Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Update	Balraj Singh		20-Sep-2006

Q(β^-)=−4.03×10^3 *5*; S(n)=9.55×10^3 *5*; S(p)=3.19×10^3 *4*; Q(α)=2.80×10^3 *4* 2012Wa38
Note: Current evaluation has used the following Q record.
ΔQ(β)=230 (1995Au04).
Q(β^-)=−4000 *SY*; S(n)=9.43×10^3 *19*; S(p)=3.16×10^3 *10*; Q(α)=2.85×10^3 *10* 1995Au04
Additional information 1.
Detailed publications of normal-deformed bands and lifetimes in Triaxial SD bands are in progress (as per references 11 and 12 in 2005Am02).
See 1998Ge13 for isotope shift measurements.
For discussion of triaxiality of yrast states of odd-A Lu isotopes, see 1999Li39.

^{167}Lu Levels

Cross Reference (XREF) Flags

A	^{167}Hf ε decay
B	^{169}Tm(^{3}He,5nγ), (α,6nγ),
C	^{123}Sb(^{48}Ca,4nγ),
D	^{123}Sb(^{48}Ca,4nγ):SD

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$	XREF	Comments
0.0[@]	7/2$^+$	51.5 min *10*	ABC	%ε+%β^+=100 μ=+2.325 *4* (1998Ge13); Q=3.275 *24* (1998Ge13) Δ<r^2>(^{170}Lu,^{167}Lu)=−0.269 (1998Ge13); 10% systematic uncertainty. μ,Q: from collinear fast beam laser spectroscopy (1998Ge13). J$^\pi$: spin from atomic beam (1972Ek01). Parity from agreement between measured μ and that expected for configuration=7/2[404]; supported by log *ft*=7.4 (log $f^{1u}t$=8.8) to (11/2)$^-$ (1.1% *7* to 571.5 level). Also, the g.s. rotational-band structure is fully consistent with a 7/2[404] assignment, as for ^{169}Lu, ^{171}Lu, ^{173}Lu, ^{175}Lu, and ^{177}Lu. Conflicting evidence for π=− (from log *ft*=7.1 (log $f^{1u}t$=8.5) to (11/2)$^+$ (apparent 4.1% branch to 125.9 level)) might be attributable to the incomplete decay scheme (≈15% unplaced γ-ray intensity). T$_{1/2}$: from 1976Me06. Other values: 55 min *3* (1958Ar59), 55 min *5* (1960Ba30); others: 1959Ha09, 1960Bu27, 1960Bo29, 1960Ba32, 1972Ek01 (53 min).
0.0+x[d]	1/2$^+$	≥1 min	B	%ε+%β^+=?; %IT=? μ=−0.0999 *13* (1998Ge13) Additional information 2. Δ<r^2>(^{170}Lu,^{167}Lu)=−0.291 (1998Ge13); 10% systematic uncertainty. J,μ: from collinear fast beam laser spectroscopy (1998Ge13). π based on proximity of μ to value expected for 1/2[411] orbital (−0.05) cf. that for the only other nearby J=1/2 orbital (viz. 1/2[541], μ≈+0.7). T$_{1/2}$: estimated by 1998Ge13; based on known rare-earth diffusion time from Ta spallation target and on their observation that J=1/2 line intensity (cf. J=7/2 g.s. line intensity) did not appear to have been reduced due to decay during diffusion out of the target.
19.6+x[c] *5*	(3/2$^+$)		BCD	
38.6+x[g] *11*	(5/2$^+$)		BCD	
107.3+x[e] *4*	(1/2$^-$)		B	
122.0+x[e] *6*	(5/2$^-$)		BCD	
140.04[#] *8*	(9/2$^+$)		ABC	
149.6+x[d] *10*	(5/2$^+$)		D	

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Adopted Levels, Gammas (continued)

^{167}Lu Levels (continued)

