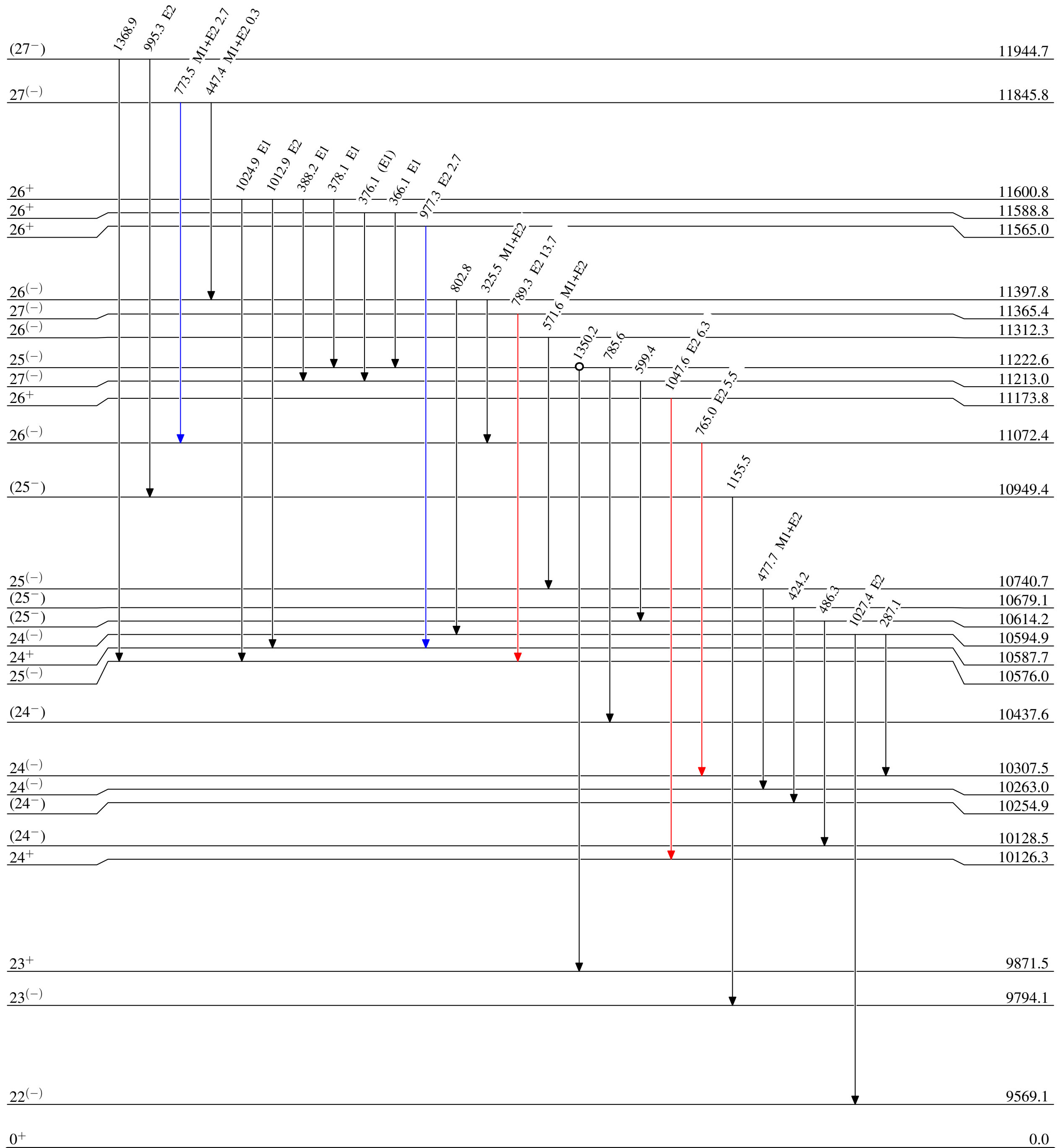
$I_\gamma < 2\% \times I_\gamma^{max}$

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

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

Coincidence

Coincidence (Uncertain)



