^{150}Nd(^{18}O,5nγ) 1997Ha23

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	C. W. Reich, Balraj Singh	NDS 111, 1211 (2010)	12-Apr-2010

Additional information 1.

1997Ha23 (some authors are common in 1997Ha23 and earlier studies: 1994Br09,1993Br10,1986LyZY,1985Ba07): E= 87 MeV. Measured Eγ, Iγ, $\gamma\gamma(\theta)$(DCO), $\gamma\gamma\gamma$ coin using GASP array of 40 Ge detectors and an inner ball of 80 BGO scintillators. Deduced B(M1)/B(E2), B(E2)(out-of-band)/B(E2)(in-band) and interaction strengths.

1994Br09, 1985Ba07 (also 1993Br10,1986LyZY): E(^{18}O)=83 MeV. Measured γ's, $\gamma\gamma$-coincidences, and $\gamma(\theta)$. Compton-suppressed Ge′s. One experiment used an array of five Compton-suppressed Ge detectors, while a second used the NORDBALL array (15 Compton-suppressed Ge detectors and 36 BaF_2 inner-ball detectors.) Cranked HFB calculations. Tilted-Axis cranking calculations for the high-spin isomers observed in this study.

1997Le20, 1996Bo01 (also 1995He19): E(^{18}O)= 87 MeV using GASP array (40 Compton suppressed Ge detectors and 80 BGO detectors for the inner ball). γ cascades feeding into low-K and high-K bands in ^{163}Er were analyzed from $\gamma\gamma\gamma$ coin data and persistence of K-quantum number investigated through spectral correlations of low-K and high-K ridges. Rotational quasi-continuum studied by 1997Le20.

1990MeZX: ^{82}Se(^{82}Se,nγ) E=290, 310 MeV. No evidence found for hyperdeformation structure.

^{163}Er has been the subject of a number of studies of the order-to-chaos transition region In nuclei. Several such studies are reported by 2005Be34, 2005Br10, 2005Le21, 2005Le35, 2008LeZX. These studies have many authors In common.

^{163}Er Levels

Level scheme is from 1997Ha23 based on coincidence data and based on earlier (1994Br09) scheme established for 10 bands. Relative intensities of γ rays were used as a guide for ordering transitions in a band.

Bands: band assignments are from 1997Ha23.

Enhanced (by 1-2 orders of magnitude) E1 interband transitions observed between several members of the ν5/2[523] and ν5/2[642] bands (1994Br09) indicate a coupling to octupole-vibrational modes.

Nomenclature of single quasiparticle orbitals (1997Ha23) is as follows:

A: ν5/2[642], α=+1/2.
B: ν5/2[642], α=−1/2.
C: ν3/2[651], α=+1/2.
D: ν3/2[651], α=−1/2.
E: ν5/2[523], α=+1/2.
F: ν5/2[523], α=−1/2.
G: ν3/2[521], α=+1/2.
H: ν3/2[521], α=−1/2.
X: ν11/2[505], α=+1/2.
Y: ν11/2[505], α=−1/2.
a: π7/2[404], α=+1/2.
b: π7/2[404], α=−1/2.
c: π1/2[411], α=+1/2.
d: π1/2[411], α=−1/2.
e: π7/2[523], α=+1/2.
f: π7/2[523], α=−1/2.
k: π5/2[402], α=+1/2.
l: π5/2[402], α=−1/2.

Multi-quasiparticle assignments (1997Ha23). The ones shown in parentheses are tentative:

FAC: π=−, α=+1/2, K≈9/2.
(EAC): π=−, α=−1/2, K≈9/2.
HAC: π=−, α=+1/2, K≈9/2.
GAC: π=−, α=−1/2, K≈9/2.
YAC: π=−, α=+1/2, K≈15/2.
XAC: π=−, α=−1/2, K≈15/2.

^{150}Nd(^{18}O,5nγ) 1997Ha23 (continued)

^{163}Er Levels (continued)

faA: π=−, α=+1/2, K=19/2.
eaA: π=−, α=−1/2, K=19/2.
(YEG/YFH): π=−, α=+1/2, K=15/2.
(XEG/XFH): π=−, α=−1/2, K=15/2.
(AEH): π=+, α=+1/2, K=9/2.
(AEG): π=+, α=−1/2, K=9/2.
(AFG): π=+, α=+1/2, K=9/2.
AFH: π=+, α=−1/2, K=9/2.
(BEG or BFH): π=+, α=+1/2, K=9/2.
(BEH or BFG): π=+, α=−1/2, K=9/2.
faE/eaF: π=+, α=+1/2, K=19/2.
eaE/faF: π=+, α=−1/2, K=19/2.
YAE/XAF: π=+, α=+1/2, K=21/2.
XAE/YAF: π=+, α=−1/2, K=21/2.
YAG/XAH: π=+, α=+1/2, K=19/2.
XAG/YAH: π=+, α=−1/2, K=19/2.

E(level)‡	Jπ†	T1/2	E(level)‡	Jπ†	E(level)‡	Jπ†
0.0[f]	5/2−		1032.3[g] 2	19/2−	1953.0[e] 3	25/2+
69.23[#c]	5/2+		1040.6[h] 3	17/2−	1957.9[g] 2	27/2−
83.96[#g]	7/2−		1077.3[e] 3	17/2+	1961.5[r] 5	21/2−
91.55[#d]	7/2+		1163.1[d] 2	23/2+	1982.4[y] 5	19/2+
104.32[#i]	3/2−		1184.8[c] 2	25/2+	2044.1[n] 3	25/2+
120.38[#c]	9/2+		1214.3[k] 3	17/2+	2066.9[q] 5	25/2−
164.42[#h]	5/2−		1242.8[f] 2	21/2−	2104.3[s] 5	23/2−
189.7[f] 2	9/2−		1258.3[p] 5	19/2−	2120.3[w] 6	19/2+
199.3[d] 2	11/2+		1270.6[i] 3	19/2−	2144.2[x] 5	21/2+
247.0[c] 2	13/2+		1298.0[u] 5	15/2−	2167.6[j] 3	27/2+
249.53[#i]	7/2−		1352.8[j] 5	19/2+	2227.9[f] 2	29/2−
319.7[g] 2	11/2−		1473.9[h] 3	21/2−	2258.3[c] 3	33/2+
359.8[h] 3	9/2−		1476.3[e] 2	21/2+	2271.0[r] 5	25/2−
411.9[d] 2	15/2+		1479.8[g] 2	23/2−	2291.4[d] 3	31/2+
445.5[p] 6	11/2−	0.58[&] μs 10	1510.3[u] 5	17/2−	2307.8[i] 3	27/2−
464.0[c] 2	17/2+		1511.2[q] 5	21/2−	2314.0[v] 5	21/2+
466.1[f] 2	13/2−		1529.6[k] 3	21/2+	2331.6[y] 5	23/2+
496.2[i] 3	11/2−		1607.4[n] 3	21/2+	2368.1[p] 5	27/2−
616.5[q] 5	13/2−		1681.1[c] 2	29/2+	2415.4[k] 2	29/2+
639.6[g] 2	15/2−		1685.7[d] 2	27/2+	2418.0[o] 4	27/2−
655.3[h] 3	13/2−		1717.2[j] 4	23/2+	2431.7[h] 3	29/2−
735.0[d] 2	19/2+		1719.2[f] 2	25/2−	2448.2[e] 2	29/2+
777.1[c] 2	21/2+		1776.0[i] 3	23/2−	2448.9[g] 3	31/2−
809.7[p] 5	15/2−		1781.4[p] 5	23/2−	2460.9[s] 5	27/2−
820.6[f] 2	17/2−		1845.2[s] 5	19/2−	2481.5 4	(23/2)
840.5[i] 3	15/2−		1931.8[k] 2	25/2+	2523.7[w] 5	23/2+
1023.9[q] 5	17/2−		1934.9[h] 4	25/2−	2540.9[n] 3	29/2+

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^{150}Nd(^{18}O,5nγ) 1997Ha23 (continued)

^{163}Er Levels (continued)

E(level)‡	Jπ†	E(level)‡	Jπ†	E(level)‡	Jπ†	E(level)‡	Jπ†
2542.1[x] 5	25/2+	4023.7[s] 5	39/2−	5783.6[r] 5	49/2−	8067.7[k] 6	61/2+
2629.3[m] 14	29/2+	4024.8[w] 5	35/2+	5802.7[m] 5	49/2+	8080.2[e] 6	61/2+
2672.6[r] 5	29/2−	4036.9[o] 4	39/2−	5905.6[y] 6	47/2+	8127.9[m] 5	61/2+
2682.7[q] 6	29/2−	4067.6[l] 4	39/2+	5988.2[i] 5	51/2−	8195.9[n] 7	61/2+
2698.7[j] 3	31/2+	4070.1[q] 8	37/2−	5999.8[f] 5	53/2−	8277.9[h] 8	61/2−
2741.8[f] 3	33/2−	4149.9[k] 4	41/2+	6034.7[c] 5	53/2+	8306.3[r] 9	61/2−
2748.6[v] 5	25/2+	4156.9[h] 4	41/2−	6077.0[v] 5	49/2+	8322.9[g] 5	63/2−
2772.7[y] 5	27/2+	4159.3[g] 3	43/2−	6108.5[d] 4	51/2+	8420.1[v] 6	61/2+
2783.7[i] 3	31/2−	4175.9[x] 5	37/2+	6144.7[o] 5	51/2−	8551.7[o] 5	63/2−
2890.5[o] 3	31/2−	4292.5[v] 5	37/2+	6146.4[j] 4	51/2+	8636.8[i] 6	63/2−
2905.2[s] 5	31/2−	4336.0[n] 5	41/2+	6158.2[e] 4	53/2+	8697.8[s] 9	63/2−
2908.7[c] 3	37/2+	4346.5[r] 5	41/2−	6174.1[s] 5	51/2−	8745.1[f] 7	65/2−
2912.5[l] 2	31/2+	4395.1[c] 4	45/2+	6188.9[l] 5	51/2+	8794.5[d] 11	63/2+
2928.3[e] 3	33/2+	4438.6[m] 8	41/2+	6287.8[x] 6	49/2+	8847.7[c] 6	65/2+
2930.8[h] 3	33/2−	4494.4[d] 4	43/2+	6336.6[k] 5	53/2+	8866.8[w] 7	63/2+
2965.0[g] 3	35/2−	4496.0[y] 5	39/2+	6426.6[w] 5	51/2+	8986.9[m] 6	65/2+
2967.2[k] 3	33/2+	4505.3[f] 4	45/2−	6455.9[g] 5	55/2−	9002.2[k] 6	65/2+
2969.0[d] 3	35/2+	4529.5[i] 4	43/2−	6463.2[h] 6	53/2−	9106.0[n] 8	65/2+
2986.9[w] 5	27/2+	4564.3[w] 5	39/2+	6520.8[n] 5	53/2+	9128.2[e] 8	65/2+
3009.2[p] 6	31/2−	4588.5[e] 3	45/2+	6562.4[m] 5	53/2+	9212.9[h] 9	65/2−
3022.1[x] 5	29/2+	4643.1[j] 4	43/2+	6572.6[r] 6	53/2−	9330.3[v] 8	65/2+
3074.0[n] 4	33/2+	4683.5[s] 5	43/2−	6682.4[y] 6	51/2+	9352.3[g] 6	67/2−
3157.6[r] 5	33/2−	4686.1[o] 4	43/2−	6792.0[v] 6	53/2+	9440.6[o] 5	67/2−
3214.4[m] 10	33/2+	4700.1[l] 4	43/2+	6807.3[i] 5	55/2−	9607.8[s] 10	67/2−
3236.2[v] 5	29/2+	4821.4[x] 5	41/2+	6848.0[f] 6	57/2−	9630.0[i] 7	67/2−
3274.5[f] 3	37/2−	4825.1[k] 4	45/2+	6914.3[c] 5	57/2+	9779.6[t] 7	69/2−
3288.7[y] 5	31/2+	4850.6[v] 5	41/2+	6935.7[o] 5	55/2−	9806.5[w] 8	67/2+
3299.1[j] 3	35/2+	4856.4[g] 4	47/2−	6947.0[d] 6	55/2+	9816.1[f] 7	69/2−
3313.5[i] 3	35/2−	4864.0[h] 5	45/2−	6977.5[j] 5	55/2+	9845.9[c] 10	69/2+
3339.1[q] 7	33/2−	5017.1[n] 5	45/2+	6988.6[s] 6	55/2−	9909.4[m] 6	69/2+
3428.5[s] 5	35/2−	5037.9[r] 5	45/2−	7020.8[l] 6	55/2+	10076.3[n] 9	69/2+
3430.2[e] 3	37/2+	5089.0[m] 4	45/2+	7088.2[e] 5	57/2+	10183.2[h] 11	69/2−
3434.6[o] 3	35/2−	5123.9[w] 5	43/2+	7090.4[x] 8	53/2+	10229.2[e] 9	69/2+
3469.4[l] 4	35/2+	5182.8[y] 5	43/2+	7173.5[w] 6	55/2+	10299.9[v] 10	69/2+
3494.5[w] 5	31/2+	5205.2[c] 4	49/2+	7176.0[k] 5	57/2+	10380.0[o] 6	71/2−
3511.9[h] 4	37/2−	5218.9[f] 5	49/2−	7322.9[m] 5	57/2+	10440.1[g] 6	71/2−
3530.4[k] 3	37/2+	5228.3[i] 4	47/2−	7348.8[n] 6	57/2+	10569.8[s] 12	71/2−
3530.6[g] 3	39/2−	5305.0[d] 4	47/2+	7351.8[h] 7	57/2−	10732.0[t] 8	73/2−
3570.7[x] 5	33/2+	5312.6[e] 4	49/2+	7356.5[g] 5	59/2−	10808.7[w] 12	71/2+
3624.2[c] 3	41/2+	5372.2[j] 4	47/2+	7413.5[r] 8	57/2−	10824.9[c] 13	73/2+
3680.5[n] 4	37/2+	5387.2[o] 4	47/2−	7518.0[y] 8	55/2+	10903.6[f] 8	73/2−
3707.8[d] 4	39/2+	5403.5[s] 5	47/2−	7573.9[v] 6	57/2+	10909.0[m] 7	73/2+
3717.8[r] 5	37/2−	5407.3[l] 4	47/2+	7681.2[i] 5	59/2−	11325.0[v] 12	73/2+
3758.3[v] 5	33/2+	5427.7[v] 5	45/2+	7733.7[o] 5	59/2−	11377.5[o] 8	75/2−
3809.6[m] 9	37/2+	5537.2[x] 5	45/2+	7763.4[f] 6	61/2−	11548.4[g] 6	75/2−
3858.2[f] 4	41/2−	5553.3[k] 4	49/2+	7831.9[s] 7	59/2−	11713.7[t] 11	77/2−
3867.1[y] 5	35/2+	5622.3[g] 4	51/2−	7845.5[d] 9	59/2+	11830.9[c] 17	77/2+
3893.0[i] 4	39/2−	5633.4[h] 5	49/2−	7856.7[c] 6	61/2+	11870.0[w] 13	75/2+
3952.0[j] 3	39/2+	5738.0[n] 5	49/2+	7954.6[x] 9	57/2+	12049.6[f] 9	77/2−
3968.7[e] 3	41/2+	5744.9[w] 5	47/2+	7988.3[w] 6	59/2+	12699.4[g] 8	79/2−

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^{150}Nd(^{18}O,5nγ) 1997Ha23 (continued)

^{163}Er Levels (continued)

E(level)‡	Jπ†	E(level)‡	Jπ†	E(level)‡	Jπ†	E(level)‡	Jπ†
12758.7[t] *12*	81/2−	1076.5+x[z] *9*	(33/2)	2915.9+x[z] *12*	(45/2)	4930.7+x[1] *13*	(55/2)
12881.5[c] *19*	81/2+	1624.0+x[z] *9*	(37/2)	3283.8+x[1] *12*	(47/2)	5393.7+x[z] *14*	(57/2)
13864.7[t] *14*	85/2−	1927.9+x[1] *12*	(39/2)	3671.4+x[z] *12*	(49/2)	5866.5+x[1] *14*	(59/2)
0.0+x[bz]	(25/2)[b]	2236.0+x[z] *12*	(41/2)	4075.6+x[1] *12*	(51/2)	6357.7+x[z] *15*	(61/2)
612.0+x[z] *8*	(29/2)	2565.4+x[1] *12*	(43/2)	4495.4+x[z] *12*	(53/2)		

† From 1997Ha23, based on multipolarities of interband transitions, band crossings, band structures, $\gamma(\theta)$ (1994Br09) and $\gamma\gamma(\theta)$(DCO) (1997Ha23). Only a few R(DCO) ratios are listed by 1997Ha23 in their paper, others were probably obtained by the authors, but not listed. Details of $\gamma(\theta)$ data (1994Br09) are not available. J^{π}'s for low-lying levels (<500) are from the Adopted Levels. Most of these assignments are given under parentheses in Adopted Levels because, in evaluators' opinion, strong arguments (according to policies in NDS) still seem lacking.

‡ From least-squares fit to Eγ's. The following low-lying levels known with better precision from Adopted Levels (taken from ^{163}Tm ε decay) were kept fixed in the least-squares adjustment: 69.23, 83.96, 91.55, 104.32, 120.38, 164.42 and 249.53.

From the Adopted Levels. Energy of this level was fixed in the least-squares analysis.

@ Half-life or lifetime= 1 ns to 75 ns from $\gamma\gamma$(t) (1994Br09).

& $\gamma\gamma$(t) in (α,2nγ) (1974An04).

[a] <≈ 1.4 ns (1997Ha23).

[b] γ rays from Band 1 and Band 2 are observed in coin with those of Band A and Band B, but no linking transitions are reported (1997Ha23). 1997Ha23 quote energy x=2074.2 and J=(25/2) based on population intensity and γ-ray energies. But in the absence of linking transitions the level energy cannot be defined precisely; it is probably near 2 MeV.

[c] Band(A): Yrast band A: ν5/2[642], α=+1/2. A band crossing at a rotational frequency of ≈400 suggests change to ABC configuration (alignment of a pair of $i_{13/2}$ neutrons) and a second band crossing suggesting change to ABCef (alignment of a pair of $h_{11/2}$ protons).