E(level)[†]	J^{π}[‡]	XREF	Comments
155.3+x[h] 11	(7/2$^+$)	BCD	
189.6+x[c] 10	(7/2$^+$)	CD	
233.9+x[e] 7	(9/2$^-$)	BCD	
243.9+x?[f] 6	(3/2$^-$)	B	
300.5+x[g] 11	(9/2$^+$)	BCD	
305.30[@] 8	(11/2$^+$)	BC	
315.28[&] 9	(7/2)$^-$	A	J^{π}: E1 γ to 7/2$^+$; tentative 7/2[523] bandhead assignment from B(315.2γ)/B(175.4γ)=3.0 (exp) cf. 3.5 from Alaga rule.
331.83[a] 9	(9/2$^-$)	BC	
400.5+x[f] 6	(7/2$^-$)	B	
403.6+x[d] 10	(9/2$^+$)	D	
433.6[b] 3	(11/2$^-$)	BC	
446.7+x[e] 7	(13/2$^-$)	BCD	
470.2+x[h] 11	(11/2$^+$)	BCD	
478.9+x[c] 10	(11/2$^+$)	CD	
494.18[#] 10	(13/2$^+$)	BC	
577.0[a] 3	(13/2$^-$)	BC	
658.8+x[f] 7	(11/2$^-$)	B	
664.9+x[g] 11	(13/2$^+$)	BCD	
704.27[@] 11	(15/2$^+$)	BC	
744.3[b] 3	(15/2$^-$)	BC	
755.0+x[d] 11	(13/2$^+$)	D	
761.6+x[e] 7	(17/2$^-$)	BCD	
858.5+x[c] 11	(15/2$^+$)	CD	
887.4+x[h] 11	(15/2$^+$)	BCD	
934.11[#] 12	(17/2$^+$)	BC	
947.8[a] 3	(17/2$^-$)	BC	
1000.4+x[f] 7	(15/2$^-$)	B	
1112.6+x[g] 11	(17/2$^+$)	CD	
1159.5[b] 4	(19/2$^-$)	BC	
1172.8+x[e] 7	(21/2$^-$)	BCD	
1181.20[@] 13	(19/2$^+$)	BC	
1188.1+x[d] 12	(17/2$^+$)	D	
1318.0+x[c] 11	(19/2$^+$)	CD	
1377.7+x[h] 12	(19/2$^+$)	CD	
1411.6[a] 4	(21/2$^-$)	BC	
1425.2+x[f] 7	(19/2$^-$)	B	
1444.31[#] 14	(21/2$^+$)	BC	
1621.4+x[g] 13	(21/2$^+$)	CD	
1656.0[b] 4	(23/2$^-$)	BC	
1671.0+x[e] 7	(25/2$^-$)	BCD	
1687.9+x[d] 12	(21/2$^+$)	D	
1720.23[@] 14	(23/2$^+$)	BC	
1828.5+x[c] 13	(23/2$^+$)	CD	
1926.0+x[h] 12	(23/2$^+$)	CD	
1947.6[a] 4	(25/2$^-$)	BC	
2007.96[#] 17	(25/2$^+$)	BC	

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Adopted Levels, Gammas (continued)

^{167}Lu Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	XREF	Comments
2158.1+x[g] 13	(25/2$^+$)	CD	
2214.8[b] 4	(27/2$^-$)	BC	
2231.8+x[d] 13	(25/2$^+$)	D	
2246.0+x[e] 7	(29/2$^-$)	BCD	
2249.7+x[k] 14	(25/2$^+$)	D	
2299.40[@] 17	(27/2$^+$)	BC	
2370.0+x[c] 14	(27/2$^+$)	CD	
2477.9+x[h] 13	(27/2$^+$)	D	
2532.1[a] 4	(29/2$^-$)	BC	
2580.58[#] 19	(29/2$^+$)	BC	
2632.0+x[m] 12	(27/2$^-$)	D	
2665.0+x 10	(27/2$^-$)	D	
2665.9+x[g] 14	(29/2$^+$)	D	
2694.1+x 15		C	E(level): level May Be suspect; it is not reported by 2003Am01 In ^{123}Sb(^{48}Ca,4nγ):SD.
2720.5+x[k] 13	(29/2$^+$)	D	
2800.7[b] 4	(31/2$^-$)	C	
2823.18[@] 20	(31/2$^+$)	C	
2886.9+x[e] 7	(33/2$^-$)	BCD	
2911.0+x[c] 17	(31/2$^+$)	D	
2930.0+x[h] 15	(31/2$^+$)	D	
3044.1[#] 3	(33/2$^+$)	C	
3070.2[a] 4	(33/2$^-$)	C	
3089.0+x[m] 10	(31/2$^-$)	D	
3104.8+x[g] 15	(33/2$^+$)	D	
3225.6+x[k] 15	(33/2$^+$)	D	
3285.48[@] 22	(35/2$^+$)	C	
3289.0[b] 4	(35/2$^-$)	C	
3408.5+x[h] 16	(35/2$^+$)	D	
3523.4[a] 4	(37/2$^-$)	C	
3532.4[#] 3	(37/2$^+$)	C	
3582.3+x[e] 7	(37/2$^-$)	CD	
3594.0+x[m] 14	(35/2$^-$)	D	
3599.8+x[g] 17	(37/2$^+$)	D	
3774.3[b] 4	(39/2$^-$)	C	
3786.5+x[k] 17	(37/2$^+$)	CD	
3812.98[@] 24	(39/2$^+$)	C	
3945.6+x[l] 17	(35/2$^+$)	D	
4046.0[a] 4	(41/2$^-$)	C	
4096.4[#] 4	(41/2$^+$)	C	
4162.0+x[m] 17	(39/2$^-$)	D	
4176.9+x[g] 19	(41/2$^+$)	D	
4273.9+x[e] 9	(41/2$^-$)	CD	
4339.6[b] 4	(43/2$^-$)	C	
4347.3+x[i] 12	(41/2$^-$)	C	
4393.3+x[k] 18	(41/2$^+$)	CD	
4417.5[@] 3	(43/2$^+$)	C	
4492.6+x[l] 17	(39/2$^+$)	D	
4656.2[a] 4	(45/2$^-$)	C	

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Adopted Levels, Gammas (continued)

^{167}Lu Levels (continued)

