Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Ashok K. Jain and Anwesha Ghosh, Balraj Singh	NDS 107, 1075 (2006)	15-Apr-2006

Q(β^-)=−4.81×10^3 *4*; S(n)=9.87×10^3 *4*; S(p)=2.71×10^3 *3*; Q(α)=3.03×10^3 *4* 2012Wa38
Note: Current evaluation has used the following Q record.
Q(β^-)=−4810 *40*; S(n)=9870 *40*; S(p)=2710 *30*; Q(α)=3030 *40* 2003Au03
Analysis of rotational bands In ^{165}Lu: 2004Ma21, 2004Ka66, 1999Li39.
Triaxial structures in ^{165}Lu (theory): 2006Ta11.
Additional information 1.

^{165}Lu Levels

Q(transition)= Transition quadrupole moment.
Nomenclature for quasi-particle orbitals used in band assignments:
a: π1/2[411], α=+1/2.
b: π1/2[411], α=−1/2.
c: π7/2[404], α=+1/2.
d: π7/2[404], α=−1/2.
e: π9/2[514], α=+1/2.
f: π9/2[514], α=−1/2.
g: π7/2[523], α=+1/2.
h: π7/2[523], α=−1/2.
k: π5/2[402], α=+1/2.
l: π5/2[402], α=−1/2.
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.

Cross Reference (XREF) Flags

A	^{165}Hf ε decay (76 s)	D	^{139}La(^{30}Si,4nγ)
B	^{124}Sn(^{45}Sc,4nγ)	E	^{150}Sm(^{19}F,4nγ)
C	^{138}Ba(^{31}P,4nγ)	F	^{153}Eu(^{16}O,4nγ)

E(level)†	J$^\pi$‡	T$_{1/2}$#	XREF	Comments
0.0[e]	1/2$^+$	10.74 min *10*		%ε+%β^+=100 μ=−0.0245 *3* (1998Ge13) <r^2>$^{1/2}$=5.284 fm *6* (2004An14 evaluation). Δ<r^2>(^{170}Lu−^{165}Lu)=−0.561 fm^2 (Laser spectroscopy,1998Ge13). The systematic uncertainty is ≈10%. J$^\pi$: spin from collinear laser spectroscopy of the hyperfine structure (1998Ge13). Earlier atomic beam magnetic resonance data of 1974Ek03 (see also 1976Ek02) also gave spin of 1/2 for a 12-min activity of ^{165}Lu. Parity is from agreement of the experimental μ with calculated value of −0.03 (1998Ge13) for the π1/2[411] orbital. 1998Ge13 found no evidence of a higher-spin isomer such as 7/2$^+$. μ: Collinear laser spectroscopy of the hyperfine structure (1998Ge13). See also 2005St24

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Adopted Levels, Gammas (continued)

^{165}Lu Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$#	XREF	Comments
				compilation. $T_{1/2}$: from 1982Ra19. Others: 11.8 min *5* (1973Me25), 12 min (1974Ek03), 12.0 min *4* (1978Bu13).
0.0+x[d]	(3/2+)		ABCDEF	Additional information 2. E(level): x ≈ 20 keV, from evaluators′ estimate based on the trend of energy separation of 3/2 and 1/2 states for the 1/2[411] bands in odd-A Lu nuclides (163Lu, ^{167}Lu to ^{179}Lu).
5.33+x[h] *19*	(5/2+)		A CDEF	
23.43+x[b] *19*	(7/2+)		ABCDEF	
54.75+x *21*	(7/2−)		D	Jπ: probable bandhead of 7/2[523] band from systematic trend of bandhead energies for odd-A Lu nuclides.
141.39+x[g] *17*	(7/2+)		A CDEF	XREF: A(?).
147.70+x[e] *12*	(5/2+)		CDEF	
182.46+x[c] *20*	(9/2+)		A CDEF	XREF: A(?).
195.39+x[d] *10*	(7/2+)	133 ps *12*	CDEF	
203.4+x *4*			A	Jπ: (3/2 to 7/2) from possible β feeding from (5/2−).
234.95+x[&] *18*	(9/2−)		AB D F	XREF: A(?).
305.52+x[h] *16*	(9/2+)		CDEF	
335.45+x[a] *21*	(11/2−)		B D F	
345.4+x[f] *4*	(5/2−)		D F	
366.58+x[b] *20*	(11/2+)	15.7 ps *15*	CDEF	
432.70+x[e] *14*	(9/2+)		CDEF	
466.49+x[f] *14*	(9/2−)	58.7 ps *35*	D F	
494.72+x[&] *20*	(13/2−)	13.0 ps *6*	B D F	
499.22+x[g] *16*	(11/2+)		CDEF	
519.60+x[d] *13*	(11/2+)	14.9 ps *7*	CDEF	
574.13+x[c] *20*	(13/2+)	6.70 ps *24*	CDEF	
662.61+x[a] *21*	(15/2−)	6.65 ps *35*	B D F	
694.78+x[f] *16*	(13/2−)	33.3 ps *14*	D F	
711.20+x[h] *18*	(13/2+)		CDEF	
802.23+x[b] *20*	(15/2+)	3.66 ps *16*	CDEF	
821.14+x[e] *17*	(13/2+)		CDEF	
893.46+x[&] *21*	(17/2−)	2.91 ps *12*	B D F	
943.34+x[d] *16*	(15/2+)	1.84 ps *17*	CDEF	
955.32+x[g] *18*	(15/2+)		CDEF	
976.1+x *7*			A	
1030.18+x[f] *19*	(17/2−)	7.77 ps *17*	D F	
1048.83+x[c] *20*	(17/2+)	2.17 ps *8*	CDEF	
1099.95+x[a] *22*	(19/2−)	1.70 ps *6*	B D F	
1197.30+x[h] *19*	(17/2+)		CDEF	
1292.01+x[e] *18*	(17/2+)		CDEF	
1310.65+x[b] *20*	(19/2+)		CDEF	
1386.75+x[&] *22*	(21/2−)	1.25 ps *18*	B D F	
1445.45+x[d] *18*	(19/2+)	2.16 ps *10*	CDEF	
1462.28+x[f] *21*	(21/2−)	2.8 ps *7*	D F	
1478.40+x[g] *20*	(19/2+)		CDEF	
1587.07+x[c] *20*	(21/2+)	1.10 ps *8*	CDEF	
1618.75+x[a] *23*	(23/2−)	0.98 ps *7*	B D F	
1740.04+x[h] *19*	(21/2+)		CDEF	

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Adopted Levels, Gammas (continued)

^{165}Lu Levels (continued)

E(level)†	Jπ‡	XREF	E(level)†	Jπ‡	T$_{1/2}$#	XREF
1769.6+x[q] 7	(19/2−)	D	3754.1+x[h] 6	(37/2+)		D
1818.57+x[e] 21	(21/2+)	CDEF	3764.2+x[r] 4	(37/2+)		CDE
1871.63+x[b] 20	(23/2+)	CDEF	3824.1+x[p] 4	(37/2−)		D
1945.33+x[&] 23	(25/2−)	B D F	3853.7+x[f] 6	(37/2−)		D F
1978.68+x[f] 23	(25/2−)	D F	3863.9+x[s] 8	(35/2+)		D
1990.16+x[d] 19	(23/2+)	CDEF	3970.2+x[b] 3	(39/2+)		CDE
2048.1+x[g] 3	(23/2+)	CDEF	3981.10+x[i] 25	(39/2+)		CDE
2155.7+x[q] 5	(23/2−)	D	4010.3+x[&] 3	(41/2−)		B D F
2166.73+x[c] 20	(25/2+)	CDEF	4034.6+x[d] 7	(39/2+)		D
2196.30+x[a] 23	(27/2−)	B D F	4117.1+x[o] 5	(39/2−)		D
2294.41+x[h] 20	(25/2+)	CDEF	4185.0+x[q] 8	(39/2−)		D
2348.77+x[e] 22	(25/2+)	CDEF	4269.9+x[j] 3	(41/2+)		CDE
2409.4+x[r] 5	(25/2+)	D	4290.5+x[c] 5	(41/2+)		D
2458.63+x[b] 20	(27/2+)	CDEF	4322.3+x[a] 3	(43/2−)		B D F
2535.23+x[&] 24	(29/2−)	B D F	4346.6+x[r] 5	(41/2+)		CDE
2538.63+x[d] 21	(27/2+)	CDEF	4373.4+x[h] 7	(41/2+)		D
2545.0+x[i] 3	(27/2+)	D	4402.6+x[s] 7	(39/2+)		D
2564.38+x[f] 25	(29/2−)	D F	4453.6+x[p] 5	(41/2−)		D
2585.7+x[q] 6	(27/2−)	D	4490.7+x[f] 7	(41/2−)		D
2612.2+x[g] 4	(27/2+)	CDE	4575.3+x[n] 7	(41/2−)		D
2730.25+x[c] 20	(29/2+)	CDEF	4579.3+x[i] 3	(43/2+)		CDE
2753.45+x[h] 23	(29/2+)	CDEF	4613.9+x[b] 4	(43/2+)		CDE
2765.4+x[j] 4	(29/2+)	D	4645.2+x[&] 3	(45/2−)		B D
2789.38+x[a] 24	(31/2−)	B D F	4686.6+x[d] 7	(43/2+)		D
2794.4+x[r] 4	(29/2+)	CDE	4773.5+x[o] 6	(43/2−)		D
2947.5+x[o] 4	(31/2−)	D	4787.5+x[t] 12	(41/2+)		D
2956.70+x[b] 20	(31/2+)	CDE	4800.4+x[q] 8	(43/2−)		D
2968.4+x[i] 3	(31/2+)	D	4888.6+x[j] 3	(45/2+)		CDE
2999.6+x[d] 4	(31/2+)	D	4960.5+x[c] 5	(45/2+)		D
3038.95+x[&] 24	(33/2−)	B D F	4987.9+x[r] 7	(45/2+)		D
3043.3+x[g] 9	(31/2+)	D	4996.5+x[a] 3	(47/2−)	>0.19[@] ps	B D
3067.2+x[q] 7	(31/2−)	D	5000.7+x[s] 7	(43/2+)		D
3180.45+x[c] 21	(33/2+)	CDE	5068.2+x[h] 8	(45/2+)		D
3195.3+x[f] 4	(33/2−)	D F	5115.7+x[p] 6	(45/2−)		D
3201.8+x[j] 3	(33/2+)	CDE	5145.2+x[f] 9	(45/2−)		D
3222.5+x[p] 4	(33/2−)	D	5174.2+x[n] 7	(45/2−)		D
3224.2+x[h] 5	(33/2+)	D	5220.7+x[i] 4	(47/2+)		CDE
3239.7+x[r] 4	(33/2+)	CDE	5325.9+x[b] 6	(47/2+)		CDE
3248.59+x[a] 25	(35/2−)	B D F	5363.9+x[&] 3	(49/2−)		B D
3417.32+x[b] 22	(35/2+)	CDE	5393.6+x 7	(47/2+)		D
3436.61+x[i] 24	(35/2+)	CDE	5435.6+x[d] 10	(47/2+)		D
3471.6+x[d] 6	(35/2+)	D	5446.7+x[q] 8	(47/2−)		D
3475.30+x[&] 25	(37/2−)	B D F	5448.8+x[t] 9	(45/2+)		D
3485.1+x[o] 4	(35/2−)	D	5475.8+x[o] 6	(47/2−)		D
3602.3+x[q] 8	(35/2−)	D	5539.5+x[j] 4	(49/2+)		CDE
3682.55+x[o] 23	(37/2+)	CDE	5655.8+x[s] 8	(47/2+)		D
3705.3+x[c] 3	(37/2+)	CDE	5684.7+x[r] 8	(49/2+)		CDE
3735.3+x[j] 3	(39/2−)	B D F	5695.5+x[c] 7	(49/2+)		D

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Adopted Levels, Gammas (continued)

^{165}Lu Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#]	XREF
5740.6+x[a] 4	(51/2−)	>0.13[@] ps	B D
5786.5+x[p] 8	(49/2−)		D
5823.2+x[h] 10	(49/2+)		D
5825.4+x[n] 7	(49/2−)		D
5845.2+x[f] 12	(49/2−)		D
5861.0+x[m] 12	(49/2−)		D
5899.8+x[i] 5	(51/2+)		CDE
6080.9+x[k] 7	(51/2+)		D
6101.7+x[b] 7	(51/2+)		CDE
6138.1+x[q] 8	(51/2−)		D
6147.1+x[&] 4	(53/2−)	0.13[@] ps 2	B D
6154.8+x[t] 9	(49/2+)		D
6178.7+x[o] 7	(51/2−)		D
6188.6+x[d] 10	(51/2+)		D
6236.2+x[j] 5	(53/2+)		CDE
6367.2+x[s] 9	(51/2+)		D
6434.9+x[r] 9	(53/2+)		CDE
6448.5+x[l] 8	(53/2+)		D
6507.6+x[p] 9	(53/2−)		D
6511.5+x[c] 11	(53/2+)		D
6539.2+x[a] 4	(55/2−)		B D
6552.5+x[n] 8	(53/2−)		D
6608.7+x[f] 14	(53/2−)		D
6612.7+x[h] 13	(53/2+)		D
6632.2+x[i] 5	(55/2+)		CDE
6642.3+x[m] 14	(53/2−)		D
6841.9+x[k] 8	(55/2+)		D
6886.7+x[q] 9	(55/2−)		D
6903.6+x[t] 10	(53/2+)		D
6907.6+x[b] 9	(55/2+)		D
6947.3+x[o] 9	(55/2−)		D
6982.4+x[&] 5	(57/2−)		B D
6994.6+x[d] 13	(55/2+)		D
6998.0+x[j] 6	(57/2+)		CDE
7132.9+x[s] 10	(55/2+)		D
7238.2+x[r] 10	(57/2+)		D
7240.5+x[l] 9	(57/2+)		CDE
7288.1+x[p] 9	(57/2−)		D
7338.5+x[c] 13	(57/2+)		D
7354.9+x[n] 10	(57/2−)		D
7383.6+x[a] 5	(59/2−)		B D
7417.6+x[h] 15	(57/2+)		D
7431.3+x[f] 16	(57/2−)		D
7439.1+x[i] 6	(59/2+)		CDE
7467.1+x[m] 16	(57/2−)		D
7677.9+x[k] 10	(59/2+)		D
7693.9+x[q] 10	(59/2−)		D
7702.3+x[t] 13	(57/2+)		D
7760.3+x[b] 12	(59/2+)		D
7788.7+x[o] 12	(59/2−)		D
7837.4+x[j] 6	(61/2+)		CDE
7841.6+x[d] 15	(59/2+)		D
7864.3+x[&] 6	(61/2−)		B D
7952.7+x[s] 13	(59/2+)		D
8093.9+x[r] 13	(61/2+)		CDE
8114.5+x[l] 11	(61/2+)		D
8128.0+x[p] 10	(61/2−)		D
8212.5+x[c] 16	(61/2+)		D
8227.1+x[n] 13	(61/2−)		D
8257.4+x[h] 17	(61/2+)		D
8269.6+x[a] 6	(63/2−)		B D
8312.3+x[f] 18	(61/2−)		D
8330.8+x[i] 7	(63/2+)		CDE
8336.8+x[m] 18	(61/2−)		D
8551.9+x[t] 15	(61/2+)		D
8557.0+x[q] 13	(63/2−)		D
8584.9+x[k] 11	(63/2+)		D
8660.4+x[b] 14	(63/2+)		D
8692.0+x[o] 15	(63/2−)		D
8733.6+x[d] 17	(63/2+)		D
8754.7+x[j] 8	(65/2+)		CDE
8795.3+x[&] 8	(65/2−)		B D
8824.9+x[s] 15	(63/2+)		D
9002.8+x[r] 15	(65/2+)		CDE
9028.0+x[p] 11	(65/2−)		D
9067.5+x[l] 13	(65/2+)		D
9133.5+x[c] 18	(65/2+)		D
9156.0+x[n] 15	(65/2−)		D
9160.2+x[h] 19	(65/2+)		D
9199.0+x[a] 8	(67/2−)		B D
9242.6+x[f] 20	(65/2−)		D
9265.1+x[m] 20	(65/2−)		D
9308.7+x[i] 9	(67/2+)		CDE
9456.6+x[t] 17	(65/2+)		D
9475.3+x[q] 15	(67/2−)		D
9544.9+x[k] 14	(67/2+)		D
9607.1+x[b] 16	(67/2+)		D
9643.2+x[o] 17	(67/2−)		D
9671.6+x[d] 19	(67/2+)		D
9742.6+x[j] 9	(69/2+)		D
9751.5+x[s] 17	(67/2+)		D
9781.3+x[&] 10	(69/2−)		B D
9965.8+x[r] 17	(69/2+)		CDE
9991.2+x[p] 14	(69/2−)		D
10072.5+x[l] 16	(69/2+)		D
10107.5+x[c] 19	(69/2+)		D

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Adopted Levels, Gammas (continued)

^{165}Lu Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	XREF
10129.5+x[n] 17	(69/2$^-$)	D
10175.4+x[a] 10	(71/2$^-$)	D
10207.7+x[f] 22	(69/2$^-$)	D
10367.1+x[i] 10	(71/2$^+$)	D
10414.1+x[t] 19	(69/2$^+$)	D
10449.1+x[q] 17	(71/2$^-$)	D
10546.9+x[k] 16	(71/2$^+$)	D
10594.0+x[b] 18	(71/2$^+$)	D
10645.1+x[o] 19	(71/2$^-$)	D
10646.6+x[d] 21	(71/2$^+$)	D
10732.6+x[s] 19	(71/2$^+$)	D
10793.8+x[j] 12	(73/2$^+$)	D
10827.3+x[&] 13	(73/2$^-$)	D
10985.1+x[r] 19	(73/2$^+$)	D
11017.5+x[p] 16	(73/2$^-$)	D
11142.3+x[n] 19	(73/2$^-$)	D
11194.1+x[f] 23	(73/2$^-$)	D
11202.0+x[a] 11	(75/2$^-$)	D
11425.2+x[t] 21	(73/2$^+$)	D
11477.3+x[q] 19	(75/2$^-$)	D
11496.8+x[i] 13	(75/2$^+$)	D
11582.9+x[k] 18	(75/2$^+$)	D
11612.2+x[b] 20	(75/2$^+$)	D
11656.6+x[d] 22	(75/2$^+$)	D
11684.1+x[o] 20	(75/2$^-$)	D
11767.7+x[s] 21	(75/2$^+$)	D
11899.2+x[j] 15	(77/2$^+$)	D
11936.2+x[&] 15	(77/2$^-$)	D
12061.4+x[r] 21	(77/2$^+$)	D
12105.5+x[p] 18	(77/2$^-$)	D
12190.1+x[n] 21	(77/2$^-$)	D
12215.8+x[f] 24	(77/2$^-$)	D
12278.0+x[a] 14	(79/2$^-$)	D
12484.3+x[t] 22	(77/2$^+$)	D
12558.9+x[q] 21	(79/2$^-$)	D
12643.9+x[k] 20	(79/2$^+$)	D
12649.9+x[b] 22	(79/2$^+$)	D
12678.8+x[i] 15	(79/2$^+$)	D
12720.6+x[d] 24	(79/2$^+$)	D
12857.3+x[s] 22	(79/2$^+$)	D
13041.4+x[j] 17	(81/2$^+$)	D
13102.7+x[&] 17	(81/2$^-$)	D
13194.8+x[r] 22	(81/2$^+$)	D
13245.2+x[p] 20	(81/2$^-$)	D
13399.7+x[a] 16	(83/2$^-$)	D
13591.8+x[t] 24	(81/2$^+$)	D
13686.6+x[q] 22	(83/2$^-$)	D
13714.9+x[b] 23	(83/2$^+$)	D

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Adopted Levels, Gammas (continued)

^{165}Lu Levels (continued)

E(level)†	Jπ‡	XREF	Comments
13829.6+x[d] 25	(83/2+)	D	
14008.3+x[s] 24	(83/2+)	D	
14199.9+x[j] 19	(85/2+)	D	
14384.1+x[r] 24	(85/2+)	D	
14558.5+x[a] 18	(87/2−)	D	
14849.1+x[q] 24	(87/2−)	D	
15208.1+x[s] 25	(87/2+)	D	
15623.4+x[r] 25	(89/2+)	D	
15745.5+x[a] 20	(91/2−)	D	
16462+x[s] 3	(91/2+)	D	
y[u]	J	D	Additional information 3.
624.5+y[u] 8	J+2	D	
1308.3+y[u] 12	J+4	D	
2049.0+y[u] 14	J+6	D	
2847.3+y[u] 16	J+8	D	
3703.3+y[u] 18	J+10	D	
4618.9+y[u] 20	J+12	D	
5594.2+y[u] 22	J+14	D	
6631.2+y[u] 23	J+16	D	
z[v]	J1	D	Additional information 4.
712.2+z[v] 8	J1+2	D	
1482.4+z[v] 12	J1+4	D	
2311.3+z[v] 14	J1+6	D	
3197.1+z[v] 16	J1+8	D	
4140.8+z[v] 18	J1+10	D	
5143.3+z[v] 20	J1+12	D	
6206.3+z[v] 22	J1+14	D	

† From least-squares fit to Eγ′s.

‡ The assignments for the excited states are from 2004Sc14, based primarily on $\gamma\gamma(\theta)$ data in (HI,xnγ) reactions, rotational band structures, and model predictions. Since firm assignments for bandheads are lacking, the evaluators have placed all the assignments in parentheses.

For excited states, the values are from differential decay curve method in recoil-distance measurements (DDCM,2005An04) in ^{139}La(^{30}Si,4nγ) reaction, unless otherwise stated.

@ From DSAM (1988Fr22) in ^{124}Sn(^{45}Sc,4nγ) reaction.

& Band(A): 9/2[514], α=+1/2. Changes to 9/2[514]⊗[AB] at ħω=0.25 MeV and spin range of 29/2 to 31/2, and 9/2[514]⊗[ABCD] at higher frequencies. A=11.8.

[a] Band(a): 9/2[514], α=−1/2. See comment for the α=+1/2 signature partner of this band. A=11.9.

[b] Band(B): 7/2[404], α=−1/2. From low to high spins, configuration changes to 7/2[404]⊗[AB], then to 7/2[404]⊗[ABCD], and finally to 7/2[404]⊗[ABCDEF]. A=16.2.

[c] Band(b): 7/2[404], α=+1/2. See comment for the α=−1/2 signature partner of this band. A=15.4.

[d] Band(C): 1/2[411], α=−1/2. At higher spins, configuration=1/2[411]⊗[AB], and then 1/2[411]⊗[ABCD].

[e] Band(c): 1/2[411], α=+1/2. A=18.2, a=0.62 for both signatures combined.

[f] Band(D): 1/2[541], α=+1/2. From low to high spins, configuration changes to 1/2[541]⊗[AB], then to 1/2[541]⊗[ABCD] and finally to 1/2[541]⊗[ABCDEF]. A=13.4, a=3.5.

[g] Band(E): 5/2[402], α=−1/2.

[h] Band(e): 5/2[402], α=+1/2. From low to high spins, configuration changes to 5/2[402]⊗[AB], and then to 5/2[402]⊗[ABCD].

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{165}Lu Levels (continued)

A=17.6.

[i] Band(F): 9/2[514]⊗[AE], α=−1/2. At higher spins, the configuration changes to 9/2[514]⊗[AEBC]. The upbend at $\hbar\omega\approx$0.56 MeV near spin 59/2 may be due to the alignment of proton pair fg or gh, with the resulting configuration=9/2[514]⊗[AEBC(fg and/or gh)].

[j] Band(f): 9/2[514]⊗[AE], α=+1/2. See comment for α=−1/2 signature partner of this band.

[k] Band(G): 9/2[514]⊗[AHBC], α=−1/2. At higher frequencies, the configuration is probably 9/2[514]⊗[AHBCEF].

[l] Band(g): 9/2[514]⊗[AHBC], α=+1/2. See comment for the α=−1/2 signature partner of this band.

[m] Band(H): band #1, α=+1/2. This band probably decays into the 1/2[541] band.

[n] Band(I): Band #2, α=+1/2. See comment for band #3. Configuration for band #2 changes from 7/2[4040]⊗[AE] at high spins to 9/2[514]⊗[BC] at low spins.

[o] Band(i): Band #3, α=−1/2. Bands #2 to #5 form pairs of signature partners above 45/2 spin. At lower spins the bands seem to form different pairs, where band #4 interchanges character with band #2 and bands #3 and #4 seem to be signature partners. From low to high spins, configuration for band #3 is 9/2[514], 9/2[514]⊗[BC], and finally to 9/2[514]⊗[BCEF].

[p] Band(J): Band #4, α=+1/2. See comment for band #3. Configuration for band #4 changes from 9/2[514]⊗[BC] at high spins to 7/2[404]⊗[AE] at low spins.

[q] Band(j): band #5, α=−1/2. See comment for band #3. The configuration changes from unfavored 1/2[541] or from 7/2[404]+octupole vibration at low spin to 7/2[404]⊗[AE] at high spins.

[r] Band(K): Zero-phonon wobbling-mode (Triaxial) SD-1 band (2004Sc14,2003Sc02,1995Sc39). Q(transition)=6.0 *+12−2*, 6.4 *+19−7* (2002Sc47). 1/2[660] band, α=+1/2. Percent feeding=1.3 (2003Sc02).

[s] Band(L): One-phonon wobbling mode (Triaxial) SD-2 band (2004Sc14,2003Sc02). Percent feeding=0.4.

[t] Band(M): Two-phonon wobbling mode (Triaxial) SD-3 band (2004Sc14,2003Sc02). Percent feeding=0.1.

[u] Band(N): Triaxial SD-4 band (2004Sc14).

[v] Band(O): Triaxial SD-5 band (2004Sc14).

Adopted Levels, Gammas (continued)

γ(^{165}Lu)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[@]	α[a]	Comments
141.39+x	(7/2$^+$)	136.10 *12*	100	5.33+x	(5/2$^+$)	D+Q			
147.70+x	(5/2$^+$)	147.67 *14*	100	0.0+x	(3/2$^+$)	D			
182.46+x	(9/2$^+$)	159.2 *1*	100	23.43+x	(7/2$^+$)	D+Q			
195.39+x	(7/2$^+$)	48.0		147.70+x	(5/2$^+$)				E_γ: from ^{139}La(^{30}Si,4nγ) only, intensity not known.
		195.4 *1*	100 *4*	0.0+x	(3/2$^+$)	E2		0.303	α(K)=0.179 *6*; α(L)=0.095 *3*; α(M)=0.0230 *7*; α(N+..)=0.00640 *20* B(E2)(W.u.)=213 *23*
203.4+x		180.0 *3*	100	23.43+x	(7/2$^+$)				
234.95+x	(9/2$^-$)	93.6 *1*		141.39+x	(7/2$^+$)				
		180.2 *1*	91 *8*	54.75+x	(7/2$^-$)	D			E_γ: this 180.2γ must Be different from 180.0γ from 203.3+x level populated In ε decay, since No 211.5γ is seen In ε decay.
		211.5 *1*	100 *8*	23.43+x	(7/2$^+$)	D			
305.52+x	(9/2$^+$)	164.28 *12*	100 *3*	141.39+x	(7/2$^+$)	D+Q			
		300.12 *15*	39 *2*	5.33+x	(5/2$^+$)	Q			
335.45+x	(11/2$^-$)	100.4 *2*	100 *11*	234.95+x	(9/2$^-$)	D+Q			
		152.6 *6*	21 *7*	182.46+x	(9/2$^+$)	D			
345.4+x	(5/2$^-$)	345.5 *5*	100	0.0+x	(3/2$^+$)				
366.58+x	(11/2$^+$)	184.3 *1*	79 *5*	182.46+x	(9/2$^+$)	(M1+E2)	+0.47 *7*	0.614 *14*	α(K)=0.495 *16*; α(L)=0.092 *2*; α(M)=0.0210 *5*; α(N+..)=0.00590 *12* B(M1)(W.u.)=0.062 *9*; B(E2)(W.u.)=190 *60*
		343.0 *1*	100 *2*	23.43+x	(7/2$^+$)	E2		0.0520	α(K)=0.0378 *12*; α(L)=0.0108 *4*; α(M)=0.00257 *8*; α(N+..)=0.00076 *2* B(E2)(W.u.)=61 *7*
432.70+x	(9/2$^+$)	237.39 *16*	100 *5*	195.39+x	(7/2$^+$)	D			
		284.96 *17*	98 *5*	147.70+x	(5/2$^+$)				
466.49+x	(9/2$^-$)	121.1 *5*	10 *3*	345.4+x	(5/2$^-$)	[E2]		1.65	α(K)=0.647 *20*; α(L)=0.761 *23*; α(M)=0.187 *6*; α(N+..)=0.0513 *16* B(E2)(W.u.)=530 *180*
		271.1 *1*	100 *10*	195.39+x	(7/2$^+$)	(E1)		0.0266	α(K)=0.0223 *7*; α(L)=0.00334 *10*; α(M)=0.00074 *2*; α(N+..)=0.00022 *1* B(E1)(W.u.)=0.000149 *23*
494.72+x	(13/2$^-$)	159.4 *1*	100 *9*	335.45+x	(11/2$^-$)	(M1)		1.00	α(K)=0.84 *3*; α(L)=0.129 *4*; α(M)=0.0288 *9*; α(N+..)=0.00791 *24* B(M1)(W.u.)=0.148 *19*
		259.8 *1*	74 *6*	234.95+x	(9/2$^-$)	(E2)		0.120	α(K)=0.0806 *25*; α(L)=0.0303 *9*; α(M)=0.00728 *22*; α(N+..)=0.00212 *7* B(E2)(W.u.)=179 *21*
499.22+x	(11/2$^+$)	193.80 *12*	100 *3*	305.52+x	(9/2$^+$)	D			
		357.56 *16*	58 *2*	141.39+x	(7/2$^+$)	Q			I_γ: from (^{31}P,4nγ). Iγ(193.8)/Iγ(357.6)=4.2 *2* in (^{19}F,4nγ) is discrepant. The relative intensity of the 193.8γ seems to be too large by a factor of about 3 in (^{19}F,4nγ).

$^{165}_{71}Lu_{94}$-8

Adopted Levels, Gammas (continued)

γ(^{165}Lu) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[@]	α[a]	Comments
519.60+x	(11/2$^+$)	214.1 *1*	14.9 *7*	305.52+x	(9/2$^+$)	(M1+E2)		0.33 *11*	α(K)=0.25 *12*; α(L)=0.061 *5*; α(M)=0.0142 *16*; α(N+..)=0.0041 *4*
		324.2 *1*	100.0 *16*	195.39+x	(7/2$^+$)	E2		0.0613	α(K)=0.0439 *14*; α(L)=0.0133 *4*; α(M)=0.00315 *10*; α(N+..)=0.00093 *3* B(E2)(W.u.)=157 *9*
574.13+x	(13/2$^+$)	207.6 *1*	47 *4*	366.58+x	(11/2$^+$)	(M1+E2)	+0.57 *10*	0.422 *15*	α(K)=0.339 *16*; α(L)=0.0644 *8*; α(M)=0.0147 *3*; α(N+..)=0.00426 *7* B(M1)(W.u.)=0.076 *11*; B(E2)(W.u.)=280 *80*
		391.7 *1*	100.0 *14*	182.46+x	(9/2$^+$)	E2		0.0357	α(K)=0.0267 *8*; α(L)=0.00687 *21*; α(M)=0.00162 *5*; α(N+..)=0.00047 *2* B(E2)(W.u.)=100 *6*
662.61+x	(15/2$^-$)	168.2 *1*	100 *8*	494.72+x	(13/2$^-$)	(M1+E2)	+0.16 *3*	0.86	α(K)=0.711 *5*; α(L)=0.113 *1*; α(M)=0.0253 *2*; α(N+..)=0.00700 *5* B(M1)(W.u.)=0.28 *4*; B(E2)(W.u.)=120 *50* E_γ: level-energy difference=167.9.
		327.0 *1*	74 *7*	335.45+x	(11/2$^-$)	(E2)		0.0596	α(K)=0.0429 *13*; α(L)=0.0128 *4*; α(M)=0.00305 *10*; α(N+..)=0.00090 *3* B(E2)(W.u.)=98 *14*
694.78+x	(13/2$^-$)	175.1 *5*	17 *4*	519.60+x	(11/2$^+$)	(E1)		0.0813	α(K)=0.0678 *21*; α(L)=0.0105 *4*; α(M)=0.00235 *7*; α(N+..)=0.00063 *2* B(E1)(W.u.)=0.00010 *4*
		228.3 *1*	100 *8*	466.49+x	(9/2$^-$)	(E2)		0.182	α(K)=0.116 *4*; α(L)=0.0504 *16*; α(M)=0.0122 *4*; α(N+..)=0.00348 *11* B(E2)(W.u.)=400 *60*
711.20+x	(13/2$^+$)	191.6 *8*	23 *7*	519.60+x	(11/2$^+$)				
		212.2 *3*	100 *15*	499.22+x	(11/2$^+$)	D+Q	+0.25 *6*		
		344.8 *5*	37 *10*	366.58+x	(11/2$^+$)				
		405.6 *5*	70 *17*	305.52+x	(9/2$^+$)	Q			
802.23+x	(15/2$^+$)	228.18 *14*	29 *3*	574.13+x	(13/2$^+$)	(M1+E2)		0.28 *10*	α(K)=0.21 *10*; α(L)=0.0487 *17*; α(M)=0.0114 *8*; α(N+..)=0.00331 *17*
		435.6 *1*	100.0 *12*	366.58+x	(11/2$^+$)	(E2)		0.0267	α(K)=0.0204 *7*; α(L)=0.00485 *15*; α(M)=0.00114 *4*; α(N+..)=0.00033 *1* B(E2)(W.u.)=131 *8*
821.14+x	(13/2$^+$)	301.5 *5*	49.6 *17*	519.60+x	(11/2$^+$)	D(+Q)	+0.07 *7*		
		388.46 *14*	100.0 *25*	432.70+x	(9/2$^+$)	Q			
893.46+x	(17/2$^-$)	230.7 *1*	100 *10*	662.61+x	(15/2$^-$)	(M1+E2)	+0.25 *3*	0.347	α(K)=0.288 *3*; α(L)=0.0458; α(M)=0.0103; α(N+..)=0.00307 B(M1)(W.u.)=0.25 *4*; B(E2)(W.u.)=140 *40*
		398.6 *1*	91 *9*	494.72+x	(13/2$^-$)	E2		0.0340	α(K)=0.0255 *8*; α(L)=0.00648 *20*; α(M)=0.00153 *5*; α(N+..)=0.00045 *1* B(E2)(W.u.)=143 *19*
943.34+x	(15/2$^+$)	231.88 *20*	17 *5*	711.20+x	(13/2$^+$)	(M1+E2)		0.26 *9*	α(K)=0.20 *10*; α(L)=0.0461 *12*; α(M)=0.0107 *7*; α(N+..)=0.00314 *13*
		423.70 *12*	100.0 *14*	519.60+x	(11/2$^+$)	E2		0.0288	α(K)=0.0218 *7*; α(L)=0.00531 *16*; α(M)=0.00124 *4*;

$^{165}_{71}Lu_{94}$-9

Adopted Levels, Gammas (continued)

γ(^{165}Lu) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[@]	α[a]	Comments
									α(N+..)=0.00036 *1* B(E2)(W.u.)=260 *30*
943.34+x	(15/2$^+$)	444.10 *15*	34.5 *9*	499.22+x	(11/2$^+$)	E2		0.0254	α(K)=0.0194 *6*; α(L)=0.00456 *14*; α(M)=0.00107 *4*; α(N+..)=0.00031 *1* B(E2)(W.u.)=72 *8*
955.32+x	(15/2$^+$)	244.33 *15*	82 *11*	711.20+x	(13/2$^+$)				
		436.3 *4*	47 *13*	519.60+x	(11/2$^+$)	(Q)			
		455.88 *18*	100 *3*	499.22+x	(11/2$^+$)	Q			
976.1+x		772.7 *5*	100	203.4+x					
1030.18+x	(17/2$^-$)	335.4 *1*	100	694.78+x	(13/2$^-$)	E2		0.0555	α(K)=0.0401 *12*; α(L)=0.0117 *4*; α(M)=0.00279 *9*; α(N+..)=0.00082 *3* B(E2)(W.u.)=302 *7*
1048.83+x	(17/2$^+$)	246.69 *13*	22.9 *22*	802.23+x	(15/2$^+$)	(M1+E2)	+0.38 *13*	0.279 *13*	α(K)=0.230 *13*; α(L)=0.0378 *1*; α(M)=0.0086; α(N+..)=0.00257 B(M1)(W.u.)=0.103 *15*; B(E2)(W.u.)=120 *70*
		474.7 *1*	100.0 *10*	574.13+x	(13/2$^+$)	E2		0.0213	α(K)=0.0165 *5*; α(L)=0.00370 *11*; α(M)=0.00086 *3*; α(N+..)=0.00025 *1* B(E2)(W.u.)=153 *7*
1099.95+x	(19/2$^-$)	206.4 *1*	71 *7*	893.46+x	(17/2$^-$)	(M1+E2)	+0.16 *3*	0.482	α(K)=0.401 *3*; α(L)=0.0627 *1*; α(M)=0.0141 *1*; α(N+..)=0.00409 *1* B(M1)(W.u.)=0.49 *7*; B(E2)(W.u.)=140 *60*
		437.6 *1*	100 *10*	662.61+x	(15/2$^-$)	E2		0.0265	α(K)=0.0202 *6*; α(L)=0.00480 *15*; α(M)=0.00112 *4*; α(N+..)=0.00033 *1* B(E2)(W.u.)=187 *24*
1197.30+x	(17/2$^+$)	241.82 *15*	53.0 *24*	955.32+x	(15/2$^+$)				
		486.10 *15*	100.0 *22*	711.20+x	(13/2$^+$)	(Q)			
1292.01+x	(17/2$^+$)	348.32 *20*	27.8 *11*	943.34+x	(15/2$^+$)	D(+Q)	+0.06 *6*		
		470.89 *15*	100.0 *22*	821.14+x	(13/2$^+$)	Q			
1310.65+x	(19/2$^+$)	262.00 *14*	16.3 *17*	1048.83+x	(17/2$^+$)	D			
		508.4 *1*	100.0 *9*	802.23+x	(15/2$^+$)	Q			
1386.75+x	(21/2$^-$)	287.0 *1*	77 *8*	1099.95+x	(19/2$^-$)	(M1+E2)	+0.20 *3*	0.193	α(K)=0.161 *1*; α(L)=0.0248 *1*; α(M)=0.00558 *1*; α(N+..)=0.00171 B(M1)(W.u.)=0.28 *6*; B(E2)(W.u.)=66 *23*
		493.1 *1*	100 *10*	893.46+x	(17/2$^-$)	E2		0.0193	α(K)=0.0150 *5*; α(L)=0.00328 *10*; α(M)=0.00076 *2*; α(N+..)=0.00022 *1* B(E2)(W.u.)=150 *30*
1445.45+x	(19/2$^+$)	502.1 *1*	100	943.34+x	(15/2$^+$)	E2		0.0186	α(K)=0.0144 *5*; α(L)=0.00312 *10* B(E2)(W.u.)=150 *7*
1462.28+x	(21/2$^-$)	432.1 *1*	100	1030.18+x	(17/2$^-$)	E2		0.0272	α(K)=0.0207 *7*; α(L)=0.00496 *15*; α(M)=0.00116 *4*; α(N+..)=0.00034 *1* B(E2)(W.u.)=240 *60*
1478.40+x	(19/2$^+$)	281.10 *16*	53 *3*	1197.30+x	(17/2$^+$)				
		523.49 *18*	100 *4*	955.32+x	(15/2$^+$)	Q			
1587.07+x	(21/2$^+$)	276.52 *13*	23.0 *10*	1310.65+x	(19/2$^+$)	(M1+E2)	+0.26 *7*	0.211 *5*	α(K)=0.176 *4*; α(L)=0.0275 *1*; α(M)=0.00619 *2*;

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Adopted Levels, Gammas (continued)

γ(^{165}Lu) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[@]	α[a]	Comments
									α(N+..)=0.00189 *1* B(M1)(W.u.)=0.158 *15*; B(E2)(W.u.)=70 *40*
1587.07+x	(21/2$^+$)	538.2 *1*	100.0 *9*	1048.83+x	(17/2$^+$)	E2		0.0156	α(K)=0.0123 *4*; α(L)=0.00253 *8* B(E2)(W.u.)=164 *13*
1618.75+x	(23/2$^-$)	232.1 *1*	43 *3*	1386.75+x	(21/2$^-$)	(M1+E2)	+0.11 *3*	0.351	α(K)=0.293 *1*; α(L)=0.0450; α(M)=0.0101; α(N+..)=0.00302 B(M1)(W.u.)=0.40 *6*; B(E2)(W.u.)=43 *24*
		518.8 *1*	100 *8*	1099.95+x	(19/2$^-$)	E2		0.0171	α(K)=0.0133 *4*; α(L)=0.00282 *9* B(E2)(W.u.)=190 *30*
1740.04+x	(21/2$^+$)	262.05 *18*	39 *6*	1478.40+x	(19/2$^+$)	Q			
		448.6 *3*	13.7 *23*	1292.01+x	(17/2$^+$)				
		542.58 *16*	100.0 *23*	1197.30+x	(17/2$^+$)	Q			
1769.6+x	(19/2$^-$)	720.7 *8*	100	1048.83+x	(17/2$^+$)	D			
1818.57+x	(21/2$^+$)	373.0 *8*	25 *7*	1445.45+x	(19/2$^+$)				
		526.14 *17*	100 *25*	1292.01+x	(17/2$^+$)	Q			
1871.63+x	(23/2$^+$)	284.49 *15*	14.0 *18*	1587.07+x	(21/2$^+$)	D			
		561.0 *1*	100.0 *11*	1310.65+x	(19/2$^+$)	Q			
1945.33+x	(25/2$^-$)	326.6 *1*	74 *8*	1618.75+x	(23/2$^-$)	D+Q	+0.09 *5*		
		558.5 *1*	100 *10*	1386.75+x	(21/2$^-$)	Q			
1978.68+x	(25/2$^-$)	516.4 *1*	100	1462.28+x	(21/2$^-$)	Q			
1990.16+x	(23/2$^+$)	544.7 *1*	100	1445.45+x	(19/2$^+$)	Q			
2048.1+x	(23/2$^+$)	308.2 *8*	31 *10*	1740.04+x	(21/2$^+$)				
		569.75 *18*	100.0 *25*	1478.40+x	(19/2$^+$)				
2155.7+x	(23/2$^-$)	386.0 *8*	21 *6*	1769.6+x	(19/2$^-$)	Q			
		568.9 *5*	100 *26*	1587.07+x	(21/2$^+$)	D			
2166.73+x	(25/2$^+$)	295.04 *14*	17.3 *4*	1871.63+x	(23/2$^+$)	D+Q	+0.40 *12*		I_γ: from (^{31}P,4nγ). Iγ(295.0)/Iγ(579.7)=0.97 in (^{19}F,4nγ) is discrepant. This branching ratio is 0.18 *6* in (^{16}O,4nγ). It seems that the relative intensity of the 579.7γ is too low by a factor of about 5.
		579.7 *1*	100.0 *11*	1587.07+x	(21/2$^+$)	Q			
2196.30+x	(27/2$^-$)	251.0 *1*	24 *3*	1945.33+x	(25/2$^-$)	D(+Q)	+0.01 *3*		
		577.6 *1*	100 *8*	1618.75+x	(23/2$^-$)	Q			
2294.41+x	(25/2$^+$)	246.3 *8*	13 *4*	2048.1+x	(23/2$^+$)				
		475.01 *24*	29.5 *13*	1818.57+x	(21/2$^+$)	Q			E_γ: poor fit; level-energy difference=475.85.
		554.59 *15*	100 *3*	1740.04+x	(21/2$^+$)	Q			
2348.77+x	(25/2$^+$)	530.23 *20*	100 *3*	1818.57+x	(21/2$^+$)	Q			
		608.84 *20*	85 *8*	1740.04+x	(21/2$^+$)	Q			
2409.4+x	(25/2$^+$)	590.7 *5*	100	1818.57+x	(21/2$^+$)	Q			
2458.63+x	(27/2$^+$)	291.80 *14*	21.8 *5*	2166.73+x	(25/2$^+$)	D+Q	+0.44 *12*		
		587.0 *1*	100.0 *15*	1871.63+x	(23/2$^+$)	Q			
2535.23+x	(29/2$^-$)	338.9 *1*	57 *6*	2196.30+x	(27/2$^-$)	D+Q	+0.18 *3*		
		589.8 *1*	100 *7*	1945.33+x	(25/2$^-$)	Q			
2538.63+x	(27/2$^+$)	548.45 *15*	100	1990.16+x	(23/2$^+$)	Q			
2545.0+x	(27/2$^+$)	554.8 *3*	100	1990.16+x	(23/2$^+$)	Q			

$^{165}_{71}Lu_{94}$-11

Adopted Levels, Gammas (continued)

$\gamma(^{165}Lu)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[@]	Comments
2564.38+x	(29/2$^-$)	585.7 *1*	100	1978.68+x	(25/2$^-$)	Q		
2585.7+x	(27/2$^-$)	418.3 *8*	36 *11*	2166.73+x	(25/2$^+$)	D		
		430.3 *5*	100 *25*	2155.7+x	(23/2$^-$)	Q		
2612.2+x	(27/2$^+$)	317.7 *8*	52 *17*	2294.41+x	(25/2$^+$)			
		564.03 *23*	100 *25*	2048.1+x	(23/2$^+$)	Q		
2730.25+x	(29/2$^+$)	271.40 *14*	43.7 *7*	2458.63+x	(27/2$^+$)	D		
		435.82 *16*	28 *3*	2294.41+x	(25/2$^+$)			
		563.6 *1*	100.0 *17*	2166.73+x	(25/2$^+$)	Q		
2753.45+x	(29/2$^+$)	404.85 *20*	42.8 *18*	2348.77+x	(25/2$^+$)			
		458.97 *15*	100.0 *22*	2294.41+x	(25/2$^+$)	Q		
		587.7 *10*	21 *3*	2166.73+x	(25/2$^+$)			
2765.4+x	(29/2$^+$)	220.2 *8*	38 *10*	2545.0+x	(27/2$^+$)			
		598.2 *5*	100 *24*	2166.73+x	(25/2$^+$)	Q		
2789.38+x	(31/2$^-$)	254.1 *1*	37 *4*	2535.23+x	(29/2$^-$)	D+Q	+0.18 *4*	
		593.2 *1*	100	2196.30+x	(27/2$^-$)	Q		
2794.4+x	(29/2$^+$)	384.8 *8*	57 *17*	2409.4+x	(25/2$^+$)			
		445.3 *5*	100 *25*	2348.77+x	(25/2$^+$)	Q		
2947.5+x	(31/2$^-$)	751.2 *3*	100	2196.30+x	(27/2$^-$)	Q		
2956.70+x	(31/2$^+$)	226.52 *14*	100.0 *20*	2730.25+x	(29/2$^+$)	D		
		418.06 *14*	57 *10*	2538.63+x	(27/2$^+$)	Q		
		498.27 *18*	73 *6*	2458.63+x	(27/2$^+$)	Q		
2968.4+x	(31/2$^+$)	203.1 *5*	50 *12*	2765.4+x	(29/2$^+$)	D		
		423.4 *5*	55 *13*	2545.0+x	(27/2$^+$)	Q		
		429.7 *5*	30 *8*	2538.63+x	(27/2$^+$)			
		509.8 *3*	100 *15*	2458.63+x	(27/2$^+$)			
2999.6+x	(31/2$^+$)	269.4 *8*	45 *13*	2730.25+x	(29/2$^+$)	D		
		455.0 *8*	32 *11*	2545.0+x	(27/2$^+$)	Q		
		461.0 *8*	50 *16*	2538.63+x	(27/2$^+$)	Q		
		540.9 *5*	100 *26*	2458.63+x	(27/2$^+$)	Q		
3038.95+x	(33/2$^-$)	249.7 *1*	100 *8*	2789.38+x	(31/2$^-$)	D+Q	+0.09 *3*	
		503.7 *1*	80 *6*	2535.23+x	(29/2$^-$)	Q		
3043.3+x	(31/2$^+$)	431.1[b] *8*	100	2612.2+x	(27/2$^+$)			
3067.2+x	(31/2$^-$)	481.5 *5*	100	2585.7+x	(27/2$^-$)	Q		
3180.45+x	(33/2$^+$)	224.33 *16*	42 *7*	2956.70+x	(31/2$^+$)			E_γ: poor fit; level-energy difference=223.75.
		450.08 *13*	100.0 *18*	2730.25+x	(29/2$^+$)	Q		
3195.3+x	(33/2$^-$)	630.9 *3*	100	2564.38+x	(29/2$^-$)	Q		
3201.8+x	(33/2$^+$)	244.1 *5*	100 *24*	2956.70+x	(31/2$^+$)	D		
		435.7 *5*	73 *18*	2765.4+x	(29/2$^+$)			
		470.6 *8*	10 *2*	2730.25+x	(29/2$^+$)	Q		
3222.5+x	(33/2$^-$)	275.0 *8*	1.1 *3*	2947.5+x	(31/2$^-$)	D		
		658.1 *8*	2.5 *8*	2564.38+x	(29/2$^-$)			
		687.3 *5*	100 *25*	2535.23+x	(29/2$^-$)	Q		
3224.2+x	(33/2$^+$)	471.0 *5*	100	2753.45+x	(29/2$^+$)	Q		

$^{165}_{71}Lu_{94}$-12

Adopted Levels, Gammas (continued)

γ(^{165}Lu) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[@]	Comments
3239.7+x	(33/2$^+$)	445.28 *24*	100 *5*	2794.4+x	(29/2$^+$)	Q		
		486.4 *4*	60 *9*	2753.45+x	(29/2$^+$)	Q		
3248.59+x	(35/2$^-$)	209.7 *1*	100 *8*	3038.95+x	(33/2$^-$)	D+Q	+0.07 *3*	
		301.1 *8*	1.9 *6*	2947.5+x	(31/2$^-$)	Q		
		459.1 *1*	44 *3*	2789.38+x	(31/2$^-$)	Q		
3417.32+x	(35/2$^+$)	214.1 *3*	11 *8*	3201.8+x	(33/2$^+$)	D		E_γ: poor fit; level-energy difference=215.5.
		237.23 *14*	100 *9*	3180.45+x	(33/2$^+$)	D		
		449.0 *5*	66 *17*	2968.4+x	(31/2$^+$)	Q		
		460.51 *15*	100 *9*	2956.70+x	(31/2$^+$)	Q		
3436.61+x	(35/2$^+$)	235.6 *3*	100 *15*	3201.8+x	(33/2$^+$)	D		
		468.2 *5*	58 *14*	2968.4+x	(31/2$^+$)	Q		
		479.83 *17*	68.0 *17*	2956.70+x	(31/2$^+$)	Q		
3471.6+x	(35/2$^+$)	472.0 *5*	100	2999.6+x	(31/2$^+$)	Q		
3475.30+x	(37/2$^-$)	226.8 *1*	100 *9*	3248.59+x	(35/2$^-$)	D+Q	+0.09 *2*	
		436.4 *1*	40 *3*	3038.95+x	(33/2$^-$)	Q		
3485.1+x	(35/2$^-$)	262.6 *5*	43 *11*	3222.5+x	(33/2$^-$)			
		537.6 *8*	20 *6*	2947.5+x	(31/2$^-$)			
		695.7 *3*	100 *25*	2789.38+x	(31/2$^-$)	Q		
3602.3+x	(35/2$^-$)	535.1 *5*	100	3067.2+x	(31/2$^-$)	Q		
3682.55+x	(37/2$^+$)	265.33 *14*	60.4 *14*	3417.32+x	(35/2$^+$)	D		
		502.04 *16*	100.0 *25*	3180.45+x	(33/2$^+$)	Q		
3705.3+x	(37/2$^+$)	268.63 *20*	100	3436.61+x	(35/2$^+$)	D		
3735.3+x	(39/2$^-$)	260.0 *1*	100 *7*	3475.30+x	(37/2$^-$)			
		486.6 *1*	53 *4*	3248.59+x	(35/2$^-$)	Q		
3754.1+x	(37/2$^+$)	530.1 *5*	100	3224.2+x	(33/2$^+$)	Q		
3764.2+x	(37/2$^+$)	524.44 *20*	100	3239.7+x	(33/2$^+$)	Q		
3824.1+x	(37/2$^-$)	339.0 *5*	100 *25*	3485.1+x	(35/2$^-$)	D		
		601.6 *5*	100 *25*	3222.5+x	(33/2$^-$)	Q		
		628.8 *8*	42 *13*	3195.3+x	(33/2$^-$)	Q		
3853.7+x	(37/2$^-$)	658.4 *5*	100	3195.3+x	(33/2$^-$)	Q		
3863.9+x	(35/2$^+$)	624.4		3239.7+x	(33/2$^+$)			
3970.2+x	(39/2$^+$)	287.6 *5*	44 *3*	3682.55+x	(37/2$^+$)	D		
		552.9 *3*	100 *3*	3417.32+x	(35/2$^+$)	Q		
3981.10+x	(39/2$^+$)	275.2 *5*	22.7 *17*	3705.3+x	(37/2$^+$)	D		
		544.65 *15*	100.0 *24*	3436.61+x	(35/2$^+$)	Q		
		562.5 *4*	15.4 *21*	3417.32+x	(35/2$^+$)			E_γ: poor fit; level-energy difference=563.8.
4010.3+x	(41/2$^-$)	275.0 *1*	100 *9*	3735.3+x	(39/2$^-$)	D+Q	+0.06 *2*	
		535.1 *1*	94 *9*	3475.30+x	(37/2$^-$)	Q		
4034.6+x	(39/2$^+$)	563.0 *5*	100	3471.6+x	(35/2$^+$)	Q		
4117.1+x	(39/2$^-$)	292.9 *8*	52 *16*	3824.1+x	(37/2$^-$)	D		
		632.0 *5*	100 *24*	3485.1+x	(35/2$^-$)	Q		
4185.0+x	(39/2$^-$)	582.7 *5*	100	3602.3+x	(35/2$^-$)	Q		
4269.9+x	(41/2$^+$)	288.46 *15*	74 *3*	3981.10+x	(39/2$^+$)	D		

$^{165}_{71}Lu_{94}$-13

Adopted Levels, Gammas (continued)

γ(^{165}Lu) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[@]	Comments
4269.9+x	(41/2$^+$)	299.8 *5*	80 *15*	3970.2+x	(39/2$^+$)	D		
		564.8 *8*	10 *3*	3705.3+x	(37/2$^+$)			
		587.46 *21*	100 *5*	3682.55+x	(37/2$^+$)			
4290.5+x	(41/2$^+$)	309.4 *8*	26 *8*	3981.10+x	(39/2$^+$)			
		608.0 *5*	100 *26*	3682.55+x	(37/2$^+$)	Q		
4322.3+x	(43/2$^-$)	312.0 *1*	100 *8*	4010.3+x	(41/2$^-$)	D+Q	+0.19 *3*	
		586.8 *1*	81 *7*	3735.3+x	(39/2$^-$)	Q		
4346.6+x	(41/2$^+$)	582.36 *18*	100 *25*	3764.2+x	(37/2$^+$)	Q		
		592.7 *8*	25 *7*	3754.1+x	(37/2$^+$)			
4373.4+x	(41/2$^+$)	608.8 *8*	34 *11*	3764.2+x	(37/2$^+$)			
		619.4 *5*	100 *25*	3754.1+x	(37/2$^+$)	Q		
4402.6+x	(39/2$^+$)	538.9 *8*	100 *29*	3863.9+x	(35/2$^+$)			
		638.2 *8*	41 *12*	3764.2+x	(37/2$^+$)			
4453.6+x	(41/2$^-$)	336.6 *8*	27 *8*	4117.1+x	(39/2$^-$)			
		629.6 *5*	100 *26*	3824.1+x	(37/2$^-$)	Q		
4490.7+x	(41/2$^-$)	637.1 *5*	100	3853.7+x	(37/2$^-$)	Q		
4575.3+x	(41/2$^-$)	840.0[b] *8*	100	3735.3+x	(39/2$^-$)			
4579.3+x	(43/2$^+$)	309.08 *20*	44 *4*	4269.9+x	(41/2$^+$)	D		
		598.55 *15*	100.0 *24*	3981.10+x	(39/2$^+$)	Q		
		609.3 *5*	49 *3*	3970.2+x	(39/2$^+$)	Q		
4613.9+x	(43/2$^+$)	643.7 *3*	100	3970.2+x	(39/2$^+$)	Q		
4645.2+x	(45/2$^-$)	322.7 *1*	84 *7*	4322.3+x	(43/2$^-$)	D		
		635.2 *1*	100 *8*	4010.3+x	(41/2$^-$)	Q		
4686.6+x	(43/2$^+$)	652.0 *5*	100	4034.6+x	(39/2$^+$)	Q		
4773.5+x	(43/2$^-$)	320.1 *8*	37 *11*	4453.6+x	(41/2$^-$)	D		
		656.3 *5*	100 *24*	4117.1+x	(39/2$^-$)	Q		
4800.4+x	(43/2$^-$)	615.4 *5*	100	4185.0+x	(39/2$^-$)	Q		
4888.6+x	(45/2$^+$)	309.36 *15*	100 *15*	4579.3+x	(43/2$^+$)	D		
		618.51 *15*	100 *15*	4269.9+x	(41/2$^+$)	Q		
4960.5+x	(45/2$^+$)	346.6 *8*	60 *17*	4613.9+x	(43/2$^+$)	D		
		670.0 *5*	100 *26*	4290.5+x	(41/2$^+$)	Q		
		690.5 *8*	43 *13*	4269.9+x	(41/2$^+$)			
4987.9+x	(45/2$^+$)	641.3 *5*	100	4346.6+x	(41/2$^+$)	Q		
4996.5+x	(47/2$^-$)	351.2 *3*	67 *10*	4645.2+x	(45/2$^-$)	D		
		674.1 *1*	100 *8*	4322.3+x	(43/2$^-$)	Q		B(E2)(W.u.)<240
5000.7+x	(43/2$^+$)	598.0 *8*	100 *30*	4402.6+x	(39/2$^+$)			
		654.1 *8*	27 *8*	4346.6+x	(41/2$^+$)			
5068.2+x	(45/2$^+$)	694.8 *5*	100	4373.4+x	(41/2$^+$)	Q		
5115.7+x	(45/2$^-$)	625.0 *8*	35 *10*	4490.7+x	(41/2$^-$)			
		662.0 *5*	100 *26*	4453.6+x	(41/2$^-$)	Q		
5145.2+x	(45/2$^-$)	654.5 *5*	100	4490.7+x	(41/2$^-$)	Q		
5174.2+x	(45/2$^-$)	598.8 *5*	100	4575.3+x	(41/2$^-$)			
5220.7+x	(47/2$^+$)	331.9 *3*	88 *13*	4888.6+x	(45/2$^+$)	D		