[d] Band(B): Band B: ν5/2[642], α=−1/2. A band crossing at a rotational frequency of ≈ 400 keV suggests neutron crossing AD with the alignment of a pair of $i_{13/2}$ neutrons.

[e] Band(C): band C: ν3/2[651], α=+1/2.

[f] Band(D): Band E: ν5/2[523], α=+1/2. No signature splitting is observed. A band crossing at a rotational frequency of ≈250 suggests change to EAB configuration (alignment of a pair of $i_{13/2}$ neutrons) and a second band crossing suggests change to EABef.

[g] Band(E): Band F: ν5/2[523], α=−1/2. No signature splitting is observed. A band crossing at a rotational frequency of ≈250 suggests a change to FAB configuration (alignment of a pair of $i_{13/2}$ neutrons) and a second band crossing suggests change to FABef.

[h] Band(F): Band G: ν3/2[521], α=+1/2. First band crossing suggests change to GAB (alignment of a pair of $i_{13/2}$ neutrons) and a second crossing to GABef (alignment of a pair of $h_{11/2}$ protons.).

[i] Band(G): Band H: ν3/2[521], α=−1/2. A band crossing suggests change to HAB at about 27/2.

[j] Band(H): band (AEG), α=−1/2.

[k] Band(I): band (AEH), α=+1/2.

[l] Band(J): band (BEH or BFG), α=−1/2.

[m] Band(K): band (BEG or BFH), α=+1/2.

[n] Band(L): band (AFG), α=+1/2.

[o] Band(M): band (EAC), α=−1/2.

[p] Band(N): Band Y: ν11/2[505], α=−1/2. No signature splitting is observed. A band crossing at a rotational frequency of ≈300 is probably due to alignment of a pair of $i_{13/2}$ neutrons.

[q] Band(O): Band X: ν11/2[505], α=+1/2. No signature splitting is observed. A band crossing at a rotational frequency of ≈300 is probably due to alignment of a pair of $i_{13/2}$ neutrons.

[r] Band(P): Band faA, K=19/2 α=+1/2. A band crossing suggests change to faABC. Based on decay modes, Routhian calculations and calculated transition rates (B(M1)/B(E2)) using tilted-axis cranking model, the best predicted configuration (1994Br09) is

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^{150}Nd(^{18}O,5nγ) 1997Ha23 (continued)

^{163}Er Levels (continued)

ν5/2[642], coupled to the 7$^-$ state formed by (π7/2[523])⊗(π7/2[404]) in ^{164}Er. No signature splitting is observed.

[s] Band(Q): Band eaA, K=19/2, α=−1/2. A band crossing suggests change to eaABC. See also comment for band faA.

[t] Band(R): band EABef.

[u] Band(S): Band X,Y +γ vibration. Based on a comparison of experimental and calculated (K-allowed and K-hindered) reduced transition (E2) probabilities and K^π=19/2$^-$ for the 1845 bandhead, 1994Br09 deduce K^π=15/2$^-$ for the 1297 bandhead. 1994Br09 state that coupling between the available orbitals does not produce J^π=15/2$^-$, however, a γ vibration built on ν11/2[505] would have 15/2$^-$ in its ground state.

[v] Band(T): Band faE, K=19/2, α=+1/2. A band crossing suggests change to faEAB.

[w] Band(U): Band eaE, K=19/2, α=−1/2. A band crossing suggests change to eaEAB.

[x] Band(V): Band YAG, K=19/2, α=+1/2. Based on decay modes, Routhian calculations and calculated transition rates (B(M1)/B(E2)) using tilted-axis cranking model, the best predicted configuration (1994Br09) is ν5/2[523] coupled to the 7$^-$ state formed by (π7/2[523])⊗(π7/2[404]) in ^{164}Er. But the configuration (ν11/2[505])⊗(ν5/2[523])⊗(ν3/2[521]), giving K^π=19/2$^-$ is not ruled out. No signature splitting is observed.

[y] Band(W): Band XAG, K=19/2, α=−1/2. See comment for band YAG.

[z] Band(X): Band 1.

[1] Band(Y): Band 2.

γ(^{163}Er)

No multipolarities are given here since none were quoted explicitly by 1997Ha23 and 1994Br09. It is assumed (evaluators) that multipolarities are implied from (mostly unlisted) $\gamma(\theta)$ data of 1994Br09, $\gamma\gamma(\theta)$(DCO) data of 1997Ha23 and associated band structures and band mixings.

DCO ratios for selected transitions (1997Ha23)

Eγ	R(DCO)	Eγ	R(DCO)
137.33	0.56 *20*	702.95	1.03 *8*
165.01	2.30 *20*	703.6	0.97 *18*
187.54	1.0 *4*	706.59	1.60 *14*
232.74	1.8 *3*	713.63	1.00 *8*
276.35	1.01 *11*	745.76	1.8 *3*
308.81	1.7 *5*	753.0	1.14 *22*
313.10	1.07 *7*	767.95	1.45 *12*
323.10	1.05 *9*	786.49	0.98 *9*
407.66	1.09 *6*	810.01	1.01 *9*
428.25	1.01 *8*	825.3	1.09 *22*
476.45	1.05 *10*	833.63	0.86 *12*
496.33	0.99 *7*	846.0	1.05 *13*
516.29	1.03 *12*	848.23	0.98 *9*
522.84	0.99 *8*	859.88	0.76 *12*
532.73	1.04 *8*	881.0	0.3 *1*
542.33	1.61 *15*	900.59	0.89 *16*
565.65	0.99 *8*	915.38	1.00 *12*
577.38	0.99 *7*	985.77	1.1 *5*
583.65	1.05 *8*	1017.63	2.1 *6*
606.00	1.03 *9*	1040.77	2.3 *10*
621.85	1.47 *12*	1055.56	1.8 *3*
628.87	0.98 *7*	1102.80	1.51 *16*
647.09	1.06 *8*	1123.1	1.8 *4*
650.52	0.98 *7*	1233.3	2.2 *3*
677.60	0.97 *8*		

For the geometry used by 1997Ha23, R(DCO) ≈ 1 indicates stretched quadrupole, R(DCO) ≈ 1.6 indicates stretched dipole

R(DCO) ratios for many other transitions were probably obtained by 1997Ha23, but not listed in the paper.

E_γ [†]	I_γ [†]	E_i(level)	J_i^π	E_f	J_f^π	Comments
22.36[‡]		91.55	7/2+	69.23	5/2+	
28.83[‡]		120.38	9/2+	91.55	7/2+	
51.1[bg]		120.38	9/2+	69.23	5/2+	
58.36[a] *22*		164.42	5/2−	104.32	3/2−	
69.30 *22*		69.23	5/2+	0.0	5/2−	
79.0 *4*		199.3	11/2+	120.38	9/2+	
83.93 *23*		83.96	7/2−	0.0	5/2−	
86.9 *11*		249.53	7/2−	164.42	5/2−	Additional information 3.
91.40 *21*		91.55	7/2+	0.0	5/2−	
104.32[‡]		104.32	3/2−	0.0	5/2−	
105.8 *3*	3.8 *20*	189.7	9/2−	83.96	7/2−	
107.8 *3*	1.4 *4*	199.3	11/2+	91.55	7/2+	
109.6 *5*	2.2 *10*	359.8	9/2−	249.53	7/2−	
116.40 *20*	8.8 *4*	1961.5	21/2−	1845.2	19/2−	
125.8[‡]		445.5	11/2−	319.7	11/2−	
126.79 *20*		247.0	13/2+	120.38	9/2+	
130.07 *24*	2.8 *4*	319.7	11/2−	189.7	9/2−	
136.2 *3*	1.4 *3*	496.2	11/2−	359.8	9/2−	
137.33[c] *20*	6.4 *3*	1982.4	19/2+	1845.2	19/2−	
142.72 *20*	12.8 *5*	2104.3	23/2−	1961.5	21/2−	
145.3 *5*	2.0 *10*	249.53	7/2−	104.32	3/2−	
146.43 *22*	1.9 *1*	466.1	13/2−	319.7	11/2−	
158.8 *3*	1.1 *1*	655.3	13/2−	496.2	11/2−	
161.95 *20*	4.3 *2*	2144.2	21/2+	1982.4	19/2+	
165.01[@] *20*	16.3 *7*	411.9	15/2+	247.0	13/2+	
166.73 *20*	13.9 *5*	2271.0	25/2−	2104.3	23/2−	
170.86 *20*	35[e]	616.5	13/2−	445.5	11/2−	
173.5 *4*	0.6 *1*	639.6	15/2−	466.1	13/2−	
181.0 *3*	1.0 *1*	820.6	17/2−	639.6	15/2−	
182.85 *21*	3.3 *2*	2144.2	21/2+	1961.5	21/2−	
185.3 *3*	1.3 *1*	840.5	15/2−	655.3	13/2−	
187.54[@] *20*	6.5 *3*	2331.6	23/2+	2144.2	21/2+	
189.73 *21*	18 *9*	189.7	9/2−	0.0	5/2−	Additional information 2.
189.96 *20*	13.4 *5*	2460.9	27/2−	2271.0	25/2−	
193.17 *20*	15.8 *7*	809.7	15/2−	616.5	13/2−	
193.66 *22*		2314.0	21/2+	2120.3	19/2+	
196.5 *5*	3.5 *13*	359.8	9/2−	164.42	5/2−	
198.5[‡g]		445.5	11/2−	247.0	13/2+	
199.5 *4*	2.3 *2*	319.7	11/2−	120.38	9/2+	
199.9 *3*	1.3 *2*	1040.6	17/2−	840.5	15/2−	
202.8 *3*	0.9 *1*	1473.9	21/2−	1270.6	19/2−	
209.8 *4*	0.4 *3*	2523.7	23/2+	2314.0	21/2+	
210.32 *20*	4.5 *3*	2542.1	25/2+	2331.6	23/2+	
210.7 *6*	0.3 *1*	1242.8	21/2−	1032.3	19/2−	
211.7 *6*	0.7 *1*	1032.3	19/2−	820.6	17/2−	
211.79 *20*	11.7 *4*	2672.6	29/2−	2460.9	27/2−	
212.30 *20*	1.2 *6*	1510.3	17/2−	1298.0	15/2−	
212.69 *20*	39.6 *18*	411.9	15/2+	199.3	11/2+	
214.13 *21*	8.8 *4*	1023.9	17/2−	809.7	15/2−	
217.02 *20*	85 *3*	464.0	17/2+	247.0	13/2+	
225.4 *3*	0.4 *1*	2748.6	25/2+	2523.7	23/2+	
227.13 *22*	3.5 *2*	2331.6	23/2+	2104.3	23/2−	
229.6 *3*	1.7 *1*	1270.6	19/2−	1040.6	17/2−	
230.48 *20*	7.9[f] *3*	2772.7	27/2+	2542.1	25/2+	
232.74[@] *20*	10.7 *4*	2905.2	31/2−	2672.6	29/2−	
234.25 *22*	3.5 *3*	1258.3	19/2−	1023.9	17/2−	
235.68 *21*	7.0 *10*	319.7	11/2−	83.96	7/2−	

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^{150}Nd(^{18}O,5nγ) 1997Ha23 (continued)

$\gamma(^{163}Er)$ (continued)

E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π
238.30 *21*	2.7 *2*	2986.9	27/2$^+$	2748.6	25/2$^+$
246.0 *4*	1.6 *4*	496.2	11/2$^-$	249.53	7/2$^-$
246.2‡		445.5	11/2$^-$	199.3	11/2$^+$
249.37 *21*	6.3 *2*	3022.1	29/2$^+$	2772.7	27/2$^+$
249.41 *21*	2.5 *2*	3236.2	29/2$^+$	2986.9	27/2$^+$
252.30 *20*	8.5 *3*	3157.6	33/2$^-$	2905.2	31/2$^-$
252.83 *22*	2.5 *2*	1511.2	21/2$^-$	1258.3	19/2$^-$
255.8‡		445.5	11/2$^-$	189.7	9/2$^-$
256.97 *21*	2.8 *5*	4821.4	41/2$^+$	4564.3	39/2$^+$
258.42 *21*	3.6 *2*	3494.5	31/2$^+$	3236.2	29/2$^+$
259.1 *3*	1.4 *1*	2104.3	23/2$^-$	1845.2	19/2$^-$
263.70 *21*	3.9 *2*	3758.3	33/2$^+$	3494.5	31/2$^+$
266.29 *23*	2.8 *2*	4024.8	35/2$^+$	3758.3	33/2$^+$
266.53 *21*	5.5 *2*	3288.7	31/2$^+$	3022.1	29/2$^+$
266.89 *21*	3.9 *2*	466.1	13/2$^-$	199.3	11/2$^+$
267.06 *24*	2.0 *4*	2748.6	25/2$^+$	2481.5	(23/2)
267.7 *3*	2.8 *2*	4292.5	37/2$^+$	4024.8	35/2$^+$
270.07 *25*	1.9 *2*	1781.4	23/2$^-$	1511.2	21/2$^-$
270.89 *20*	7.8 *3*	3428.5	35/2$^-$	3157.6	33/2$^-$
271.02 *20*	13.6 *5*	735.0	19/2$^+$	464.0	17/2$^+$
271.09 *22*	3.1 *2*	2542.1	25/2$^+$	2271.0	25/2$^-$
271.72 *22*	2.5 *2*	4564.3	39/2$^+$	4292.5	37/2$^+$
273.37 *21*	6.0 *3*	5123.9	43/2$^+$	4850.6	41/2$^+$
276.35# *20*	27.5 *12*	466.1	13/2$^-$	189.7	9/2$^-$
281.85 *21*	3.2 *2*	3570.7	33/2$^+$	3288.7	31/2$^+$
285.40 *24*	1.9 *1*	2066.9	25/2$^-$	1781.4	23/2$^-$
286.06 *23*	1.2 *1*	4850.6	41/2$^+$	4564.3	39/2$^+$
289.05 *20*	6.5 *2*	3717.8	37/2$^-$	3428.5	35/2$^-$
295.84 *22*	4.6 *5*	655.3	13/2$^-$	359.8	9/2$^-$
296.32 *21*	3.9 *2*	3867.1	35/2$^+$	3570.7	33/2$^+$
300.7 *3*	1.2 *1*	2368.1	27/2$^-$	2066.9	25/2$^-$
301.2 *6*	0.5 *1*	1776.0	23/2$^-$	1473.9	21/2$^-$
302.08 *24*	1.9 *10*	5123.9	43/2$^+$	4821.4	41/2$^+$
303.68 *21*	5.2 *2*	5427.7	45/2$^+$	5123.9	43/2$^+$
303.9 *3*	1.1 *1*	2672.6	29/2$^-$	2368.1	27/2$^-$
305.56 *24*	1.7 *1*	3274.5	37/2$^-$	2969.0	35/2$^+$
305.66 *21*	5.4 *2*	4023.7	39/2$^-$	3717.8	37/2$^-$
308.81@ *22*	5.1 *2*	4175.9	37/2$^+$	3867.1	35/2$^+$
309.9 *3*	1.8 *1*	2271.0	25/2$^-$	1961.5	21/2$^-$
313.10# *20*	140 *4*	777.1	21/2$^+$	464.0	17/2$^+$
313.11 *22*	6.3 *5*	1476.3	21/2$^+$	1163.1	23/2$^+$
314.6 *3*	1.4 *2*	2682.7	29/2$^-$	2368.1	27/2$^-$
315.19 *21*	3.5 *10*	1529.6	21/2$^+$	1214.3	17/2$^+$
317.08 *21*	5.4 *2*	5744.9	47/2$^+$	5427.7	45/2$^+$
319.7 *3*	1.4 *1*	4496.0	39/2$^+$	4175.9	37/2$^+$
319.90 *21*	5.3 *5*	639.6	15/2$^-$	319.7	11/2$^-$
322.80 *21*	4.8 *2*	4346.5	41/2$^-$	4023.7	39/2$^-$
323.10# *20*	67.7 *22*	735.0	19/2$^+$	411.9	15/2$^+$
325.1‡		445.5	11/2$^-$	120.38	9/2$^+$
325.54 *25*	1.4 *1*	4821.4	41/2$^+$	4496.0	39/2$^+$
329.5 *3*	0.5 *1*	2565.4+x	(43/2)	2236.0+x	(41/2)
331.86 *21*	4.5 *2*	6077.0	49/2$^+$	5744.9	47/2$^+$
334.96 *20*	10.4 *5*	1845.2	19/2$^-$	1510.3	17/2$^-$
337.14 *21*	3.5 *2*	4683.5	43/2$^-$	4346.5	41/2$^-$

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^{150}Nd(^{18}O,5nγ) 1997Ha23 (continued)

$\gamma(^{163}Er)$ (continued)