E(level)[†]	J^{π}[‡]	XREF	E(level)[†]	J^{π}[‡]	XREF	E(level)[†]	J^{π}[‡]	XREF
4735.5[#] 4	$(45/2^+)$	C	6935.0+x[m] 26	$(55/2^-)$	D	9374.1[j] 13	$(67/2^+)$	C
4785.0+x[m] 20	$(43/2^-)$	D	6952.2[a] 7	$(57/2^-)$	C	9541+x[m] 3	$(67/2^-)$	D
4832.1+x[g] 20	$(45/2^+)$	D	7036.3[#] 8	$(57/2^+)$	C	9841+x[l] 3	$(67/2^+)$	D
4910.2+x[e] 10	$(45/2^-)$	CD	7183.1+x[e] 13	$(57/2^-)$	CD	9941.8+x[g] 25	$(69/2^+)$	D
4986.2[b] 4	$(47/2^-)$	C	7213.7+x[g] 21	$(57/2^+)$	D	9962.7+x[e] 21	$(69/2^-)$	D
5048.0+x[k] 19	$(45/2^+)$	CD	7231.8+x[l] 21	$(55/2^+)$	D	10040+x[k] 3	$(69/2^+)$	D
5093.5[@] 6	$(47/2^+)$	C	7300.4+x[k] 21	$(57/2^+)$	CD	10195.9?[b] 14	$(71/2^-)$	C
5097.6+x[l] 18	$(43/2^+)$	D	7333.6[b] 7	$(59/2^-)$	C	10245.1?[@] 14	$(71/2^+)$	C
5107.3+x[i] 16	$(45/2^-)$	C	7471.0[@] 11	$(59/2^+)$	C	10521+x[m] 3	$(71/2^-)$	D
5349.1[a] 5	$(49/2^-)$	C	7523.3+x[i] 24	$(57/2^-)$	C	10817+x[l] 3	$(71/2^+)$	D
5443.1[#] 4	$(49/2^+)$	C	7745.0+x[m] 28	$(59/2^-)$	D	10930+x[g] 3	$(73/2^+)$	D
5456.0+x[m] 22	$(47/2^-)$	D	7854.1[a] 8	$(61/2^-)$	C	10995.7+x[e] 23	$(73/2^-)$	D
5557.3+x[g] 21	$(49/2^+)$	D	7876.1[#] 10	$(61/2^+)$	C	11056+x[k] 3	$(73/2^+)$	D
5606.4+x[e] 11	$(49/2^-)$	CD	8047.8+x[l] 23	$(59/2^+)$	D	11558+x[m] 4	$(75/2^-)$	D
5705.5[b] 4	$(51/2^-)$	C	8056.7+x[e] 14	$(61/2^-)$	CD	11849+x[l] 3	$(75/2^+)$	D
5749.8+x[k] 20	$(49/2^+)$	CD	8115.6+x[g] 22	$(61/2^+)$	D	11984+x[g] 3	$(77/2^+)$	D
5755.7+x[l] 19	$(47/2^+)$	D	8154.9+x[k] 22	$(61/2^+)$	CD	12132+x[k] 3	$(77/2^+)$	D
5833.8[@] 8	$(51/2^+)$	C	8200+x?	$(61/2^+)$	D	12657+x[m] 4	$(79/2^-)$	D
5872.3+x[i] 19	$(49/2^-)$	C	8232.9[b] 9	$(63/2^-)$	C	12933+x[l] 4	$(79/2^+)$	D
6116.8[a] 5	$(53/2^-)$	C	8341.6[@] 12	$(63/2^+)$	C	13104+x[g] 3	$(81/2^+)$	D
6172.0+x[m] 24	$(51/2^-)$	D	8382.5[j] 12	$(63/2^+)$	C	13267+x[k] 3	$(81/2^+)$	D
6213.3[#] 6	$(53/2^+)$	C	8616+x[m] 3	$(63/2^-)$	D	13821+x[m] 4	$(83/2^-)$	D
6359.5+x[g] 21	$(53/2^+)$	D	8747.1[#] 14	$(65/2^+)$	C	14082+x[l] 4	$(83/2^+)$	D
6365.6+x[e] 12	$(53/2^-)$	CD	8917.8+x[l] 25	$(63/2^+)$	D	14287+x[g] 4	$(85/2^+)$	D
6466.7+x[l] 20	$(51/2^+)$	D	8982.7+x[e] 18	$(65/2^-)$	CD	14459+x[k] 4	$(85/2^+)$	D
6490.3[b] 6	$(55/2^-)$	C	9009.8+x[g] 23	$(65/2^+)$	D	15282+x[l] 4	$(87/2^+)$	D
6501.5+x[k] 20	$(53/2^+)$	CD	9080.9+x[k] 24	$(65/2^+)$	D	15530+x[g] 4	$(89/2^+)$	D
6631.5[@] 9	$(55/2^+)$	C	9187.9?[b] 10	$(67/2^-)$	C	15706+x[k] 4	$(89/2^+)$	D
6689.3+x[i] 22	$(53/2^-)$	C	9266.1[@] 13	$(67/2^+)$	C	16821+x[g] 4	$(93/2^+)$	D

[†] From least-squares adjustment of adopted Eγ, allowing ΔE_{γ}=1 keV in Eγ values for which authors gave no uncertainty. See ^{169}Tm(^{3}He,5nγ), (α,6nγ) for estimate of "x" (≈30 keV).