$^{165}_{71}Lu_{94}$-14

Adopted Levels, Gammas (continued)

γ(^{165}Lu) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[@]	Comments
5220.7+x	(47/2$^+$)	641.4 *3*	100 *15*	4579.3+x	(43/2$^+$)	Q		
5325.9+x	(47/2$^+$)	712.0 *5*	100	4613.9+x	(43/2$^+$)	Q		
5363.9+x	(49/2$^-$)	367.2 *3*	46 *7*	4996.5+x	(47/2$^-$)	D		
		718.7 *1*	100 *8*	4645.2+x	(45/2$^-$)	Q		
5393.6+x	(47/2$^+$)	707.0 *5*	100	4686.6+x	(43/2$^+$)	Q		
5435.6+x	(47/2$^+$)	749.0 *8*	100	4686.6+x	(43/2$^+$)	Q		
5446.7+x	(47/2$^-$)	331.0[b] *8*	25 *8*	5115.7+x	(45/2$^-$)			
		646.3 *5*	100 *25*	4800.4+x	(43/2$^-$)	Q		
5448.8+x	(45/2$^+$)	661.3 *8*	100	4787.5+x	(41/2$^+$)			
		1102.2[b]		4346.6+x	(41/2$^+$)			
5475.8+x	(47/2$^-$)	702.31 *5*	100	4773.5+x	(43/2$^-$)	Q		
5539.5+x	(49/2$^+$)	318.6 *3*	84 *12*	5220.7+x	(47/2$^+$)	D		
		651.1 *3*	100 *15*	4888.6+x	(45/2$^+$)	Q		
5655.8+x	(47/2$^+$)	655.1 *8*	100 *29*	5000.7+x	(43/2$^+$)			
		667.9 *8*	27 *8*	4987.9+x	(45/2$^+$)	(E2+M1)[&]	+3.1[&] *4*	
5684.7+x	(49/2$^+$)	696.8 *5*	100	4987.9+x	(45/2$^+$)	Q		
5695.5+x	(49/2$^+$)	735.0 *5*	100	4960.5+x	(45/2$^+$)	Q		
5740.6+x	(51/2$^-$)	377.0 *5*	51 *13*	5363.9+x	(49/2$^-$)	D		
		743.9 *3*	100 *15*	4996.5+x	(47/2$^-$)	Q		B(E2)(W.u.)<240
5786.5+x	(49/2$^-$)	339.8 *8*	38 *12*	5446.7+x	(47/2$^-$)			
		670.8 *8*	100 *31*	5115.7+x	(45/2$^-$)	Q		
5823.2+x	(49/2$^+$)	755.0 *5*	100 *27*	5068.2+x	(45/2$^+$)	Q		
5825.4+x	(49/2$^-$)	349.5 *8*	42 *12*	5475.8+x	(47/2$^-$)			
		651.2 *5*	100 *24*	5174.2+x	(45/2$^-$)			
5845.2+x	(49/2$^-$)	700.0 *8*	100	5145.2+x	(45/2$^-$)	Q		
5861.0+x	(49/2$^-$)	715.8[b] *8*	100	5145.2+x	(45/2$^-$)			
5899.8+x	(51/2$^+$)	360.1 *5*	92 *23*	5539.5+x	(49/2$^+$)	(D)		
		679.2 *5*	100 *26*	5220.7+x	(47/2$^+$)	Q		
6080.9+x	(51/2$^+$)	687.2 *8*	36 *11*	5393.6+x	(47/2$^+$)			
		755.0 *5*	100 *24*	5325.9+x	(47/2$^+$)	Q		
6101.7+x	(51/2$^+$)	708.1 *8*	14 *5*	5393.6+x	(47/2$^+$)			
		775.8 *5*	100 *26*	5325.9+x	(47/2$^+$)	Q		
6138.1+x	(51/2$^-$)	351.5 *8*	32 *10*	5786.5+x	(49/2$^-$)			
		691.4 *5*	100 *3*	5446.7+x	(47/2$^-$)	Q		
6147.1+x	(53/2$^-$)	406.0 *5*	46 *12*	5740.6+x	(51/2$^-$)	D		
		783.3 *3*	100 *15*	5363.9+x	(49/2$^-$)	Q		B(E2)(W.u.)=180 *+40−30*
6154.8+x	(49/2$^+$)	706.0 *8*	100	5448.8+x	(45/2$^+$)			
		1166.9[b]		4987.9+x	(45/2$^+$)			
6178.7+x	(51/2$^-$)	352.8 *8*	29 *10*	5825.4+x	(49/2$^-$)			
		703.0 *5*	100 *24*	5475.8+x	(47/2$^-$)	Q		
6188.6+x	(51/2$^+$)	753.0 *8*	100 *31*	5435.6+x	(47/2$^+$)	Q		
		795.0 *8*	69 *23*	5393.6+x	(47/2$^+$)	Q		

$^{165}_{71}Lu_{94}$-15

Adopted Levels, Gammas (continued)

γ(^{165}Lu) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[@]
6236.2+x	(53/2$^+$)	336.0 *5*	72 *18*	5899.8+x	(51/2$^+$)	D	
		696.7 *3*	100 *15*	5539.5+x	(49/2$^+$)	Q	
6367.2+x	(51/2$^+$)	682.5 *8*	6 *2*	5684.7+x	(49/2$^+$)	(E2+M1)[&]	+3.1[&] *4*
		711.4 *8*	100 *31*	5655.8+x	(47/2$^+$)	Q	
6434.9+x	(53/2$^+$)	750.2 *5*	100	5684.7+x	(49/2$^+$)	Q	
6448.5+x	(53/2$^+$)	367.6 *8*	86 *24*	6080.9+x	(51/2$^+$)		
		753.0 *8*	100 *29*	5695.5+x	(49/2$^+$)	Q	
6507.6+x	(53/2$^-$)	369.4 *8*	44 *13*	6138.1+x	(51/2$^-$)		
		721.2 *5*	100 *26*	5786.5+x	(49/2$^-$)	Q	
6511.5+x	(53/2$^+$)	816.0 *8*	100	5695.5+x	(49/2$^+$)	Q	
6539.2+x	(55/2$^-$)	391.8 *5*	41 *25*	6147.1+x	(53/2$^-$)	D	
		798.7 *3*	100 *15*	5740.6+x	(51/2$^-$)	Q	
6552.5+x	(53/2$^-$)	373.5 *8*	24 *10*	6178.7+x	(51/2$^-$)		
		727.3 *8*	100 *29*	5825.4+x	(49/2$^-$)		
6608.7+x	(53/2$^-$)	763.5 *8*	100	5845.2+x	(49/2$^-$)	Q	
6612.7+x	(53/2$^+$)	789.5 *8*	100	5823.2+x	(49/2$^+$)	Q	
6632.2+x	(55/2$^+$)	395.8 *5*	94 *23*	6236.2+x	(53/2$^+$)	D	
		732.9 *5*	100 *25*	5899.8+x	(51/2$^+$)	Q	
6642.3+x	(53/2$^-$)	781.3 *8*	100	5861.0+x	(49/2$^-$)		
6841.9+x	(55/2$^+$)	393.4 *8*	63 *21*	6448.5+x	(53/2$^+$)		
		761.0 *8*	100 *30*	6080.9+x	(51/2$^+$)	Q	
6886.7+x	(55/2$^-$)	378.9 *8*	38 *11*	6507.6+x	(53/2$^-$)		
		748.6 *5*	100 *25*	6138.1+x	(51/2$^-$)	Q	
6903.6+x	(53/2$^+$)	748.8 *8*	100	6154.8+x	(49/2$^+$)		
		1218.9[b]		5684.7+x	(49/2$^+$)		
6907.6+x	(55/2$^+$)	805.9 *8*	100 *31*	6101.7+x	(51/2$^+$)	Q	
		826.7 *8*	8 *4*	6080.9+x	(51/2$^+$)		
6947.3+x	(55/2$^-$)	394.8 *8*	25 *8*	6552.5+x	(53/2$^-$)		
		768.6 *8*	100 *33*	6178.7+x	(51/2$^-$)	Q	
6982.4+x	(57/2$^-$)	442.9 *5*	27 *6*	6539.2+x	(55/2$^-$)	D	
		835.4 *3*	100 *15*	6147.1+x	(53/2$^-$)	Q	
6994.6+x	(55/2$^+$)	806.0 *8*	100	6188.6+x	(51/2$^+$)	Q	
6998.0+x	(57/2$^+$)	365.9 *5*	42 *11*	6632.2+x	(55/2$^+$)	D	
		761.4 *5*	100 *25*	6236.2+x	(53/2$^+$)	Q	
7132.9+x	(55/2$^+$)	697.9 *8*	21 *6*	6434.9+x	(53/2$^+$)		
		765.7 *8*	100 *29*	6367.2+x	(51/2$^+$)	Q	
7238.2+x	(57/2$^+$)	803.3 *5*	100	6434.9+x	(53/2$^+$)	Q	
7240.5+x	(57/2$^+$)	398.6 *8*	95 *30*	6841.9+x	(55/2$^+$)		
		792.0 *8*	100 *32*	6448.5+x	(53/2$^+$)	Q	
7288.1+x	(57/2$^-$)	401.4 *8*	34 *10*	6886.7+x	(55/2$^-$)		
		780.4 *5*	100 *24*	6507.6+x	(53/2$^-$)	Q	
7338.5+x	(57/2$^+$)	827.0 *8*	100	6511.5+x	(53/2$^+$)	Q	

$^{165}_{71}Lu_{94}$-16

Adopted Levels, Gammas (continued)

γ(^{165}Lu) (continued)

E_i(level)	J_i^π	E_γ †	I_γ ‡	E_f	J_f^π	Mult.#
7354.9+x	(57/2$^-$)	407.5[b] *8*	21 *7*	6947.3+x	(55/2$^-$)	
		802.5 *8*	100 *29*	6552.5+x	(53/2$^-$)	
7383.6+x	(59/2$^-$)	401.2 *5*	35 *9*	6982.4+x	(57/2$^-$)	
		844.5 *3*	100 *15*	6539.2+x	(55/2$^-$)	Q
7417.6+x	(57/2$^+$)	804.9 *8*	100	6612.7+x	(53/2$^+$)	
7431.3+x	(57/2$^-$)	822.6 *8*	100	6608.7+x	(53/2$^-$)	Q
7439.1+x	(59/2$^+$)	442.0 *8*	27 *7*	6998.0+x	(57/2$^+$)	
		806.9 *5*	100 *25*	6632.2+x	(55/2$^+$)	Q
7467.1+x	(57/2$^-$)	824.8 *8*	100	6642.3+x	(53/2$^-$)	Q
7677.9+x	(59/2$^+$)	437.4 *8*	72 *20*	7240.5+x	(57/2$^+$)	
		836.0 *8*	100 *32*	6841.9+x	(55/2$^+$)	Q
7693.9+x	(59/2$^-$)	405.9 *8*	28 *9*	7288.1+x	(57/2$^-$)	
		807.3 *5*	100 *25*	6886.7+x	(55/2$^-$)	Q
7702.3+x	(57/2$^+$)	798.7 *8*	100	6903.6+x	(53/2$^+$)	
7760.3+x	(59/2$^+$)	852.7 *8*	100	6907.6+x	(55/2$^+$)	
7788.7+x	(59/2$^-$)	841.4 *8*	100	6947.3+x	(55/2$^-$)	Q
7837.4+x	(61/2$^+$)	398.6 *5*	51 *12*	7439.1+x	(59/2$^+$)	D
		839.50 *5*	100 *25*	6998.0+x	(57/2$^+$)	Q
7841.6+x	(59/2$^+$)	847.0 *8*	100	6994.6+x	(55/2$^+$)	Q
7864.3+x	(61/2$^-$)	881.6 *5*	100	6982.4+x	(57/2$^-$)	Q
7952.7+x	(59/2$^+$)	819.9 *8*	100	7132.9+x	(55/2$^+$)	Q
8093.9+x	(61/2$^+$)	855.7 *8*	100	7238.2+x	(57/2$^+$)	Q
8114.5+x	(61/2$^+$)	436.6 *8*	24 *8*	7677.9+x	(59/2$^+$)	
		874.0 *8*	100 *32*	7240.5+x	(57/2$^+$)	Q
8128.0+x	(61/2$^-$)	434.0 *8*	16 *5*	7693.9+x	(59/2$^-$)	
		839.9 *5*	100 *26*	7288.1+x	(57/2$^-$)	Q
8212.5+x	(61/2$^+$)	874.0 *8*	100	7338.5+x	(57/2$^+$)	Q
8227.1+x	(61/2$^-$)	872.2 *8*	100	7354.9+x	(57/2$^-$)	
8257.4+x	(61/2$^+$)	839.8 *8*	100	7417.6+x	(57/2$^+$)	
8269.6+x	(63/2$^-$)	405.0 *5*	34 *9*	7864.3+x	(61/2$^-$)	D
		886.2 *5*	100 *25*	7383.6+x	(59/2$^-$)	Q
8312.3+x	(61/2$^-$)	881.0 *8*	100	7431.3+x	(57/2$^-$)	Q
8330.8+x	(63/2$^+$)	493.2 *8*	52 *16*	7837.4+x	(61/2$^+$)	
		891.7 *5*	100 *33*	7439.1+x	(59/2$^+$)	Q
8336.8+x	(61/2$^-$)	869.7 *8*	100	7467.1+x	(57/2$^-$)	
8551.9+x	(61/2$^+$)	849.6 *8*	100	7702.3+x	(57/2$^+$)	
8557.0+x	(63/2$^-$)	863.1 *8*	100	7693.9+x	(59/2$^-$)	
8584.9+x	(63/2$^+$)	470.4 *8*	17 *5*	8114.5+x	(61/2$^+$)	
		907.0 *8*	100 *30*	7677.9+x	(59/2$^+$)	Q
8660.4+x	(63/2$^+$)	900.1 *8*	100	7760.3+x	(59/2$^+$)	Q
8692.0+x	(63/2$^-$)	903.2 *8*	100	7788.7+x	(59/2$^-$)	Q
8733.6+x	(63/2$^+$)	892.0 *8*	100	7841.6+x	(59/2$^+$)	Q
8754.7+x	(65/2$^+$)	917.2 *5*	100	7837.4+x	(61/2$^+$)	Q
8795.3+x	(65/2$^-$)	931.0 *5*	100	7864.3+x	(61/2$^-$)	Q
8824.9+x	(63/2$^+$)	872.1 *8*	100	7952.7+x	(59/2$^+$)	Q
9002.8+x	(65/2$^+$)	908.9 *8*	100	8093.9+x	(61/2$^+$)	Q
9028.0+x	(65/2$^-$)	900.1 *5*	100	8128.0+x	(61/2$^-$)	Q
9067.5+x	(65/2$^+$)	953.0 *8*	100	8114.5+x	(61/2$^+$)	
9133.5+x	(65/2$^+$)	921.0 *8*	100	8212.5+x	(61/2$^+$)	
9156.0+x	(65/2$^-$)	928.9 *8*	100	8227.1+x	(61/2$^-$)	
9160.2+x	(65/2$^+$)	902.8 *8*	100	8257.4+x	(61/2$^+$)	
9199.0+x	(67/2$^-$)	929.4 *5*	100	8269.6+x	(63/2$^-$)	Q
9242.6+x	(65/2$^-$)	930.2 *8*	100	8312.3+x	(61/2$^-$)	
9265.1+x	(65/2$^-$)	928.3 *8*	100	8336.8+x	(61/2$^-$)	
9308.7+x	(67/2$^+$)	977.9 *5*	100	8330.8+x	(63/2$^+$)	
9456.6+x	(65/2$^+$)	904.7 *8*	100	8551.9+x	(61/2$^+$)	
9475.3+x	(67/2$^-$)	918.2 *8*	100	8557.0+x	(63/2$^-$)	
9544.9+x	(67/2$^+$)	960.0 *8*	100	8584.9+x	(63/2$^+$)	Q
9607.1+x	(67/2$^+$)	946.7 *8*	100	8660.4+x	(63/2$^+$)	
9643.2+x	(67/2$^-$)	951.2 *8*	100	8692.0+x	(63/2$^-$)	Q
9671.6+x	(67/2$^+$)	938.0 *8*	100	8733.6+x	(63/2$^+$)	
9742.6+x	(69/2$^+$)	987.9 *5*	100	8754.7+x	(65/2$^+$)	Q
9751.5+x	(67/2$^+$)	926.6 *8*	100	8824.9+x	(63/2$^+$)	Q
9781.3+x	(69/2$^-$)	986.0 *5*	100	8795.3+x	(65/2$^-$)	Q
9965.8+x	(69/2$^+$)	963.0 *8*	100	9002.8+x	(65/2$^+$)	Q
9991.2+x	(69/2$^-$)	963.1 *8*	100	9028.0+x	(65/2$^-$)	
10072.5+x	(69/2$^+$)	1005.0 *8*	100	9067.5+x	(65/2$^+$)	
10107.5+x	(69/2$^+$)	974.0 *8*	100	9133.5+x	(65/2$^+$)	
10129.5+x	(69/2$^-$)	973.5 *8*	100	9156.0+x	(65/2$^-$)	
10175.4+x	(71/2$^-$)	976.4 *5*	100	9199.0+x	(67/2$^-$)	Q
10207.7+x	(69/2$^-$)	965.1 *8*	100	9242.6+x	(65/2$^-$)	
10367.1+x	(71/2$^+$)	1058.4 *5*	100	9308.7+x	(67/2$^+$)	
10414.1+x	(69/2$^+$)	957.5 *8*	100	9456.6+x	(65/2$^+$)	
10449.1+x	(71/2$^-$)	973.9 *8*	100	9475.3+x	(67/2$^-$)	
10546.9+x	(71/2$^+$)	1002.0 *8*	100	9544.9+x	(67/2$^+$)	Q
10594.0+x	(71/2$^+$)	986.9 *8*	100	9607.1+x	(67/2$^+$)	
10645.1+x	(71/2$^-$)	1001.9 *8*	100	9643.2+x	(67/2$^-$)	
10646.6+x	(71/2$^+$)	975.0 *8*	100	9671.6+x	(67/2$^+$)	
10732.6+x	(71/2$^+$)	981.1 *8*	100	9751.5+x	(67/2$^+$)	Q
10793.8+x	(73/2$^+$)	1051.2 *8*	100	9742.6+x	(69/2$^+$)	
10827.3+x	(73/2$^-$)	1046.0 *8*	100	9781.3+x	(69/2$^-$)	
10985.1+x	(73/2$^+$)	1019.3 *8*	100	9965.8+x	(69/2$^+$)	
11017.5+x	(73/2$^-$)	1026.3 *8*	100	9991.2+x	(69/2$^-$)	
11142.3+x	(73/2$^-$)	1012.8 *8*	100	10129.5+x	(69/2$^-$)	
11194.1+x	(73/2$^-$)	986.4 *8*	100	10207.7+x	(69/2$^-$)	
11202.0+x	(75/2$^-$)	1026.6 *5*	100	10175.4+x	(71/2$^-$)	Q

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Adopted Levels, Gammas (continued)

γ(^{165}Lu) (continued)

E_i(level)	J_i^π	E_γ †	I_γ ‡	E_f	J_f^π	Mult.#
11425.2+x	(73/2$^+$)	1011.1 *8*	100	10414.1+x	(69/2$^+$)	
11477.3+x	(75/2$^-$)	1028.1 *8*	100	10449.1+x	(71/2$^-$)	
11496.8+x	(75/2$^+$)	1129.7 *8*	100	10367.1+x	(71/2$^+$)	
11582.9+x	(75/2$^+$)	1036.0 *8*	100	10546.9+x	(71/2$^+$)	Q
11612.2+x	(75/2$^+$)	1018.2 *8*	100	10594.0+x	(71/2$^+$)	
11656.6+x	(75/2$^+$)	1010.0 *8*	100	10646.6+x	(71/2$^+$)	
11684.1+x	(75/2$^-$)	1039.0 *8*	100	10645.1+x	(71/2$^-$)	
11767.7+x	(75/2$^+$)	1035.1 *8*	100	10732.6+x	(71/2$^+$)	
11899.2+x	(77/2$^+$)	1105.4 *8*	100	10793.8+x	(73/2$^+$)	
11936.2+x	(77/2$^-$)	1108.9 *8*	100	10827.3+x	(73/2$^-$)	
12061.4+x	(77/2$^+$)	1076.3 *8*	100	10985.1+x	(73/2$^+$)	
12105.5+x	(77/2$^-$)	1088.0 *8*	100	11017.5+x	(73/2$^-$)	
12190.1+x	(77/2$^-$)	1047.8 *8*	100	11142.3+x	(73/2$^-$)	
12215.8+x	(77/2$^-$)	1021.7 *8*	100	11194.1+x	(73/2$^-$)	
12278.0+x	(79/2$^-$)	1076.0 *8*	100	11202.0+x	(75/2$^-$)	Q
12484.3+x	(77/2$^+$)	1059.1 *8*	100	11425.2+x	(73/2$^+$)	
12558.9+x	(79/2$^-$)	1081.6 *8*	100	11477.3+x	(75/2$^-$)	
12643.9+x	(79/2$^+$)	1061.0 *8*	100	11582.9+x	(75/2$^+$)	
12649.9+x	(79/2$^+$)	1037.7 *8*	100	11612.2+x	(75/2$^+$)	
12678.8+x	(79/2$^+$)	1182.0 *8*	100	11496.8+x	(75/2$^+$)	
12720.6+x	(79/2$^+$)	1064.0 *8*	100	11656.6+x	(75/2$^+$)	
12857.3+x	(79/2$^+$)	1089.6 *8*	100	11767.7+x	(75/2$^+$)	
13041.4+x	(81/2$^+$)	1142.2 *8*	100	11899.2+x	(77/2$^+$)	
13102.7+x	(81/2$^-$)	1166.5 *8*	100	11936.2+x	(77/2$^-$)	
13194.8+x	(81/2$^+$)	1133.4 *8*	100	12061.4+x	(77/2$^+$)	
13245.2+x	(81/2$^-$)	1139.7 *8*	100	12105.5+x	(77/2$^-$)	
13399.7+x	(83/2$^-$)	1121.7 *8*	100	12278.0+x	(79/2$^-$)	Q
13591.8+x	(81/2$^+$)	1107.4 *8*	100	12484.3+x	(77/2$^+$)	
13686.6+x	(83/2$^-$)	1127.7 *8*	100	12558.9+x	(79/2$^-$)	
13714.9+x	(83/2$^+$)	1065.0 *8*	100	12649.9+x	(79/2$^+$)	
13829.6+x	(83/2$^+$)	1109.0 *8*	100	12720.6+x	(79/2$^+$)	
14008.3+x	(83/2$^+$)	1151.0 *8*	100	12857.3+x	(79/2$^+$)	
14199.9+x	(85/2$^+$)	1158.5 *8*	100	13041.4+x	(81/2$^+$)	
14384.1+x	(85/2$^+$)	1189.3 *8*	100	13194.8+x	(81/2$^+$)	
14558.5+x	(87/2$^-$)	1158.8 *8*	100	13399.7+x	(83/2$^-$)	
14849.1+x	(87/2$^-$)	1162.5 *8*	100	13686.6+x	(83/2$^-$)	
15208.1+x	(87/2$^+$)	1199.8 *8*	100	14008.3+x	(83/2$^+$)	
15623.4+x	(89/2$^+$)	1239.3 *8*	100	14384.1+x	(85/2$^+$)	
15745.5+x	(91/2$^-$)	1187.0[b] *8*	100	14558.5+x	(87/2$^-$)	
16462+x	(91/2$^+$)	1253.7[b] *8*	100	15208.1+x	(87/2$^+$)	
624.5+y	J+2	624.5 *8*	100	y	J	
1308.3+y	J+4	683.8 *8*	100	624.5+y	J+2	
2049.0+y	J+6	740.7 *8*	100	1308.3+y	J+4	
2847.3+y	J+8	798.3 *8*	100	2049.0+y	J+6	
3703.3+y	J+10	856.0 *8*	100	2847.3+y	J+8	
4618.9+y	J+12	915.6 *8*	100	3703.3+y	J+10	
5594.2+y	J+14	975.3 *8*	100	4618.9+y	J+12	
6631.2+y	J+16	1037.0 *8*	100	5594.2+y	J+14	
712.2+z	J1+2	712.2 *8*	100	z	J1	
1482.4+z	J1+4	770.2 *8*	100	712.2+z	J1+2	
2311.3+z	J1+6	828.9 *8*	100	1482.4+z	J1+4	
3197.1+z	J1+8	885.8 *8*	100	2311.3+z	J1+6	
4140.8+z	J1+10	943.7 *8*	100	3197.1+z	J1+8	
5143.3+z	J1+12	1002.5 *8*	100	4140.8+z	J1+10	
6206.3+z	J1+14	1063.0 *8*	100	5143.3+z	J1+12	

† From (^{31}P,4nγ) or (^{19}F,4nγ) for positive-parity states and from (^{16}O,4nγ) for negative-parity states. Uncertainty of 0.5 or 1 keV is assigned for gamma rays from (^{45}Sc,4nγ) only. For SD bands, many values are from ^{139}La(^{30}Si,4nγ).

‡ Weighted average of all available data. Large uncertainty implies that the values available from (^{31}P,4nγ) and (^{19}F,4nγ) have a fairly large deviation.

From DCO ratios In heavy-ion reactions such As (^{30}Si,4nγ) and (^{16}O,4nγ), mult=Q corresponds to ΔJ=2, stretched quadrupole (most likely E2) transition and mult=D corresponds to ΔJ=1, dipole (small quadrupole admixture is possible). The mult=E2 is from DCO ratio and application of RUL for levels of known lifetimes.

@ From (^{45}Sc,4nγ) for negative-parity states and from from (^{16}O,4nγ) for positive-parity states.

& From DCO. The other solution with dominant M1 component is excluded In analogy with ^{163}Lu transitions In SD bands.

a Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

b Placement of transition in the level scheme is uncertain.

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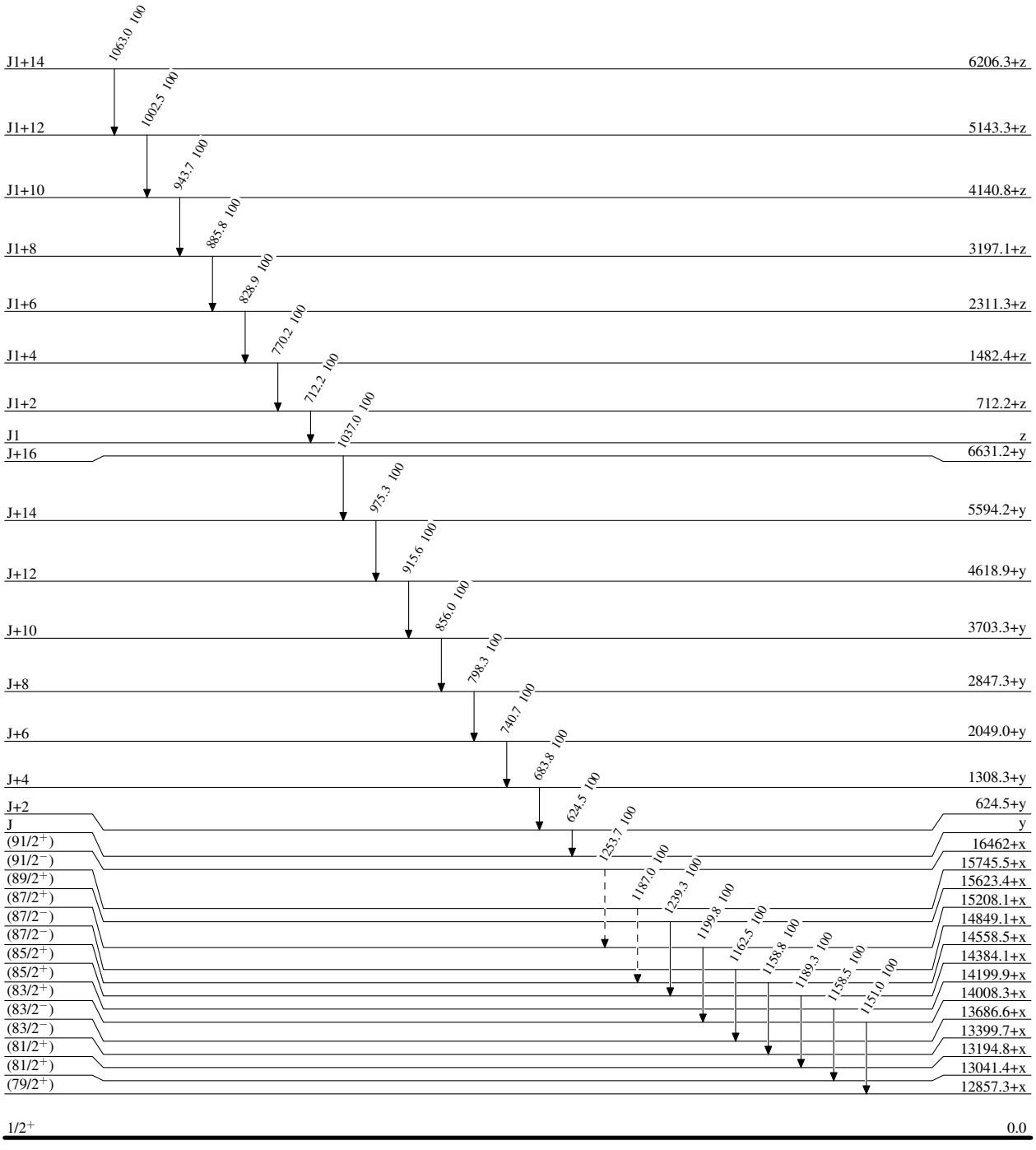
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

- - - - - - ► γ Decay (Uncertain)

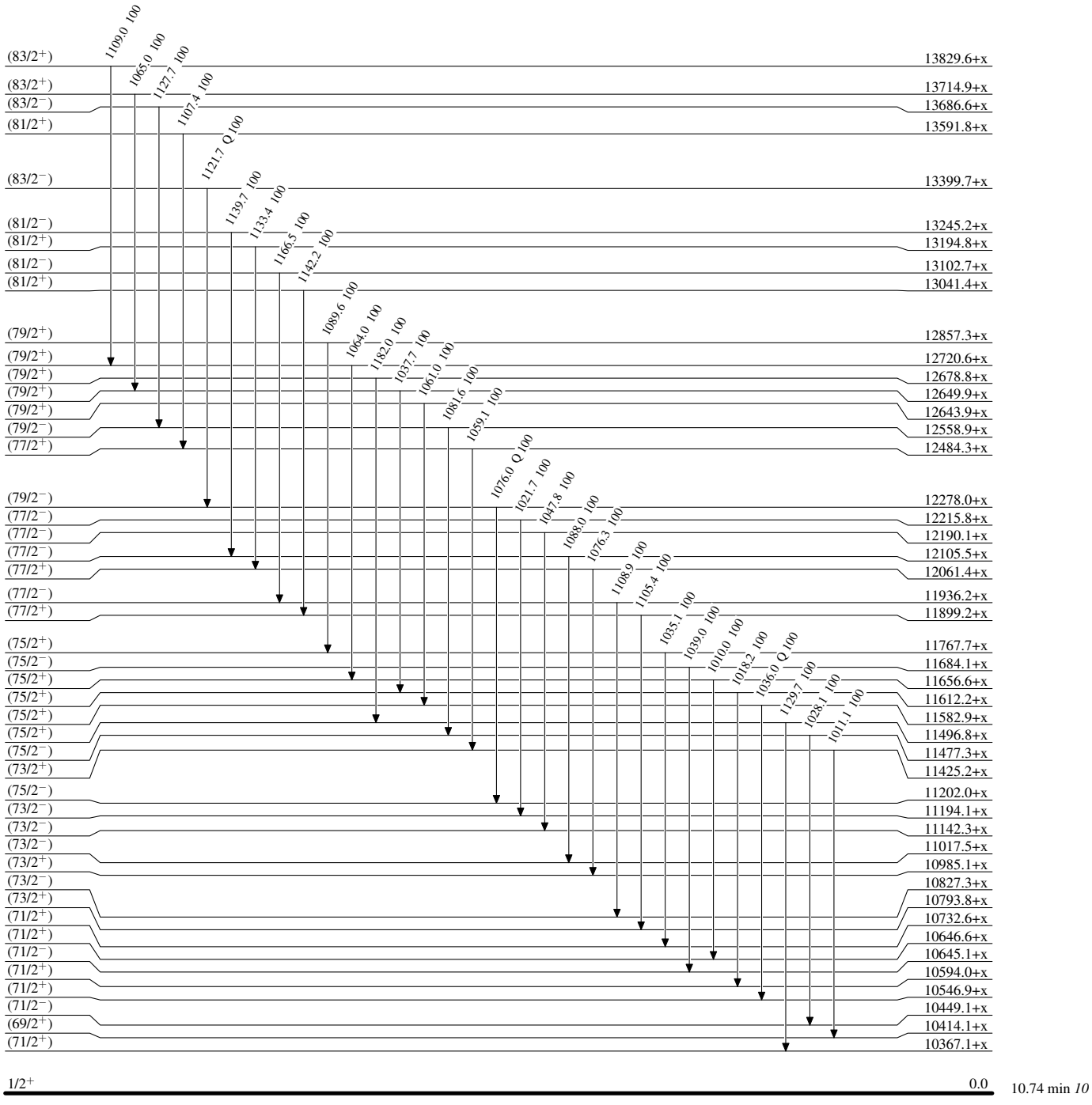


$^{165}_{71}Lu_{94}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

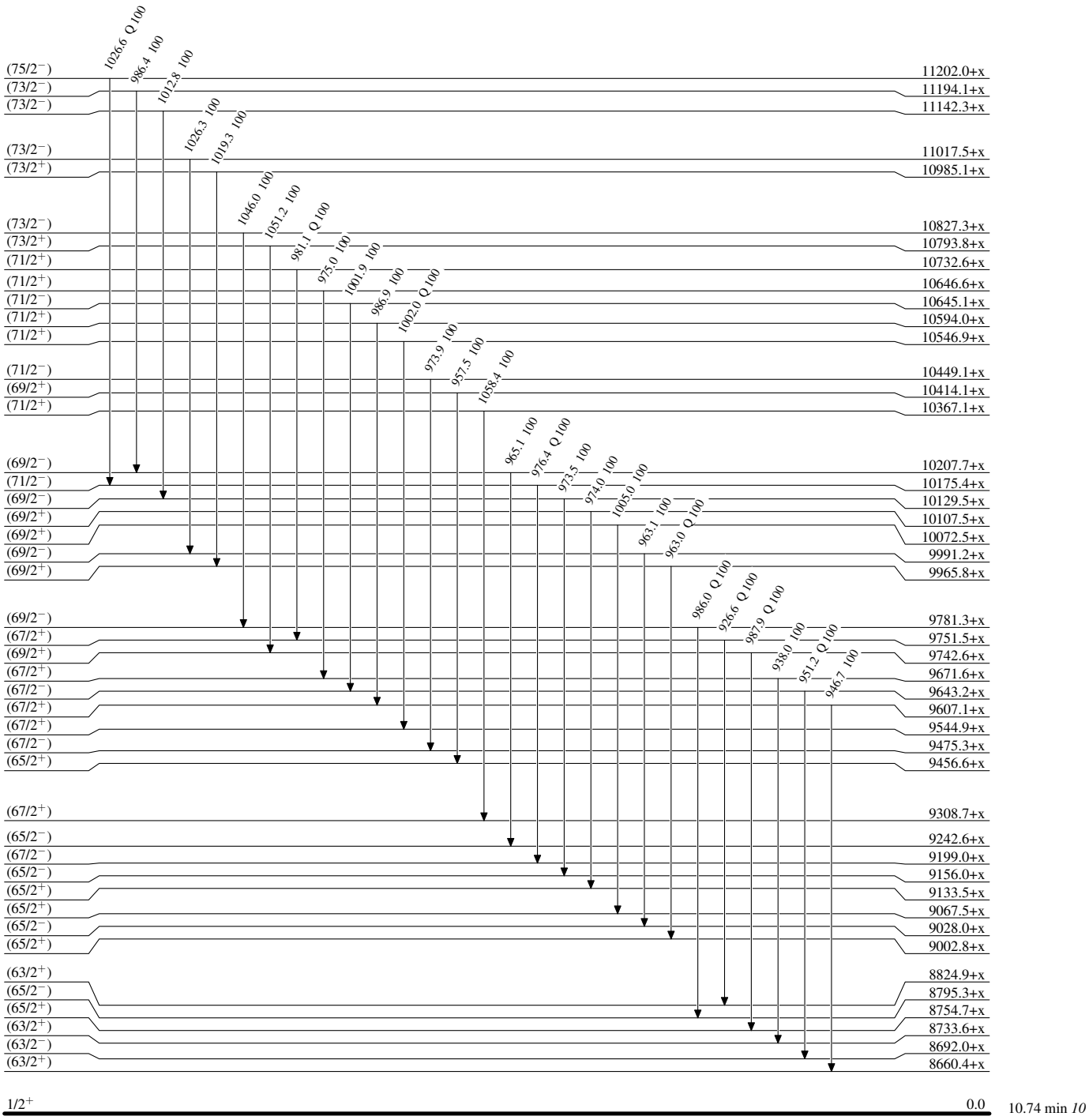


$^{165}_{71}Lu_{94}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

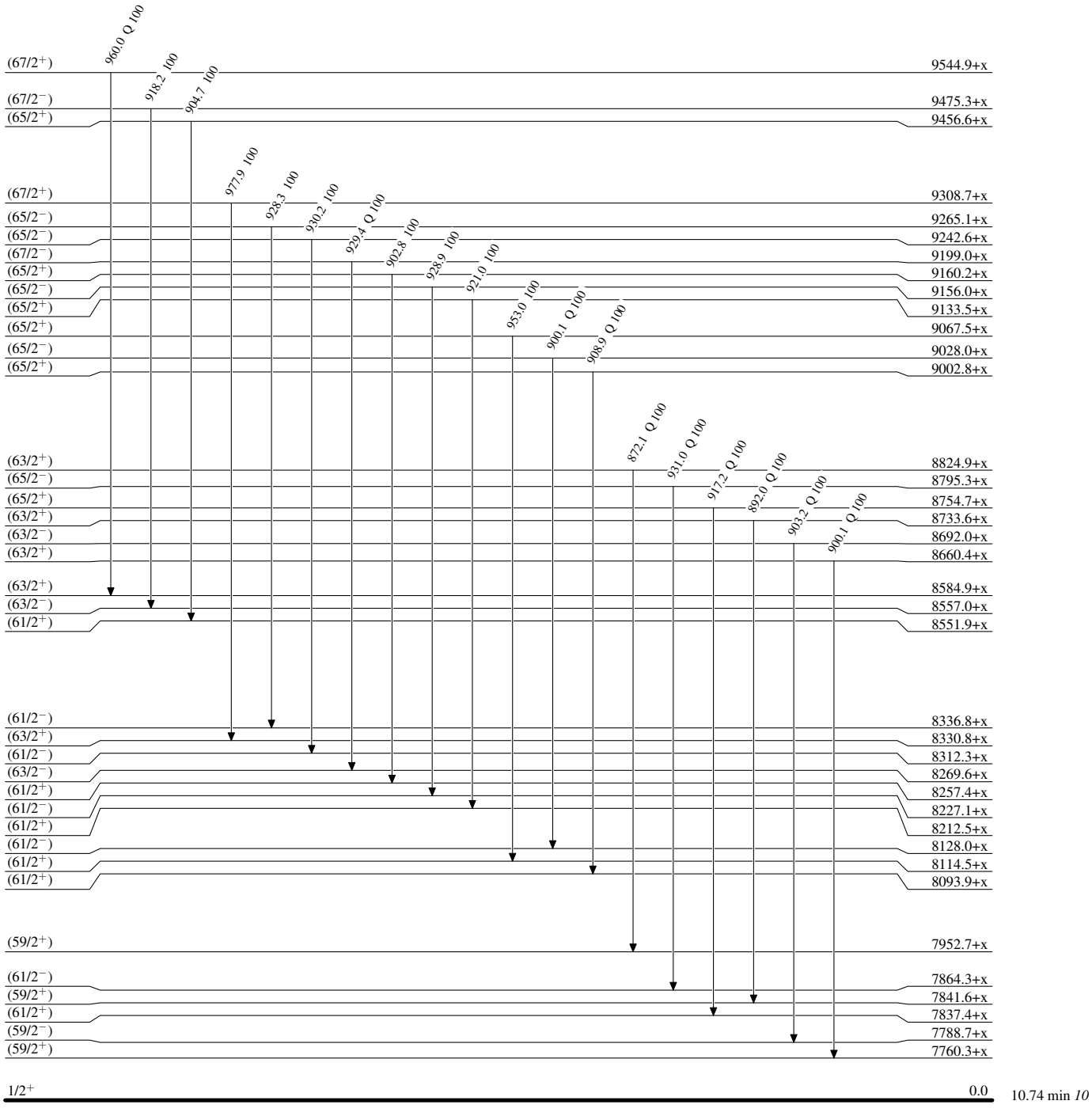


$^{165}_{71}Lu_{94}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

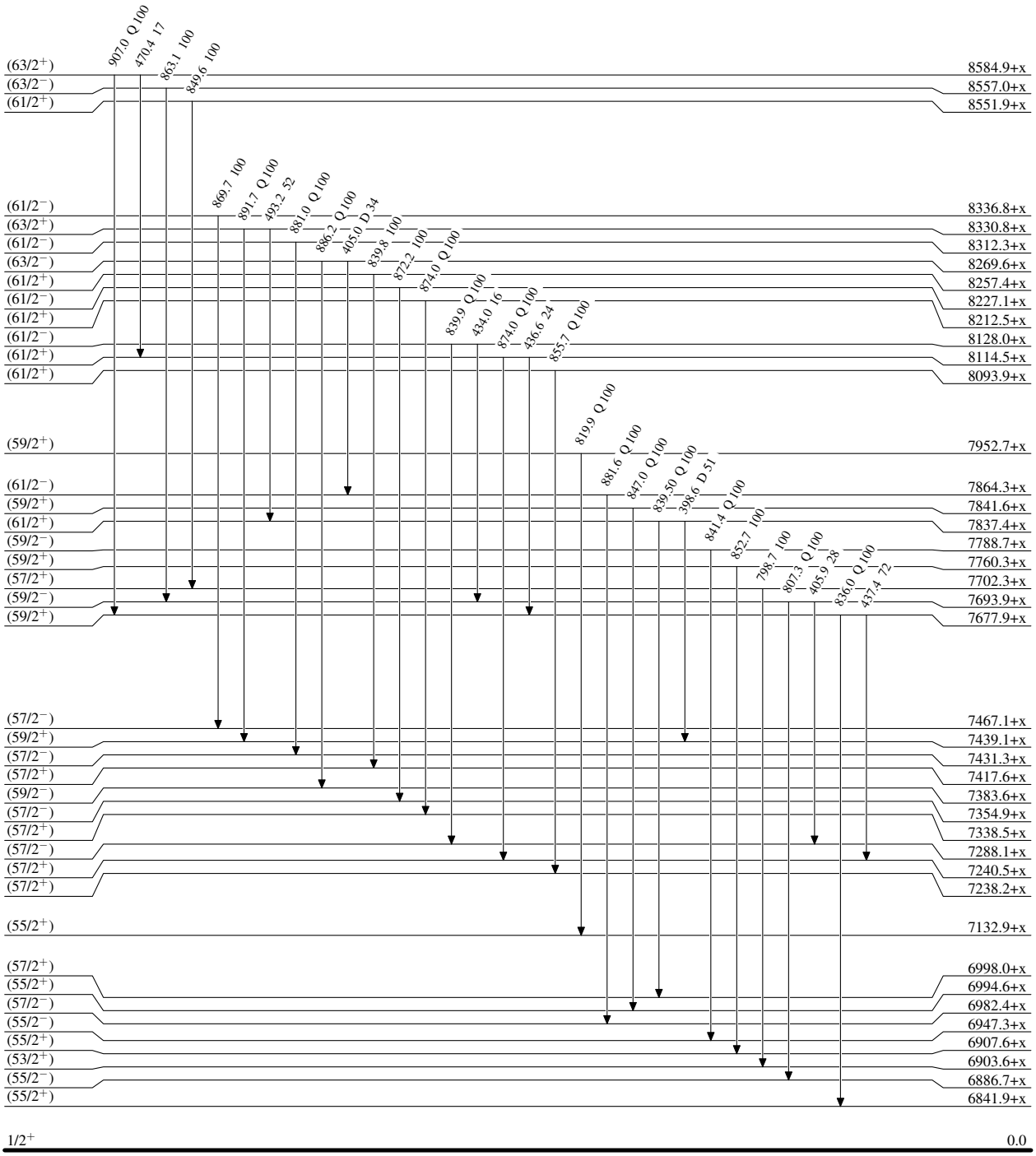


$^{165}_{71}Lu_{94}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{165}_{71}Lu_{94}$

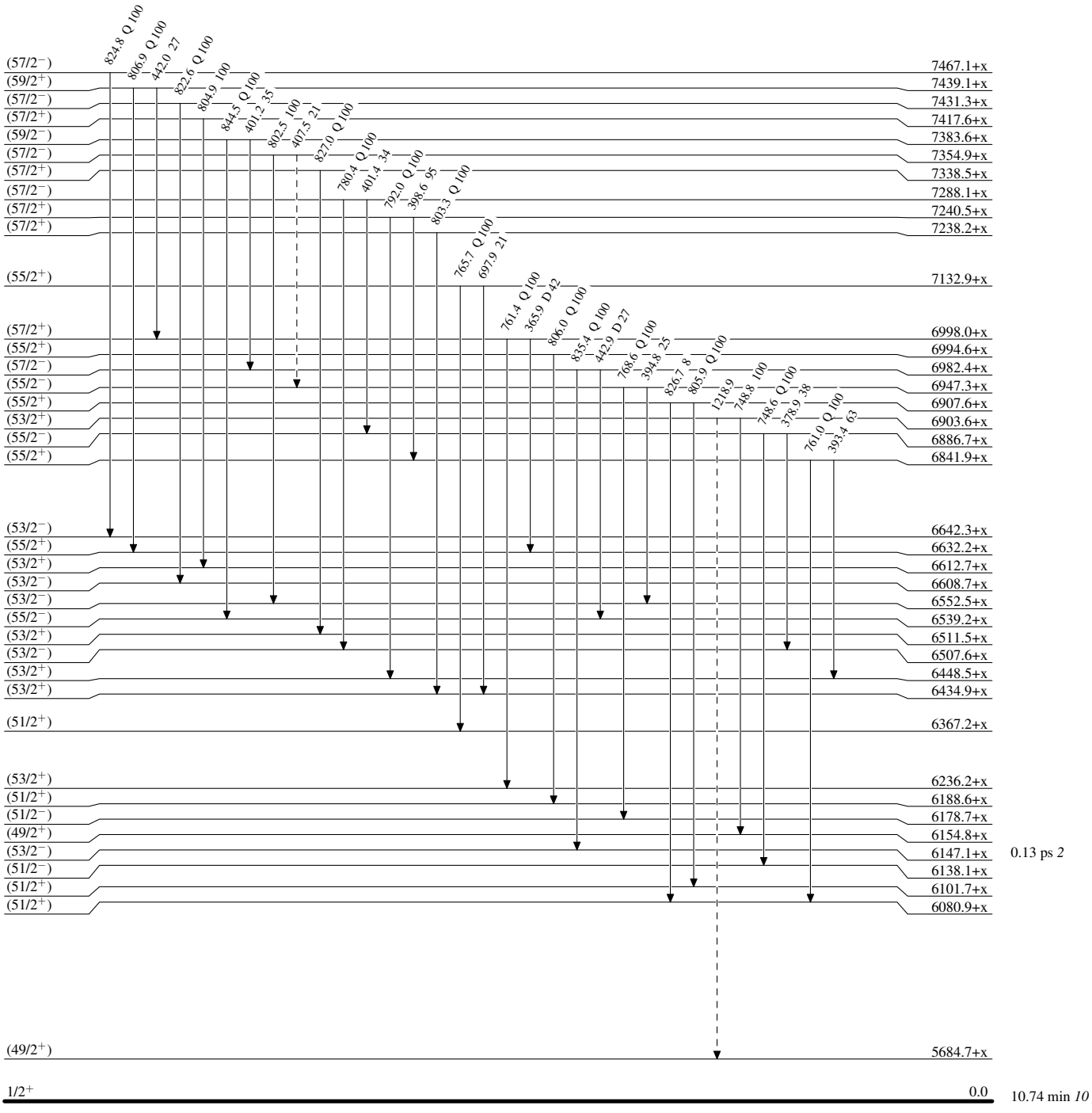
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

– – – – – – ► γ Decay (Uncertain)



$^{165}_{71}Lu_{94}$

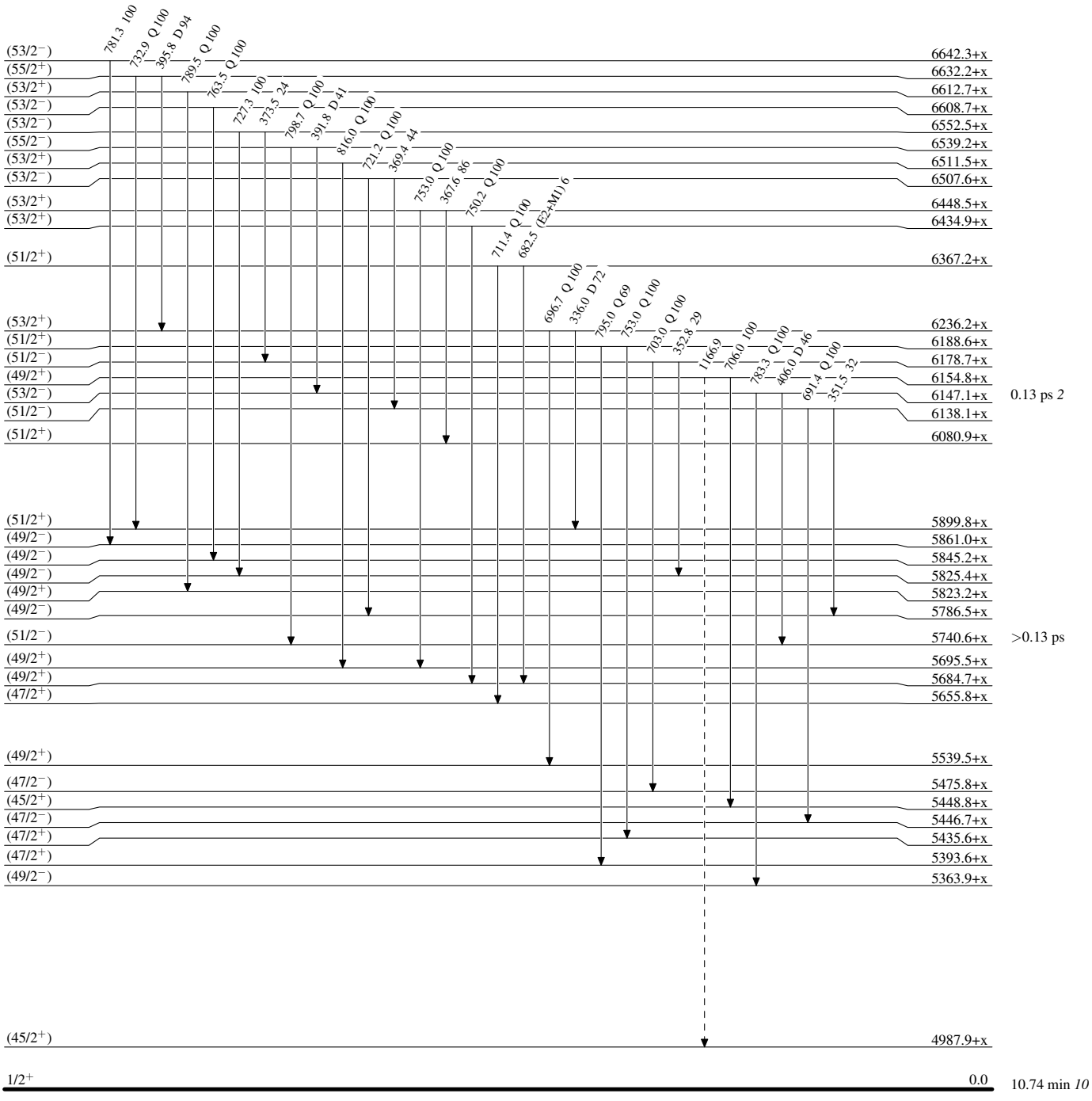
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

– – – – – – ► γ Decay (Uncertain)



$^{165}_{71}Lu_{94}$

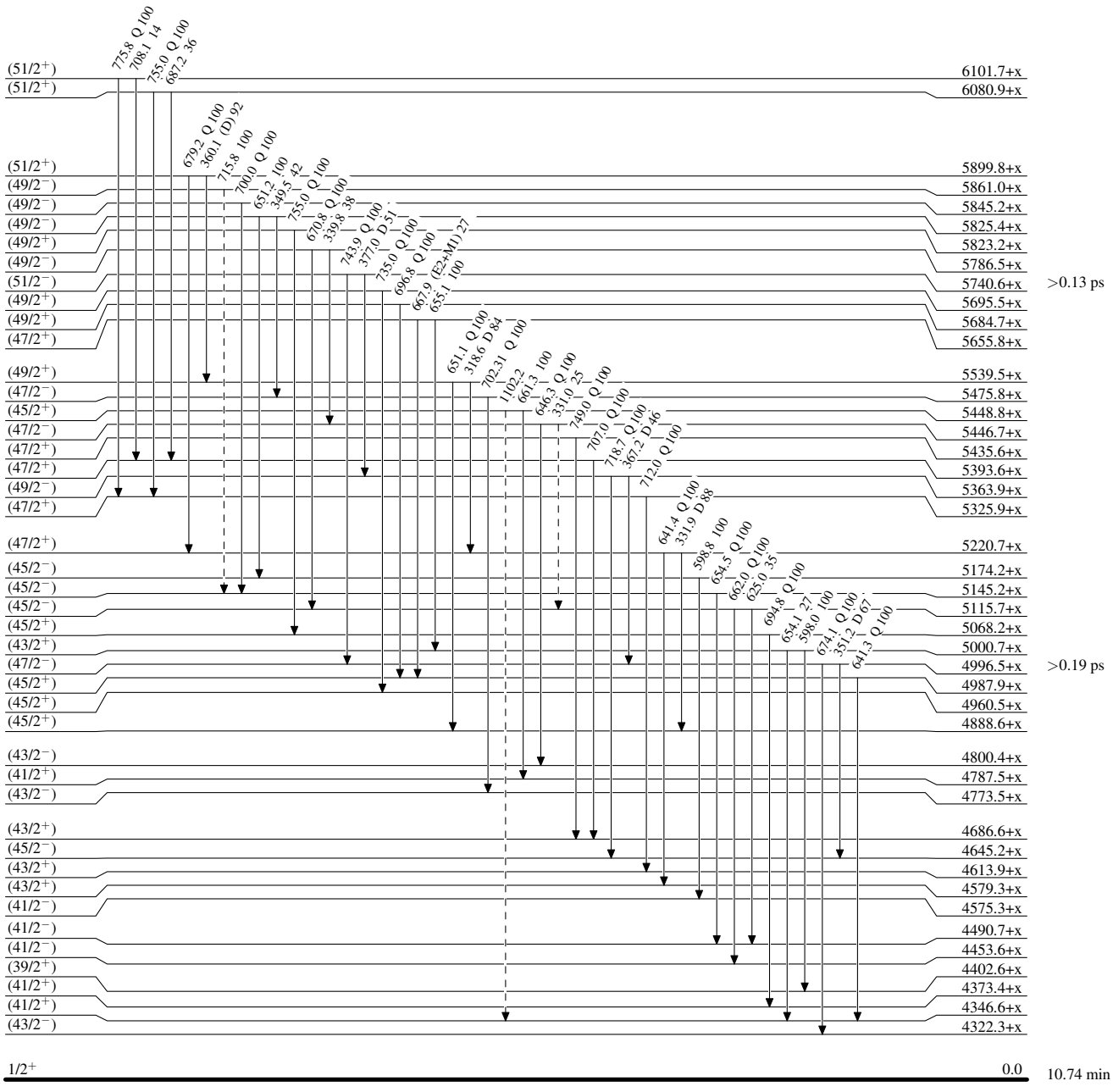
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{165}_{71}Lu_{94}$