E_γ [†]	I_γ [†]	E_i(level)	J_i^π	E_f	J_f^π
342.1 *3*	1.7 *3*	1077.3	$17/2^+$	735.0	$19/2^+$
344.01 *23*	2.6 *2*	840.5	$15/2^-$	496.2	$11/2^-$
349.0 *3*	0.9 *1*	2331.6	$23/2^+$	1982.4	$19/2^+$
349.52 *21*	3.9 *2*	6426.6	$51/2^+$	6077.0	$49/2^+$
351.0 *5*	0.5 *2*	2915.9+x	(45/2)	2565.4+x	(43/2)
354.18 *23*	2.2 *2*	5037.9	$45/2^-$	4683.5	$43/2^-$
354.21 *25*	0.7 *1*	5537.2	$45/2^+$	5182.8	$43/2^+$
354.52 *20*	35.8 *13*	820.6	$17/2^-$	466.1	$13/2^-$
356.72 *23*	3.0 *2*	2460.9	$27/2^-$	2104.3	$23/2^-$
361.0 *3*	1.2 *1*	5182.8	$43/2^+$	4821.4	$41/2^+$
364.38 *22*	5.2 *3*	809.7	$15/2^-$	445.5	$11/2^-$
364.5 *5*	0.5 *2*	1717.2	$23/2^+$	1352.8	$19/2^+$
365.36 *22*	2.8 *2*	6792.0	$53/2^+$	6426.6	$51/2^+$
365.4 *4*	1.8 *1*	5403.5	$47/2^-$	5037.9	$45/2^-$
368.0 *4*	0.5 *1*	3283.8+x	(47/2)	2915.9+x	(45/2)
368.40 *25*	0.9 *1*	5905.6	$47/2^+$	5537.2	$45/2^+$
380.10 *25*	1.5 *1*	5783.6	$49/2^-$	5403.5	$47/2^-$
381.42 *22*	2.6 *1*	7173.5	$55/2^+$	6792.0	$53/2^+$
382.4 *4*	0.9 *1*	6287.8	$49/2^+$	5905.6	$47/2^+$
385.31 *22*	6.0 *4*	1040.6	$17/2^-$	655.3	$13/2^-$
386.06 *20*	10.2 *4*	1163.1	$23/2^+$	777.1	$21/2^+$
390.3 *3*	1.1 *1*	6174.1	$51/2^-$	5783.6	$49/2^-$
392.6 *5*	0.8 *2*	639.6	$15/2^-$	247.0	$13/2^+$
392.61 *21*	5.1 *3*	1032.3	$19/2^-$	639.6	$15/2^-$
394.5 *4*	1.2 *1*	6682.4	$51/2^+$	6287.8	$49/2^+$
397.97 *24*	1.9 *1*	2542.1	$25/2^+$	2144.2	$21/2^+$
398.4 *3*	1.0 *1*	6572.6	$53/2^-$	6174.1	$51/2^-$
398.8 *3*	2.0 *3*	1476.3	$21/2^+$	1077.3	$17/2^+$
400.0 *3*	1.2 *1*	7573.9	$57/2^+$	7173.5	$55/2^+$
401.73 *22*	3.5 *2*	2672.6	$29/2^-$	2271.0	$25/2^-$
402.16 *23*	2.1 *2*	1931.8	$25/2^+$	1529.6	$21/2^+$
403.4 *5*	0.1 *1*	2523.7	$23/2^+$	2120.3	$19/2^+$
407.3 *3*	3.5[f] *3*	1023.9	$17/2^-$	616.5	$13/2^-$
407.66[#] *20*	150 *5*	1184.8	$25/2^+$	777.1	$21/2^+$
408.77 *21*	8.3 *4*	820.6	$17/2^-$	411.9	$15/2^+$
414.13 *22*	2.7 *1*	7988.3	$59/2^+$	7573.9	$57/2^+$
415.9 *4*	0.6 *1*	6988.6	$55/2^-$	6572.6	$53/2^-$
422.37 *20*	39.8 *13*	1242.8	$21/2^-$	820.6	$17/2^-$
423.50 *23*	2.3 *3*	1953.0	$25/2^+$	1529.6	$21/2^+$
428.25[#] *20*	75.4 *24*	1163.1	$23/2^+$	735.0	$19/2^+$
430.08 *24*	6.6 *4*	1270.6	$19/2^-$	840.5	$15/2^-$
431.61 *22*	3.2 *2*	8420.1	$61/2^+$	7988.3	$59/2^+$
433.45 *23*	3.0 *2*	1473.9	$21/2^-$	1040.6	$17/2^-$
434.5 *4*	0.2 *1*	2748.6	$25/2^+$	2314.0	$21/2^+$
436.74 *25*	1.7 *2*	2044.1	$25/2^+$	1607.4	$21/2^+$
441.24 *22*	3.7 *2*	2772.7	$27/2^+$	2331.6	$23/2^+$
444.14 *21*	6.1 *2*	2905.2	$31/2^-$	2460.9	$27/2^-$
446.6 *3*	1.4 *1*	8866.8	$63/2^+$	8420.1	$61/2^+$
447.44 *21*	5.8 *4*	1479.8	$23/2^-$	1032.3	$19/2^-$
448.71 *22*	5.6 *3*	1258.3	$19/2^-$	809.7	$15/2^-$
450.41 *20*	12.1 *4*	2741.8	$33/2^-$	2291.4	$31/2^+$
450.5 *5*	0.2 *1*	2167.6	$27/2^+$	1717.2	$23/2^+$
455.50 *22*	2.8 *3*	1931.8	$25/2^+$	1476.3	$21/2^+$
461.02 *22*	4.6 *3*	1934.9	$25/2^-$	1473.9	$21/2^-$
462.92 *22*	4.4 *3*	3430.2	$37/2^+$	2967.2	$33/2^+$

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^{150}Nd(^{18}O,5nγ) 1997Ha23 (continued)

$\gamma(^{163}Er)$ (continued)

E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π
462.99 *23*	1.8 *2*	2986.9	27/2$^+$	2523.7	23/2$^+$
464.5 *5*	0.5 *4*	1076.5+x	(33/2)	612.0+x	(29/2)
472.5 *4*	1.0 *2*	2890.5	31/2$^-$	2418.0	27/2$^-$
475.8 *3*	2.5 *2*	2783.7	31/2$^-$	2307.8	27/2$^-$
476.3 *4*	4.0 *4*	1953.0	25/2$^+$	1476.3	21/2$^+$
476.45# *20*	44.8 *15*	1719.2	25/2$^-$	1242.8	21/2$^-$
478.06 *21*	7.3 *4*	1957.9	27/2$^-$	1479.8	23/2$^-$
480.12 *21*	5.4 *2*	3022.1	29/2$^+$	2542.1	25/2$^+$
480.25 *21*	8.2 *4*	2928.3	33/2$^+$	2448.2	29/2$^+$
483.64 *20*	12.4 *6*	2415.4	29/2$^+$	1931.8	25/2$^+$
485.08 *21*	5.5 *2*	3157.6	33/2$^-$	2672.6	29/2$^-$
487.05 *22*	4.7 *3*	1511.2	21/2$^-$	1023.9	17/2$^-$
487.65 *22*	1.6 *2*	3236.2	29/2$^+$	2748.6	25/2$^+$
491.19 *21*	10.0 *4*	2448.9	31/2$^-$	1957.9	27/2$^-$
495.02 *21*	13.3 *7*	2448.2	29/2$^+$	1953.0	25/2$^+$
496.33# *20*	132 *4*	1681.1	29/2$^+$	1184.8	25/2$^+$
496.77 *23*	4.2 *3*	2540.9	29/2$^+$	2044.1	25/2$^+$
497.0 *5*	3.3 *2*	2431.7	29/2$^-$	1934.9	25/2$^-$
498.94 *21*	10.7 *5*	2930.8	33/2$^-$	2431.7	29/2$^-$
500.35 *21*	9.1 *4*	1685.7	27/2$^+$	1184.8	25/2$^+$
501.74 *20*	16.8 *7*	3430.2	37/2$^+$	2928.3	33/2$^+$
505.31 *23*	7.8 *4*	1776.0	23/2$^-$	1270.6	19/2$^-$
507.28 *23*	3.4 *2*	3494.5	31/2$^+$	2986.9	27/2$^+$
507.70 *23*	7.0 *3*	1242.8	21/2$^-$	735.0	19/2$^+$
508.78 *20*	56.5 *18*	2227.9	29/2$^-$	1719.2	25/2$^-$
512.65 *21*	9.4 *5*	2928.3	33/2$^+$	2415.4	29/2$^+$
513.91 *20*	54.3 *17*	2741.8	33/2$^-$	2227.9	29/2$^-$
516.10 *21*	4.3 *2*	3288.7	31/2$^+$	2772.7	27/2$^+$
516.29# *20*	13.1 *5*	2965.0	35/2$^-$	2448.9	31/2$^-$
516.8 *5*	2.1 *4*	2448.2	29/2$^+$	1931.8	25/2$^+$
518.72 *21*	4.9 *3*	2967.2	33/2$^+$	2448.2	29/2$^+$
522.3 *3*	3.4 *2*	3758.3	33/2$^+$	3236.2	29/2$^+$
522.84# *20*	58.2 *18*	1685.7	27/2$^+$	1163.1	23/2$^+$
523.1 *3*	3.0 *3*	1781.4	23/2$^-$	1258.3	19/2$^-$
523.24 *21*	6.5 *3*	3428.5	35/2$^-$	2905.2	31/2$^-$
529.62 *21*	8.3 *4*	3313.5	35/2$^-$	2783.7	31/2$^-$
530.43 *22*	4.4 *3*	4024.8	35/2$^+$	3494.5	31/2$^+$
531.11 *23*	3.1 *3*	2698.7	31/2$^+$	2167.6	27/2$^+$
531.5 *3*	2.7 *2*	2307.8	27/2$^-$	1776.0	23/2$^-$
532.73# *20*	50.9 *16*	3274.5	37/2$^-$	2741.8	33/2$^-$
533.14 *21*	1.8 *3*	3074.0	33/2$^+$	2540.9	29/2$^+$
534.14 *22*	4.5 *3*	4292.5	37/2$^+$	3758.3	33/2$^+$
535.10 *22*	3.3 *2*	4159.3	43/2$^-$	3624.2	41/2$^+$
538.34 *20*	13.8 *6*	3968.7	41/2$^+$	3430.2	37/2$^+$
539.50 *24*	1.7 *2*	4564.3	39/2$^+$	4024.8	35/2$^+$
542.33@ *20*	13.6 *5*	2227.9	29/2$^-$	1685.7	27/2$^+$
544.14 *25*	2.2 *2*	3434.6	35/2$^-$	2890.5	31/2$^-$
546.98 *21*	7.9 *4*	1845.2	19/2$^-$	1298.0	15/2$^-$
547.5 *3*	1.5 *3*	1624.0+x	(37/2)	1076.5+x	(33/2)
548.61 *21*	5.7 *3*	3570.7	33/2$^+$	3022.1	29/2$^+$
551.84 *21*	6.3 *4*	2967.2	33/2$^+$	2415.4	29/2$^+$
555.54 *23*	4.7 *3*	2066.9	25/2$^-$	1511.2	21/2$^-$
556.24 *20*	13.6 *5*	1719.2	25/2$^-$	1163.1	23/2$^+$
556.9 *5*	2.3 *4*	3469.4	35/2$^+$	2912.5	31/2$^+$

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^{150}Nd(^{18}O,5nγ) 1997Ha23 (continued)

$\gamma(^{163}Er)$ (continued)

E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π
558.3 *3*	1.3 *1*	4850.6	$41/2^+$	4292.5	$37/2^+$
559.72 *24*	3.0 *2*	5123.9	$43/2^+$	4564.3	$39/2^+$
560.30 *21*	8.0 *3*	3717.8	$37/2^-$	3157.6	$33/2^-$
563.08 *21*	14.3 *6*	3530.4	$37/2^+$	2967.2	$33/2^+$
565.65# *20*	27.7 *9*	3530.6	$39/2^-$	2965.0	$35/2^-$
568.4 *6*	1.6f *2*	1032.3	$19/2^-$	464.0	$17/2^+$
577.2 *5*	1.9 *2*	5427.7	$45/2^+$	4850.6	$41/2^+$
577.38# *20*	100 *3*	2258.3	$33/2^+$	1681.1	$29/2^+$
578.56 *21*	7.9 *4*	3867.1	$35/2^+$	3288.7	$31/2^+$
579.47 *20*	12.3 *6*	3893.0	$39/2^-$	3313.5	$35/2^-$
581.10 *21*	17.9 *7*	3511.9	$37/2^-$	2930.8	$33/2^-$
583.65# *20*	48.9 *16*	3858.2	$41/2^-$	3274.5	$37/2^-$
585.1 *9*	0.5 *2*	3214.4	$33/2^+$	2629.3	$29/2^+$
586.50 *23*	4.1 *3*	2368.1	$27/2^-$	1781.4	$23/2^-$
595.13 *21*	7.8 *3*	4023.7	$39/2^-$	3428.5	$35/2^-$
595.2 *5*	0.5 *2*	3809.6	$37/2^+$	3214.4	$33/2^+$
598.23 *21*	4.9 *3*	4067.6	$39/2^+$	3469.4	$35/2^+$
600.53 *21*	4.3 *3*	3299.1	$35/2^+$	2698.7	$31/2^+$
602.22 *23*	4.9 *4*	3530.4	$37/2^+$	2928.3	$33/2^+$
602.33 *21*	3.5 *3*	4036.9	$39/2^-$	3434.6	$35/2^-$
605.05 *22*	5.3 *3*	4175.9	$37/2^+$	3570.7	$33/2^+$
606.00# *20*	40.5 *13*	2291.4	$31/2^+$	1685.7	$27/2^+$
606.2 *6*	0.8 *2*	2672.6	$29/2^-$	2066.9	$25/2^-$
606.52 *22*	2.8 *3*	3680.5	$37/2^+$	3074.0	$33/2^+$
606.53 *25*	3.4 *2*	5427.7	$45/2^+$	4821.4	$41/2^+$
609.93 *23*	5.1 *3*	2291.4	$31/2^+$	1681.1	$29/2^+$
612.0 *8*		612.0+x	(29/2)	0.0+x	(25/2)
612.0 *8*	1.0 *2*	2236.0+x	(41/2)	1624.0+x	(37/2)
613.3 *4*	1.5 *4*	1077.3	$17/2^+$	464.0	$17/2^+$
615.79 *25*	3.6 *3*	2682.7	$29/2^-$	2066.9	$25/2^-$
619.37 *21*	18.5 *9*	4149.9	$41/2^+$	3530.4	$37/2^+$
619.64 *21*	9.4 *6*	4588.5	$45/2^+$	3968.7	$41/2^+$
621.03 *22*	5.6 *3*	5744.9	$47/2^+$	5123.9	$43/2^+$
621.85@ *20*	12.7 *5*	3530.6	$39/2^-$	2908.7	$37/2^+$
627.6 *3*	1.5 *10*	5123.9	$43/2^+$	4496.0	$39/2^+$
628.87# *20*	25.2 *9*	4159.3	$43/2^-$	3530.6	$39/2^-$
628.90 *21*	6.0 *3*	4346.5	$41/2^-$	3717.8	$37/2^-$
629.0 *5*	0.5 *2*	4438.6	$41/2^+$	3809.6	$37/2^+$
629.11 *22*	5.7 *3*	4496.0	$39/2^+$	3867.1	$35/2^+$
632.50 *21*	6.4 *3*	4700.1	$43/2^+$	4067.6	$39/2^+$
636.50 *21*	10.2 *4*	4529.5	$43/2^-$	3893.0	$39/2^-$
637.4 *5*	2.5 *9*	2565.4+x	(43/2)	1927.9+x	(39/2)
641.1 *3*	2.7 *2*	3009.2	$31/2^-$	2368.1	$27/2^-$
644.96 *21*	12.7 *6*	4156.9	$41/2^-$	3511.9	$37/2^-$
645.42 *23*	4.7 *2*	4821.4	$41/2^+$	4175.9	$37/2^+$
647.09# *20*	39.2 *13*	4505.3	$45/2^-$	3858.2	$41/2^-$
649.35 *22*	5.3 *4*	4686.1	$43/2^-$	4036.9	$39/2^-$
649.41 *23*	3.9 *2*	6077.0	$49/2^+$	5427.7	$45/2^+$
650.4 *6*	0.5 *2*	5089.0	$45/2^+$	4438.6	$41/2^+$
650.52# *20*	71.3 *22*	2908.7	$37/2^+$	2258.3	$33/2^+$
652.88 *20*	8.7 *4*	3952.0	$39/2^+$	3299.1	$35/2^+$
655.58 *21*	6.4 *3*	4336.0	$41/2^+$	3680.5	$37/2^+$
656.4 *3*	2.6 *2*	3339.1	$33/2^-$	2682.7	$29/2^-$

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^{150}Nd(^{18}O,5nγ) 1997Ha23 (continued)

$\gamma(^{163}Er)$ (continued)

