^{150}Nd(α,3nγ) 1994Kh01,1976Co12

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 110, 1 (2009)	20-Nov-2008

Includes ^{148}Nd(α,nγ).
Others: 1994Ba01 (also 1992Ch43), 1978HaZH, 1976Ge03, 1973Co34, 1970Bo02.
1994Kh01: E=35 MeV. Measured γ, $\gamma\gamma$, $\gamma\gamma(\theta)$ (DCO).
1994Ba01 (also 1992Ch43): E=35 MeV. Measured γ, $\gamma\gamma$, $\gamma\gamma$(t) (pulsed). 1992Ch43 report a 23-ns isomer at 2606 keV feeding the 25/2$^-$, 1912 level.
1976Co12: E=22.5-30 MeV. Measured γ, $\gamma\gamma$, $\gamma(\theta)$. Iγ's given at E(α)=22.5, 25.0, 27.0 and 28.5 MeV. $\gamma\gamma$ data at E(α)=28.5 MeV. $\gamma(\theta)$ data at 30°, 55°, 70° and 90° relative to incident beam.
1976Ge03: E=16.5-38.4 MeV. Main data reported at 33 MeV. γ, $\gamma\gamma$, γ(t), $\gamma(\theta)$, $\gamma\gamma\gamma$(t) measurements. $\gamma(\theta)$ from 90° to 165°. Relative γ intensities are not given.
1973Co34, 1970Bo02: ^{148}Nd(α,nγ) E=18 MeV. Study of the 261-keV isomer.
The level scheme is from 1994Kh01 which, for lower levels, is based on the work by 1976Co12 and 1976Ge03.
See 1983Ka06, 1983Ma71, 1979Ka16 for systematics of high spin states and theoretical interpretation.

^{151}Sm Levels

The 2287, 2686, 3014, and 3222 levels proposed by 1994Ba01 are not included here: 1. 2286 level: 360.5γ, 488.9γ are assigned now (1994Kh01) with 1503 and 2229 levels, respectively. 2. 2686 level: 176.9γ, 596.4γ are not reported by 1994Kh01. The intensities for the doublets at 176 and at 597 keV reported by 1994Ba01 are≈8 times larger than those given by 1994Kh01. It is possible that in 1994Ba01 both these lines are contributed by an impurity. 3. 3014 level: 504γ, 808.6γ are complex lines according to 1994Kh01 and are placed with other levels defined by several additional transitions. 4. 3222 level: 207.4γ could be placed with 502 level, instead.

E(level)[‡]	J$^\pi$[†]	T$_{1/2}$	Comments
0.0[e]	5/2$^-$		
4.821[#k] *3*	3/2$^-$		
65.826[d] *19*	7/2$^-$		
69.701[h] *9*	5/2$^-$		
91.51[a] *3*	(9/2)$^+$		
104.82 *2*	3/2$^-$		
147.88[a] *6*	13/2$^+$		
167.737 *14*	5/2$^+$		
168.38 *2*	(5/2)$^-$		
175.33[h] *8*	(9/2)$^-$		
208.98[k] *3*	(7/2)$^-$		
261.08[b] *4*	(11/2)$^-$	1.4[@] μs *1*	
294.82[e] *6*	9/2$^-$		
315.25 *7*	(3/2$^-$)		
323.92 *3*	7/2$^+$		
383.20[a] *7*	(17/2$^+$)		
419.1[c] *2*	11/2$^+$		Additional information 1.
423.16[d] *9*	(11/2)$^-$		
445.10[b] *6*	(13/2$^-$)		
502.27[k] *10*	(11/2$^-$)		
530.2[g] *3*	(9/2$^+$)		
531.65[h] *13*	13/2$^-$		
648.18[b] *7*	(15/2$^-$)		

Continued on next page (footnotes at end of table)

^{150}Nd(α,3nγ) 1994Kh01,1976Co12 (continued)

^{151}Sm Levels (continued)

E(level)[‡]	Jπ[†]	Comments
671.98[c] 9	(15/2+)	Additional information 2.
696.33[e] 10	(13/2−)	
705.74[g] 14	(13/2+)	
754.3[i] 4	(11/2+)	
757.66[a] 8	(21/2+)	
796.8[l] 5	(11/2+)	
813.31[d] 16	(15/2−)	
850.6[j] 3	(13/2+)	
869.35[b] 8	(17/2−)	
894.9[k] 2	(15/2−)	
974.69[g] 12	(17/2+)	
993.5[f] 3	(13/2−)	
994.15[h] 13	(17/2−)	
1041.4[l] 3	(15/2+)	
1054.11[c] 10	(19/2+)	Additional information 3.
1091.1[i] 2	(15/2+)	
1107.47[b] 9	(19/2−)	
1142.36[d] 13	(19/2−)	
1161.04[e] 16	(17/2−)	
1190.6[j] 2	(17/2+)	
1223.97[f] 16	(17/2−)	
1236.53[a] 9	(25/2+)	
1321.83[g] 13	(21/2+)	
1361.32[b] 13	(21/2−)	Additional information 4.
1379.04[k] 16	(19/2−)	
1386.6[l] 2	(19/2+)	
1478.68[h] 13	(21/2−)	
1490.0[i] 2	(19/2+)	
1502.53[d] 14	(23/2−)	
1531.17[f] 16	(21/2−)	
1532.88[c] 13	(23/2+)	
1625.56[j] 16	(21/2+)	
1628.1[o] 2	(17/2)	
1629.87[b] 15	(23/2−)	
1705.8[e] 2	(21/2−)	
1721.1[n] 3	(19/2)	
1740.17[g] 15	(25/2+)	
1798.16[a] 12	(29/2+)	
1830.4[l] 2	(23/2+)	
1835.4[o] 2	(19/2)	
1883.1[m] 2	(21/2)	
1906.57[f] 15	(25/2−)	
1911.87[b] 16	(25/2−)	
1916.6[n] 2	(21/2)	
1927.26[d] 15	(27/2−)	
1936.6[k] 2	(23/2−)	
1955.1[i] 2	(23/2+)	
2018.69[h] 15	(25/2−)	

Continued on next page (footnotes at end of table)

^{150}Nd(α,3nγ) 1994Kh01,1976Co12 (continued)

^{151}Sm Levels (continued)

E(level)‡	Jπ†	E(level)‡	Jπ†	E(level)‡	Jπ†	E(level)‡	Jπ†
2041.3[o] 2	(21/2)	2427.1[a] 2	(33/2+)	2892.1[m] 3	(29/2)	3439.6[b] 5	(35/2−)
2089.10[c] 14	(27/2+)	2444.2[o] 2	(25/2)	2898.1[f] 2	(33/2−)	3478.1[f] 3	(37/2−)
2097.7[j] 3	(25/2+)	2472.0[i] 3	(27/2+)	2935.6[l] 4	(31/2+)	3493.7[m] 5	(33/2)
2107.2[m] 2	(23/2)	2509.8[b] 2	(29/2−)	2991.0[d] 2	(35/2−)	3627.0[d] 4	(39/2−)
2132.8[n] 2	(23/2)	2560.2[h] 2	(29/2−)	3035.0[i] 4	(31/2+)	3764.7[h] 5	(37/2−)
2205.5[b] 2	(27/2−)	2601.4[j] 3	(29/2+)	3107[n] 1	(31/2)	3812[m] 1	(35/2)
2229.2[g] 2	(29/2+)	2610.8[n] 3	(27/2)	3108.2[a] 2	(37/2+)	3829.0[a] 4	(41/2+)
2242.1[e] 3	(25/2−)	2613.1[m] 2	(27/2)	3132.8[b] 4	(33/2−)	4080.0[g] 5	(41/2+)
2248.3[o] 2	(23/2)	2650.8[o] 3	(27/2)	3140.2[h] 3	(33/2−)	4105.6[c] 5	(39/2+)
2350.9[m] 2	(25/2)	2711.6[c] 2	(31/2+)	3183.2[j] 5	(33/2+)	4122.2[f] 5	(41/2−)
2351.2[l] 2	(27/2+)	2762.3[e] 5	(29/2−)	3186.0[m] 3	(31/2)	4323.5[d] 5	(43/2−)
2364.3[n] 2	(25/2)	2788.4[g] 2	(33/2+)	3358.0[e] 6	(33/2−)	4574.0[a] 6	(45/2+)
2375.8[f] 2	(29/2−)	2821.4[b] 3	(31/2−)	3388.8[c] 3	(35/2+)		
2423.1[d] 2	(31/2−)	2861.3[n] 3	(29/2)	3408.7[g] 2	(37/2+)		

† From ‘Adopted Levels’.
‡ From least-squares fit to Eγ′s.
# From ‘Adopted Levels’.
@ γ(t) in (α,nγ) (1973Co34). Other: 9 μs 3 (1970Bo02).
& From analysis of delayed γ-ray intensities, 1992Ch43 report $T_{1/2}$=23 ns 4 for a 2606 level deexciting by a 693.6γ; no such γ is reported in their later work (1994Ba01) or by 1994Kh01. It is possible that this γ is the same as the 698.8γ.
[a] Band(A): ΔJ=2 band, $i_{13/2}$ band.
[b] Band(B): ΔJ=1, 11/2[505] band.
[c] Band(C): Band 1. ΔJ=2.
[d] Band(D): Band 2. ΔJ=2.
[e] Band(E): Band 3. ΔJ=2.
[f] Band(F): Band 4. ΔJ=2.
[g] Band(G): Band 5. ΔJ=2.
[h] Band(H): Band 6. ΔJ=2.
[i] Band(I): Band 7. ΔJ=2.
[j] Band(J): Band 8. ΔJ=2.
[k] Band(K): Band 9. ΔJ=2.
[l] Band(L): Band 10. ΔJ=2.
[m] Band(M): Band 11. ΔJ=1.
[n] Band(N): Band 12. ΔJ=1.
[o] Band(O): Band 13. ΔJ=1.

γ(^{151}Sm)

The γγ(θ) data are quoted as DCO ratios from 1994Kh01. DCO(1) is ratio of coincidence intensities for 79° and (117°+ 40°) whereas DCO(2) is ratio of coincidence intensities for (37°+40°) and (63°+79°). In this arrangement with the gate on ΔJ=2 stretched quadrupole transitions, the following ratios are expected: DCO(1)=1.0 1, DCO(2)=2.9 3 for ΔJ=2, stretched quadrupole. DCO(1)=1.8 2, DCO(2)=1.9 2 for ΔJ=1, stretched dipole. The DCO ratios which differ significantly from these values indicate ΔJ=1, mixed dipole+quadrupole (generally M1+E2 from RUL).

The 176.9γ and 596.4γ reported by 1994Ba01 are not included here. Comparison of Iγ′s with those from 1994Kh01 suggests that these may arise from other nuclides.

```
--------------------------------------------------------------
γ-ray intensities at other α energies (1976Co12)
  Eγ           Iγ          Iγ          Iγ          Iγ
 (1976Co12) 25 MeV      27 MeV      28.5 MeV    35 MeV
```

				(1994Ba01)
56.37 10	1.55	6.4		0.23 2
65.83	15	49		5.48 6
69.69				
85.7 1	0.25	0.80	1.0	8.97 6 c)
98.4 2		0.21		
100.0		0.48		
101.91		0.45		
104.82	<0.4	0.63		
109.55 +	<3.1	<6.7		6.83 7
109.79				
113.21 5	0.25	2.2	2.6	1.23 6
128.35 25		<0.4	0.53	
139.28	0.38	1.0	0.73	
143.16	0.13	0.31	0.29	
147.51	0.44	0.80	0.70	
155.5 +		0.25	0.22	
156.2				
162.92 +	0.60	1.85	0.40	
163.56			1.4	
167.73	1.3	3.0	3.1	
168.38				
169.57 5 +	3.5	12	14	9.8 10
169.7 8 a)				
175.4 8 + a)				2.08 8 c)
176.9 8 a)				
184.02 5 +	5.2	18	20	
185.1 9 a)				10.46 10
195.26 5 +	2.1	7.1	9.0	
197.1 9 a)				3.8 3
203.07 5	2.7	11	14	27.5 5 b)
207.39 18	0.17	0.52	0.78	1.7 5
208.98	1.2	2.8	3.1	
221.15 5	2.2	7.45	9.7	20.6 5 b)
228.98 7	1.5	4.6	4.4	1.04 6
232.42 3	0.35	1.25	1.8	
235.29 5	13	58	88	128.4 7
238.11 5	2.4	5.4	6.2	24.3 8 c)
253.79 15	<0.72	<2.3	4.0	10.5 4 b)
256.0 a)				
265.9 6		0.17	0.4	1.21 6
268.67 15 +	<1.9	<4.0	1.5	8.1 4 b)
268.9 2			2.0	
273.2 2	<0.18	<0.82	0.80	
275.50 25	<1.1	<1.4	0.80	
282.15 25 +	0.75	2.6	0.60	7.9 8 b)
282.65 20			3.3	
288.78 8	0.63	2.8	4.1	8.7 10 b)
293.36 13	0.25	0.95	1.3	7.94 13 c)
293.4 5			0.30	
294.5			<0.3	
294.80 15	<1.25	<3.1	2.1	
296.55 10	0.47	2.2	4.1	13.3 8 b)
303.3 5	<0.33	<0.55	0.2	1.9 8
308.1 12 a)				1.84 6
311	<0.31	<0.56	0.1	2.7 17
313.9 a)				<4.1
323.92	0.28	0.86	1.25	
327.1 3	<1.3	<3.0	0.35	
331.58 15	<1.9	<4.0	5.1	
347.2 2		<1.15	0.40	5.6 5
356.42 15	<7.0	<13.5	9.9	15.2 9 b)
357.38 15			3.0	
360.5 13 a)				1.18 9

374.49 5	4.95	27	54	100.0
382.20 25	<0.46	<1.15	2.3	4.6 5
384.50 35	<0.70	<1.6	1.1	
387.10 8	0.70	2.4	3.9	6.8 6
401.48 11	0.34	1.5	3.3	
424.20 25 +	0.60	2.9	1.0	
424.29 15			4.7	11.6 5 b)
430.30 25	<1.3	<2.1	1.5	
459.35 15	0.55	2.6	4.3	7.6 6
462.95 20	<1.9	<3.7	4.4	5.6 5
476.95 15	0.32	1.2	2.9	7.2 5 b)
478.86 5	0.95	9.2	23	53.1 9
488.9 15 a)				4.27 14
492.0 3	0.30	1.5	3.4	8.3 14
495.75 30		0.50	1.5	3.3 14
504 a)				<4.0
522.45 30	<0.35	<1.2	2.3	6.1 15
524.1 2	<1.0	<3.4	4.5	
550.70 35			1.5	6.9 6
552.0 5			0.4	
559.65 20			1.7	27 2 c)
561.65 30	<0.15	2.0	5.8	25.5 13
575.65 45		0.30	0.75	2.1 7
596.7 5 +			0.40	
597.7 17 a)				25.5 3 c)
611.6 5	<0.35	<1.65	0.75	1.68 13
626.0 3		0.80	1.4	8.6 30
665.4 6	<0.93	<3.1		
671.0 2	<0.94	<3.85	5.0	10.5 9
690.60 25			2.6	10.5 9
721.1 3	<0.25	<0.97	1.4	
744.85 13	0.53	2.7	5.5	13.7 23
759.03 12	<0.92	3.6	6.3	
774.0 5		<1.55	1.4	3.5 13
808.6 18 a)				6.4 4 c)

a) from 1994Ba01.
b) too large by a factor of ≈2.
c) too large by a factor of ≈3 or more.