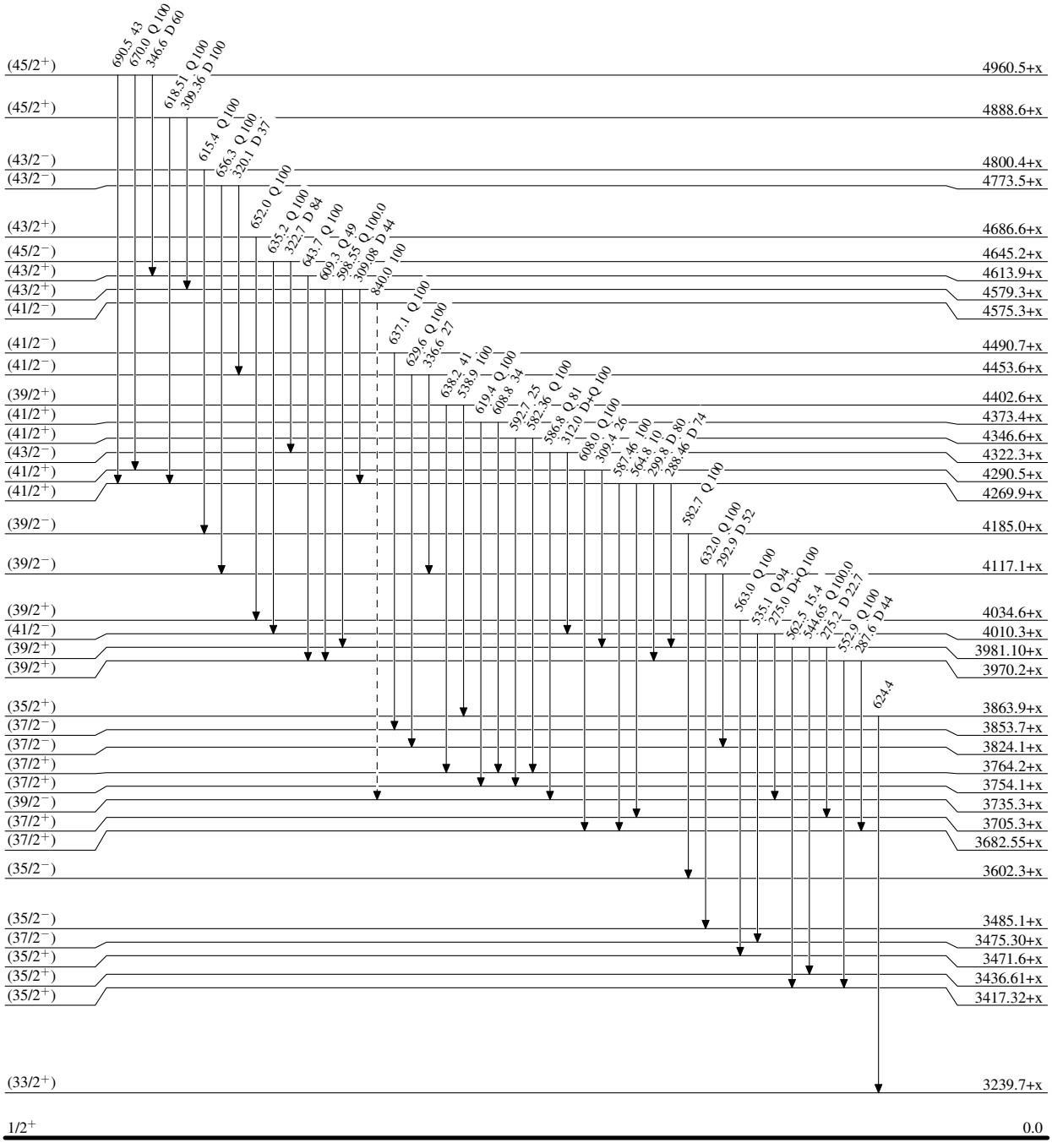
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

– – – – – – ► γ Decay (Uncertain)

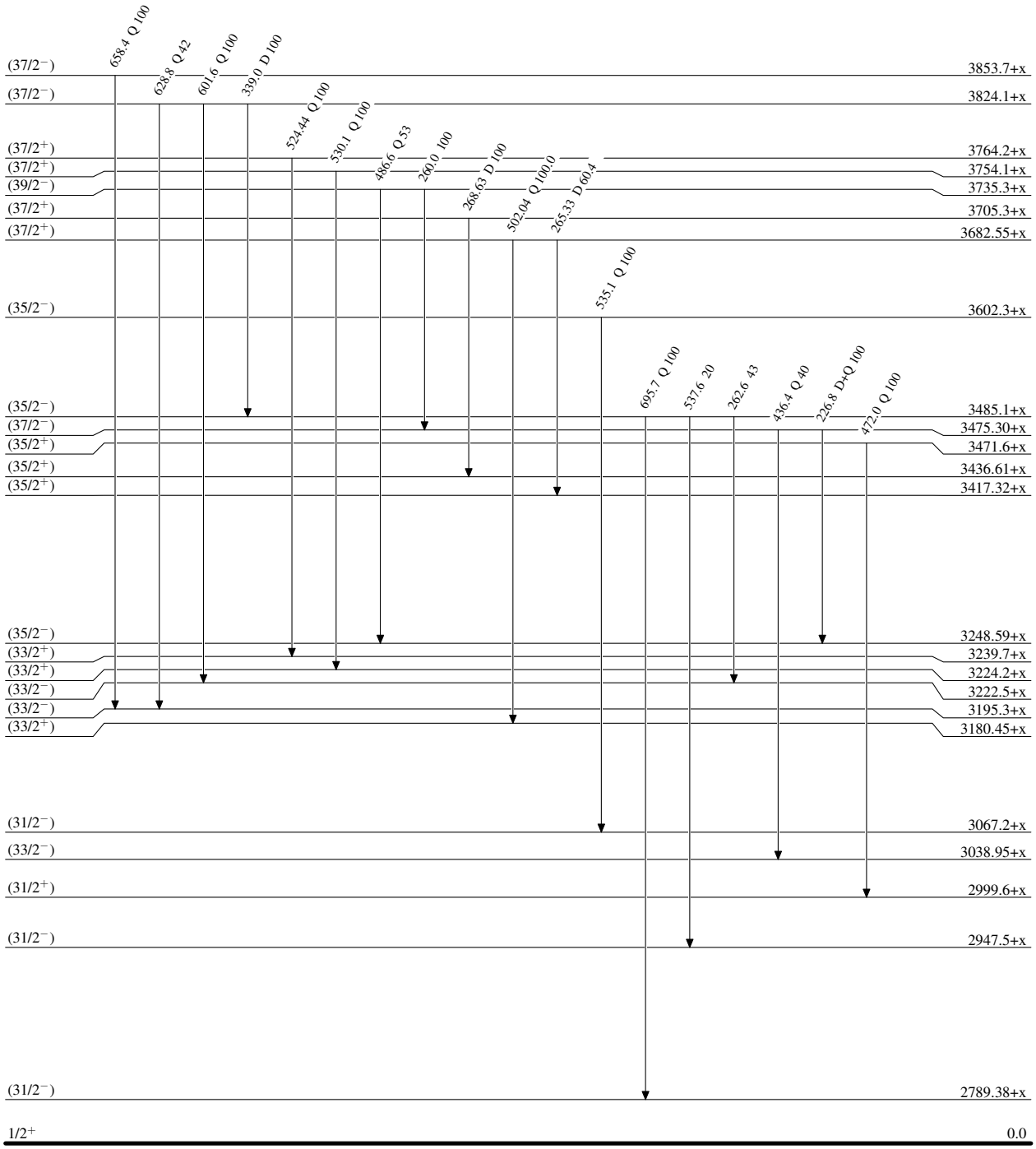


$^{165}_{71}Lu_{94}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{165}_{71}Lu_{94}$

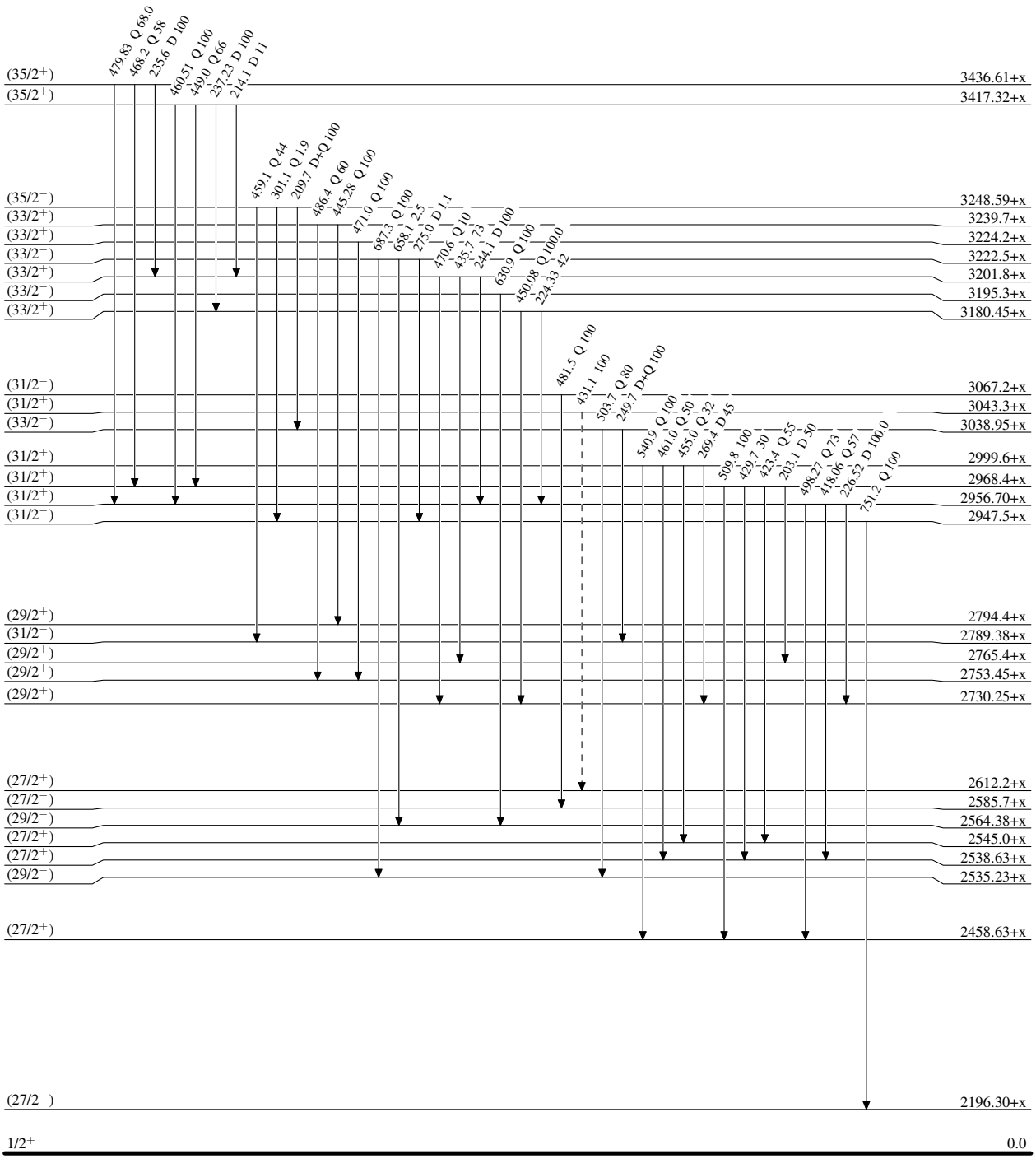
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

– – – – – – ► γ Decay (Uncertain)

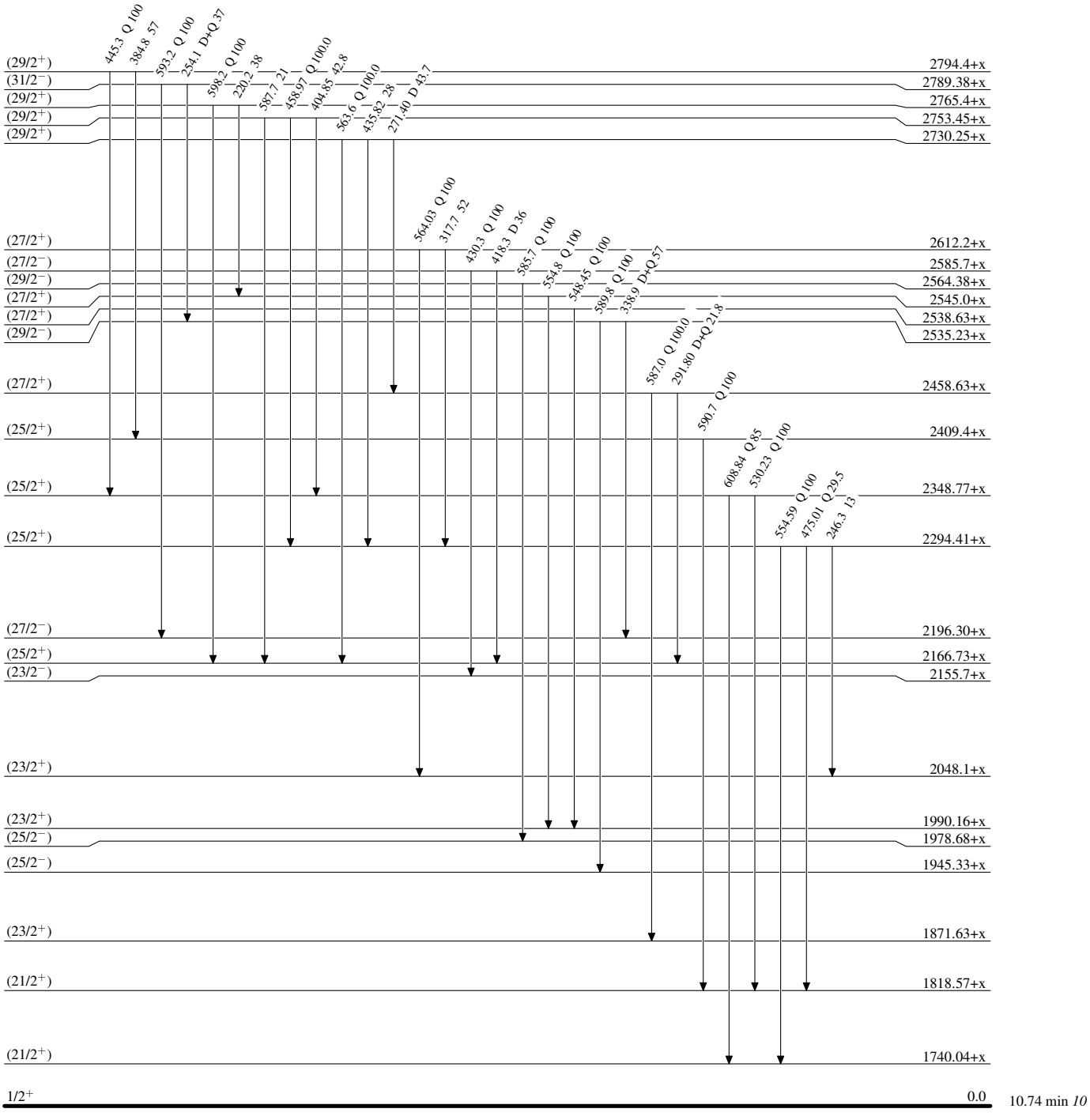


$^{165}_{71}Lu_{94}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

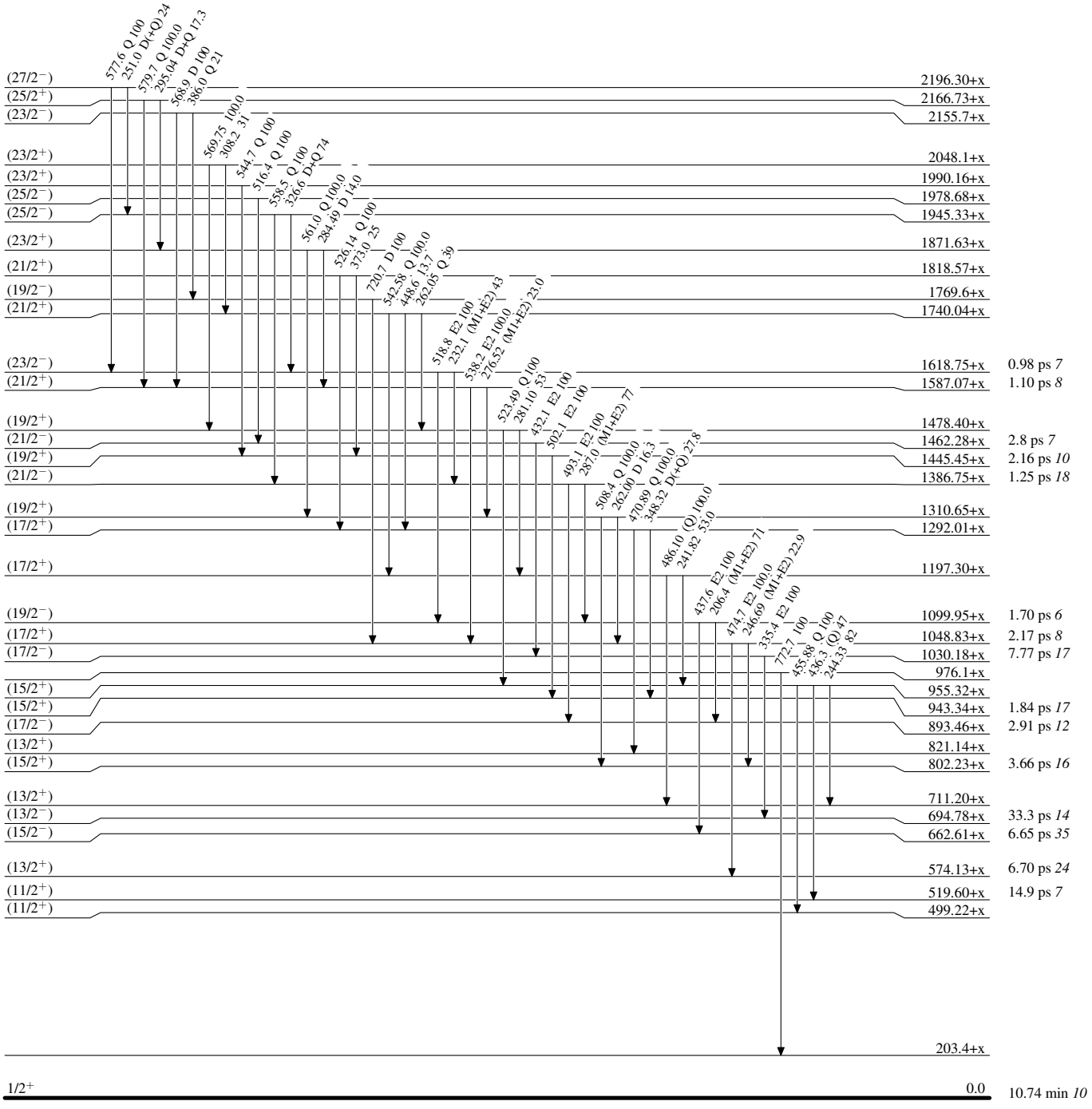


$^{165}_{71}Lu_{94}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

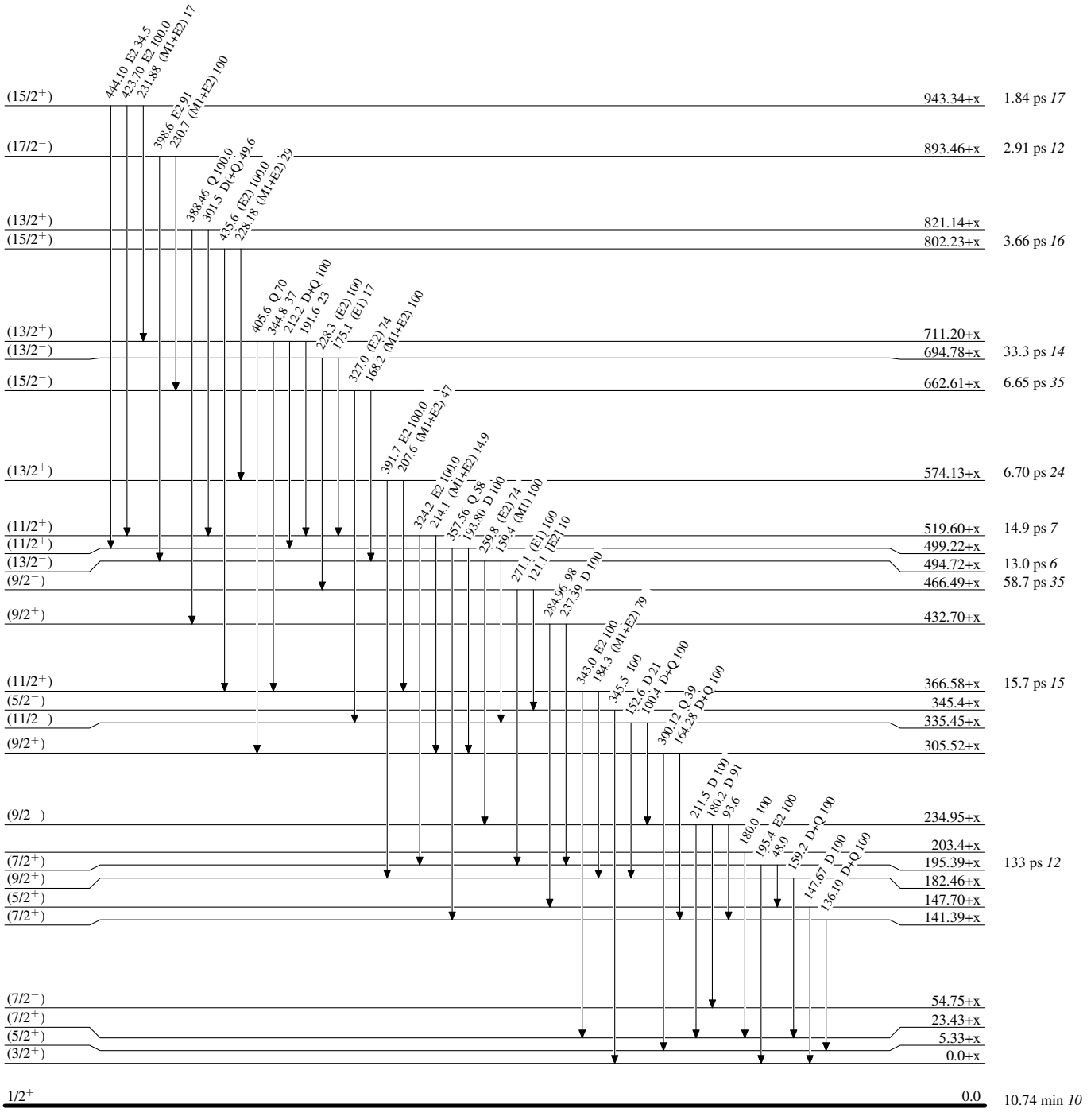


$^{165}_{71}Lu_{94}$

Adopted Levels, Gammas

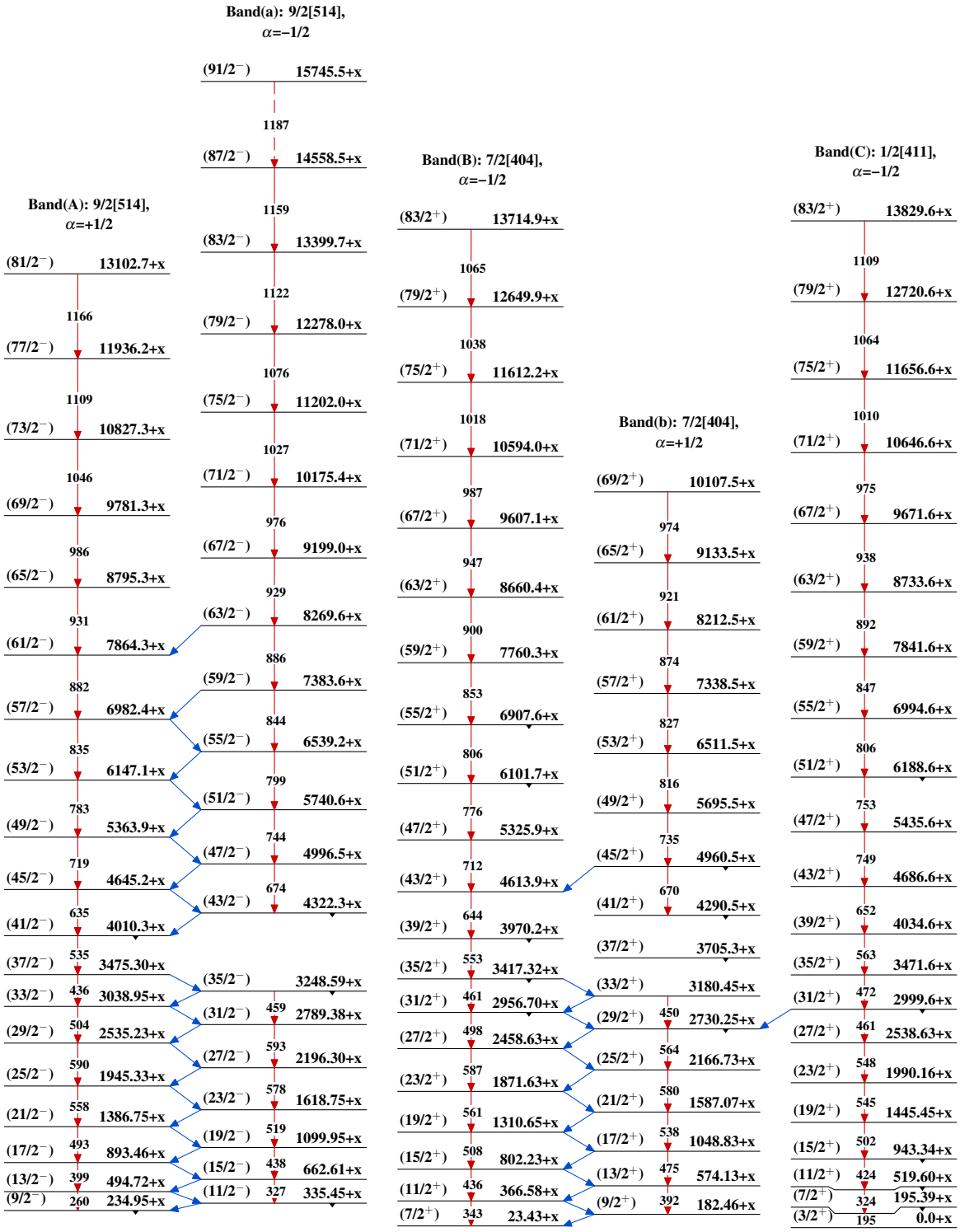
Level Scheme (continued)

Intensities: Relative photon branching from each level



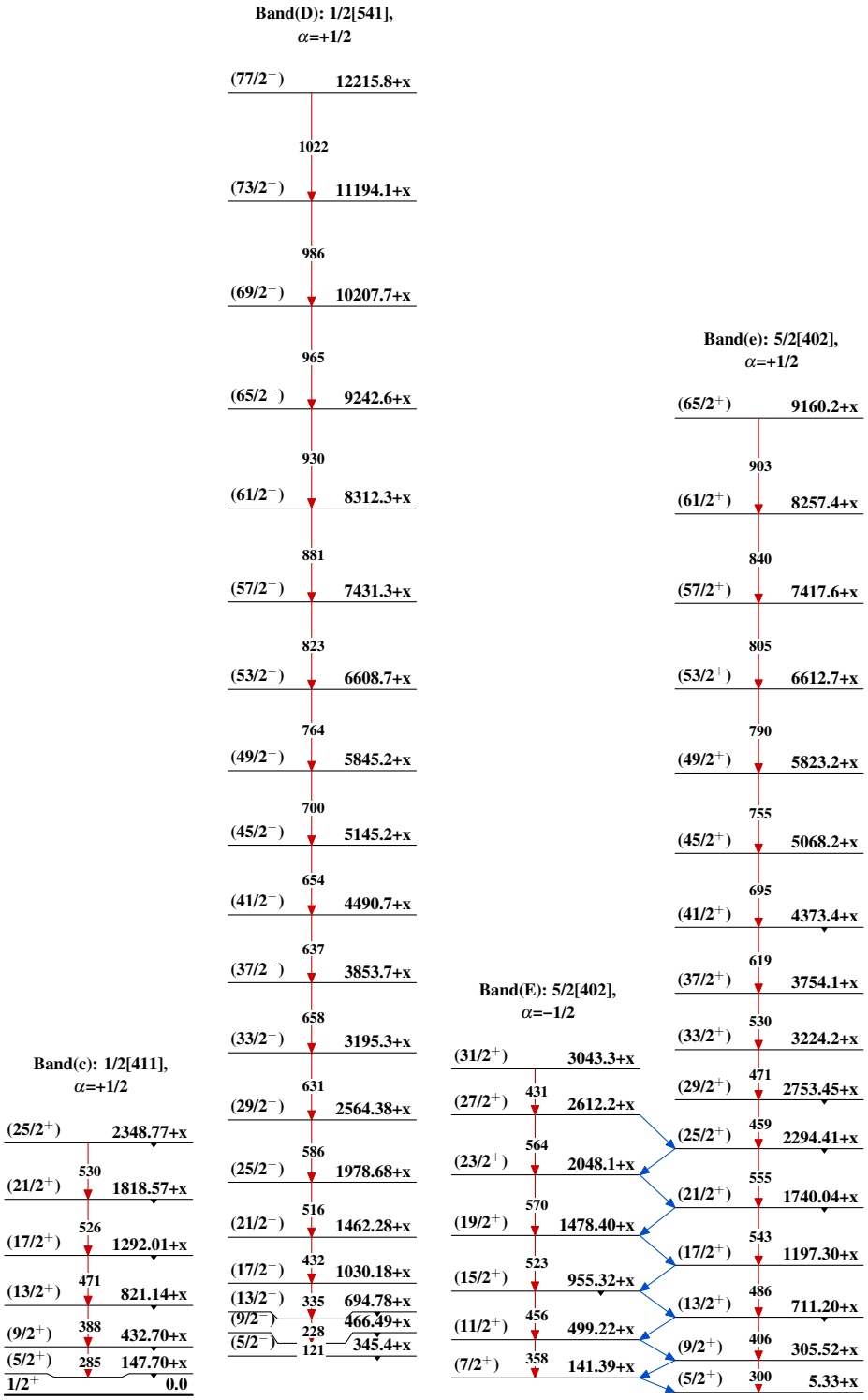
$^{165}_{71}Lu_{94}$

Adopted Levels, Gammas



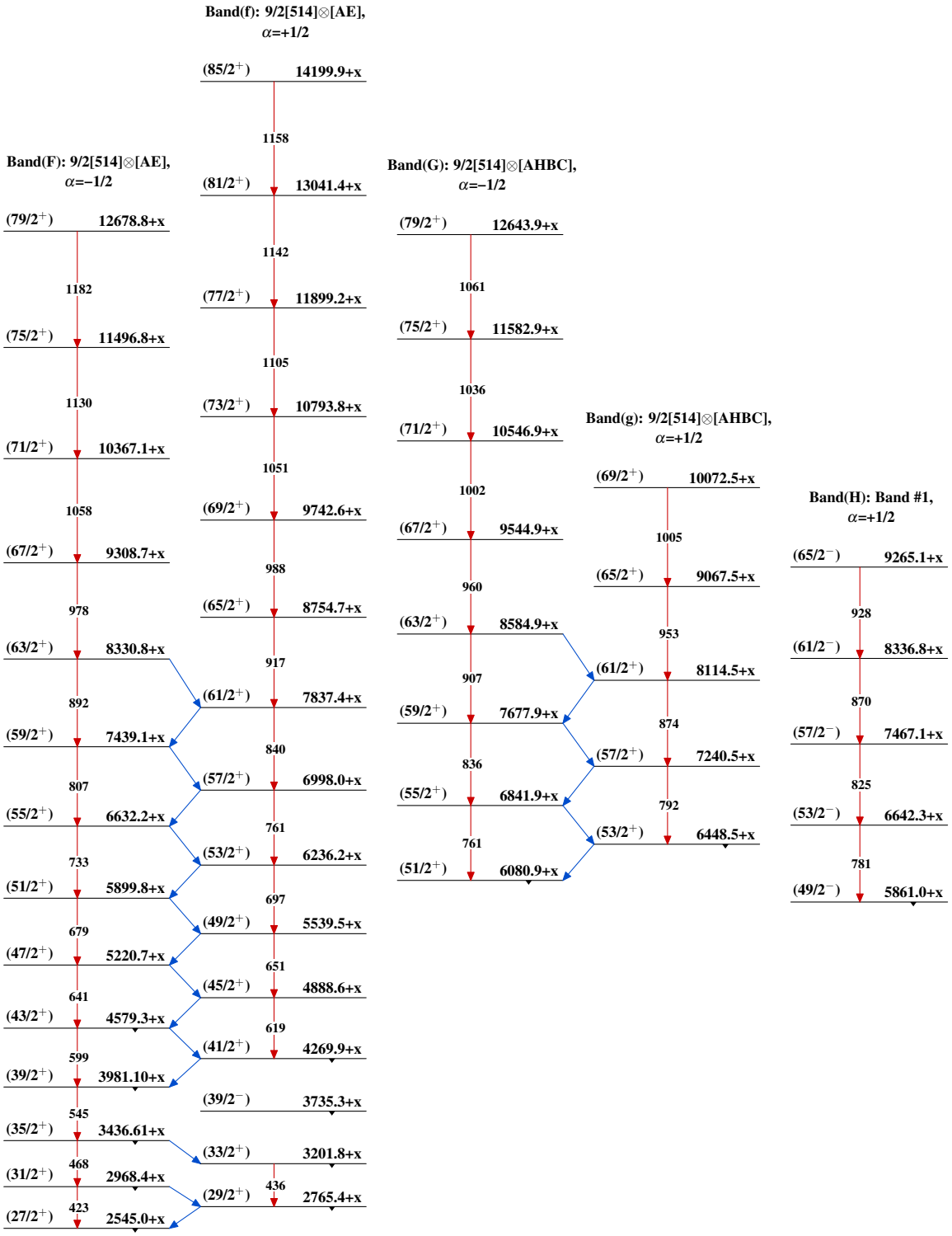
$^{165}_{71}Lu_{94}$

Adopted Levels, Gammas (continued)

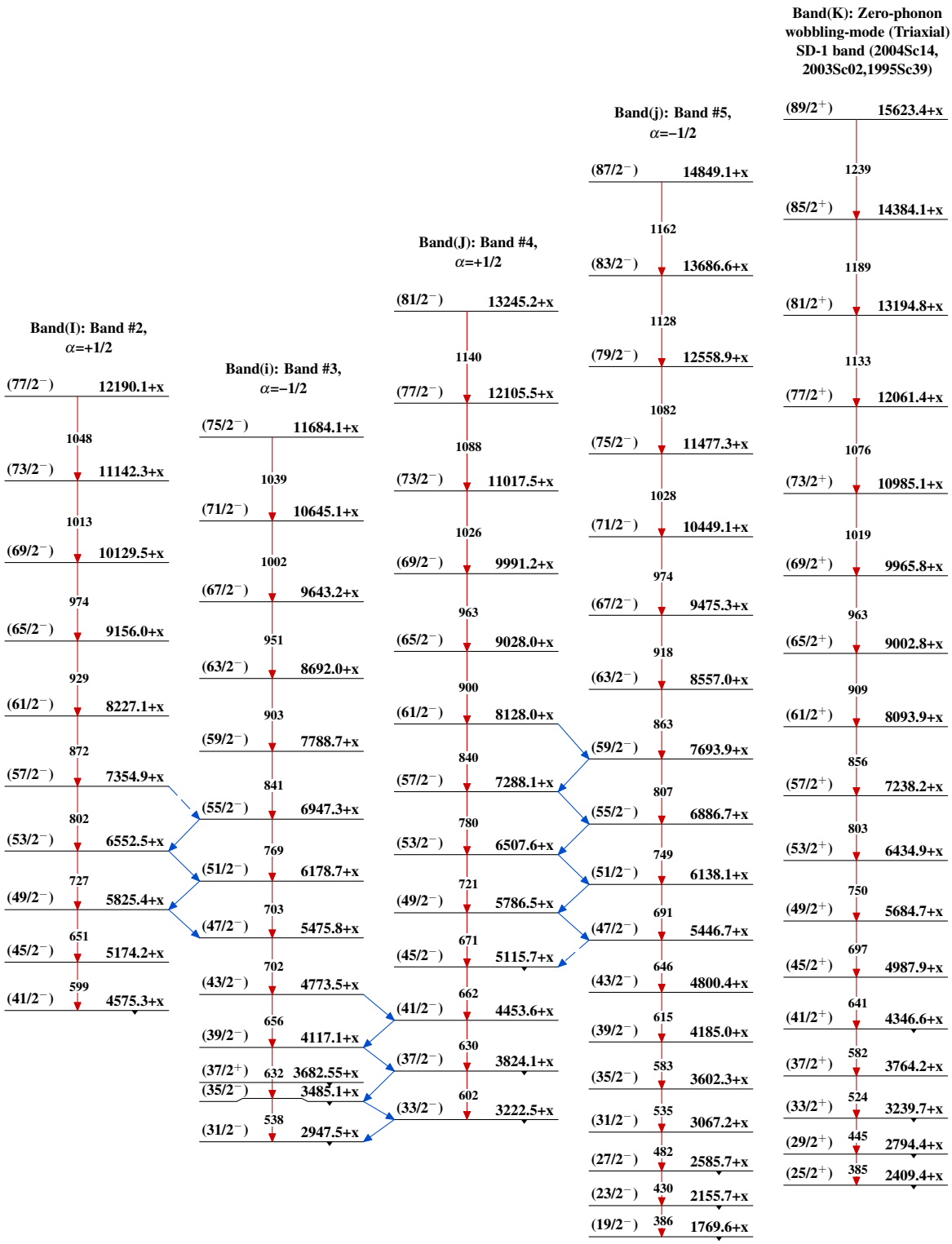


$^{165}_{71}Lu_{94}$

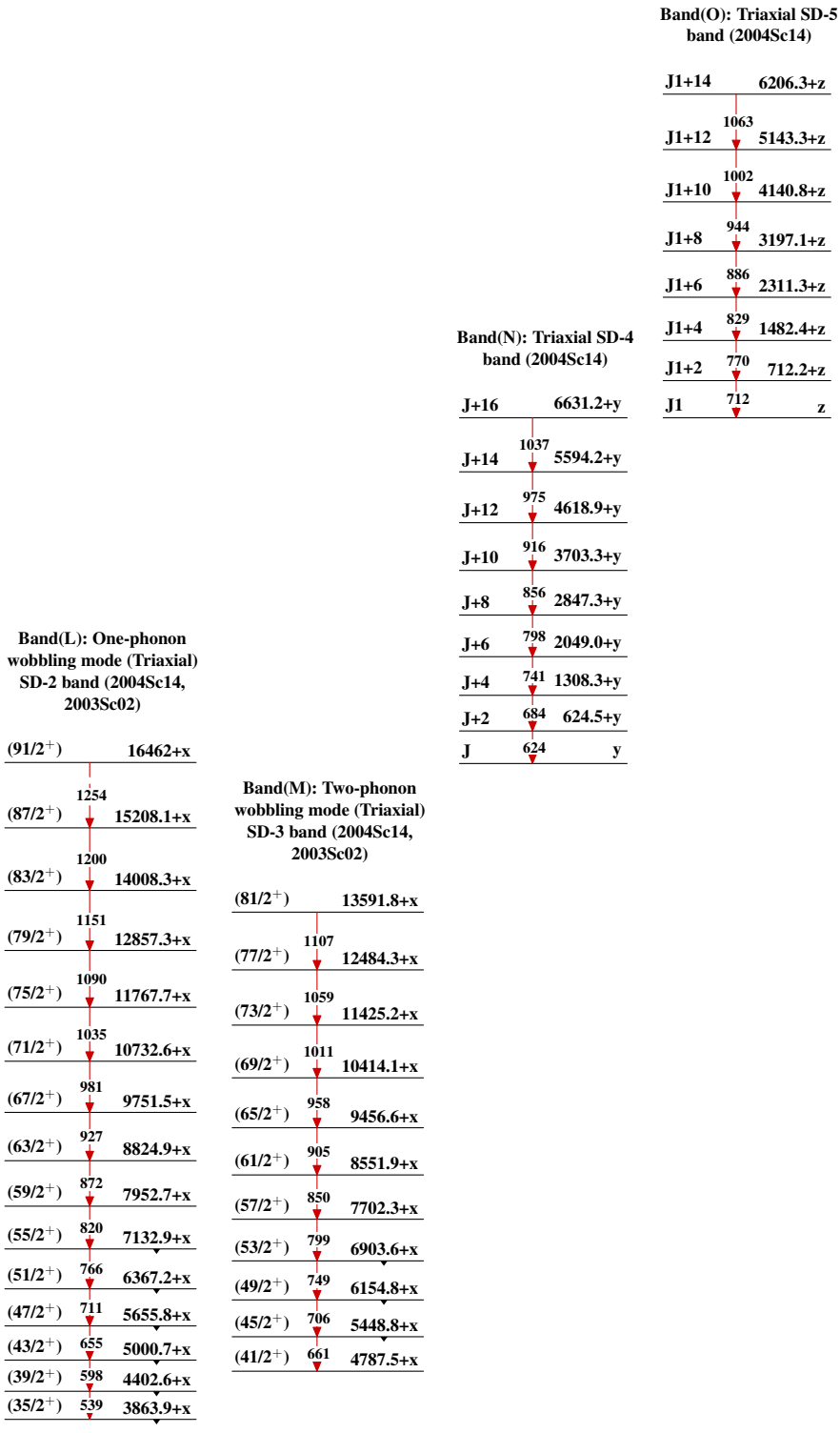
Adopted Levels, Gammas (continued)



Adopted Levels, Gammas (continued)



Adopted Levels, Gammas (continued)



^{165}Hf ε decay (76 s) 1989Hi04

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Ashok K. Jain and Anwesha Ghosh, Balraj Singh	NDS 107, 1075 (2006)	15-Apr-2006

Parent: ^{165}Hf: E=0.0; J^π=(5/2$^-$); $T_{1/2}$=76 s *4*; Q(ε)=4810 *40*; %ε+%$β^+$ decay=100.0

1989Hi04: Measured γ, γγ, K x ray, $T_{1/2}$.

1981Br30, 1981LiZM: Measured γ, K x ray, $T_{1/2}$.

1992HeZV: Measured $T_{1/2}$(^{165}Hf isotope)=77 s *4*.

The level scheme is based on 772.7-180.0 coincidence and low-lying level structure shown in Adopted Levels.

^{165}Lu Levels

E(level)	J^π[†]	Comments
0+x[†]	(3/2$^+$)	E(level): x ≈ 20 keV; see 'Adopted Levels' for comments.
5.4+x[†]	(5/2$^+$)	
23.2+x[†]	(7/2$^+$)	
141.2+x?	(7/2$^+$)	
181.8+x?	(9/2$^+$)	
203.2+x *3*		J^π: 7/2[523] proposed by 1989Hi04 is suspect In view of another low-lying (7/2$^-$) At 54.8+x reported In ^{139}La(^{30}Si,4nγ).
234.2+x?	(9/2$^-$)	
975.9+x		

[†] From 'Adopted Levels'.

γ(^{165}Lu)

Iγ/100 decays cannot be calculated since the decay scheme is not well established.

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Comments
[x]83.5[†]						
135.8[†‡]		141.2+x?	(7/2$^+$)	5.4+x	(5/2$^+$)	
158.6[†‡]		181.8+x?	(9/2$^+$)	23.2+x	(7/2$^+$)	
180.0 *3*	100	203.2+x		23.2+x	(7/2$^+$)	
211[†‡]	<7	234.2+x?	(9/2$^-$)	23.2+x	(7/2$^+$)	I_γ: from 1989Hi04. Iγ≈10 (1981Br30).
772.7 *5*	1.4 *2*	975.9+x		203.2+x		

[†] Tentative gamma ray from 1981Br30 only.

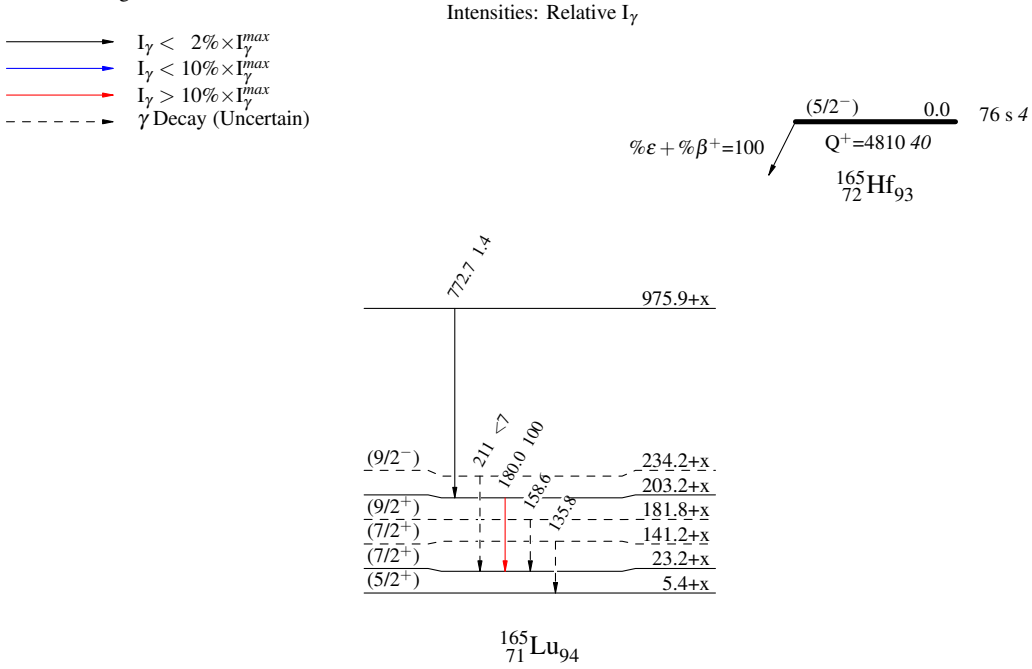
[‡] Placement of transition in the level scheme is uncertain.

[x] γ ray not placed in level scheme.

^{165}Hf ε decay (76 s) 1989Hi04

Decay Scheme

Intensities: Relative I_γ



^{124}Sn(^{45}Sc,4nγ) 1988Fr22

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Ashok K. Jain and Anwesha Ghosh, Balraj Singh	NDS 107, 1075 (2006)	15-Apr-2006

1988Fr22 (also 1986Fr14): E=203 MeV. Measured: γ, $\gamma\gamma$, $\gamma\gamma(\theta)$, deduced B(E2) and transition quadrupole moment ratios from DSA measurements.

The level scheme, for only the 9/2[514] band, is from 1988Fr22. In accordance with 1995Sc39, the lowest ($9/2^-$) level in 1988Fr22 is shown here at 234.5+x, decaying by a 211.3γ (from 1995Sc39) to a 23.2+x level.

^{165}Lu Levels

E(level)	J$^\pi$[†]	T$_{1/2}$[‡]	Comments
23.2+x	($7/2^+$)		E(level): from Adopted Levels. E(level): x ≈ 20 keV; see 'Adopted Levels' for comments.
234.5+x[#]	$9/2^-$		
334.9+x[@]	$11/2^-$		
494.2+x[#]	$13/2^-$		
662.1+x[@]	$15/2^-$		
892.9+x[#]	$17/2^-$		
1099.2+x[@]	$19/2^-$		
1386.4+x[#]	$21/2^-$		
1618.3+x[@]	$23/2^-$		
1945.1+x[#]	$25/2^-$		
2196.3+x[@]	$27/2^-$		
2535.5+x[#]	$29/2^-$		
2789.7+x[@]	$31/2^-$		
3039.3+x[#]	$33/2^-$		
3249.3+x[@]	$35/2^-$		
3476.4+x[#]	$37/2^-$		
3736.2+x[@]	$39/2^-$		
4011.4+x[#]	$41/2^-$		
4324.0+x[@]	$43/2^-$		
4647.4+x[#]	$45/2^-$		
4998.7+x[@]	$47/2^-$	>0.19 ps	
5366.3+x[#]	$49/2^-$		
5743.8+x[@]	$51/2^-$	>0.13 ps	
6151.2+x[#]	$53/2^-$	0.13 ps *2*	
6544.6+x[@]	$55/2^-$		
6988+x[#]	$57/2^-$		
7389.6+x[@]	$59/2^-$		
7871+x[#]	$61/2^-$		
8275.6+x[@]	$63/2^-$		
8801+x[#]	$65/2^-$		
9195+x?[@]	($67/2^-$)		
9775+x?[#]	($69/2^-$)		

[†] From 1988Fr22, based on $\gamma\gamma(\theta)$ data and band assignment. The assignments are consistent with those in 'Adopted Levels', except that all are given in parenthese there due to lack of strong supporting arguments for low-lying levels.

Continued on next page (footnotes at end of table)

^{124}Sn(^{45}Sc,4nγ) 1988Fr22 (continued)

^{165}Lu Levels (continued)

‡ Deduced (by evaluators) from B(E2)(W.u.)'s given by 1988Fr22 from DSAM measurements.
# Band(A): 9/2[514] Band, α=+1/2.
@ Band(a): 9/2[514] Band, α=−1/2.

$\gamma(^{165}Lu)$

E_i(level)	J_i^π	E_γ	I_γ†	E_f	J_f^π	Mult.‡	δ‡	Comments
234.5+x	9/2−	211.3 *2*		23.2+x	(7/2+)			E_γ: from adopted gammas.
334.9+x	11/2−	100.4		234.5+x	9/2−			
494.2+x	13/2−	159.3		334.9+x	11/2−			
		259.7		234.5+x	9/2−			
662.1+x	15/2−	167.9	100	494.2+x	13/2−	D+Q	+0.16 *3*	
		327.2	57 *5*	334.9+x	11/2−			
892.9+x	17/2−	230.8	100	662.1+x	15/2−	D+Q	+0.25 *3*	
		398.7	91 *9*	494.2+x	13/2−			
1099.2+x	19/2−	206.3	71 *5*	892.9+x	17/2−	D+Q	+0.16 *3*	
		437.1	100	662.1+x	15/2−			
1386.4+x	21/2−	287.2	78 *6*	1099.2+x	19/2−	D+Q	+0.20 *3*	
		493.5	100	892.9+x	17/2−			
1618.3+x	23/2−	231.9	32 *3*	1386.4+x	21/2−	D+Q	+0.11 *3*	
		519.1	100	1099.2+x	19/2−			
1945.1+x	25/2−	326.8	75 *8*	1618.3+x	23/2−	D+Q	+0.09 *5*	
		558.7	100	1386.4+x	21/2−			
2196.3+x	27/2−	251.2	24 *3*	1945.1+x	25/2−	D(+Q)	+0.01 *3*	
		578.0	100	1618.3+x	23/2−			
2535.5+x	29/2−	339.2	56 *6*	2196.3+x	27/2−	D+Q	+0.18 *3*	
		590.4	100	1945.1+x	25/2−			
2789.7+x	31/2−	254.2	37 *4*	2535.5+x	29/2−	D+Q	+0.18 *4*	
		593.4	100	2196.3+x	27/2−			
3039.3+x	33/2−	249.6	83 *7*	2789.7+x	31/2−	D+Q	+0.09 *3*	
		503.8	100	2535.5+x	29/2−			
3249.3+x	35/2−	210.0	100	3039.3+x	33/2−	D+Q	+0.07 *3*	
		459.6	93 *9*	2789.7+x	31/2−			
3476.4+x	37/2−	227.4	100	3249.3+x	35/2−	D+Q	+0.09 *2*	
		436.9	82 *8*	3039.3+x	33/2−			
3736.2+x	39/2−	260.0	100	3476.4+x	37/2−	D+Q		
		486.9	86 *9*	3249.3+x	35/2−			
4011.4+x	41/2−	275.4	99 *8*	3736.2+x	39/2−	D+Q	+0.06 *2*	
		534.9	100	3476.4+x	37/2−			
4324.0+x	43/2−	312.4	86 *8*	4011.4+x	41/2−	D+Q	+0.19 *3*	
		587.3	100	3736.2+x	39/2−			
4647.4+x	45/2−	323.4	64 *3*	4324.0+x	43/2−			
		635.9	100	4011.4+x	41/2−			
4998.7+x	47/2−	351.3	64 *3*	4647.4+x	45/2−			
		674.7	100	4324.0+x	43/2−			B(E2)(W.u.)<240 (DSA,1988Fr22).
5366.3+x	49/2−	367.3	54 *3*	4998.7+x	47/2−			
		719.1	100	4647.4+x	45/2−			
5743.8+x	51/2−	377.5	50.5 *25*	5366.3+x	49/2−			
		745.1	100	4998.7+x	47/2−			B(E2)(W.u.)<240 (DSA,1988Fr22).
6151.2+x	53/2−	406.6	50 *5*	5743.8+x	51/2−			
		784.9	100	5366.3+x	49/2−			B(E2)(W.u.)=180 *+40−30* (DSA,1988Fr22).
6544.6+x	55/2−	393.0	51 *3*	6151.2+x	53/2−			
		800.8	100	5743.8+x	51/2−			
6988+x	57/2−	444	41 *9*	6544.6+x	55/2−			
		837	100	6151.2+x	53/2−			

Continued on next page (footnotes at end of table)

^{124}Sn(^{45}Sc,4nγ) 1988Fr22 (continued)

$\gamma(^{165}Lu)$ (continued)

E_i(level)	J_i^π	E_γ	I_γ[†]	E_f	J_f^π	E_i(level)	J_i^π	E_γ	I_γ[†]	E_f	J_f^π
7389.6+x	$59/2^-$	401	38 *5*	6988+x	$57/2^-$	8801+x	$65/2^-$	526[#]	35 *4*	8275.6+x	$63/2^-$
		845	100	6544.6+x	$55/2^-$			930	100	7871+x	$61/2^-$
7871+x	$61/2^-$	481	68 *6*	7389.6+x	$59/2^-$	9195+x?	$(67/2^-)$	394[#]		8801+x	$65/2^-$
		883	100	6988+x	$57/2^-$			920[#]		8275.6+x	$63/2^-$
8275.6+x	$63/2^-$	405[#]	47 *7*	7871+x	$61/2^-$	9775+x?	$(69/2^-)$	974[#]		8801+x	$65/2^-$
		886	100	7389.6+x	$59/2^-$						

[†] Branching ratios. The authors take values from 1984Jo05 for levels below $27/2^-$.
[‡] From $\gamma\gamma(\theta)$, but No values of A_2 and A_4 coefficients are listed by 1988Fr22.
[#] Placement of transition in the level scheme is uncertain.