$^{140}_{60}Nd_{80}$

$^{96}Zr(^{48}Ca,4n\gamma)$ 2013Le22,2013Va10

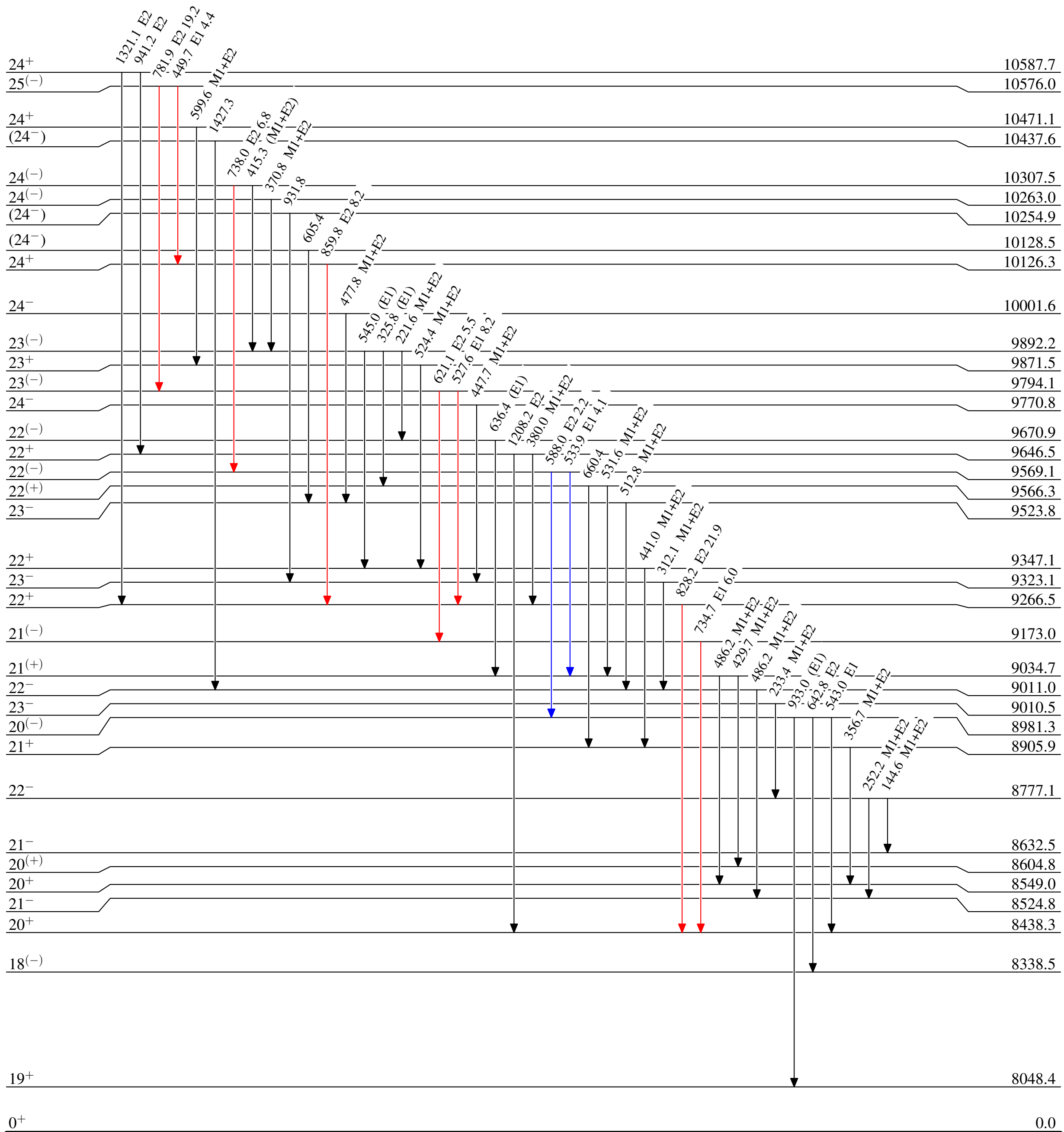
Level Scheme (continued)

Intensities: Relative I_γ

@ Multiply placed: intensity suitably divided

Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$ (black)
- $I_\gamma < 10\% \times I_\gamma^{max}$ (blue)
- $I_\gamma > 10\% \times I_\gamma^{max}$ (red)