E_γ[†]	E_i(level)	J_i^π	E_f	J_f^π
4.821[#] *3*	4.821	3/2$^-$	0.0	5/2$^-$
25.68[#] *2*	91.51	(9/2)$^+$	65.826	7/2$^-$
56.37[@] *10*	147.88	13/2$^+$	91.51	(9/2)$^+$
64.88[#] *1*	69.701	5/2$^-$	4.821	3/2$^-$

Continued on next page (footnotes at end of table)

^{150}Nd(α,3nγ) 1994Kh01,1976Co12 (continued)

γ(^{151}Sm) (continued)

Eγ[†]	Iγ[‡]	E$_i$(level)	J^π_i	E$_f$	J^π_f	Mult.	Comments
65.83[@] 5	>5	65.826	7/2⁻	0.0	5/2⁻		
69.70[#] 2		69.701	5/2⁻	0.0	5/2⁻		
83.8 4	0.41 4	175.33	(9/2)⁻	91.51	(9/2)⁺		DCO(1)=1.3 3 consistent with ΔJ=2 or 1.
85.7[@] 1		261.08	(11/2)⁻	175.33	(9/2)⁻		
98.4[e#] 2	[e]	167.737	5/2⁺	69.701	5/2⁻		
98.4[e#] 2	[e]	168.38	(5/2)⁻	69.701	5/2⁻		
100.00[#] 2		104.82	3/2⁻	4.821	3/2⁻		
101.91[#] 2		167.737	5/2⁺	65.826	7/2⁻		
104.82[#] 2		104.82	3/2⁻	0.0	5/2⁻		
105.7 4	0.8 1	175.33	(9/2)⁻	69.701	5/2⁻		DCO(1)=1.45 10, DCO(2)=2.5 3. DCO(1) is inconsistent with expected ΔJ=2; DCO(2) is marginally consistent with ΔJ=2.
107.0[d]		530.2	(9/2⁺)	423.16	(11/2)⁻		
109.5 2	5.11 8	175.33	(9/2)⁻	65.826	7/2⁻	D[a]	DCO(1)=1.73 8, DCO(2)=1.74 10.
113.21[@] 5		261.08	(11/2)⁻	147.88	13/2⁺		A_2=+0.10 10 (1976Co12).
116.9 4	0.04 1	3108.2	(37/2⁺)	2991.0	(35/2⁻)		
117.0[d]		813.31	(15/2⁻)	696.33	(13/2⁻)		
119.3 4		294.82	9/2⁻	175.33	(9/2)⁻		DCO(2)=1.6 9.
124.2 4	0.21 2	419.1	11/2⁺	294.82	9/2⁻	D[a]	DCO(2)=1.10 23.
128.35[@] 25	0.31 2	423.16	(11/2)⁻	294.82	9/2⁻	D+Q[c]	DCO(2)=1.35 17.
129.9 4	0.11 1	1927.26	(27/2⁻)	1798.16	(29/2⁺)		Eγ: poor energy fit. Level energy difference is 129.1.
139.28[#] 3		208.98	(7/2)⁻	69.701	5/2⁻	D+Q	A_2=−0.67 10 (1976Co12).
143.16[#] 3		208.98	(7/2)⁻	65.826	7/2⁻		
147.51[#] 6		315.25	(3/2⁻)	167.737	5/2⁺		A_2=−0.03 10 (1976Co12).
155.5[#] 2		323.92	7/2⁺	168.38	(5/2)⁻		
161.1[d]		2097.7	(25/2⁺)	1936.6	(23/2⁻)		
161.7 4	0.07 2	974.69	(17/2⁺)	813.31	(15/2⁻)		
162.0[d]		1883.1	(21/2)	1721.1	(19/2)		
162.92[#] 2		167.737	5/2⁺	4.821	3/2⁻		
163.56[#] 2		168.38	(5/2)⁻	4.821	3/2⁻		
164.7[d]		696.33	(13/2⁻)	531.65	13/2⁻		
167.5[d]		1161.04	(17/2⁻)	994.15	(17/2⁻)		
167.73[#] 2		167.737	5/2⁺	0.0	5/2⁻		
168.38[#] 5		168.38	(5/2)⁻	0.0	5/2⁻		
169.57[@] 5		261.08	(11/2)⁻	91.51	(9/2)⁺		
169.7[g] 8		1531.17	(21/2⁻)	1361.32	(21/2⁻)		From 1994Ba01 only. Main part of this γ ray is with 261 level.
175.3[d]		175.33	(9/2)⁻	0.0	5/2⁻		
175.6 4	0.2 1	705.74	(13/2⁺)	530.2	(9/2⁺)		
179.5[d]		1321.83	(21/2⁺)	1142.36	(19/2⁻)		
180.8[d]		994.15	(17/2⁻)	813.31	(15/2⁻)		
182.5[d]		2089.10	(27/2⁺)	1906.57	(25/2⁻)		
184.02[@] 5	>21	445.10	(13/2⁻)	261.08	(11/2)⁻	D+Q[c]	A_2=−0.47 5, A_4=+0.14 9 (1976Co12). DCO(2)=1.29 5. Additional information 6.
186.1 4	0.18 2	2898.1	(33/2⁻)	2711.6	(31/2⁺)		
188.4[d]		1379.04	(19/2⁻)	1190.6	(17/2⁺)		

Continued on next page (footnotes at end of table)

^{150}Nd(α,3nγ) 1994Kh01,1976Co12 (continued)

γ(^{151}Sm) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.	Comments
190.6[d]		2107.2	(23/2)	1916.6	(21/2)		
195.26[@] 5		261.08	(11/2)⁻	65.826	7/2⁻		A_2=+0.09 8 (1976Co12).
195.3[d] 4		2444.2	(25/2)	2248.3	(23/2)		
195.5[d] 4		1916.6	(21/2)	1721.1	(19/2)		
198.6[d]		894.9	(15/2⁻)	696.33	(13/2⁻)		
202.0[d]		3829.0	(41/2⁺)	3627.0	(39/2⁻)		
203.07[@] 5	14.8 2	648.18	(15/2⁻)	445.10	(13/2⁻)	D+Q[c]	A_2=−0.51 8, A_4=+0.21 10 (1976Co12). DCO(2)=1.28 6. Additional information 7.
203.3[d]		1705.8	(21/2⁻)	1502.53	(23/2⁻)		
206.1[d] 4		2041.3	(21/2)	1835.4	(19/2)		
206.9[d] 4		2248.3	(23/2)	2041.3	(21/2)		
207[d] 1		2650.8	(27/2)	2444.2	(25/2)		
207.3[d]		1740.17	(25/2⁺)	1532.88	(23/2⁺)		
207.39[@] 18		502.27	(11/2⁻)	294.82	9/2⁻	D+Q	A_2=−0.72 17 (1976Co12).
207.5[d] 4		1835.4	(19/2)	1628.1	(17/2)		
209.0 4		208.98	(7/2)⁻	0.0	5/2⁻	D[a]	A_2=−0.22 7 (1976Co12). DCO(2)=1.83 15.
211.1[d]		1532.88	(23/2⁺)	1321.83	(21/2⁺)		
216.1[d] 4		2132.8	(23/2)	1916.6	(21/2)		
218.1[d]		2350.9	(25/2)	2132.8	(23/2)		
221.15[@] 5	11.7 2	869.35	(17/2⁻)	648.18	(15/2⁻)	D+Q[c]	A_2=−0.59 7 (1976Co12). DCO(1)=2.28 6, DCO(2)=1.28 3. Additional information 9.
224.0 4		2107.2	(23/2)	1883.1	(21/2)	D+Q[c]	DCO(2)=1.01 8.
228.98[@] 7	1.32 3	294.82	9/2⁻	65.826	7/2⁻	D+Q[c]	DCO(2)=1.15 7.
230.5 4	0.03 1	1223.97	(17/2⁻)	993.5	(13/2⁻)		
231.5[d] 4		2364.3	(25/2)	2132.8	(23/2)		
232.42[#] 3		323.92	7/2⁺	91.51	(9/2)⁺		
235.29[@] 5	150 2	383.20	(17/2⁺)	147.88	13/2⁺	Q[&]	A_2=+0.30 3, A_4=−0.13 8 (1976Co12). DCO(1)=1.01 3, DCO(2)=2.86 7. Additional information 5.
237.6[d]		1740.17	(25/2⁺)	1502.53	(23/2⁻)		
238.11[@] 5	8.4 1	1107.47	(19/2⁻)	869.35	(17/2⁻)	D+Q[c]	A_2=−0.37 7 (1976Co12). DCO(1)=2.22 6, DCO(2)=1.20 6. Additional information 10.
243.8[d] 4		2350.9	(25/2)	2107.2	(23/2)		
244.6[d] 4		1041.4	(15/2⁺)	796.8	(11/2⁺)		
246[d] 1		3107	(31/2)	2861.3	(29/2)		
246.6 4		1625.56	(21/2⁺)	1379.04	(19/2⁻)	D[a]	DCO(2)=2.12 17.
246.7[d] 4		2610.8	(27/2)	2364.3	(25/2)		
247.8[d]		423.16	(11/2)⁻	175.33	(9/2)⁻		
250.7[d] 4		2861.3	(29/2)	2610.8	(27/2)		
252.8 4	0.41 3	671.98	(15/2⁺)	419.1	11/2⁺	Q[&]	DCO(2)=3.0 5.
253.79[@] 15	5.33 8	1361.32	(21/2⁻)	1107.47	(19/2⁻)	D+Q[c]	A_2=−0.50 3 (1976Ge03) for complex G. DCO(1)=2.47 15 DCO(2)=1.29 7.
254.7[d]		1478.68	(21/2⁻)	1223.97	(17/2⁻)		
261.9[d] 4		2613.1	(27/2)	2350.9	(25/2)		

Continued on next page (footnotes at end of table)

^{150}Nd(α,3nγ) 1994Kh01,1976Co12 (continued)

γ(^{151}Sm) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.	Comments
266.1[d]		1161.04	(17/2⁻)	894.9	(15/2⁻)		
266.1 *4*	0.50 *2*	1502.53	(23/2⁻)	1236.53	(25/2⁺)	D[a]	DCO(2)=2.0 *3*.
267.8 *4*		1321.83	(21/2⁺)	1054.11	(19/2⁺)	D+Q[c]	DCO(2)=1.01 *8*.
268.5 *2*	3.39 *5*	1629.87	(23/2⁻)	1361.32	(21/2⁻)	D+Q[c]	A_2=−0.33 *3* (1976Ge03) for unresolved 268.7γ+268.9γ. DCO(1)=1.67 *11*, DCO(2)=1.37 *5*.
269.0 *2*	1.2 *1*	974.69	(17/2⁺)	705.74	(13/2⁺)	Q[&]	DCO(2)=3.0 *3*.
271.2 *4*	0.3 *1*	419.1	11/2⁺	147.88	13/2⁺	D[a]	DCO(2)=1.5 *6*.
273.2[@] *2*	0.6 *1*	696.33	(13/2⁻)	423.16	(11/2)⁻	D+Q[c]	DCO(2)=1.45 *13*.
275.50[@] *25*	0.38 *3*	423.16	(11/2)⁻	147.88	13/2⁺		E_γ: 275.1 (1994Kh01).
277.2[d]		696.33	(13/2⁻)	419.1	11/2⁺		
278.9[d] *4*		2892.1	(29/2)	2613.1	(27/2)		
280.5 *4*	0.008 *2*	3388.8	(35/2⁺)	3108.2	(37/2⁺)		
282.1 *2*	2.32 *4*	1911.87	(25/2⁻)	1629.87	(23/2⁻)	D+Q[c]	A_2=−0.45 *4* (1976Ge03) for unresolved 282.3γ+282.6γ. DCO(1)=1.95 *18*, DCO(2)=1.38 *7*.
282.65[@] *20*		705.74	(13/2⁺)	423.16	(11/2)⁻	D[a]	DCO(2)=1.75 *10*.
284.5 *4*	0.11 *2*	2711.6	(31/2⁺)	2427.1	(33/2⁺)		
286.4 *4*		705.74	(13/2⁺)	419.1	11/2⁺	D[a]	DCO(2)=2.1 *3*.
286.8 *2*	1.4 *2*	2375.8	(29/2⁻)	2089.10	(27/2⁺)	D[a]	DCO(2)=1.85 *13*.
288.5[d]		2711.6	(31/2⁺)	2423.1	(31/2⁻)		
288.78[@] *8*	3.70 *7*	671.98	(15/2⁺)	383.20	(17/2⁺)	D+Q[c]	A_2=0.00 *8* (1976Co12). DCO(1)=1.31 *6*, DCO(2)=1.96 *8*.
290.8 *4*	0.64 *2*	2089.10	(27/2⁺)	1798.16	(29/2⁺)	D+Q[c]	DCO(2)=2.31 *15*.
293.36[@] *13*		502.27	(11/2⁻)	208.98	(7/2)⁻		
293.5[@] *3*		2205.5	(27/2⁻)	1911.87	(25/2⁻)		A_2=−0.33 *8*, A_4=−0.22 *13* (1976Ge03). These values suggest ΔJ=0, D+Q; but adopted ΔJ=1.
294.1[d] *4*		3186.0	(31/2)	2892.1	(29/2)		
294.80[@] *15*	0.9 *1*	294.82	9/2⁻	0.0	5/2⁻	Q[&]	DCO(2)=2.6 *3*.
295.8 *4*		1190.6	(17/2⁺)	894.9	(15/2⁻)	D[a]	DCO(2)=1.72 *16*.
296.3 *2*	2.1 *4*	1532.88	(23/2⁺)	1236.53	(25/2⁺)	D+Q[c]	DCO(2)=2.03 *6*.
296.55[@] *10*	3.0 *5*	1054.11	(19/2⁺)	757.66	(21/2⁺)	D+Q[c]	A_2=−0.31 *10* (1976Co12). DCO(1)=1.42 *6*, DCO(2)=2.08 *8*.
299.5[d]		2097.7	(25/2⁺)	1798.16	(29/2⁺)		
300.5 *4*	0.08 *2*	3408.7	(37/2⁺)	3108.2	(37/2⁺)		
302.0 *4*	0.5 *1*	2229.2	(29/2⁺)	1927.26	(27/2⁻)	D[a]	DCO(2)=1.90 *9*.
302.7 *4*		974.69	(17/2⁺)	671.98	(15/2⁺)	D+Q[c]	DCO(2)=1.01 *12*.
304.1 *4*	0.83 *2*	2509.8	(29/2⁻)	2205.5	(27/2⁻)	D+Q[c]	DCO(2)=1.46 *25*.
306.8[d] *4*		3439.6	(35/2⁻)	3132.8	(33/2⁻)		
307.5[d] *4*		1531.17	(21/2⁻)	1223.97	(17/2⁻)		
308[d] *1*		3493.7	(33/2)	3186.0	(31/2)		
311.0[d]		1936.6	(23/2⁻)	1625.56	(21/2⁺)		
311.4 *4*	0.06 *1*	3132.8	(33/2⁻)	2821.4	(31/2⁻)		
311.6 *4*	0.37 *5*	2821.4	(31/2⁻)	2509.8	(29/2⁻)	D+Q[c]	DCO(2)=1.30 *9*.
314.8[d]		2242.1	(25/2⁻)	1927.26	(27/2⁻)		
318[d] *1*		3812	(35/2)	3493.7	(33/2)		
322.0 *4*	0.4 *1*	994.15	(17/2⁻)	671.98	(15/2⁺)		
323.92[#] *4*		323.92	7/2⁺	0.0	5/2⁻		
327.1[@] *3*		502.27	(11/2⁻)	175.33	(9/2)⁻		
327.6 *4*	0.1 *1*	419.1	11/2⁺	91.51	(9/2)⁺		
329.0[d]		1490.0	(19/2⁺)	1161.04	(17/2⁻)		
329.3 *4*	0.09 *6*	1142.36	(19/2⁻)	813.31	(15/2⁻)		