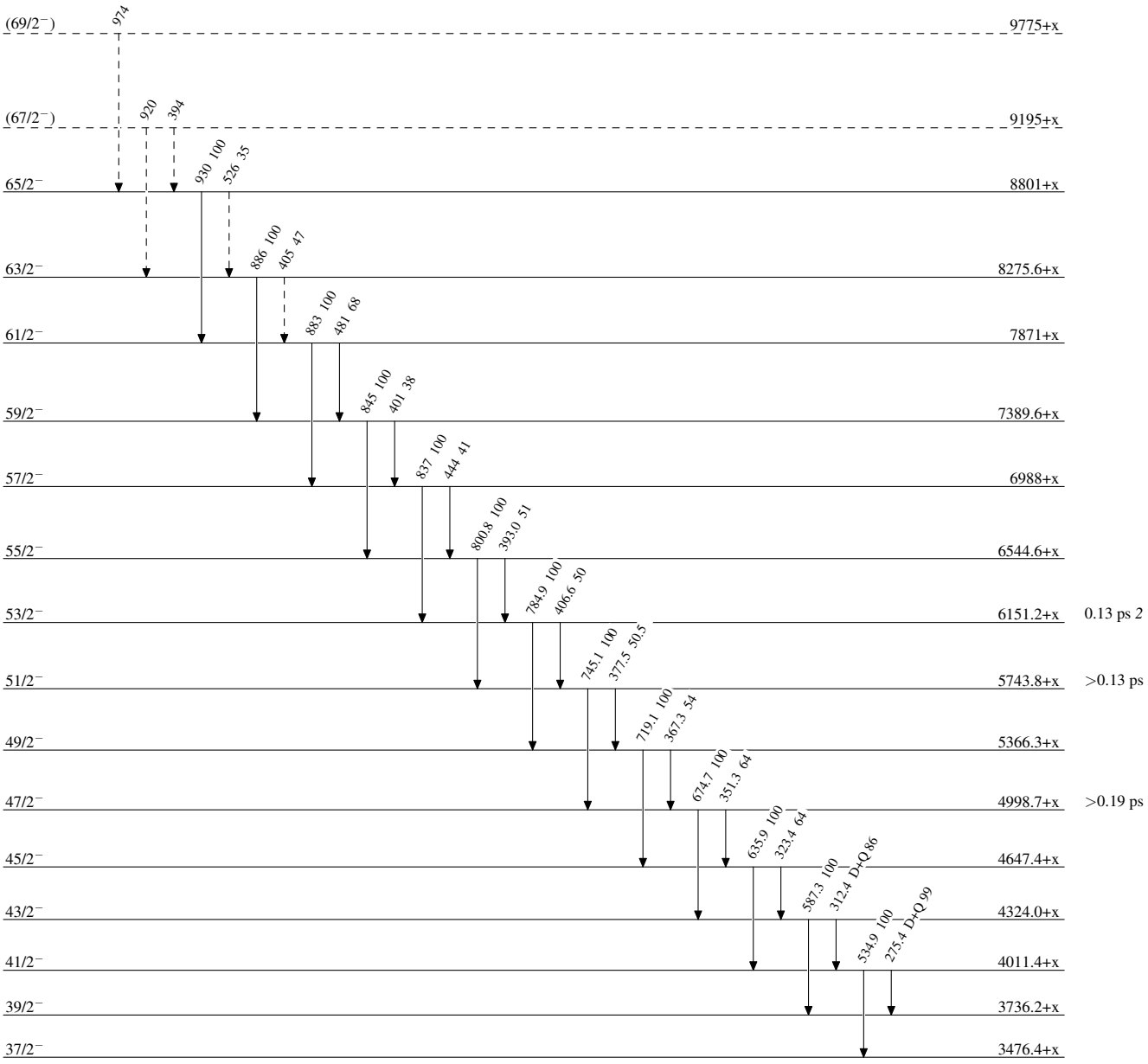
^{124}Sn(^{45}Sc,4nγ) **1988Fr22**

Legend

Level Scheme

Intensities: Relative photon branching from each level

γ Decay (Uncertain)

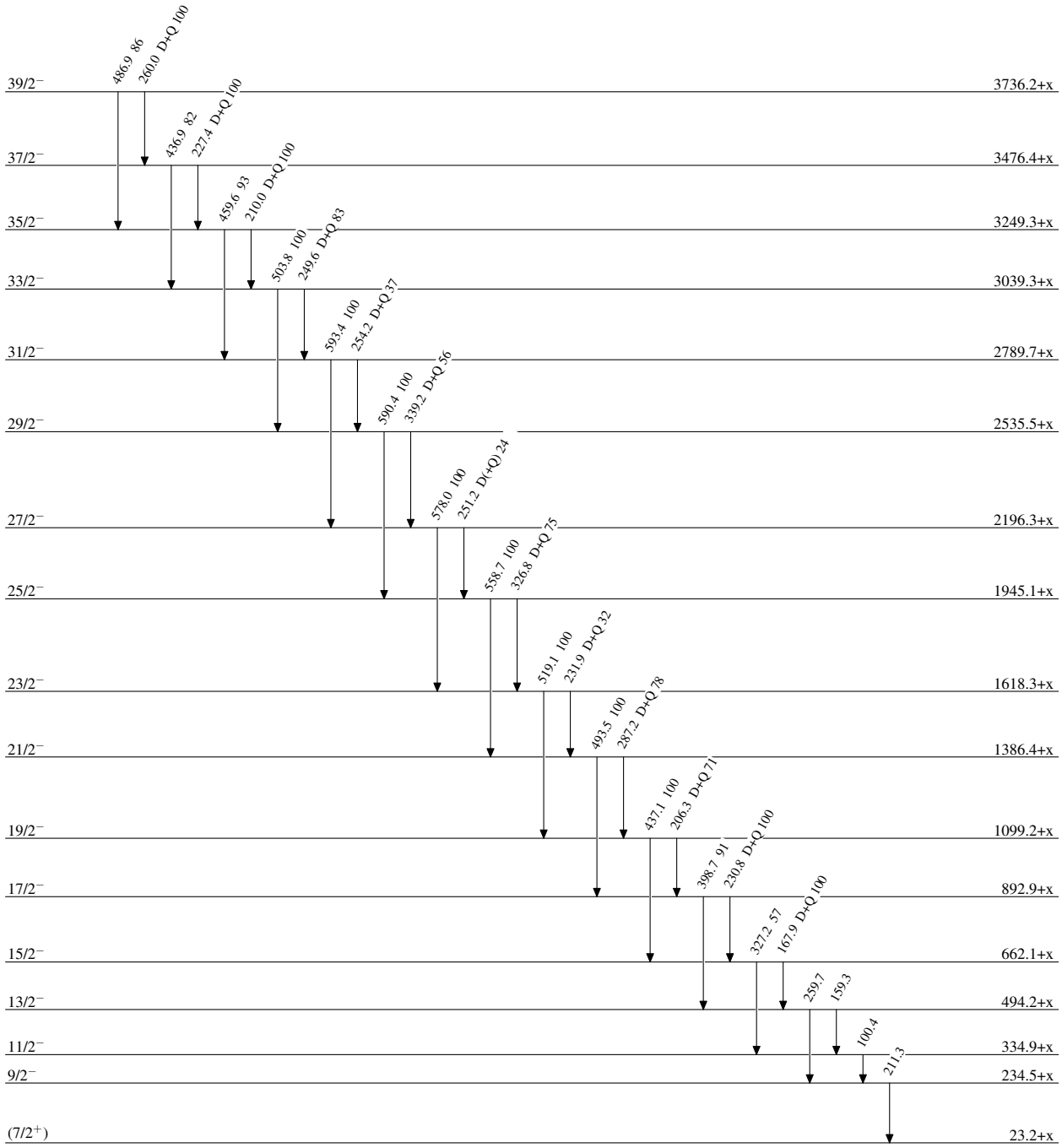


$^{165}_{71}Lu_{94}$

^{124}Sn(^{45}Sc,4nγ) 1988Fr22

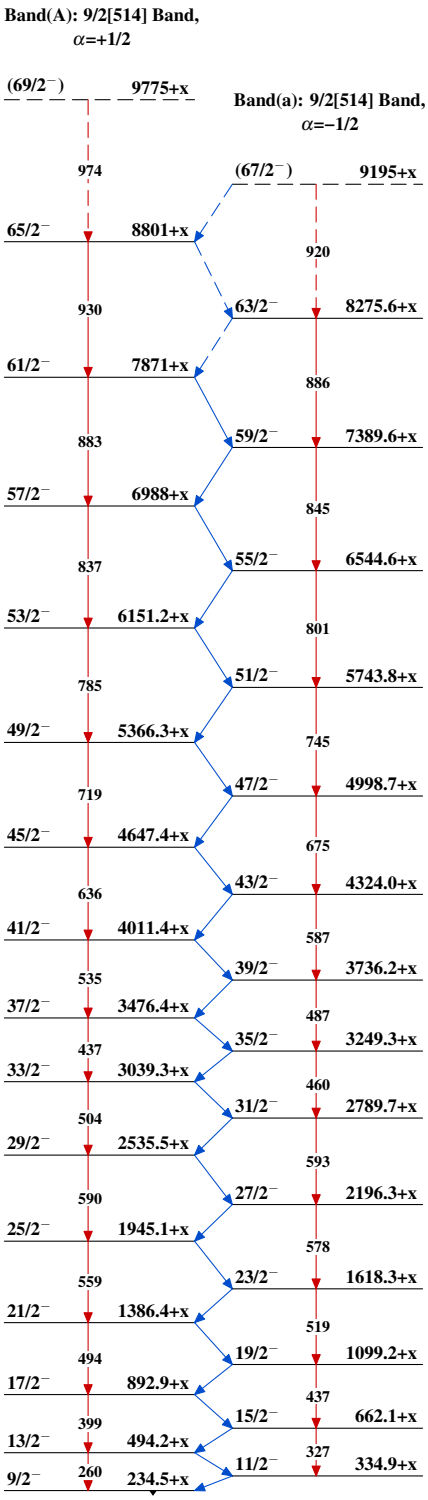
Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{165}_{71}Lu_{94}$

^{124}Sn(^{45}Sc,4nγ) 1988Fr22



$^{165}_{71}Lu_{94}$

^{138}Ba(^{31}P,4nγ) 1995Sc39

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Ashok K. Jain and Anwesha Ghosh, Balraj Singh	NDS 107, 1075 (2006)	15-Apr-2006

1995Sc39: ^{138}Ba(^{31}P,4nγ) E=155 MeV. Measured Eγ, Iγ, γγ coin. Deduced a superdeformed structure and other normal-deformed bands. The authors also report data from ^{150}Sm(^{19}F,4nγ) reaction.
Theory for SD band: 1999Xi02.

^{165}Lu Levels

E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡
0.0+x@[a]	3/2+	1291.99+x& 19	17/2+	2730.16+x[d] 24	29/2+	5325.7+x[e] 16	47/2+
5.4+x[b] 2	5/2+	1310.5+x[e] 3	19/2+	2753.44+x[b] 24	29/2+	5539.4+x[f] 4	49/2+
23.2+x[e] 3	7/2+	1445.39+x[a] 20	19/2+	2956.62+x[e] 24	31/2+	5899.6+x[g] 4	51/2+
141.44+x[c] 20	7/2+	1478.39+x[c] 21	19/2+	3180.3+x[d] 3	33/2+	5904.0+x[h] 6	(49/2+)
147.70+x& 13	5/2+	1587.0+x[d] 3	21/2+	3200.9+x[f] 3	33/2+	6101.5+x[e] 19	51/2+
182.2+x[d] 3	9/2+	1740.01+x[b] 21	21/2+	3233.5+x[h] 4	(33/2+)	6236.0+x[f] 4	53/2+
195.39+x[a] 11	7/2+	1818.51+x& 22	21/2+	3417.2+x[e] 3	35/2+	6632.0+x[g] 4	55/2+
305.56+x[b] 19	9/2+	1871.5+x[e] 3	23/2+	3436.5+x[g] 3	35/2+	6707.5+x[h] 6	(53/2+)
366.4+x[e] 3	11/2+	1879.2+x# 7	(21/2+)	3682.4+x[d] 3	37/2+	6997.6+x[f] 4	57/2+
432.70+x& 14	9/2+	1990.11+x[a] 23	23/2+	3705.2+x[f] 4	37/2+	7439.0+x[g] 4	59/2+
499.21+x[c] 19	11/2+	2048.1+x[c] 3	23/2+	3815.9+x[h] 4	(37/2+)	7562.8+x[h] 7	(57/2+)
519.58+x[a] 15	11/2+	2166.7+x[d] 3	25/2+	3970.0+x[e] 6	39/2+	7837.4+x[f] 4	61/2+
573.9+x[d] 3	13/2+	2222.7+x# 6	25/2+	3981.0+x[g] 3	39/2+	8330.7+x[g] 5	63/2+
711.21+x[b] 19	13/2+	2263.8+x[h] 4	(25/2+)	4269.8+x[f] 3	41/2+	8470.3+x[h] 8	(61/2+)
802.0+x[e] 3	15/2+	2294.36+x[b] 22	25/2+	4457.2+x[h] 5	(41/2+)	8755.1+x[f] 5	65/2+
821.13+x& 18	13/2+	2348.73+x& 23	25/2+	4579.2+x[g] 3	43/2+	9305.7+x[g] 6	67/2+
943.32+x[a] 17	15/2+	2458.5+x[e] 3	27/2+	4613.7+x[e] 12	43/2+	9432.6+x[h] 9	(65/2+)
955.32+x[c] 20	15/2+	2538.56+x[a] 24	27/2+	4888.5+x[f] 3	45/2+		
1048.7+x[d] 3	17/2+	2612.2+x[c] 4	27/2+	5153.3+x[h] 5	(45/2+)		
1197.29+x[b] 20	17/2+	2709.1+x[h] 4	(29/2+)	5220.6+x[g] 3	47/2+		

† From least-squares fit to Eγ′s.
‡ From 1995Sc39, based on rotational-band assignments and $\gamma(\theta)$ data in earlier (1988Fr22,1984Jo05) studies. The assignments are consistent with those in 'Adopted Levels', except that all are given in parenthese there due to lack of strong supporting arguments for low-lying levels.
# Level not supported In more recent studies (2004Sc14), the transition connected with this level placed elsewhere. IT is omitted In 'Adopted Levels'.
@ x ≈ 20 keV; see 'Adopted Levels' for comments.
& Band(A): 1/2[411] band, α=+1/2.
a Band(a): 1/2[411] band, α=−1/2.
b Band(B): 5/2[402] band, α=+1/2.
c Band(b): 5/2[402] band, α=−1/2.
d Band(C): 7/2[404] band, α=+1/2.
e Band(c): 7/2[404] band, α=−1/2.
f Band(D): 3-quasiparticle band, α=+1/2.
g Band(d): 3-quasiparticle band, α=−1/2.
h Band(E): SD (triaxial), 1/2[660] band, α=+1/2.

^{138}Ba(^{31}P,4nγ) 1995Sc39 (continued)

$\gamma(^{165}Lu)$

E_γ [†]	I_γ	E_i(level)	J_i^π	E_f	J_f^π
136.10 *12*	10.0 *10*	141.44+x	$7/2^+$	5.4+x	$5/2^+$
147.67 *14*	10.0 *10*	147.70+x	$5/2^+$	0.0+x	$3/2^+$
159.18 *11*	10.0 *10*	182.2+x	$9/2^+$	23.2+x	$7/2^+$
164.28 *12*	43.3 *16*	305.56+x	$9/2^+$	141.44+x	$7/2^+$
184.27 *11*	85.7 *19*	366.4+x	$11/2^+$	182.2+x	$9/2^+$
193.80 *12*	41.9 *11*	499.21+x	$11/2^+$	305.56+x	$9/2^+$
195.41 *11*	83 *3*	195.39+x	$7/2^+$	0.0+x	$3/2^+$
207.59 *12*	61.5 *11*	573.9+x	$13/2^+$	366.4+x	$11/2^+$
212.17 *14*	25.7 *9*	711.21+x	$13/2^+$	499.21+x	$11/2^+$
214.07 *16*	13.2 *5*	519.58+x	$11/2^+$	305.56+x	$9/2^+$
214.1[@] *3*	10.4 *5*	3417.2+x	$35/2^+$	3200.9+x	$33/2^+$
224.33[#] *16*	15.4 *5*	3180.3+x	$33/2^+$	2956.62+x	$31/2^+$
226.52 *14*	27.7 *7*	2956.62+x	$31/2^+$	2730.16+x	$29/2^+$
228.18 *14*	46.0 *9*	802.0+x	$15/2^+$	573.9+x	$13/2^+$
231.88 *20*	8.5 *6*	943.32+x	$15/2^+$	711.21+x	$13/2^+$
235.60 *3*	26.5 *6*	3436.5+x	$35/2^+$	3200.9+x	$33/2^+$
237.23 *14*	19.7 *6*	3417.2+x	$35/2^+$	3180.3+x	$33/2^+$
237.39 *16*	14.9 *8*	432.70+x	$9/2^+$	195.39+x	$7/2^+$
241.82 *15*	17.3 *6*	1197.29+x	$17/2^+$	955.32+x	$15/2^+$
244.11 *14*	25.2 *6*	3200.9+x	$33/2^+$	2956.62+x	$31/2^+$
244.33 *15*	17.3 *7*	955.32+x	$15/2^+$	711.21+x	$13/2^+$
246.69 *13*	33.8 *7*	1048.7+x	$17/2^+$	802.0+x	$15/2^+$
262.00 *14*	28.3 *7*	1310.5+x	$19/2^+$	1048.7+x	$17/2^+$
262.05 *18*	11.1 *6*	1740.01+x	$21/2^+$	1478.39+x	$19/2^+$
265.33 *14*	20.1 *6*	3682.4+x	$37/2^+$	3417.2+x	$35/2^+$
268.63 *20*	16.2 *6*	3705.2+x	$37/2^+$	3436.5+x	$35/2^+$
271.40 *14*	36.1 *7*	2730.16+x	$29/2^+$	2458.5+x	$27/2^+$
275.2 *10*	7.1 *4*	3981.0+x	$39/2^+$	3705.2+x	$37/2^+$
276.52 *13*	38.5 *7*	1587.0+x	$21/2^+$	1310.5+x	$19/2^+$
281.10 *16*	13.4 *6*	1478.39+x	$19/2^+$	1197.29+x	$17/2^+$
284.49 *15*	17.6 *7*	1871.5+x	$23/2^+$	1587.0+x	$21/2^+$
284.96 *17*	15.2 *9*	432.70+x	$9/2^+$	147.70+x	$5/2^+$
287.6 *10*	14.9 *7*	3970.0+x	$39/2^+$	3682.4+x	$37/2^+$
288.46 *15*	10.6 *5*	4269.8+x	$41/2^+$	3981.0+x	$39/2^+$
291.80 *14*	24.2 *6*	2458.5+x	$27/2^+$	2166.7+x	$25/2^+$
295.04 *14*	28.6 *6*	2166.7+x	$25/2^+$	1871.5+x	$23/2^+$
299.9 *10*	14.2 *5*	4269.8+x	$41/2^+$	3970.0+x	$39/2^+$
300.12 *15*	17.4 *10*	305.56+x	$9/2^+$	5.4+x	$5/2^+$
301.5 *10*	16.3 *6*	821.13+x	$13/2^+$	519.58+x	$11/2^+$
309.08 *20*	16.3 *8*	4579.2+x	$43/2^+$	4269.8+x	$41/2^+$
309.36 *15*	38.0 *9*	4888.5+x	$45/2^+$	4579.2+x	$43/2^+$
318.58 *13*	30.7 *5*	5539.4+x	$49/2^+$	5220.6+x	$47/2^+$
324.18 *12*	83.2 *17*	519.58+x	$11/2^+$	195.39+x	$7/2^+$
331.86 *14*	25.0 *5*	5220.6+x	$47/2^+$	4888.5+x	$45/2^+$
335.99 *14*	22.9 *6*	6236.0+x	$53/2^+$	5899.6+x	$51/2^+$
343.03 *12*	121 *3*	366.4+x	$11/2^+$	23.2+x	$7/2^+$
343.5 *3*	10.0 *10*	2222.7+x	$25/2^+$	1879.2+x	$(21/2^+)$
348.32 *20*	11.0 *5*	1291.99+x	$17/2^+$	943.32+x	$15/2^+$
357.56 *16*	24.5 *9*	499.21+x	$11/2^+$	141.44+x	$7/2^+$
360.06 *14*	22.8 *5*	5899.6+x	$51/2^+$	5539.4+x	$49/2^+$
365.94 *20*	9.1 *5*	6997.6+x	$57/2^+$	6632.0+x	$55/2^+$
388.46 *14*	33.4 *10*	821.13+x	$13/2^+$	432.70+x	$9/2^+$
391.71 *11*	142.6 *24*	573.9+x	$13/2^+$	182.2+x	$9/2^+$
395.84 *18*	13.9 *5*	6632.0+x	$55/2^+$	6236.0+x	$53/2^+$
398.62 *20*	13.3 *6*	7837.4+x	$61/2^+$	7439.0+x	$59/2^+$

Continued on next page (footnotes at end of table)

^{138}Ba(^{31}P,4nγ) 1995Sc39 (continued)

γ(^{165}Lu) (continued)

E_γ [†]	I_γ	E_i(level)	J_i^π	E_f	J_f^π
404.85 *20*	18.2 *10*	2753.44+x	29/2$^+$	2348.73+x	25/2$^+$
405.57 *16*	23.0 *11*	711.21+x	13/2$^+$	305.56+x	9/2$^+$
418.06 *14*	20.1 *4*	2956.62+x	31/2$^+$	2538.56+x	27/2$^+$
423.70 *12*	75.0 *13*	943.32+x	15/2$^+$	519.58+x	11/2$^+$
435.61 *12*	183.0 *25*	802.0+x	15/2$^+$	366.4+x	11/2$^+$
435.82 *16*	20.8 *8*	2730.16+x	29/2$^+$	2294.36+x	25/2$^+$
436.3 *4*	8.0 *9*	955.32+x	15/2$^+$	519.58+x	11/2$^+$
442.0 *3*	5.9 *5*	7439.0+x	59/2$^+$	6997.6+x	57/2$^+$
444.10 *15*	26.8 *8*	943.32+x	15/2$^+$	499.21+x	11/2$^+$
445.28 *24*	14.9 *9*	2709.1+x	(29/2$^+$)	2263.8+x	(25/2$^+$)
445.4 *3*	3.8 *9*	2263.8+x	(25/2$^+$)	1818.51+x	21/2$^+$
448.6 *3*	5.9 *6*	1740.01+x	21/2$^+$	1291.99+x	17/2$^+$
450.08 *13*	43.6 *9*	3180.3+x	33/2$^+$	2730.16+x	29/2$^+$
455.88 *18*	24.2 *10*	955.32+x	15/2$^+$	499.21+x	11/2$^+$
458.97 *15*	40.5 *11*	2753.44+x	29/2$^+$	2294.36+x	25/2$^+$
460.51 *15*	32.7 *10*	3417.2+x	35/2$^+$	2956.62+x	31/2$^+$
470.65 *18*	32.6 *10*	3200.9+x	33/2$^+$	2730.16+x	29/2$^+$
470.89 *15*	38.3 *11*	1291.99+x	17/2$^+$	821.13+x	13/2$^+$
474.73 *12*	163.6 *20*	1048.7+x	17/2$^+$	573.9+x	13/2$^+$
475.01[‡] *24*	10.4 *6*	2294.36+x	25/2$^+$	1818.51+x	21/2$^+$
479.83 *17*	23.0 *8*	3436.5+x	35/2$^+$	2956.62+x	31/2$^+$
480.0 *4*	6.9 *6*	3233.5+x	(33/2$^+$)	2753.44+x	29/2$^+$
486.10 *15*	34.7 *11*	1197.29+x	17/2$^+$	711.21+x	13/2$^+$
486.4 *4*	7.4 *8*	2709.1+x	(29/2$^+$)	2222.7+x	25/2$^+$
493.2 *3*	5.2 *7*	8330.7+x	63/2$^+$	7837.4+x	61/2$^+$
498.27 *18*	23.0 *7*	2956.62+x	31/2$^+$	2458.5+x	27/2$^+$
502.04 *16*	34.2 *10*	3682.4+x	37/2$^+$	3180.3+x	33/2$^+$
502.07 *12*	98.2 *15*	1445.39+x	19/2$^+$	943.32+x	15/2$^+$
508.41 *12*	197.1 *20*	1310.5+x	19/2$^+$	802.0+x	15/2$^+$
523.49 *18*	27.3 *13*	1478.39+x	19/2$^+$	955.32+x	15/2$^+$
523.6 *10*	5.0 *8*	2263.8+x	(25/2$^+$)	1740.01+x	21/2$^+$
524.44 *20*	11.5 *9*	3233.5+x	(33/2$^+$)	2709.1+x	(29/2$^+$)
526.14 *17*	38.0 *11*	1818.51+x	21/2$^+$	1291.99+x	17/2$^+$
530.23 *20*	18.5 *8*	2348.73+x	25/2$^+$	1818.51+x	21/2$^+$
538.25 *12*	174.9 *18*	1587.0+x	21/2$^+$	1048.7+x	17/2$^+$
542.58 *16*	34.7 *11*	1740.01+x	21/2$^+$	1197.29+x	17/2$^+$
544.65 *15*	33.9 *10*	3981.0+x	39/2$^+$	3436.5+x	35/2$^+$
544.73 *13*	92.9 *14*	1990.11+x	23/2$^+$	1445.39+x	19/2$^+$
548.45 *15*	36.7 *9*	2538.56+x	27/2$^+$	1990.11+x	23/2$^+$
552.9 *10*	36.5 *10*	3970.0+x	39/2$^+$	3417.2+x	35/2$^+$
554.59 *15*	33.7 *13*	2294.36+x	25/2$^+$	1740.01+x	21/2$^+$
561.03 *13*	151.6 *20*	1871.5+x	23/2$^+$	1310.5+x	19/2$^+$
562.5[a] *4*	5.0 *7*	3981.0+x	39/2$^+$	3417.2+x	35/2$^+$
563.56 *14*	84.0 *16*	2730.16+x	29/2$^+$	2166.7+x	25/2$^+$
564.0 *10*		4269.8+x	41/2$^+$	3705.2+x	37/2$^+$
564.03 *23*	16.3 *9*	2612.2+x	27/2$^+$	2048.1+x	23/2$^+$
569.75 *18*	22.9 *11*	2048.1+x	23/2$^+$	1478.39+x	19/2$^+$
579.74 *12*	165.0 *18*	2166.7+x	25/2$^+$	1587.0+x	21/2$^+$
582.36 *18*	21.5 *11*	3815.9+x	(37/2$^+$)	3233.5+x	(33/2$^+$)
587.02 *13*	110.8 *19*	2458.5+x	27/2$^+$	1871.5+x	23/2$^+$
587.46 *21*	14.3 *9*	4269.8+x	41/2$^+$	3682.4+x	37/2$^+$
587.7 *10*	6.8 *15*	2753.44+x	29/2$^+$	2166.7+x	25/2$^+$
598.55 *15*	40.7 *10*	4579.2+x	43/2$^+$	3981.0+x	39/2$^+$
608.84 *20*	18.1 *10*	2348.73+x	25/2$^+$	1740.01+x	21/2$^+$
609.3 *10*	18.9 *7*	4579.2+x	43/2$^+$	3970.0+x	39/2$^+$

Continued on next page (footnotes at end of table)

^{138}Ba(^{31}P,4nγ) 1995Sc39 (continued)

γ(^{165}Lu) (continued)

E_γ [†]	I_γ	E_i(level)	J_i^π	E_f	J_f^π
618.51 *15*	44.7 *8*	4888.5+x	45/2$^+$	4269.8+x	41/2$^+$
641.3[&] *2*	20.6[b] *10*	4457.2+x	(41/2$^+$)	3815.9+x	(37/2$^+$)
641.44 *17*	37.9 *11*	5220.6+x	47/2$^+$	4579.2+x	43/2$^+$
643.7 *10*	29.1 *12*	4613.7+x	43/2$^+$	3970.0+x	39/2$^+$
651.13 *15*	45.3 *10*	5539.4+x	49/2$^+$	4888.5+x	45/2$^+$
679.18 *18*	24.2 *7*	5899.6+x	51/2$^+$	5220.6+x	47/2$^+$
696.10 *20*	19.7 *9*	5153.3+x	(45/2$^+$)	4457.2+x	(41/2$^+$)
696.73 *17*	29.8 *9*	6236.0+x	53/2$^+$	5539.4+x	49/2$^+$
712.0 *10*	26.0 *9*	5325.7+x	47/2$^+$	4613.7+x	43/2$^+$
732.95 *20*	23.6 *8*	6632.0+x	55/2$^+$	5899.6+x	51/2$^+$
750.73 *20*	20.6 *9*	5904.0+x	(49/2$^+$)	5153.3+x	(45/2$^+$)
761.39 *18*	31.1 *8*	6997.6+x	57/2$^+$	6236.0+x	53/2$^+$
775.8 *10*	18.0 *8*	6101.5+x	51/2$^+$	5325.7+x	47/2$^+$
803.5 *3*	14.0 *7*	6707.5+x	(53/2$^+$)	5904.0+x	(49/2$^+$)
806.93 *20*	28.6 *9*	7439.0+x	59/2$^+$	6632.0+x	55/2$^+$
839.50 *22*	22.1 *8*	7837.4+x	61/2$^+$	6997.6+x	57/2$^+$
855.31 *25*	14.9 *7*	7562.8+x	(57/2$^+$)	6707.5+x	(53/2$^+$)
891.77 *25*	17.9 *8*	8330.7+x	63/2$^+$	7439.0+x	59/2$^+$
907.5 *3*	9.1 *7*	8470.3+x	(61/2$^+$)	7562.8+x	(57/2$^+$)
917.66 *24*	20.3 *8*	8755.1+x	65/2$^+$	7837.4+x	61/2$^+$
962.3 *4*	8.0 *7*	9432.6+x	(65/2$^+$)	8470.3+x	(61/2$^+$)
975.0 *3*	14.0 *8*	9305.7+x	67/2$^+$	8330.7+x	63/2$^+$

[†] From (^{31}P,4nγ) and (^{19}F,4nγ) reactions.
[‡] Poor fit; level-energy difference=475.85.
[#] Poor fit; level-energy difference=223.71.
[@] Poor fit; level-energy difference=216.2.
[&] From level-energy difference. This gamma ray is not listed in table 1 of 1995Sc39. Uncertainty is assigned by the evaluators.
[a] Poor fit; level-energy difference=563.8.
[b] From the average of Iγ(696γ) and Iγ(582γ). Intensity is not available from 1995Sc39.

^{138}Ba(^{31}P,4nγ) 1995Sc39

Level Scheme

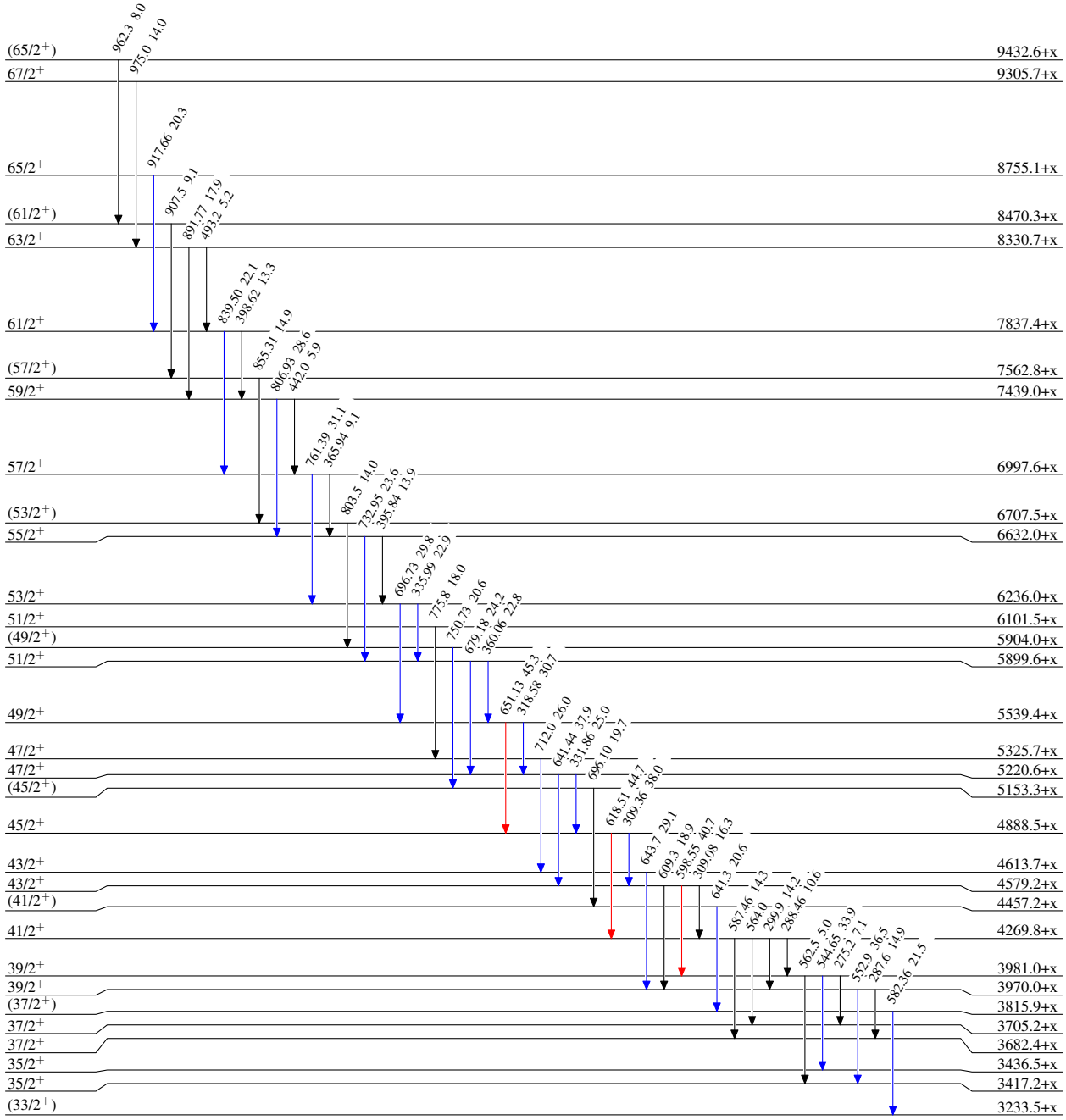
Intensities: Relative I_γ

Legend

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

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

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

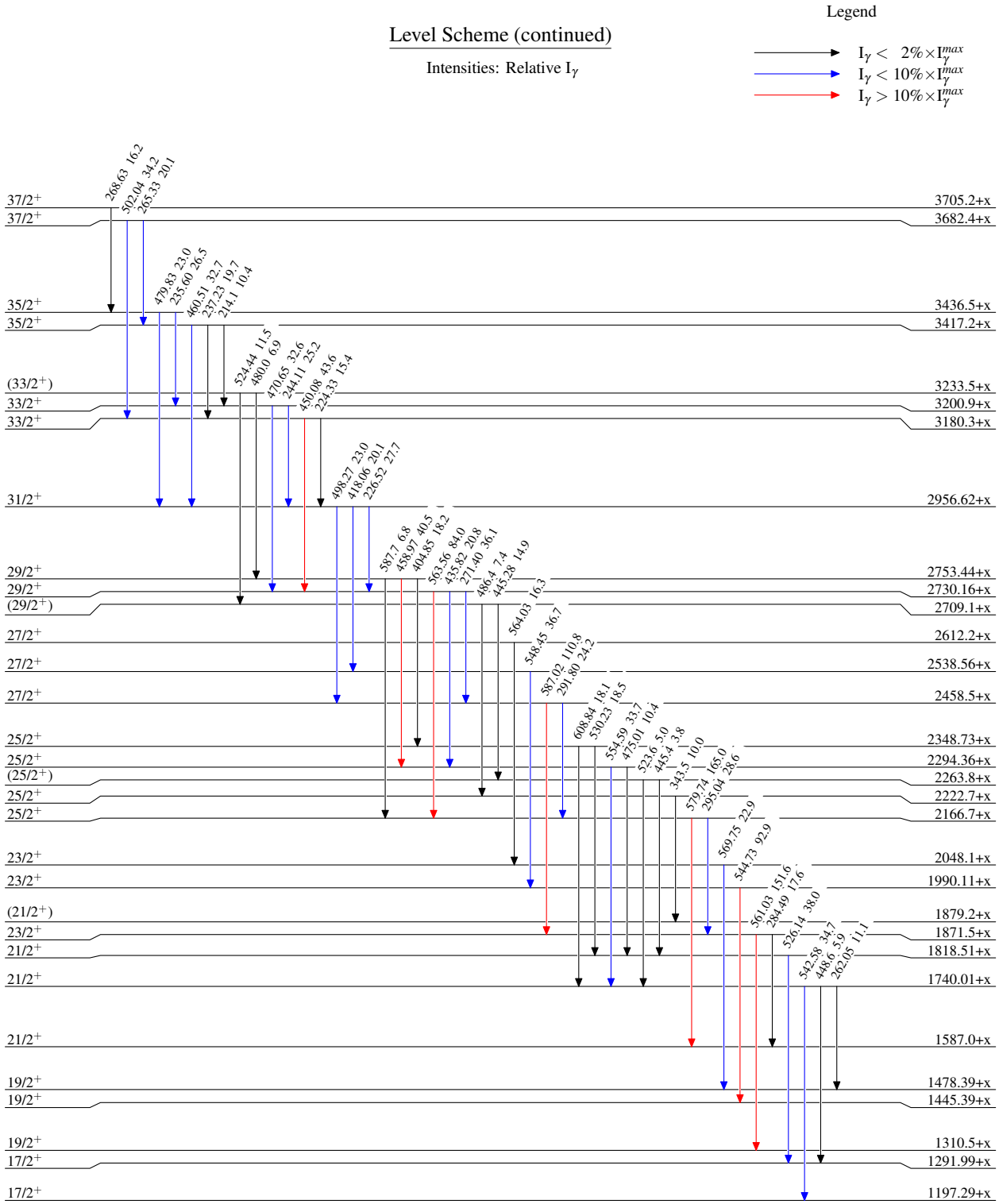


$^{165}_{71}Lu_{94}$

^{138}Ba(^{31}P,4nγ) 1995Sc39

Level Scheme (continued)

Intensities: Relative I_γ

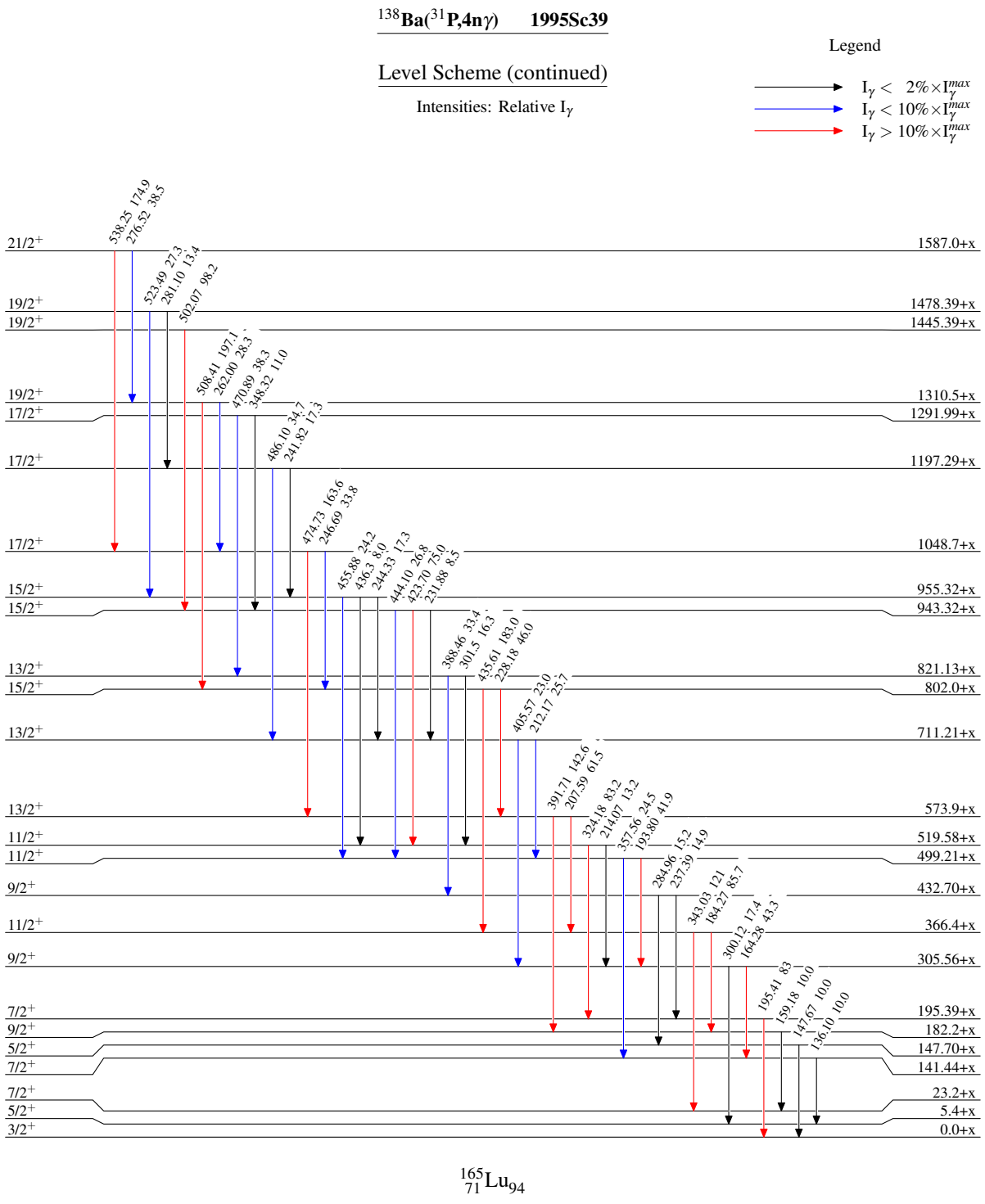


$^{165}_{71}Lu_{94}$

^{138}Ba(^{31}P,4nγ) 1995Sc39

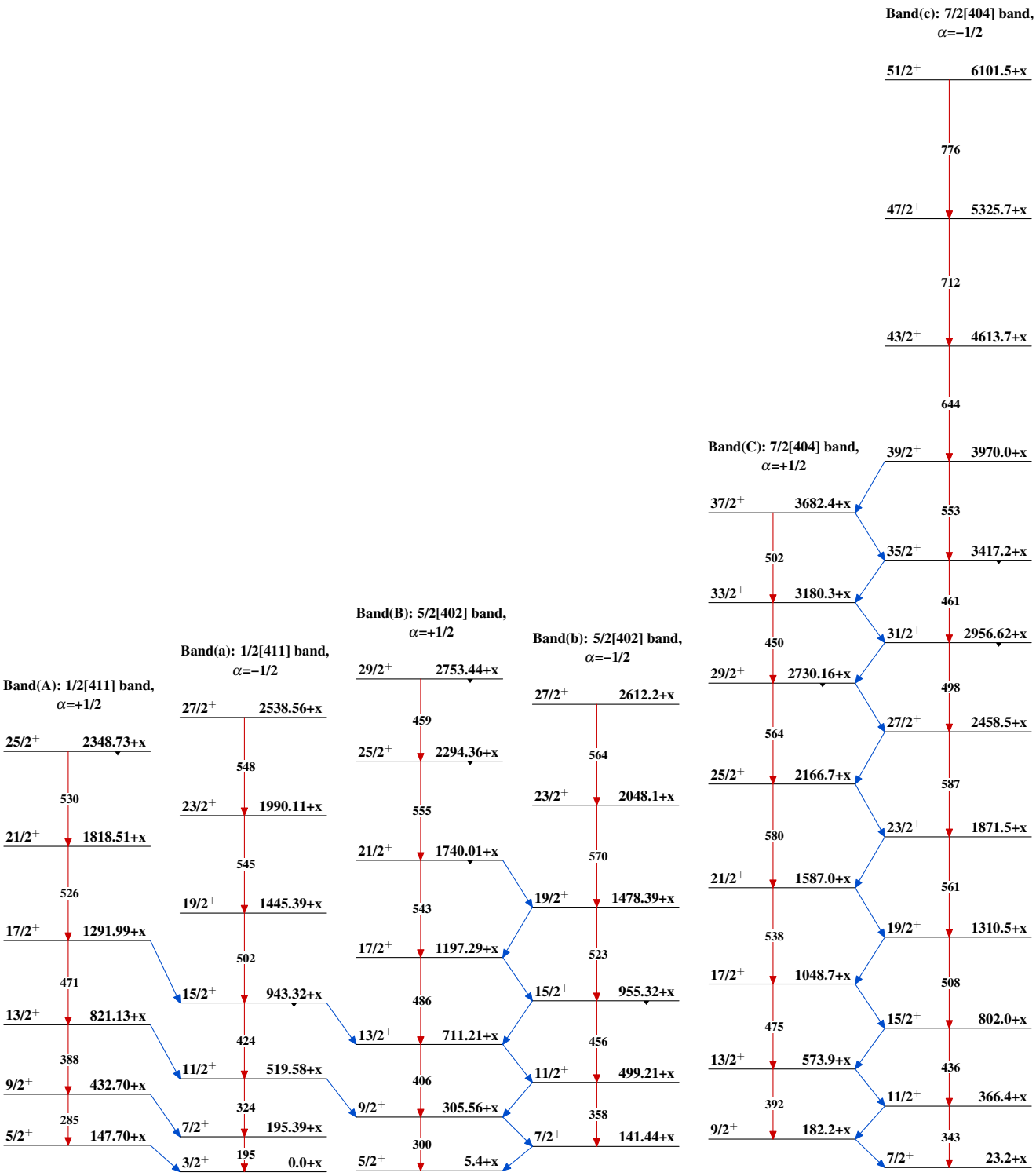
Level Scheme (continued)

Intensities: Relative I_γ



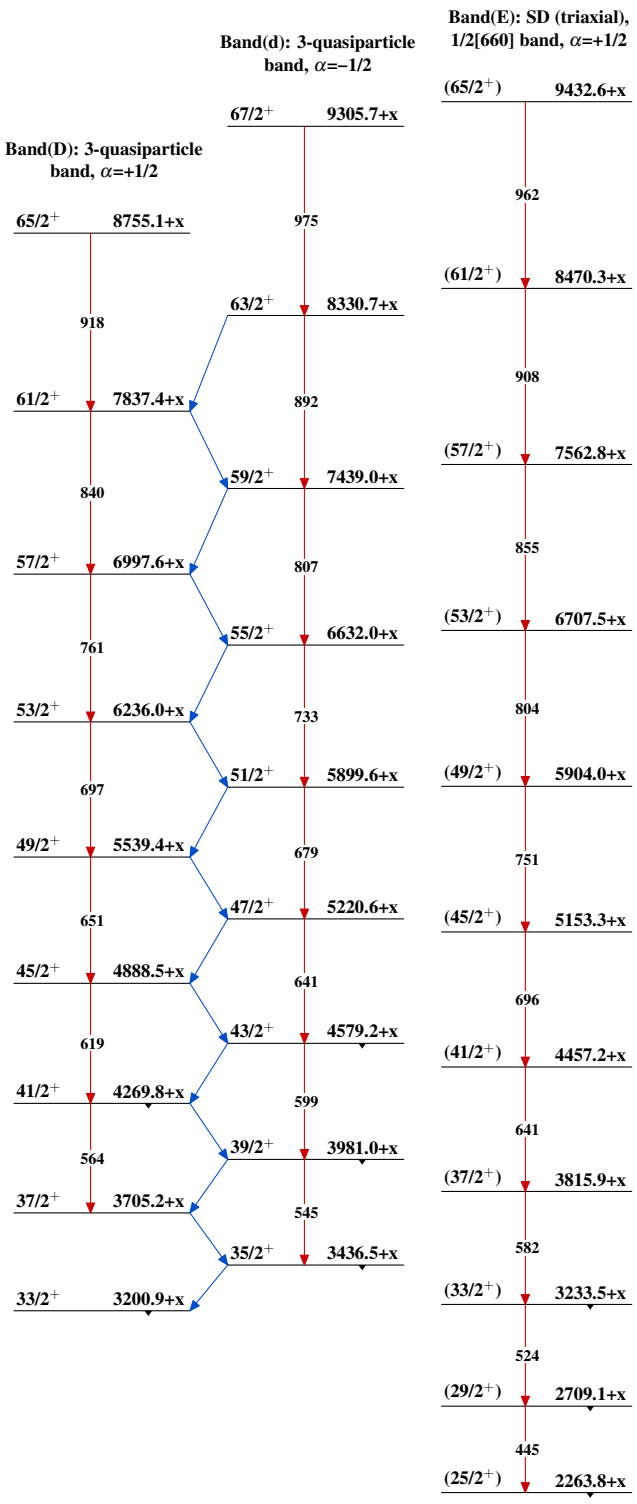
$^{165}_{71}Lu_{94}$

^{138}Ba(^{31}P,4nγ) 1995Sc39



$^{165}_{71}Lu_{94}$

^{138}Ba(^{31}P,4nγ) 1995Sc39 (continued)



$^{165}_{71}Lu_{94}$

^{139}La(^{30}Si,4nγ) 2004Sc14,2003Sc02,2005An04

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Ashok K. Jain and Anwesha Ghosh, Balraj Singh	NDS 107, 1075 (2006)	15-Apr-2006

Includes ^{124}Sn(^{45}Sc,4nγ) from 2002Sc47 for lifetime data and deduced quadrupole moments.

2004Sc14, 2003Sc02: E=152 MeV. Measured Eγ, Iγ, $\gamma\gamma$, $\gamma\gamma$, $\gamma\gamma(\theta)$(DCO) with the EUROBALL spectrometer array, which comprised of 30 conventional large-volume tapered Ge detectors as well as 26 Clover and 15 Cluster composite Ge detectors. The Clover detectors consist of 4 Ge crystals each and the Clusters are composed of 7 crystals each. All detectors are surrounded by BGO scintillation detectors for Compton suppression. Also, an inner ball of 210 BGO detectors was used to as a multiplicity filter to enhance the detection of high-spin states which deexcite in long γ-ray cascades. Deduced normal-deformed and superdeformed structures.

2005An04: E=135 MeV. Measured lifetimes of normal-deformed states In four low-lying rotational bands using differential decay-curve method (DDCM) In recoil-distance measurements; GASP array of 40 Compton-suppressed Ge detectors and 80 BGO detectors.

2002Sc47: ^{124}Sn(^{45}Sc,4nγ) E=217 MeV. Measured lifetimes by DSAM and deduced quadrupole moment.

All data are from 2004Sc14, unless otherwise stated.

Additional information 1.

^{165}Lu Levels

Q(transition)= Transition quadrupole moment.

Nomenclature for quasi-particle orbitals:

a: π1/2[411], α=+1/2.
b: π1/2[411], α=−1/2.
c: π7/2[404], α=+1/2.
d: π7/2[404], α=−1/2.
e: π9/2[514], α=+1/2.
f: π9/2[514], α=−1/2.
g: π7/2[523], α=+1/2.
h: π7/2[523], α=−1/2.
k: π5/2[402], α=+1/2.
l: π5/2[402], α=−1/2.
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.

The first alignment of pair of $i_{13/2}$ neutrons [AB] results in an alignment gain of 10$\hbar$ at $\hbar\omega$=0.25 MeV in most bands, except for the 1/2[541] band where the alignment is delayed. The alignments of the next pair of $i_{13/2}$ neutrons [BC] and [CD] occur at higher frequencies of $\hbar\omega\approx$0.31 and 0.40 MeV, respectively with an alignment gain of$\approx$4.5$\hbar$.