[‡] Unless noted to the contrary, J^{π} is based on energy and intensity fits of coincident transitions into rotational bands consistent with expected Nilsson states, and supported by DCO-ratio data from ^{123}Sb(^{48}Ca,4nγ), ^{152}Sm(^{19}F,4nγ).

[#] Band(A): 7/2[404], α=+1/2 band (1990Yu01). Rotational band parameters: A=15.8, B=−21 (7/2, 11/2, 15/2 members).

[@] Band(a): 7/2[404], α=−1/2 (1990Yu01). Rotational band parameters: A=15.6, B=−18 (9/2, 13/2, 17/2 members).

[&] Band(B): Possible 7/2[523] band (1973Me09). Bandhead assignment based on B(315.2γ)/B(175.4γ)=3.0 (exp) cf. 3.5 from Alaga rule. However, there is no evidence for this band in (HI,xnγ), (He,xnγ) or (p,xnγ) studies, so evaluator considers assignment to be very doubtful.

[a] Band(C): 9/2[514], α=+1/2 band (1990Yu01).

[b] Band(c): 9/2[514], α=−1/2 (1990Yu01).

[c] Band(D): 1/2[411] band, α=−1/2 (2003Am01,1998Ya04).

[d] Band(d): 1/2[411] band, α=+1/2 (2003Am01).

[e] Band(E): 1/2[541], α=+1/2 band (1990Yu01). Rotational band parameters: A=12.2, a=+3.4 (1/2, 5/2, 9/2 levels); strongly coupled to other bands.

[f] Band(e): 1/2[541], α=−1/2 (1977Ba40). Rotational band parameters: A=10.4, a=+2.4 (7/2, 11/2, 15/2 levels); however, a is

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Adopted Levels, Gammas (continued)

^{167}Lu Levels (continued)

grossly inconsistent with that for signature partner band if J=3/2 member is included in fit.

[g] Band(F): 5/2[402], α=+1/2 band (2003Am01,1998Ya04). Rotational band parameters: A=16.7, B=−31 (5/2, 9/2, 13/2 members).

[h] Band(f): 5/2[402], α=−1/2 (2003Am01,1998Ya04). Rotational band parameters: A=16.5, B=−18 (7/2, 11/2, 15/2 members).

[i] Band(G): α=+1/2 sideband (1990Yu01).

[j] Band(H): α=−1/2 sideband (1990Yu01).

[k] Band(I): Triaxial SD-1 band (2003Am01,2005Am02,2005Gu28). Q(transition)=6.9 *3* (2005Gu28, preliminary value). The uncertainty does not include systematic error of ≈10-15% due to stopping power. Population≈8% relative to yrast band. The transitions (interband as well as intraband) and J^{π}'s in this band are adopted from 2003Am01. 1998Ya04 proposed a cascade of eight transitions (904-854-804-753-705-653-601-551) in an SD band connected via 547 and 561 transitions to normal bands. Only six transitions in the cascade seem to be common with those reported by 2003Am01, and the connecting transitions given by 2003Am01 are different from those in 1998Ya04. Corresponding spins are also higher by 2 units in 2003Am01 than those proposed by 1998Ya04.

[l] Band(J): Wobbling-mode Triaxial SD-2 band (2003Am01,2005Am02). Population≈2% relative to yrast band.

[m] Band(K): Triaxial SD-3 band (2005Am02). Population≈4% relative to yrast band. Multi-quasiparticle excitation.

$\gamma(^{167}$Lu)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Mult.[#]	α[c]	Comments
19.6+x	(3/2$^+$)	(19.6 5)	100	0.0+x	1/2$^+$			E_γ: from level energy difference.
107.3+x	(1/2$^-$)	87.7[&] 1	<290[&]	19.6+x	(3/2$^+$)			
		107.3[&] 5	100[&] 10	0.0+x	1/2$^+$			
122.0+x	(5/2$^-$)	(14.7 9)		107.3+x	(1/2$^-$)			E_γ: from level energy difference.
		102.6[&] 5		19.6+x	(3/2$^+$)			
140.04	(9/2$^+$)	139.9[@] 2	100[@]	0.0	7/2$^+$	[M1,E2]	1.21 24	
149.6+x	(5/2$^+$)	130		19.6+x	(3/2$^+$)			
155.3+x	(7/2$^+$)	116.7[&] 1	100	38.6+x	(5/2$^+$)			
189.6+x	(7/2$^+$)	170 1	100	19.6+x	(3/2$^+$)			
233.9+x	(9/2$^-$)	111.7 5	100	122.0+x	(5/2$^-$)			
243.9+x?	(3/2$^-$)	122.1[&e] 5	60[&] 10	122.0+x	(5/2$^-$)			
		224.2[&e] 5	81[&] 14	19.6+x	(3/2$^+$)			
		≈243.3[&e]	100[&] 10	0.0+x	1/2$^+$			
300.5+x	(9/2$^+$)	144.7[&] 5	<540[&]	155.3+x	(7/2$^+$)			
		261.7[&] 5	100[&] 10	38.6+x	(5/2$^+$)			
305.30	(11/2$^+$)	165.3 1	91 10	140.04	(9/2$^+$)			I_γ: weighted average from (^{48}Ca,4nγ)... and (He,xnγ).
		305.3 1	100	0.0	7/2$^+$			
315.28	(7/2)$^-$	175.4[@] 2	6[@] 1	140.04	(9/2$^+$)	[E1]	0.0809	
		315.24[@] 10	100[@]	0.0	7/2$^+$	E1[@]	0.0184	
331.83	(9/2$^-$)	191.7[&] 1	<71[&]	140.04	(9/2$^+$)	D		
		331.9[&] 1	100[&] 10	0.0	7/2$^+$			
400.5+x	(7/2$^-$)	156.5[&e]		243.9+x?	(3/2$^-$)			E_γ: 156.5 1 for contaminated transition.
		167.2[&e] 1		233.9+x	(9/2$^-$)			E_γ: for doubly-placed γ.
		278.5 1		122.0+x	(5/2$^-$)			
403.6+x	(9/2$^+$)	214		189.6+x	(7/2$^+$)			
		248		155.3+x	(7/2$^+$)			
		254		149.6+x	(5/2$^+$)			
433.6	(11/2$^-$)	101.7[&] 5	100[&] 10	331.83	(9/2$^-$)			
		294.0[&] 5	71[&] 7	140.04	(9/2$^+$)			
446.7+x	(13/2$^-$)	212.8 1	100	233.9+x	(9/2$^-$)	Q		
470.2+x	(11/2$^+$)	169.7[&] 1	100[&] 10	300.5+x	(9/2$^+$)			
		314.9[d&] 1	<326[d&]	155.3+x	(7/2$^+$)			
478.9+x	(11/2$^+$)	178.2 5		300.5+x	(9/2$^+$)			
		289.4 5		189.6+x	(7/2$^+$)			
494.18	(13/2$^+$)	188.9 1	38 5	305.30	(11/2$^+$)			
		354.1 1	100 9	140.04	(9/2$^+$)			
577.0	(13/2$^-$)	143.4 1	100 7	433.6	(11/2$^-$)			
		244.8 5	32 5	331.83	(9/2$^-$)			