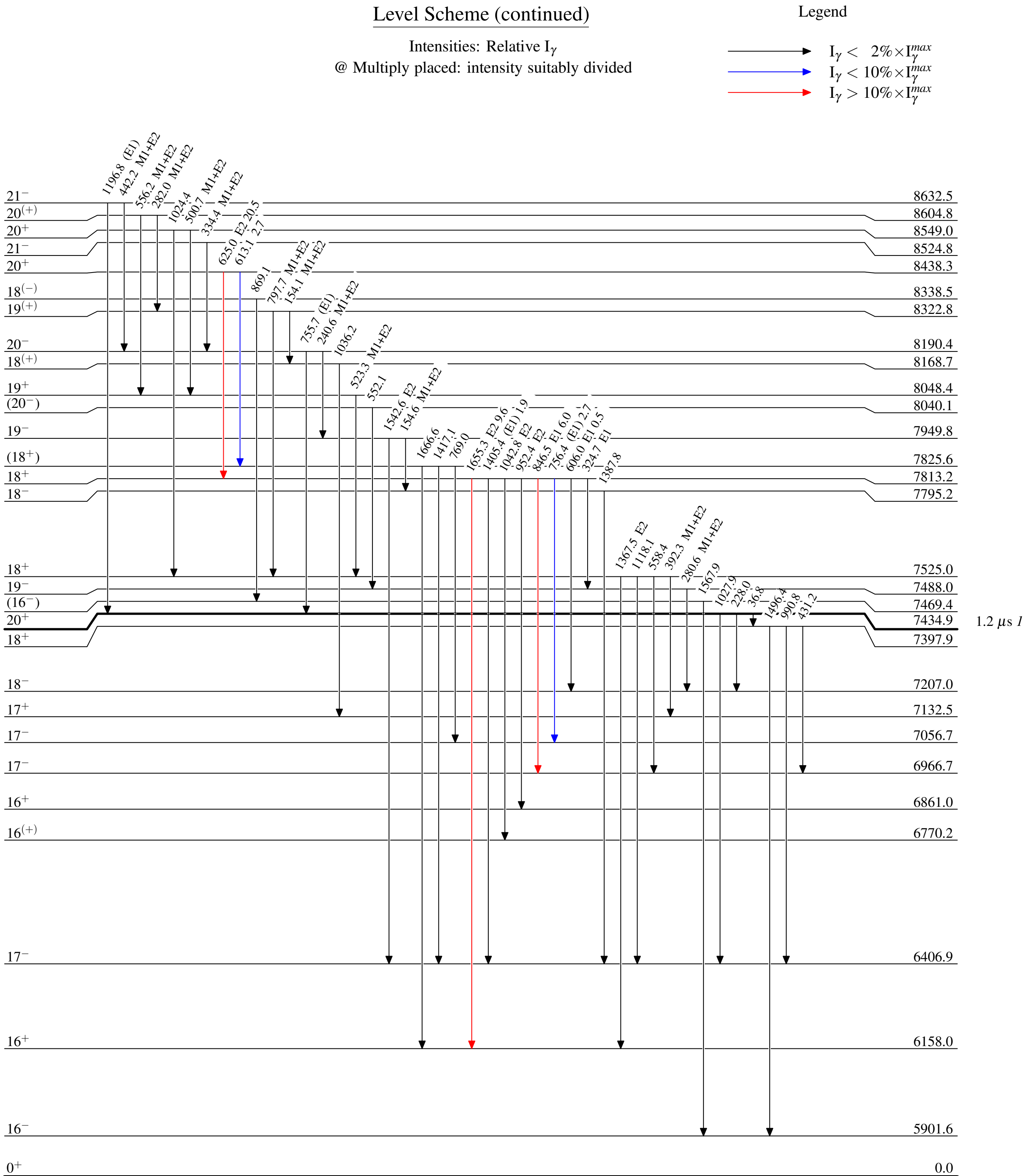
$^{140}_{60}Nd_{80}$

^{96}Zr(^{48}Ca,4nγ) 2013Le22,2013Va10

Level Scheme (continued)

Intensities: Relative I_γ

@ Multiply placed: intensity suitably divided



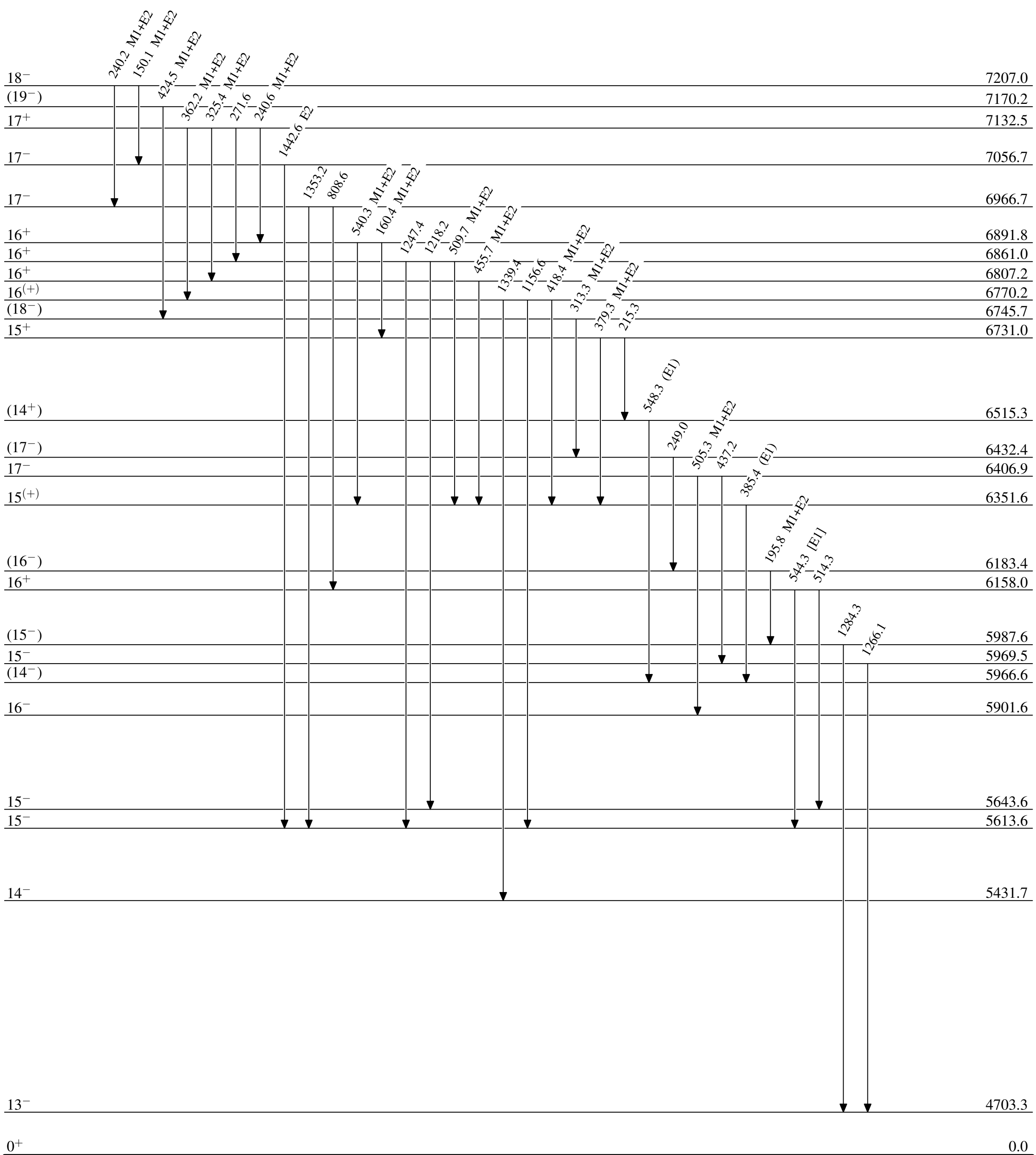
$^{140}_{60}Nd_{80}$

$^{96}Zr(^{48}Ca,4n\gamma)$ 2013Le22,2013Va10

Level Scheme (continued)