E(level)†	Jπ‡	E(level)†	Jπ‡	$T_{1/2}$#	E(level)†	Jπ‡	$T_{1/2}$#
0.0+x@d	3/2+	182.4+x[c] 4	9/2+		366.6+x[b] 4	11/2+	15.7 ps 15
5.4+x[h] 5	5/2+	195.39+x[d] 10	7/2+	133 ps 12	432.7+x[e] 4	9/2+	
23.4+x[b] 4	7/2+	234.9+x& 4	9/2−		466.48+x[f] 14	9/2−	58.7 ps 35
54.7+x 4	(7/2−)	305.6+x[h] 4	9/2+		494.7+x& 4	13/2−	13.0 ps 6
141.4+x[g] 4	7/2+	335.5+x[a] 4	11/2−		499.3+x[g] 4	11/2+	
147.7+x[e] 4	5/2+	345.5+x[f] 5	5/2−		519.60+x[d] 14	11/2+	14.9 ps 7

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^{139}La(^{30}Si,4nγ) 2004Sc14,2003Sc02,2005An04 (continued)

^{165}Lu Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$#	E(level)†	Jπ‡
574.2+x[c] 4	13/2+	6.70 ps 24	2956.8+x[b] 4	31/2+
662.7+x[a] 4	15/2−	6.65 ps 35	2968.4+x[i] 4	31/2+
694.77+x[f] 17	13/2−	33.3 ps 14	2999.7+x[d] 5	31/2+
711.4+x[h] 3	13/2+		3038.6+x[&] 4	33/2−
802.2+x[b] 4	15/2+	3.66 ps 16	3043.4+x[g] 11	31/2+
821.2+x[e] 4	13/2+		3067.1+x[q] 8	31/2−
893.3+x[&] 4	17/2−	2.91 ps 12	3180.4+x[c] 5	33/2+
943.4+x[d] 3	15/2+	1.84 ps 17	3195.2+x[f] 4	33/2−
955.5+x[g] 4	15/2+		3201.1+x[j] 5	33/2+
1030.17+x[f] 20	17/2−	7.77 ps 17	3222.2+x[p] 5	33/2−
1048.9+x[c] 4	17/2+	2.17 ps 8	3224.6+x[h] 7	33/2+
1099.5+x[a] 4	19/2−	1.70 ps 6	3240.1+x[r] 7	33/2+
1197.5+x[h] 4	17/2+		3248.2+x[a] 4	35/2−
1292.1+x[e] 5	17/2+		3417.3+x[b] 5	35/2+
1310.6+x[b] 4	19/2+		3436.6+x[i] 5	35/2+
1386.4+x[&] 4	21/2−	1.25 ps 18	3471.7+x[d] 7	35/2+
1445.5+x[d] 3	19/2+	2.16 ps 10	3474.9+x[&] 4	37/2−
1462.25+x[f] 22	21/2−	2.8 ps 7	3484.8+x[o] 5	35/2−
1478.6+x[g] 5	19/2+		3602.2+x[q] 8	35/2−
1587.0+x[c] 4	21/2+	1.10 ps 8	3682.5+x[c] 5	37/2+
1618.3+x[a] 4	23/2−	0.98 ps 7	3705.4+x[j] 6	37/2+
1740.2+x[h] 4	21/2+		3734.9+x[a] 4	39/2−
1769.6+x[q] 7	19/2−		3754.6+x[h] 8	37/2+
1818.6+x[e] 5	21/2+		3765.2+x[r] 8	37/2+
1871.6+x[b] 4	23/2+		3823.8+x[p] 5	37/2−
1945.0+x[&] 4	25/2−		3853.5+x[f] 6	37/2−
1978.64+x[f] 24	25/2−		3864.5+x[s] 10	35/2+
1990.2+x[d] 3	23/2+		3970.2+x[b] 5	39/2+
2048.3+x[g] 6	23/2+		3980.9+x[i] 5	39/2+
2155.6+x[q] 6	23/2−		4009.9+x[&] 4	41/2−
2166.7+x[c] 4	25/2+		4034.7+x[d] 8	39/2+
2195.9+x[a] 4	27/2−		4116.8+x[o] 6	39/2−
2294.5+x[h] 5	25/2+		4184.9+x[q] 8	39/2−
2348.8+x[e] 5	25/2+		4270.0+x[j] 5	41/2+
2409.3+x[r] 7	25/2+		4290.5+x[c] 6	41/2+
2458.6+x[b] 4	27/2+		4321.9+x[a] 4	43/2−
2534.9+x[&] 4	29/2−		4347.3+x[r] 9	41/2+
2538.6+x[d] 4	27/2+		4374.0+x[h] 9	41/2+
2545.0+x[i] 4	27/2+		4403.4+x[s] 10	39/2+
2564.3+x[f] 3	29/2−		4453.4+x[p] 6	41/2−
2585.7+x[q] 6	27/2−		4490.6+x[f] 7	41/2−
2612.3+x[g] 7	27/2+		4575.0+x[n] 8	41/2−
2730.3+x[c] 4	29/2+		4579.4+x[i] 5	43/2+
2753.6+x[h] 5	29/2+		4613.9+x[b] 6	43/2+
2765.2+x[j] 5	29/2+		4644.9+x[&] 4	45/2−
2789.0+x[a] 4	31/2−		4686.7+x[d] 8	43/2+
2794.1+x[r] 6	29/2+		4773.2+x[o] 7	43/2−
2947.1+x[o] 5	31/2−		4788.2+x[t] 14	41/2+

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^{139}La(^{30}Si,4nγ) 2004Sc14,2003Sc02,2005An04 (continued)

^{165}Lu Levels (continued)

E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡
4800.2+x[q] 8	43/2$^-$	6886.5+x[q] 9	55/2$^-$	9133.5+x[c] 18	65/2$^+$
4888.7+x[j] 5	45/2$^+$	6904.3+x[t] 12	53/2$^+$	9155.7+x[n] 16	65/2$^-$
4960.5+x[c] 6	45/2$^+$	6907.6+x[b] 9	55/2$^+$	9160.9+x[h] 20	65/2$^+$
4988.6+x[r] 10	45/2$^+$	6947.1+x[o] 10	55/2$^-$	9198.6+x[a] 9	67/2$^-$
4996.1+x[a] 4	47/2$^-$	6982.1+x[&] 6	57/2$^-$	9242.4+x[f] 20	65/2$^-$
5001.4+x[s] 10	43/2$^+$	6994.7+x[d] 13	55/2$^+$	9265.0+x[m] 20	(65/2)$^-$
5068.9+x[h] 10	45/2$^+$	6998.0+x[j] 7	57/2$^+$	9308.7+x[i] 10	67/2$^+$
5115.5+x[p] 7	45/2$^-$	7133.6+x[s] 12	55/2$^+$	9457.3+x[t] 19	65/2$^+$
5145.1+x[f] 9	45/2$^-$	7239.0+x[r] 12	57/2$^+$	9475.1+x[q] 15	67/2$^-$
5173.9+x[n] 8	45/2$^-$	7240.5+x[l] 10	57/2$^+$	9544.9+x[k] 14	67/2$^+$
5220.8+x[i] 6	47/2$^+$	7287.9+x[p] 10	57/2$^-$	9607.1+x[b] 17	67/2$^+$
5325.9+x[b] 7	47/2$^+$	7338.5+x[c] 14	57/2$^+$	9642.9+x[o] 17	67/2$^-$
5363.5+x[&] 4	49/2$^-$	7354.6+x[n] 10	57/2$^-$	9671.7+x[d] 19	67/2$^+$
5393.7+x 8	47/2$^+$	7383.2+x[a] 6	59/2$^-$	9742.6+x[j] 10	69/2$^+$
5435.6+x[d] 10	47/2$^+$	7418.3+x[h] 16	57/2$^+$	9752.2+x[s] 19	67/2$^+$
5446.5+x[q] 8	47/2$^-$	7431.2+x[f] 17	57/2$^-$	9780.9+x[&] 10	69/2$^-$
5449.5+x[t] 12	45/2$^+$	7439.2+x[i] 8	59/2$^+$	9966.5+x[r] 19	69/2$^+$
5475.5+x[o] 7	47/2$^-$	7467.0+x[m] 17	(57/2)$^-$	9991.0+x[p] 14	69/2$^-$
5539.6+x[j] 6	49/2$^+$	7677.9+x[k] 10	59/2$^+$	10072.5+x[l] 16	69/2$^+$
5656.5+x[s] 11	47/2$^+$	7693.8+x[q] 10	59/2$^-$	10107.5+x[c] 20	69/2$^+$
5685.4+x[r] 10	49/2$^+$	7703.0+x[t] 15	57/2$^+$	10129.2+x[n] 18	69/2$^-$
5695.5+x[c] 8	49/2$^+$	7760.3+x[b] 12	59/2$^+$	10175.0+x[a] 10	71/2$^-$
5740.2+x[a] 5	51/2$^-$	7788.4+x[o] 13	59/2$^-$	10207.5+x[f] 22	69/2$^-$
5786.3+x[p] 8	49/2$^-$	7837.5+x[j] 7	61/2$^+$	10367.1+x[i] 11	71/2$^+$
5823.9+x[h] 11	49/2$^+$	7841.7+x[d] 15	59/2$^+$	10414.8+x[t] 20	69/2$^+$
5825.1+x[n] 8	49/2$^-$	7863.9+x[&] 7	61/2$^-$	10449.0+x[q] 17	71/2$^-$
5845.1+x[f] 12	49/2$^-$	7953.5+x[s] 15	59/2$^+$	10546.9+x[k] 17	71/2$^+$
5860.9+x[m] 12	(49/2)$^-$	8094.7+x[r] 15	61/2$^+$	10594.0+x[b] 19	71/2$^+$
5899.8+x[i] 6	51/2$^+$	8114.5+x[l] 11	61/2$^+$	10644.8+x[o] 19	71/2$^-$
6080.9+x[k] 7	51/2$^+$	8127.8+x[p] 10	61/2$^-$	10646.7+x[d] 21	71/2$^+$
6101.7+x[b] 8	51/2$^+$	8212.5+x[c] 16	61/2$^+$	10733.3+x[s] 20	71/2$^+$
6137.9+x[q] 9	51/2$^-$	8226.8+x[n] 13	61/2$^-$	10793.7+x[j] 13	73/2$^+$
6146.7+x[&] 5	53/2$^-$	8258.1+x[h] 18	61/2$^+$	10826.9+x[&] 13	73/2$^-$
6155.5+x[t] 11	49/2$^+$	8269.2+x[a] 7	63/2$^-$	10985.9+x[r] 20	73/2$^+$
6178.5+x[o] 8	51/2$^-$	8312.2+x[f] 18	61/2$^-$	11017.3+x[p] 16	73/2$^-$
6188.7+x[d] 10	51/2$^+$	8330.8+x[i] 9	63/2$^+$	11142.0+x[n] 19	73/2$^-$
6236.3+x[j] 6	53/2$^+$	8336.7+x[m] 18	(61/2)$^-$	11193.9+x[f] 23	73/2$^-$
6367.9+x[s] 11	51/2$^+$	8552.6+x[t] 17	61/2$^+$	11201.6+x[a] 11	75/2$^-$
6435.7+x[r] 11	53/2$^+$	8556.9+x[q] 13	63/2$^-$	11425.9+x[t] 22	73/2$^+$
6448.5+x[l] 8	53/2$^+$	8584.9+x[k] 12	63/2$^+$	11477.1+x[q] 19	75/2$^-$
6507.5+x[p] 9	53/2$^-$	8660.4+x[b] 15	63/2$^+$	11496.8+x[i] 14	75/2$^+$
6511.5+x[c] 11	53/2$^+$	8691.6+x[o] 15	63/2$^-$	11582.9+x[k] 18	75/2$^+$
6538.8+x[a] 5	55/2$^-$	8733.7+x[d] 17	63/2$^+$	11612.3+x[b] 20	75/2$^+$
6552.2+x[n] 9	53/2$^-$	8754.6+x[j] 9	65/2$^+$	11656.7+x[d] 22	75/2$^+$
6608.6+x[f] 14	53/2$^-$	8794.9+x[&] 9	65/2$^-$	11683.8+x[o] 20	75/2$^-$
6613.4+x[h] 14	53/2$^+$	8825.6+x[s] 17	63/2$^+$	11768.4+x[s] 22	75/2$^+$
6632.3+x[i] 7	55/2$^+$	9003.5+x[r] 17	65/2$^+$	11899.2+x[j] 15	77/2$^+$
6642.2+x[m] 14	(53/2)$^-$	9027.9+x[p] 12	65/2$^-$	11935.8+x[&] 15	77/2$^-$
6841.9+x[k] 9	55/2$^+$	9067.5+x[l] 14	65/2$^+$	12062.1+x[r] 22	77/2$^+$

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^{139}La(^{30}Si,4nγ) 2004Sc14,2003Sc02,2005An04 (continued)

^{165}Lu Levels (continued)

E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡
12105.3+x[p] 18	77/2−	13592.5+x[t] 25	81/2+	2049.0+y[u] 14	J+6
12189.8+x[n] 21	77/2−	13686.4+x[q] 22	83/2−	2847.3+y[u] 16	J+8
12215.6+x[f] 24	77/2−	13715.0+x[b] 23	83/2+	3703.3+y[u] 18	J+10
12277.6+x[a] 14	79/2−	13829.7+x[d] 25	83/2+	4618.9+y[u] 20	J+12
12485.0+x[t] 23	77/2+	14009.0+x[s] 25	83/2+	5594.2+y[u] 22	J+14
12558.7+x[q] 21	79/2−	14199.8+x[j] 19	85/2+	6631.2+y[u] 23	J+16
12643.9+x[k] 20	79/2+	14384.9+x[r] 25	85/2+	z[v]	J1
12649.9+x[b] 22	79/2+	14558.1+x[a] 18	87/2−	712.2+z[v] 8	J1+2
12678.8+x[i] 16	79/2+	14848.9+x[q] 24	87/2−	1482.4+z[v] 12	J1+4
12720.7+x[d] 24	79/2+	15209+x[s] 3	87/2+	2311.3+z[v] 14	J1+6
12858.0+x[s] 23	79/2+	15624+x[r] 3	89/2+	3197.1+z[v] 16	J1+8
13041.3+x[j] 17	81/2+	15745.1+x[a] 20	91/2−	4140.8+z[v] 18	J1+10
13102.3+x[&] 17	81/2−	16463+x?[s] 3	(91/2+)	5143.3+z[v] 20	J1+12
13195.6+x[r] 23	81/2+	y[u]	J	6206.3+z[v] 22	J1+14
13245.0+x[p] 20	81/2−	624.5+y[u] 8	J+2		
13399.3+x[a] 16	83/2−	1308.3+y[u] 12	J+4		

† From least-squares fit to Eγ′s.

‡ As proposed by 2004Sc14 based on γγ(θ)(DCO) data for selected transitions and band assignments. The assignments are consistent with those in 'Adopted Levels', except that all are given in parentheses there due to lack of strong supporting arguments.

From differential decay curve method In recoil-distance measurements (DDCM,2005An04).

@ x ≈ 20 keV; see 'Adopted Levels' for comments.

& Band(A): 9/2[514], α=+1/2. Changes to 9/2[514]⊗[AB] at ħω=0.25 MeV and spin range of 29/2 to 31/2, and 9/2[514]⊗[ABCD] at higher frequencies.

[a] Band(a): 9/2[514], α=−1/2. See comment for the α=+1/2 signature partner of this band.

[b] Band(B): 7/2[404], α=−1/2. From low to high spins, configuration changes to 7/2[404]⊗[AB], then to 7/2[404]⊗[ABCD], and finally to 7/2[404]⊗[ABCDEF].

[c] Band(b): 7/2[404], α=+1/2. See comment for the α=−1/2 signature partner of this band.

[d] Band(C): 1/2[411], α=−1/2. At higher spins, configuration=1/2[411]⊗[AB], and then 1/2[411]⊗[ABCD].

[e] Band(c): 1/2[411], α=+1/2.

[f] Band(D): 1/2[541], α=+1/2. From low to high spins, configuration changes to 1/2[541]⊗[AB], then to 1/2[541]⊗[ABCD] and finally to 1/2[541]⊗[ABCDEF].

[g] Band(E): 5/2[402], α=−1/2.

[h] Band(e): 5/2[402], α=+1/2. From low to high spins, configuration changes to 5/2[402]⊗[AB], and then to 5/2[402]⊗[ABCD].

[i] Band(F): 9/2[514]⊗[AE], α=−1/2. At higher spins, the configuration changes to 9/2[514]⊗[AEBC]. The upbend at ħω≈0.56 MeV near spin 59/2 may be due to the alignment of proton pair fg or gh, with the resulting configuration=9/2[514]⊗[AEBC(fg and/or gh)].

[j] Band(f): 9/2[514]⊗[AE], α=+1/2. See comment for α=−1/2 signature partner of this band.

[k] Band(G): 9/2[514]⊗[AHBC], α=−1/2. At higher frequencies, the configuration is probably 9/2[514]⊗[AHBCEF].

[l] Band(g): 9/2[514]⊗[AHBC], α=+1/2. See comment for the α=−1/2 signature partner of this band.

[m] Band(H): band #1, α=+1/2. This band probably decays into the 1/2[541] band.

[n] Band(I): Band #2, α=+1/2. See comment for band #3. Configuration for band #2 changes from 7/2[4040]⊗[AE] at high spins to 9/2[514]⊗[BC] at low spins.

[o] Band(i): Band #3, α=−1/2. Bands #2 to #5 form pairs of signature partners above spin 45/2. At lower spins, the bands seem to form different pairs, where band #4 interchanges character with band #2 and band #3 and band #4 seem to be signature partners. From low to high spins, configuration for band #3 is 9/2[514], 9/2[514]⊗[BC], and finally to 9/2[514]⊗[BCEF].

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^{139}La(^{30}Si,4nγ) 2004Sc14,2003Sc02,2005An04 (continued)

^{165}Lu Levels (continued)

[p] Band(J): Band #4, α=+1/2. See comment for band #3. Configuration for band #4 changes from 9/2[514]⊗[BC] at high spins to 7/2[404]⊗[AE] at low spins.
[q] Band(j): band #5, α=−1/2. See comment for band #3. The configuration changes from unfavored 1/2[541] or from 7/2[404]+octupole vibration at low spin to 7/2[404]⊗[AE] at high spins.
[r] Band(K): Zero-phonon wobbling-mode (Triaxial) SD-1 band (2004Sc14,2003Sc02,1995Sc39). Q(transition)=6.0 *+12−2*, 6.4 *+19−7* (2002Sc47). 1/2[660] band, α=+1/2. Percent feeding=1.3 (2003Sc02).
[s] Band(L): One-phonon wobbling mode (Triaxial) SD-2 band (2004Sc14,2003Sc02). Percent feeding=0.4.
[t] Band(M): Two-phonon wobbling mode (Triaxial) SD-3 band (2004Sc14,2003Sc02). Percent feeding=0.1.
[u] Band(N): Triaxial SD-4 band (2004Sc14).
[v] Band(O): Triaxial SD-5 band (2004Sc14).

γ(^{165}Lu)

R(DCO) are for 25° and 90°. The DCO ratios correspond to gates on ΔJ=2, quadrupole transitions. The ratio of 1 implies ΔJ=2, quadrupole (most likely E2) and DCO≈0.5 implies ΔJ=1, dipole transition.

E_γ[†#]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	Comments
48.0		195.39+x	$7/2^+$	147.7+x	$5/2^+$		
93.6 *1*		234.9+x	$9/2^-$	141.4+x	$7/2^+$		
100.6 *3*	12 *2*	335.5+x	$11/2^-$	234.9+x	$9/2^-$	D	DCO=0.48 *6*
121.1 *8*	1.2 *4*	466.48+x	$9/2^-$	345.5+x	$5/2^-$		
136.1 *5*	5.8 *14*	141.4+x	$7/2^+$	5.4+x	$5/2^+$	D	DCO=0.46 *5*
147.7 *5*	5.8 *14*	147.7+x	$5/2^+$	0.0+x	$3/2^+$	D	DCO=0.52 *6*
152.7 *8*	1.2 *4*	335.5+x	$11/2^-$	182.4+x	$9/2^+$	D	DCO=0.5 *1*
159.2 *1*	57 *5*	182.4+x	$9/2^+$	23.4+x	$7/2^+$	D	DCO=0.64 *7*
159.4 *1*	88 *7*	494.7+x	$13/2^-$	335.5+x	$11/2^-$	D	DCO=0.55 *6*
164.3 *3*	11.1 *17*	305.6+x	$9/2^+$	141.4+x	$7/2^+$	D	DCO=0.57 *6*
168.2 *1*	77 *6*	662.7+x	$15/2^-$	494.7+x	$13/2^-$	D	DCO=0.58 *6*
175.1 *5*	4.9 *12*	694.77+x	$13/2^-$	519.60+x	$11/2^+$	D	DCO=0.4 *1*
180.2 *1*	108 *9*	234.9+x	$9/2^-$	54.7+x	$(7/2^-)$	D	DCO=0.60 *6*
184.3 *1*	28.4 *23*	366.6+x	$11/2^+$	182.4+x	$9/2^+$	D	DCO=0.61 *7*
191.6 *8*	2.4 *7*	711.4+x	$13/2^+$	519.60+x	$11/2^+$		
193.8 *3*	15.7 *24*	499.3+x	$11/2^+$	305.6+x	$9/2^+$	D	DCO=0.56 *5*
195.4 *1*	63 *5*	195.39+x	$7/2^+$	0.0+x	$3/2^+$	(E2)	DCO=0.65 *7*
203.1 *5*	5.2 *13*	2968.4+x	$31/2^+$	2765.2+x	$29/2^+$	D	DCO=0.60 *7*
206.4 *1*	72 *6*	1099.5+x	$19/2^-$	893.3+x	$17/2^-$	D	DCO=0.68 *6*
207.6 *1*	23.0 *18*	574.2+x	$13/2^+$	366.6+x	$11/2^+$	D	DCO=0.73 *9*
209.7 *1*	64 *5*	3248.2+x	$35/2^-$	3038.6+x	$33/2^-$	D	DCO=0.60 *7*
211.5 *1*	119 *10*	234.9+x	$9/2^-$	23.4+x	$7/2^+$	D	DCO=0.60 *6*
212.2 *3*	10.4 *16*	711.4+x	$13/2^+$	499.3+x	$11/2^+$	D	DCO=0.46 *6*
214.1 *5*	3.8 *10*	519.60+x	$11/2^+$	305.6+x	$9/2^+$		
214.1 *8*	1.2 *4*	3417.3+x	$35/2^+$	3201.1+x	$33/2^+$	D	
220.2 *8*	1.5 *4*	2765.2+x	$29/2^+$	2545.0+x	$27/2^+$		
224.3[@] *5*	8.4 *21*	3180.4+x	$33/2^+$	2956.8+x	$31/2^+$		
226.5 *3*	14.2 *21*	2956.8+x	$31/2^+$	2730.3+x	$29/2^+$	D	DCO=0.64 *8*
226.8 *1*	59 *5*	3474.9+x	$37/2^-$	3248.2+x	$35/2^-$	D	DCO=0.56 *6*
228.2 *3*	14.6 *22*	802.2+x	$15/2^+$	574.2+x	$13/2^+$	D	DCO=0.80 *11*
228.3 *1*	28.8 *23*	694.77+x	$13/2^-$	466.48+x	$9/2^-$		DCO=0.64 *6*
230.7 *1*	86 *7*	893.3+x	$17/2^-$	662.7+x	$15/2^-$	D	DCO=0.61 *7*
231.9 *5*	6.5 *16*	943.4+x	$15/2^+$	711.4+x	$13/2^+$	D	DCO=0.70 *6*
232.1 *1*	43 *3*	1618.3+x	$23/2^-$	1386.4+x	$21/2^-$	D	DCO=0.71 *8*
235.6 *3*	11.8 *18*	3436.6+x	$35/2^+$	3201.1+x	$33/2^+$	D	DCO=0.49 *7*
237.2 *3*	10.7 *16*	3417.3+x	$35/2^+$	3180.4+x	$33/2^+$	D	DCO=0.53 *8*

Continued on next page (footnotes at end of table)

^{139}La(^{30}Si,4nγ) 2004Sc14,2003Sc02,2005An04 (continued)

γ(^{165}Lu) (continued)

E_γ[†][#]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	Comments
237.4 *5*	4.9 *12*	432.7+x	9/2$^+$	195.39+x	7/2$^+$	D	DCO=0.63 *6*
241.8 *5*	6.6 *16*	1197.5+x	17/2$^+$	955.5+x	15/2$^+$	D	DCO=0.58 *6*
244.1 *5*	8.2 *20*	3201.1+x	33/2$^+$	2956.8+x	31/2$^+$	D	DCO=0.48 *7*
244.3 *5*	7.7 *19*	955.5+x	15/2$^+$	711.4+x	13/2$^+$		
246.3 *8*	1.3 *4*	2294.5+x	25/2$^+$	2048.3+x	23/2$^+$		
246.7 *3*	10.8 *16*	1048.9+x	17/2$^+$	802.2+x	15/2$^+$	D	DCO=0.72 *9*
249.7 *1*	50 *4*	3038.6+x	33/2$^-$	2789.0+x	31/2$^-$	D	DCO=0.56 *6*
251.0 *1*	27.9 *22*	2195.9+x	27/2$^-$	1945.0+x	25/2$^-$	D	DCO=0.64 *6*
254.1 *1*	27.2 *22*	2789.0+x	31/2$^-$	2534.9+x	29/2$^-$	D	DCO=0.60 *6*
259.8[@] *1*	65 *5*	494.7+x	13/2$^-$	234.9+x	9/2$^-$		
260.0[@] *1*	43 *3*	3734.9+x	39/2$^-$	3474.9+x	37/2$^-$		
262.0 *5*	9.1 *23*	1310.6+x	19/2$^+$	1048.9+x	17/2$^+$	D	DCO=0.65 *7*
262.0 *5*	5.9 *15*	1740.2+x	21/2$^+$	1478.6+x	19/2$^+$	Q	DCO=0.54 *6*
262.6 *5*	5.2 *13*	3484.8+x	35/2$^-$	3222.2+x	33/2$^-$		
265.3 *5*	8.7 *22*	3682.5+x	37/2$^+$	3417.3+x	35/2$^+$	D	DCO=0.50 *9*
268.6 *5*	6.2 *16*	3705.4+x	37/2$^+$	3436.6+x	35/2$^+$	D	DCO=0.47 *6*
269.4 *8*	1.7 *5*	2999.7+x	31/2$^+$	2730.3+x	29/2$^+$	D	DCO=0.6 *1*
271.1 *1*	27.9 *22*	466.48+x	9/2$^-$	195.39+x	7/2$^+$	D	DCO=0.59 *6*
271.4 *3*	13.1 *20*	2730.3+x	29/2$^+$	2458.6+x	27/2$^+$	D	DCO=0.48 *7*
275.0 *8*	1.1 *3*	3222.2+x	33/2$^-$	2947.1+x	31/2$^-$	D	DCO=0.62 *9*
275.0 *1*	34 *3*	4009.9+x	41/2$^-$	3734.9+x	39/2$^-$	D	DCO=0.61 *7*
275.2 *5*	3.5 *9*	3980.9+x	39/2$^+$	3705.4+x	37/2$^+$	D	DCO=0.51 *7*
276.5 *3*	13.4 *20*	1587.0+x	21/2$^+$	1310.6+x	19/2$^+$	D	DCO=0.50 *7*
281.1 *5*	3.5 *9*	1478.6+x	19/2$^+$	1197.5+x	17/2$^+$		
284.5 *5*	5.6 *14*	1871.6+x	23/2$^+$	1587.0+x	21/2$^+$	D	DCO=0.64 *8*
285.0 *5*	6.0 *15*	432.7+x	9/2$^+$	147.7+x	5/2$^+$	Q	DCO=0.80 *7*
287.0 *1*	62 *5*	1386.4+x	21/2$^-$	1099.5+x	19/2$^-$	D	DCO=0.67 *7*
287.6 *5*	5.1 *13*	3970.2+x	39/2$^+$	3682.5+x	37/2$^+$	D	DCO=0.58 *7*
288.8 *5*	6.0 *15*	4270.0+x	41/2$^+$	3980.9+x	39/2$^+$	D	DCO=0.72 *1*
291.8 *5*	6.6 *16*	2458.6+x	27/2$^+$	2166.7+x	25/2$^+$	D	DCO=0.75 *12*
292.9 *8*	2.6 *8*	4116.8+x	39/2$^-$	3823.8+x	37/2$^-$	D	DCO=0.67 *9*
295.0 *5*	9.6 *24*	2166.7+x	25/2$^+$	1871.6+x	23/2$^+$	D	DCO=0.65 *9*
299.8 *5*	5.4 *14*	4270.0+x	41/2$^+$	3970.2+x	39/2$^+$	D	DCO=0.58 *7*
300.1 *5*	3.4 *8*	305.6+x	9/2$^+$	5.4+x	5/2$^+$	Q	DCO=0.85 *14*
301.1 *8*	1.2 *4*	3248.2+x	35/2$^-$	2947.1+x	31/2$^-$	Q	
301.5 *5*	4.4 *11*	821.2+x	13/2$^+$	519.60+x	11/2$^+$	D	DCO=0.48 *6*
308.2 *8*	2.5 *8*	2048.3+x	23/2$^+$	1740.2+x	21/2$^+$		
309.1 *5*	7.5 *19*	4579.4+x	43/2$^+$	4270.0+x	41/2$^+$	D	DCO=0.64 *8*
309.4 *8*	2.2 *7*	4290.5+x	41/2$^+$	3980.9+x	39/2$^+$		
309.4 *3*	12.6 *19*	4888.7+x	45/2$^+$	4579.4+x	43/2$^+$	D	DCO=0.64 *8*
312.0 *1*	27.3 *22*	4321.9+x	43/2$^-$	4009.9+x	41/2$^-$	D	DCO=0.56 *6*
317.7 *8*	2.5 *8*	2612.3+x	27/2$^+$	2294.5+x	25/2$^+$		
318.6 *3*	10.3 *15*	5539.6+x	49/2$^+$	5220.8+x	47/2$^+$	D	DCO=0.68 *9*
320.1 *8*	1.7 *5*	4773.2+x	43/2$^-$	4453.4+x	41/2$^-$	D	
322.7 *1*	22.2 *18*	4644.9+x	45/2$^-$	4321.9+x	43/2$^-$	D	DCO=0.69 *8*
324.2 *1*	29 *2*	519.60+x	11/2$^+$	195.39+x	7/2$^+$	E2	DCO=0.92 *8*
326.6[@] *1*	43 *3*	1945.0+x	25/2$^-$	1618.3+x	23/2$^-$		
327.0[@] *1*	57 *5*	662.7+x	15/2$^-$	335.5+x	11/2$^-$		
331.0[b] *8*	0.9 *3*	5446.5+x	47/2$^-$	5115.5+x	45/2$^-$		
331.9 *3*	10.8 *16*	5220.8+x	47/2$^+$	4888.7+x	45/2$^+$	D	DCO=0.56 *8*
335.4 *1*	37.9 *30*	1030.17+x	17/2$^-$	694.77+x	13/2$^-$	E2	DCO=0.80 *6*
336.0 *5*	7.9 *20*	6236.3+x	53/2$^+$	5899.8+x	51/2$^+$	D	DCO=0.56 *7*
336.6 *8*	1.7 *5*	4453.4+x	41/2$^-$	4116.8+x	39/2$^-$		
338.9 *1*	32 *3*	2534.9+x	29/2$^-$	2195.9+x	27/2$^-$	D	DCO=0.65 *6*

Continued on next page (footnotes at end of table)

^{139}La(^{30}Si,4nγ) 2004Sc14,2003Sc02,2005An04 (continued)

γ(^{165}Lu) (continued)

E_γ[†][#]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	Comments
339.0 *5*	6.0 *15*	3823.8+x	37/2$^-$	3484.8+x	35/2$^-$	D	DCO=0.64 *8*
339.8 *8*	1.0 *3*	5786.3+x	49/2$^-$	5446.5+x	47/2$^-$		
343.0 *1*	34.3 *27*	366.6+x	11/2$^+$	23.4+x	7/2$^+$	E2	DCO=0.93 *9*
344.8[@] *5*	3.8 *10*	711.4+x	13/2$^+$	366.6+x	11/2$^+$		
345.5 *5*	3.2 *8*	345.5+x	5/2$^-$	0.0+x	3/2$^+$		
346.6 *8*	2.8 *8*	4960.5+x	45/2$^+$	4613.9+x	43/2$^+$	D	
348.3 *8*	2.0 *6*	1292.1+x	17/2$^+$	943.4+x	15/2$^+$		
349.5 *8*	1.4 *4*	5825.1+x	49/2$^-$	5475.5+x	47/2$^-$		
351.2 *3*	13.7 *21*	4996.1+x	47/2$^-$	4644.9+x	45/2$^-$	D	DCO=0.55 *6*
351.5 *8*	1.3 *4*	6137.9+x	51/2$^-$	5786.3+x	49/2$^-$		
352.8 *8*	1.2 *4*	6178.5+x	51/2$^-$	5825.1+x	49/2$^-$		
357.6 *5*	4.9 *12*	499.3+x	11/2$^+$	141.4+x	7/2$^+$	Q	DCO=0.91 *11*
360.1 *5*	7.9 *20*	5899.8+x	51/2$^+$	5539.6+x	49/2$^+$	(D)	DCO=0.81 *11*
365.9 *5*	3.9 *10*	6998.0+x	57/2$^+$	6632.3+x	55/2$^+$	D	DCO=0.69 *1*
367.2 *3*	10.9 *16*	5363.5+x	49/2$^-$	4996.1+x	47/2$^-$	D	DCO=0.61 *6*
367.6 *8*	1.8 *5*	6448.5+x	53/2$^+$	6080.9+x	51/2$^+$		
369.4 *8*	1.7 *5*	6507.5+x	53/2$^-$	6137.9+x	51/2$^-$		
373.0 *8*	2.4 *7*	1818.6+x	21/2$^+$	1445.5+x	19/2$^+$		
373.5 *8*	0.5 *2*	6552.2+x	53/2$^-$	6178.5+x	51/2$^-$		
377.0 *5*	8.6 *22*	5740.2+x	51/2$^-$	5363.5+x	49/2$^-$	D	DCO=0.58 *7*
378.9 *8*	2.1 *6*	6886.5+x	55/2$^-$	6507.5+x	53/2$^-$		
384.8 *8*	2.0 *6*	2794.1+x	29/2$^+$	2409.3+x	25/2$^+$		
386.0 *8*	0.96 *29*	2155.6+x	23/2$^-$	1769.6+x	19/2$^-$	Q	DCO=1.20 *15*
388.5 *3*	12.3 *18*	821.2+x	13/2$^+$	432.7+x	9/2$^+$	Q	DCO=0.93 *7*
391.7 *1*	45 *4*	574.2+x	13/2$^+$	182.4+x	9/2$^+$	E2	DCO=0.89 *9*
391.8 *5*	5.1 *13*	6538.8+x	55/2$^-$	6146.7+x	53/2$^-$	D	DCO=0.72 *9*
393.4 *8*	0.9 *3*	6841.9+x	55/2$^+$	6448.5+x	53/2$^+$		
394.8 *8*	0.3 *1*	6947.1+x	55/2$^-$	6552.2+x	53/2$^-$		
395.8 *5*	6.4 *16*	6632.3+x	55/2$^+$	6236.3+x	53/2$^+$	D	DCO=0.62 *8*
398.6 *1*	60 *5*	893.3+x	17/2$^-$	494.7+x	13/2$^-$	E2	DCO=0.92 *8*
398.6 *8*	2.1 *6*	7240.5+x	57/2$^+$	6841.9+x	55/2$^+$		
398.6 *5*	4.5 *11*	7837.5+x	61/2$^+$	7439.2+x	59/2$^+$	D	DCO=0.55 *8*
401.2 *5*	3.9 *10*	7383.2+x	59/2$^-$	6982.1+x	57/2$^-$		
401.4 *8*	1.4 *4*	7287.9+x	57/2$^-$	6886.5+x	55/2$^-$		
404.8[@] *5*	3.9 *10*	2753.6+x	29/2$^+$	2348.8+x	25/2$^+$		
405.0 *5*	3.2 *8*	8269.2+x	63/2$^-$	7863.9+x	61/2$^-$	D	DCO=0.65 *7*
405.6 *5*	7.3 *18*	711.4+x	13/2$^+$	305.6+x	9/2$^+$	Q	DCO=0.91 *9*
405.9 *8*	0.9 *3*	7693.8+x	59/2$^-$	7287.9+x	57/2$^-$		
406.0 *5*	7.8 *20*	6146.7+x	53/2$^-$	5740.2+x	51/2$^-$	D	DCO=0.65 *8*
407.5[b] *8*	0.3 *1*	7354.6+x	57/2$^-$	6947.1+x	55/2$^-$		
418.1 *5*	7.0 *18*	2956.8+x	31/2$^+$	2538.6+x	27/2$^+$	Q	DCO=1.01 *11*
418.3 *8*	2.9 *9*	2585.7+x	27/2$^-$	2166.7+x	25/2$^+$	D	DCO=0.50 *8*
423.4 *5*	5.8 *14*	2968.4+x	31/2$^+$	2545.0+x	27/2$^+$	Q	DCO=0.95 *11*
423.7 *3*	19.0 *28*	943.4+x	15/2$^+$	519.60+x	11/2$^+$	E2	DCO=1.06 *9*
429.7 *5*	3.2 *8*	2968.4+x	31/2$^+$	2538.6+x	27/2$^+$		
430.3 *5*	8.0 *20*	2585.7+x	27/2$^-$	2155.6+x	23/2$^-$	Q	DCO=1.04 *9*
431.1[b] *8*	2.8 *8*	3043.4+x	31/2$^+$	2612.3+x	27/2$^+$		
432.1 *1*	32.4 *26*	1462.25+x	21/2$^-$	1030.17+x	17/2$^-$	E2	DCO=1.00 *6*
434.0 *8*	0.6 *2*	8127.8+x	61/2$^-$	7693.8+x	59/2$^-$		
435.6 *1*	47.1 *38*	802.2+x	15/2$^+$	366.6+x	11/2$^+$	E2	DCO=0.95 *9*
435.7[@] *5*	6.0 *15*	3201.1+x	33/2$^+$	2765.2+x	29/2$^+$		
436.3 *5*	3.5 *9*	955.5+x	15/2$^+$	519.60+x	11/2$^+$		
436.4 *1*	23.8 *19*	3474.9+x	37/2$^-$	3038.6+x	33/2$^-$	Q	DCO=0.94 *9*
436.6 *1*	97 *8*	1099.5+x	19/2$^-$	662.7+x	15/2$^-$	E2	DCO=0.94 *7*

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^{139}La(^{30}Si,4nγ) 2004Sc14,2003Sc02,2005An04 (continued)

$\gamma(^{165}Lu)$ (continued)

E_γ[†#]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	Comments
436.6 *8*	0.6 *2*	8114.5+x	61/2$^+$	7677.9+x	59/2$^+$		
437.4 *8*	1.8 *5*	7677.9+x	59/2$^+$	7240.5+x	57/2$^+$		
442.0 *8*	1.5 *4*	7439.2+x	59/2$^+$	6998.0+x	57/2$^+$		
442.9 *5*	4.2 *10*	6982.1+x	57/2$^-$	6538.8+x	55/2$^-$	D	DCO=0.52 *7*
444.1 *5*	9.2 *23*	943.4+x	15/2$^+$	499.3+x	11/2$^+$	E2	DCO=1.31 *21*
445.3 *5*	3.5 *9*	2794.1+x	29/2$^+$	2348.8+x	25/2$^+$	Q	DCO=0.89 *17*
446.1 *8*	2.8 *8*	3240.1+x	33/2$^+$	2794.1+x	29/2$^+$	Q	DCO=0.89 *17*
448.6 *8*	0.3 *1*	1740.2+x	21/2$^+$	1292.1+x	17/2$^+$		
449.0 *5*	7.1 *18*	3417.3+x	35/2$^+$	2968.4+x	31/2$^+$	Q	DCO=1.02 *9*
450.1 *5*	7.0 *18*	3180.4+x	33/2$^+$	2730.3+x	29/2$^+$	Q	DCO=1.06 *11*
455.0 *8*	1.2 *4*	2999.7+x	31/2$^+$	2545.0+x	27/2$^+$	Q	DCO=1.15 *21*
455.9 *5*	7.5 *19*	955.5+x	15/2$^+$	499.3+x	11/2$^+$	Q	DCO=1.17 *11*
459.0 *3*	12.6 *19*	2753.6+x	29/2$^+$	2294.5+x	25/2$^+$	Q	DCO=1.01 *9*
459.1 *1*	28.1 *22*	3248.2+x	35/2$^-$	2789.0+x	31/2$^-$	Q	DCO=1.08 *9*
460.5 *3*	10.7 *16*	3417.3+x	35/2$^+$	2956.8+x	31/2$^+$	Q	DCO=0.89 *11*
461.0 *8*	1.9 *6*	2999.7+x	31/2$^+$	2538.6+x	27/2$^+$	Q	DCO=1.20 *22*
468.2 *5*	6.8 *17*	3436.6+x	35/2$^+$	2968.4+x	31/2$^+$	Q	DCO=0.89 *11*
470.4 *8*	0.46 *14*	8584.9+x	63/2$^+$	8114.5+x	61/2$^+$		
470.6 *8*	0.8 *2*	3201.1+x	33/2$^+$	2730.3+x	29/2$^+$	Q	DCO=0.90 *18*
470.9 *5*	9.9 *25*	1292.1+x	17/2$^+$	821.2+x	13/2$^+$	Q	DCO=1.04 *8*
471.0 *5*	6.8 *17*	3224.6+x	33/2$^+$	2753.6+x	29/2$^+$	Q	DCO=0.95 *9*
472.0 *5*	9.6 *24*	3471.7+x	35/2$^+$	2999.7+x	31/2$^+$	Q	DCO=1.12 *11*
474.7 *1*	51 *4*	1048.9+x	17/2$^+$	574.2+x	13/2$^+$	E2	DCO=1.01 *9*
475.0 *8*	2.6 *8*	2294.5+x	25/2$^+$	1818.6+x	21/2$^+$	Q	DCO=0.95 *11*
479.8 *5*	8.0 *2*	3436.6+x	35/2$^+$	2956.8+x	31/2$^+$	Q	DCO=1.05 *11*
481.5 *5*	5.4 *14*	3067.1+x	31/2$^-$	2585.7+x	27/2$^-$	Q	DCO=0.92 *9*
486.1 *3*	10.0 *15*	1197.5+x	17/2$^+$	711.4+x	13/2$^+$	Q	DCO=0.99 *9*
486.5 *8*	2.8 *8*	3240.1+x	33/2$^+$	2753.6+x	29/2$^+$	Q	DCO=0.85 *15*
486.6 *1*	22.7 *18*	3734.9+x	39/2$^-$	3248.2+x	35/2$^-$	Q	DCO=1.02 *9*
493.1 *1*	61 *5*	1386.4+x	21/2$^-$	893.3+x	17/2$^-$	E2	DCO=1.05 *9*
493.2 *8*	2.6 *8*	8330.8+x	63/2$^+$	7837.5+x	61/2$^+$		
498.3 *5*	6.7 *17*	2956.8+x	31/2$^+$	2458.6+x	27/2$^+$	Q	DCO=1.05 *11*
502.0 *5*	6.3 *16*	3682.5+x	37/2$^+$	3180.4+x	33/2$^+$	Q	DCO=1.02 *11*
502.1 *1*	30 *2*	1445.5+x	19/2$^+$	943.4+x	15/2$^+$	E2	DCO=1.23 *13*
503.7 *1*	40 *3*	3038.6+x	33/2$^-$	2534.9+x	29/2$^-$	Q	DCO=1.08 *11*
508.4 *1*	51 *4*	1310.6+x	19/2$^+$	802.2+x	15/2$^+$	Q	DCO=1.14 *12*
509.8[@] *3*	10.5 *16*	2968.4+x	31/2$^+$	2458.6+x	27/2$^+$		
516.4 *1*	28.9 *23*	1978.64+x	25/2$^-$	1462.25+x	21/2$^-$	Q	DCO=1.04 *8*
518.8 *1*	100 *8*	1618.3+x	23/2$^-$	1099.5+x	19/2$^-$	E2	DCO=1.06 *8*
523.5 *5*	9.0 *22*	1478.6+x	19/2$^+$	955.5+x	15/2$^+$	Q	DCO=0.78 *11*
525.1 *5*	4.6 *12*	3765.2+x	37/2$^+$	3240.1+x	33/2$^+$	Q	DCO=0.95 *12*
526.1 *5*	9.4 *24*	1818.6+x	21/2$^+$	1292.1+x	17/2$^+$	Q	DCO=1.10 *8*
530.1 *5*	5.7 *14*	3754.6+x	37/2$^+$	3224.6+x	33/2$^+$	Q	DCO=1.09 *9*
530.2 *5*	4.3 *11*	2348.8+x	25/2$^+$	1818.6+x	21/2$^+$	Q	DCO=1.05 *11*
535.1 *5*	5.5 *14*	3602.2+x	35/2$^-$	3067.1+x	31/2$^-$	Q	DCO=1.14 *12*
535.1 *1*	32 *3*	4009.9+x	41/2$^-$	3474.9+x	37/2$^-$	Q	DCO=1.04 *9*
537.6 *8*	2.4 *7*	3484.8+x	35/2$^-$	2947.1+x	31/2$^-$		
538.2 *1*	52 *4*	1587.0+x	21/2$^+$	1048.9+x	17/2$^+$	E2	DCO=1.03 *9*
538.9 *8*	0.58 *17*	4403.4+x	39/2$^+$	3864.5+x	35/2$^+$		
540.9 *5*	3.8 *10*	2999.7+x	31/2$^+$	2458.6+x	27/2$^+$	Q	DCO=1.05 *11*
542.6 *3*	10.8 *16*	1740.2+x	21/2$^+$	1197.5+x	17/2$^+$	Q	DCO=1.02 *9*
544.6 *3*	14 *2*	3980.9+x	39/2$^+$	3436.6+x	35/2$^+$	Q	DCO=1.20 *11*
544.7 *1*	30 *2*	1990.2+x	23/2$^+$	1445.5+x	19/2$^+$	Q	DCO=1.20 *12*
548.4 *3*	14.2 *21*	2538.6+x	27/2$^+$	1990.2+x	23/2$^+$	Q	DCO=1.05 *12*
552.9 *3*	10.0 *15*	3970.2+x	39/2$^+$	3417.3+x	35/2$^+$	Q	DCO=1.01 *11*

Continued on next page (footnotes at end of table)

^{139}La(^{30}Si,4nγ) 2004Sc14,2003Sc02,2005An04 (continued)

γ(^{165}Lu) (continued)

E_γ[†][#]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	Comments
554.6 *5*	9.7 *24*	2294.5+x	25/2$^+$	1740.2+x	21/2$^+$	Q	DCO=1.08 *9*
554.8 *3*	11.8 *18*	2545.0+x	27/2$^+$	1990.2+x	23/2$^+$	Q	DCO=1.04 *9*
558.5 *1*	57 *5*	1945.0+x	25/2$^-$	1386.4+x	21/2$^-$	Q	DCO=1.02 *9*
561.0 *1*	42 *3*	1871.6+x	23/2$^+$	1310.6+x	19/2$^+$	Q	DCO=0.98 *9*
562.5[@] *8*	2.4 *7*	3980.9+x	39/2$^+$	3417.3+x	35/2$^+$		
563.0 *5*	8.8 *22*	4034.7+x	39/2$^+$	3471.7+x	35/2$^+$	Q	DCO=1.12 *12*
563.6 *1*	27.9 *22*	2730.3+x	29/2$^+$	2166.7+x	25/2$^+$	Q	DCO=1.04 *9*
564.0 *5*	4.8 *12*	2612.3+x	27/2$^+$	2048.3+x	23/2$^+$	Q	DCO=1.10 *11*
564.8 *8*	1.7 *5*	4270.0+x	41/2$^+$	3705.4+x	37/2$^+$		
568.9 *5*	4.6 *12*	2155.6+x	23/2$^-$	1587.0+x	21/2$^+$	D	DCO=0.59 *7*
569.7 *5*	8.0 *2*	2048.3+x	23/2$^+$	1478.6+x	19/2$^+$	Q	DCO=0.90 *9*
577.6 *1*	97 *8*	2195.9+x	27/2$^-$	1618.3+x	23/2$^-$	Q	DCO=1.06 *9*
579.7 *1*	53 *4*	2166.7+x	25/2$^+$	1587.0+x	21/2$^+$	Q	DCO=1.04 *9*
582.1 *5*	5.5 *14*	4347.3+x	41/2$^+$	3765.2+x	37/2$^+$	Q	DCO=0.89 *12*
582.7 *5*	4.5 *11*	4184.9+x	39/2$^-$	3602.2+x	35/2$^-$	Q	DCO=1.02 *13*
585.7 *1*	22.1 *18*	2564.3+x	29/2$^-$	1978.64+x	25/2$^-$	Q	DCO=1.17 *9*
586.8 *1*	22.1 *18*	4321.9+x	43/2$^-$	3734.9+x	39/2$^-$	Q	DCO=1.16 *11*
587.0 *1*	36.9 *30*	2458.6+x	27/2$^+$	1871.6+x	23/2$^+$	Q	DCO=1.10 *9*
587.5[@] *5*	5.2 *13*	4270.0+x	41/2$^+$	3682.5+x	37/2$^+$		
589.8 *1*	56 *4*	2534.9+x	29/2$^-$	1945.0+x	25/2$^-$	Q	DCO=1.03 *9*
590.7 *5*	3.3 *8*	2409.3+x	25/2$^+$	1818.6+x	21/2$^+$	Q	DCO=1.20 *15*
592.7 *8*	1.4 *4*	4347.3+x	41/2$^+$	3754.6+x	37/2$^+$		
593.2 *1*	86 *7*	2789.0+x	31/2$^-$	2195.9+x	27/2$^-$	Q	DCO=0.90 *9*
598.0 *8*	1.0 *3*	5001.4+x	43/2$^+$	4403.4+x	39/2$^+$		
598.2 *5*	4.2 *10*	2765.2+x	29/2$^+$	2166.7+x	25/2$^+$	Q	DCO=0.97 *11*
598.5 *3*	13 *2*	4579.4+x	43/2$^+$	3980.9+x	39/2$^+$	Q	DCO=0.97 *9*
598.8 *5*	4.1 *10*	5173.9+x	45/2$^-$	4575.0+x	41/2$^-$		
601.6 *5*	6.0 *15*	3823.8+x	37/2$^-$	3222.2+x	33/2$^-$	Q	DCO=1.10 *11*
608.0 *5*	8.6 *22*	4290.5+x	41/2$^+$	3682.5+x	37/2$^+$	Q	DCO=0.89 *11*
608.8 *5*	7.3 *18*	2348.8+x	25/2$^+$	1740.2+x	21/2$^+$	Q	DCO=1.10 *12*
608.8 *8*	1.9 *6*	4374.0+x	41/2$^+$	3765.2+x	37/2$^+$		
609.3 *5*	6.3 *16*	4579.4+x	43/2$^+$	3970.2+x	39/2$^+$	Q	DCO=1.05 *11*
615.4 *5*	4.9 *12*	4800.2+x	43/2$^-$	4184.9+x	39/2$^-$	Q	DCO=1.25 *15*
618.5 *3*	12.5 *19*	4888.7+x	45/2$^+$	4270.0+x	41/2$^+$	Q	DCO=0.90 *11*
619.4 *5*	5.6 *14*	4374.0+x	41/2$^+$	3754.6+x	37/2$^+$	Q	DCO=0.91 *9*
624.4		3864.5+x	35/2$^+$	3240.1+x	33/2$^+$		
624.5 *8*	0.6 *2*	624.5+y	J+2	y	J		
625.0 *8*	1.1 *3*	5115.5+x	45/2$^-$	4490.6+x	41/2$^-$		
628.8 *8*	2.5 *8*	3823.8+x	37/2$^-$	3195.2+x	33/2$^-$	Q	DCO=0.98 *11*
629.6 *5*	6.2 *16*	4453.4+x	41/2$^-$	3823.8+x	37/2$^-$	Q	DCO=0.96 *11*
630.9 *3*	13.2 *20*	3195.2+x	33/2$^-$	2564.3+x	29/2$^-$	Q	DCO=1.14 *9*
632.0 *5*	5.0 *12*	4116.8+x	39/2$^-$	3484.8+x	35/2$^-$	Q	DCO=1.00 *9*
635.2 *1*	26.3 *21*	4644.9+x	45/2$^-$	4009.9+x	41/2$^-$	Q	DCO=1.06 *9*
637.1 *5*	5.3 *13*	4490.6+x	41/2$^-$	3853.5+x	37/2$^-$	Q	DCO=1.10 *12*
638.2 *8*	0.24 *7*	4403.4+x	39/2$^+$	3765.2+x	37/2$^+$		
641.3 *5*	7.3 *18*	4988.6+x	45/2$^+$	4347.3+x	41/2$^+$	Q	DCO=1.00 *9*
641.4 *3*	12.3 *18*	5220.8+x	47/2$^+$	4579.4+x	43/2$^+$	Q	DCO=1.06 *9*
643.7 *3*	10.4 *16*	4613.9+x	43/2$^+$	3970.2+x	39/2$^+$	Q	DCO=1.13 *12*
646.3 *5*	3.6 *9*	5446.5+x	47/2$^-$	4800.2+x	43/2$^-$	Q	DCO=1.19 *16*
651.1 *3*	12.2 *18*	5539.6+x	49/2$^+$	4888.7+x	45/2$^+$	Q	DCO=1.16 *12*
651.2 *5*	3.3 *8*	5825.1+x	49/2$^-$	5173.9+x	45/2$^-$		
652.0 *5*	8.4 *21*	4686.7+x	43/2$^+$	4034.7+x	39/2$^+$	Q	DCO=1.02 *11*
654.1 *8*	0.27 *8*	5001.4+x	43/2$^+$	4347.3+x	41/2$^+$		
654.5 *5*	3.1 *8*	5145.1+x	45/2$^-$	4490.6+x	41/2$^-$	Q	DCO=0.93 *12*
655.1 *8*	2.7 *8*	5656.5+x	47/2$^+$	5001.4+x	43/2$^+$		

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^{139}La(^{30}Si,4nγ) 2004Sc14,2003Sc02,2005An04 (continued)

$\gamma(^{165}Lu)$ (continued)

E_γ[†][#]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	δ	Comments
656.3 *5*	4.5 *11*	4773.2+x	43/2$^-$	4116.8+x	39/2$^-$	Q		DCO=0.90 *10*
658.1 *8*	2.5 *8*	3222.2+x	33/2$^-$	2564.3+x	29/2$^-$			
658.4 *5*	8.9 *22*	3853.5+x	37/2$^-$	3195.2+x	33/2$^-$	Q		DCO=1.05 *10*
661.3 *8*	1.5 *4*	5449.5+x	45/2$^+$	4788.2+x	41/2$^+$			
662.0 *5*	3.0 *8*	5115.5+x	45/2$^-$	4453.4+x	41/2$^-$	Q		DCO=0.92 *12*
667.9 *8*	0.74 *22*	5656.5+x	47/2$^+$	4988.6+x	45/2$^+$	(E2+M1)[a]	+3.1[a] *4*	DCO=0.37 *14*
670.0 *5*	4.7 *12*	4960.5+x	45/2$^+$	4290.5+x	41/2$^+$	Q		DCO=1.20 *15*
670.8 *8*	2.6 *8*	5786.3+x	49/2$^-$	5115.5+x	45/2$^-$	Q		DCO=0.94 *12*
674.1 *1*	20.3 *16*	4996.1+x	47/2$^-$	4321.9+x	43/2$^-$	Q		DCO=1.02 *9*
679.2 *5*	8.6 *22*	5899.8+x	51/2$^+$	5220.8+x	47/2$^+$	Q		DCO=0.92 *9*
682.5 *8*	0.52 *16*	6367.9+x	51/2$^+$	5685.4+x	49/2$^+$	(E2+M1)[a]	+3.1[a] *4*	DCO=0.38 *13* (2003Sc02)
683.8 *8*	1.0 *3*	1308.3+y	J+4	624.5+y	J+2			
687.2 *8*	1.6 *5*	6080.9+x	51/2$^+$	5393.7+x	47/2$^+$			
687.3 *5*	5.2 *13*	3222.2+x	33/2$^-$	2534.9+x	29/2$^-$	Q		DCO=1.13 *12*
690.5 *8*	2.0 *6*	4960.5+x	45/2$^+$	4270.0+x	41/2$^+$			
691.4 *5*	4.0 *1*	6137.9+x	51/2$^-$	5446.5+x	47/2$^-$	Q		DCO=1.25 *16*
694.8 *5*	3.3 *8*	5068.9+x	45/2$^+$	4374.0+x	41/2$^+$	Q		DCO=0.89 *9*
695.7 *3*	12.2 *18*	3484.8+x	35/2$^-$	2789.0+x	31/2$^-$	Q		DCO=1.05 *9*
696.7 *3*	10.9 *16*	6236.3+x	53/2$^+$	5539.6+x	49/2$^+$	Q		DCO=1.21 *15*
696.8 *5*	4.9 *12*	5685.4+x	49/2$^+$	4988.6+x	45/2$^+$	Q		DCO=1.20 *14*
697.9 *8*	0.36 *11*	7133.6+x	55/2$^+$	6435.7+x	53/2$^+$			
700.0 *8*	2.6 *8*	5845.1+x	49/2$^-$	5145.1+x	45/2$^-$	Q		DCO=0.90 *11*
702.31 *5*	4.2 *10*	5475.5+x	47/2$^-$	4773.2+x	43/2$^-$	Q		DCO=0.94 *11*
703.0 *5*	4.2 *10*	6178.5+x	51/2$^-$	5475.5+x	47/2$^-$	Q		DCO=0.94 *11*
706.0 *8*	1.6 *5*	6155.5+x	49/2$^+$	5449.5+x	45/2$^+$			
707.0 *5*	5.1 *13*	5393.7+x	47/2$^+$	4686.7+x	43/2$^+$	Q		DCO=0.98 *9*
708.1 *8*	0.6 *2*	6101.7+x	51/2$^+$	5393.7+x	47/2$^+$			
711.4 *8*	2.6 *8*	6367.9+x	51/2$^+$	5656.5+x	47/2$^+$	Q		DCO=1.00 *9*
712.0 *5*	7.2 *18*	5325.9+x	47/2$^+$	4613.9+x	43/2$^+$	Q		DCO=1.09 *11*
712.2 *8*	0.5 *2*	712.2+z	J1+2	z	J1			
715.8[b] *8*	1.4 *4*	5860.9+x	(49/2)$^-$	5145.1+x	45/2$^-$			
718.7 *1*	23.8 *19*	5363.5+x	49/2$^-$	4644.9+x	45/2$^-$	Q		DCO=1.00 *11*
720.7 *8*	0.5 *2*	1769.6+x	19/2$^-$	1048.9+x	17/2$^+$	D		DCO=0.63 *9*
721.2 *5*	3.9 *10*	6507.5+x	53/2$^-$	5786.3+x	49/2$^-$	Q		DCO=1.06 *12*
727.3 *8*	2.1 *6*	6552.2+x	53/2$^-$	5825.1+x	49/2$^-$			
732.9 *5*	6.8 *17*	6632.3+x	55/2$^+$	5899.8+x	51/2$^+$	Q		DCO=1.25 *12*
735.0 *5*	4.1 *10*	5695.5+x	49/2$^+$	4960.5+x	45/2$^+$	Q		DCO=0.98 *15*
740.7 *8*	0.9 *3*	2049.0+y	J+6	1308.3+y	J+4			
743.9 *3*	17.0 *26*	5740.2+x	51/2$^-$	4996.1+x	47/2$^-$	Q		DCO=1.00 *9*
748.6 *5*	5.5 *14*	6886.5+x	55/2$^-$	6137.9+x	51/2$^-$	Q		DCO=1.17 *15*
748.8 *8*	1.7 *5*	6904.3+x	53/2$^+$	6155.5+x	49/2$^+$			
749.0 *8*	1.80 *54*	5435.6+x	47/2$^+$	4686.7+x	43/2$^+$	Q		DCO=1.14 *20*
750.2 *5*	4.6 *12*	6435.7+x	53/2$^+$	5685.4+x	49/2$^+$	Q		DCO=1.12 *12*
751.2 *3*	16.8 *25*	2947.1+x	31/2$^-$	2195.9+x	27/2$^-$	Q		DCO=1.02 *10*
753.0 *8*	1.3 *4*	6188.7+x	51/2$^+$	5435.6+x	47/2$^+$	Q		DCO=1.05 *22*
753.0 *8*	2.1 *6*	6448.5+x	53/2$^+$	5695.5+x	49/2$^+$	Q		DCO=1.01 *12*
755.0 *5*	3.0 *8*	5823.9+x	49/2$^+$	5068.9+x	45/2$^+$	Q		DCO=0.93 *9*
755.0 *5*	4.5 *11*	6080.9+x	51/2$^+$	5325.9+x	47/2$^+$	Q		DCO=1.01 *9*
761.0 *8*	1.42 *43*	6841.9+x	55/2$^+$	6080.9+x	51/2$^+$	Q		DCO=1.10 *11*
761.4 *5*	9.3 *23*	6998.0+x	57/2$^+$	6236.3+x	53/2$^+$	Q		DCO=1.02 *10*
763.5 *8*	1.4 *4*	6608.6+x	53/2$^-$	5845.1+x	49/2$^-$	Q		DCO=1.05 *11*
765.7 *8*	1.7 *5*	7133.6+x	55/2$^+$	6367.9+x	51/2$^+$	Q		DCO=0.88 *14*
768.6 *8*	1.2 *4*	6947.1+x	55/2$^-$	6178.5+x	51/2$^-$	Q		DCO=0.98 *11*
770.2 *8*	0.9 *3*	1482.4+z	J1+4	712.2+z	J1+2			
775.8 *5*	4.3 *11*	6101.7+x	51/2$^+$	5325.9+x	47/2$^+$	Q		DCO=1.21 *15*

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^{139}La(^{30}Si,4nγ) 2004Sc14,2003Sc02,2005An04 (continued)

γ(^{165}Lu) (continued)