Continued on next page (footnotes at end of table)

^{150}Nd(α,3nγ) 1994Kh01,1976Co12 (continued)

γ(^{151}Sm) (continued)

Eγ[†]	Iγ[‡]	Ei(level)	J^π_i	Ef	J^π_f	Mult.	Comments
331.1[d]		754.3	(11/2+)	423.16	(11/2)−		
331.58[@] 15	1.32 4	423.16	(11/2)−	91.51	(9/2)+	D[a]	DCO(2)=2.0 6.
335.8[d]		2711.6	(31/2+)	2375.8	(29/2−)		
336.3[d]		1478.68	(21/2−)	1142.36	(19/2−)		
336.8[d] 4		1091.1	(15/2+)	754.3	(11/2+)		
339.2[d]		2762.3	(29/2−)	2423.1	(31/2−)		
339.8[d] 4		1190.6	(17/2+)	850.6	(13/2+)		
345.4[d] 4		1386.6	(19/2+)	1041.4	(15/2+)		
347.1 2	4.6 1	1321.83	(21/2+)	974.69	(17/2+)	Q[&]	DCO(2)=2.78 15.
347.6[d]		1490.0	(19/2+)	1142.36	(19/2−)		
347.7[d]		1161.04	(17/2−)	813.31	(15/2−)		
348.9[d]		2089.10	(27/2+)	1740.17	(25/2+)		
351.7[d]		1830.4	(23/2+)	1478.68	(21/2−)		
356.42[@] 15	5.2 2	531.65	13/2−	175.33	(9/2)−	Q[&]	DCO(1)=1.05 5, DCO(2)=2.80 16.
357.38[@] 15	1.53 3	423.16	(11/2)−	65.826	7/2−	Q[&]	Eγ: 357.8 (1994Kh01). DCO(2)=3.1 3.
359.7 4	0.11 2	1502.53	(23/2−)	1142.36	(19/2−)		
361.1 4	0.05 1	2788.4	(33/2+)	2427.1	(33/2+)		
365.3[d]		2788.4	(33/2+)	2423.1	(31/2−)		
371.3 4	0.04 1	3478.1	(37/2−)	3108.2	(37/2+)		
373.9 2	3.4 3	1906.57	(25/2−)	1532.88	(23/2+)		
374.49[@] 5	117 1	757.66	(21/2+)	383.20	(17/2+)	Q[&]	A_2=+0.34 10, A_4=−0.07 2 (1976Ge03). DCO(1)=1.01 3, DCO(2)=2.90 8. Additional information 8.
375.1[d] 4		1906.57	(25/2−)	1531.17	(21/2−)		
377.2[d]		1190.6	(17/2+)	813.31	(15/2−)		
382.1 2	2.68 12	1054.11	(19/2+)	671.98	(15/2+)		
382.3[d]		2892.1	(29/2)	2509.8	(29/2−)		
383.8 4	0.79 3	531.65	13/2−	147.88	13/2+	D[b]	DCO(1)=0.98 7, DCO(2)=2.52 23.
385.0 4	0.48 4	1142.36	(19/2−)	757.66	(21/2+)	D[a]	DCO(2)=1.82 7.
386.1[d]		2107.2	(23/2)	1721.1	(19/2)		
387.10[@] 8	3.62 7	648.18	(15/2−)	261.08	(11/2)−	Q[&]	DCO(2)=2.65 15.
388.8[d]		1531.17	(21/2−)	1142.36	(19/2−)		
390.3 4	0.11 3	813.31	(15/2−)	423.16	(11/2)−		
393.3[d] 4		894.9	(15/2−)	502.27	(11/2−)		
399.1 4		1490.0	(19/2+)	1091.1	(15/2+)	Q[&]	DCO(1)=0.85 10, DCO(2)=3.2 5.
401.48[@] 11	1.76 4	696.33	(13/2−)	294.82	9/2−	Q[&]	DCO(2)=2.8 3.
402.5[d] 4		2650.8	(27/2)	2248.3	(23/2)		
403.1[d] 4		2444.2	(25/2)	2041.3	(21/2)		
403.7 4	0.7 1	1906.57	(25/2−)	1502.53	(23/2−)	D[a]	DCO(1)=1.59 20.
407.8 4	0.40 5	2613.1	(27/2)	2205.5	(27/2−)		
410.6[d]		1223.97	(17/2−)	813.31	(15/2−)		
410.8[d]		502.27	(11/2−)	91.51	(9/2)+		
411.9[d] 4		2132.8	(23/2)	1721.1	(19/2)		
412.8[d] 4		2248.3	(23/2)	1835.4	(19/2)		
413.5[d] 4		2041.3	(21/2)	1628.1	(17/2)		
418.3 2	7.7 1	1740.17	(25/2+)	1321.83	(21/2+)	Q[&]	DCO(1)=1.09 4, DCO(2)=3.01 23.

Continued on next page (footnotes at end of table)

^{150}Nd(α,3nγ) 1994Kh01,1976Co12 (continued)

γ(^{151}Sm) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.	Comments
424.29[@] 15	5.39 8	869.35	(17/2⁻)	445.10	(13/2⁻)		
424.4 4	0.24 3	1927.26	(27/2⁻)	1502.53	(23/2⁻)		
424.8 2	1.7 2	1478.68	(21/2⁻)	1054.11	(19/2⁺)	D[a]	E_γ: 424.20 25 (1976Co12). DCO(1)=1.37 9, DCO(2)=1.65 20. DCO(1) suggests ΔJ=1 with significant D+Q admixture.
427.3 4		850.6	(13/2⁺)	423.16	(11/2)⁻	D[a]	DCO(2)=2.1 5.
427.8 4	0.5 1	1906.57	(25/2⁻)	1478.68	(21/2⁻)	Q[&]	DCO(1)=1.06 17.
430.30[@] 25	0.66 6	813.31	(15/2⁻)	383.20	(17/2⁺)	D[a]	DCO(2)=1.55 9.
431.0[d]		2229.2	(29/2⁺)	1798.16	(29/2⁺)		
434.3[d]		2350.9	(25/2)	1916.6	(21/2)		
434.8 4		1625.56	(21/2⁺)	1190.6	(17/2⁺)	Q[&]	DCO(2)=3.0 3.
438.7 4	0.1 1	530.2	(9/2⁺)	91.51	(9/2)⁺		
439.0 4	0.24 2	2350.9	(25/2)	1911.87	(25/2⁻)		
443.7 4	0.30 2	1830.4	(23/2⁺)	1386.6	(19/2⁺)		
444.6[d]		2351.2	(27/2⁺)	1906.57	(25/2⁻)		
448.0 4		2364.3	(25/2)	1916.6	(21/2)		DCO(2)=2.28 12 consistent with ΔJ=0,1. 1994Kh01 give ΔJ=2.
448.5 2	1.2 1	2375.8	(29/2⁻)	1927.26	(27/2⁻)	D+Q[c]	DCO(1)=1.36 15, DCO(2)=2.5 3.
452.4[d]		2364.3	(25/2)	1911.87	(25/2⁻)		
453.3[d]		2472.0	(27/2⁺)	2018.69	(25/2⁻)		
459.35[@] 15	6.8 1	1107.47	(19/2⁻)	648.18	(15/2⁻)	Q[&]	DCO(1)=0.97 8, DCO(2)=2.57 19.
459.5[d]		754.3	(11/2⁺)	294.82	9/2⁻		
462.6 2	5.0 1	994.15	(17/2⁻)	531.65	13/2⁻	Q[&]	DCO(1)=1.00 4, DCO(2)=2.73 11.
464.7 2	1.05 5	1161.04	(17/2⁻)	696.33	(13/2⁻)	Q[&]	DCO(2)=2.8 4.
465.1 2	1.04 7	1955.1	(23/2⁺)	1490.0	(19/2⁺)	Q[&]	DCO(2)=3.11 22.
467.9[d] 4		2350.9	(25/2)	1883.1	(21/2)		
469.2 4	0.94 4	2375.8	(29/2⁻)	1906.57	(25/2⁻)	Q[&]	DCO(1)=0.99 4, DCO(2)=2.99 20.
471.6 4	0.26 4	2898.1	(33/2⁻)	2427.1	(33/2⁺)		
472.3 4		2097.7	(25/2⁺)	1625.56	(21/2⁺)	Q[&]	DCO(2)=2.7 3.
475.3 4	0.5 1	2898.1	(33/2⁻)	2423.1	(31/2⁻)	D+Q[c]	DCO(2)=2.48 19 is consistent with ΔJ=1 or 2; 1994Kh01 assign ΔJ=1.
476.4[d]		1955.1	(23/2⁺)	1478.68	(21/2⁻)		
476.95[@] 15		1531.17	(21/2⁻)	1054.11	(19/2⁺)		DCO(2)=2.2 6 consistent with ΔJ=0-2. 1994Kh01 give ΔJ=1, E1.
477.3[d]		2107.2	(23/2)	1629.87	(23/2⁻)		
477.9[d] 4		2610.8	(27/2)	2132.8	(23/2)		
478.86[@] 5	70 1	1236.53	(25/2⁺)	757.66	(21/2⁺)	Q[&]	A_2=+0.36 2, A_4=−0.09 2 (1976Ge03). DCO(1)=1.00 3, DCO(2)=2.88 9. Additional information 11.
478.9 2	5.6 3	1532.88	(23/2⁺)	1054.11	(19/2⁺)		
480.3[d]		2613.1	(27/2)	2132.8	(23/2)		
482.4[d]		2711.6	(31/2⁺)	2229.2	(29/2⁺)		
484.4[d] 4		1379.04	(19/2⁻)	894.9	(15/2⁻)		
484.4 2	1.74 5	1478.68	(21/2⁻)	994.15	(17/2⁻)	Q[&]	DCO(1)=1.07 8, DCO(2)=3.07 24.
485.8[d]		2018.69	(25/2⁻)	1532.88	(23/2⁺)		
487.1[d]		3478.1	(37/2⁻)	2991.0	(35/2⁻)		
487.5[d]		2018.69	(25/2⁻)	1531.17	(21/2⁻)		
488.9 2	5.02 11	2229.2	(29/2⁺)	1740.17	(25/2⁺)	Q[&]	DCO(2)=2.85 9.

Continued on next page (footnotes at end of table)

^{150}Nd(α,3nγ) 1994Kh01,1976Co12 (continued)

$\gamma(^{151}Sm)$ (continued)