E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π
659.67 *22*	5.0 *2*	4683.5	43/2$^-$	4023.7	39/2$^-$
665.5 *5*	1.9 *5*	1077.3	17/2$^+$	411.9	15/2$^+$
672.1 *3*	1.4 *1*	5372.2	47/2$^+$	4700.1	43/2$^+$
674.71 *23*	2.3 *2*	4850.6	41/2$^+$	4175.9	37/2$^+$
675.06 *21*	10.9 *5*	4825.1	45/2$^+$	4149.9	41/2$^+$
677.60# *20*	25.4 *9*	2969.0	35/2$^+$	2291.4	31/2$^+$
679.8 *3*	1.1 *2*	2915.9+x	(45/2)	2236.0+x	(41/2)
681.11 *21*	4.8 *3*	5017.1	45/2$^+$	4336.0	41/2$^+$
681.3 *4*	3.7 *5*	1298.0	15/2$^-$	616.5	13/2$^-$
681.79 *23*	3.8 *2*	6426.6	51/2$^+$	5744.9	47/2$^+$
686.4 *4*	1.8 *2*	5537.2	45/2$^+$	4850.6	41/2$^+$
686.9 *3*	2.6 *2*	5182.8	43/2$^+$	4496.0	39/2$^+$
691.15 *22*	5.1 *3*	4643.1	43/2$^+$	3952.0	39/2$^+$
691.38 *21*	6.3 *3*	5037.9	45/2$^-$	4346.5	41/2$^-$
697.07 *20*	21.9 *8*	4856.4	47/2$^-$	4159.3	43/2$^-$
698.77 *21*	10.9 *4*	5228.3	47/2$^-$	4529.5	43/2$^-$
699.0 *5*	1.8 *4*	1476.3	21/2$^+$	777.1	21/2$^+$
700.9 *4*	4.9 *4*	1510.3	17/2$^-$	809.7	15/2$^-$
701.14 *22*	4.6 *3*	5387.2	47/2$^-$	4686.1	43/2$^-$
702.6 *3*	4.2 *4*	1479.8	23/2$^-$	777.1	21/2$^+$
702.95# *24*	5.8 *3*	2930.8	33/2$^-$	2227.9	29/2$^-$
703.6# *3*	1.8 *1*	5387.2	47/2$^-$	4683.5	43/2$^-$
706.59@ *21*	16.7 *6*	2965.0	35/2$^-$	2258.3	33/2$^+$
707.17 *21*	11.5 *5*	4864.0	45/2$^-$	4156.9	41/2$^-$
707.2 *3*	2.6 *3*	5407.3	47/2$^+$	4700.1	43/2$^+$
712.5 *4*	3.3 *2*	2431.7	29/2$^-$	1719.2	25/2$^-$
713.63# *20*	27.9 *9*	5218.9	49/2$^-$	4505.3	45/2$^-$
713.7 *3*	3.6 *4*	5802.7	49/2$^+$	5089.0	45/2$^+$
715.13 *25*	4.2 *3*	6792.0	53/2$^+$	6077.0	49/2$^+$
715.59 *20*	53.6 *17*	3624.2	41/2$^+$	2908.7	37/2$^+$
716.9 *5*	1.5 *3*	5537.2	45/2$^+$	4821.4	41/2$^+$
718.3 *4*	1.8 *4*	3283.8+x	(47/2)	2565.4+x	(43/2)
720.15 *23*	4.3 *2*	5403.5	47/2$^-$	4683.5	43/2$^-$
720.99 *21*	6.2 *3*	5738.0	49/2$^+$	5017.1	45/2$^+$
722.8 *3*	2.0 *2*	5905.6	47/2$^+$	5182.8	43/2$^+$
724.03 *21*	9.8 *5*	5312.6	49/2$^+$	4588.5	45/2$^+$
728.11 *21*	12.5 *6*	5553.3	49/2$^+$	4825.1	45/2$^+$
729.15 *22*	3.8 *2*	5372.2	47/2$^+$	4643.1	43/2$^+$
729.5 *3*	4.5 *4*	2415.4	29/2$^+$	1685.7	27/2$^+$
731.0 *4*	1.4 *2*	4070.1	37/2$^-$	3339.1	33/2$^-$
734.6 *5*	3.4 *3*	2415.4	29/2$^+$	1681.1	29/2$^+$
736.34 *24*	4.9 *3*	6108.5	51/2$^+$	5372.2	47/2$^+$
738.78 *21*	17.4 *6*	3707.8	39/2$^+$	2969.0	35/2$^+$
741.5 *4*	2.6 *4*	1476.3	21/2$^+$	735.0	19/2$^+$
745.65 *22*	5.0 *2*	5783.6	49/2$^-$	5037.9	45/2$^-$
745.76@ *23*	6.3 *4*	2431.7	29/2$^-$	1685.7	27/2$^+$
746.92 *25*	3.0 *2*	7173.5	55/2$^+$	6426.6	51/2$^+$
747.12 *25*	3.4 *3*	1931.8	25/2$^+$	1184.8	25/2$^+$
749.8 *8*	0.4 *2*	1214.3	17/2$^+$	464.0	17/2$^+$
750.4 *4*	1.6 *2*	6287.8	49/2$^+$	5537.2	45/2$^+$
753.0& *4*	2.0 *4*	1529.6	21/2$^+$	777.1	21/2$^+$
755.5 *3*	1.4 *2*	3671.4+x	(49/2)	2915.9+x	(45/2)
757.56 *24*	2.6 *2*	6144.7	51/2$^-$	5387.2	47/2$^-$
759.7 *4*	1.8 *3*	6562.4	53/2$^+$	5802.7	49/2$^+$

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^{150}Nd(^{18}O,5nγ) 1997Ha23 (continued)

$\gamma(^{163}Er)$ (continued)

E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π
759.84 *21*	8.1 *3*	5988.2	51/2$^-$	5228.3	47/2$^-$
760.5 *3*	2.7 *3*	7322.9	57/2$^+$	6562.4	53/2$^+$
762.32 *22*	7.1 *4*	2448.2	29/2$^+$	1685.7	27/2$^+$
764.3 *3*	2.6 *3*	5407.3	47/2$^+$	4643.1	43/2$^+$
765.91 *20*	18.9 *7*	5622.3	51/2$^-$	4856.4	47/2$^-$
767.0 *5*	2.0 *5*	2448.2	29/2$^+$	1681.1	29/2$^+$
767.9 *5*	2.0 *5*	1953.0	25/2$^+$	1184.8	25/2$^+$
767.95@ *21*	17.1 *7*	2448.9	31/2$^-$	1681.1	29/2$^+$
768.8 *5*	3.0 *3*	1931.8	25/2$^+$	1163.1	23/2$^+$
769.40 *22*	8.8 *4*	5633.4	49/2$^-$	4864.0	45/2$^-$
770.4 *5*	4.5 *3*	3511.9	37/2$^-$	2741.8	33/2$^-$
770.8 *3*	2.7 *2*	6174.1	51/2$^-$	5403.5	47/2$^-$
771.12 *20*	34.4 *11*	4395.1	45/2$^+$	3624.2	41/2$^+$
773.17 *21*	17.5 *8*	1957.9	27/2$^-$	1184.8	25/2$^+$
774.21 *21*	7.2 *4*	6146.4	51/2$^+$	5372.2	47/2$^+$
776.9 *4*	1.4 *2*	6682.4	51/2$^+$	5905.6	47/2$^+$
780.90 *20*	19.6 *7*	5999.8	53/2$^-$	5218.9	49/2$^-$
781.6 *3*	1.1 *2*	6188.9	51/2$^+$	5407.3	47/2$^+$
781.90 *25*	3.9 *2*	7573.9	57/2$^+$	6792.0	53/2$^+$
782.78 *22*	3.9 *2*	6520.8	53/2$^+$	5738.0	49/2$^+$
783.31 *22*	7.1 *4*	6336.6	53/2$^+$	5553.3	49/2$^+$
786.49# *21*	11.6 *5*	4494.4	43/2$^+$	3707.8	39/2$^+$
789.01 *25*	3.1 *2*	6572.6	53/2$^-$	5783.6	49/2$^-$
790.3 *5*	4.9 *5*	1953.0	25/2$^+$	1163.1	23/2$^+$
791.03 *24*	2.5 *2*	6935.7	55/2$^-$	6144.7	51/2$^-$
791.8 *4*	1.7 *3*	4075.6+x	(51/2)	3283.8+x	(47/2)
794.2 *5*	2.6 *4*	1529.6	21/2$^+$	735.0	19/2$^+$
798.1 *3*	1.7 *2*	7733.7	59/2$^-$	6935.7	55/2$^-$
801.9 *9*	0.4 *2*	1214.3	17/2$^+$	411.9	15/2$^+$
802.5 *6*	0.6 *1*	7322.9	57/2$^+$	6520.8	53/2$^+$
802.6 *5*	1.0 *2*	7090.4	53/2$^+$	6287.8	49/2$^+$
803.6 *3*	3.0 *2*	6108.5	51/2$^+$	5305.0	47/2$^+$
805.0 *3*	2.0 *2*	8127.9	61/2$^+$	7322.9	57/2$^+$
810.01# *20*	19.2 *7*	5205.2	49/2$^+$	4395.1	45/2$^+$
810.57 *22*	6.8 *3*	5305.0	47/2$^+$	4494.4	43/2$^+$
814.6 *4*	1.6 *2*	6988.6	55/2$^-$	6174.1	51/2$^-$
815.0 *3*	2.1 *2*	7988.3	59/2$^+$	7173.5	55/2$^+$
817.9 *3*	1.4 *2*	8551.7	63/2$^-$	7733.7	59/2$^-$
819.05 *22*	6.2 *3*	6807.3	55/2$^-$	5988.2	51/2$^-$
821.41 *23*	4.3 *2*	1845.2	19/2$^-$	1023.9	17/2$^-$
824.0 *5*	0.8 *2*	4495.4+x	(53/2)	3671.4+x	(49/2)
825.3# *3*	3.6 *3*	2783.7	31/2$^-$	1957.9	27/2$^-$
828.0 *3*	2.1 *2*	7348.8	57/2$^+$	6520.8	53/2$^+$
829.51 *21*	11.9 *5*	6034.7	53/2$^+$	5205.2	49/2$^+$
829.73 *23*	7.3 *3*	6463.2	53/2$^-$	5633.4	49/2$^-$
831.13 *22*	7.9 *4*	6977.5	55/2$^+$	6146.4	51/2$^+$
831.8 *3*	3.2 *3*	7020.8	55/2$^+$	6188.9	51/2$^+$
833.63# *21*	13.6 *5*	6455.9	55/2$^-$	5622.3	51/2$^-$
835.6 *5*	0.5 *2*	7518.0	55/2$^+$	6682.4	51/2$^+$
838.5 *4*	5.8 *3*	6947.0	55/2$^+$	6108.5	51/2$^+$
839.26 *23*	5.2 *3*	7176.0	57/2$^+$	6336.6	53/2$^+$
840.9 *5*	0.8 *2*	7413.5	57/2$^-$	6572.6	53/2$^-$
841.4 *3*	2.7 *2*	6146.4	51/2$^+$	5305.0	47/2$^+$
843.3 *4*	1.6 *2*	7831.9	59/2$^-$	6988.6	55/2$^-$

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^{150}Nd(^{18}O,5nγ) 1997Ha23 (continued)

$\gamma(^{163}Er)$ (continued)

E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π
846.0# *4*	6.2 *4*	6158.2	53/2$^+$	5312.6	49/2$^+$
846.6 *3*	2.6 *2*	8420.1	61/2$^+$	7573.9	57/2$^+$
847.1 *3*	1.7 *2*	8195.9	61/2$^+$	7348.8	57/2$^+$
848.23# *21*	14.1 *5*	6848.0	57/2$^-$	5999.8	53/2$^-$
852.2 *4*	11.0 *16*	1298.0	15/2$^-$	445.5	11/2$^-$
855.1 *5*	1.4 *3*	4930.7+x	(55/2)	4075.6+x	(51/2)
858.8 *4*	0.9 *2*	8986.9	65/2$^+$	8127.9	61/2$^+$
859.88& *22*	5.1 *3*	2540.9	29/2$^+$	1681.1	29/2$^+$
864.2 *5*	0.4 *2*	7954.6	57/2$^+$	7090.4	53/2$^+$
865.9 *5*	0.5 *1*	8697.8	63/2$^-$	7831.9	59/2$^-$
870.5 *3*	1.8 *2*	8551.7	63/2$^-$	7681.2	59/2$^-$
872.5 *3*	2.6 *5*	1607.4	21/2$^+$	735.0	19/2$^+$
873.8 *3*	3.9 *3*	7681.2	59/2$^-$	6807.3	55/2$^-$
874.5 *4*	1.5 *3*	9002.2	65/2$^+$	8127.9	61/2$^+$
877.7 *3*	1.7 *2*	5372.2	47/2$^+$	4494.4	43/2$^+$
878.6 *5*	2.8 *2*	8866.8	63/2$^+$	7988.3	59/2$^+$
879.59 *21*	7.8 *3*	6914.3	57/2$^+$	6034.7	53/2$^+$
881.0[d] *3*	3.5 *4*	2044.1	25/2$^+$	1163.1	23/2$^+$
888.6 *3*	3.9 *2*	7351.8	57/2$^-$	6463.2	53/2$^-$
888.9 *3*	2.3 *2*	9440.6	67/2$^-$	8551.7	63/2$^-$
889.0 *5*	0.8 *6*	1352.8	19/2$^+$	464.0	17/2$^+$
891.6 *3*	3.3 *3*	8067.7	61/2$^+$	7176.0	57/2$^+$
892.8 *5*	1.2 *2*	8306.3	61/2$^-$	7413.5	57/2$^-$
894.0 *4*	5.7 *4*	1510.3	17/2$^-$	616.5	13/2$^-$
898.3 *6*	0.4 *2*	5393.7+x	(57/2)	4495.4+x	(53/2)
898.5 *6*	3.2 *3*	7845.5	59/2$^+$	6947.0	55/2$^+$
900.59# *21*	7.6 *3*	7356.5	59/2$^-$	6455.9	55/2$^-$
903.5 *5*	1.4 *2*	8636.8	63/2$^-$	7733.7	59/2$^-$
910.0 *5*	0.5 *1*	9607.8	67/2$^-$	8697.8	63/2$^-$
910.1 *3*	1.5 *2*	9106.0	65/2$^+$	8195.9	61/2$^+$
910.2 *5*	0.9 *2*	9330.3	65/2$^+$	8420.1	61/2$^+$
915.38# *22*	4.3 *3*	7763.4	61/2$^-$	6848.0	57/2$^-$
915.9 *5*	2.7 *2*	10732.0	73/2$^-$	9816.1	69/2$^-$
918.0 *3*	3.9 *3*	5312.6	49/2$^+$	4395.1	45/2$^+$
922.4 *4*	1.4 *2*	9909.4	69/2$^+$	8986.9	65/2$^+$
926.1 *5*	1.5 *2*	8277.9	61/2$^-$	7351.8	57/2$^-$
930.02 *24*	4.3 *3*	7088.2	57/2$^+$	6158.2	53/2$^+$
932.7 *3*	2.9 *3*	2890.5	31/2$^-$	1957.9	27/2$^-$
934.2 *4*	1.5 *2*	9002.2	65/2$^+$	8067.7	61/2$^+$
935.0 *4*	0.6 *2*	9212.9	65/2$^-$	8277.9	61/2$^-$
935.8 *5*	0.4 *2*	5866.5+x	(59/2)	4930.7+x	(55/2)
938.0 *5*	0.8 *3*	2418.0	27/2$^-$	1479.8	23/2$^-$
939.1 *3*	2.1 *3*	5089.0	45/2$^+$	4149.9	41/2$^+$
939.4 *4*	1.2 *2*	10380.0	71/2$^-$	9440.6	67/2$^-$
939.7 *5*	0.3 *2*	9806.5	67/2$^+$	8866.8	63/2$^+$
940.0 *5*	1.1 *5*	1717.2	23/2$^+$	777.1	21/2$^+$
942.7 *5*	6.2 *2*	7856.7	61/2$^+$	6914.3	57/2$^+$
949.0 *7*	2.1 *2*	8794.5	63/2$^+$	7845.5	59/2$^+$
952.4 *5*	0.9 *2*	10732.0	73/2$^-$	9779.6	69/2$^-$
952.7 *3*	3.0 *3*	6158.2	53/2$^+$	5205.2	49/2$^+$
955.4 *4*	2.1 *2*	8636.8	63/2$^-$	7681.2	59/2$^-$
962.0 *5*	0.2 *1*	10569.8	71/2$^-$	9607.8	67/2$^-$
964.0 *6*	0.2 *1*	6357.7+x	(61/2)	5393.7+x	(57/2)
964.5 *3*	2.4 *2*	4588.5	45/2$^+$	3624.2	41/2$^+$

Continued on next page (footnotes at end of table)

^{150}Nd(^{18}O,5nγ) 1997Ha23 (continued)

$\gamma(^{163}Er)$ (continued)

E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π	Comments
966.42 *22*	4.3 *3*	8322.9	63/2$^-$	7356.5	59/2$^-$	
969.6 *6*	0.4 *1*	10299.9	69/2$^+$	9330.3	65/2$^+$	
970.3 *4*	1.1 *1*	10076.3	69/2$^+$	9106.0	65/2$^+$	
970.3 *6*	0.9 *1*	10183.2	69/2$^-$	9212.9	65/2$^-$	
977.7 *5*	1.2 *2*	5802.7	49/2$^+$	4825.1	45/2$^+$	
979.0 *8*	1.3 *1*	10824.9	73/2$^+$	9845.9	69/2$^+$	
981.63 *24*	2.4 *2*	8745.1	65/2$^-$	7763.4	61/2$^-$	
981.7 *8*	1.3 *1*	11713.7	77/2$^-$	10732.0	73/2$^-$	
982.9 *3*	3.2 *4*	2167.6	27/2$^+$	1184.8	25/2$^+$	
983.1 *8*	1.3 *2*	3893.0	39/2$^-$	2908.7	37/2$^+$	
985.77[#] *24*	3.5 *3*	3434.6	35/2$^-$	2448.9	31/2$^-$	
991.1 *4*	2.8 *1*	8847.7	65/2$^+$	7856.7	61/2$^+$	
992.0 *3*	3.5 *3*	8080.2	61/2$^+$	7088.2	57/2$^+$	
993.1 *4*	1.9 *2*	9630.0	67/2$^-$	8636.8	63/2$^-$	
997.5 *5*	0.7 *2*	11377.5	75/2$^-$	10380.0	71/2$^-$	
998.2 *8*	1.7 *1*	9845.9	69/2$^+$	8847.7	65/2$^+$	
999.6 *3*	2.6 *2*	10909.0	73/2$^+$	9909.4	69/2$^+$	
1002.2 *8*	0.6 *1*	10808.7	71/2$^+$	9806.5	67/2$^+$	
1006.0 *10*	1.0 *4*	11830.9	77/2$^+$	10824.9	73/2$^+$	
1009.1 *4*	1.5 *2*	6562.4	53/2$^+$	5553.3	49/2$^+$	
1017.63[@] *24*	4.4 *3*	2698.7	31/2$^+$	1681.1	29/2$^+$	
1025.1 *6*	0.4 *1*	11325.0	73/2$^+$	10299.9	69/2$^+$	
1027.6 *5*	0.9 *1*	10380.0	71/2$^-$	9352.3	67/2$^-$	
1029.4 *3*	2.7 *2*	9352.3	67/2$^-$	8322.9	63/2$^-$	
1034.5 *3*	1.6 *2*	9779.6	69/2$^-$	8745.1	65/2$^-$	
1035.7 *3*	2.2 *2*	1845.2	19/2$^-$	809.7	15/2$^-$	
1040.77[@] *22*	4.5 *3*	3299.1	35/2$^+$	2258.3	33/2$^+$	
1045.0 *5*	0.4 *2*	12758.7	81/2$^-$	11713.7	77/2$^-$	
1048.0 *5*	1.5 *3*	9128.2	65/2$^+$	8080.2	61/2$^+$	
1050.6 *10*	0.5 *2*	12881.5	81/2$^+$	11830.9	77/2$^+$	
1055.56[@] *25*	4.2 *3*	3313.5	35/2$^-$	2258.3	33/2$^+$	
1061.3 *6*	0.1 *1*	11870.0	75/2$^+$	10808.7	71/2$^+$	
1061.8 *3*	1.5 *1*	9909.4	69/2$^+$	8847.7	65/2$^+$	
1065.6 *11*	0.5 *2*	1529.6	21/2$^+$	464.0	17/2$^+$	
1071.0 *3*	1.0 *3*	9816.1	69/2$^-$	8745.1	65/2$^-$	
1087.5 *5*	0.3 *1*	10903.6	73/2$^-$	9816.1	69/2$^-$	
1087.8 *3*	1.4 *2*	10440.1	71/2$^-$	9352.3	67/2$^-$	
1101.0 *5*	0.8 *2*	10229.2	69/2$^+$	9128.2	65/2$^+$	
1102.80[@] *23*	4.4 *3*	2783.7	31/2$^-$	1681.1	29/2$^+$	
1106.0 *6*	0.4 *1*	13864.7	85/2$^-$	12758.7	81/2$^-$	
1108.4 *3*	1.0 *1*	11548.4	75/2$^-$	10440.1	71/2$^-$	
1123.1[@] *3*	3.1 *2*	2307.8	27/2$^-$	1184.8	25/2$^+$	
1124.0 *5*	0.3 *1*	10903.6	73/2$^-$	9779.6	69/2$^-$	
1146.0 *5*	0.6 *1*	12049.6	77/2$^-$	10903.6	73/2$^-$	
1151.0 *4*	0.9 *1*	12699.4	79/2$^-$	11548.4	75/2$^-$	
1155.2 *5*	0.5 *2*	1931.8	25/2$^+$	777.1	21/2$^+$	
1168.3 *6*	0.9 *2*	11548.4	75/2$^-$	10380.0	71/2$^-$	
1175.6 *6*	0.5 *2*	1953.0	25/2$^+$	777.1	21/2$^+$	
1211.1 *6*	1.4 *24*	3469.4	35/2$^+$	2258.3	33/2$^+$	Additional information 4.
1226.88 *10*	1.1 *3*	2912.5	31/2$^+$	1685.7	27/2$^+$	
1230.7 *6*	1.5 *6*	2415.4	29/2$^+$	1184.8	25/2$^+$	
1231.7 *10*	1.1 *3*	2912.5	31/2$^+$	1681.1	29/2$^+$	
1233.3[@] *6*	1.6 *8*	2418.0	27/2$^-$	1184.8	25/2$^+$	
1241.6 *6*	3.6 *6*	4149.9	41/2$^+$	2908.7	37/2$^+$	