E_γ[†][#]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	Comments
780.4 *5*	4.1 *10*	7287.9+x	57/2$^-$	6507.5+x	53/2$^-$	Q	DCO=0.89 *12*
781.3 *8*	1.0 *3*	6642.2+x	(53/2)$^-$	5860.9+x	(49/2)$^-$		
783.3 *3*	16.9 *25*	6146.7+x	53/2$^-$	5363.5+x	49/2$^-$	Q	DCO=1.04 *11*
789.5 *8*	2.0 *6*	6613.4+x	53/2$^+$	5823.9+x	49/2$^+$	Q	DCO=1.04 *11*
792.0 *8*	2.2 *7*	7240.5+x	57/2$^+$	6448.5+x	53/2$^+$	Q	DCO=1.10 *14*
795.0 *8*	0.9 *3*	6188.7+x	51/2$^+$	5393.7+x	47/2$^+$	Q	DCO=1.15 *18*
798.3 *8*	0.8 *2*	2847.3+y	J+8	2049.0+y	J+6		
798.7 *3*	12.5 *19*	6538.8+x	55/2$^-$	5740.2+x	51/2$^-$	Q	DCO=1.02 *11*
798.7 *8*	1.9 *6*	7703.0+x	57/2$^+$	6904.3+x	53/2$^+$		
802.5 *8*	1.4 *4*	7354.6+x	57/2$^-$	6552.2+x	53/2$^-$		
803.3 *5*	3.2 *8*	7239.0+x	57/2$^+$	6435.7+x	53/2$^+$	Q	DCO=0.89 *11*
804.9 *8*	1.4 *4*	7418.3+x	57/2$^+$	6613.4+x	53/2$^+$		
805.9 *8*	2.6 *8*	6907.6+x	55/2$^+$	6101.7+x	51/2$^+$	Q	DCO=1.20 *16*
806.0 *8*	1.9 *6*	6994.7+x	55/2$^+$	6188.7+x	51/2$^+$	Q	DCO=1.05 *18*
806.9 *5*	5.5 *14*	7439.2+x	59/2$^+$	6632.3+x	55/2$^+$	Q	DCO=0.92 *11*
807.3 *5*	3.2 *8*	7693.8+x	59/2$^-$	6886.5+x	55/2$^-$	Q	DCO=1.21 *15*
816.0 *8*	2.3 *7*	6511.5+x	53/2$^+$	5695.5+x	49/2$^+$	Q	DCO=1.19 *16*
819.9 *8*	1.2 *4*	7953.5+x	59/2$^+$	7133.6+x	55/2$^+$	Q	DCO=1.05 *12*
822.6 *8*	1.3 *4*	7431.2+x	57/2$^-$	6608.6+x	53/2$^-$	Q	DCO=1.10 *12*
824.8 *8*	0.9 *3*	7467.0+x	(57/2)$^-$	6642.2+x	(53/2)$^-$	Q	
826.7 *8*	0.2 *1*	6907.6+x	55/2$^+$	6080.9+x	51/2$^+$		
827.0 *8*	1.7 *5*	7338.5+x	57/2$^+$	6511.5+x	53/2$^+$	Q	DCO=1.05 *16*
828.9 *8*	0.8 *2*	2311.3+z	J1+6	1482.4+z	J1+4		
835.4 *3*	15.4 *23*	6982.1+x	57/2$^-$	6146.7+x	53/2$^-$	Q	DCO=0.91 *9*
836.0 *8*	2.5 *8*	7677.9+x	59/2$^+$	6841.9+x	55/2$^+$	Q	DCO=1.04 *12*
839.50 *5*	8.9 *22*	7837.5+x	61/2$^+$	6998.0+x	57/2$^+$	Q	DCO=0.98 *11*
839.8 *8*	0.8 *2*	8258.1+x	61/2$^+$	7418.3+x	57/2$^+$		
839.9 *5*	3.8 *10*	8127.8+x	61/2$^-$	7287.9+x	57/2$^-$	Q	DCO=0.88 *11*
840.0[b] *8*	2.9 *9*	4575.0+x	41/2$^-$	3734.9+x	39/2$^-$		
841.4 *8*	1.1 *3*	7788.4+x	59/2$^-$	6947.1+x	55/2$^-$	Q	DCO=0.83 *12*
844.5 *3*	11.0 *16*	7383.2+x	59/2$^-$	6538.8+x	55/2$^-$	Q	DCO=0.89 *9*
847.0 *8*	1.4 *4*	7841.7+x	59/2$^+$	6994.7+x	55/2$^+$	Q	DCO=0.95 *15*
849.6 *8*	1.8 *5*	8552.6+x	61/2$^+$	7703.0+x	57/2$^+$		
852.7 *8*	2.3 *7*	7760.3+x	59/2$^+$	6907.6+x	55/2$^+$		
855.7 *8*	2.8 *8*	8094.7+x	61/2$^+$	7239.0+x	57/2$^+$	Q	DCO=1.01 *11*
856.0 *8*	0.6 *2*	3703.3+y	J+10	2847.3+y	J+8		
863.1 *8*	2.9 *9*	8556.9+x	63/2$^-$	7693.8+x	59/2$^-$		
869.7 *8*	0.6 *2*	8336.7+x	(61/2)$^-$	7467.0+x	(57/2)$^-$		
872.1 *8*	0.93 *28*	8825.6+x	63/2$^+$	7953.5+x	59/2$^+$	Q	DCO=0.92 *15*
872.2 *8*	1.3 *4*	8226.8+x	61/2$^-$	7354.6+x	57/2$^-$		
874.0 *8*	2.5 *8*	8114.5+x	61/2$^+$	7240.5+x	57/2$^+$	Q	DCO=1.20 *15*
874.0 *8*	1.3 *4*	8212.5+x	61/2$^+$	7338.5+x	57/2$^+$	Q	DCO=1.06 *16*
881.0 *8*	1.2 *4*	8312.2+x	61/2$^-$	7431.2+x	57/2$^-$	Q	DCO=1.06 *12*
881.6 *5*	9.2 *23*	7863.9+x	61/2$^-$	6982.1+x	57/2$^-$	Q	DCO=1.20 *12*
885.8 *8*	0.5 *2*	3197.1+z	J1+8	2311.3+z	J1+6		
886.2 *5*	9.3 *23*	8269.2+x	63/2$^-$	7383.2+x	59/2$^-$	Q	DCO=1.15 *11*
891.7 *5*	5.0 *12*	8330.8+x	63/2$^+$	7439.2+x	59/2$^+$	Q	DCO=0.94 *11*
892.0 *8*	1.3 *4*	8733.7+x	63/2$^+$	7841.7+x	59/2$^+$	Q	DCO=0.98 *17*
900.1 *8*	2.2 *7*	8660.4+x	63/2$^+$	7760.3+x	59/2$^+$	Q	
900.1 *5*	3.5 *9*	9027.9+x	65/2$^-$	8127.8+x	61/2$^-$	Q	DCO=0.92 *15*
902.8 *8*	0.7 *2*	9160.9+x	65/2$^+$	8258.1+x	61/2$^+$		
903.2 *8*	0.55 *16*	8691.6+x	63/2$^-$	7788.4+x	59/2$^-$	Q	DCO=0.92 *15*
904.7 *8*	1.5 *4*	9457.3+x	65/2$^+$	8552.6+x	61/2$^+$		
907.0 *8*	2.7 *8*	8584.9+x	63/2$^+$	7677.9+x	59/2$^+$	Q	DCO=1.12 *15*
908.9 *8*	2.1 *6*	9003.5+x	65/2$^+$	8094.7+x	61/2$^+$	Q	DCO=1.14 *12*

Continued on next page (footnotes at end of table)

^{139}La(^{30}Si,4nγ) 2004Sc14,2003Sc02,2005An04 (continued)

$\gamma(^{165}Lu)$ (continued)

E_γ[†][#]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	Comments
915.6 *8*	0.3 *1*	4618.9+y	J+12	3703.3+y	J+10		
917.2 *5*	4.4 *11*	8754.6+x	$65/2^+$	7837.5+x	$61/2^+$	Q	DCO=1.25 *15*
918.2 *8*	2.3 *7*	9475.1+x	$67/2^-$	8556.9+x	$63/2^-$		
921.0 *8*	1.2 *4*	9133.5+x	$65/2^+$	8212.5+x	$61/2^+$		
926.6 *8*	0.79 *24*	9752.2+x	$67/2^+$	8825.6+x	$63/2^+$	Q	DCO=0.95 *17*
928.3 *8*	0.3 *1*	9265.0+x	$(65/2)^-$	8336.7+x	$(61/2)^-$		
928.9 *8*	1.2 *4*	9155.7+x	$65/2^-$	8226.8+x	$61/2^-$		
929.4 *5*	5.0 *12*	9198.6+x	$67/2^-$	8269.2+x	$63/2^-$	Q	DCO=1.08 *9*
930.2 *8*	0.8 *2*	9242.4+x	$65/2^-$	8312.2+x	$61/2^-$		
931.0 *5*	6.7 *17*	8794.9+x	$65/2^-$	7863.9+x	$61/2^-$	Q	DCO=1.16 *12*
938.0 *8*	1.2 *4*	9671.7+x	$67/2^+$	8733.7+x	$63/2^+$		
943.7 *8*	0.4 *1*	4140.8+z	J1+10	3197.1+z	J1+8		
946.7 *8*	1.6 *5*	9607.1+x	$67/2^+$	8660.4+x	$63/2^+$		
951.2 *8*	0.34 *10*	9642.9+x	$67/2^-$	8691.6+x	$63/2^-$	Q	DCO=0.92 *19*
953.0 *8*	2.2 *7*	9067.5+x	$65/2^+$	8114.5+x	$61/2^+$	Q	DCO=1.18 *17*
957.5 *8*	1.3 *4*	10414.8+x	$69/2^+$	9457.3+x	$65/2^+$		
960.0 *8*	2.6 *8*	9544.9+x	$67/2^+$	8584.9+x	$63/2^+$	Q	DCO=1.20 *15*
963.0 *8*	1.5 *4*	9966.5+x	$69/2^+$	9003.5+x	$65/2^+$	Q	DCO=0.95 *12*
963.1 *8*	2.3 *7*	9991.0+x	$69/2^-$	9027.9+x	$65/2^-$		
965.1 *8*	0.6 *2*	10207.5+x	$69/2^-$	9242.4+x	$65/2^-$		
973.5 *8*	1.1 *3*	10129.2+x	$69/2^-$	9155.7+x	$65/2^-$		
973.9 *8*	2.2 *7*	10449.0+x	$71/2^-$	9475.1+x	$67/2^-$		
974.0 *8*	0.60 *18*	10107.5+x	$69/2^+$	9133.5+x	$65/2^+$		
975.0 *8*	1.0 *3*	10646.7+x	$71/2^+$	9671.7+x	$67/2^+$		
975.3 *8*	0.2 *1*	5594.2+y	J+14	4618.9+y	J+12		
976.4 *5*	3.8 *10*	10175.0+x	$71/2^-$	9198.6+x	$67/2^-$	Q	DCO=1.06 *9*
977.9 *5*	3.7 *9*	9308.7+x	$67/2^+$	8330.8+x	$63/2^+$		
981.1 *8*	0.71 *21*	10733.3+x	$71/2^+$	9752.2+x	$67/2^+$	Q	DCO=1.13 *15*
986.0 *5*	3.4 *8*	9780.9+x	$69/2^-$	8794.9+x	$65/2^-$	Q	DCO=1.08 *11*
986.4 *8*	0.4 *1*	11193.9+x	$73/2^-$	10207.5+x	$69/2^-$		
986.9 *8*	1.3 *4*	10594.0+x	$71/2^+$	9607.1+x	$67/2^+$		
987.9 *5*	3.3 *8*	9742.6+x	$69/2^+$	8754.6+x	$65/2^+$	Q	DCO=1.14 *16*
1001.9 *8*	0.16 *5*	10644.8+x	$71/2^-$	9642.9+x	$67/2^-$		
1002.0 *8*	1.5 *4*	10546.9+x	$71/2^+$	9544.9+x	$67/2^+$	Q	DCO=1.22 *17*
1002.5 *8*	0.3 *1*	5143.3+z	J1+12	4140.8+z	J1+10		
1005.0 *8*	1.6 *5*	10072.5+x	$69/2^+$	9067.5+x	$65/2^+$		
1010.0 *8*	0.8 *2*	11656.7+x	$75/2^+$	10646.7+x	$71/2^+$		
1011.1 *8*	0.7 *2*	11425.9+x	$73/2^+$	10414.8+x	$69/2^+$		
1012.8 *8*	0.95 *28*	11142.0+x	$73/2^-$	10129.2+x	$69/2^-$		
1018.2 *8*	1.0 *1*	11612.3+x	$75/2^+$	10594.0+x	$71/2^+$		
1019.3 *8*	1.1 *3*	10985.9+x	$73/2^+$	9966.5+x	$69/2^+$		DCO=0.96 *12*
1021.7 *8*	0.2 *1*	12215.6+x	$77/2^-$	11193.9+x	$73/2^-$		
1026.3 *8*	1.9 *6*	11017.3+x	$73/2^-$	9991.0+x	$69/2^-$		
1026.6 *5*	3.0 *8*	11201.6+x	$75/2^-$	10175.0+x	$71/2^-$	Q	DCO=1.14 *12*
1028.1 *8*	1.4 *4*	11477.1+x	$75/2^-$	10449.0+x	$71/2^-$		
1035.1 *8*	0.52 *16*	11768.4+x	$75/2^+$	10733.3+x	$71/2^+$		DCO=1.14 *15*
1036.0 *8*	1.4 *4*	11582.9+x	$75/2^+$	10546.9+x	$71/2^+$	Q	DCO=0.95 *15*
1037.0 *8*	0.10 *3*	6631.2+y	J+16	5594.2+y	J+14		
1037.7 *8*	0.9 *3*	12649.9+x	$79/2^+$	11612.3+x	$75/2^+$		
1039.0 *8*	0.11 *3*	11683.8+x	$75/2^-$	10644.8+x	$71/2^-$		
1046.0 *8*	2.2 *7*	10826.9+x	$73/2^-$	9780.9+x	$69/2^-$		
1047.8 *8*	0.93 *28*	12189.8+x	$77/2^-$	11142.0+x	$73/2^-$		
1051.2 *8*	2.4 *7*	10793.7+x	$73/2^+$	9742.6+x	$69/2^+$		
1058.4 *5*	3.1 *8*	10367.1+x	$71/2^+$	9308.7+x	$67/2^+$		
1059.1 *8*	0.5 *2*	12485.0+x	$77/2^+$	11425.9+x	$73/2^+$		
1061.0 *8*	1.2 *4*	12643.9+x	$79/2^+$	11582.9+x	$75/2^+$		

Continued on next page (footnotes at end of table)

^{139}La(^{30}Si,4nγ) 2004Sc14,2003Sc02,2005An04 (continued)

$\gamma(^{165}Lu)$ (continued)

E_γ[†#]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	Comments
1063.0 *8*	0.10 *3*	6206.3+z	J1+14	5143.3+z	J1+12		
1064.0 *8*	0.5 *2*	12720.7+x	79/2$^+$	11656.7+x	75/2$^+$		
1065.0 *8*	0.5 *2*	13715.0+x	83/2$^+$	12649.9+x	79/2$^+$		
1076.0 *8*	2.4 *7*	12277.6+x	79/2$^-$	11201.6+x	75/2$^-$	Q	DCO=0.89 *13*
1076.3 *8*	0.9 *3*	12062.1+x	77/2$^+$	10985.9+x	73/2$^+$		
1081.6 *8*	1.1 *3*	12558.7+x	79/2$^-$	11477.1+x	75/2$^-$		
1088.0 *8*	1.0 *3*	12105.3+x	77/2$^-$	11017.3+x	73/2$^-$		
1089.6 *8*	0.44 *13*	12858.0+x	79/2$^+$	11768.4+x	75/2$^+$		
1102.2[b]		5449.5+x	45/2$^+$	4347.3+x	41/2$^+$		
1105.4 *8*	1.5 *4*	11899.2+x	77/2$^+$	10793.7+x	73/2$^+$		
1107.4 *8*	0.3 *1*	13592.5+x	81/2$^+$	12485.0+x	77/2$^+$		
1108.9 *8*	1.4 *4*	11935.8+x	77/2$^-$	10826.9+x	73/2$^-$		
1109.0 *8*	0.4 *1*	13829.7+x	83/2$^+$	12720.7+x	79/2$^+$		
1121.7 *8*	1.4 *4*	13399.3+x	83/2$^-$	12277.6+x	79/2$^-$	Q	DCO=1.11 *14*
1127.7 *8*	0.6 *2*	13686.4+x	83/2$^-$	12558.7+x	79/2$^-$		
1129.7 *8*	1.2 *4*	11496.8+x	75/2$^+$	10367.1+x	71/2$^+$		
1133.4 *8*	0.6 *2*	13195.6+x	81/2$^+$	12062.1+x	77/2$^+$		
1139.7 *8*	0.8 *2*	13245.0+x	81/2$^-$	12105.3+x	77/2$^-$		
1142.2 *8*	0.9 *3*	13041.3+x	81/2$^+$	11899.2+x	77/2$^+$		
1151.0 *8*	0.27 *8*	14009.0+x	83/2$^+$	12858.0+x	79/2$^+$		
1158.5 *8*	0.5 *2*	14199.8+x	85/2$^+$	13041.3+x	81/2$^+$		
1158.8 *8*	0.7 *2*	14558.1+x	87/2$^-$	13399.3+x	83/2$^-$		
1162.5 *8*	0.4 *1*	14848.9+x	87/2$^-$	13686.4+x	83/2$^-$		
1166.5 *8*	0.6 *2*	13102.3+x	81/2$^-$	11935.8+x	77/2$^-$		
1166.9[b]		6155.5+x	49/2$^+$	4988.6+x	45/2$^+$		
1182.0 *8*	0.4 *1*	12678.8+x	79/2$^+$	11496.8+x	75/2$^+$		
1187.0 *8*	0.40 *12*	15745.1+x	91/2$^-$	14558.1+x	87/2$^-$		
1189.3 *8*	0.4 *1*	14384.9+x	85/2$^+$	13195.6+x	81/2$^+$		
1199.8 *8*	0.22 *7*	15209+x	87/2$^+$	14009.0+x	83/2$^+$		
1218.9[b]		6904.3+x	53/2$^+$	5685.4+x	49/2$^+$		
1239.3 *8*	0.2 *1*	15624+x	89/2$^+$	14384.9+x	85/2$^+$		
1253.7[b] *8*	0.15 *4*	16463+x?	(91/2$^+$)	15209+x	87/2$^+$		

[†] Authors give an uncertainty range of 0.1-0.8 keV for all assigned transitions, based on individual γ's intensity. The evaluators assign uncertainties to γ transitions as follows: 0.1 for Iγ>20%, 0.3 for Iγ=(10-20)%, 0.5 for Iγ=(3-10)% and 0.8 for Iγ<3%.

[‡] Authors give an uncertainty range of (8-30)% for all γ intensities. The evaluators have assigned individual uncertainties to γ intensities based on the following criterion: 8% for Iγ>20%, 15% for Iγ=(10-20)%, 25% for Iγ=(3-10)% and 30% for Iγ<3%.

[#] DCO values are normalized to known ΔJ=2, stretched quadrupole transitions.

[@] Transition contaminated from a γ-ray line with similar energy.

[&] From DCO ratios, mult=Q corresponds to ΔJ=2, stretched quadrupole (most likely E2) transition and mult=D corresponds to ΔJ=1, dipole (small quadrupole admixture is possible). The mult=E2 is from DCO ratio and application of RUL for levels of known lifetimes.

[a] From DCO. The other solution with dominant M1 component is excluded In analogy with ^{163}Lu transitions In SD bands.

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

^{139}La(^{30}Si,4nγ) 2004Sc14,2003Sc02,2005An04

Level Scheme

Intensities: Relative I_γ

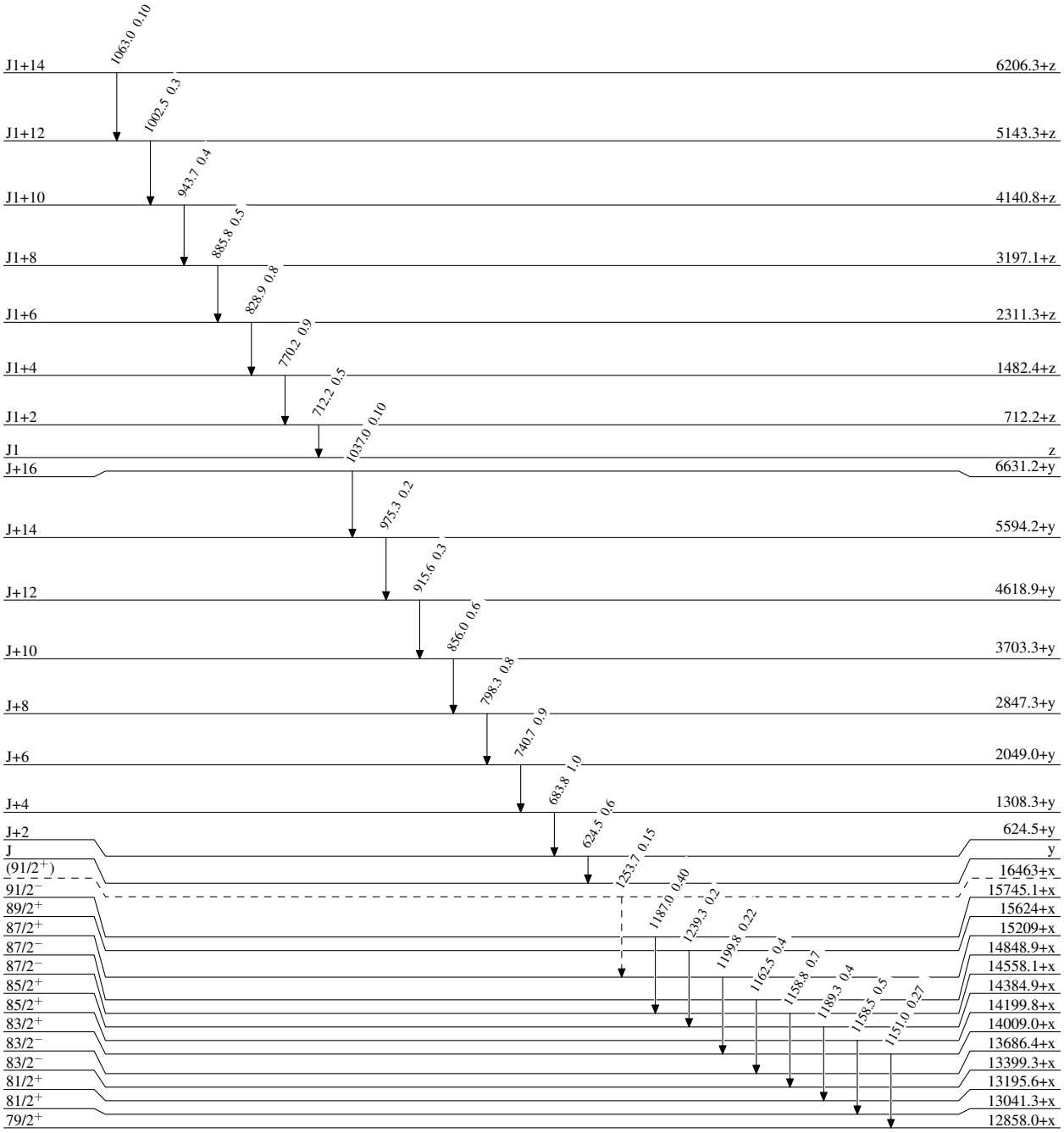
Legend

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

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

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

γ Decay (Uncertain)



$^{165}_{71}Lu_{94}$

^{139}La(^{30}Si,4nγ) 2004Sc14,2003Sc02,2005An04

Level Scheme (continued)

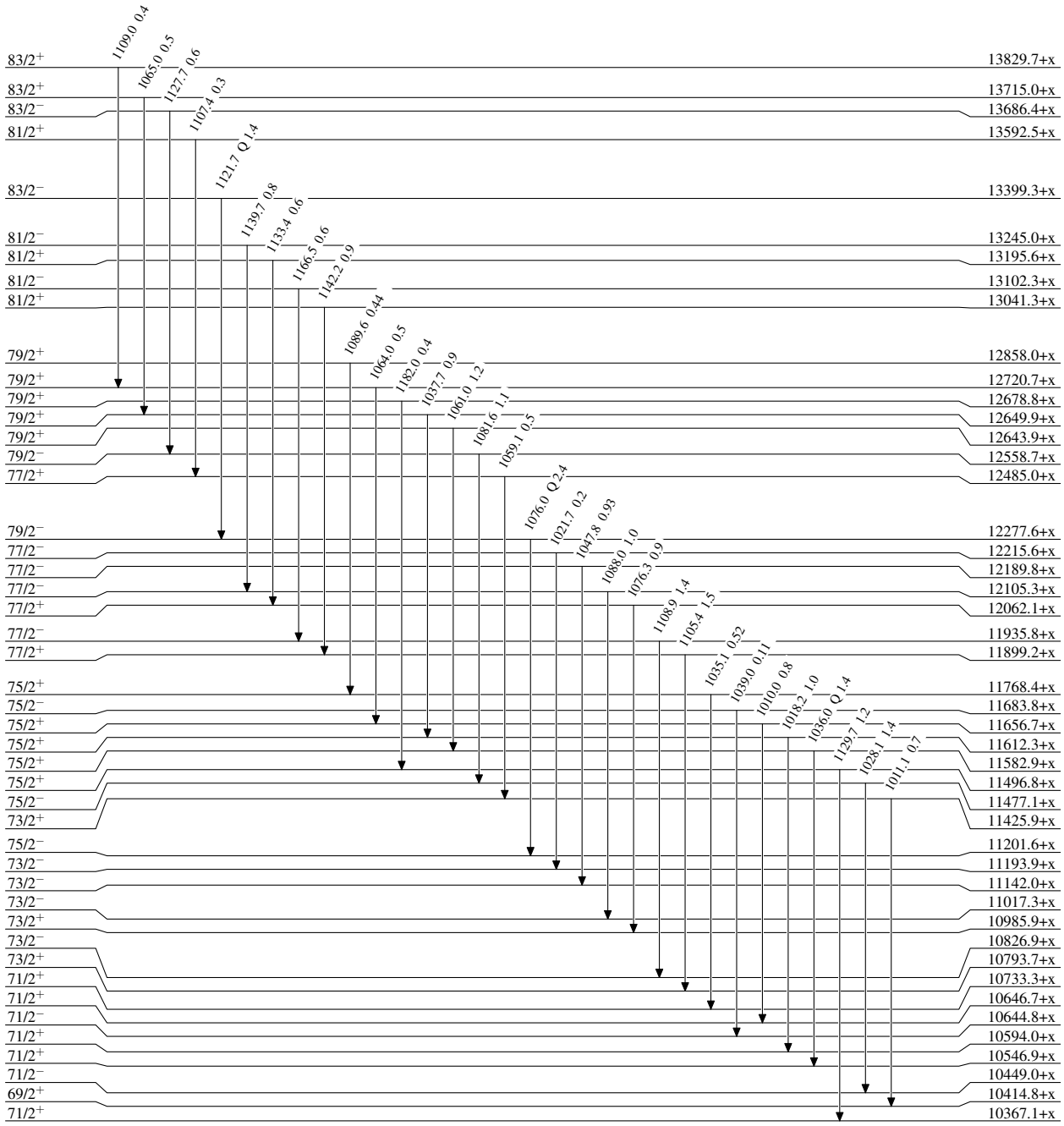
Intensities: Relative I_γ

Legend

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

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

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



$^{165}_{71}Lu_{94}$

^{139}La(^{30}Si,4nγ) 2004Sc14,2003Sc02,2005An04

Level Scheme (continued)

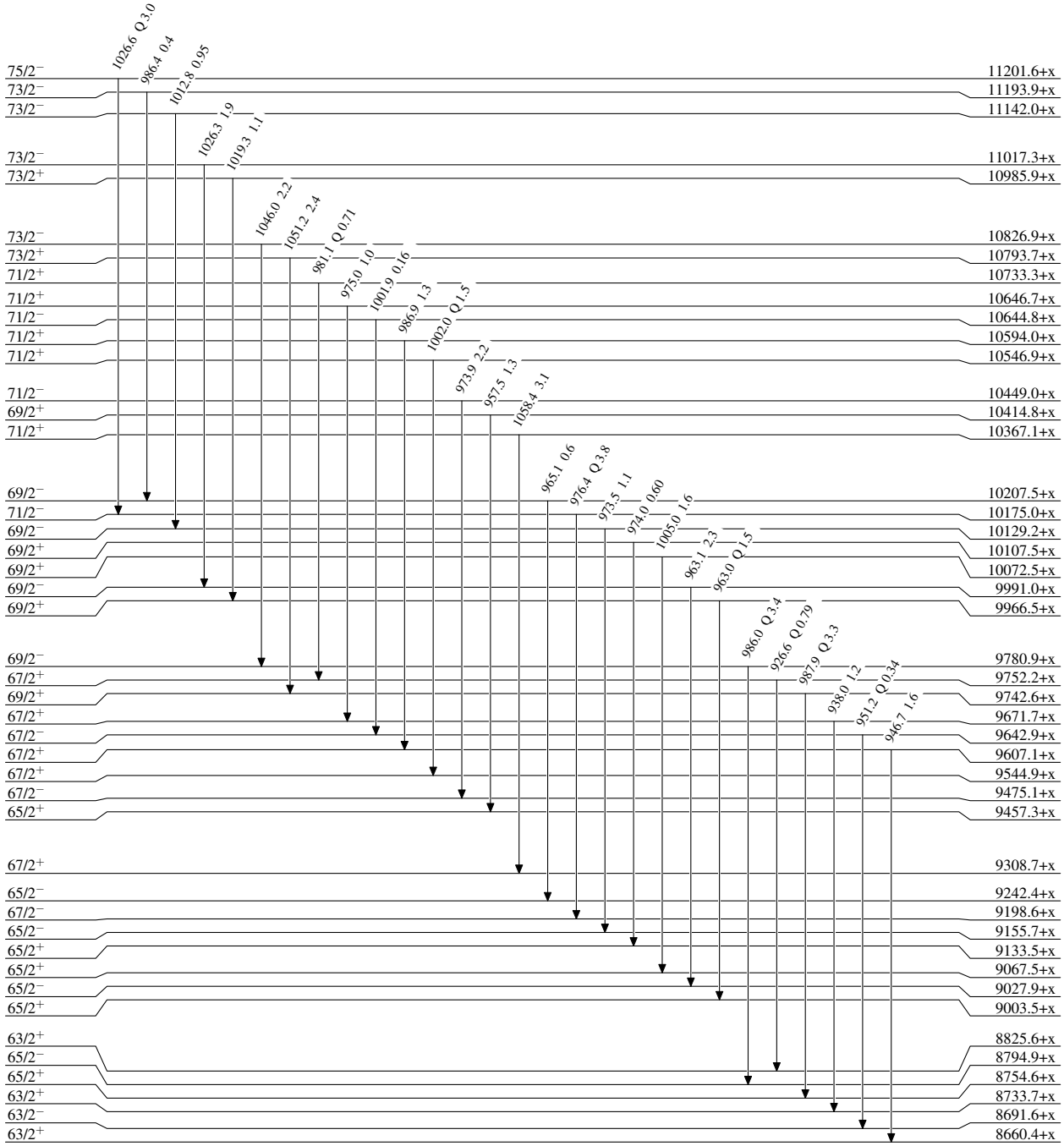
Intensities: Relative I_γ

Legend

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

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

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



$^{165}_{71}Lu_{94}$

^{139}La(^{30}Si,4nγ) 2004Sc14,2003Sc02,2005An04

Level Scheme (continued)

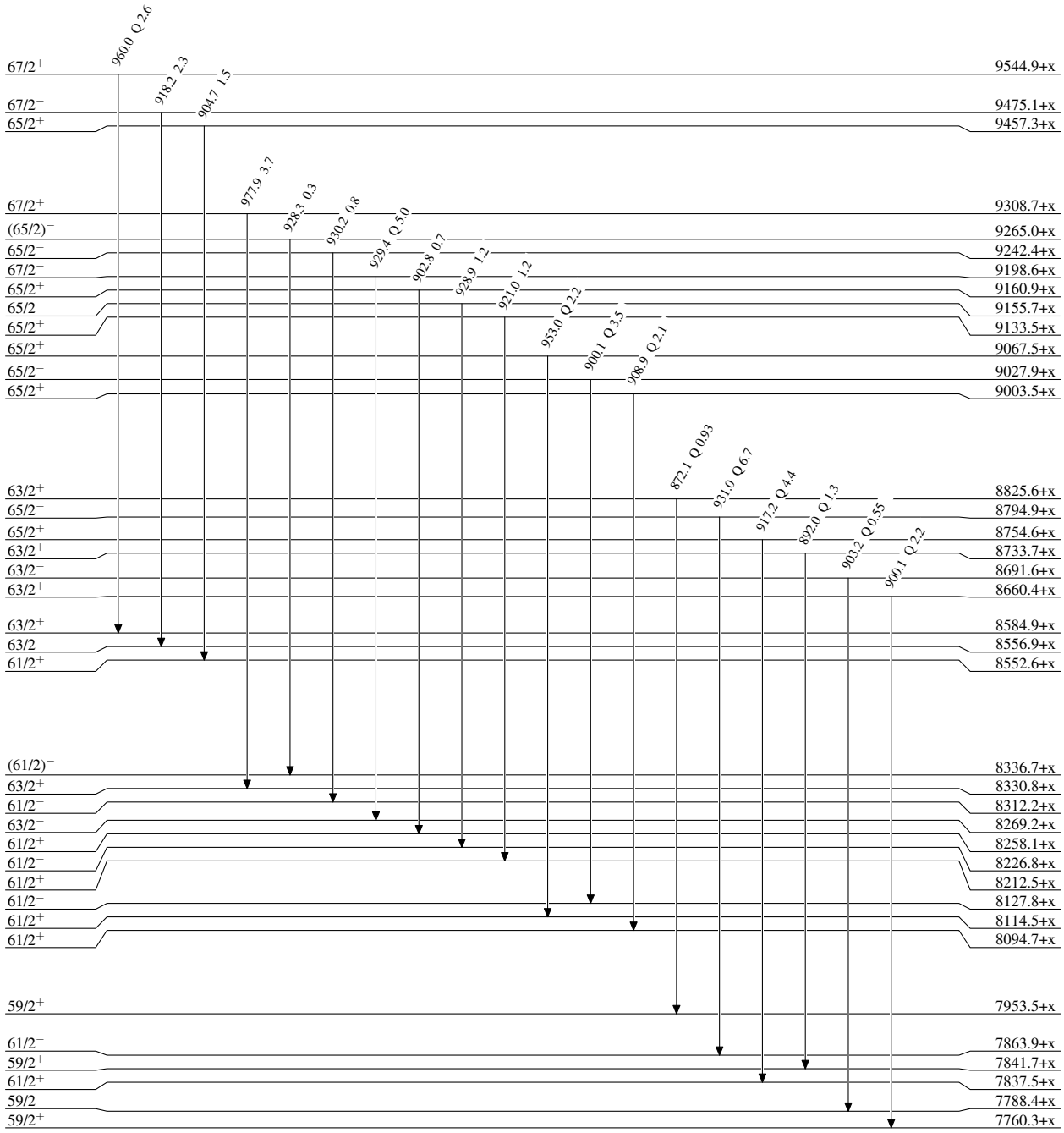
Intensities: Relative I_γ

Legend

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

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

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

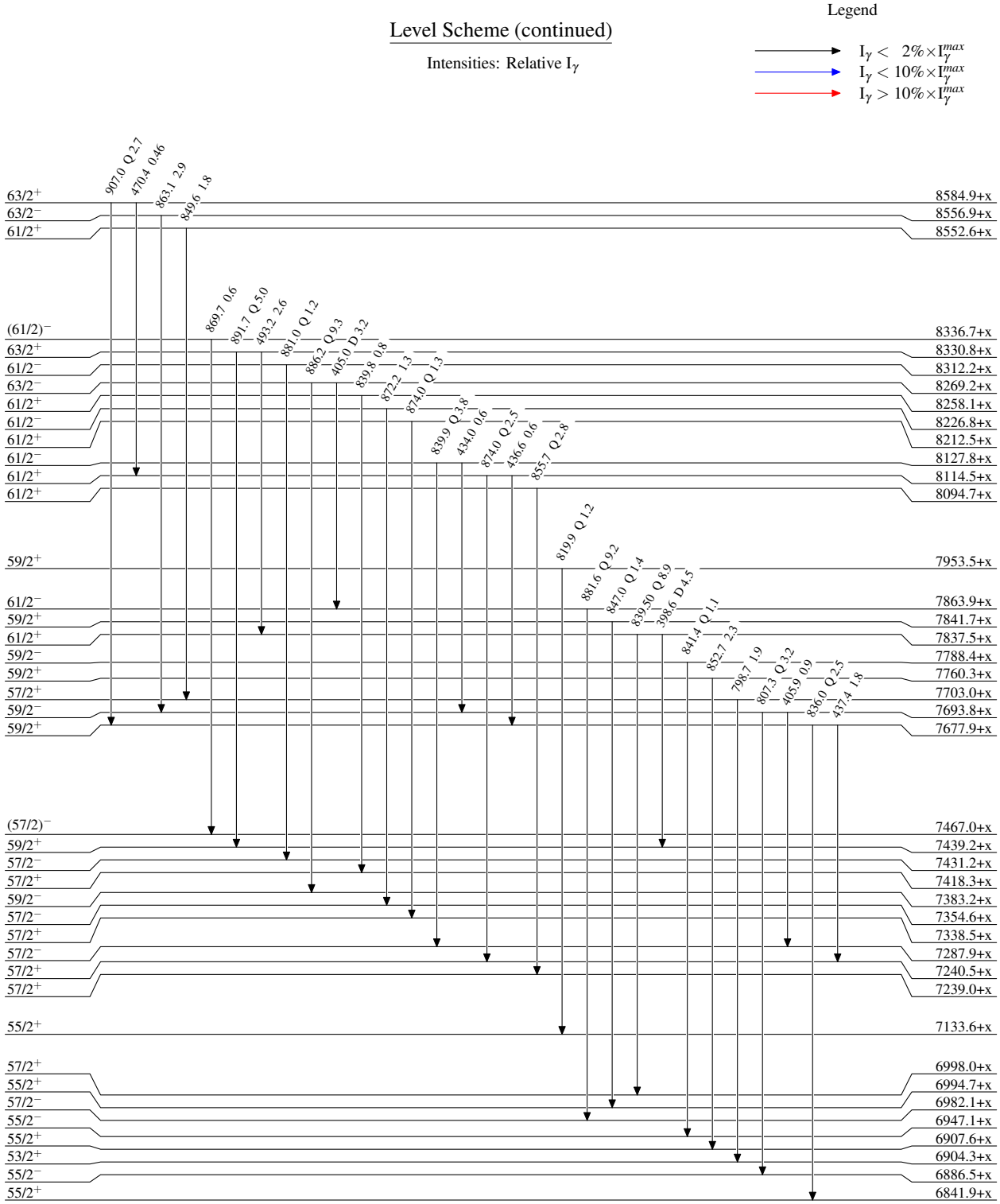


$^{165}_{71}Lu_{94}$

^{139}La(^{30}Si,4nγ) 2004Sc14,2003Sc02,2005An04

Level Scheme (continued)

Intensities: Relative I_γ



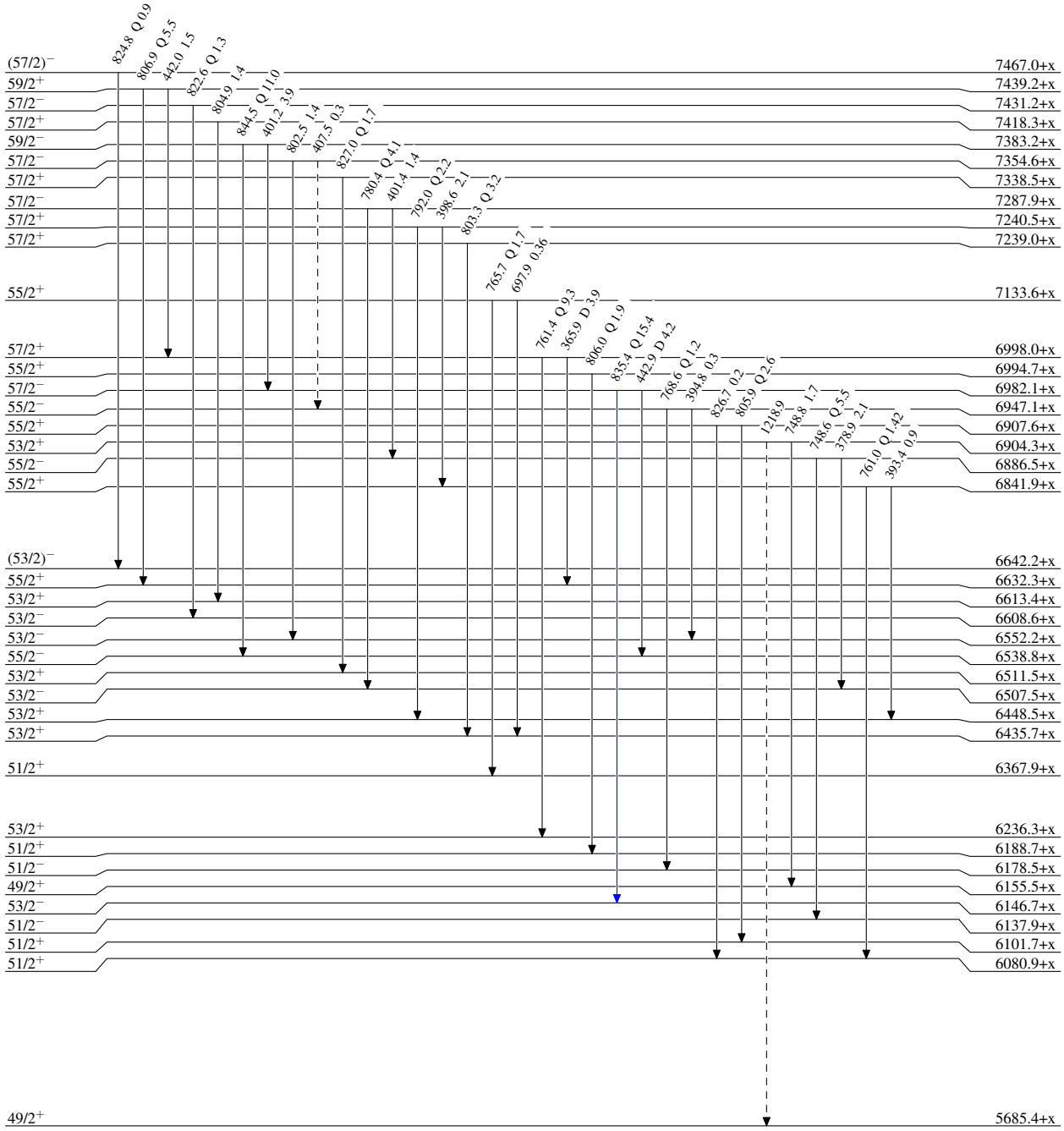
$^{165}_{71}Lu_{94}$

^{139}La(^{30}Si,4nγ) 2004Sc14,2003Sc02,2005An04

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)



$^{165}_{71}Lu_{94}$

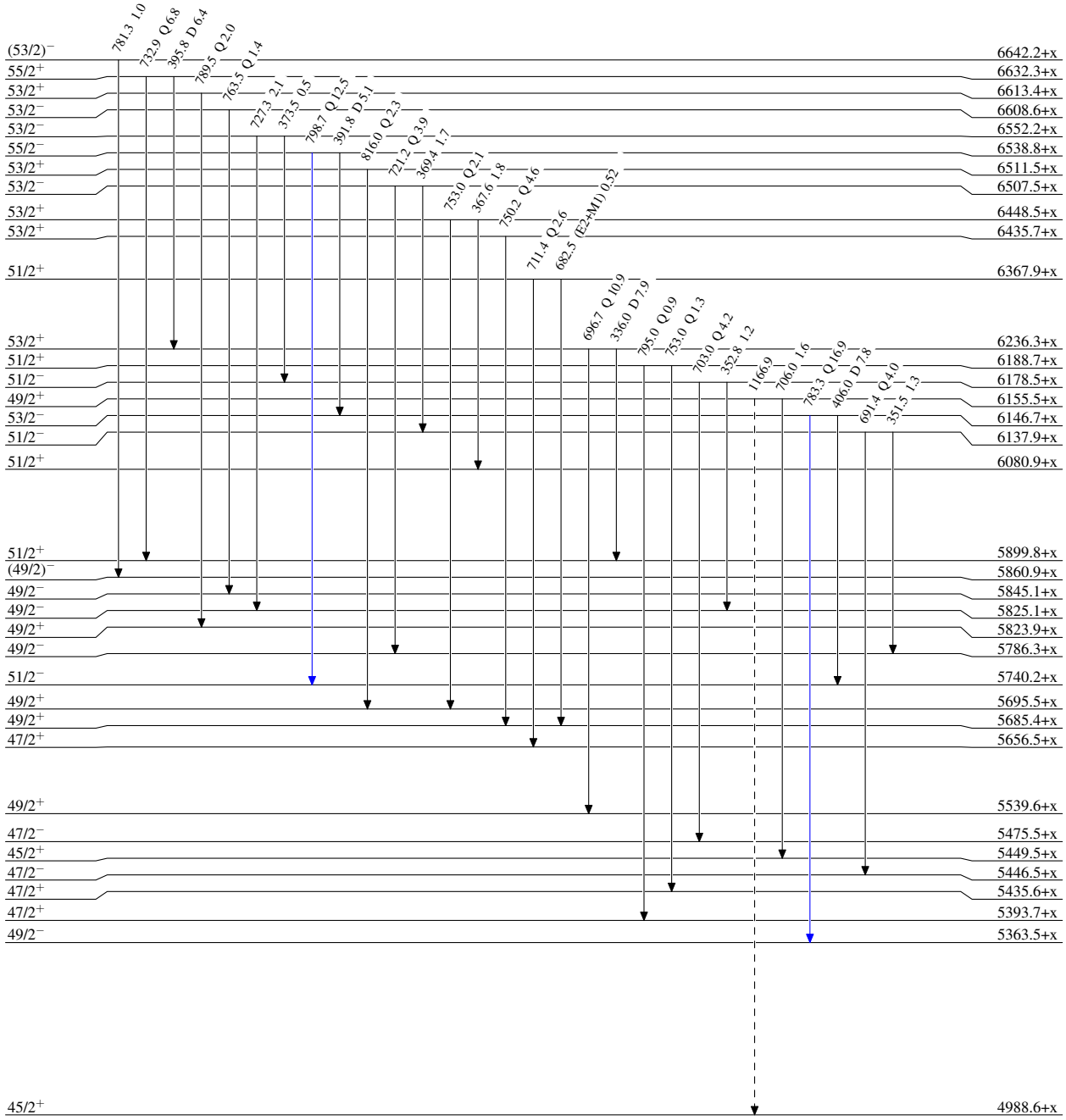
^{139}La(^{30}Si,4nγ) 2004Sc14,2003Sc02,2005An04

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)

Level Scheme (continued)

Intensities: Relative I_γ



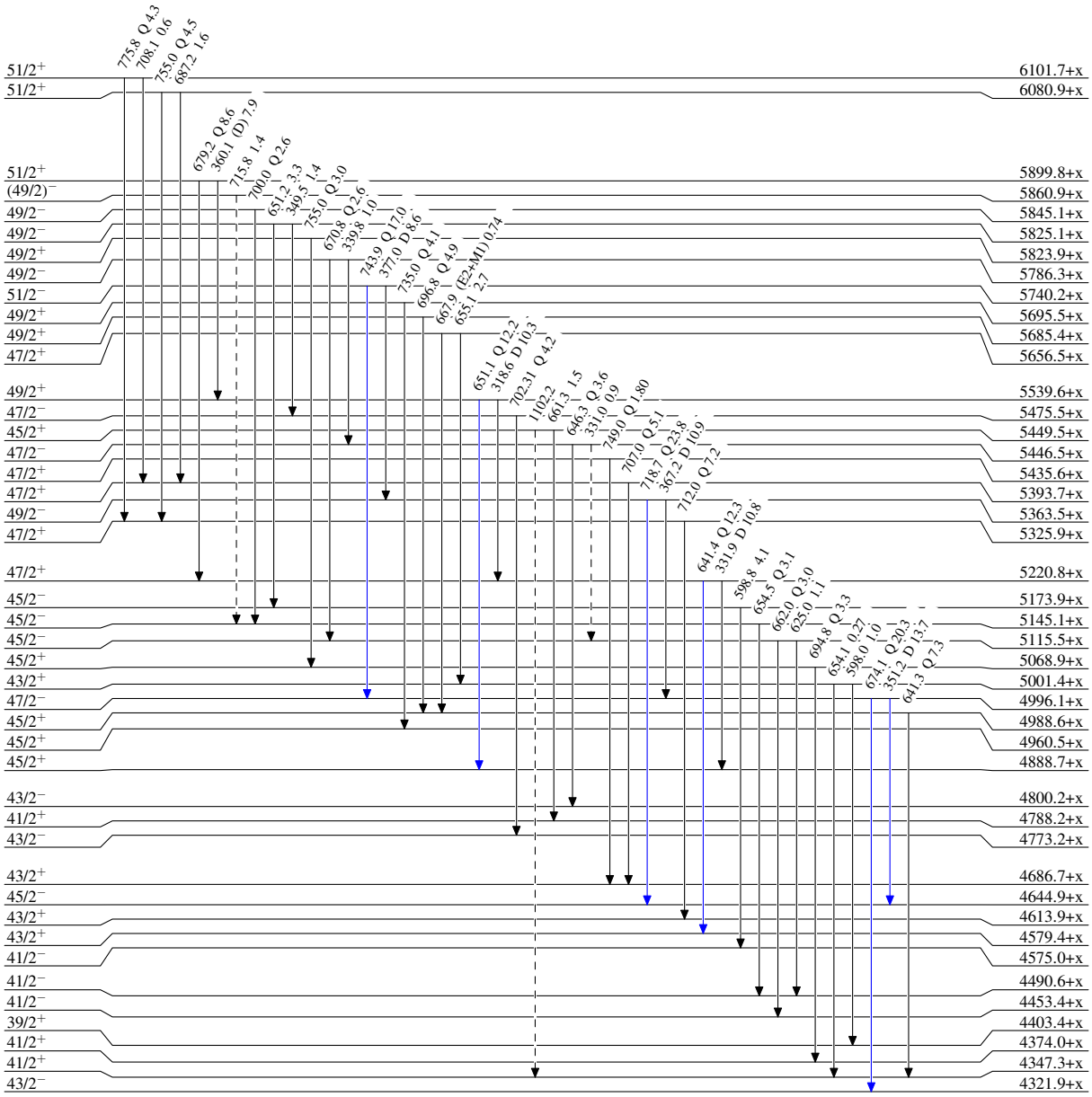
$^{165}_{71}Lu_{94}$

^{139}La(^{30}Si,4nγ) 2004Sc14,2003Sc02,2005An04

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)



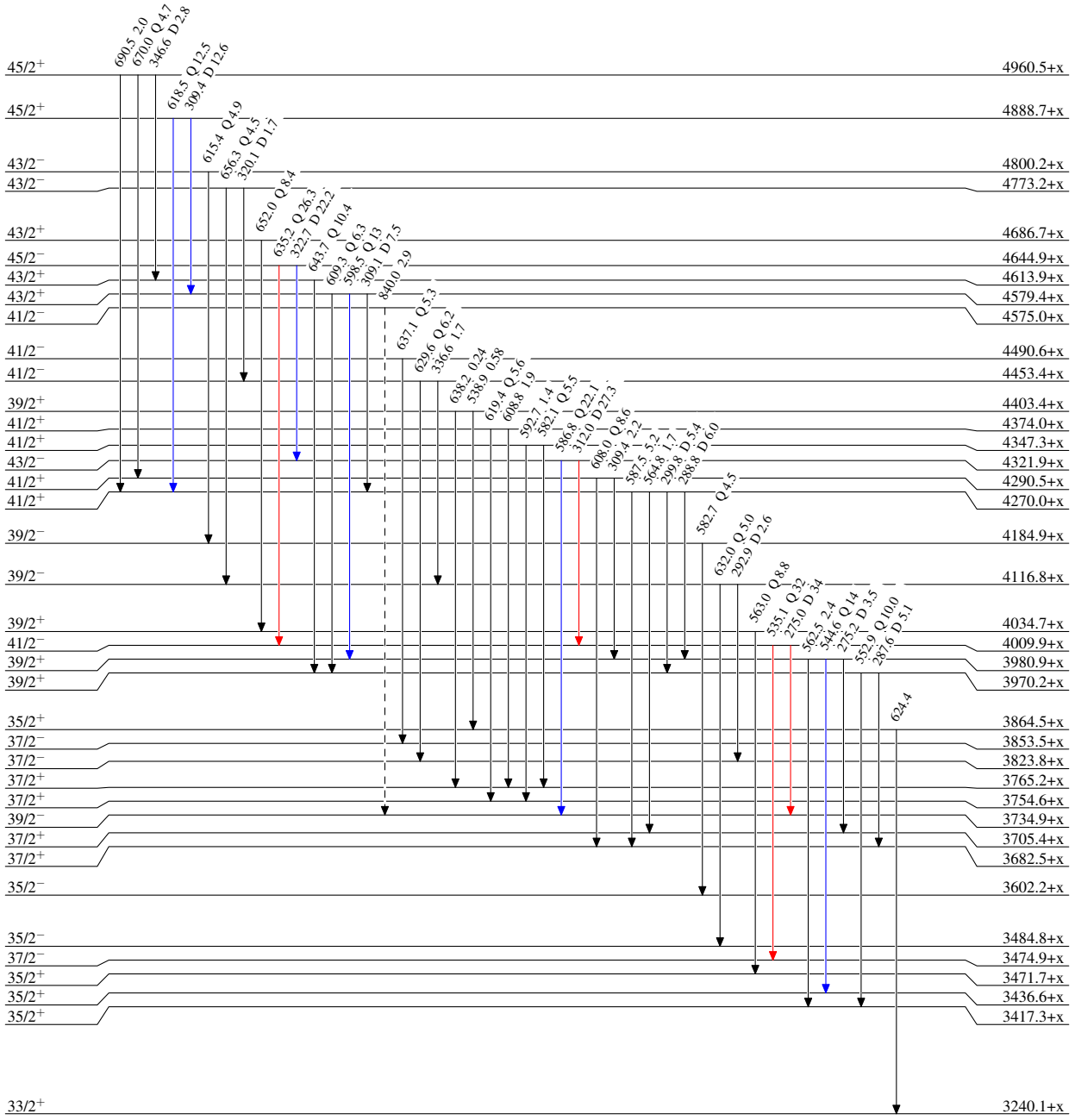
$^{165}_{71}Lu_{94}$

^{139}La(^{30}Si,4nγ) 2004Sc14,2003Sc02,2005An04

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)



$^{165}_{71}Lu_{94}$

^{139}La(^{30}Si,4nγ) 2004Sc14,2003Sc02,2005An04

Level Scheme (continued)