E_γ [†]	I_γ [‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.	Comments
489.0[d]		1161.04	(17/2⁻)	671.98	(15/2⁺)		
490.7[d]		3388.8	(35/2⁺)	2898.1	(33/2⁻)		
492.1 2	5.8 1	1361.32	(21/2⁻)	869.35	(17/2⁻)	Q[&]	DCO(1)=0.95 8, DCO(2)=2.91 13.
494.5[d]		4323.5	(43/2⁻)	3829.0	(41/2⁺)		
495[d] 1		3107	(31/2)	2610.8	(27/2)		
495.7 4	0.53 8	2423.1	(31/2⁻)	1927.26	(27/2⁻)		
495.9 2	1.1 1	1490.0	(19/2⁺)	994.15	(17/2⁻)	D[a]	DCO(1)=1.77 14, DCO(2)=1.90 11.
497.2[d] 4		2861.3	(29/2)	2364.3	(25/2)		
502.0		796.8	(11/2⁺)	294.82	9/2⁻		E_γ: from level energy difference. Eγ=502.6 in table 1 (1994Kh01). DCO(2)=1.3 3 consistent with ΔJ=1, D+Q; 1994Kh01 assign ΔJ=1, E1.
502.9[d]		2132.8	(23/2)	1629.87	(23/2⁻)		
503.6 4		2601.4	(29/2⁺)	2097.7	(25/2⁺)	Q[&]	DCO(2)=2.4 6.
503.7 4	0.062 4	1740.17	(25/2⁺)	1236.53	(25/2⁺)		
505.7[d] 4		2613.1	(27/2)	2107.2	(23/2)		
511.6 4		894.9	(15/2⁻)	383.20	(17/2⁺)	D[a]	DCO(2)=2.10 7.
516.2[d]		2018.69	(25/2⁻)	1502.53	(23/2⁻)		
517.2 4	0.6 1	2472.0	(27/2⁺)	1955.1	(23/2⁺)	Q[&]	DCO(2)=2.9 4.
518.6[d]		1190.6	(17/2⁺)	671.98	(15/2⁺)		
518.7 4	0.62 5	3627.0	(39/2⁻)	3108.2	(37/2⁺)	D[a]	DCO(1)=1.9 5.
520.2 4	0.13 4	2762.3	(29/2⁻)	2242.1	(25/2⁻)		
520.8 4	0.33 2	2351.2	(27/2⁺)	1830.4	(23/2⁺)		
521.8[d]		1883.1	(21/2)	1361.32	(21/2⁻)		
522.2 2	2.4 2	2898.1	(33/2⁻)	2375.8	(29/2⁻)	Q[&]	DCO(2)=2.97 18.
522.4 2	5.37 8	1629.87	(23/2⁻)	1107.47	(19/2⁻)	Q[&]	A_2=+0.31 5, A_4=−0.02 8 (1976Ge03). DCO(1)=0.99 8, DCO(2)=2.82 15.
524.1 2	6.9 5	671.98	(15/2⁺)	147.88	13/2⁺		DCO(2)=3.2 3 consistent with ΔJ=2, but 1994Kh01 give ΔJ=1, M1/E2.
527.6[d]		1223.97	(17/2⁻)	696.33	(13/2⁻)		
536.3 4	0.15 4	2242.1	(25/2⁻)	1705.8	(21/2⁻)		
537.4 4		1531.17	(21/2⁻)	994.15	(17/2⁻)	Q[&]	DCO(1)=1.04 12, DCO(2)=2.8 4.
540.1 2	2.1 2	2018.69	(25/2⁻)	1478.68	(21/2⁻)	Q[&]	DCO(2)=3.0 4.
541.3 4		2892.1	(29/2)	2350.9	(25/2)	Q[&]	DCO(1)=0.89 15.
541.5 2	1.1 3	2560.2	(29/2⁻)	2018.69	(25/2⁻)	Q[&]	DCO(2)=2.9 3.
544.9 4	0.40 5	1705.8	(21/2⁻)	1161.04	(17/2⁻)		
548.7 4	0.15 2	696.33	(13/2⁻)	147.88	13/2⁺		
550.6 2	4.01 6	1911.87	(25/2⁻)	1361.32	(21/2⁻)	Q[&]	DCO(2)=3.43 24.
552.0 2	1.7 2	1223.97	(17/2⁻)	671.98	(15/2⁺)	D[a]	DCO(2)=1.70 21.
555.3[d]		1916.6	(21/2)	1361.32	(21/2⁻)		
556.3 2	4.21 6	2089.10	(27/2⁺)	1532.88	(23/2⁺)	Q[&]	DCO(2)=2.6 4.
557.7[d]		1936.6	(23/2⁻)	1379.04	(19/2⁻)		
557.9 4	0.35 3	705.74	(13/2⁺)	147.88	13/2⁺		
559.1 2	2.26 7	2788.4	(33/2⁺)	2229.2	(29/2⁺)	Q[&]	DCO(2)=2.9 3.
559.5 2	1.22 5	1091.1	(15/2⁺)	531.65	13/2⁻	D[a]	DCO(1)=1.56 12, DCO(2)=1.72 12.
561.7 1	35 2	1798.16	(29/2⁺)	1236.53	(25/2⁺)	Q[&]	A_2=+0.35 3, A_4=−0.15 6 (1976Ge03). DCO(1)=0.99 3, DCO(2)=2.85 13.
563.4[d]		1705.8	(21/2⁻)	1142.36	(19/2⁻)		
563.6 4	0.4 1	3035.0	(31/2⁺)	2472.0	(27/2⁺)		

Continued on next page (footnotes at end of table)

^{150}Nd(α,3nγ) 1994Kh01,1976Co12 (continued)

γ(^{151}Sm) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.	Comments
563.8 *2*	3.1 *2*	2991.0	(35/2⁻)	2427.1	(33/2⁺)	D[a]	DCO(2)=1.82 *11*.
564.1 *2*	2.1 *1*	1321.83	(21/2⁺)	757.66	(21/2⁺)	D[b]	DCO(2)=2.6 *3*.
567.7 *4*	0.56 *6*	2991.0	(35/2⁻)	2423.1	(31/2⁻)	Q[&]	DCO(2)=2.8 *3*.
571.6 *2*	2.0 *2*	1625.56	(21/2⁺)	1054.11	(19/2⁺)		
573.0[d] *4*		3186.0	(31/2)	2613.1	(27/2)		
575.7 *2*	3.12 *7*	2205.5	(27/2⁻)	1629.87	(23/2⁻)	Q[&]	DCO(1)=1.04 *4*, DCO(2)=3.1 *3*.
577.6 *2*	1.25 *5*	2375.8	(29/2⁻)	1798.16	(29/2⁺)	D[b]	DCO(2)=2.8 *2*.
579.0[d]		754.3	(11/2⁺)	175.33	(9/2)⁻		
580.0 *2*	1.1 *1*	3478.1	(37/2⁻)	2898.1	(33/2⁻)	Q[&]	DCO(2)=3.1 *3*.
580.1 *4*	0.6 *1*	3140.2	(33/2⁻)	2560.2	(29/2⁻)		
581.8[d] *4*		3183.2	(33/2⁺)	2601.4	(29/2⁺)		
584.3 *4*	0.17 *3*	2935.6	(31/2⁺)	2351.2	(27/2⁺)		
591.3 *2*	1.99 *6*	974.69	(17/2⁺)	383.20	(17/2⁺)	D[b]	DCO(1)=0.99 *4*, DCO(2)=2.88 *19*.
595.7[d] *4*		3358.0	(33/2⁻)	2762.3	(29/2⁻)		
597[d]		3107	(31/2)	2509.8	(29/2⁻)		
597.9 *2*	3.33 *7*	2509.8	(29/2⁻)	1911.87	(25/2⁻)	Q[&]	DCO(2)=2.8 *3*.
600.4[d]		3388.8	(35/2⁺)	2788.4	(33/2⁺)		
601.6[d] *4*		3493.7	(33/2)	2892.1	(29/2)		
607.3 *4*	0.16 *2*	3035.0	(31/2⁺)	2427.1	(33/2⁺)		
610.8 *2*	1.82 *10*	994.15	(17/2⁻)	383.20	(17/2⁺)	D[b]	DCO(2)=3.00 *9*.
613.6[d]		1721.1	(19/2)	1107.47	(19/2⁻)		
614.3 *4*	0.1 *1*	705.74	(13/2⁺)	91.51	(9/2)⁺		
615.8 *2*	1.97 *4*	2821.4	(31/2⁻)	2205.5	(27/2⁻)		
618[d] *1*		3439.6	(35/2⁻)	2821.4	(31/2⁻)		
620.1 *2*	1.0 *2*	3408.7	(37/2⁺)	2788.4	(33/2⁺)		
621.8 *4*		1379.04	(19/2⁻)	757.66	(21/2⁺)		DCO(2)=2.53 *21* consistent with ΔJ=0-2. 1994Kh01 give ΔJ=1, E1.
622.4 *2*	1.45 *9*	2711.6	(31/2⁺)	2089.10	(27/2⁺)		
623.2 *4*	0.97 *3*	3132.8	(33/2⁻)	2509.8	(29/2⁻)		
624.5[d] *4*		3764.7	(37/2⁻)	3140.2	(33/2⁻)		
624.9 *2*	6.48 *9*	2423.1	(31/2⁻)	1798.16	(29/2⁺)	D[a]	DCO(1)=1.75 *5*, DCO(2)=1.81 *12*.
626[d] *1*		3812	(35/2)	3186.0	(31/2)		
629.0 *1*	12.5 *1*	2427.1	(33/2⁺)	1798.16	(29/2⁺)	Q[&]	E_γ: 626.0 *3* (1976Ge03). DCO(1)=1.04 *4*, DCO(2)=2.88 *19*.
629.5 *4*		1161.04	(17/2⁻)	531.65	13/2⁻	Q[&]	DCO(1)=1.01 *7*, DCO(2)=2.9 *4*.
633.2 *4*	0.1 *1*	2560.2	(29/2⁻)	1927.26	(27/2⁻)		
636.1 *4*	0.3 *1*	3627.0	(39/2⁻)	2991.0	(35/2⁻)		
644.1[d] *4*		4122.2	(41/2⁻)	3478.1	(37/2⁻)		
651.7 *2*	1.2 *1*	1705.8	(21/2⁻)	1054.11	(19/2⁺)	D[a]	DCO(2)=1.6 *4*.
655.6 *4*	0.32 *2*	2861.3	(29/2)	2205.5	(27/2⁻)		DCO(2)=2.1 *11* consistent with ΔJ=0-2.
665.4 *4*	0.32 *4*	813.31	(15/2⁻)	147.88	13/2⁺		
670.0 *2*	1.8 *3*	1906.57	(25/2⁻)	1236.53	(25/2⁺)		
670.9 *2*	8.6 *3*	1054.11	(19/2⁺)	383.20	(17/2⁺)	D+Q[c]	DCO(1)=0.91 *4*, DCO(2)=3.21 *13*.
671.3[d] *4*		4080.0	(41/2⁺)	3408.7	(37/2⁺)		
673.2[d]		2762.3	(29/2⁻)	2089.10	(27/2⁺)		
674.1 *4*	0.29 *3*	2472.0	(27/2⁺)	1798.16	(29/2⁺)		
674.1[d]		2601.4	(29/2⁺)	1927.26	(27/2⁻)		
676.0 *4*	0.10 *1*	3186.0	(31/2)	2509.8	(29/2⁻)		
677.4 *4*	0.33 *3*	3388.8	(35/2⁺)	2711.6	(31/2⁺)		

Continued on next page (footnotes at end of table)

^{150}Nd(α,3nγ) 1994Kh01,1976Co12 (continued)

γ(^{151}Sm) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	Comments
681.1 2	2.66 5	3108.2	(37/2+)	2427.1	(33/2+)	Q[&]	DCO(1)=1.00 4, DCO(2)=2.9 2.
686.6[d]		2892.1	(29/2)	2205.5	(27/2−)		
690.6 2	8.83 10	1927.26	(27/2−)	1236.53	(25/2+)	D[a]	DCO(1)=1.92 5, DCO(2)=1.75 8.
692.4 4		1223.97	(17/2−)	531.65	13/2−		DCO(2)=2.9 12 allows ΔJ=0,1 or 2. 1994Kh01 ΔJ=2, E2.
696.5[d] 4		4323.5	(43/2−)	3627.0	(39/2−)		
698.8 4	0.46 4	2610.8	(27/2)	1911.87	(25/2−)		
701.5 4	0.42 4	2613.1	(27/2)	1911.87	(25/2−)	D[a]	DCO(2)=1.8 5.
709.1 4	0.74 5	2242.1	(25/2−)	1532.88	(23/2+)	D[a]	DCO(1)=1.57 12, DCO(2)=1.67 12.
713.2 4	0.36 4	3140.2	(33/2−)	2427.1	(33/2+)	D[b]	DCO(2)=3.8 7.
716.8[d] 4		4105.6	(39/2+)	3388.8	(35/2+)		
716.9 4	0.02 2	3140.2	(33/2−)	2423.1	(31/2−)		
718.6 4	0.43 6	1955.1	(23/2+)	1236.53	(25/2+)		
720.8[f] 4	0.10[f] 1	2350.9	(25/2)	1629.87	(23/2−)		
720.8[f] 4	0.42[f] 3	3829.0	(41/2+)	3108.2	(37/2+)	Q[&]	DCO(2)=3.1 3.
721.1 2	3.53 7	1478.68	(21/2−)	757.66	(21/2+)	D[b]	DCO(1)=0.95 4, DCO(2)=2.90 16.
732.3 4	0.49 4	1490.0	(19/2+)	757.66	(21/2+)		DCO(2)=3.0 3 consistent with ΔJ=2 but 1994Kh01 give ΔJ=1, M1+E2.
734.4 4	0.57 3	2364.3	(25/2)	1629.87	(23/2−)	D+Q[c]	DCO(1)=2.2 3, DCO(2)=2.2 4.
739.8 4	0.01 1	2650.8	(27/2)	1911.87	(25/2−)		E_γ: poor energy fit. Level energy difference is 738.9.
744.85[@] 13	8.59 13	1502.53	(23/2−)	757.66	(21/2+)	D[a]	DCO(1)=1.62 6, DCO(2)=1.83 5.
745.0 4	0.08 3	4574.0	(45/2+)	3829.0	(41/2+)		
745.9 4	0.13 2	2107.2	(23/2)	1361.32	(21/2−)		
747.0[d]		894.9	(15/2−)	147.88	13/2+		
756.1[d]		3183.2	(33/2+)	2427.1	(33/2+)		
759.03[@] 12	6.29 14	1142.36	(19/2−)	383.20	(17/2+)	D[a]	E_γ: 759.6 (1994Kh01). DCO(1)=1.58 8, DCO(2)=1.63 8.
759.1[d]		850.6	(13/2+)	91.51	(9/2)+		
760.1[d]		3183.2	(33/2+)	2423.1	(31/2−)		
761.9 2	1.22 5	2560.2	(29/2−)	1798.16	(29/2+)	D[b]	DCO(1)=1.14 20, DCO(2)=2.5 2.
771.5 4	0.63 3	2132.8	(23/2)	1361.32	(21/2−)	D[a]	DCO(1)=1.7 3, DCO(2)=2.1 3.
774.0 5		1531.17	(21/2−)	757.66	(21/2+)		
775.4 2	7.3 4	1532.88	(23/2+)	757.66	(21/2+)		DCO(2)=3.22 12 consistent with ΔJ=2. 1994Kh01 give ΔJ=1, M1+E2.
775.6 2	1.68 3	1883.1	(21/2)	1107.47	(19/2−)	D[a]	DCO(1)=1.55 13, DCO(2)=1.75 9.
777.8 4	0.24 2	1161.04	(17/2−)	383.20	(17/2+)		
782.1 2	1.31 4	2018.69	(25/2−)	1236.53	(25/2+)	D[b]	DCO(2)=2.83 17.
803.3 4	0.70 3	2601.4	(29/2+)	1798.16	(29/2+)	D[b]	DCO(2)=2.53 21.
807.1 4	0.53 3	1190.6	(17/2+)	383.20	(17/2+)	D+Q[b]	DCO(1)=2.51 15.
809.3 4	0.43 4	1916.6	(21/2)	1107.47	(19/2−)	D+Q[c]	DCO(2)=0.96 17.
814.7 4	0.08 1	2444.2	(25/2)	1629.87	(23/2−)		
818.1 4	0.12 2	993.5	(13/2−)	175.33	(9/2)−		
826.8 2	3.1 1	974.69	(17/2+)	147.88	13/2+	Q[&]	DCO(2)=2.90 14.
840.9 4	0.46 5	1223.97	(17/2−)	383.20	(17/2+)		
851.8 4	0.66 3	1721.1	(19/2)	869.35	(17/2−)		DCO(2)=2.2 8 consistent with ΔJ=0-2. 1994Kh01 give ΔJ=1.
852.5 2	2.34 5	2089.10	(27/2+)	1236.53	(25/2+)	D+Q[c]	DCO(1)=0.94 5, DCO(2)=3.41 15.
860.8 4	0.96 7	2097.7	(25/2+)	1236.53	(25/2+)	D[b]	DCO(2)=2.79 25.
867.7 4	0.45 4	1625.56	(21/2+)	757.66	(21/2+)	D[b]	DCO(2)=2.4 3.
886.9 4	0.14 2	2248.3	(23/2)	1361.32	(21/2−)		
893.7 4	0.12 3	1041.4	(15/2+)	147.88	13/2+		