Intensities: Relative I_γ

@ Multiply placed: intensity suitably divided



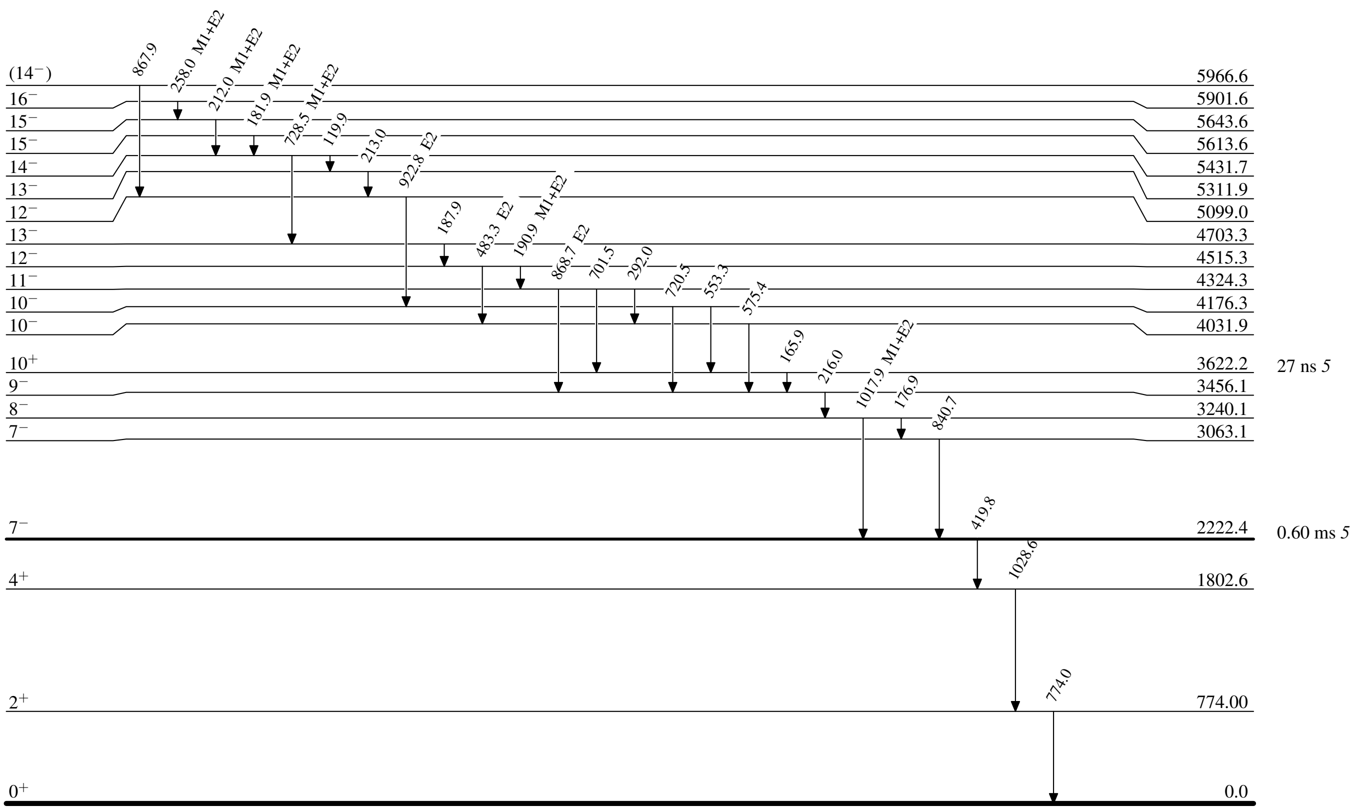
$^{140}_{60}Nd_{80}$

$^{96}Zr(^{48}Ca,4n\gamma)$ 2013Le22,2013Va10

Level Scheme (continued)