Adopted Levels, Gammas (continued)

γ(^{167}Lu) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Mult.[#]	Comments
658.8+x	(11/2⁻)	212.3[&] *5*		446.7+x	(13/2⁻)		E_γ: for doubly-placed, contaminated γ in (He,xnγ).
		258.5[&] *5*		400.5+x	(7/2⁻)		
		424.8 *1*		233.9+x	(9/2⁻)		E_γ: for doubly-placed γ; from (He,xnγ).
664.9+x	(13/2⁺)	185		478.9+x	(11/2⁺)		
		196[a]		470.2+x	(11/2⁺)		
		365[a]		300.5+x	(9/2⁺)		
704.27	(15/2⁺)	210.3 *1*	29 *3*	494.18	(13/2⁺)		
		399.0 *1*	100 *8*	305.30	(11/2⁺)		
744.3	(15/2⁻)	167.3 *1*	100 *9*	577.0	(13/2⁻)		
		310.7 *1*	52 *4*	433.6	(11/2⁻)		
755.0+x	(13/2⁺)	276		478.9+x	(11/2⁺)		
		285		470.2+x	(11/2⁺)		
		351		403.6+x	(9/2⁺)		
761.6+x	(17/2⁻)	314.9[d] *1*	100[d]	446.7+x	(13/2⁻)		
858.5+x	(15/2⁺)	194		664.9+x	(13/2⁺)		
		379.6 *5*	81 *13*	478.9+x	(11/2⁺)		
		388.3 *1*	100 *13*	470.2+x	(11/2⁺)		
887.4+x	(15/2⁺)	222.6[&] *5*	100[&]	664.9+x	(13/2⁺)		
		408[a]		478.9+x	(11/2⁺)		
		417[a]		470.2+x	(11/2⁺)		
934.11	(17/2⁺)	230.0 *1*	14.6 *15*	704.27	(15/2⁺)		I_γ: from (He,xnγ); other Iγ:Iγ(440)=23 *3*:100 *13* in (^{48}Ca,4nγ).
		439.7 *1*	100 *9*	494.18	(13/2⁺)		I_γ: from (He,xnγ). Other Eγ: 440.1 *1* from (He,xnγ).
947.8	(17/2⁻)	203.6 *1*	100 *5*	744.3	(15/2⁻)	D	I_γ: weighted average from (He,xnγ) and (^{48}Ca,4nγ).
		370.8 *1*	66 *5*	577.0	(13/2⁻)	Q	I_γ: weighted average from (He,xnγ) and (^{48}Ca,4nγ).
1000.4+x	(15/2⁻)	341.7[&] *1*	100[&] *10*	658.8+x	(11/2⁻)		
		553.8[&] *5*	38[&] *19*	446.7+x	(13/2⁻)		
1112.6+x	(17/2⁺)	225 *1*		887.4+x	(15/2⁺)		
		254		858.5+x	(15/2⁺)		
		448 *1*		664.9+x	(13/2⁺)		
1159.5	(19/2⁻)	211.7 *1*	96 *8*	947.8	(17/2⁻)		
		415.2 *1*	100 *6*	744.3	(15/2⁻)		
1172.8+x	(21/2⁻)	411.2 *1*	100	761.6+x	(17/2⁻)	Q	
1181.20	(19/2⁺)	247.0[&] *1*	<31	934.11	(17/2⁺)		
		477.0 *1*	100 *8*	704.27	(15/2⁺)		
1188.1+x	(17/2⁺)	301		887.4+x	(15/2⁺)		
		330		858.5+x	(15/2⁺)		
		433		755.0+x	(13/2⁺)		
1318.0+x	(19/2⁺)	205		1112.6+x	(17/2⁺)		
		459.5 *1*	100 *15*	858.5+x	(15/2⁺)	Q	
1377.7+x	(19/2⁺)	190		1188.1+x	(17/2⁺)		