Continued on next page (footnotes at end of table)

^{150}Nd(^{18}O,5nγ) 1997Ha23 (continued)

$\gamma(^{163}Er)$ (continued)

E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π
1247.2 *6*	1.0 *4*	2928.3	$33/2^+$	1681.1	$29/2^+$
1263.4 *6*	0.4 *2*	2448.2	$29/2^+$	1184.8	$25/2^+$
1272.2 *6*	7.5 *8*	3530.4	$37/2^+$	2258.3	$33/2^+$
1285.8 *6*	0.2 *1*	2967.2	$33/2^+$	1681.1	$29/2^+$
1296.7 *5*	1.3 *3*	2481.5	(23/2)	1184.8	$25/2^+$
1318.3 *6*	1.0 *3*	2481.5	(23/2)	1163.1	$23/2^+$

† From 1997Ha23, unless otherwise stated. Energies and intensities are also available from 1994Br09 for about 155 γ rays. There is a general agreement between 1994Br09 and 1997Ha23, except that the energies quoted in 1994Br09 are systematically higher by 0.2 to 1 keV than those in the more complete work of 1997Ha23.

‡ From level-energy difference. γ ray is seen in ^{163}Tm ε decay or (α,2nγ).

R(DCO) (1997Ha23) suggests $\Delta J=2$, stretched quadrupole transition.

@ R(DCO) (1997Ha23) suggests $\Delta J=1$, stretched dipole or dipole+quadrupole transition.

& R(DCO) interpreted (1997Ha23) as a $\Delta J=0$ transition.

[a] Energy of this γ ray, for the present placement, is too low by 1.7 keV as compared to 60.105 *3* adopted from ^{163}Tm ε decay.

[b] From level-energy difference. Transition seems present in level scheme figure 1 of 1994Br09.

[c] Mult=E1 from intensity balance (1994Br09), R(DCO) is consistent with $\Delta J=0$, dipole (1997Ha23).

[d] R(DCO) gives $\Delta J=1$ with a large quadrupole (most likely E2) admixture.

[e] From 1994Br09 at E= 83 MeV.

[f] Intensity (branching) reported by 1994Br09 is in disagreement with that in 1997Ha23.

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

^{150}Nd(^{18}O,5nγ) 1997Ha23

Level Scheme

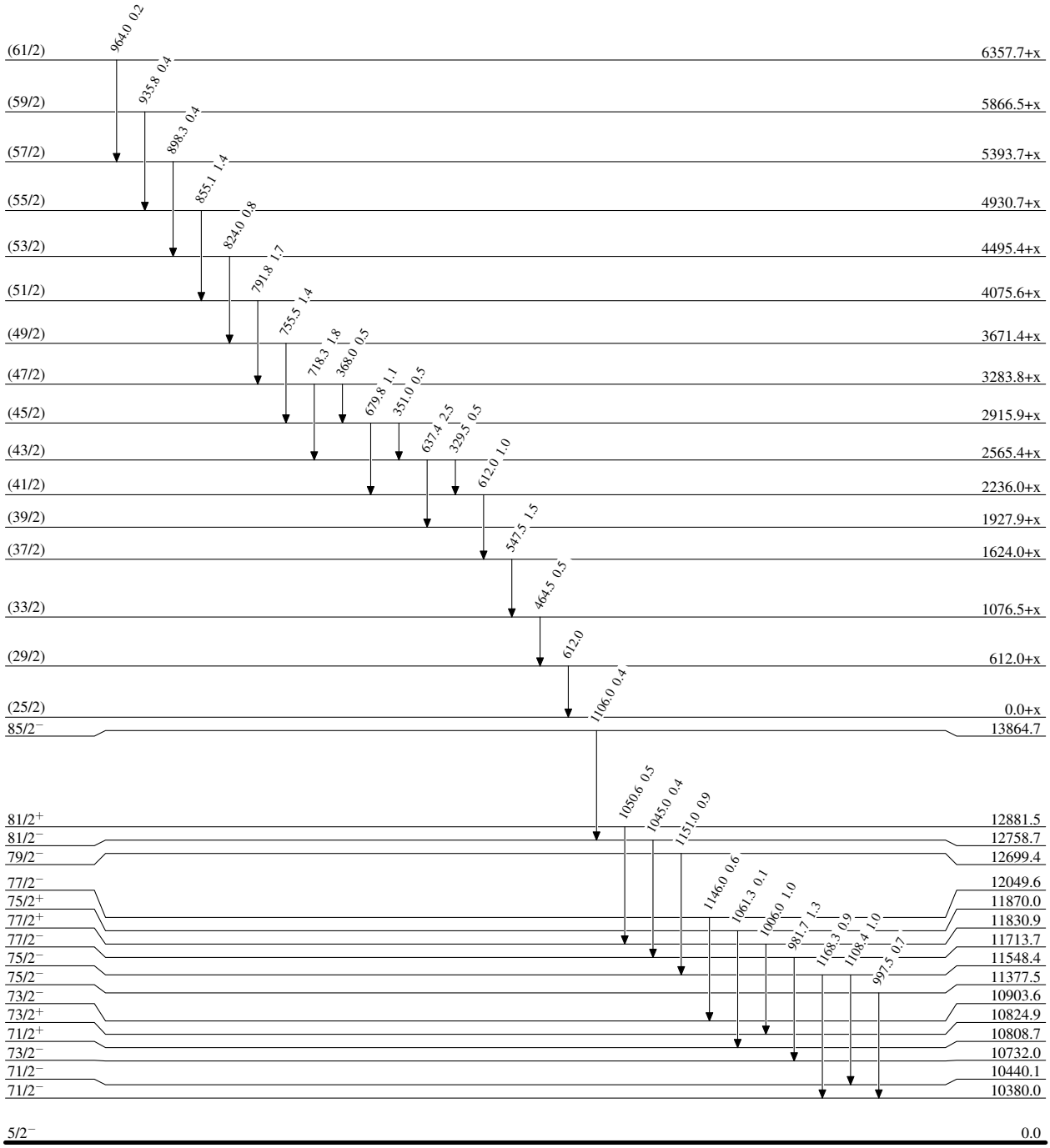
Intensities: Relative I_γ

Legend

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

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

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



$^{163}_{68}Er_{95}$

^{150}Nd(^{18}O,5nγ) 1997Ha23

Level Scheme (continued)

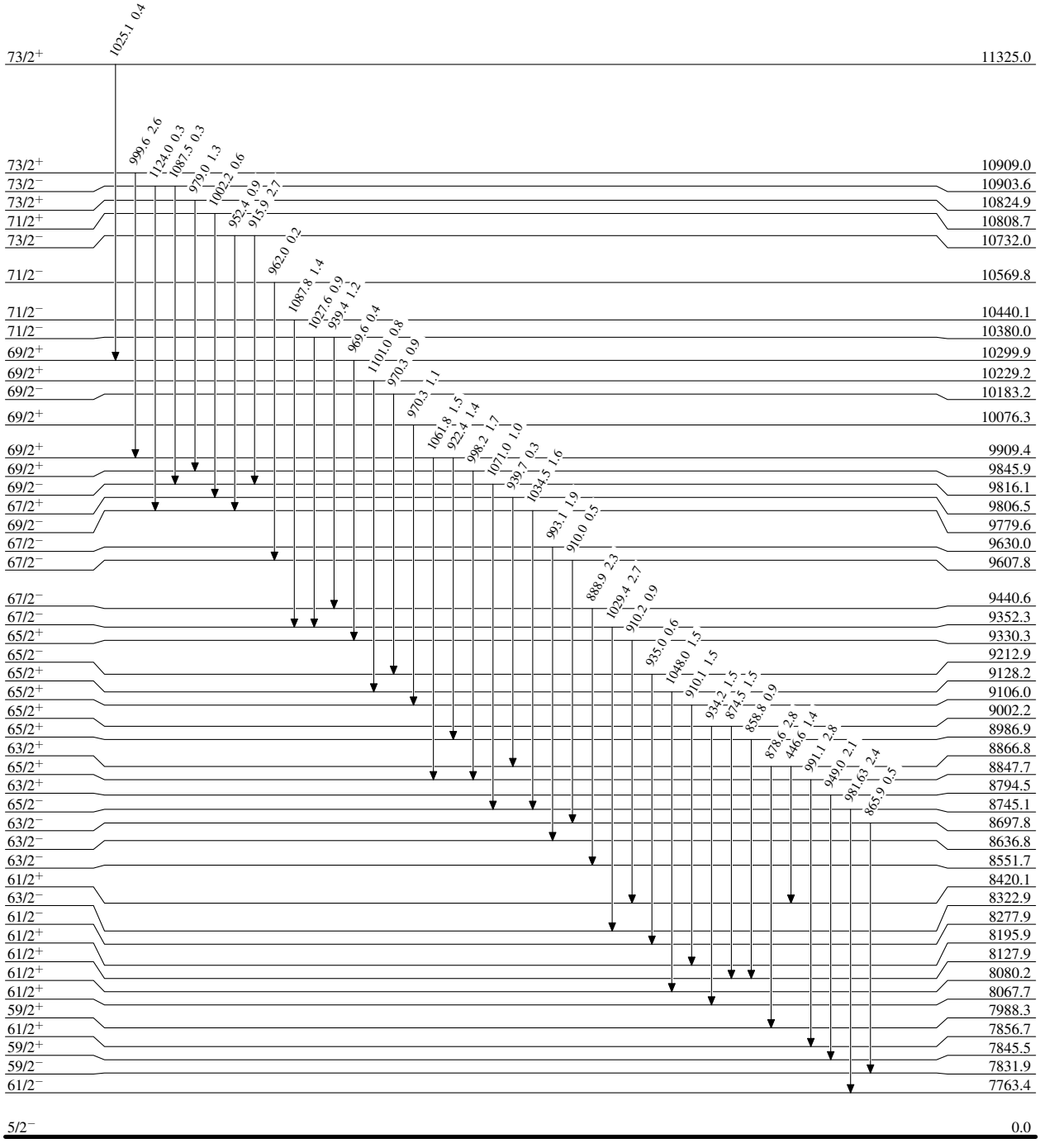
Intensities: Relative I_γ

Legend

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

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

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



$^{163}_{68}Er_{95}$

^{150}Nd(^{18}O,5nγ) 1997Ha23

Level Scheme (continued)

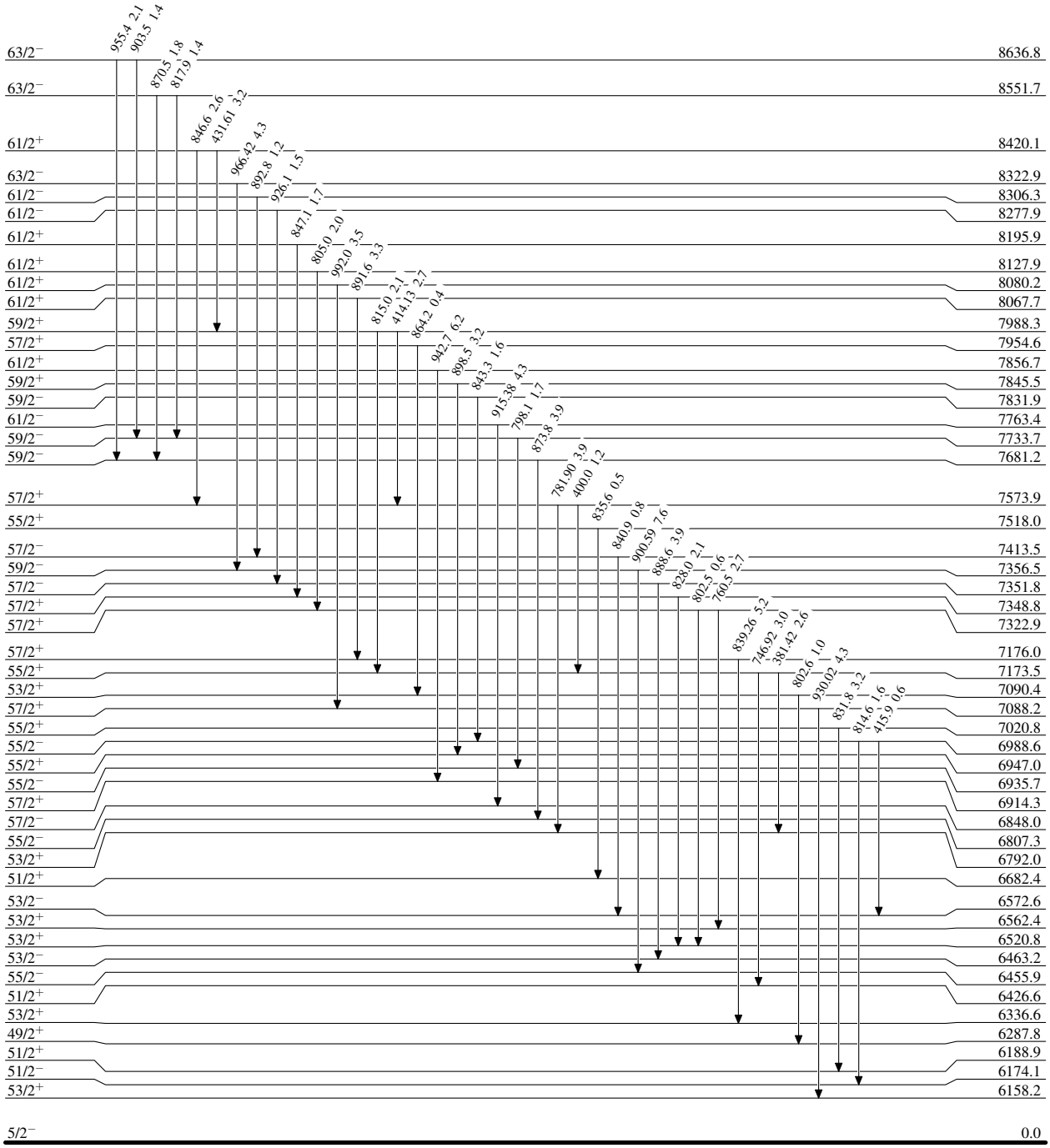
Intensities: Relative I_γ

Legend

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

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

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



$^{163}_{68}Er_{95}$

^{150}Nd(^{18}O,5nγ) 1997Ha23

Level Scheme (continued)