Continued on next page (footnotes at end of table)

^{150}Nd(α,3nγ) 1994Kh01,1976Co12 (continued)

γ(^{151}Sm) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.	Comments
913.6 4	0.37 3	2711.6	(31/2+)	1798.16	(29/2+)	D+Q[c]	DCO(2)=4.3 5.
933.9 4	0.36 2	2041.3	(21/2)	1107.47	(19/2−)		
938.7 2	3.23 6	1321.83	(21/2+)	383.20	(17/2+)	Q[&]	DCO(1)=0.90 4, DCO(2)=2.87 16.
961.6 4	0.09 4	3388.8	(35/2+)	2427.1	(33/2+)		
966.1 4	0.55 3	1835.4	(19/2)	869.35	(17/2−)		
979.7 4	0.28 4	1628.1	(17/2)	648.18	(15/2−)		
982.3 4	0.28 3	3408.7	(37/2+)	2427.1	(33/2+)		
982.4 2	1.97 7	1740.17	(25/2+)	757.66	(21/2+)	Q[&]	DCO(2)=2.67 12.
990.2 4	0.08 2	2788.4	(33/2+)	1798.16	(29/2+)		
992.7 4	0.45 4	2229.2	(29/2+)	1236.53	(25/2+)	Q[&]	DCO(2)=3.0 3.
995.7 2	1.6 1	1379.04	(19/2−)	383.20	(17/2+)	D[a]	DCO(2)=1.74 11.
1003.4 2	2.02 4	1386.6	(19/2+)	383.20	(17/2+)		DCO(2)=3.12 12 consistent with ΔJ=2. 1994Kh01 give ΔJ=1, M1+E2.
1020.1 4	0.04 1	2650.8	(27/2)	1629.87	(23/2−)		E_γ: poor energy fit. Level energy difference is 1020.9.
1042.8 4	0.37 2	1190.6	(17/2+)	147.88	13/2+		
1072.7 2	2.01 5	1830.4	(23/2+)	757.66	(21/2+)		DCO(2)=3.4 3 consistent with ΔJ=2 but 1994Kh01 give ΔJ=1, M1+E2.
1082.9 4	0.11 2	2444.2	(25/2)	1361.32	(21/2−)		
1114.5 4	0.87 4	2351.2	(27/2+)	1236.53	(25/2+)		DCO(2)=2.9 4 consistent with ΔJ=2. 1994Kh01 give ΔJ=1, M1+E2.
1137.5 4	0.29 5	2935.6	(31/2+)	1798.16	(29/2+)		
1140.4 4	0.06 2	2248.3	(23/2)	1107.47	(19/2−)		
1171.4 4	0.03 1	2041.3	(21/2)	869.35	(17/2−)		
1178.9 2	1.03 4	1936.6	(23/2−)	757.66	(21/2+)	D[a]	DCO(2)=1.51 11.
1183.6 4	0.25 3	1628.1	(17/2)	445.10	(13/2−)		
1187.1 4	0.04 1	1835.4	(19/2)	648.18	(15/2−)		
1242.3 4	0.74 4	1625.56	(21/2+)	383.20	(17/2+)		DCO(2)=2.34 25 gives ΔJ=1, D+Q; but assigned ΔJ^π requires ΔJ=2.

† From 1994Kh01 unless otherwise stated. The uncertainties have been assigned by the evaluator as follows based on a general statement by 1994Kh01 that these are 0.1 to 0.4 keV: 0.1 for Iγ>10, 0.2 for Iγ=1-10 and 0.4 for Iγ<1.

‡ From 1994Kh01 at Eα=35 MeV. See the table above for intensities at other energies. Values from 1994Ba01 are not in good agreement with those from 1994Kh01 for several transitions (flagged in the table above).

1976Co12 take value from ^{151}Pm β^- decay (1973Co29). γ is not reported or very weak in (α,3nγ).

@ From 1976Co12. The value available from 1994Kh01 is in agreement but is less precise.

& γγ(θ) (DCO) (1994Kh01) consistent with ΔJ=2, stretched transition (generally E2).

a γγ(θ) (DCO) (1994Kh01) consistent with ΔJ=1, stretched dipole.

b γγ(θ) (DCO) (1994Kh01) consistent with ΔJ=0, dipole.

c γγ(θ) (DCO) (1994Kh01) consistent with ΔJ=1 with a significant D+Q admixture (generally M1+E2).

d Shown only in the level scheme figure (figures 2,3 in 1994Kh01). Energy quoted here is from level energy difference.

e Multiply placed with undivided intensity.

f Multiply placed with intensity suitably divided.

g Placement of transition in the level scheme is uncertain.

^{150}Nd(α,3nγ) 1994Kh01,1976Co12

Level Scheme

Intensities: Relative I_γ

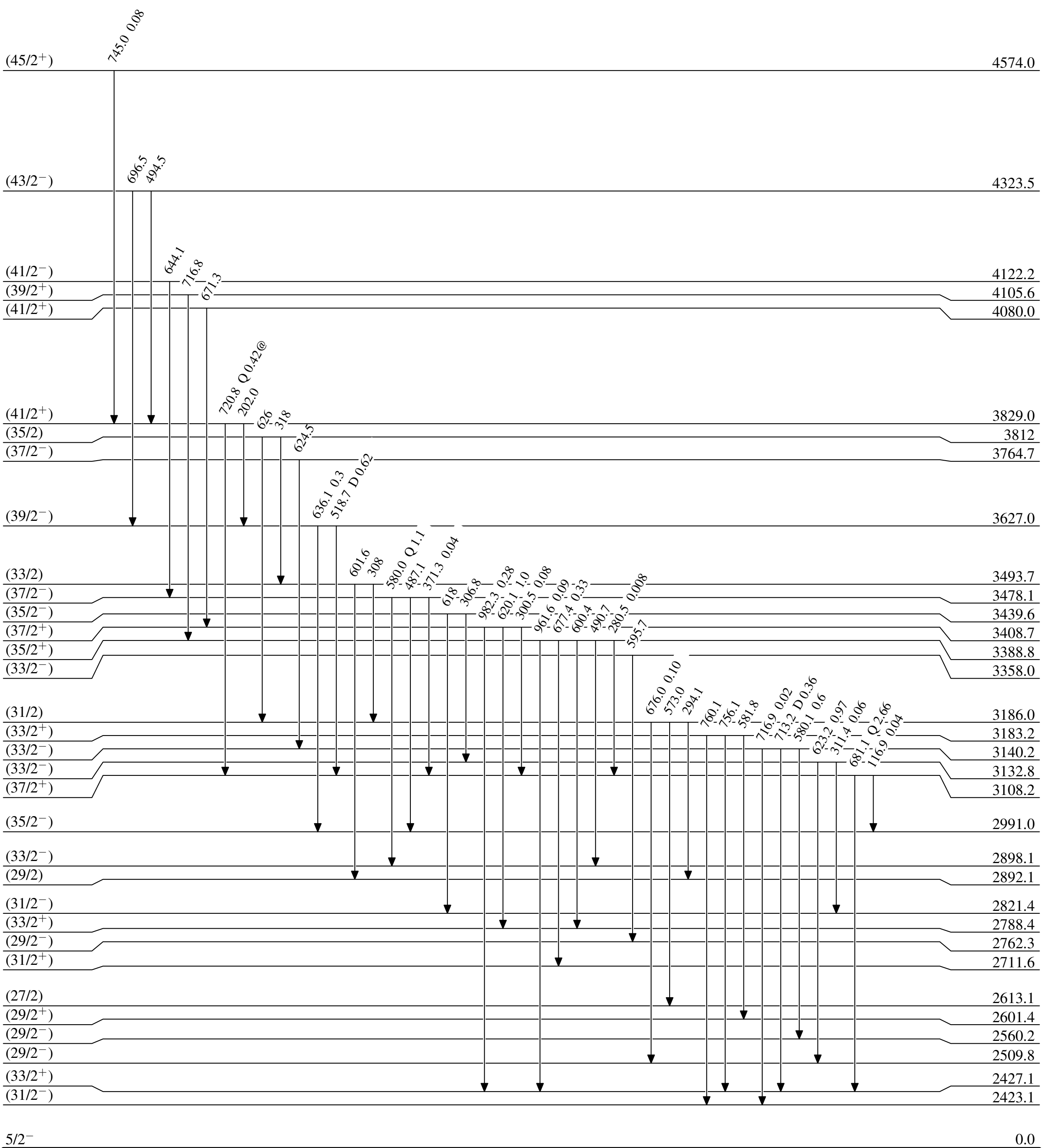
@ Multiply placed: intensity suitably divided

Legend

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

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

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



$^{151}_{62}Sm_{89}$

^{150}Nd(α,3nγ) 1994Kh01,1976Co12

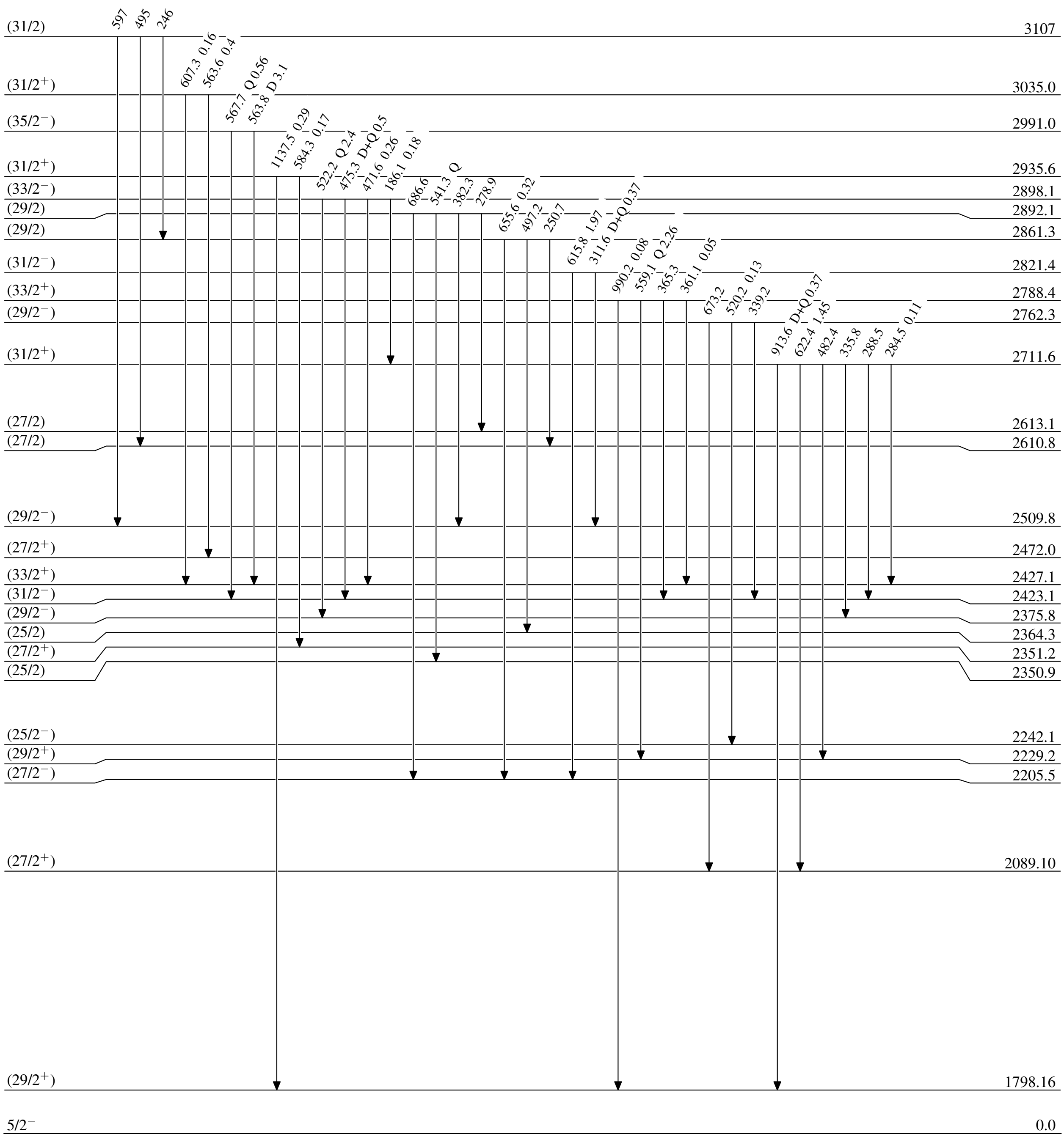
Level Scheme (continued)