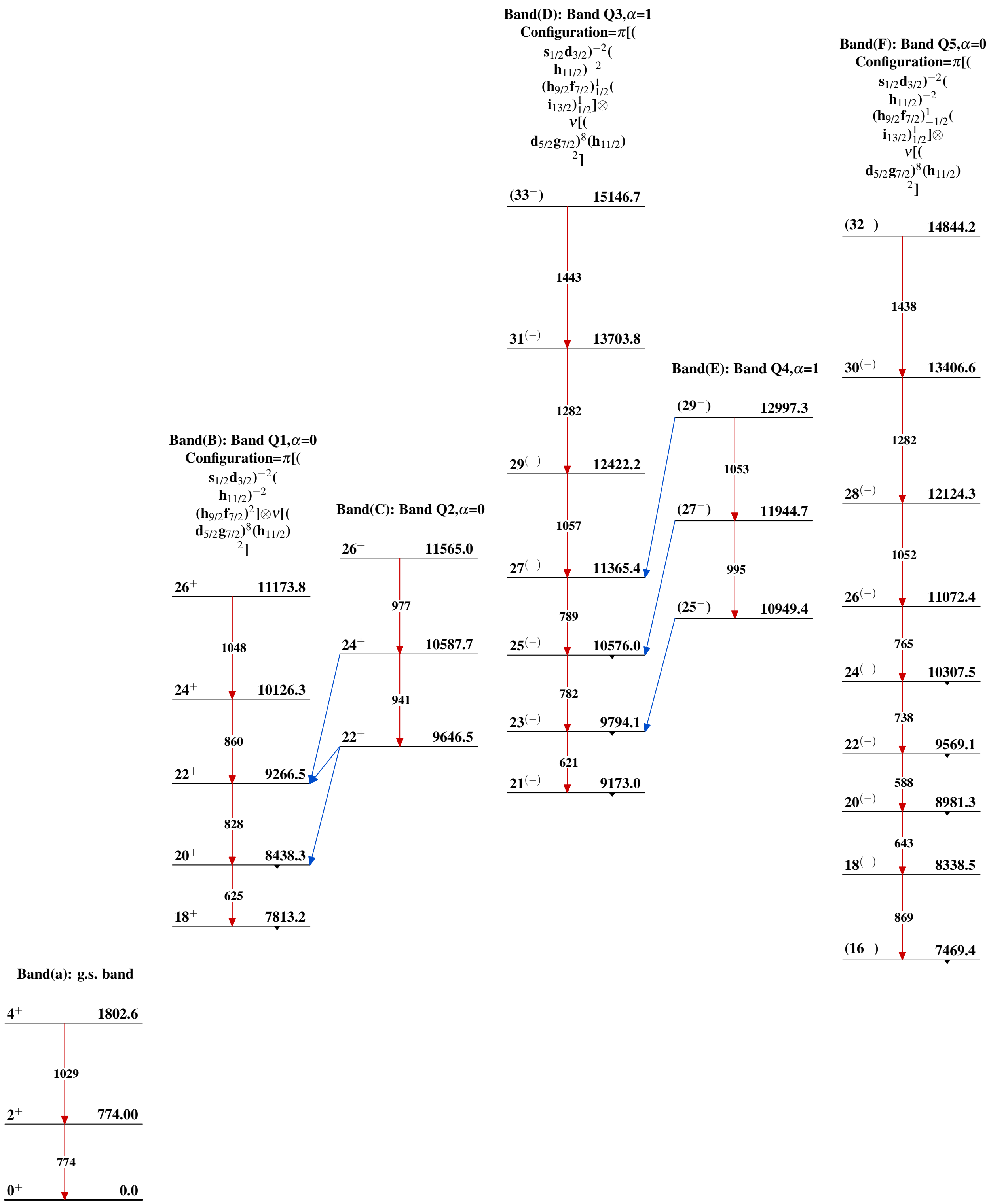
Intensities: Relative I_γ

@ Multiply placed: intensity suitably divided



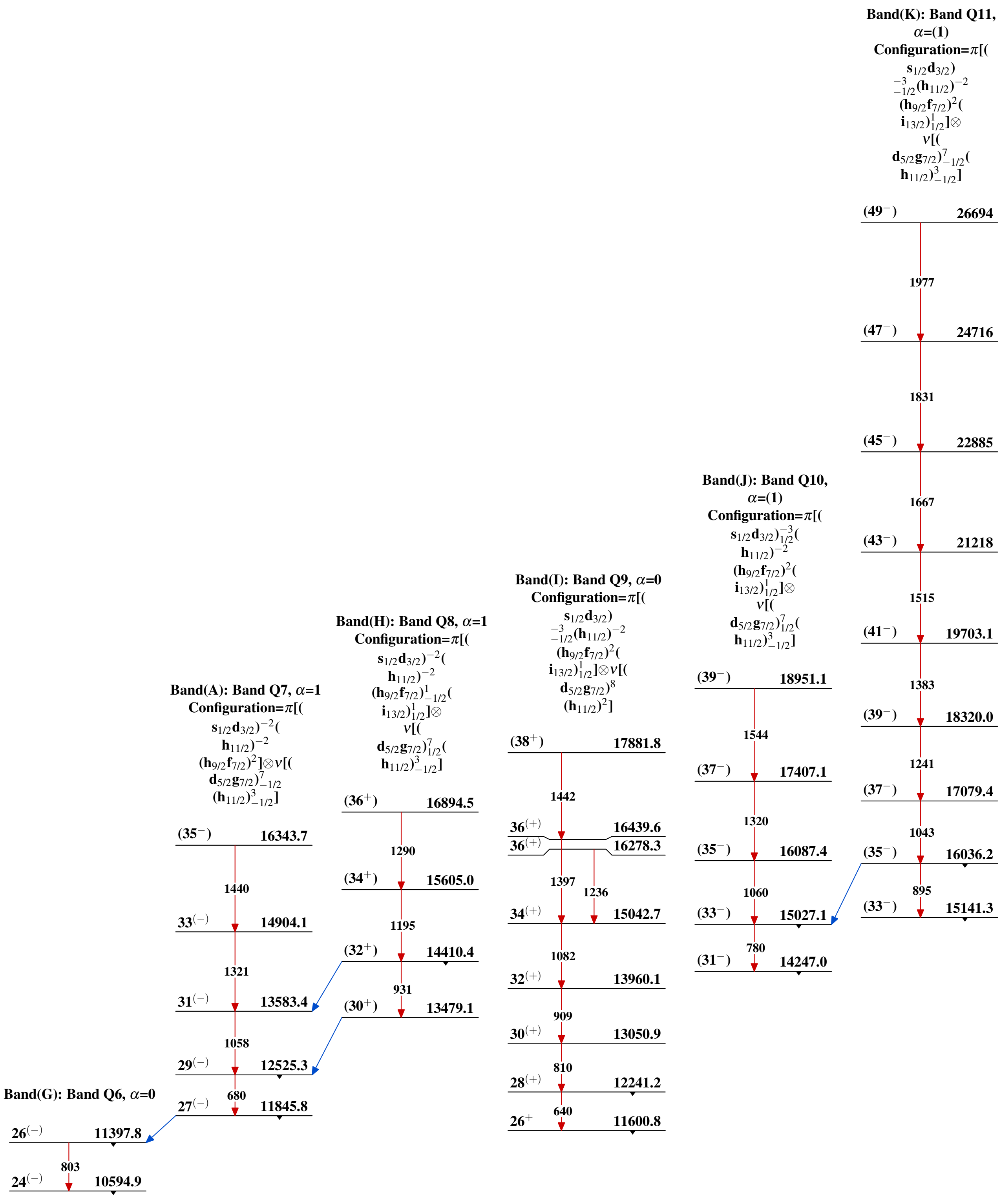
$^{140}_{60}Nd_{80}$