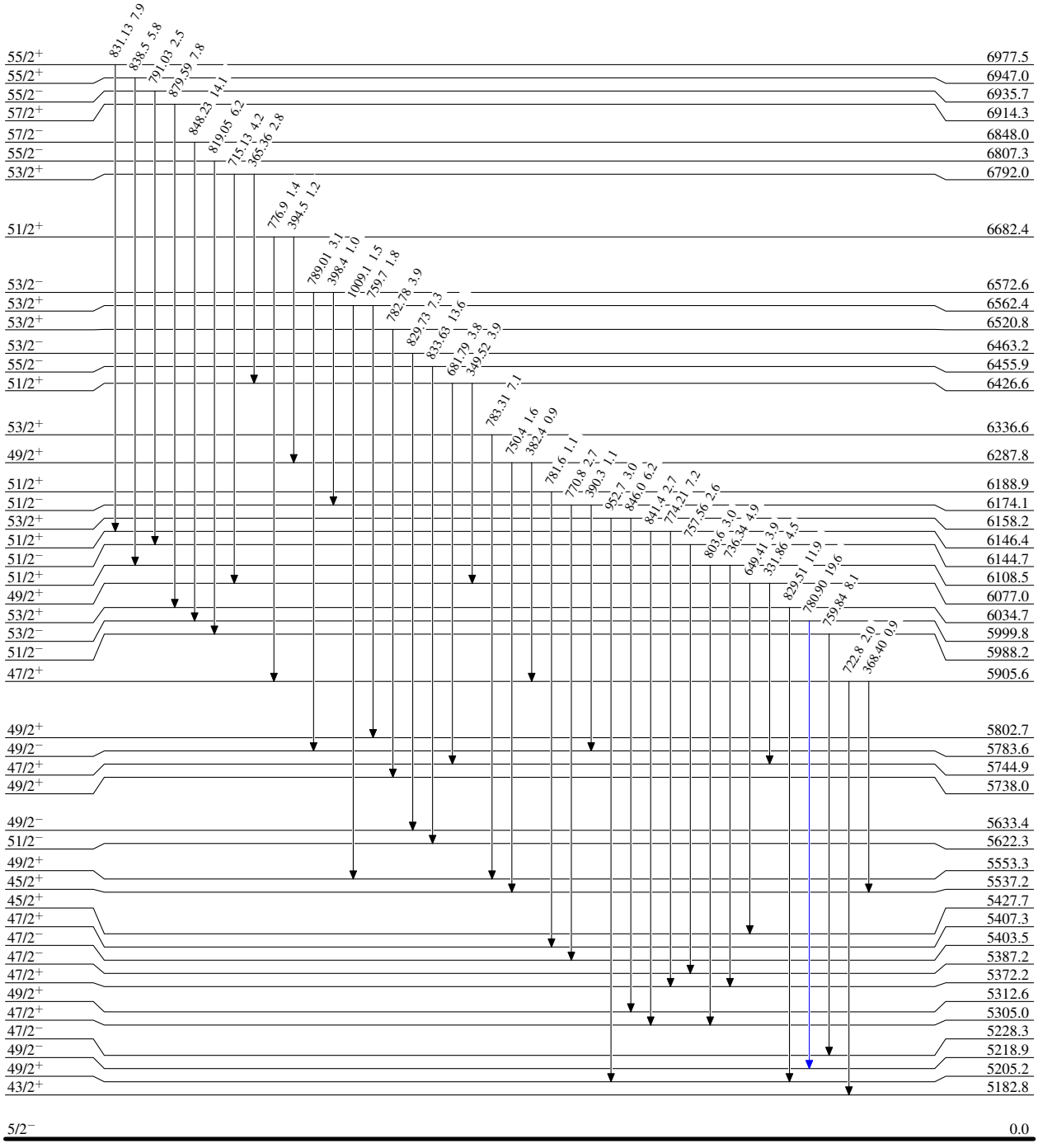
Intensities: Relative I_γ

Legend

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

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

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



$^{163}_{68}Er_{95}$

^{150}Nd(^{18}O,5nγ) 1997Ha23

Level Scheme (continued)

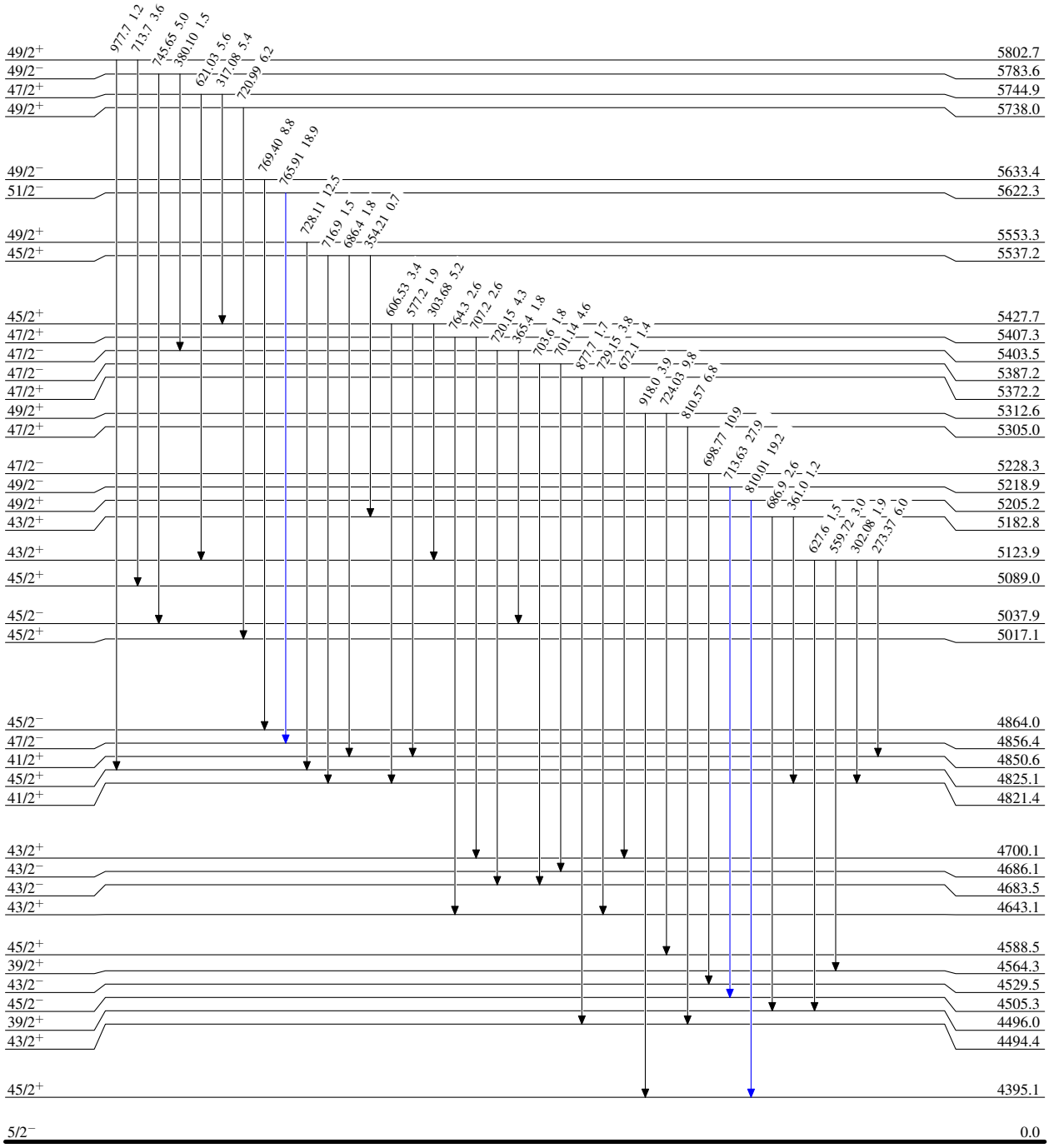
Intensities: Relative I_γ

Legend

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

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

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



$^{163}_{68}Er_{95}$

^{150}Nd(^{18}O,5nγ) 1997Ha23

Level Scheme (continued)

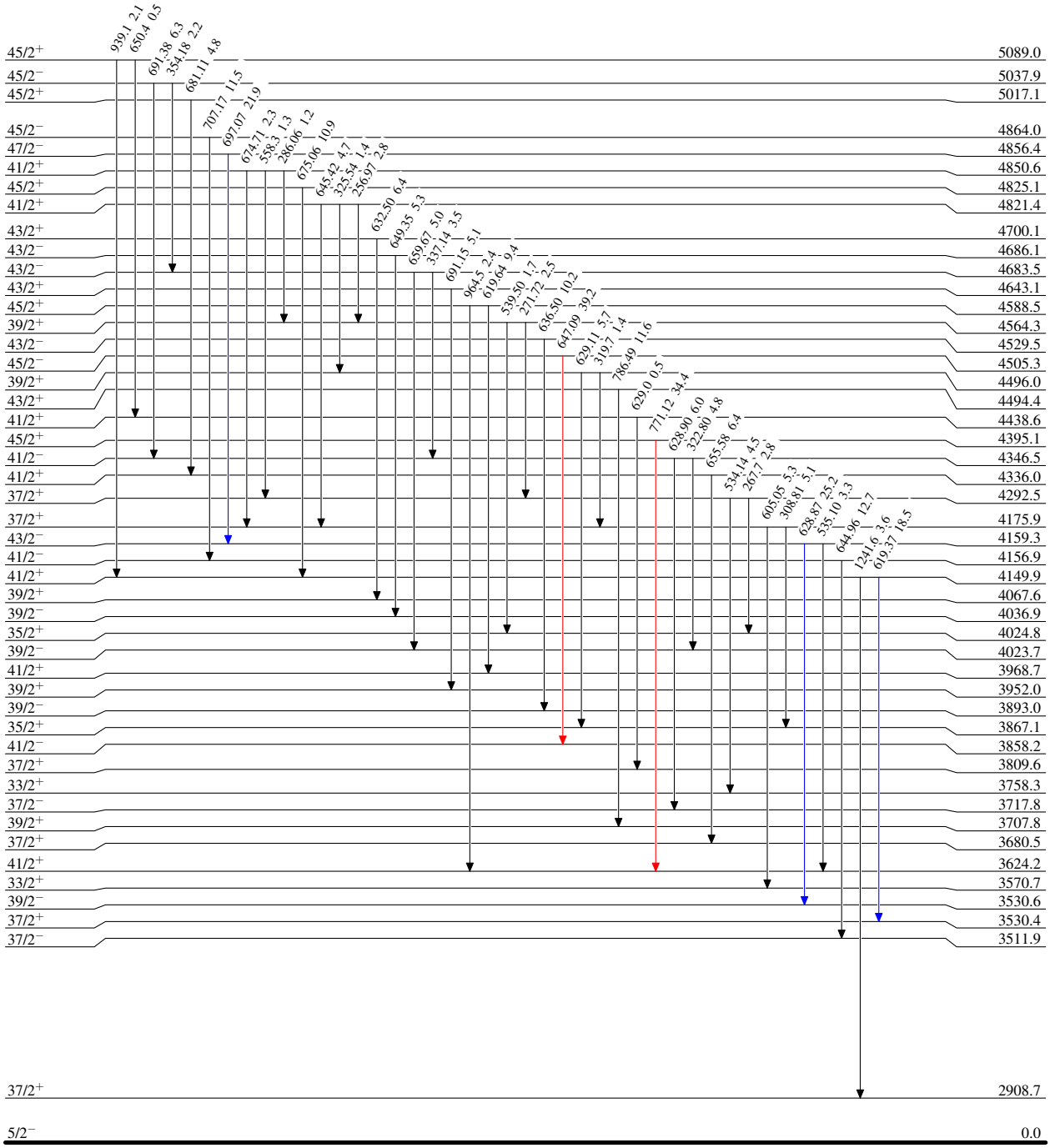
Intensities: Relative I_γ

Legend

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

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

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



$^{163}_{68}Er_{95}$

^{150}Nd(^{18}O,5nγ) 1997Ha23

Level Scheme (continued)

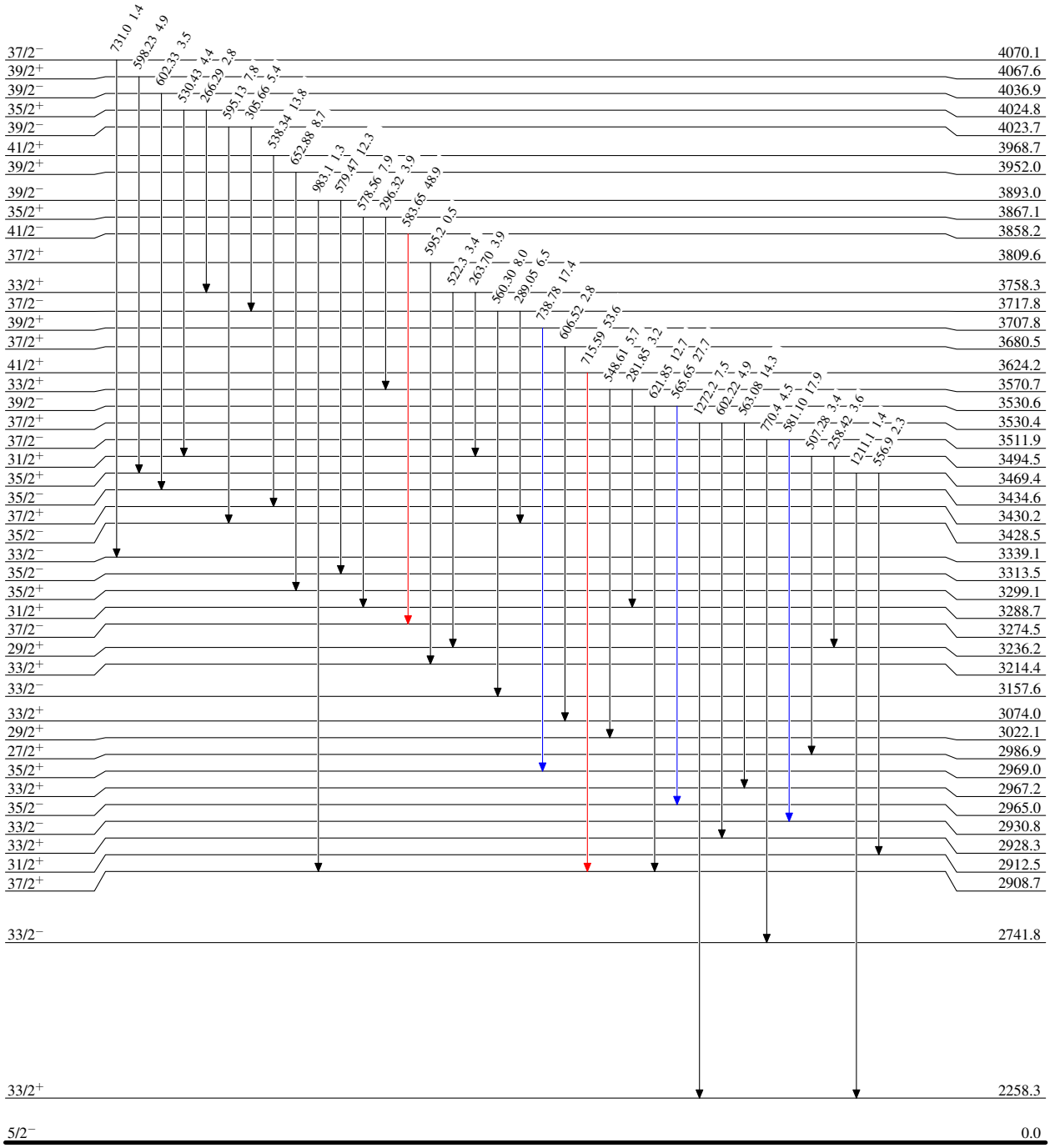
Intensities: Relative I_γ

Legend

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

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

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



$^{163}_{68}Er_{95}$

^{150}Nd(^{18}O,5nγ) 1997Ha23

Level Scheme (continued)

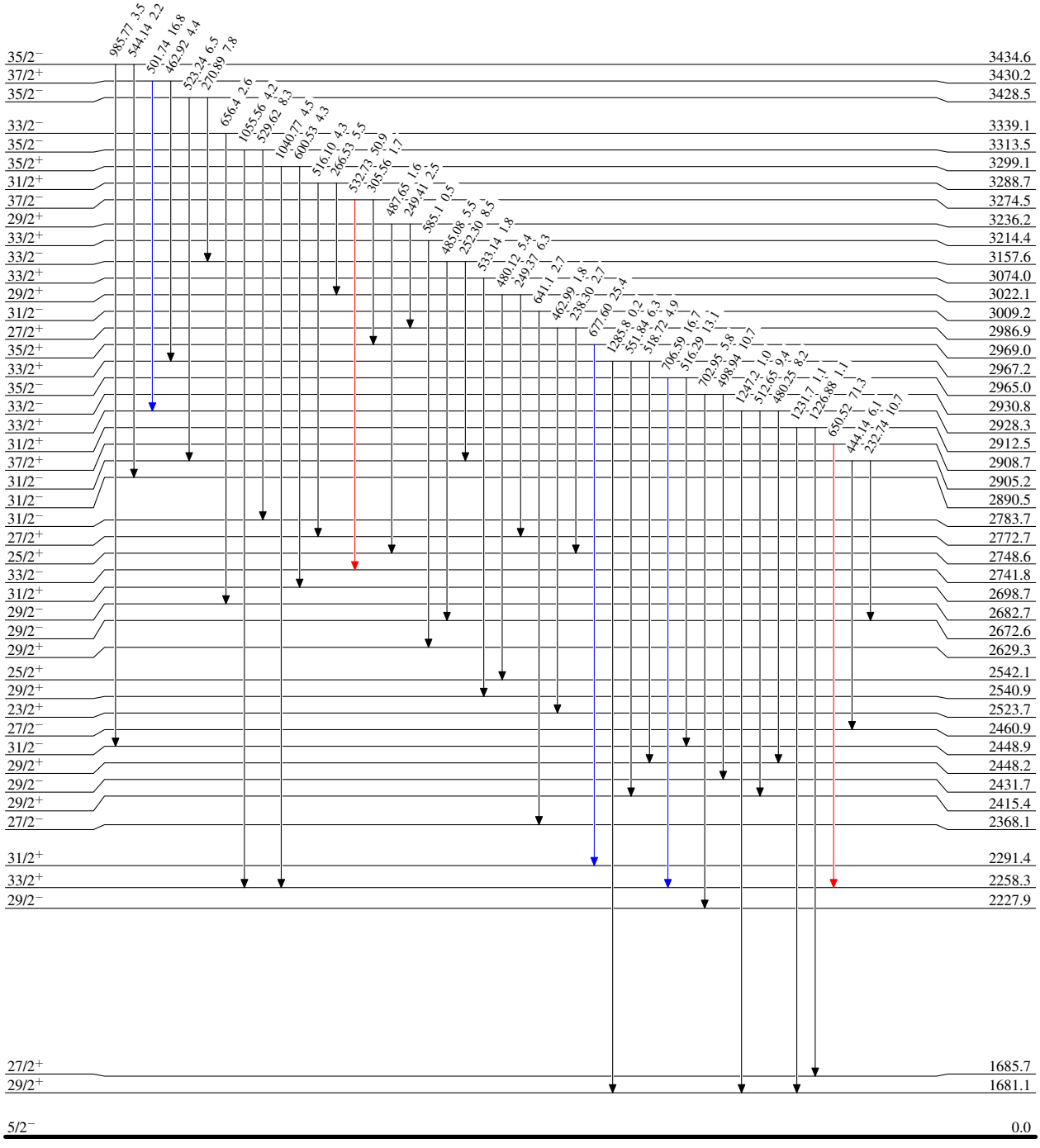
Intensities: Relative I_γ

Legend

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

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

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



$^{163}_{68}Er_{95}$

^{150}Nd(^{18}O,5nγ) 1997Ha23

Level Scheme (continued)