Intensities: Relative I_γ

@ Multiply placed: intensity suitably divided

Legend

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



$^{151}_{62}Sm_{89}$

^{150}Nd(α,3nγ) 1994Kh01,1976Co12

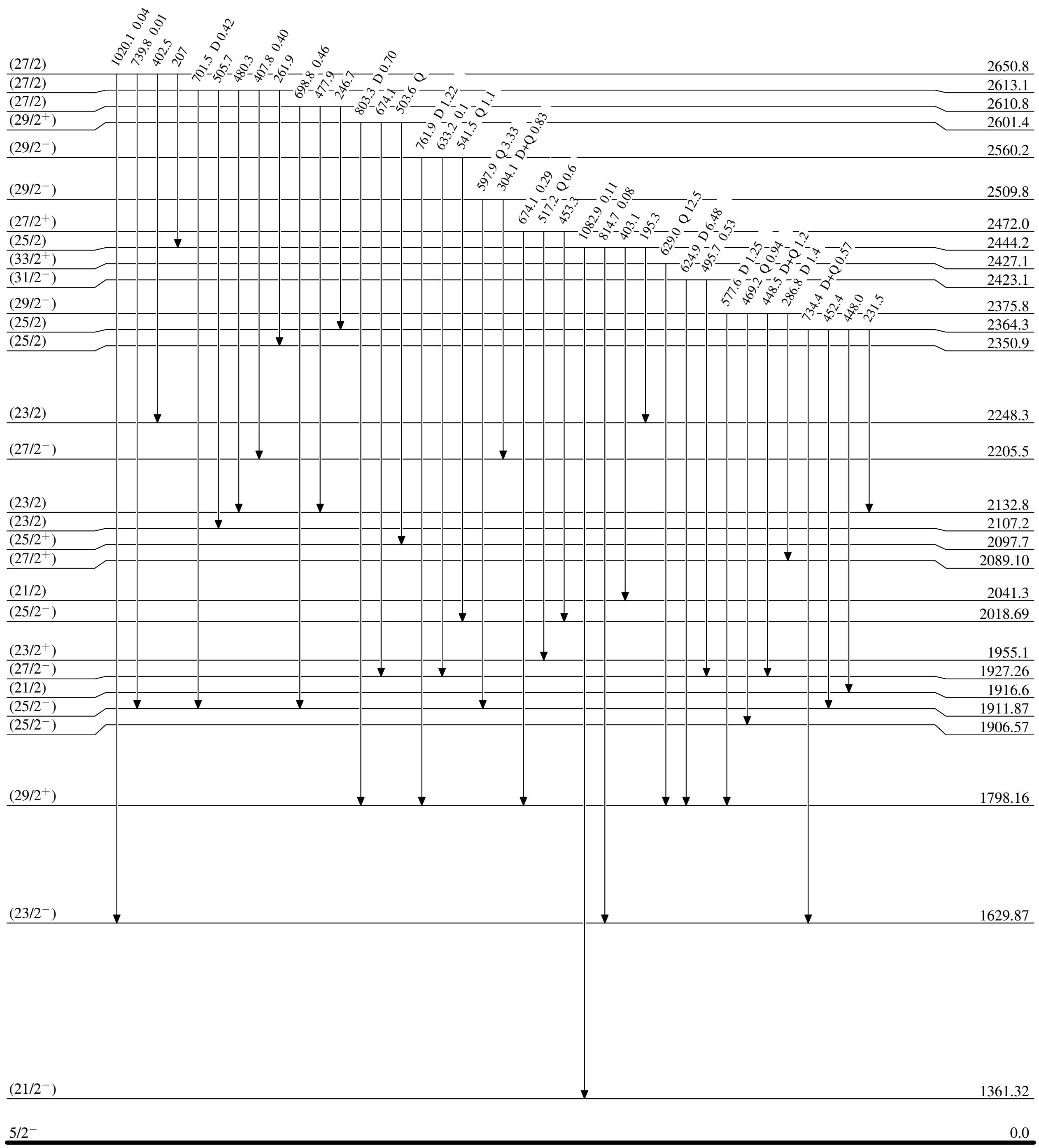
Level Scheme (continued)

Intensities: Relative I_γ

@ Multiply placed: intensity suitably divided

Legend

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



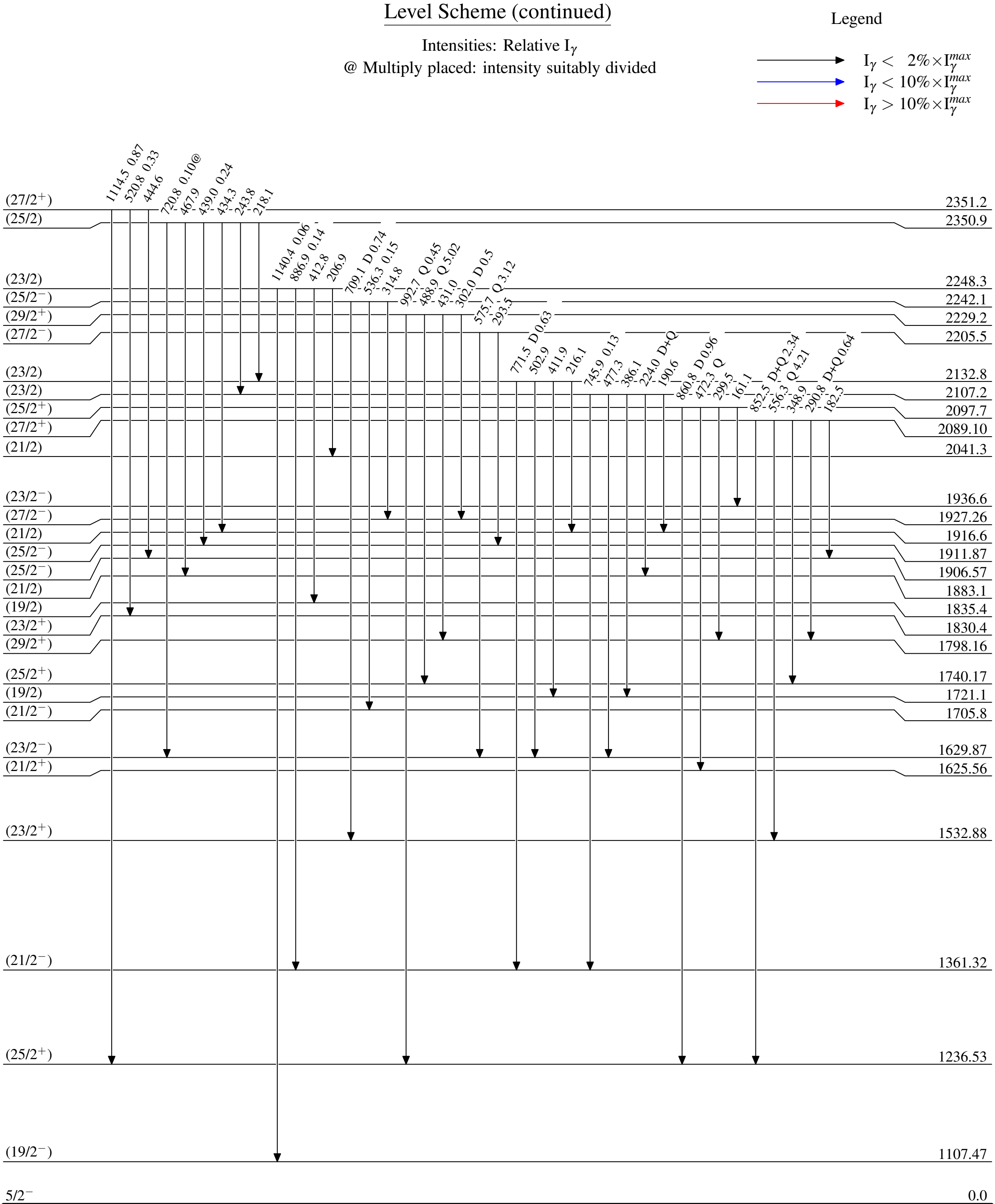
$^{151}_{62}Sm_{89}$

^{150}Nd(α,3nγ) 1994Kh01,1976Co12

Level Scheme (continued)

Intensities: Relative I_γ

@ Multiply placed: intensity suitably divided



$^{151}_{62}Sm_{89}$

^{150}Nd(α,3nγ) 1994Kh01,1976Co12

Level Scheme (continued)

Intensities: Relative I_γ

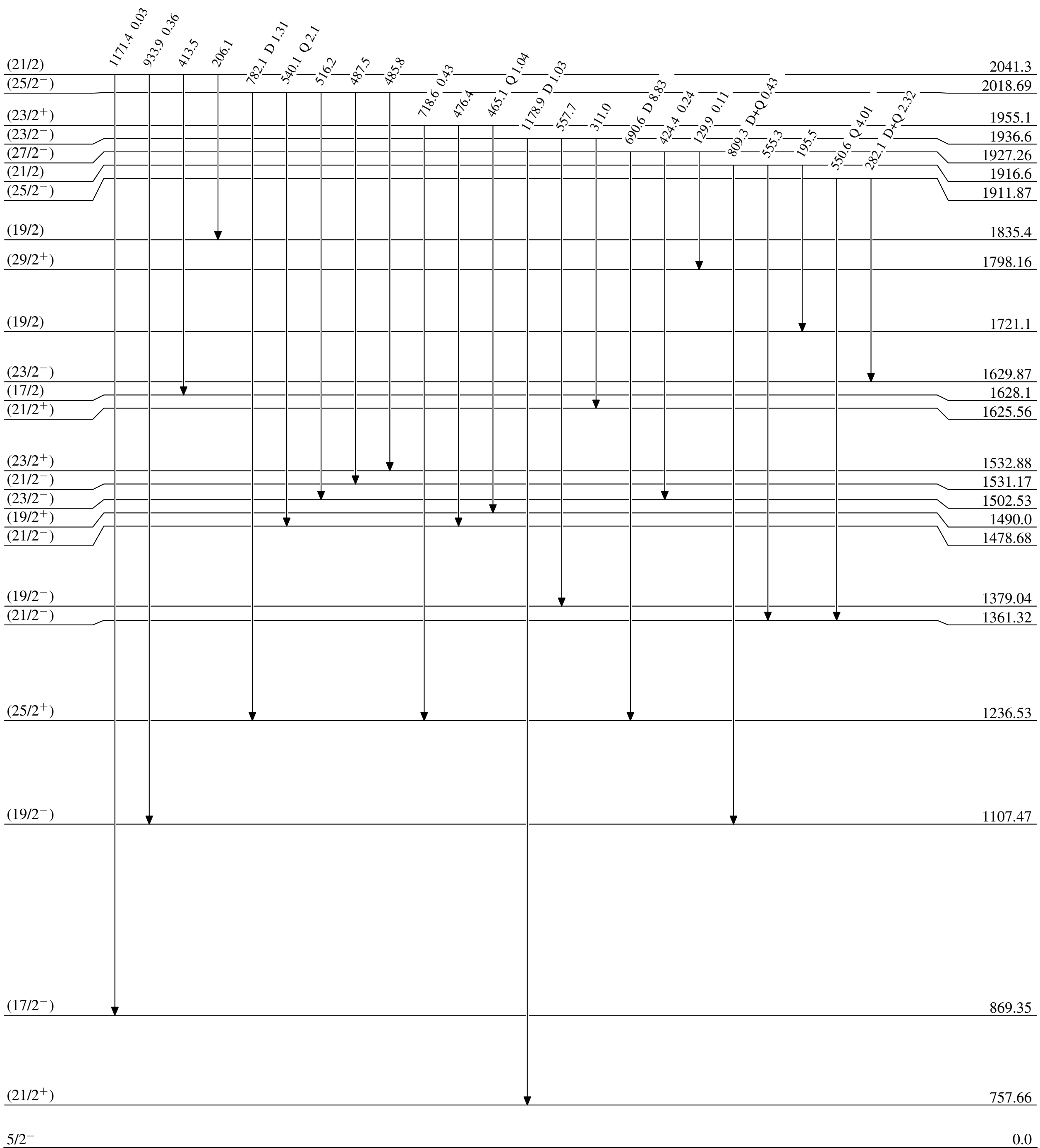
@ Multiply placed: intensity suitably divided

Legend

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

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

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



$^{151}_{62}Sm_{89}$

^{150}Nd(α,3nγ) **1994Kh01,1976Co12**

Level Scheme (continued)

Intensities: Relative I$_\gamma$

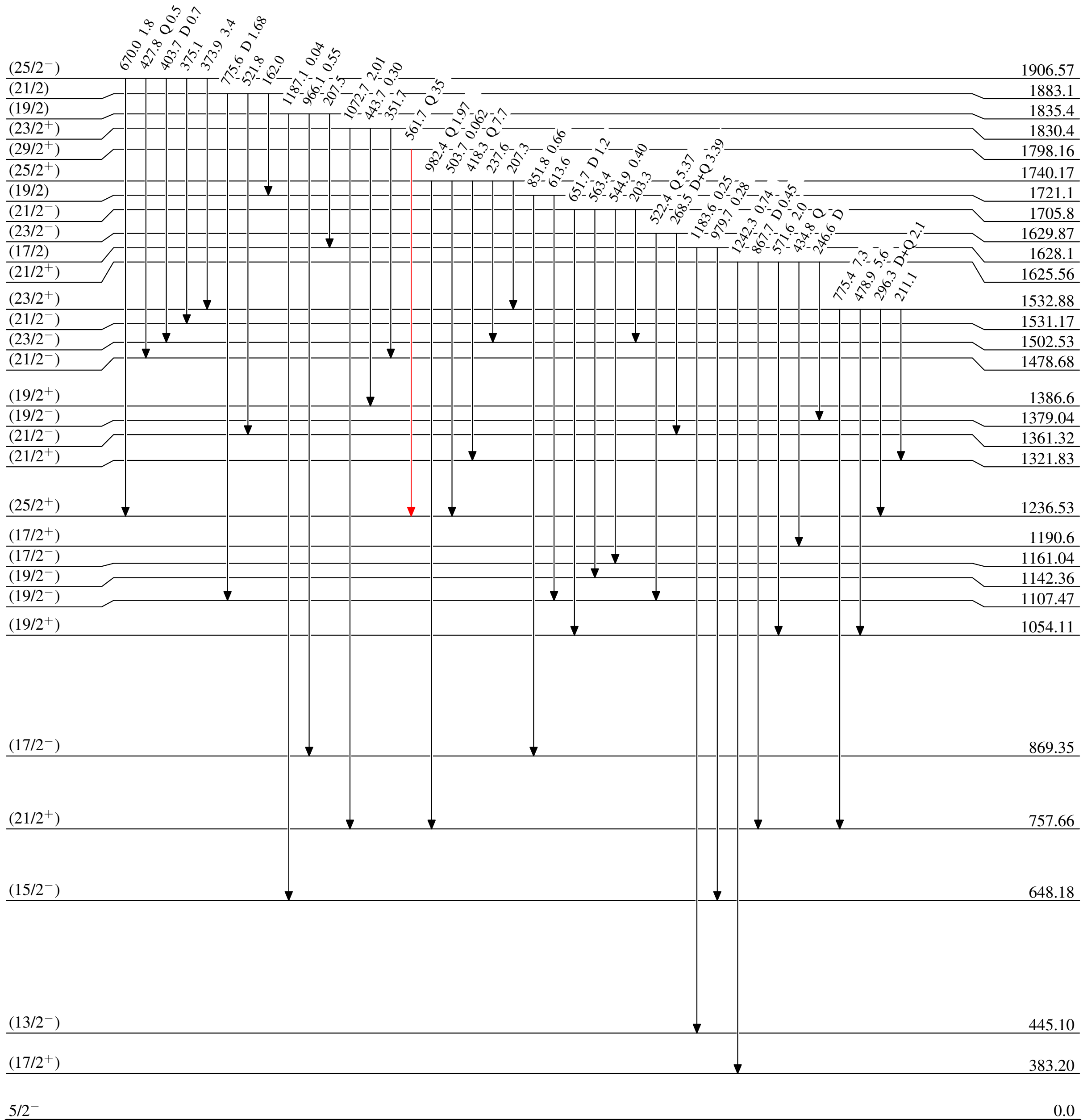
@ Multiply placed: intensity suitably divided