$^{96}Zr(^{48}Ca,4n\gamma)$ 2013Le22,2013Va10



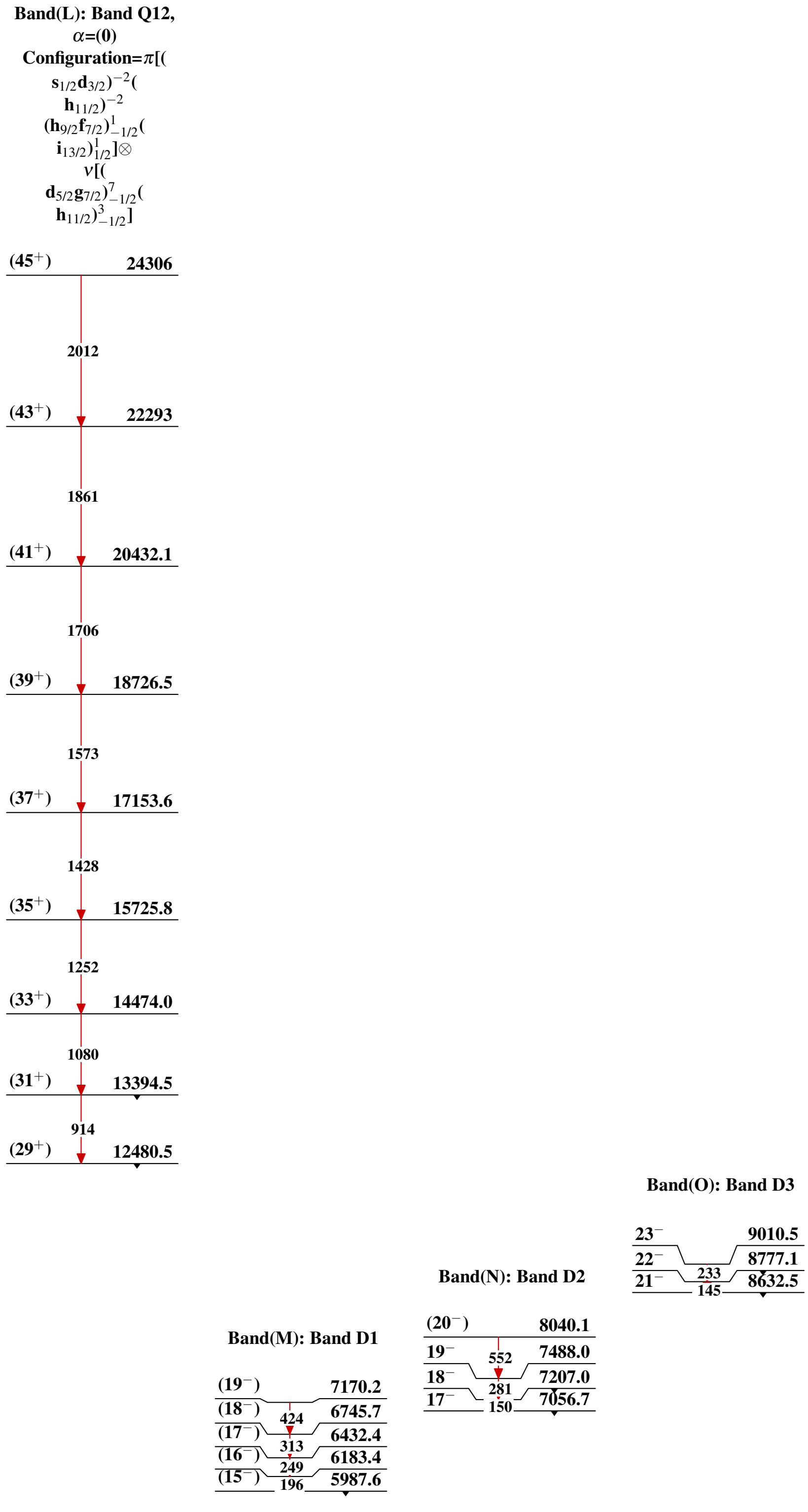
$^{140}_{60}Nd_{80}$

$^{96}Zr(^{48}Ca,4n\gamma)$ 2013Le22,2013Va10 (continued)