From ENSDF

γ(^{167}Lu) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Mult.[#]	Comments
1377.7+x	(19/2+)	265		1112.6+x	(17/2+)		
		490		887.4+x	(15/2+)		
1411.6	(21/2−)	252.1 *1*	93 *7*	1159.5	(19/2−)		Other Iγ: 67 *7* from (He,xnγ).
		463.8 *1*	100 *6*	947.8	(17/2−)		
1425.2+x	(19/2−)	424.8 *1*	100	1000.4+x	(15/2−)		E_γ: for doubly-placed γ; from (He,xnγ).
1444.31	(21/2+)	263.6 *5*	14.4 *11*	1181.20	(19/2+)		
		510.2 *1*	100 *7*	934.11	(17/2+)		
1621.4+x	(21/2+)	244[a]		1377.7+x	(19/2+)		
		509[a]		1112.6+x	(17/2+)		
1656.0	(23/2−)	244.4 *1*	66 *6*	1411.6	(21/2−)		
		496.5 *1*	100 *6*	1159.5	(19/2−)		
1671.0+x	(25/2−)	498.2 *1*	100	1172.8+x	(21/2−)	Q	
1687.9+x	(21/2+)	310		1377.7+x	(19/2+)		
		370		1318.0+x	(19/2+)		
		500		1188.1+x	(17/2+)		
1720.23	(23/2+)	276.0[&] *1*	15.8 *13*	1444.31	(21/2+)		
		539.0 *1*	100 *8*	1181.20	(19/2+)		
1828.5+x	(23/2+)	510 *1*	100	1318.0+x	(19/2+)	(Q)	
1926.0+x	(23/2+)	238[a]		1687.9+x	(21/2+)		
		305		1621.4+x	(21/2+)		
		548[a]		1377.7+x	(19/2+)		
1947.6	(25/2−)	291.6 *1*	59 *4*	1656.0	(23/2−)		
		535.9 *1*	100 *7*	1411.6	(21/2−)	Q	
2007.96	(25/2+)	288.3 *5*	17.0 *14*	1720.23	(23/2+)		
		563.6 *1*	100 *9*	1444.31	(21/2+)		
2158.1+x	(25/2+)	232		1926.0+x	(23/2+)		
		537		1621.4+x	(21/2+)		
2214.8	(27/2−)	267.6 *5*	31 *5*	1947.6	(25/2−)		
		558.9 *1*	100 *6*	1656.0	(23/2−)	Q	
2231.8+x	(25/2+)	306		1926.0+x	(23/2+)		
		544		1687.9+x	(21/2+)		
2246.0+x	(29/2−)	575.0 *1*	100	1671.0+x	(25/2−)	(Q)	
2249.7+x	(25/2+)	562		1687.9+x	(21/2+)		
2299.40	(27/2+)	291.2 *5*	12.8 *13*	2007.96	(25/2+)		
		579.2 *1*	100 *8*	1720.23	(23/2+)		
2370.0+x	(27/2+)	541[a]	100	1828.5+x	(23/2+)		
2477.9+x	(27/2+)	246		2231.8+x	(25/2+)		
		319		2158.1+x	(25/2+)		
		552		1926.0+x	(23/2+)		
2532.1	(29/2−)	316 *1*	66 *10*	2214.8	(27/2−)		
		584.4 *1*	100 *12*	1947.6	(25/2−)		
2580.58	(29/2+)	281.0 *5*	19 *3*	2299.40	(27/2+)		
		572.6 *1*	100 *7*	2007.96	(25/2+)		