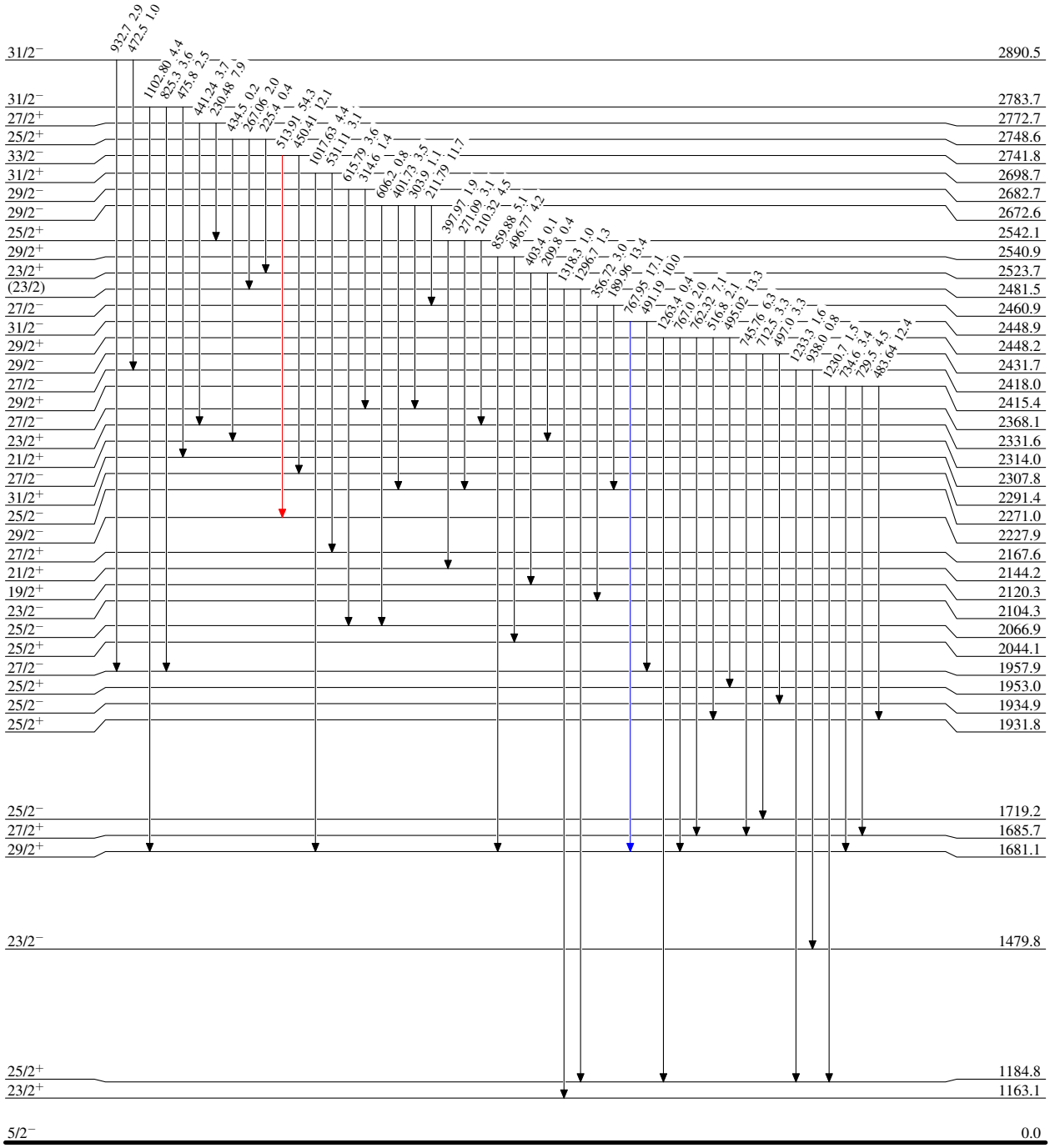
Intensities: Relative I_γ

Legend

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

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

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



$^{163}_{68}Er_{95}$

^{150}Nd(^{18}O,5nγ) 1997Ha23

Level Scheme (continued)

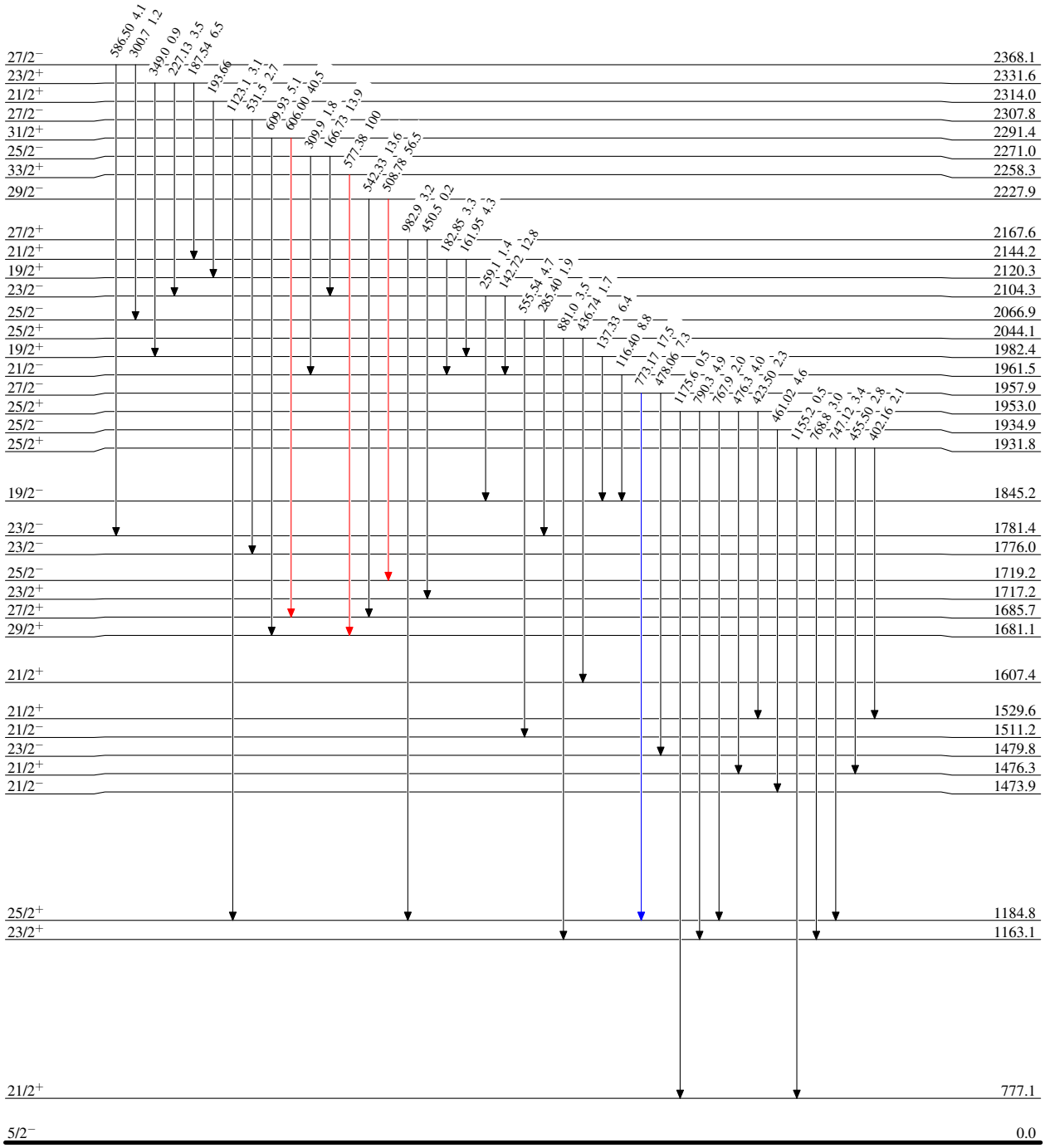
Intensities: Relative I_γ

Legend

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

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

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



$^{163}_{68}Er_{95}$

^{150}Nd(^{18}O,5nγ) 1997Ha23

Level Scheme (continued)

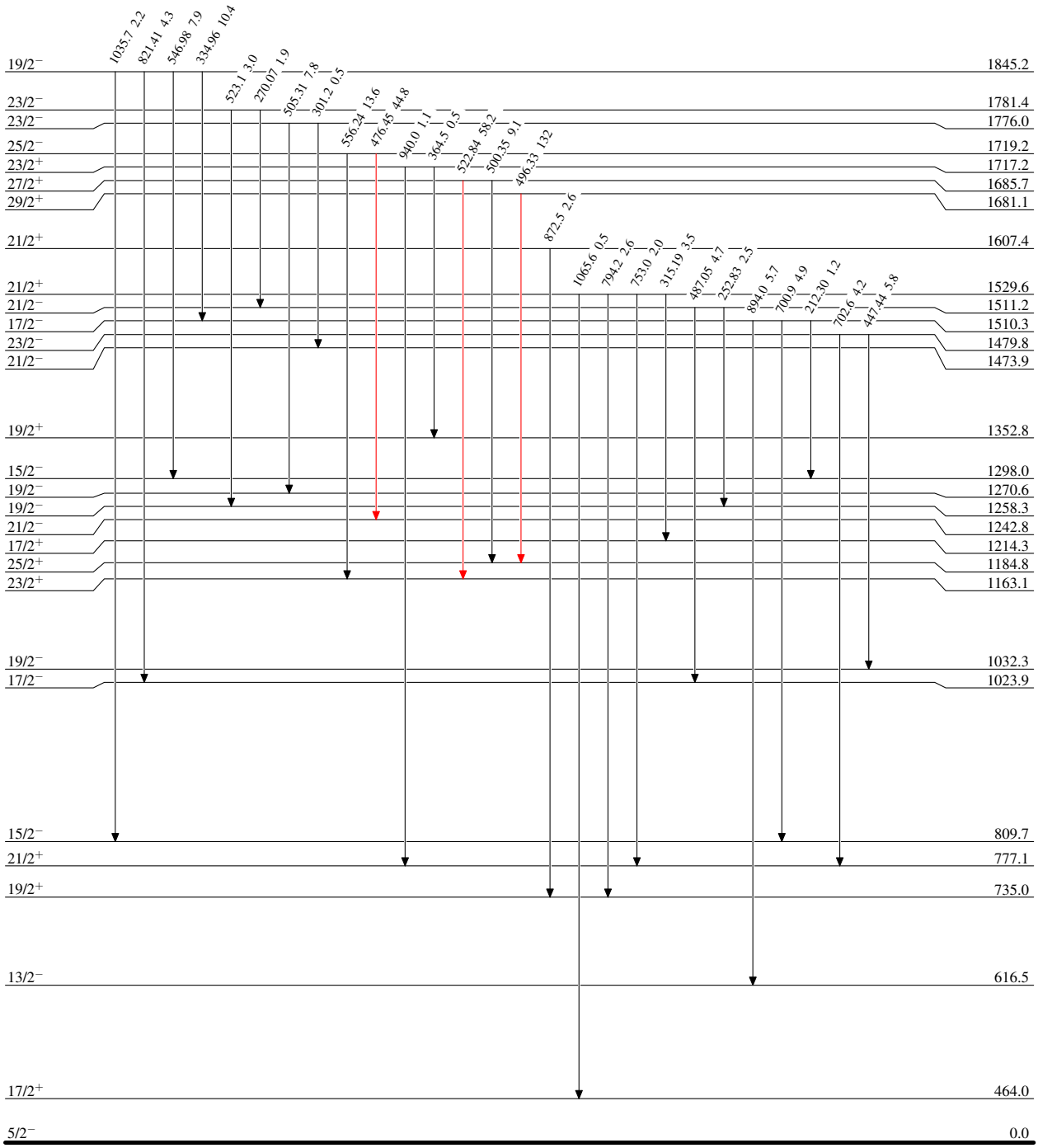
Intensities: Relative I_γ

Legend

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

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

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



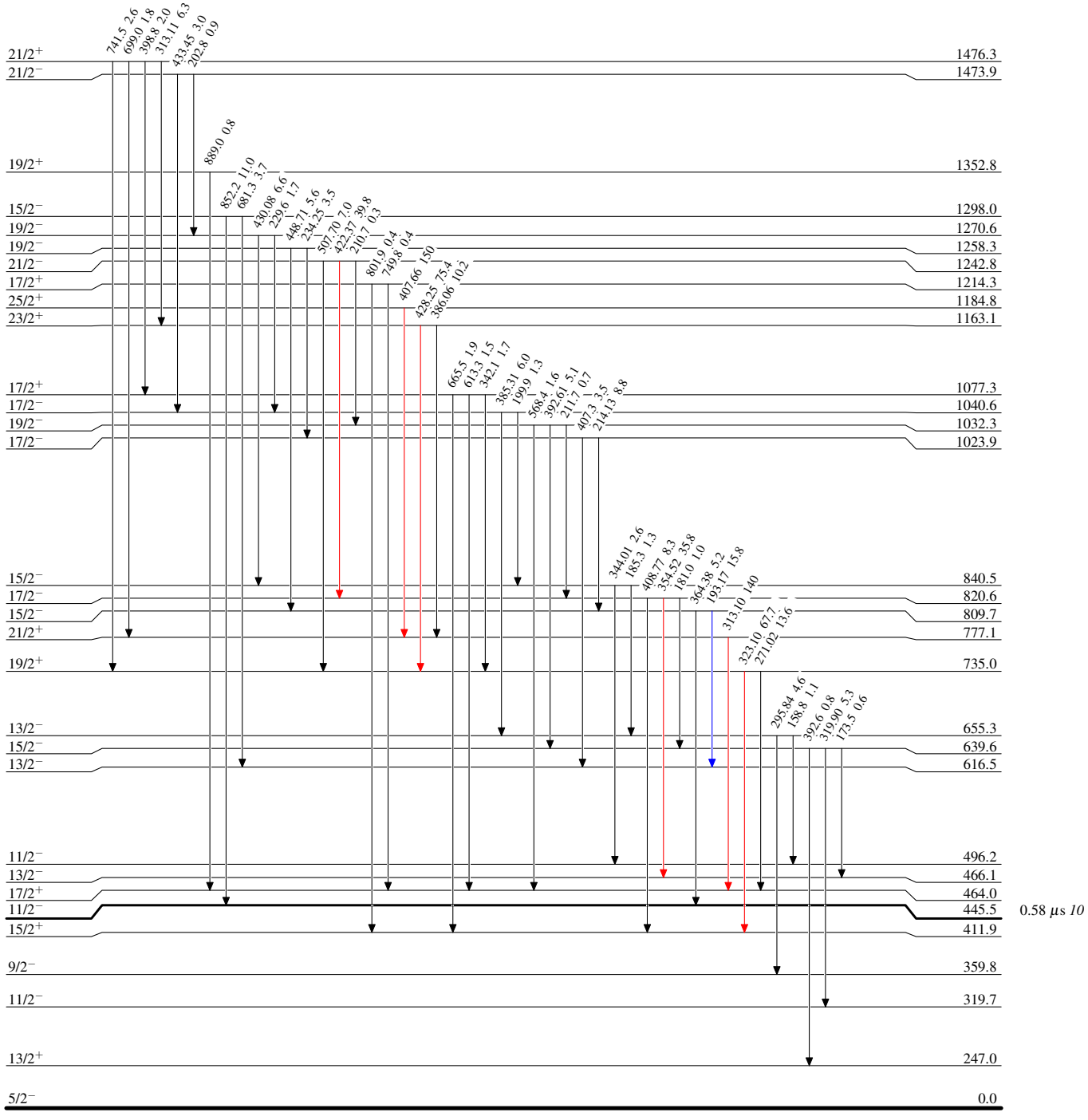
$^{163}_{68}Er_{95}$

^{150}Nd(^{18}O,5nγ) 1997Ha23

Level Scheme (continued)

Intensities: Relative I_γ

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



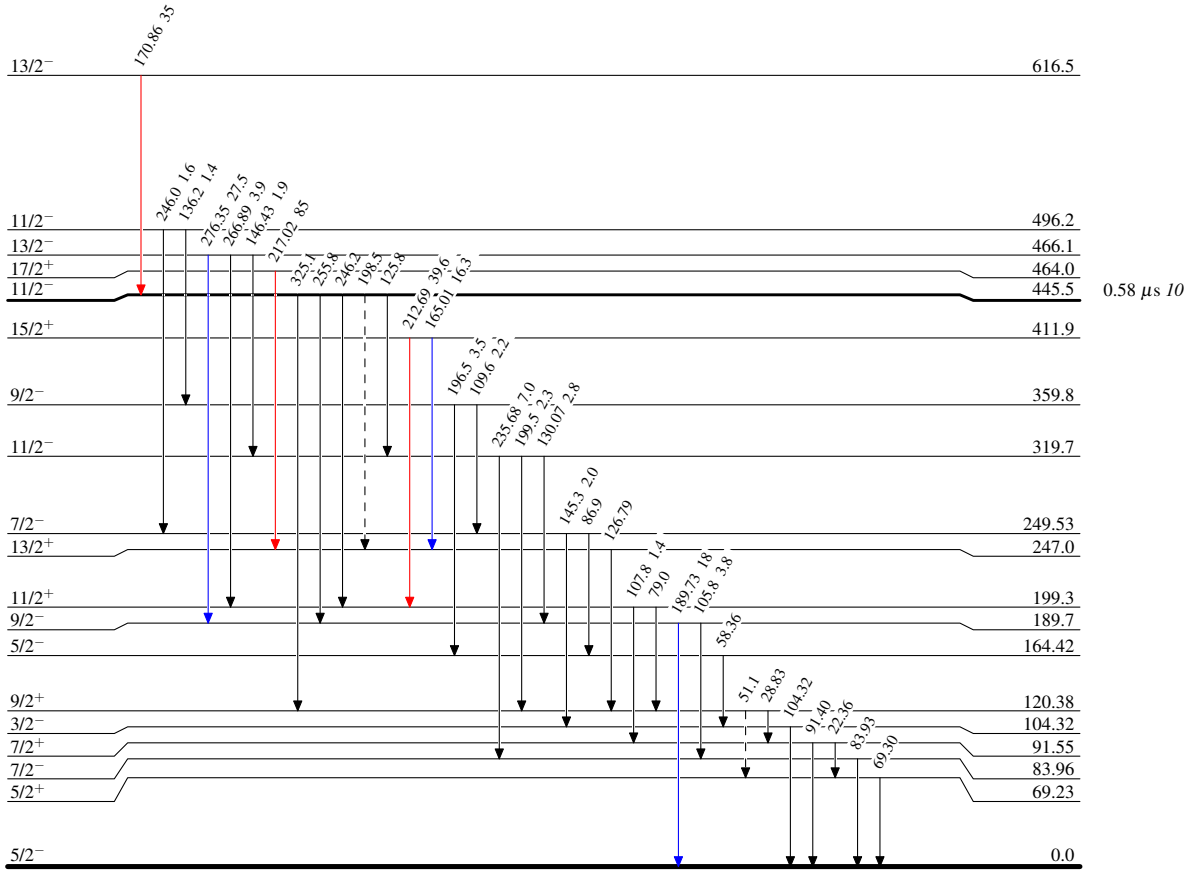
$^{163}_{68}Er_{95}$

^{150}Nd(^{18}O,5nγ) 1997Ha23

Level Scheme (continued)