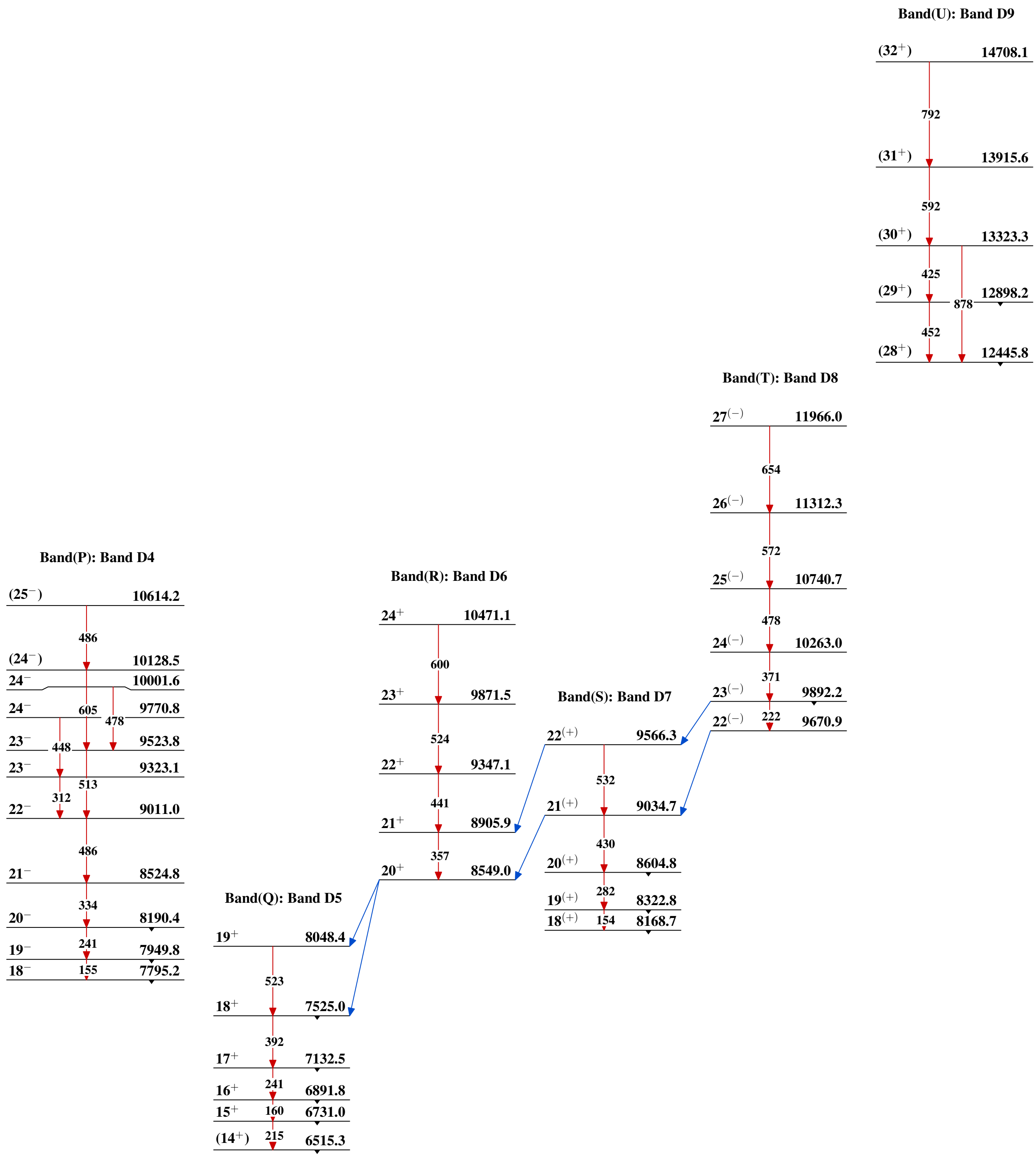
$^{140}_{60}Nd_{80}$

$^{96}Zr(^{48}Ca,4n\gamma)$ 2013Le22,2013Va10 (continued)