$\gamma(^{167}Lu)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Mult.[#]	Comments
2632.0+x	(27/2⁻)	961.0		1671.0+x	(25/2⁻)		I_γ: %branching≈60 *5*. Mult.,δ: ΔJ=1 transition; δ(E2/M1)=−1.9 +*11*−*200* or −0.5 +*5*−*8*.
2665.0+x	(27/2⁻)	994		1671.0+x	(25/2⁻)		
2665.9+x	(29/2⁺)	188		2477.9+x	(27/2⁺)		
		508		2158.1+x	(25/2⁺)		
2694.1+x		323		2370.0+x	(27/2⁺)		
		537		2158.1+x	(25/2⁺)		
2720.5+x	(29/2⁺)	242		2477.9+x	(27/2⁺)		
		351		2370.0+x	(27/2⁺)		
		471		2249.7+x	(25/2⁺)		
		489		2231.8+x	(25/2⁺)		
		562		2158.1+x	(25/2⁺)		
2800.7	(31/2⁻)	268.5 *1*	73 *13*	2532.1	(29/2⁻)		
		585.9 *1*	100 *11*	2214.8	(27/2⁻)		
2823.18	(31/2⁺)	242.1 *5*	30 *3*	2580.58	(29/2⁺)		
		523.8 *1*	100 *9*	2299.40	(27/2⁺)		
2886.9+x	(33/2⁻)	640.9 *1*	100	2246.0+x	(29/2⁻)		
2911.0+x	(31/2⁺)	541		2370.0+x	(27/2⁺)		
2930.0+x	(31/2⁺)	264		2665.9+x	(29/2⁺)		
		452		2477.9+x	(27/2⁺)		
3044.1	(33/2⁺)	221.1 *5*	31.2 *25*	2823.18	(31/2⁺)		
		463 *1*	100 *14*	2580.58	(29/2⁺)		
3070.2	(33/2⁻)	269.6 *1*	100 *16*	2800.7	(31/2⁻)		
		538.2 *1*	68 *5*	2532.1	(29/2⁻)	Q	
3089.0+x	(31/2⁻)	424		2665.0+x	(27/2⁻)		
		457		2632.0+x	(27/2⁻)		
		843.1		2246.0+x	(29/2⁻)		I_γ: %branching=27 *5*. Mult.,δ: expected to Be the same As for 961.0γ from 2632.0+x, (27/2⁻) level.
3104.8+x	(33/2⁺)	175		2930.0+x	(31/2⁺)		
		439		2665.9+x	(29/2⁺)		
3225.6+x	(33/2⁺)	505		2720.5+x	(29/2⁺)		
		560		2665.9+x	(29/2⁺)		
3285.48	(35/2⁺)	241.2 *5*	59 *6*	3044.1	(33/2⁺)		
		462.3 *1*	100 *19*	2823.18	(31/2⁺)		
3289.0	(35/2⁻)	218.8 *1*	100 *6*	3070.2	(33/2⁻)	D	
		488.3 *1*	91 *6*	2800.7	(31/2⁻)		
3408.5+x	(35/2⁺)	304		3104.8+x	(33/2⁺)		
		478		2930.0+x	(31/2⁺)		
3523.4	(37/2⁻)	234.4 *1*	100 *6*	3289.0	(35/2⁻)	D	
		453.1 *1*	70 *5*	3070.2	(33/2⁻)		
3532.4	(37/2⁺)	246.6 *5*	<59	3285.48	(35/2⁺)		
		488.4 *1*	100 *8*	3044.1	(33/2⁺)		
3582.3+x	(37/2⁻)	695.4 *1*	100	2886.9+x	(33/2⁻)		

$^{167}_{71}Lu_{96}$-9

Adopted Levels, Gammas (continued)

$\gamma(^{167}Lu)$ (continued)

E_i(level)	J^{π}_i	E_γ†	I_γ‡	E_f	J^{π}_f	Mult.#	δ	Comments
3594.0+x	(35/2⁻)	505		3089.0+x	(31/2⁻)			
3599.8+x	(37/2⁺)	191		3408.5+x	(35/2⁺)			
		495		3104.8+x	(33/2⁺)			
3774.3	(39/2⁻)	251.0 5	100 10	3523.4	(37/2⁻)			
		485.3 5	93 7	3289.0	(35/2⁻)	Q		
3786.5+x	(37/2⁺)	561		3225.6+x	(33/2⁺)			
3812.98	(39/2⁺)	280.7 5	23 4	3532.4	(37/2⁺)			
		527.5 1	100 9	3285.48	(35/2⁺)			
3945.6+x	(35/2⁺)	720		3225.6+x	(33/2⁺)			
4046.0	(41/2⁻)	271.7 1	100 6	3774.3	(39/2⁻)	D		
		522.6 1	100 7	3523.4	(37/2⁻)	Q		
4096.4	(41/2⁺)	283.6 5	23.5 24	3812.98	(39/2⁺)			
		563.9 1	100 16	3532.4	(37/2⁺)			
4162.0+x	(39/2⁻)	568		3594.0+x	(35/2⁻)			
4176.9+x	(41/2⁺)	577		3599.8+x	(37/2⁺)			
4273.9+x	(41/2⁻)	691.6 5	100	3582.3+x	(37/2⁻)			
4339.6	(43/2⁻)	293.9 5	87 9	4046.0	(41/2⁻)			
		565.2 5	100 7	3774.3	(39/2⁻)	Q		
4347.3+x	(41/2⁻)	765 1	100	3582.3+x	(37/2⁻)			
4393.3+x	(41/2⁺)	607		3786.5+x	(37/2⁺)			
4417.5	(43/2⁺)	321.5[e] 5	<13.5	4096.4	(41/2⁺)			
		604.5 1	100 8	3812.98	(39/2⁺)			
4492.6+x	(39/2⁺)	547	100	3945.6+x	(35/2⁺)			
		706.1	91 4	3786.5+x	(37/2⁺)	(E2+M1)[b]	−3.1[b] +11−34	
4656.2	(45/2⁻)	316.9 5	65 12	4339.6	(43/2⁻)	D		
		610.2 1	100 7	4046.0	(41/2⁻)			
4735.5	(45/2⁺)	317[e] 1	<18	4417.5	(43/2⁺)			
		639.1 1	100 9	4096.4	(41/2⁺)			
4785.0+x	(43/2⁻)	623		4162.0+x	(39/2⁻)			
4832.1+x	(45/2⁺)	655		4176.9+x	(41/2⁺)			
4910.2+x	(45/2⁻)	636.3 5	100	4273.9+x	(41/2⁻)			
4986.2	(47/2⁻)	330.0 1	76 7	4656.2	(45/2⁻)			Ratio(DCO)=0.68 9.
		646.5 1	100 8	4339.6	(43/2⁻)			
5048.0+x	(45/2⁺)	655		4393.3+x	(41/2⁺)			
5093.5	(47/2⁺)	359[e] 1	<14	4735.5	(45/2⁺)			
		676.0 5	100 9	4417.5	(43/2⁺)			
5097.6+x	(43/2⁺)	605	100	4492.6+x	(39/2⁺)			
		704.2	41 6	4393.3+x	(41/2⁺)			
5107.3+x	(45/2⁻)	760 1	100	4347.3+x	(41/2⁻)			
5349.1	(49/2⁻)	363.0 5	52 10	4986.2	(47/2⁻)			
		692.8 5	100 14	4656.2	(45/2⁻)	(Q)		
5443.1	(49/2⁺)	707.6 1	100	4735.5	(45/2⁺)			
5456.0+x	(47/2⁻)	671		4785.0+x	(43/2⁻)			