Legend

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

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

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



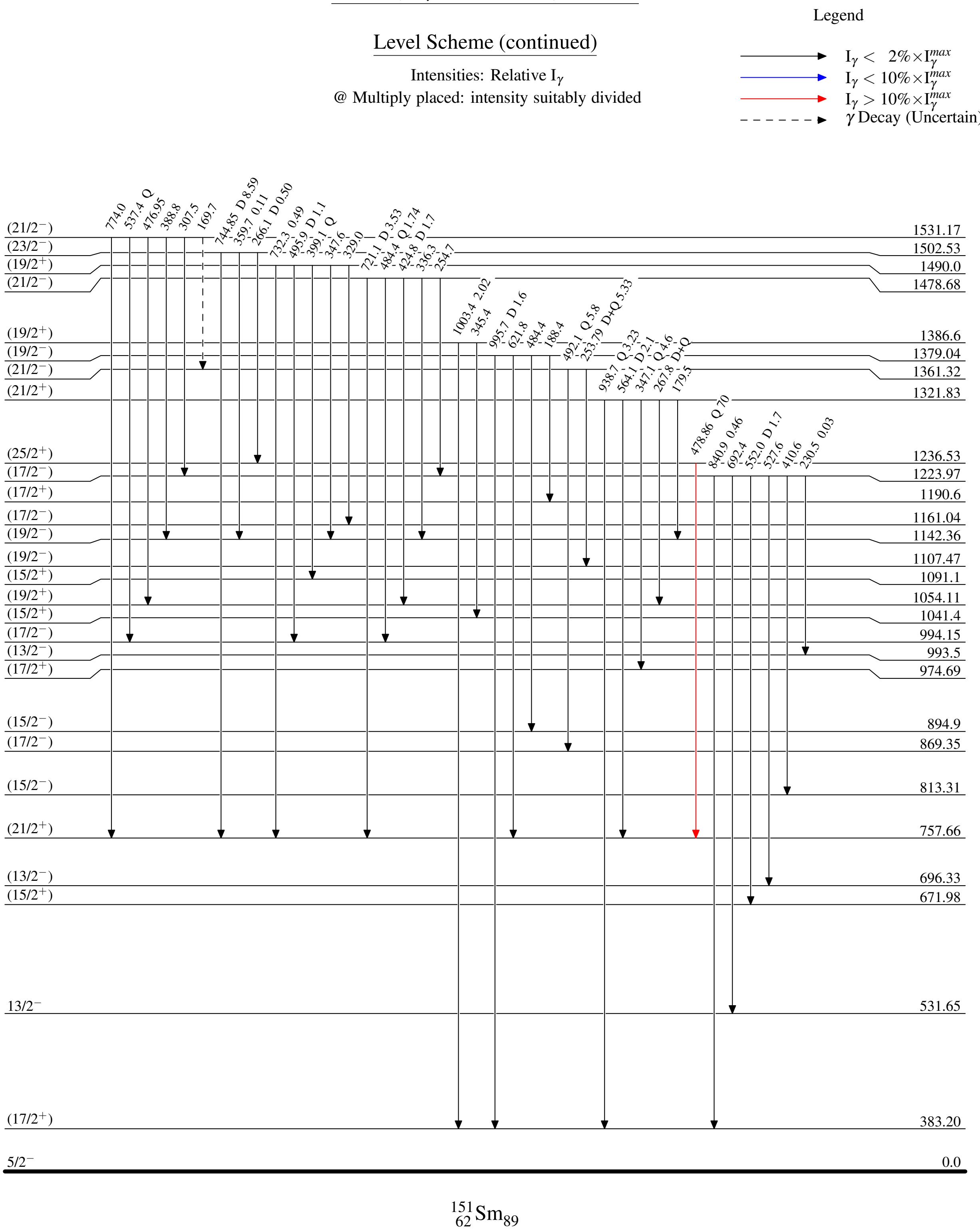
$^{151}_{62}Sm_{89}$

^{150}Nd(α,3nγ) 1994Kh01,1976Co12

Level Scheme (continued)

Intensities: Relative I_γ

@ Multiply placed: intensity suitably divided



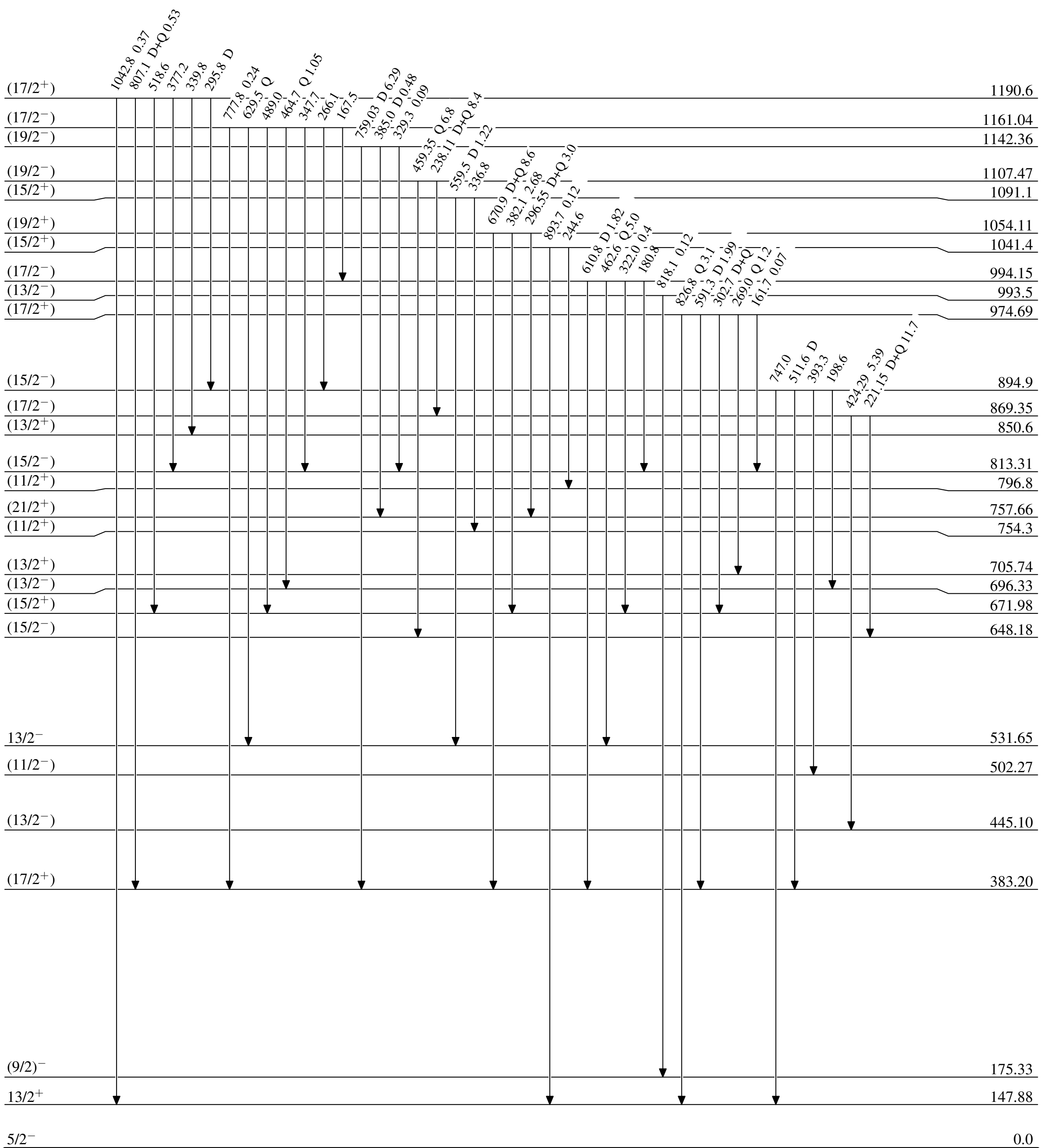
^{150}Nd(α,3nγ) 1994Kh01,1976Co12

Level Scheme (continued)

Intensities: Relative I_γ

@ Multiply placed: intensity suitably divided

Legend



$^{151}_{62}Sm_{89}$

^{150}Nd(α,3nγ) 1994Kh01,1976Co12

Level Scheme (continued)

Intensities: Relative I_γ

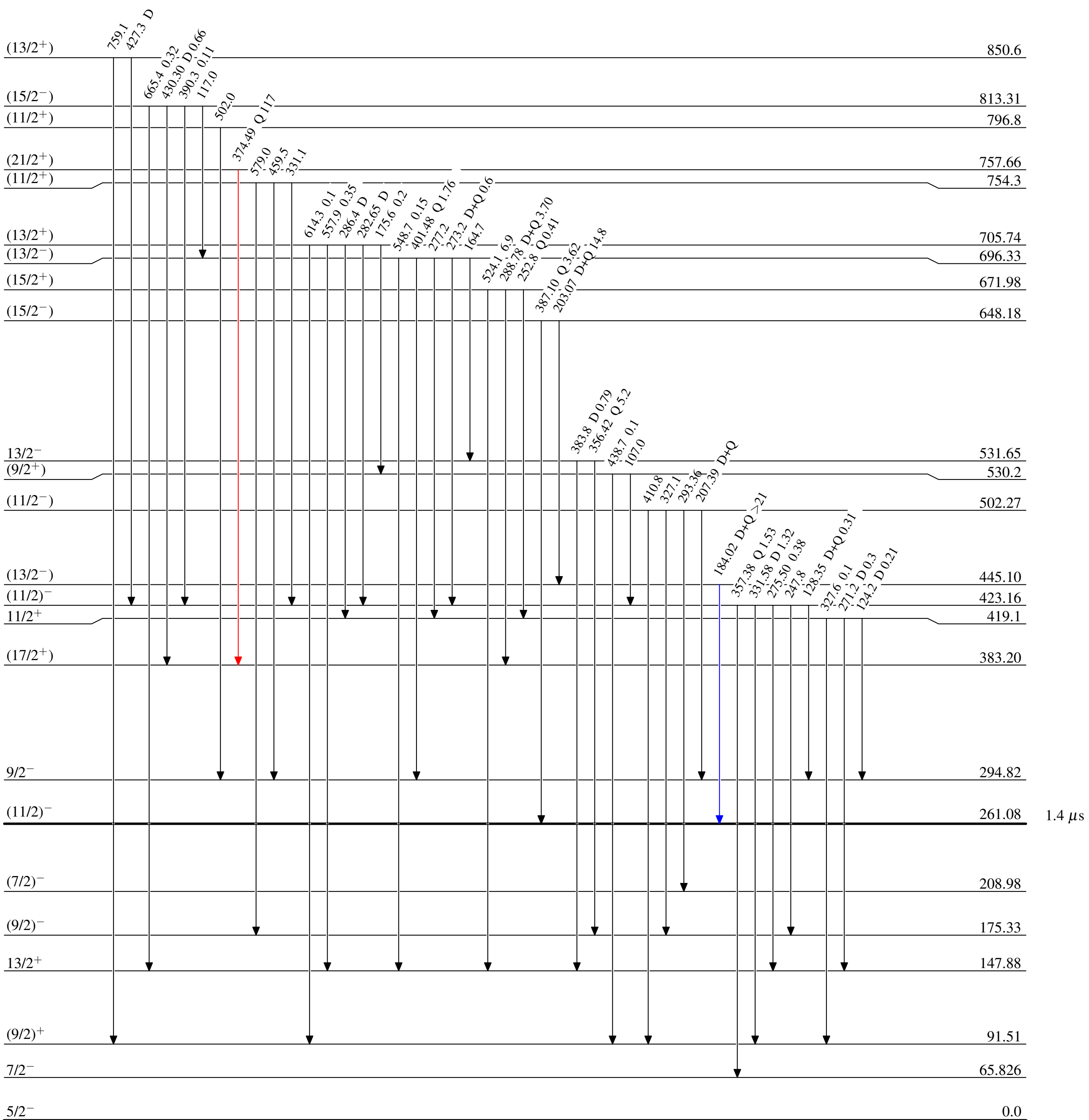
@ Multiply placed: intensity suitably divided

Legend

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

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

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



$^{151}_{62}Sm_{89}$

^{150}Nd(α,3nγ) 1994Kh01,1976Co12

Level Scheme (continued)

Intensities: Relative I_γ

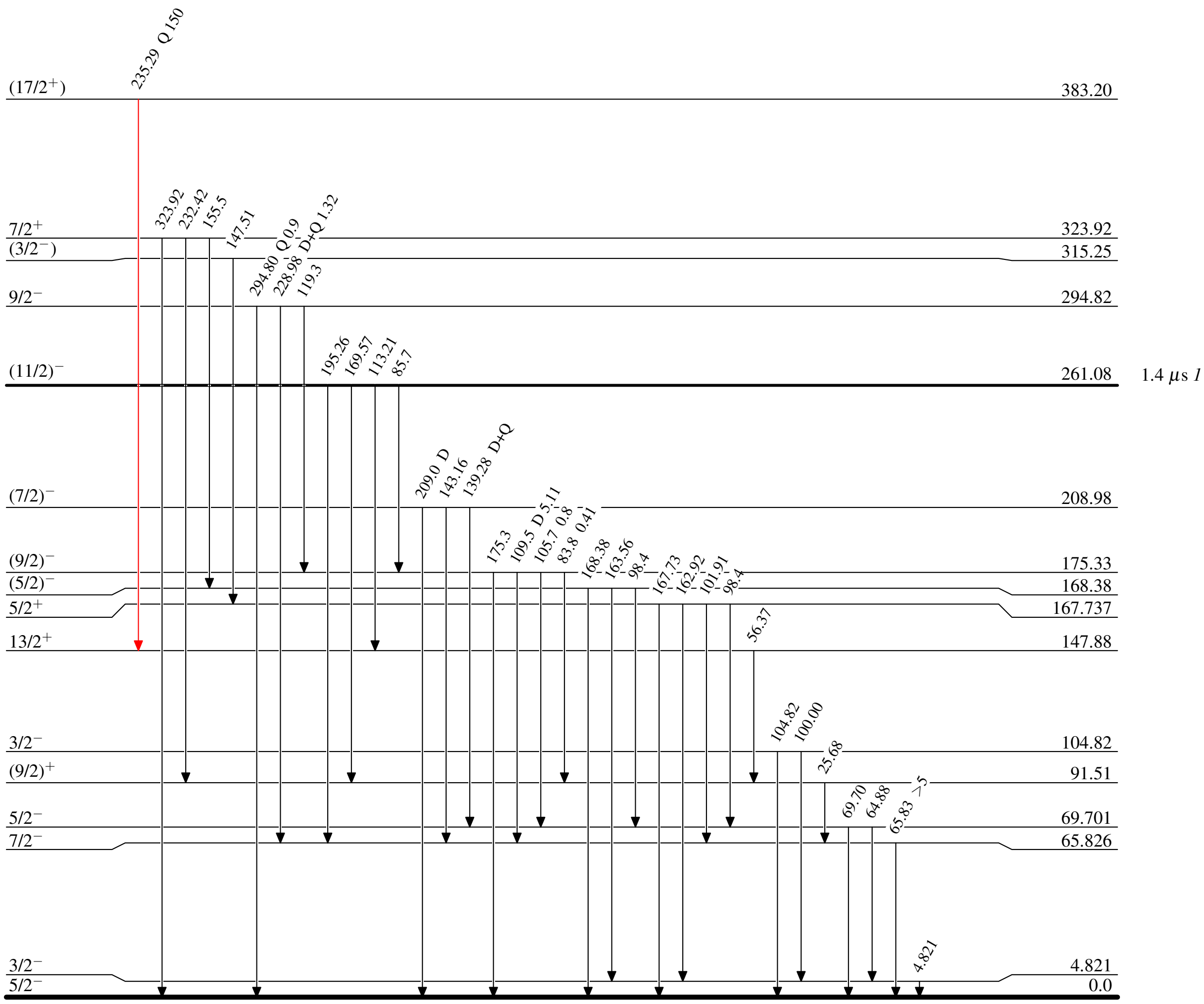
@ Multiply placed: intensity suitably divided