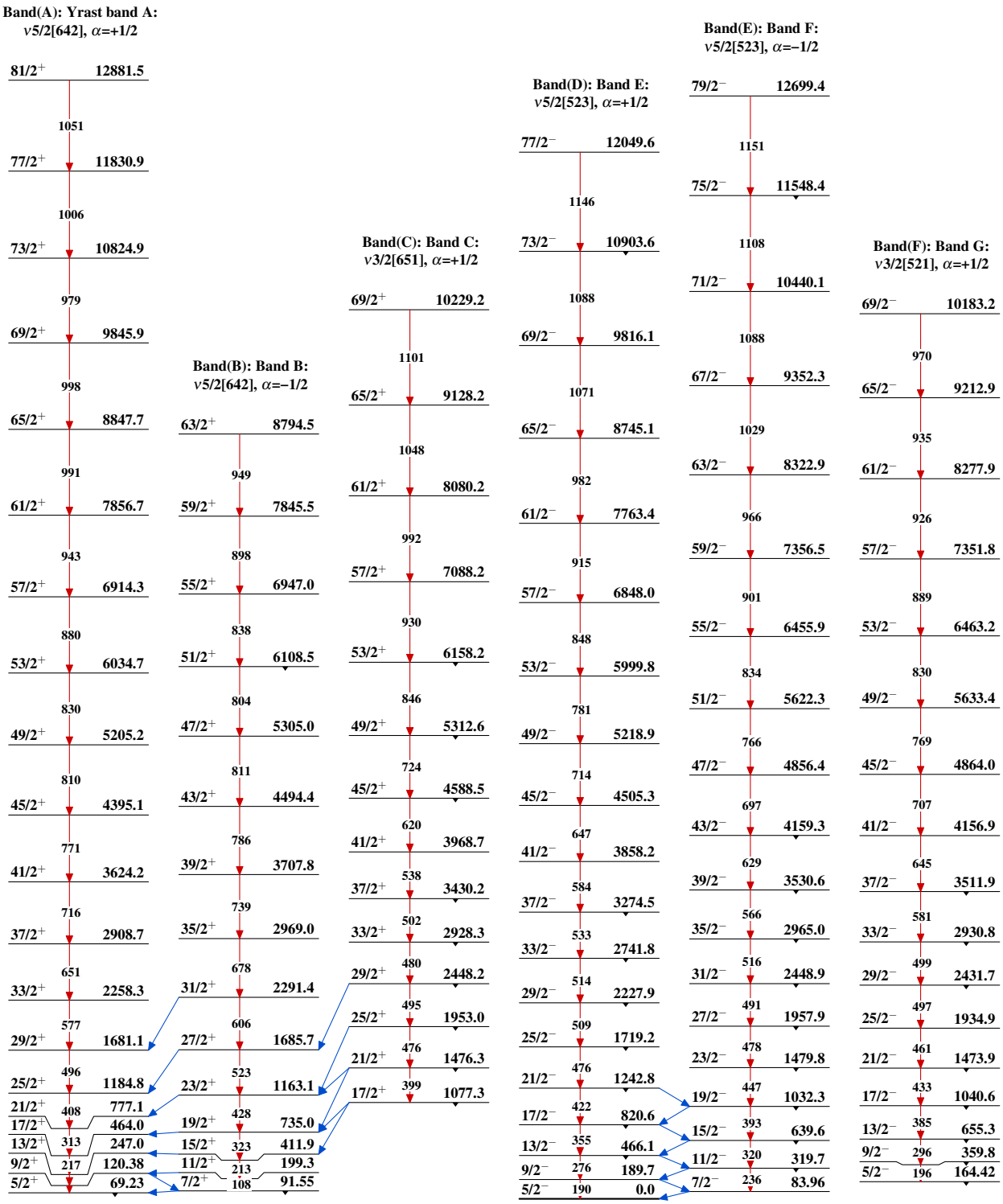
Intensities: Relative I_γ

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



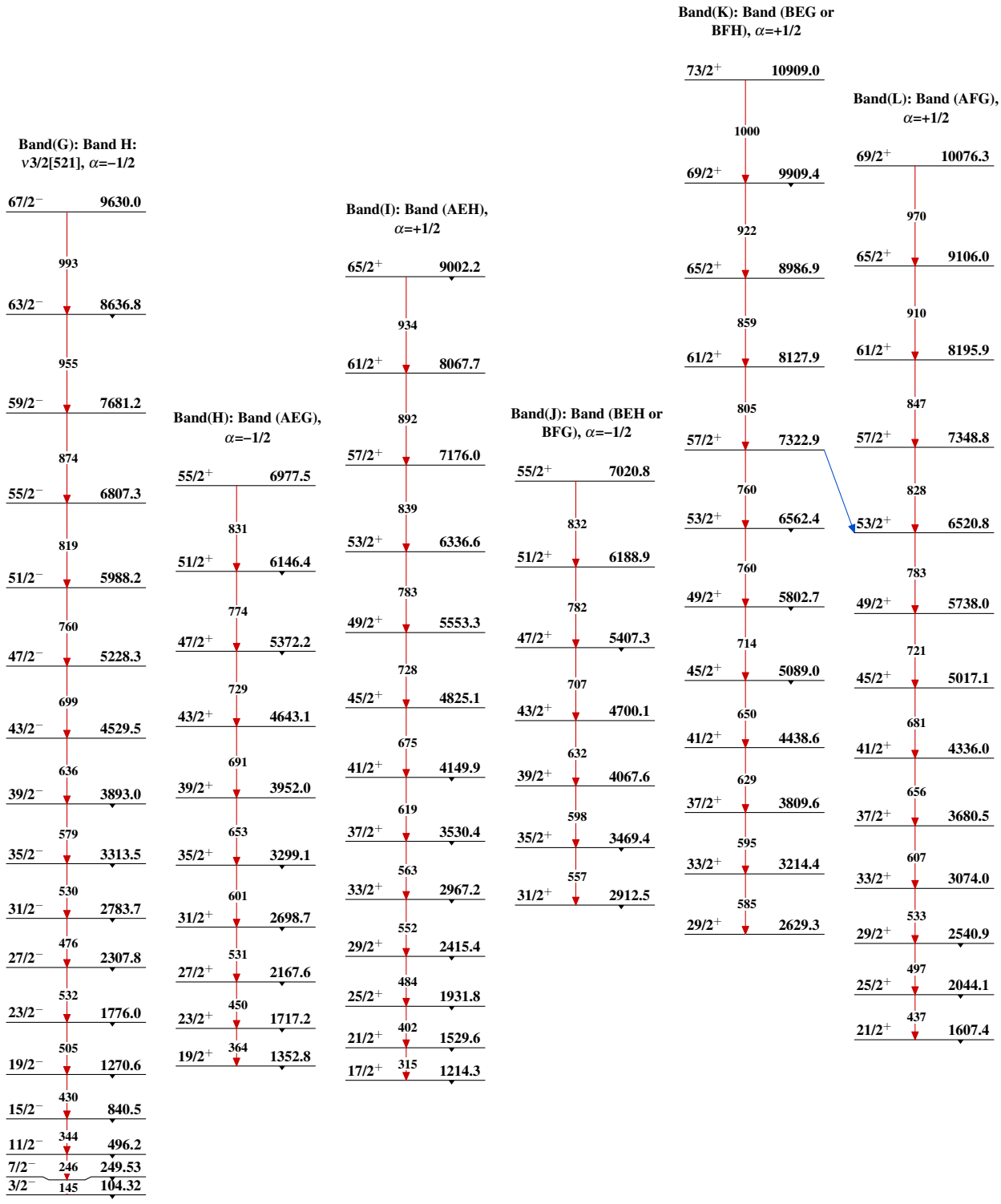
$^{163}_{68}Er_{95}$

^{150}Nd(^{18}O,5nγ) 1997Ha23

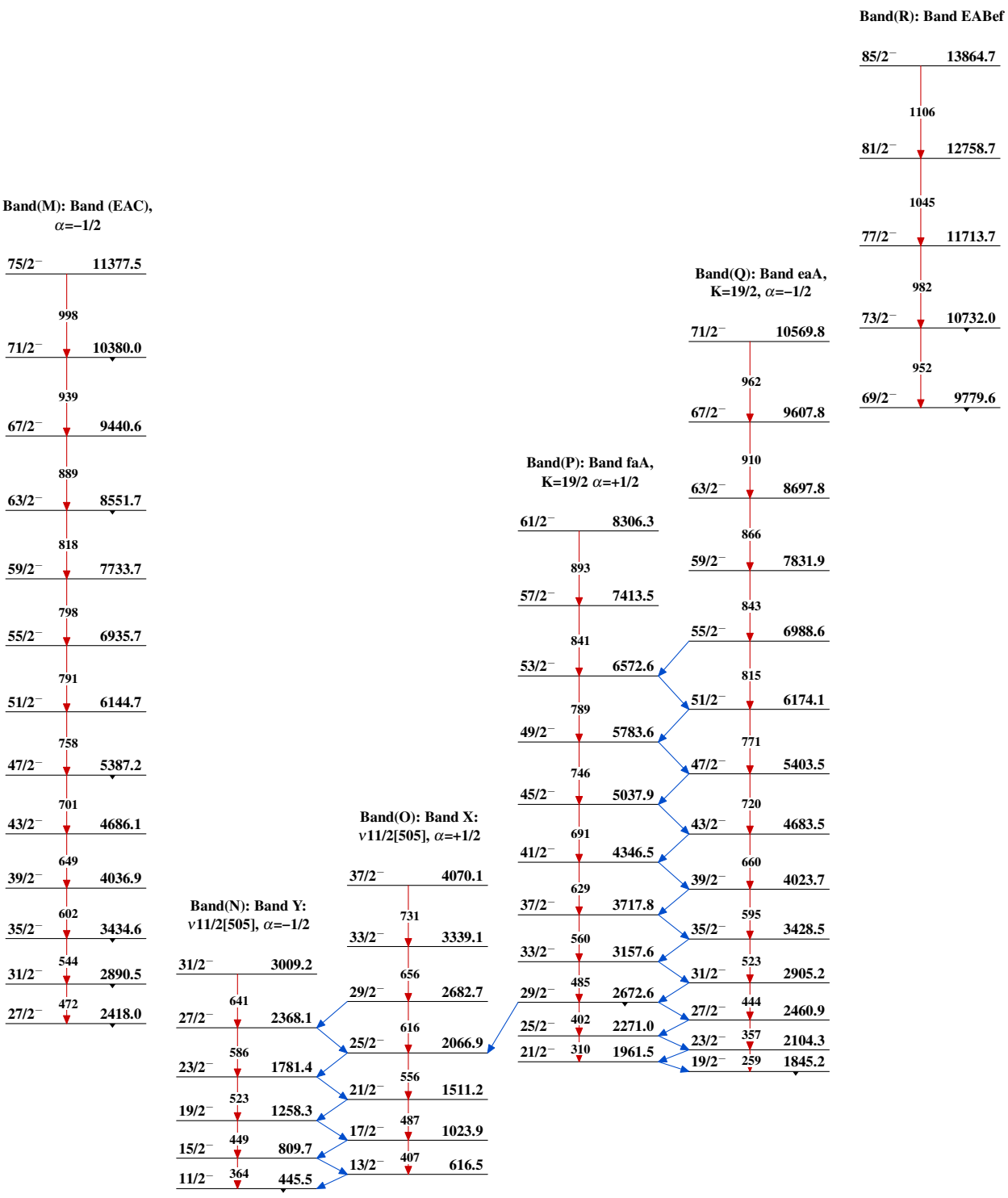


$^{163}_{68}Er_{95}$

^{150}Nd(^{18}O,5nγ) 1997Ha23 (continued)

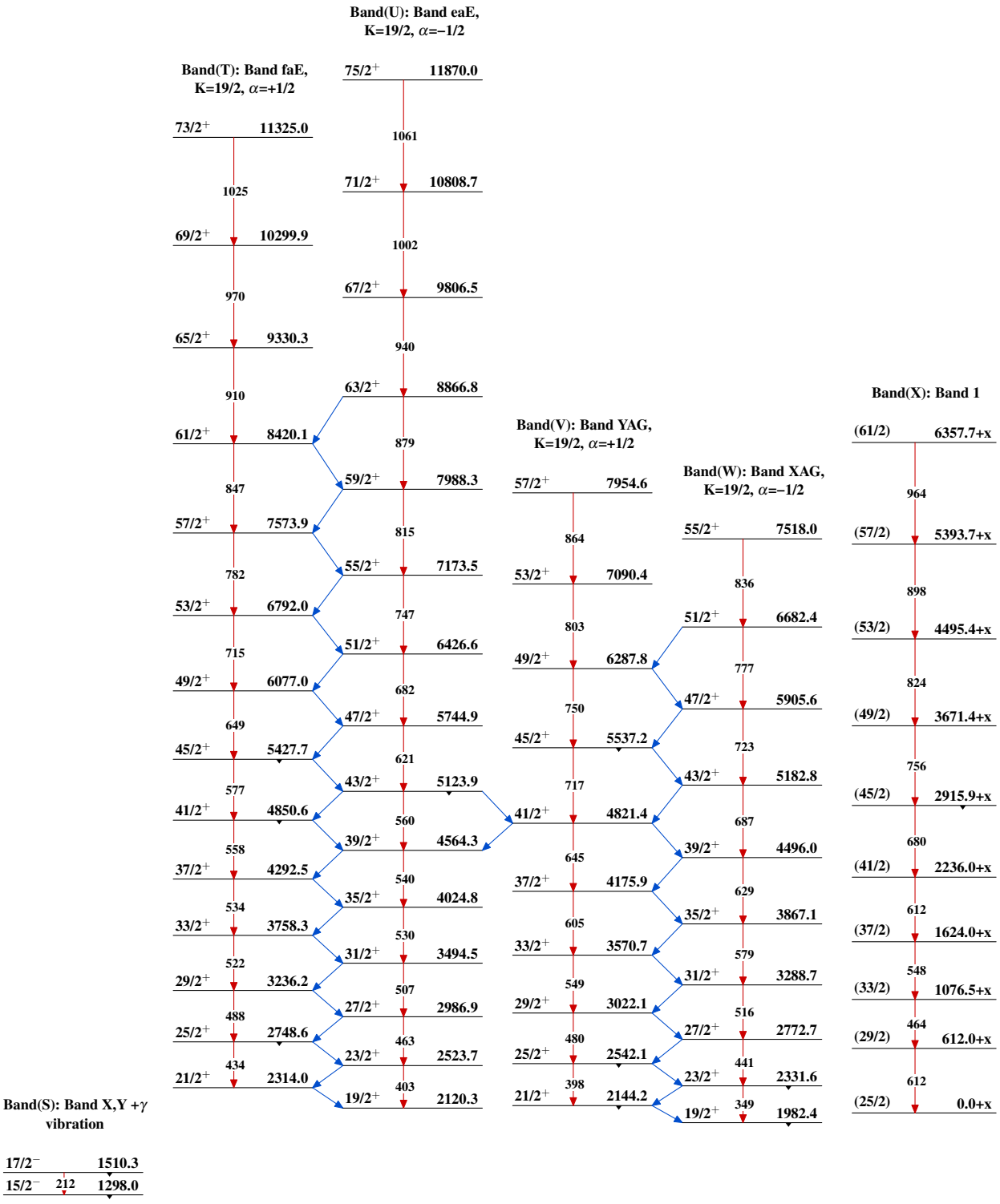


^{150}Nd(^{18}O,5nγ) 1997Ha23 (continued)

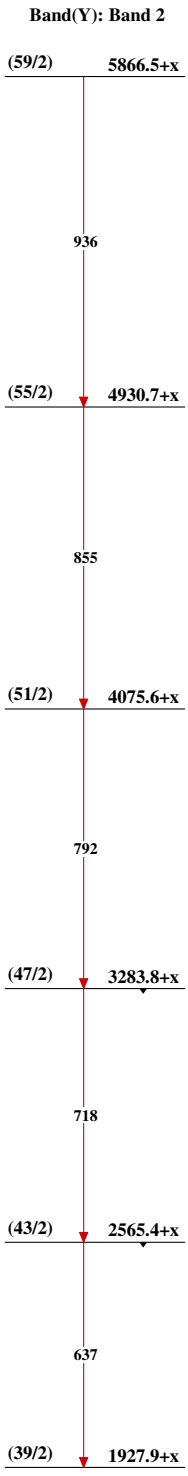


$^{163}_{68}Er_{95}$

^{150}Nd(^{18}O,5nγ) 1997Ha23 (continued)



^{150}Nd(^{18}O,5nγ) 1997Ha23 (continued)



$^{163}_{68}Er_{95}$