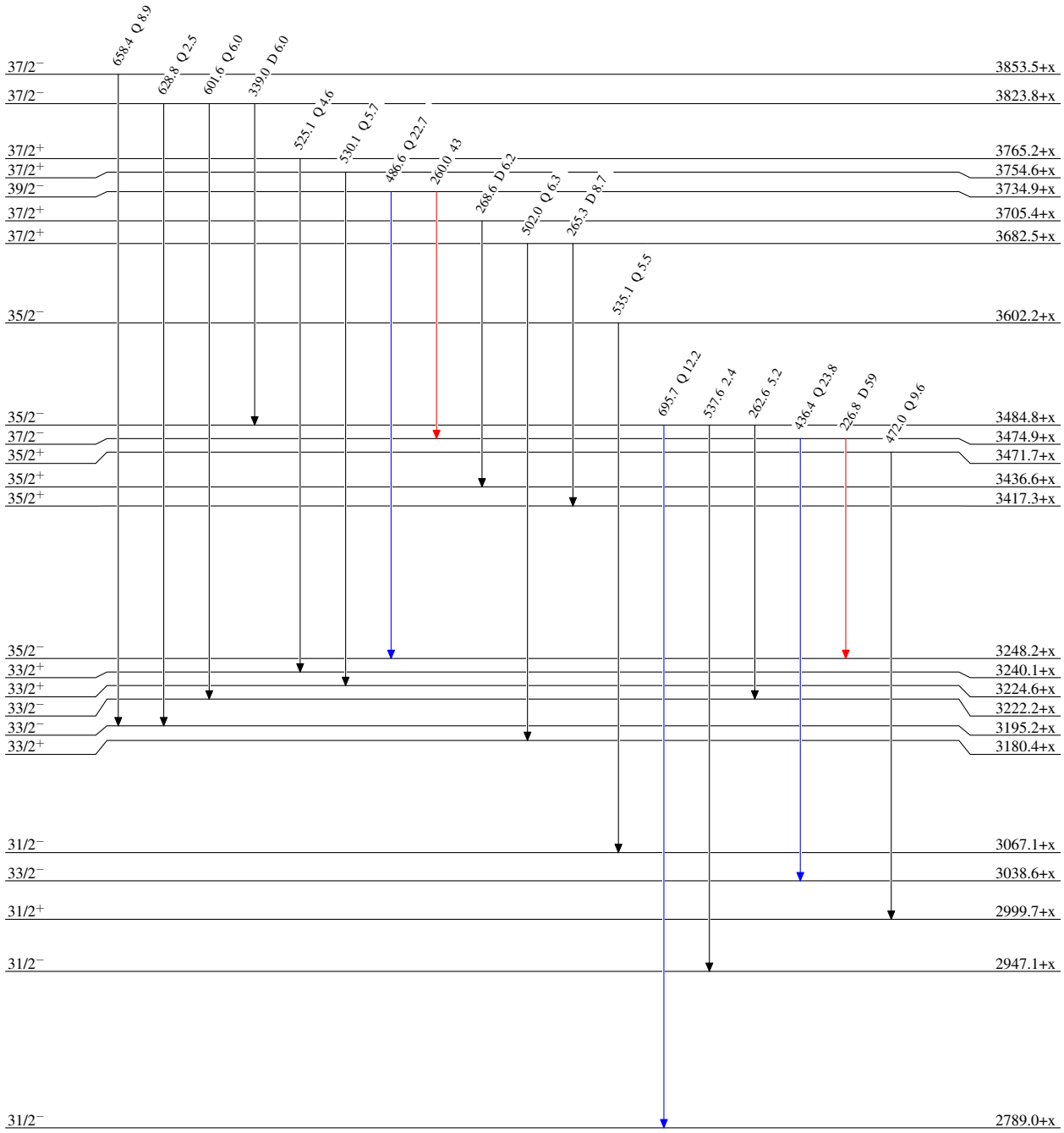
Intensities: Relative I_γ

Legend

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

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

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



$^{165}_{71}Lu_{94}$

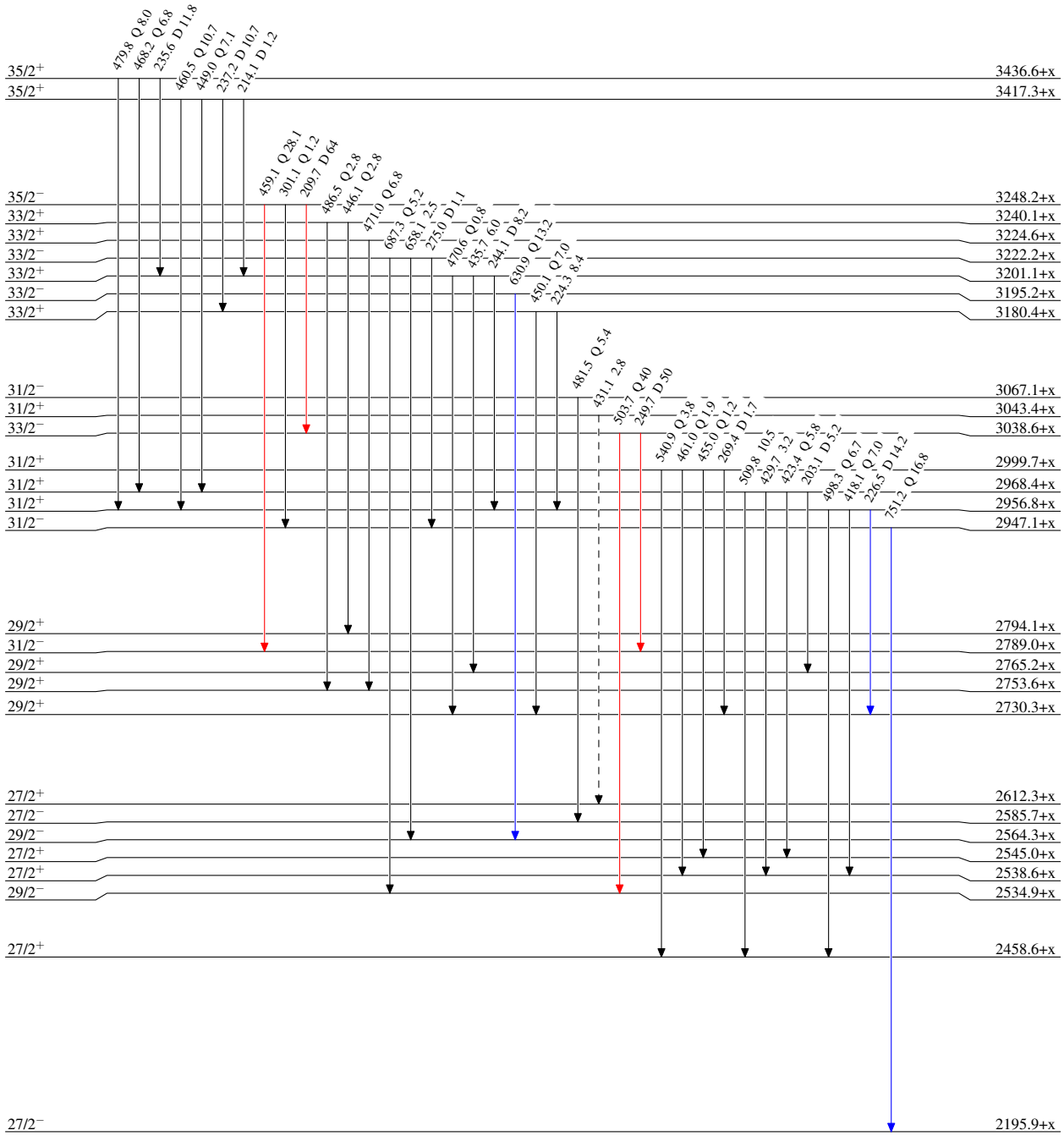
^{139}La(^{30}Si,4nγ) 2004Sc14,2003Sc02,2005An04

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)

Level Scheme (continued)

Intensities: Relative I_γ

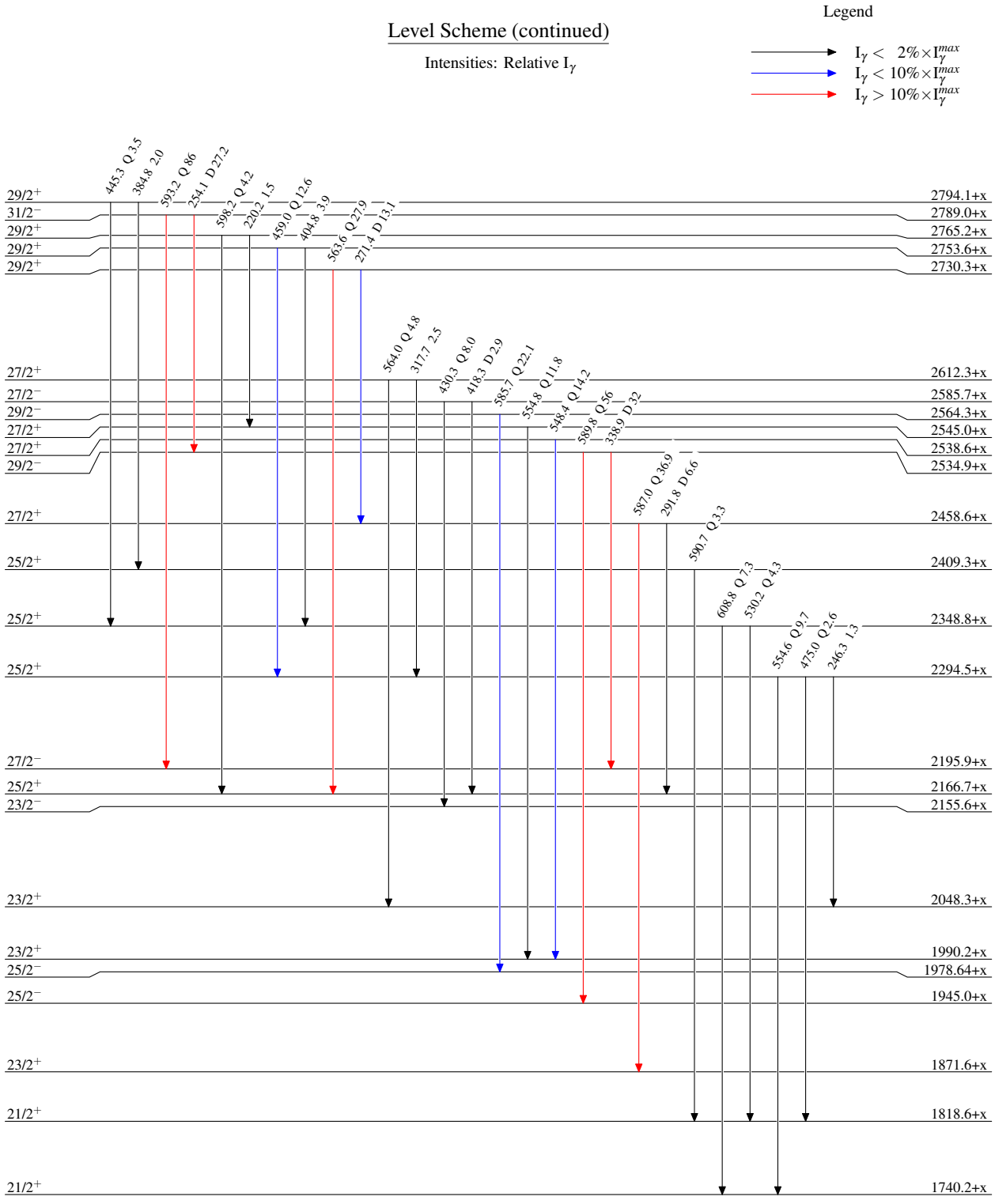


$^{165}_{71}Lu_{94}$

^{139}La(^{30}Si,4nγ) 2004Sc14,2003Sc02,2005An04

Level Scheme (continued)

Intensities: Relative I_γ



$^{165}_{71}Lu_{94}$

^{139}La(^{30}Si,4nγ) 2004Sc14,2003Sc02,2005An04

Level Scheme (continued)

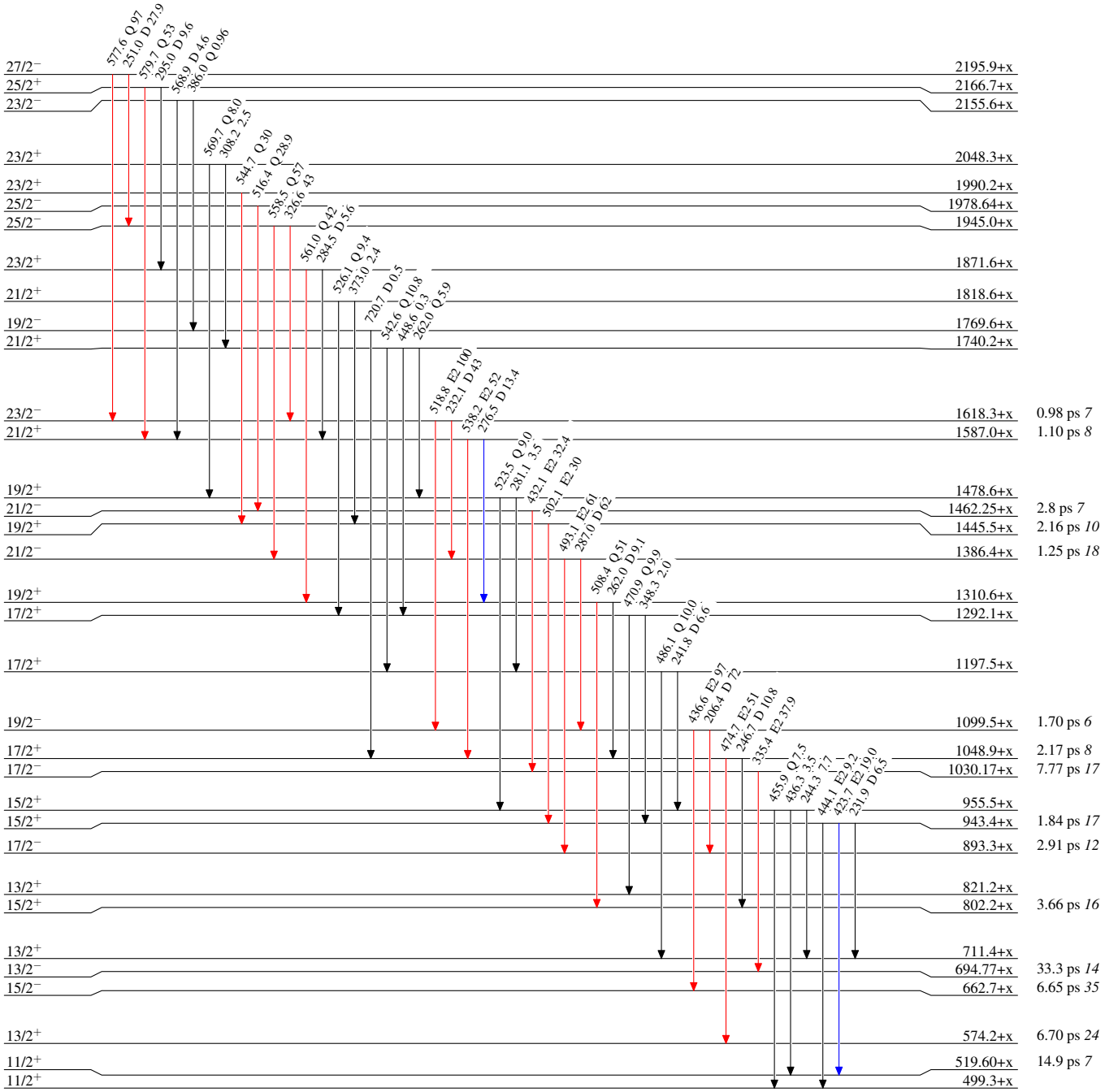
Intensities: Relative I_γ

Legend

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

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

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



$^{165}_{71}Lu_{94}$

^{139}La(^{30}Si,4nγ) 2004Sc14,2003Sc02,2005An04

Level Scheme (continued)

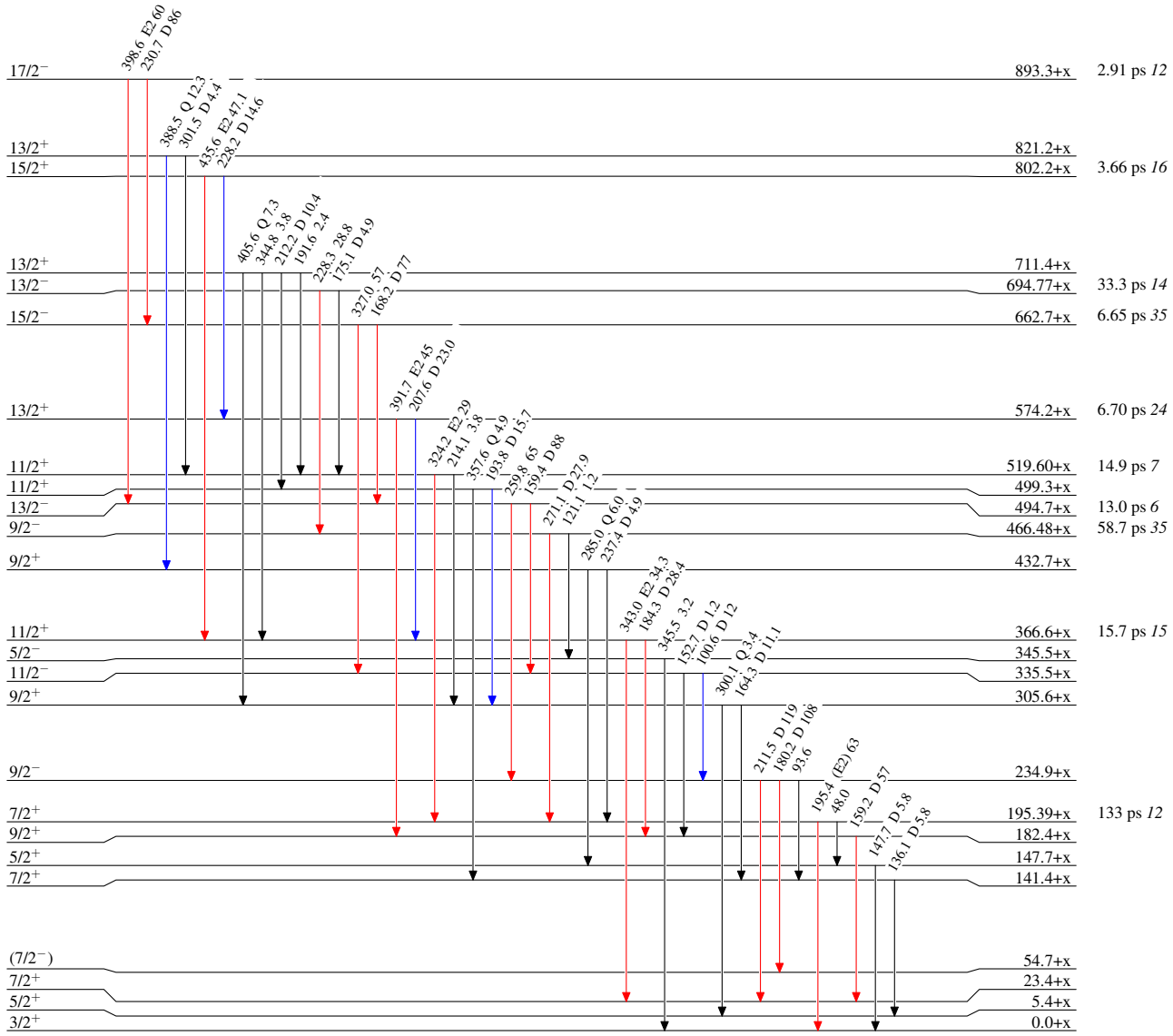
Intensities: Relative I_γ

Legend

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

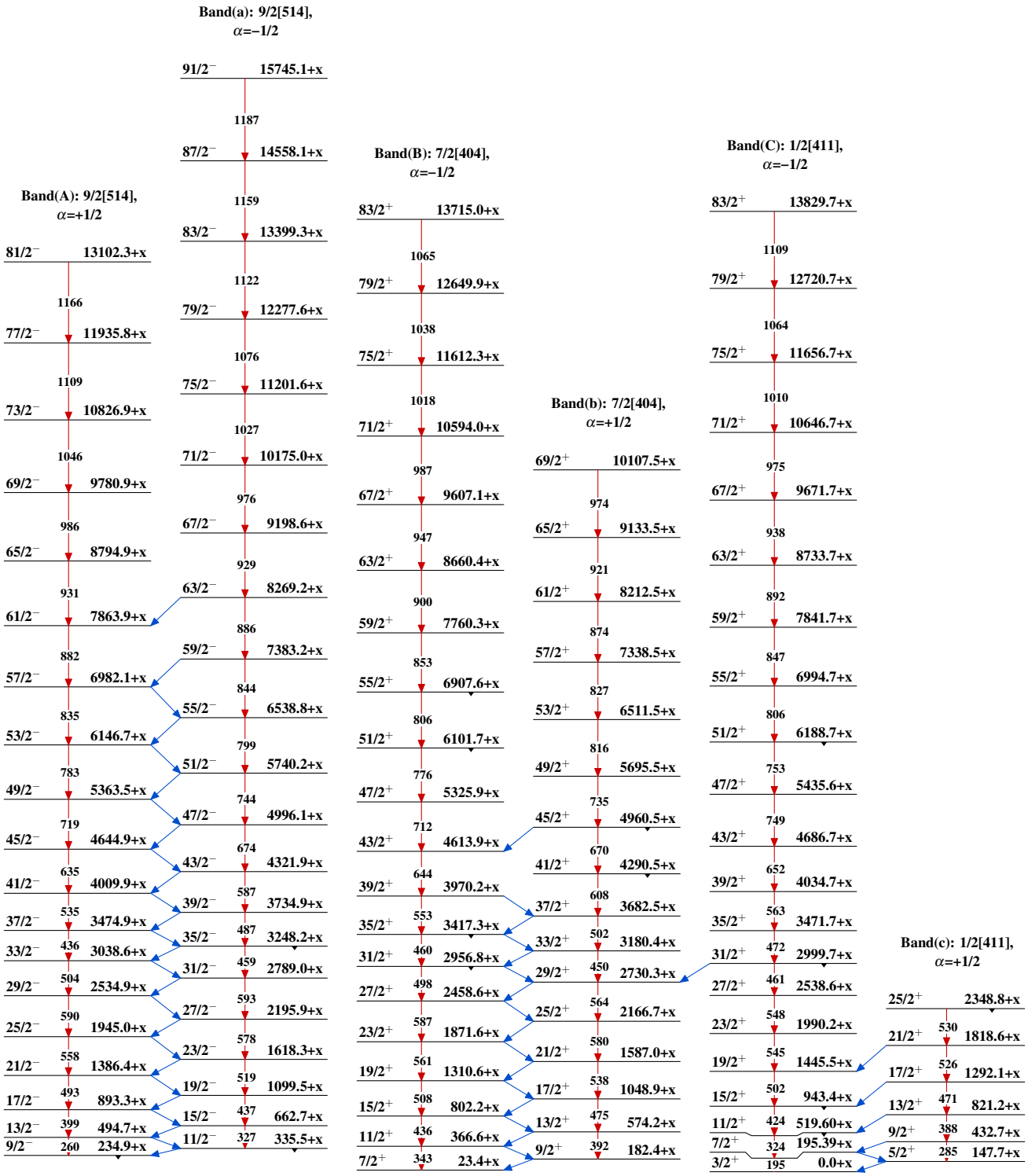
$I_\gamma < 10\% \times I_\gamma^{max}$

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



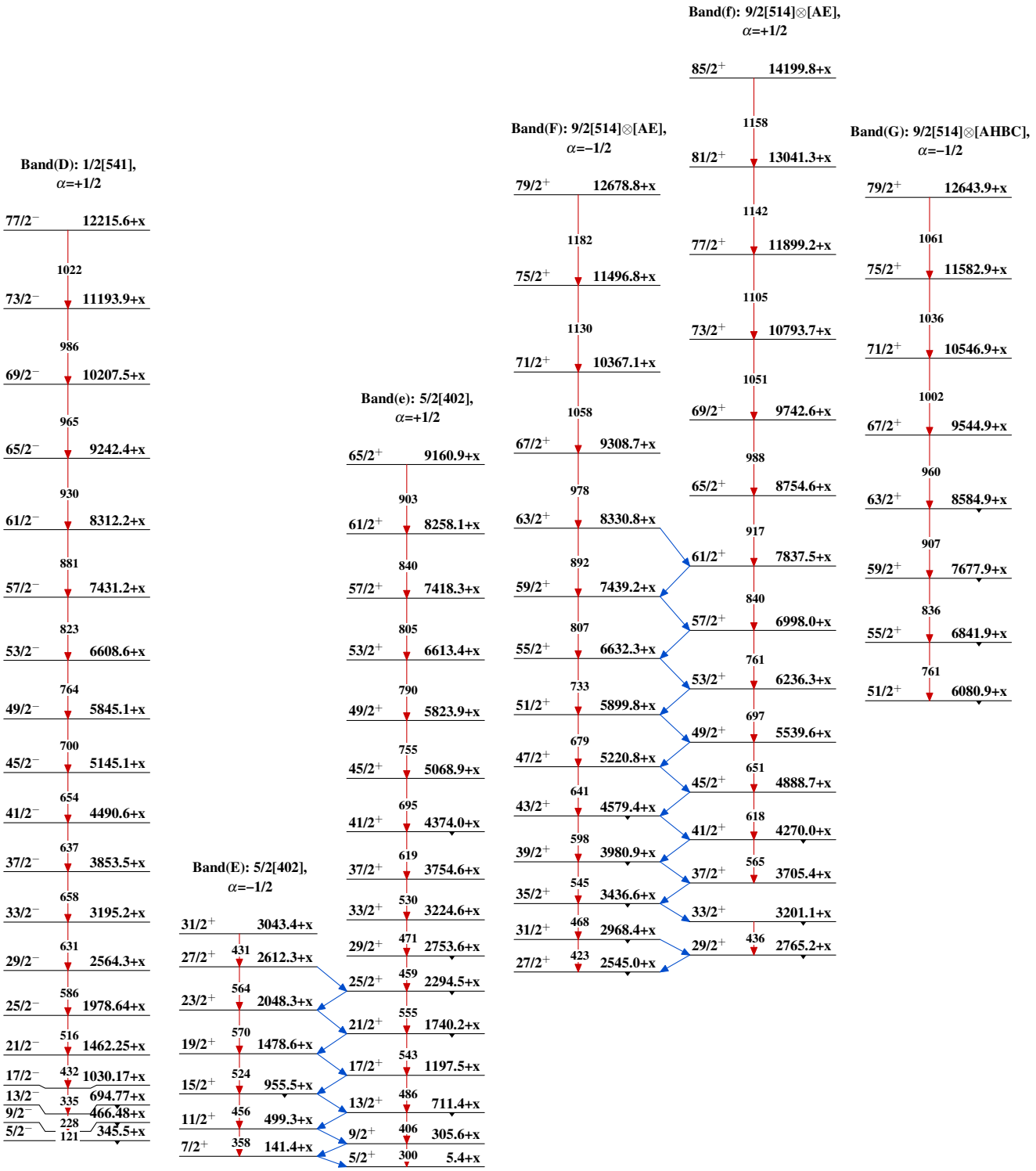
$^{165}_{71}Lu_{94}$

$^{139}La(^{30}Si,4n\gamma)$ 2004Sc14,2003Sc02,2005An04



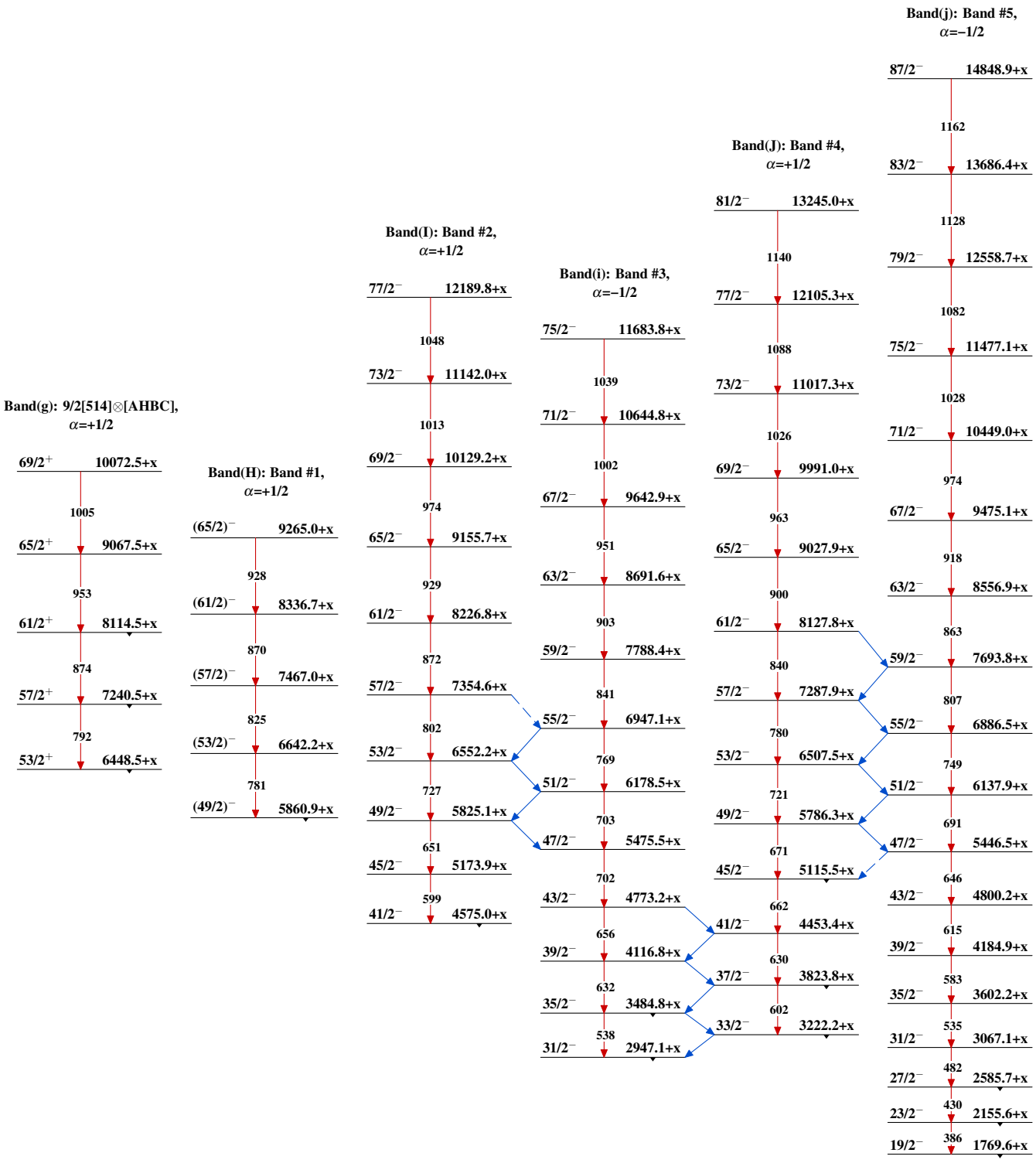
$^{165}_{71}Lu_{94}$

^{139}La(^{30}Si,4nγ) 2004Sc14,2003Sc02,2005An04 (continued)

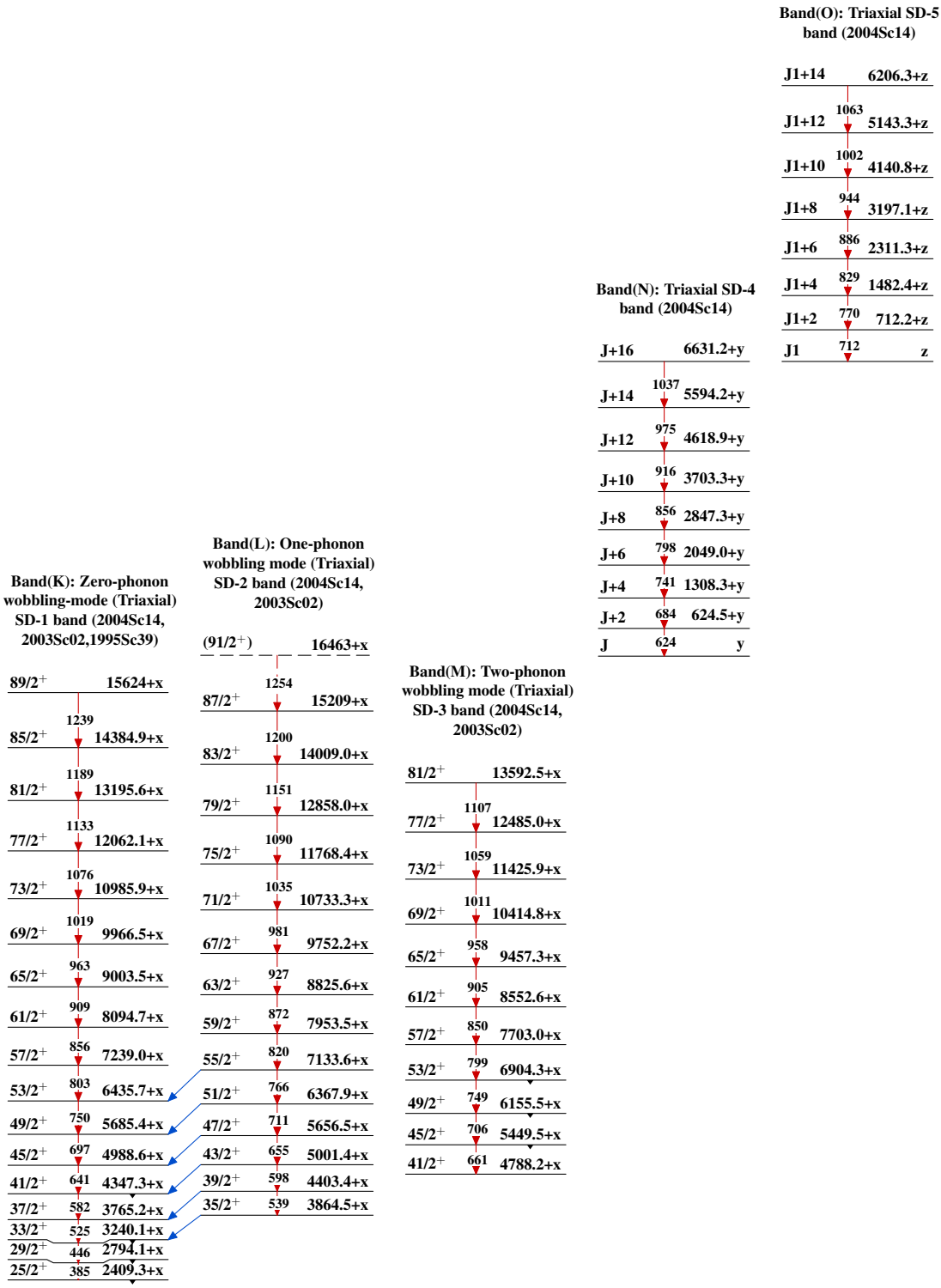


$^{165}_{71}Lu_{94}$

$^{139}La(^{30}Si,4n\gamma)$ 2004Sc14,2003Sc02,2005An04 (continued)



$^{139}La(^{30}Si,4n\gamma)$ 2004Sc14,2003Sc02,2005An04 (continued)



^{150}Sm(^{19}F,4nγ) 1995Sc39

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Ashok K. Jain and Anwesha Ghosh, Balraj Singh	NDS 107, 1075 (2006)	15-Apr-2006

1995Sc39: ^{150}Sm(^{19}F,4nγ) E=95 MeV. Measured Eγ, Iγ, $\gamma\gamma$ coin. Deduced a superdeformed structure and other normal-deformed bands. The authors also report data from ^{138}Ba(^{31}P,4nγ) reaction.
Other: 1983RoZW.
Theory for SD band: 1999Xi02.

^{165}Lu Levels

E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡
0.0+x@ [a]	3/2+	1291.99+x& 19	17/2+	2730.16+x [d] 24	29/2+	5325.7+x [e] 16	47/2+
5.4+x [b] 2	5/2+	1310.5+x [e] 3	19/2+	2753.44+x [b] 24	29/2+	5539.4+x [f] 4	49/2+
23.2+x [e] 3	7/2+	1445.39+x [a] 20	19/2+	2956.62+x [e] 24	31/2+	5899.6+x [g] 4	51/2+
141.44+x [c] 20	7/2+	1478.39+x [c] 21	19/2+	3180.3+x [d] 3	33/2+	5904.0+x [h] 6	(49/2+)
147.70+x& 13	5/2+	1587.0+x [d] 3	21/2+	3200.9+x [f] 3	33/2+	6101.5+x [e] 19	51/2+
182.2+x [d] 3	9/2+	1740.01+x [b] 21	21/2+	3233.5+x [h] 4	(33/2+)	6236.0+x [f] 4	53/2+
195.39+x [a] 11	7/2+	1818.51+x& 22	21/2+	3417.2+x [e] 3	35/2+	6632.0+x [g] 4	55/2+
305.56+x [b] 19	9/2+	1871.5+x [e] 3	23/2+	3436.5+x [g] 3	35/2+	6707.5+x [h] 6	(53/2+)
366.4+x [e] 3	11/2+	1879.2+x# 7	(21/2+)	3682.4+x [d] 3	37/2+	6997.6+x [f] 4	57/2+
432.70+x& 14	9/2+	1990.11+x [a] 23	23/2+	3705.2+x [f] 4	37/2+	7439.0+x [g] 4	59/2+
499.21+x [c] 19	11/2+	2048.1+x [c] 3	23/2+	3815.9+x [h] 4	(37/2+)	7562.8+x [h] 7	(57/2+)
519.58+x [a] 15	11/2+	2166.7+x [d] 3	25/2+	3970.0+x [e] 6	39/2+	7837.4+x [f] 4	61/2+
573.9+x [d] 3	13/2+	2222.7+x# 6	25/2+	3981.0+x [g] 3	39/2+	8330.7+x [g] 5	63/2+
711.21+x [b] 19	13/2+	2263.8+x [h] 4	(25/2+)	4269.8+x [f] 3	41/2+	8470.3+x [h] 8	(61/2+)
802.0+x [e] 3	15/2+	2294.36+x [b] 22	25/2+	4457.2+x [h] 5	(41/2+)	8755.1+x [f] 5	65/2+
821.13+x& 18	13/2+	2348.73+x& 23	25/2+	4579.2+x [g] 3	43/2+	9305.7+x [g] 6	67/2+
943.32+x [a] 17	15/2+	2458.5+x [e] 3	27/2+	4613.7+x [e] 12	43/2+	9432.6+x [h] 9	(65/2+)
955.32+x [c] 20	15/2+	2538.56+x [a] 24	27/2+	4888.5+x [f] 3	45/2+		
1048.7+x [d] 3	17/2+	2612.2+x [c] 4	27/2+	5153.3+x [h] 5	(45/2+)		
1197.29+x [b] 20	17/2+	2709.1+x [h] 4	(29/2+)	5220.6+x [g] 3	47/2+		

† From least-squares fit to Eγ's.
‡ From 1995Sc39, based on rotational-band assignments and $\gamma(\theta)$ data in earlier (1988Fr22,1984Jo05) studies. The assignments are consistent with those in 'Adopted Levels', except that all are given in parentheses there due to lack of strong supporting arguments.
# Level not supported In more recent studies (2004Sc14), the transition connected with this level placed elsewhere. IT is omitted In 'Adopted Levels'.
@ x ≈ 20 keV; see 'Adopted Levels' for comments.
& Band(A): 1/2[411] band, α=+1/2.
[a] Band(a): 1/2[411] band, α=−1/2.
[b] Band(B): 5/2[402] band, α=+1/2.
[c] Band(b): 5/2[402] band, α=−1/2.
[d] Band(C): 7/2[404] band, α=+1/2.
[e] Band(c): 7/2[404] band, α=−1/2.
[f] Band(D): 3-quasiparticle band, α=+1/2.
[g] Band(d): 3-quasiparticle band, α=−1/2.
[h] Band(E): SD (triaxial), 1/2[660] band, α=+1/2.

^{150}Sm(^{19}F,4nγ) 1995Sc39 (continued)

$\gamma(^{165}Lu)$

E_γ †	I_γ	E_i(level)	J_i^π	E_f	J_f^π
136.10 *12*	10.0 *10*	141.44+x	7/2$^+$	5.4+x	5/2$^+$
147.67 *14*	10.0 *10*	147.70+x	5/2$^+$	0.0+x	3/2$^+$
159.18 *11*	10.0 *10*	182.2+x	9/2$^+$	23.2+x	7/2$^+$
164.28 *12*	62.9 *17*	305.56+x	9/2$^+$	141.44+x	7/2$^+$
184.27 *11*	124.3 *22*	366.4+x	11/2$^+$	182.2+x	9/2$^+$
193.80 *12*	124.3‡ *22*	499.21+x	11/2$^+$	305.56+x	9/2$^+$
195.41 *11*	114 *4*	195.39+x	7/2$^+$	0.0+x	3/2$^+$
207.59 *12*	92.4 *13*	573.9+x	13/2$^+$	366.4+x	11/2$^+$
212.17 *14*	41.3 *10*	711.21+x	13/2$^+$	499.21+x	11/2$^+$
214.07 *16*	16.1 *5*	519.58+x	11/2$^+$	305.56+x	9/2$^+$
214.1& *3*	16.2 *5*	3417.2+x	35/2$^+$	3200.9+x	33/2$^+$
224.33@ *16*	21.6 *5*	3180.3+x	33/2$^+$	2956.62+x	31/2$^+$
226.52 *14*	41.0 *8*	2956.62+x	31/2$^+$	2730.16+x	29/2$^+$
228.18 *14*	67.0 *10*	802.0+x	15/2$^+$	573.9+x	13/2$^+$
231.88 *20*	19.8 *6*	943.32+x	15/2$^+$	711.21+x	13/2$^+$
235.60 *3*	31.1 *6*	3436.5+x	35/2$^+$	3200.9+x	33/2$^+$
237.23 *14*	24.7 *6*	3417.2+x	35/2$^+$	3180.3+x	33/2$^+$
237.39 *16*	20.4 *9*	432.70+x	9/2$^+$	195.39+x	7/2$^+$
241.82 *15*	25.6 *6*	1197.29+x	17/2$^+$	955.32+x	15/2$^+$
244.11 *14*	31.0 *6*	3200.9+x	33/2$^+$	2956.62+x	31/2$^+$
244.33 *15*	26.0 *7*	955.32+x	15/2$^+$	711.21+x	13/2$^+$
246.69 *13*	48.8 *7*	1048.7+x	17/2$^+$	802.0+x	15/2$^+$
262.00 *14*	43.3 *8*	1310.5+x	19/2$^+$	1048.7+x	17/2$^+$
262.05 *18*	19.3 *6*	1740.01+x	21/2$^+$	1478.39+x	19/2$^+$
265.33 *14*	22.5 *5*	3682.4+x	37/2$^+$	3417.2+x	35/2$^+$
268.63 *20*	18.0 *5*	3705.2+x	37/2$^+$	3436.5+x	35/2$^+$
271.40 *14*	40.0 *6*	2730.16+x	29/2$^+$	2458.5+x	27/2$^+$
275.2 *10*	9.1 *4*	3981.0+x	39/2$^+$	3705.2+x	37/2$^+$
276.52 *13*	49.0 *8*	1587.0+x	21/2$^+$	1310.5+x	19/2$^+$
281.10 *16*	19.2 *6*	1478.39+x	19/2$^+$	1197.29+x	17/2$^+$
284.49 *15*	24.7 *6*	1871.5+x	23/2$^+$	1587.0+x	21/2$^+$
284.96 *17*	19.5 *9*	432.70+x	9/2$^+$	147.70+x	5/2$^+$
287.6 *10*	15.7 *6*	3970.0+x	39/2$^+$	3682.4+x	37/2$^+$
288.46 *15*	13.4 *5*	4269.8+x	41/2$^+$	3981.0+x	39/2$^+$
291.80 *14*	26.4 *6*	2458.5+x	27/2$^+$	2166.7+x	25/2$^+$
295.04 *14*	30.6‡ *6*	2166.7+x	25/2$^+$	1871.5+x	23/2$^+$
299.9 *10*	12.4 *5*	4269.8+x	41/2$^+$	3970.0+x	39/2$^+$
300.12 *15*	23.6 *10*	305.56+x	9/2$^+$	5.4+x	5/2$^+$
301.5 *10*	18.3 *6*	821.13+x	13/2$^+$	519.58+x	11/2$^+$
309.08 *20*	18.3 *8*	4579.2+x	43/2$^+$	4269.8+x	41/2$^+$
309.36 *15*	28.9 *8*	4888.5+x	45/2$^+$	4579.2+x	43/2$^+$
318.58 *13*	21.3 *4*	5539.4+x	49/2$^+$	5220.6+x	47/2$^+$
324.18 *12*	111.5 *18*	519.58+x	11/2$^+$	195.39+x	7/2$^+$
331.86 *14*	22.6 *5*	5220.6+x	47/2$^+$	4888.5+x	45/2$^+$
335.99 *14*	23.8‡ *5*	6236.0+x	53/2$^+$	5899.6+x	51/2$^+$
343.03 *12*	146 *3*	366.4+x	11/2$^+$	23.2+x	7/2$^+$
343.5 *3*	10.0 *10*	2222.7+x	25/2$^+$	1879.2+x	(21/2$^+$)
348.32 *20*	12.3 *5*	1291.99+x	17/2$^+$	943.32+x	15/2$^+$
357.56 *16*	29.6‡ *9*	499.21+x	11/2$^+$	141.44+x	7/2$^+$
360.06 *14*	13.9 *4*	5899.6+x	51/2$^+$	5539.4+x	49/2$^+$
365.94 *20*	6.1 *4*	6997.6+x	57/2$^+$	6632.0+x	55/2$^+$
388.46 *14*	36.4 *9*	821.13+x	13/2$^+$	432.70+x	9/2$^+$
391.71 *11*	180.9 *24*	573.9+x	13/2$^+$	182.2+x	9/2$^+$

Continued on next page (footnotes at end of table)

^{150}Sm(^{19}F,4nγ) 1995Sc39 (continued)

γ(^{165}Lu) (continued)

E_γ [†]	I_γ	E_i(level)	J_i^π	E_f	J_f^π
395.84 *18*	13.7[‡] *5*	6632.0+x	55/2$^+$	6236.0+x	53/2$^+$
398.62 *20*	11.1[‡] *5*	7837.4+x	61/2$^+$	7439.0+x	59/2$^+$
404.85 *20*	18.9 *8*	2753.44+x	29/2$^+$	2348.73+x	25/2$^+$
405.57 *16*	26.3 *9*	711.21+x	13/2$^+$	305.56+x	9/2$^+$
418.06 *14*	20.3 *4*	2956.62+x	31/2$^+$	2538.56+x	27/2$^+$
423.70 *12*	88.5 *12*	943.32+x	15/2$^+$	519.58+x	11/2$^+$
435.61 *12*	201.7 *24*	802.0+x	15/2$^+$	366.4+x	11/2$^+$
435.82 *16*	27.9 *7*	2730.16+x	29/2$^+$	2294.36+x	25/2$^+$
436.3 *4*	16.7 *8*	955.32+x	15/2$^+$	519.58+x	11/2$^+$
442.0 *3*	5.8[‡] *4*	7439.0+x	59/2$^+$	6997.6+x	57/2$^+$
444.10 *15*	29.8 *8*	943.32+x	15/2$^+$	499.21+x	11/2$^+$
445.28 *24*	15.6 *7*	2709.1+x	(29/2$^+$)	2263.8+x	(25/2$^+$)
445.4 *3*	4.5 *6*	2263.8+x	(25/2$^+$)	1818.51+x	21/2$^+$
448.6 *3*	5.2 *5*	1740.01+x	21/2$^+$	1291.99+x	17/2$^+$
450.08 *13*	44.2 *8*	3180.3+x	33/2$^+$	2730.16+x	29/2$^+$
455.88 *18*	27.8 *9*	955.32+x	15/2$^+$	499.21+x	11/2$^+$
458.97 *15*	45.3 *10*	2753.44+x	29/2$^+$	2294.36+x	25/2$^+$
460.51 *15*	42.3 *9*	3417.2+x	35/2$^+$	2956.62+x	31/2$^+$
470.65 *18*	35.6 *9*	3200.9+x	33/2$^+$	2730.16+x	29/2$^+$
470.89 *15*	45.2 *10*	1291.99+x	17/2$^+$	821.13+x	13/2$^+$
474.73 *12*	194.7 *20*	1048.7+x	17/2$^+$	573.9+x	13/2$^+$
475.01[#] *24*	11.3 *5*	2294.36+x	25/2$^+$	1818.51+x	21/2$^+$
479.83 *17*	27.5 *8*	3436.5+x	35/2$^+$	2956.62+x	31/2$^+$
480.0 *4*	5.7 *5*	3233.5+x	(33/2$^+$)	2753.44+x	29/2$^+$
486.10 *15*	46.7 *10*	1197.29+x	17/2$^+$	711.21+x	13/2$^+$
486.4 *4*	10.5 *7*	2709.1+x	(29/2$^+$)	2222.7+x	25/2$^+$
493.2 *3*	10.0[‡] *6*	8330.7+x	63/2$^+$	7837.4+x	61/2$^+$
498.27 *18*	28.4 *6*	2956.62+x	31/2$^+$	2458.5+x	27/2$^+$
502.04 *16*	36.7 *9*	3682.4+x	37/2$^+$	3180.3+x	33/2$^+$
502.07 *12*	111.3 *15*	1445.39+x	19/2$^+$	943.32+x	15/2$^+$
508.41 *12*	242.4 *20*	1310.5+x	19/2$^+$	802.0+x	15/2$^+$
523.49 *18*	34.8 *12*	1478.39+x	19/2$^+$	955.32+x	15/2$^+$
523.6 *10*	7.4 *10*	2263.8+x	(25/2$^+$)	1740.01+x	21/2$^+$
524.44 *20*	11.0 *9*	3233.5+x	(33/2$^+$)	2709.1+x	(29/2$^+$)
526.14 *17*	45.3 *10*	1818.51+x	21/2$^+$	1291.99+x	17/2$^+$
530.23 *20*	24.6 *7*	2348.73+x	25/2$^+$	1818.51+x	21/2$^+$
538.25 *12*	204.5 *17*	1587.0+x	21/2$^+$	1048.7+x	17/2$^+$
542.58 *16*	43.1 *10*	1740.01+x	21/2$^+$	1197.29+x	17/2$^+$
544.65 *15*	37.3 *9*	3981.0+x	39/2$^+$	3436.5+x	35/2$^+$
544.73 *13*	102.8 *13*	1990.11+x	23/2$^+$	1445.39+x	19/2$^+$
548.45 *15*	45.3 *9*	2538.56+x	27/2$^+$	1990.11+x	23/2$^+$
552.9 *10*	33.5 *9*	3970.0+x	39/2$^+$	3417.2+x	35/2$^+$
554.59 *15*	39.4 *11*	2294.36+x	25/2$^+$	1740.01+x	21/2$^+$
561.03 *13*	161.8 *18*	1871.5+x	23/2$^+$	1310.5+x	19/2$^+$
562.5[a] *4*	6.0 *8*	3981.0+x	39/2$^+$	3417.2+x	35/2$^+$
563.56 *14*	90.6 *15*	2730.16+x	29/2$^+$	2166.7+x	25/2$^+$
564.0 *10*	1.8 *5*	4269.8+x	41/2$^+$	3705.2+x	37/2$^+$
564.03 *23*	22.5 *8*	2612.2+x	27/2$^+$	2048.1+x	23/2$^+$
569.75 *18*	31.6 *9*	2048.1+x	23/2$^+$	1478.39+x	19/2$^+$
579.74 *12*	31.6[‡] *9*	2166.7+x	25/2$^+$	1587.0+x	21/2$^+$
582.36 *18*	25.6 *9*	3815.9+x	(37/2$^+$)	3233.5+x	(33/2$^+$)
587.02 *13*	120.7 *18*	2458.5+x	27/2$^+$	1871.5+x	23/2$^+$
587.46 *21*	18.1 *9*	4269.8+x	41/2$^+$	3682.4+x	37/2$^+$
587.7 *10*	10.6 *14*	2753.44+x	29/2$^+$	2166.7+x	25/2$^+$

Continued on next page (footnotes at end of table)

^{150}Sm(^{19}F,4nγ) 1995Sc39 (continued)

γ(^{165}Lu) (continued)

E_γ[†]	I_γ	E_i(level)	J_i^π	E_f	J_f^π
598.55 *15*	38.3 *9*	4579.2+x	43/2$^+$	3981.0+x	39/2$^+$
608.84 *20*	19.8 *8*	2348.73+x	25/2$^+$	1740.01+x	21/2$^+$
609.3 *10*	20.2 *7*	4579.2+x	43/2$^+$	3970.0+x	39/2$^+$
618.51 *15*	35.7 *7*	4888.5+x	45/2$^+$	4269.8+x	41/2$^+$
641.3[b] *2*	20.6[c] *10*	4457.2+x	(41/2$^+$)	3815.9+x	(37/2$^+$)
641.44 *17*	33.5 *9*	5220.6+x	47/2$^+$	4579.2+x	43/2$^+$
643.7 *10*	23.5 *9*	4613.7+x	43/2$^+$	3970.0+x	39/2$^+$
651.13 *15*	29.8 *8*	5539.4+x	49/2$^+$	4888.5+x	45/2$^+$
679.18 *18*	18.4 *6*	5899.6+x	51/2$^+$	5220.6+x	47/2$^+$
696.10 *20*	15.5 *7*	5153.3+x	(45/2$^+$)	4457.2+x	(41/2$^+$)
696.73 *17*	20.9[‡] *7*	6236.0+x	53/2$^+$	5539.4+x	49/2$^+$
712.0 *10*	18.3 *7*	5325.7+x	47/2$^+$	4613.7+x	43/2$^+$
732.95 *20*	11.4[‡] *6*	6632.0+x	55/2$^+$	5899.6+x	51/2$^+$
750.73 *20*	10.8 *6*	5904.0+x	(49/2$^+$)	5153.3+x	(45/2$^+$)
761.39 *18*	12.6 *6*	6997.6+x	57/2$^+$	6236.0+x	53/2$^+$
775.8 *10*	8.7 *6*	6101.5+x	51/2$^+$	5325.7+x	47/2$^+$
803.5 *3*	6.4 *5*	6707.5+x	(53/2$^+$)	5904.0+x	(49/2$^+$)
806.93 *20*	9.9[‡] *5*	7439.0+x	59/2$^+$	6632.0+x	55/2$^+$
839.50 *22*	12.3[‡] *6*	7837.4+x	61/2$^+$	6997.6+x	57/2$^+$
855.31 *25*	4.9 *4*	7562.8+x	(57/2$^+$)	6707.5+x	(53/2$^+$)
891.77 *25*	5.3[‡] *5*	8330.7+x	63/2$^+$	7439.0+x	59/2$^+$
907.5 *3*	2.6 *4*	8470.3+x	(61/2$^+$)	7562.8+x	(57/2$^+$)
917.66 *24*	3.6 *5*	8755.1+x	65/2$^+$	7837.4+x	61/2$^+$
962.3 *4*	2.1 *3*	9432.6+x	(65/2$^+$)	8470.3+x	(61/2$^+$)
975.0 *3*	2.2 *4*	9305.7+x	67/2$^+$	8330.7+x	63/2$^+$

[†] From (^{19}F,4nγ) and (^{31}P,4nγ) reactions.
[‡] Comparison of branching ratio with that deduced from (^{31}P,4nγ) shows a large discrepancy. See adopted gammas for details.
[#] Poor fit; level-energy difference=475.85.
[@] Poor fit; level-energy difference=223.71.
[&] Poor fit; level-energy difference=216.2.
[a] Poor fit; level-energy difference=563.8.
[b] From level-energy difference. This gamma ray is not listed in tabular gamma-ray data of 1995Sc39. Uncertainty is assigned by the evaluators.
[c] From the average of Iγ(696γ) and Iγ(582γ). Intensity is not available from 1995Sc39.