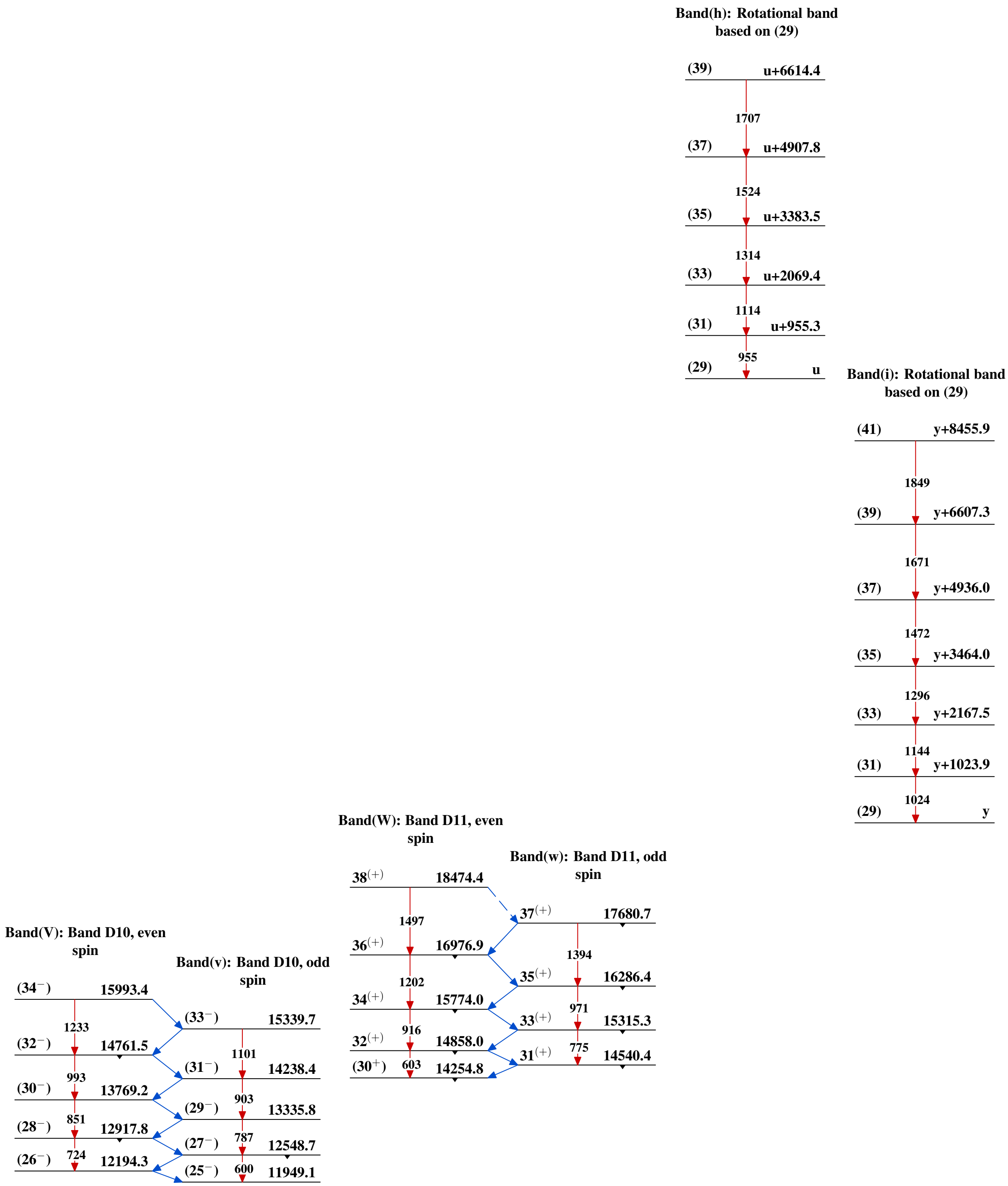
$^{140}_{60}Nd_{80}$

$^{96}Zr(^{48}Ca,4n\gamma)$ 2013Le22,2013Va10 (continued)



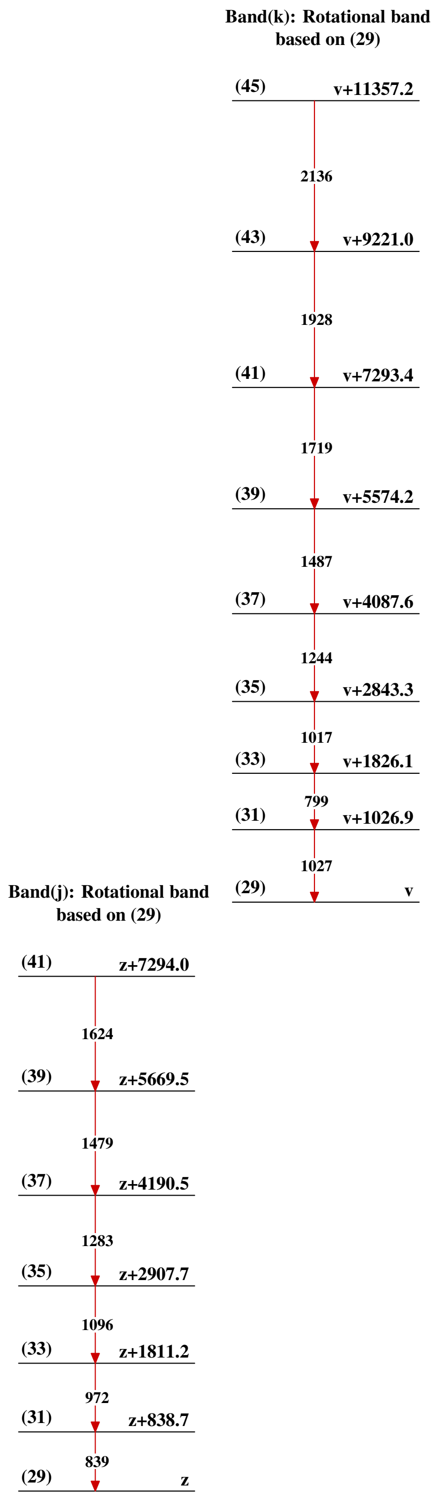
$^{140}_{60}Nd_{80}$

$^{96}Zr(^{48}Ca,4n\gamma)$ 2013Le22,2013Va10 (continued)



$^{140}_{60}Nd_{80}$

$^{96}Zr(^{48}Ca,4n\gamma)$ 2013Le22,2013Va10 (continued)



$^{140}_{60}Nd_{80}$