Legend

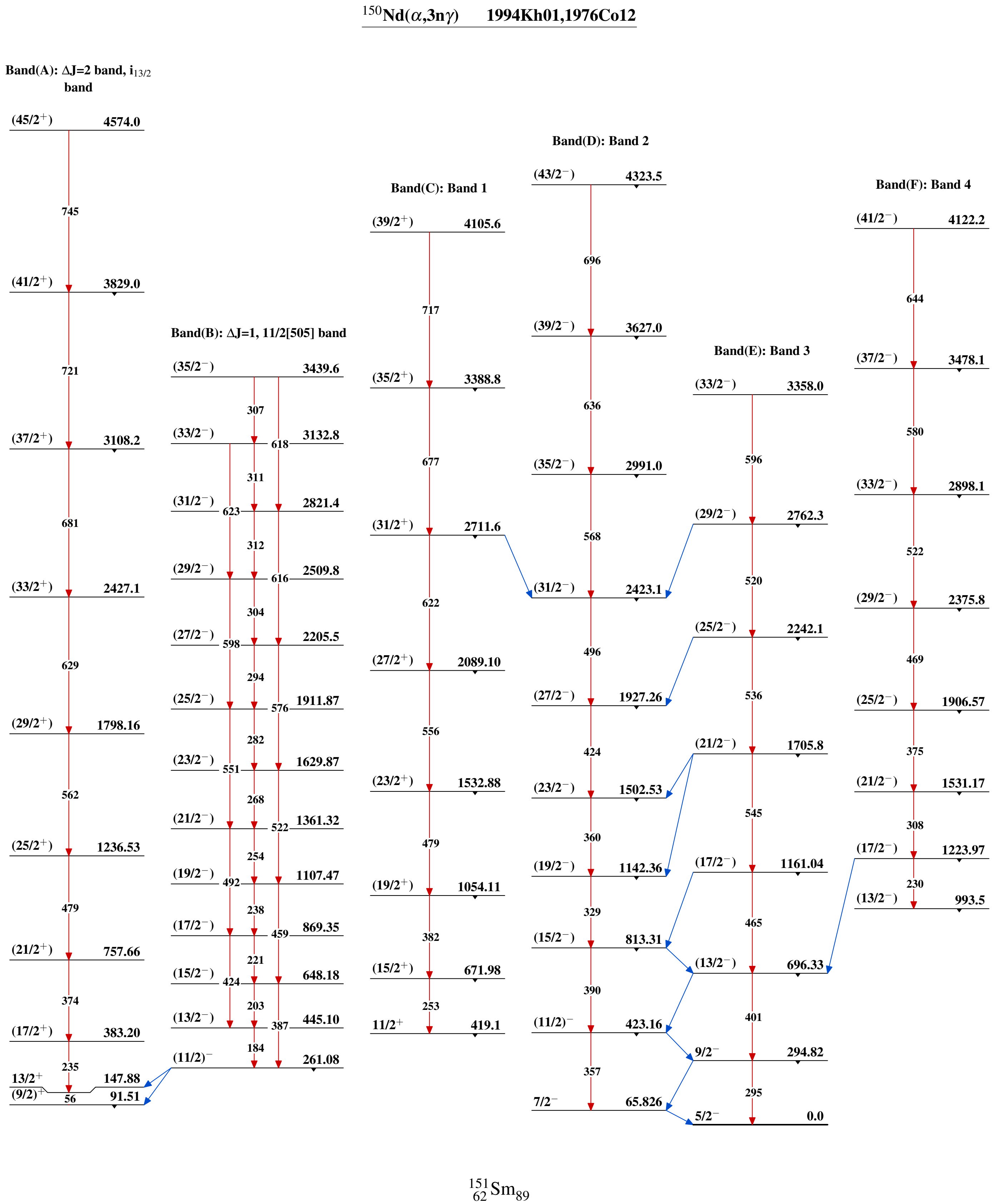
$I_\gamma < 2\% \times I_\gamma^{max}$

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

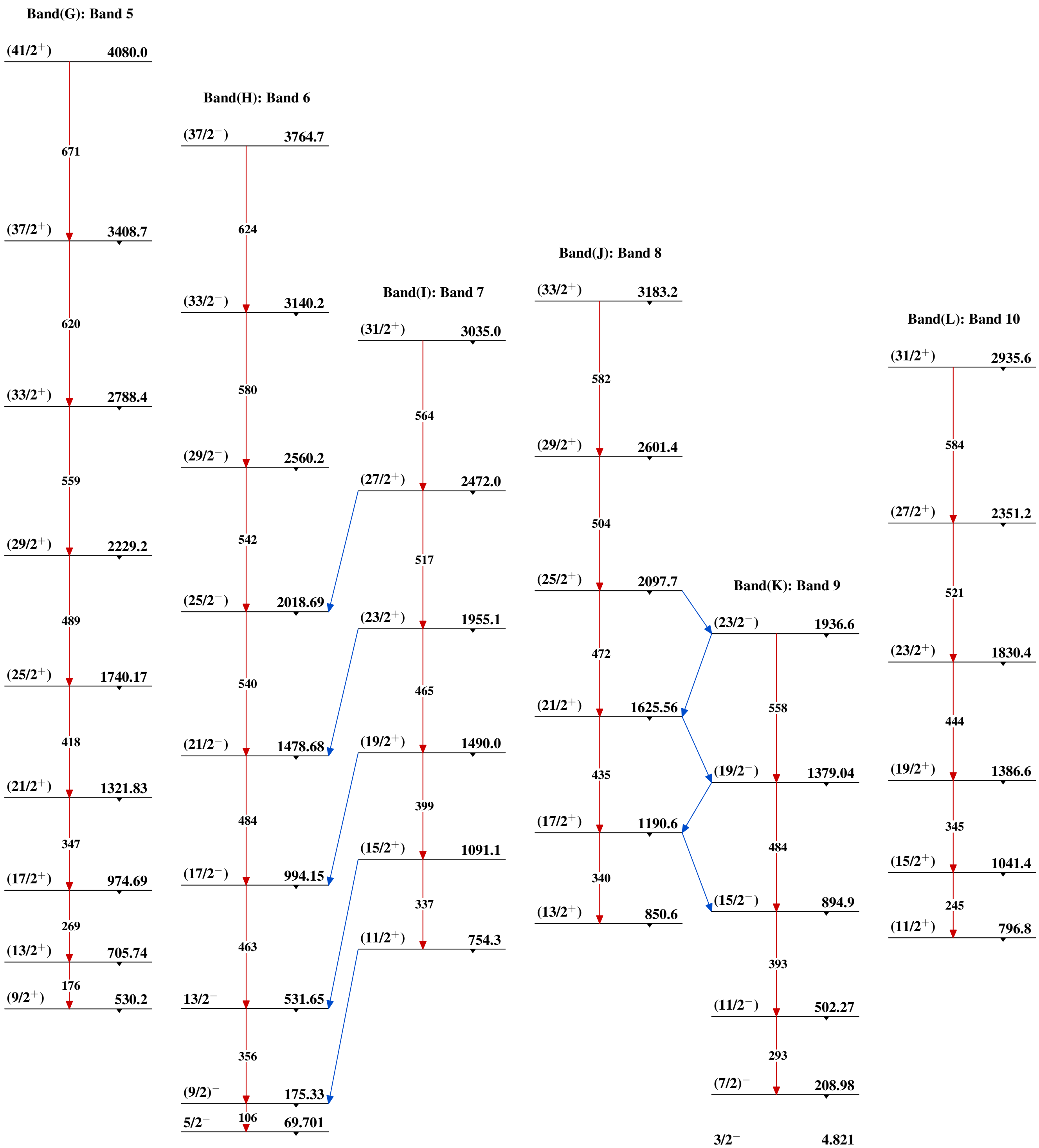
$I_\gamma > 10\% \times I_\gamma^{max}$



$^{151}_{62}Sm_{89}$

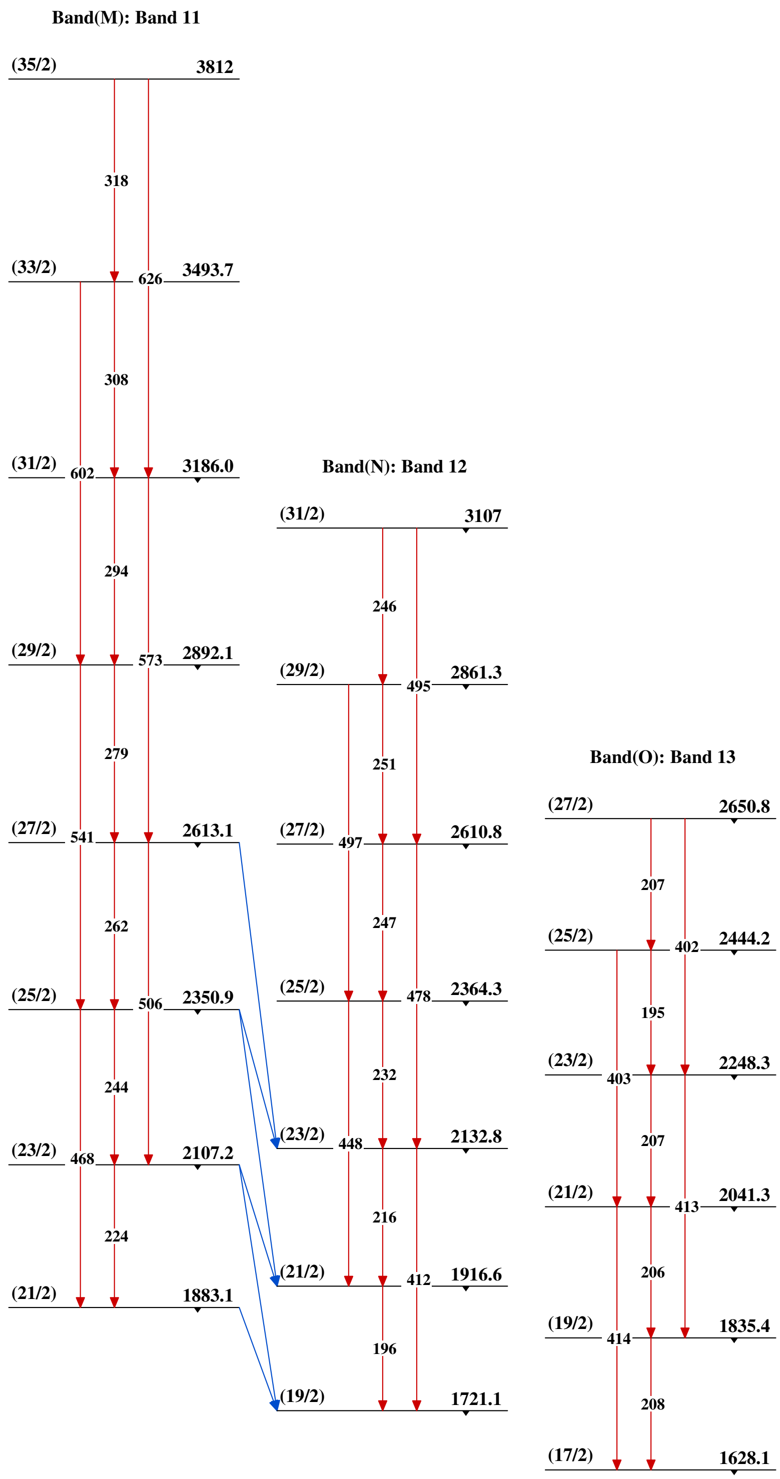

^{150}Nd(α,3nγ) 1994Kh01,1976Co12
Band(A): ΔJ=2 band, $i_{13/2}$ band
(45/2+) 4574.0
745
(41/2+) 3829.0
721
(37/2+) 3108.2
681
(33/2+) 2427.1
629
(29/2+) 1798.16
562
(25/2+) 1236.53
479
(21/2+) 757.66
374
(17/2+) 383.20
235
13/2+ 147.88
56
(9/2)+ 91.51
Band(B): ΔJ=1, 11/2[505] band
(35/2−) 3439.6
307
(33/2−) 3132.8
618
311
(31/2−) 2821.4
623
312
(29/2−) 2509.8
616
304
(27/2−) 2205.5
598
294
(25/2−) 1911.87
576
282
(23/2−) 1629.87
551
268
(21/2−) 1361.32
522
254
(19/2−) 1107.47
492
238
(17/2−) 869.35
459
221
(15/2−) 648.18
424
203
(13/2−) 445.10
387
184
(11/2)− 261.08
Band(C): Band 1
(39/2+) 4105.6
717
(35/2+) 3388.8
677
(31/2+) 2711.6
622
(27/2+) 2089.10
556
(23/2+) 1532.88
479
(19/2+) 1054.11
382
(15/2+) 671.98
253
11/2+ 419.1
Band(D): Band 2
(43/2−) 4323.5
696
(39/2−) 3627.0
636
(35/2−) 2991.0
568
(31/2−) 2423.1
496
(27/2−) 1927.26
424
(23/2−) 1502.53
360
(19/2−) 1142.36
329
(15/2−) 813.31
390
(11/2)− 423.16
357
7/2− 65.826
Band(E): Band 3
(33/2−) 3358.0
596
(29/2−) 2762.3
520
(25/2−) 2242.1
536
(21/2−) 1705.8
545
(17/2−) 1161.04
465
(13/2−) 696.33
401
9/2− 294.82
295
5/2− 0.0
Band(F): Band 4
(41/2−) 4122.2
644
(37/2−) 3478.1
580
(33/2−) 2898.1
522
(29/2−) 2375.8
469
(25/2−) 1906.57
375
(21/2−) 1531.17
308
(17/2−) 1223.97
230
(13/2−) 993.5
$^{151}_{62}Sm_{89}$

^{150}Nd(α,3nγ) 1994Kh01,1976Co12 (continued)



$^{151}_{62}Sm_{89}$

^{150}Nd(α,3nγ) 1994Kh01,1976Co12 (continued)



$^{151}_{62}Sm_{89}$