^{150}Sm(^{19}F,4nγ) 1995Sc39

Level Scheme

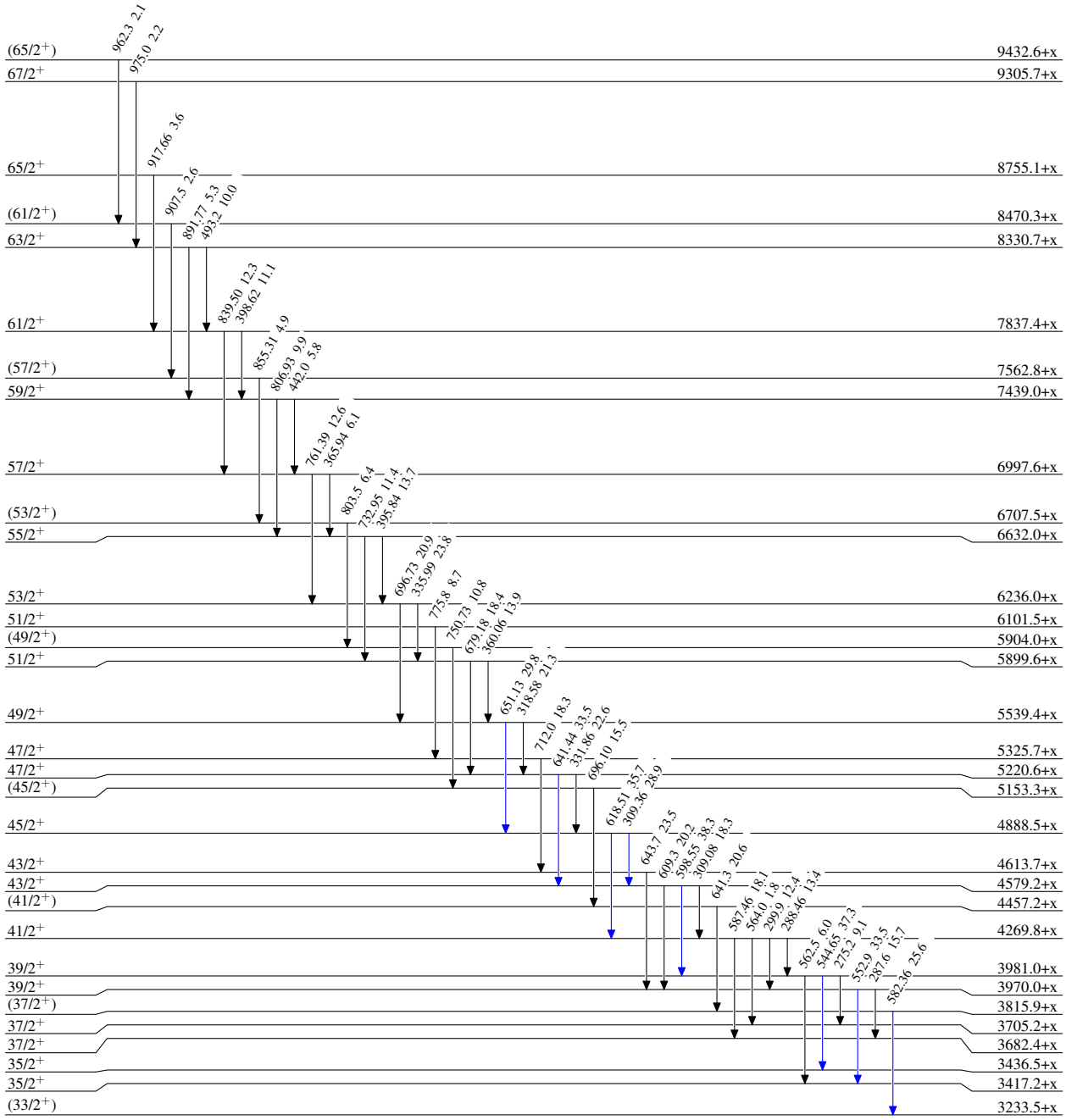
Intensities: Relative I_γ

Legend

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

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

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



$^{165}_{71}Lu_{94}$

^{150}Sm(^{19}F,4nγ) 1995Sc39

Level Scheme (continued)

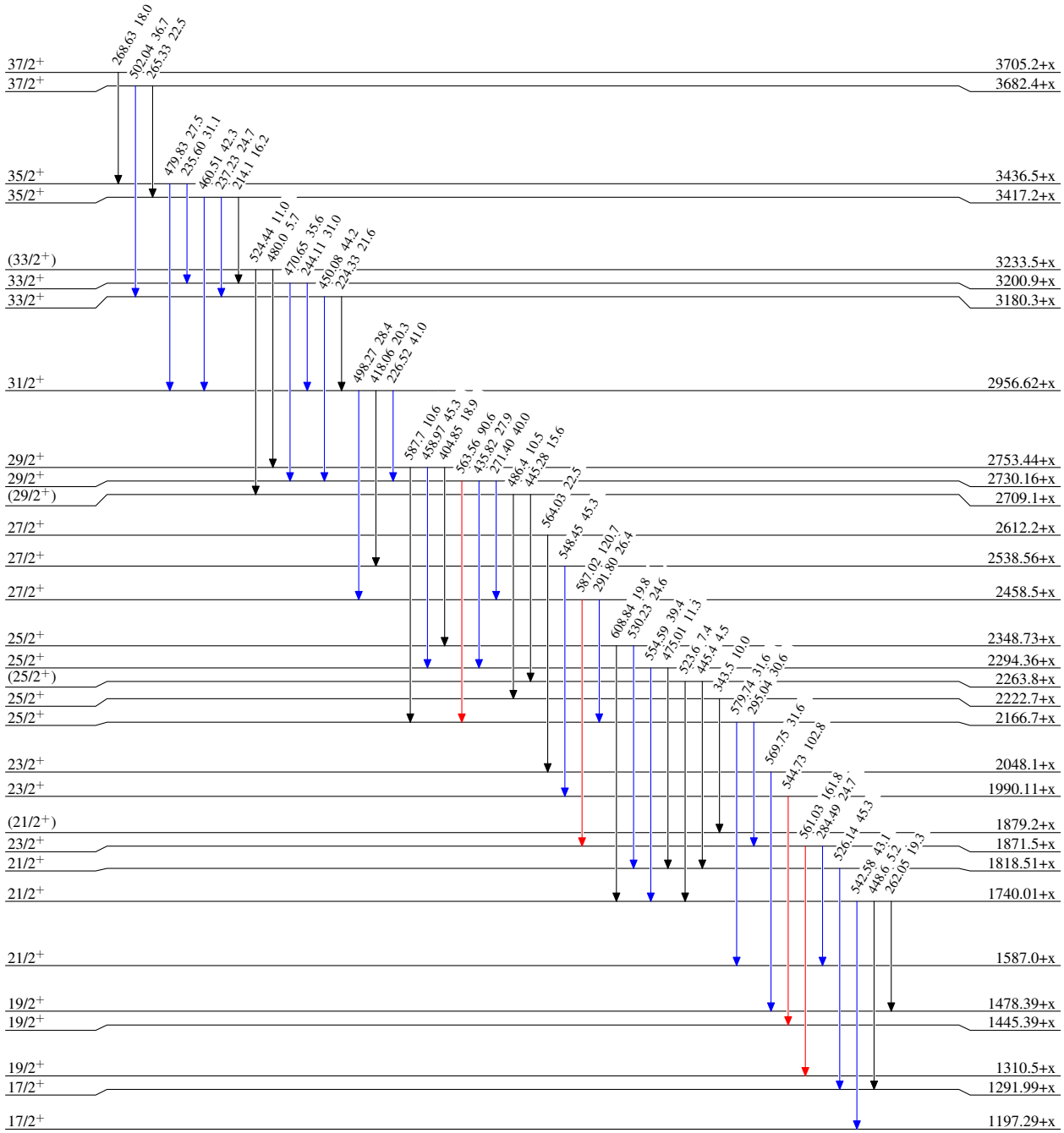
Intensities: Relative I_γ

Legend

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

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

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

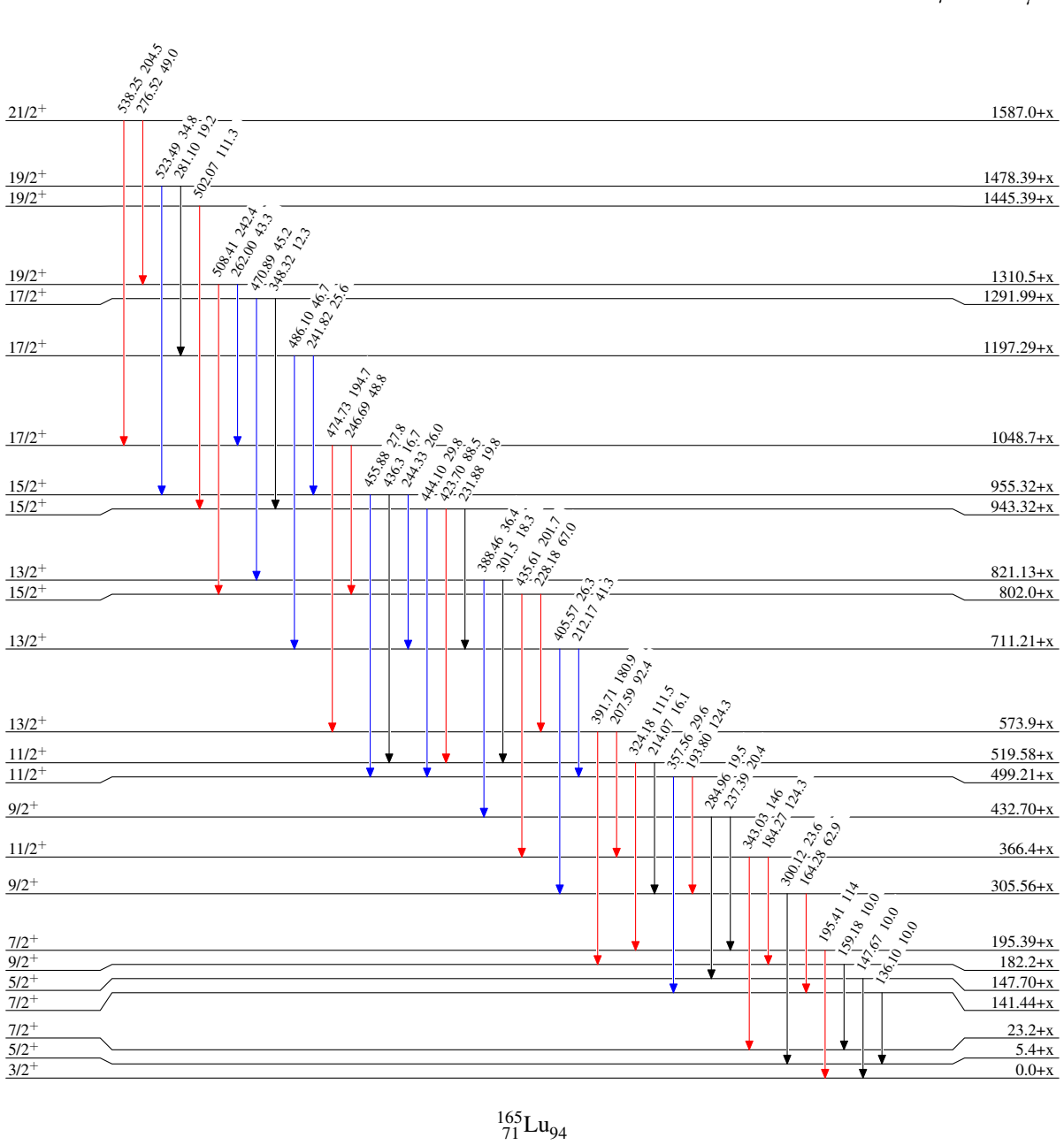


$^{165}_{71}Lu_{94}$

^{150}Sm(^{19}F,4nγ) 1995Sc39

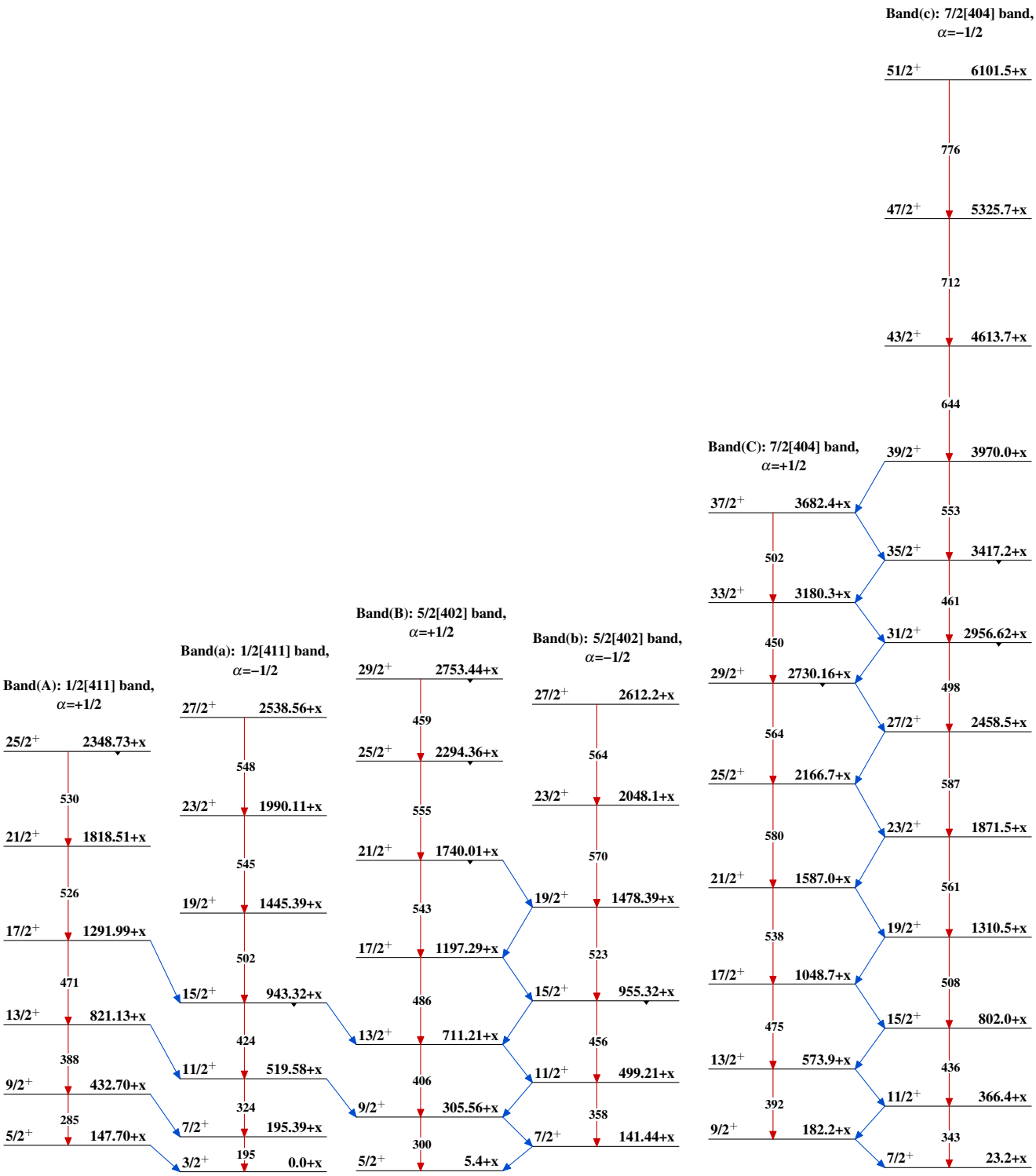
Level Scheme (continued)

Intensities: Relative I_γ



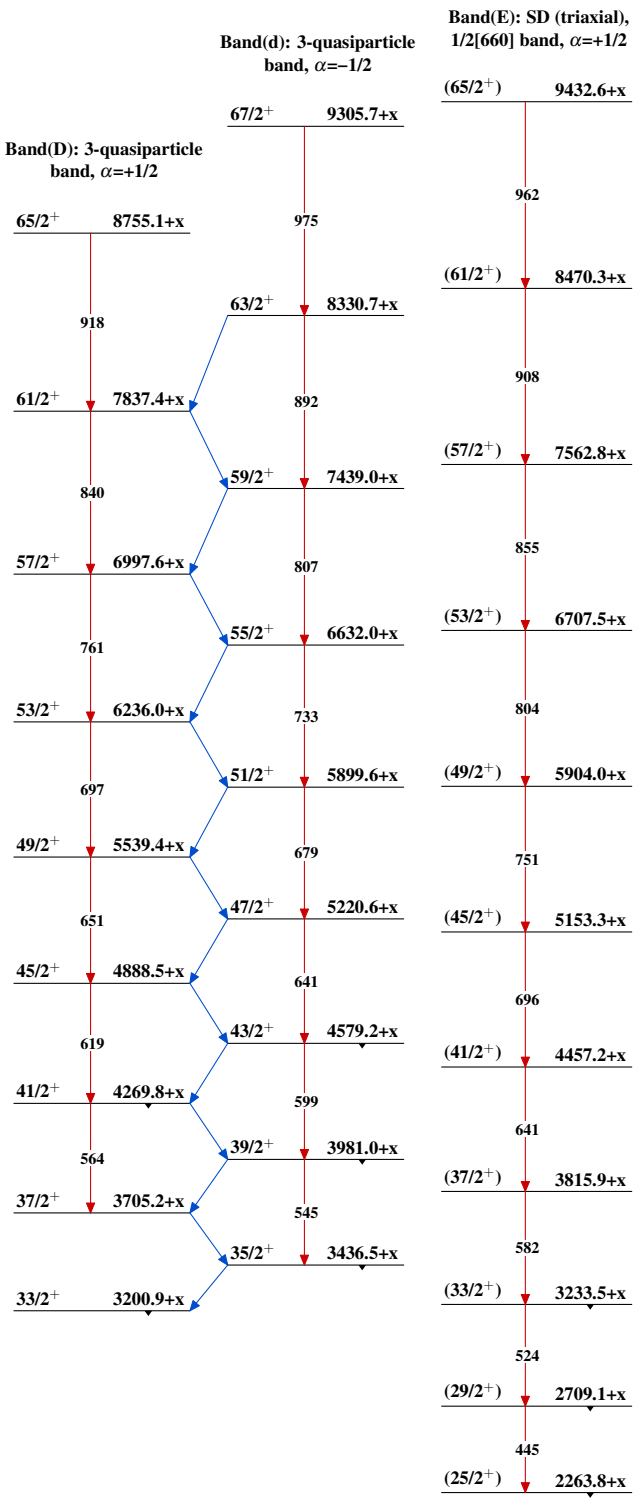
$^{165}_{71}Lu_{94}$

^{150}Sm(^{19}F,4nγ) 1995Sc39



$^{165}_{71}Lu_{94}$

$^{150}Sm(^{19}F,4n\gamma)$ 1995Sc39 (continued)



$^{165}_{71}Lu_{94}$

^{153}Eu(^{16}O,4nγ) 1984Jo05

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Ashok K. Jain and Anwesha Ghosh, Balraj Singh	NDS 107, 1075 (2006)	15-Apr-2006

1984Jo05: E=73-85 MeV. Measured: γ, $\gamma\gamma$, $\gamma(\theta)$, γ(t), yield.

The level scheme is from 1984Jo05 with modifications introduced by 1995Sc39. All bands are now interconnected whereas in 1984Jo05 bands 1/2[541], 1/2[411] and 5/2[402] formed one set and the bands 7/2[402] and 9/2[514] formed another set. The value of 0+y in 1984Jo05 is replaced here by 23.2+x, based on 'Adopted Levels'.

^{165}Lu Levels

E(level)	J$^{\pi}$[†]	Comments
0.0+x[#&]	(3/2$^+$)	Additional information 1.
5.5+x[b] 6	(5/2$^+$)	
23.5+x[a] 3	(7/2$^+$)	
54.75+x[@] 21	(7/2$^-$)	Additional information 2.
141.7+x[b] 6	(7/2$^+$)	
147.4+x[&] 4	(5/2$^+$)	
182.6+x[a] 3	(9/2$^+$)	
195.30+x[&] 19	(7/2$^+$)	
234.84+x[d] 20	(9/2$^-$)	
305.9+x[b] 6	(9/2$^+$)	
335.2+x[d] 3	(11/2$^-$)	
345.3+x[c] 4	(5/2$^-$)	
366.8+x[a] 4	(11/2$^+$)	
432.3+x[&] 4	(9/2$^+$)	
466.4+x[c] 3	(9/2$^-$)	
494.5+x[d] 3	(13/2$^-$)	
499.2+x[b] 5	(11/2$^+$)	
519.6+x[&] 3	(11/2$^+$)	
574.6+x[a] 4	(13/2$^+$)	
662.4+x[d] 3	(15/2$^-$)	
694.6+x[c] 3	(13/2$^-$)	
712.0+x[b] 5	(13/2$^+$)	
802.7+x[a] 4	(15/2$^+$)	
821.4+x[&] 4	(13/2$^+$)	
893.2+x[d] 3	(17/2$^-$)	
943.6+x[&] 4	(15/2$^+$)	
956.5+x[b] 5	(15/2$^+$)	
1030.0+x[c] 4	(17/2$^-$)	
1049.8+x[a] 4	(17/2$^+$)	
1099.5+x[d] 3	(19/2$^-$)	
1198.4+x[b] 5	(17/2$^+$)	
1292.9+x[&] 4	(17/2$^+$)	
1311.6+x[a] 4	(19/2$^+$)	
1386.7+x[d] 4	(21/2$^-$)	
1445.9+x[b] 4	(19/2$^+$)	
1462.6+x[c] 5	(21/2$^-$)	
1479.8+x[b] 6	(19/2$^+$)	

Continued on next page (footnotes at end of table)

^{153}Eu(^{16}O,4nγ) 1984Jo05 (continued)

^{165}Lu Levels (continued)

E(level)	Jπ†	E(level)	Jπ†	E(level)	Jπ†	E(level)	Jπ†
1588.3+x[a] 4	(21/2+)	2050.0+x[b] 8	(23/2+)	2546.0+x‡ 7	(27/2+)	3249.6+x[d] 4	(35/2−)
1618.6+x[d] 4	(23/2−)	2168.2+x[a] 5	(25/2+)	2564.3+x[c] 6	(29/2−)	3330.7+x?‡[a] 7	(33/2+)
1740.9+x[b] 6	(21/2+)	2196.6+x[d] 4	(27/2−)	2732.1+x[a] 5	(29/2+)	3476.7+x[d] 5	(37/2−)
1819.4+x& 5	(21/2+)	2295.6+x?[b] 9	(25/2+)	2755.6+x?[b] 13	(29/2+)	3736.5+x[d] 5	(39/2−)
1873.2+x[a] 4	(23/2+)	2350.2+x& 7	(25/2+)	2790.0+x[d] 4	(31/2−)	3854.8+x[c] 9	(37/2−)
1945.4+x[d] 4	(25/2−)	2460.6+x[a] 5	(27/2+)	3029.6+x?‡[a] 7	(31/2+)	4011.7+x[d] 5	(41/2−)
1979.1+x[c] 5	(25/2−)	2535.8+x[d] 4	(29/2−)	3039.6+x[d] 4	(33/2−)	4324.0+x[d] 6	(43/2−)
1990.9+x& 5	(23/2+)	2539.3+x 5	(27/2+)	3195.8+x[c] 8	(33/2−)	4483.9+x[c] 11	(41/2−)

† From 'Adopted Levels'.
‡ This level is probably non-existent in view of the more recent work of 1995Sc39, where it is absent.
# x ≈ 20 keV; see 'Adopted Levels' for comments.
@ From 'Adopted Levels'.
& Band(A): 1/2[411] band.
a Band(B): 7/2[404] band.
b Band(C): 5/2[402] band.
c Band(D): 1/2[541] band.
d Band(E): 9/2[514] band.

γ(^{165}Lu)

Eγ&	Iγ†	Ei(level)	J_i^π	Ef	J_f^π	Mult.‡	δ‡	Comments
100.4 2	28 3	335.2+x	(11/2−)	234.84+x	(9/2−)	D+Q		A_2=+0.04 3, A_4=−0.04 3.
121.1 5	5.3 18	466.4+x	(9/2−)	345.3+x	(5/2−)			
136.2 2	21.3 21	141.7+x	(7/2+)	5.5+x	(5/2+)	D+Q		A_2=−0.04 3, A_4=+0.04 3.
147.4 5	12 4	147.4+x	(5/2+)	0.0+x	(3/2+)	D		A_2=−0.21 7, A_4=−0.05 7.
152.6 6	6.0 20	335.2+x	(11/2−)	182.6+x	(9/2+)	D		A_2=−0.21 7, A_4=−0.05 7.
159.1 2	56 5	182.6+x	(9/2+)	23.5+x	(7/2+)	D+Q		A_2=+0.18 2, A_4=−0.01 2 for 159.1γ+159.3γ.
159.3 2	77 7	494.5+x	(13/2−)	335.2+x	(11/2−)	D+Q		A_2=+0.18 2, A_4=−0.01 2 for 159.3γ+159.1γ.
164.2 2	16.0 16	305.9+x	(9/2+)	141.7+x	(7/2+)	D+Q		A_2=−0.06 4, A_4=−0.01 4.
167.9 2	65 7	662.4+x	(15/2−)	494.5+x	(13/2−)	D+Q	+0.15 5	A_2=−0.01 2, A_4=−0.01 2.
175.0 5	5.5 18	694.6+x	(13/2−)	519.6+x	(11/2+)	D		A_2=−0.32 11, A_4=+0.06 12.
180.1 2	100	234.84+x	(9/2−)	54.75+x	(7/2−)	D		A_2=+0.16 2, A_4=−0.02 2.
184.2 2	37 3	366.8+x	(11/2+)	182.6+x	(9/2+)	D+Q	+0.47 7	A_2=+0.32 3, A_4=−0.01 3.
193.3 5	8.6 25	499.2+x	(11/2+)	305.9+x	(9/2+)			
195.3 2	93 9	195.30+x	(7/2+)	0.0+x	(3/2+)	Q		A_2=+0.29 2, A_4=−0.07 2.
206.3 2	53 5	1099.5+x	(19/2−)	893.2+x	(17/2−)	D+Q	+0.15 3	A_2=+0.01 2, A_4=−0.01 2.
207.8 2	15.3 15	574.6+x	(13/2+)	366.8+x	(11/2+)	D+Q	+0.57 10	A_2=+0.38 6, A_4=−0.01 5.
210.0 2	22.2 22	3249.6+x	(35/2−)	3039.6+x	(33/2−)	D+Q	+0.05 3	A_2=−0.13 3, A_4=0.00 3.
211.3 2	99	234.84+x	(9/2−)	23.5+x	(7/2+)	D		A_2=−0.27 2, A_4=0.00 2.
212.8 5	6.0 20	712.0+x	(13/2+)	499.2+x	(11/2+)	D+Q	+0.25 6	A_2=+0.12 15, A_4=+0.04 15.
227.1 5		3476.7+x	(37/2−)	3249.6+x	(35/2−)			
228.1 5	13 4	802.7+x	(15/2+)	574.6+x	(13/2+)			A_2=+0.18 2, A_4=−0.07 2 for 228.1γ+228.2γ.
228.2 2	58 6	694.6+x	(13/2−)	466.4+x	(9/2−)	Q		A_2=+0.18 2, A_4=−0.07 2 for 228.2γ+228.1γ.
230.8 2	56 5	893.2+x	(17/2−)	662.4+x	(15/2−)	D+Q	+0.22 4	A_2=+0.10 2, A_4=−0.01 2.

Continued on next page (footnotes at end of table)

^{153}Eu(^{16}O,4nγ) 1984Jo05 (continued)

γ(^{165}Lu) (continued)

E_γ[&]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[‡]	Comments
231.9 *2*	26 *3*	1618.6+x	(23/2$^-$)	1386.7+x	(21/2$^-$)	D+Q	+0.11 *3*	A_2=−0.04 *3*, A_4=+0.02 *3*.
237.0 *5*	9 *3*	432.3+x	(9/2$^+$)	195.30+x	(7/2$^+$)	D		A_2=−0.41 *11*, A_4=0.00 *12*.
241.9 *5*		1198.4+x	(17/2$^+$)	956.5+x	(15/2$^+$)			
244.5 *5*		956.5+x	(15/2$^+$)	712.0+x	(13/2$^+$)			
247.1 *5*	9 *3*	1049.8+x	(17/2$^+$)	802.7+x	(15/2$^+$)	D+Q	+0.38 *13*	A_2=+0.29 *11*, A_4=−0.08 *11*.
249.6 *2*	15.9	3039.6+x	(33/2$^-$)	2790.0+x	(31/2$^-$)	D(+Q)	+0.04 *4*	A_2=−0.14 *7*, A_4=−0.01 *7*.
251.2 *3*	11.8 *25*	2196.6+x	(27/2$^-$)	1945.4+x	(25/2$^-$)	D(+Q)	+0.07 *7*	A_2=−0.11 *9*, A_4=+0.05 *10*.
254.2 *5*	12 *2*	2790.0+x	(31/2$^-$)	2535.8+x	(29/2$^-$)	D		A_2=−0.25 *9*, A_4=+0.07 *9*.
259.7 *2*	<31	494.5+x	(13/2$^-$)	234.84+x	(9/2$^-$)	Q		I_γ: I(259.7γ+259.8γ)=309 *30*. A_2=+0.20 *5*, A_4=−0.09 *5* for 259.8γ+259.7γ.
259.8 *2*	<31	3736.5+x	(39/2$^-$)	3476.7+x	(37/2$^-$)			I_γ: 309 *31* for 259.8+259.7. A_2=+0.20 *5*, A_4=−0.09 *5* for 259.8γ+259.7γ.
261.1 *5*		1740.9+x	(21/2$^+$)	1479.8+x	(19/2$^+$)			
261.8 *5*	10 *3*	1311.6+x	(19/2$^+$)	1049.8+x	(17/2$^+$)			
271.1 *2*	56 *6*	466.4+x	(9/2$^-$)	195.30+x	(7/2$^+$)	D		A_2=−0.19 *3*, A_4=+0.00 *3*.
271.5	[#]	2732.1+x	(29/2$^+$)	2460.6+x	(27/2$^+$)			A_2=−0.19 *3*, A_4=0.00 *3* for 271.5γ+271.1γ.
275.2 *3*	14 *4*	4011.7+x	(41/2$^-$)	3736.5+x	(39/2$^-$)	D(+Q)	+0.04 *4*	A_2=−0.12 *8*, A_4=+0.01 *8*.
276.7 *3*	12 *2*	1588.3+x	(21/2$^+$)	1311.6+x	(19/2$^+$)	D+Q	+0.26 *7*	A_2=+0.15 *9*, A_4=−0.07 *9*.
281.4 *5*		1479.8+x	(19/2$^+$)	1198.4+x	(17/2$^+$)			
284.9 *5*	12 *4*	432.3+x	(9/2$^+$)	147.4+x	(5/2$^+$)			A_2=+0.17 *7*, A_4=+0.01 *8* for 284.9γ+284.9γ.
284.9 *5*	6.6 *20*	1873.2+x	(23/2$^+$)	1588.3+x	(21/2$^+$)			A_2=+0.17 *7*, A_4=+0.01 *8* for 284.9γ+284.9γ.
287.2 *2*	44 *4*	1386.7+x	(21/2$^-$)	1099.5+x	(19/2$^-$)	D+Q	+0.21 *4*	A_2=+0.07 *4*, A_4=−0.02 *4*.
292.4 *5*	5.6 *18*	2460.6+x	(27/2$^+$)	2168.2+x	(25/2$^+$)	D+Q	+0.44 *12*	A_2=+0.34 *10*, A_4=−0.12 *10*.
295.0 *5*	6.5 *20*	2168.2+x	(25/2$^+$)	1873.2+x	(23/2$^+$)	D+Q	+0.40 *12*	A_2=+0.34 *9*, A_4=−0.04 *8*.
300.4 *5*	6.4 *20*	305.9+x	(9/2$^+$)	5.5+x	(5/2$^+$)	Q		A_2=+0.38 *9*, A_4=−0.14 *8*.
301.8 *5*	4.1 *14*	821.4+x	(13/2$^+$)	519.6+x	(11/2$^+$)	D(+Q)	+0.07 *7*	A_2=−0.08 *14*, A_4=−0.12 *16*.
312.3 *5*	8.1 *25*	4324.0+x	(43/2$^-$)	4011.7+x	(41/2$^-$)	D+Q	+0.18 *7*	A_2=+0.06 *9*, A_4=+0.07 *9*.
324.3 *2*	33 *3*	519.6+x	(11/2$^+$)	195.30+x	(7/2$^+$)	Q		A_2=+0.27 *6*, A_4=−0.10 *6*.
326.8 *2*	29 *3*	1945.4+x	(25/2$^-$)	1618.6+x	(23/2$^-$)			A_2=+0.20 *3*, A_4=−0.03 *3* for 326.8γ+327.2γ.
327.2 *2*	37 *4*	662.4+x	(15/2$^-$)	335.2+x	(11/2$^-$)	Q		A_2=+0.20 *3*, A_4=−0.03 *3* for 327.2γ+326.8γ.
335.4 *2*	45 *5*	1030.0+x	(17/2$^-$)	694.6+x	(13/2$^-$)	Q		A_2=+0.24 *3*, A_4=−0.08 *3*.
339.2 *2*	19.6 *20*	2535.8+x	(29/2$^-$)	2196.6+x	(27/2$^-$)	D+Q	+0.16 *4*	A_2=+0.01 *4*, A_4=+0.03 *4*.
343.3 *2*	34 *3*	366.8+x	(11/2$^+$)	23.5+x	(7/2$^+$)	Q		A_2=+0.26 *4*, A_4=−0.07 *4*.
345.3 *5*	[#]	345.3+x	(5/2$^-$)	0.0+x	(3/2$^+$)			
349.3 *5*	5.3 *18*	1292.9+x	(17/2$^+$)	943.6+x	(15/2$^+$)	D(+Q)	+0.06 *6*	A_2=−0.01 *11*, A_4=+0.10 *12*.
357.5 *5*	4.9 *16*	499.2+x	(11/2$^+$)	141.7+x	(7/2$^+$)			
389.1 *3*	12 *4*	821.4+x	(13/2$^+$)	432.3+x	(9/2$^+$)	Q		A_2=+0.27 *8*, A_4=−0.10 *8*.
392.0 *2*	50 *5*	574.6+x	(13/2$^+$)	182.6+x	(9/2$^+$)	Q		A_2=+0.25 *3*, A_4=−0.09 *3*.
398.7 *2*	51 *5*	893.2+x	(17/2$^-$)	494.5+x	(13/2$^-$)	Q		A_2=+0.31 *3*, A_4=−0.11 *3*.
406.1 *5*	10 *4*	712.0+x	(13/2$^+$)	305.9+x	(9/2$^+$)	Q		A_2=+0.30 *5*, A_4=−0.13 *5*.
424.0 *2*	23.9 *24*	943.6+x	(15/2$^+$)	519.6+x	(11/2$^+$)	Q		A_2=+0.28 *3*, A_4=−0.15 *3*.
432.6 *2*	30 *3*	1462.6+x	(21/2$^-$)	1030.0+x	(17/2$^-$)	Q		A_2=+0.29 *7*, A_4=−0.08 *7*.
435.9 *2*	36 *4*	802.7+x	(15/2$^+$)	366.8+x	(11/2$^+$)	Q		A_2=+0.19 *2*, A_4=−0.03 *2* for 435.9γ+436.9γ+437.1γ+437.1γ.
436.9 *5*	7.2 *24*	956.5+x	(15/2$^+$)	519.6+x	(11/2$^+$)	Q		A_2=+0.19 *2*, A_4=−0.03 *2* for 436.9γ+435.9γ+437.1γ.
437.1 *2*	74 *7*	1099.5+x	(19/2$^-$)	662.4+x	(15/2$^-$)	Q		A_2=+0.19 *2*, A_4=−0.03 *2* for 437.1γ+436.9γ+435.9γ.

Continued on next page (footnotes at end of table)

^{153}Eu(^{16}O,4nγ) 1984Jo05 (continued)

γ(^{165}Lu) (continued)

E_γ[&]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	Comments
437.1 *2*	16.7 *17*	3476.7+x	(37/2$^-$)	3039.6+x	(33/2$^-$)	(Q)	A_2=+0.19 *2*, A_4=−0.03 *2* for 437.1γ+436.9γ+435.9γ.
444.4 *5*	11 *4*	943.6+x	(15/2$^+$)	499.2+x	(11/2$^+$)	Q	A_2=+0.41 *6*, A_4=−0.15 *6*.
457.3 *5*	5.9 *20*	956.5+x	(15/2$^+$)	499.2+x	(11/2$^+$)	Q	A_2=+0.54 *15*, A_4=+0.15 *14*.
459.6 *2*	20.6 *21*	3249.6+x	(35/2$^-$)	2790.0+x	(31/2$^-$)	Q	A_2=+0.26 *4*, A_4=−0.05 *4*.
460[a]	#	2755.6+x?	(29/2$^+$)	2295.6+x?	(25/2$^+$)		
471.5 *2*	16.3 *16*	1292.9+x	(17/2$^+$)	821.4+x	(13/2$^+$)	(Q)	A_2=+0.33 *11*, A_4=+0.01 *11*.
475.2 *2*	49 *5*	1049.8+x	(17/2$^+$)	574.6+x	(13/2$^+$)	Q	A_2=+0.28 *2*, A_4=−0.08 *2*.
476[a]	#	2295.6+x?	(25/2$^+$)	1819.4+x	(21/2$^+$)		
486.4 *2*	16.5 *17*	1198.4+x	(17/2$^+$)	712.0+x	(13/2$^+$)	Q	A_2=+0.22 *3*, A_4=−0.07 *3* for 486.4γ+486.9γ.
486.9 *3*	14.4 *20*	3736.5+x	(39/2$^-$)	3249.6+x	(35/2$^-$)	(Q)	A_2=+0.22 *3*, A_4=−0.07 *3* for 486.9γ+486.4γ.
493.5 *2*	56 *6*	1386.7+x	(21/2$^-$)	893.2+x	(17/2$^-$)	Q	A_2=+0.24 *2*, A_4=−0.08 *2*.
502.3 *2*	36 *4*	1445.9+x	(19/2$^+$)	943.6+x	(15/2$^+$)	Q	A_2=+0.24 *4*, A_4=−0.08 *4*.
503.8 *2*	18.6 *19*	3039.6+x	(33/2$^-$)	2535.8+x	(29/2$^-$)	(Q)	A_2=+0.23 *6*, A_4=−0.05 *6*.
508.9 *2*	37 *4*	1311.6+x	(19/2$^+$)	802.7+x	(15/2$^+$)		
516.5 *2*	23.5 *24*	1979.1+x	(25/2$^-$)	1462.6+x	(21/2$^-$)	Q	A_2=+0.18 *6*, A_4=−0.13 *6*.
519.1 *2*	80 *8*	1618.6+x	(23/2$^-$)	1099.5+x	(19/2$^-$)	Q	A_2=+0.21 *2*, A_4=−0.09 *2*.
523.3 *5*		1479.8+x	(19/2$^+$)	956.5+x	(15/2$^+$)		
526.5 *3*	14.1 *20*	1819.4+x	(21/2$^+$)	1292.9+x	(17/2$^+$)	Q	A_2=+0.24 *8*, A_4=−0.10 *8*.
530.8 *5*	7.6 *25*	2350.2+x	(25/2$^+$)	1819.4+x	(21/2$^+$)	Q	A_2=+0.19 *13*, A_4=−0.14 *13*.
535.0 *5*		4011.7+x	(41/2$^-$)	3476.7+x	(37/2$^-$)		
538.5 *2*	48 *5*	1588.3+x	(21/2$^+$)	1049.8+x	(17/2$^+$)	Q	A_2=+0.30 *3*, A_4=−0.09 *3*.
542.5 *2*	15.5 *16*	1740.9+x	(21/2$^+$)	1198.4+x	(17/2$^+$)	Q	A_2=+0.28 *6*, A_4=−0.12 *6*.
545.0 *2*	34 *3*	1990.9+x	(23/2$^+$)	1445.9+x	(19/2$^+$)	Q	A_2=+0.27 *3*, A_4=−0.10 *3*.
548.4 *2*	16.5 *17*	2539.3+x	(27/2$^+$)	1990.9+x	(23/2$^+$)	Q	A_2=+0.22 *7*, A_4=−0.11 *7*.
555[a]	#	2295.6+x?	(25/2$^+$)	1740.9+x	(21/2$^+$)		
555.1[@a] *5*	10 *3*	2546.0+x	(27/2$^+$)	1990.9+x	(23/2$^+$)	(Q)	A_2=+0.18 *7*, A_4=−0.08 *8*.
558.7 *2*	39 *4*	1945.4+x	(25/2$^-$)	1386.7+x	(21/2$^-$)	Q	A_2=+0.27 *4*, A_4=−0.09 *4*.
561.6 *2*	43 *4*	1873.2+x	(23/2$^+$)	1311.6+x	(19/2$^+$)	Q	A_2=+0.31 *3*, A_4=−0.12 *3*.
563.9 *2*	37 *4*	2732.1+x	(29/2$^+$)	2168.2+x	(25/2$^+$)	Q	A_2=+0.41 *4*, A_4=−0.12 *4*.
569.0[@a] *5*		3029.6+x?	(31/2$^+$)	2460.6+x	(27/2$^+$)		
570.2 *5*		2050.0+x	(23/2$^+$)	1479.8+x	(19/2$^+$)		
578.0 *2*	64 *6*	2196.6+x	(27/2$^-$)	1618.6+x	(23/2$^-$)	Q	A_2=+0.24 *3*, A_4=−0.11 *3*.
579.9 *2*	37 *4*	2168.2+x	(25/2$^+$)	1588.3+x	(21/2$^+$)	Q	A_2=+0.28 *4*, A_4=−0.10 *4*.
585.2 *3*	14.0 *20*	2564.3+x	(29/2$^-$)	1979.1+x	(25/2$^-$)		
587.4 *2*	24.7 *25*	2460.6+x	(27/2$^+$)	1873.2+x	(23/2$^+$)	Q	A_2=+0.24 *5*, A_4=−0.07 *5*.
587.5 *5*	12 *2*	4324.0+x	(43/2$^-$)	3736.5+x	(39/2$^-$)	Q	A_2=+0.24 *5*, A_4=−0.07 *5*.
590.4 *2*	31 *3*	2535.8+x	(29/2$^-$)	1945.4+x	(25/2$^-$)	Q	A_2=+0.34 *5*, A_4=−0.13 *5*.
593.4 *2*	31 *3*	2790.0+x	(31/2$^-$)	2196.6+x	(27/2$^-$)	Q	A_2=+0.24 *6*, A_4=−0.12 *6*.
598.6[@a] *5*		3330.7+x?	(33/2$^+$)	2732.1+x	(29/2$^+$)		
629.1 *5*	4.1 *14*	4483.9+x	(41/2$^-$)	3854.8+x	(37/2$^-$)		
631.5 *5*	7.4 *25*	3195.8+x	(33/2$^-$)	2564.3+x	(29/2$^-$)		
659.0 *5*	6.2 *20*	3854.8+x	(37/2$^-$)	3195.8+x	(33/2$^-$)		

[†] At E(^{16}O)=84 MeV.
[‡] From $\gamma(\theta)$ data.
[#] Weak gamma ray.
[@] This gamma ray is absent in the more recent work of 1995Sc39.
[&] From least-squares fit to Eγ's. The energy of 54.75+x is held fixed in this procedure.
[a] Placement of transition in the level scheme is uncertain.

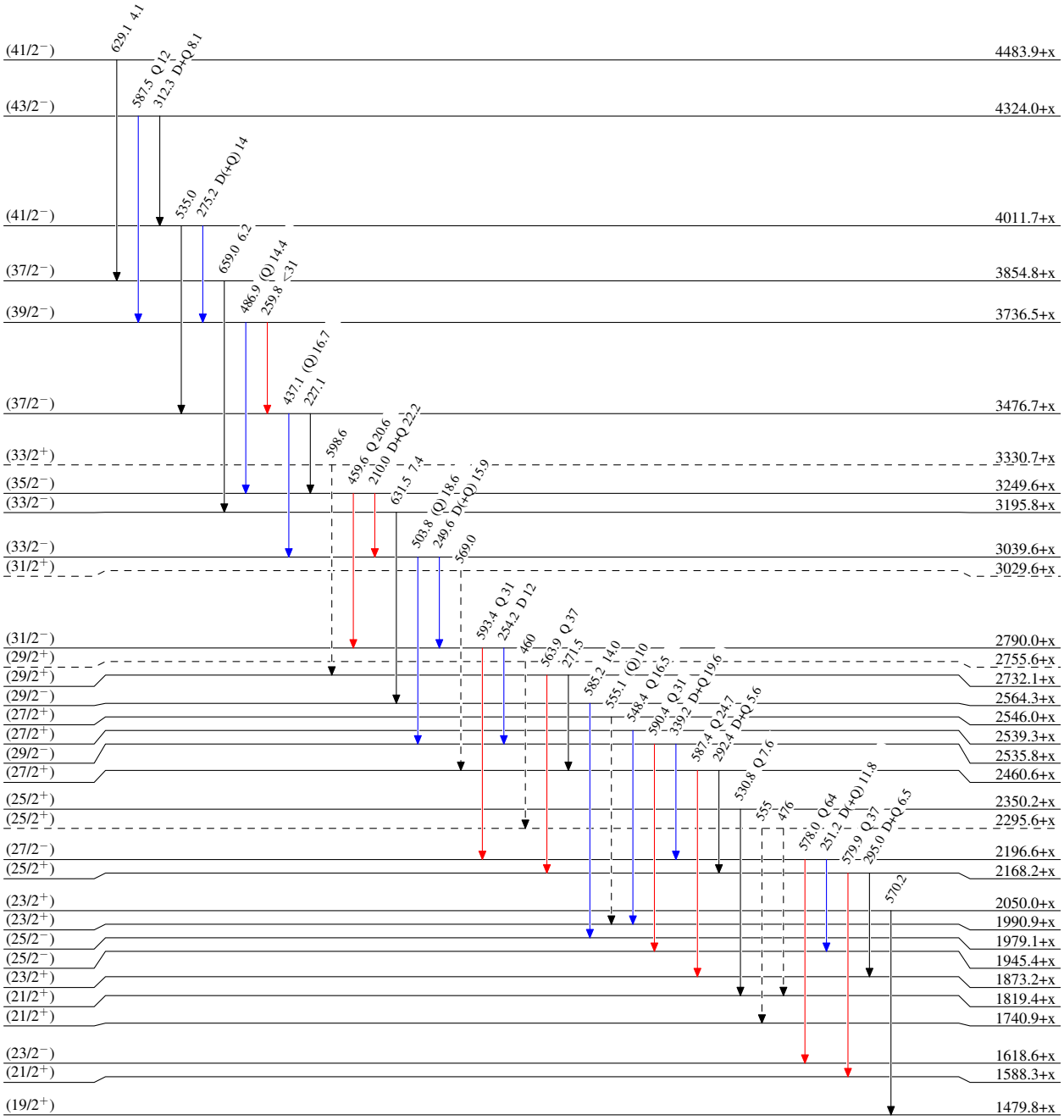
^{153}Eu(^{16}O,4nγ) 1984Jo05

Level Scheme

Intensities: Relative I_γ

Legend

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



$^{165}_{71}Lu_{94}$

^{153}Eu(^{16}O,4nγ) 1984Jo05

Level Scheme (continued)

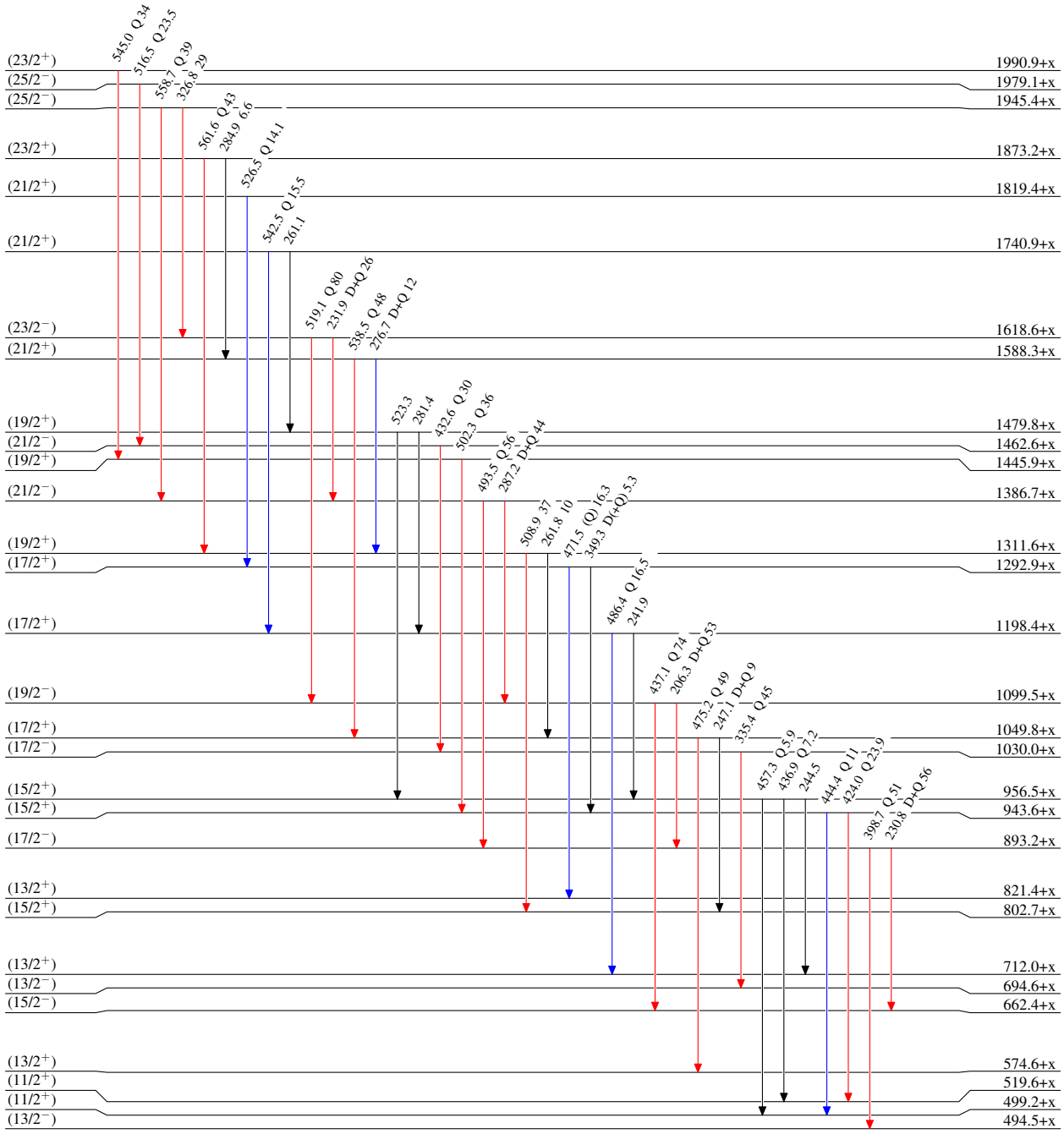
Intensities: Relative I_γ

Legend

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

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

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

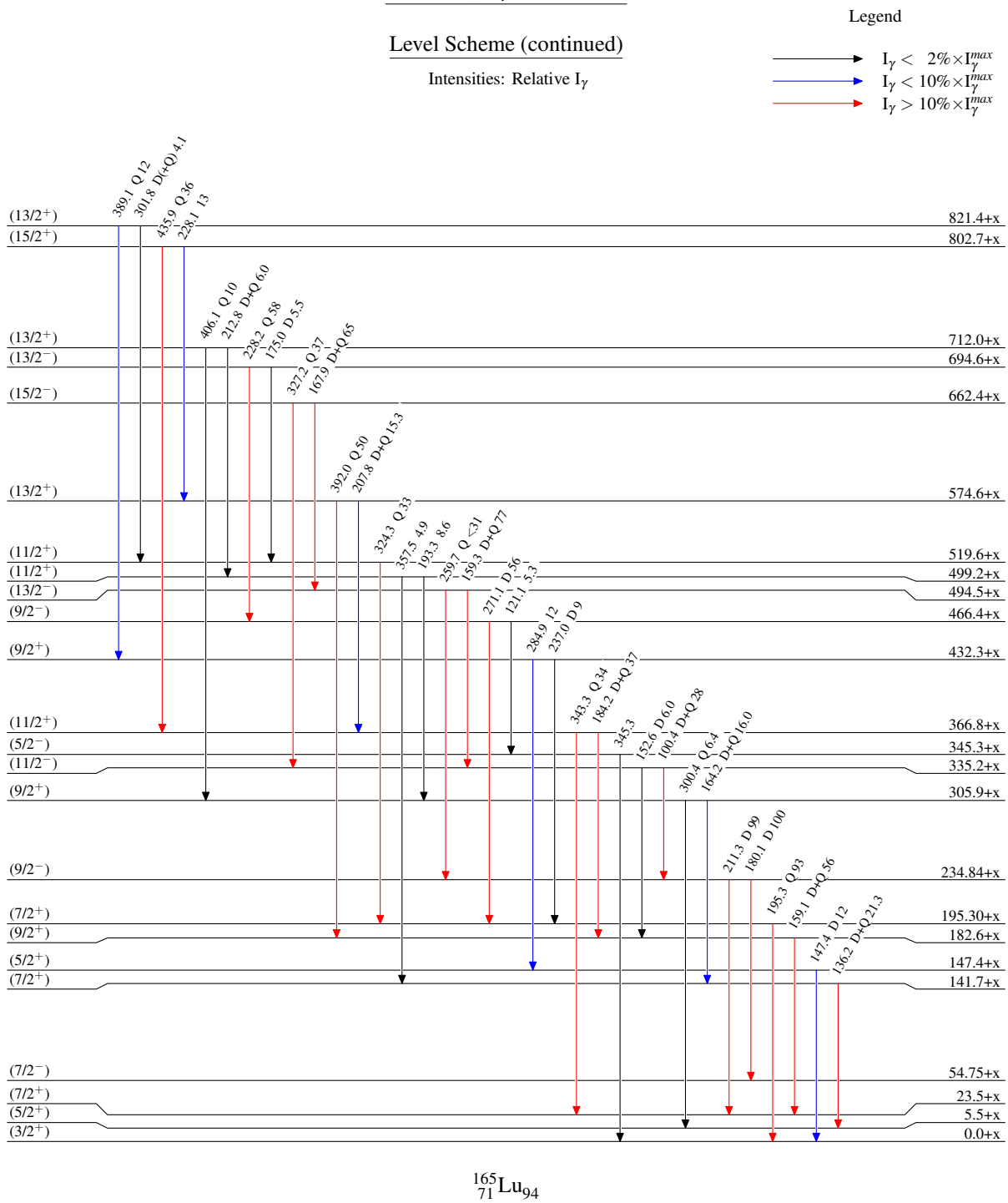


$^{165}_{71}Lu_{94}$

^{153}Eu(^{16}O,4nγ) 1984Jo05

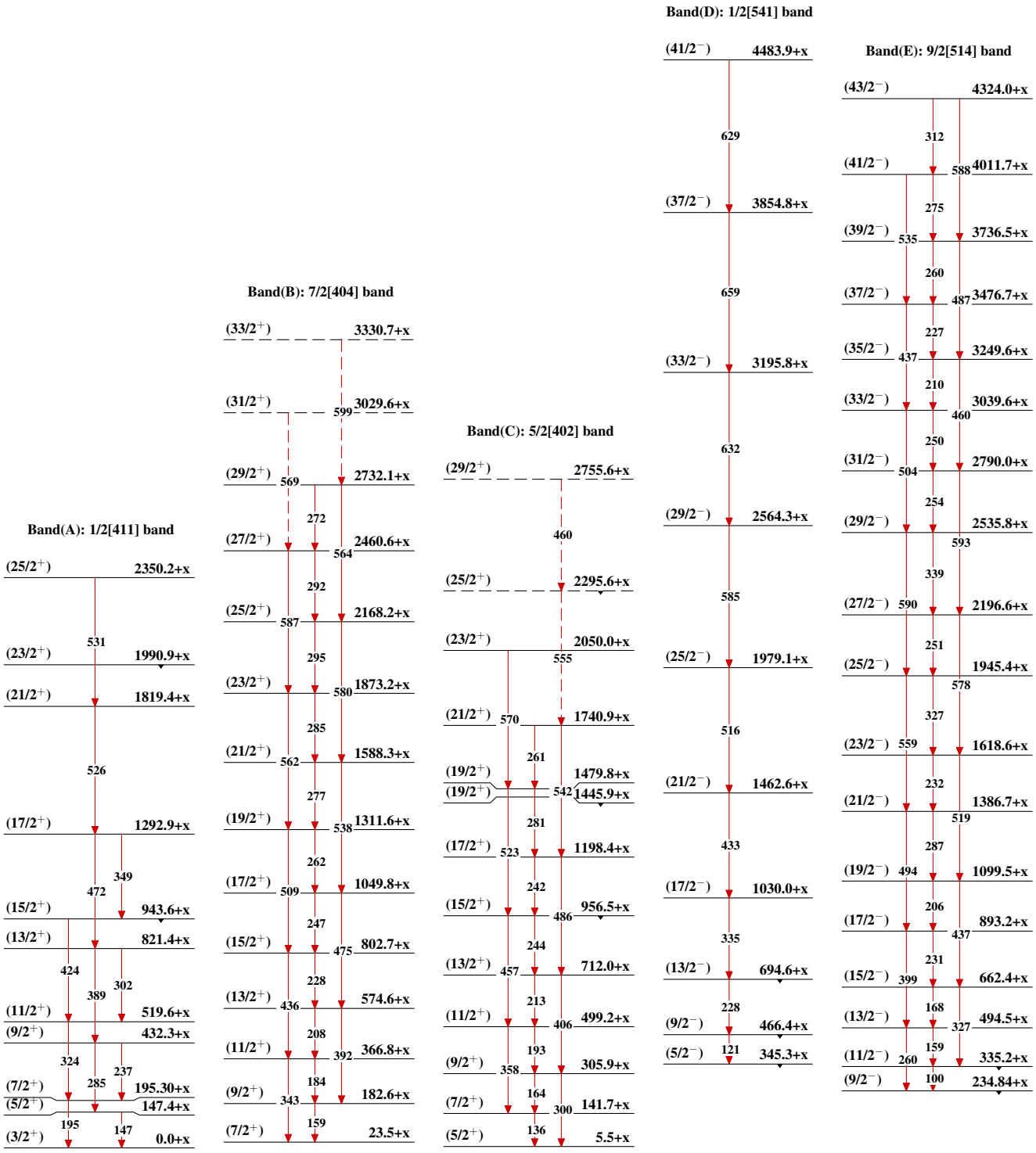
Level Scheme (continued)

Intensities: Relative I_γ



$^{165}_{71}Lu_{94}$

^{153}Eu(^{16}O,4nγ) 1984Jo05



$^{165}_{71}Lu_{94}$