Adopted Levels, Gammas (continued)

$\gamma(^{167}Lu)$ (continued)

E_i(level)	J^{π}_i	E_{γ}†	I_{γ}‡	E_f	J^{π}_f	Mult.#	δ
5557.3+x	(49/2+)	725		4832.1+x	(45/2+)		
5606.4+x	(49/2−)	696.2 5	100	4910.2+x	(45/2−)	(Q)	
5705.5	(51/2−)	356.5 5	47 4	5349.1	(49/2−)		
		719.3 1	100 13	4986.2	(47/2−)		
5749.8+x	(49/2+)	702		5048.0+x	(45/2+)		
5755.7+x	(47/2+)	658	100	5097.6+x	(43/2+)		
		707.7	39 4	5048.0+x	(45/2+)	(E2+M1)[b]	−5.1[b] +16−25
5833.8	(51/2+)	740.3 5	100	5093.5	(47/2+)		
5872.3+x	(49/2−)	765 1	100	5107.3+x	(45/2−)		
6116.8	(53/2−)	411.8 5	32 5	5705.5	(51/2−)		
		767.5 5	100 8	5349.1	(49/2−)	Q	
6172.0+x	(51/2−)	716		5456.0+x	(47/2−)		
6213.3	(53/2+)	770.2 5	100	5443.1	(49/2+)		
6359.5+x	(53/2+)	802		5557.3+x	(49/2+)		
6365.6+x	(53/2−)	759.2 5	100	5606.4+x	(49/2−)		
6466.7+x	(51/2+)	711	100	5755.7+x	(47/2+)		
		716.9	30 8	5749.8+x	(49/2+)	(E2+M1)[b]	−4[b] +3−8
6490.3	(55/2−)	373.8 5	32 4	6116.8	(53/2−)		
		784.5 5	100 9	5705.5	(51/2−)	(Q)	
6501.5+x	(53/2+)	752		5749.8+x	(49/2+)		
6631.5	(55/2+)	797.7 5	100	5833.8	(51/2+)		
6689.3+x	(53/2−)	817 1	100	5872.3+x	(49/2−)		
6935.0+x	(55/2−)	763		6172.0+x	(51/2−)		
6952.2	(57/2−)	462 1	33 4	6490.3	(55/2−)		
		835.4 5	100 10	6116.8	(53/2−)	(Q)	
7036.3	(57/2+)	823.0 5	100	6213.3	(53/2+)		
7183.1+x	(57/2−)	817.5 5	100	6365.6+x	(53/2−)		
7213.7+x	(57/2+)	854		6359.5+x	(53/2+)		
7231.8+x	(55/2+)	730.3	32 7	6501.5+x	(53/2+)		
		765	100	6466.7+x	(51/2+)		
7300.4+x	(57/2+)	799		6501.5+x	(53/2+)		
7333.6	(59/2−)	381.3 5	33 4	6952.2	(57/2−)		
		843.4 5	100 14	6490.3	(55/2−)	Q	
7471.0	(59/2+)	839.5 5	100	6631.5	(55/2+)		
7523.3+x	(57/2−)	834 1	100	6689.3+x	(53/2−)		
7745.0+x	(59/2−)	810		6935.0+x	(55/2−)		
7854.1	(61/2−)	901.9 5	100	6952.2	(57/2−)		
7876.1	(61/2+)	839.8 5	100	7036.3	(57/2+)		
8047.8+x	(59/2+)	816		7231.8+x	(55/2+)		
8056.7+x	(61/2−)	873.6 5	100	7183.1+x	(57/2−)		
8115.6+x	(61/2+)	815		7300.4+x	(57/2+)		
		902		7213.7+x	(57/2+)		
8154.9+x	(61/2+)	855		7300.4+x	(57/2+)		

$^{167}_{71}Lu_{96}$-11

Adopted Levels, Gammas (continued)

γ(^{167}Lu) (continued)

E_i(level)	J^π_i	E_γ†	I_γ‡	E_f	J^π_f	E_i(level)	J^π_i	E_γ†	I_γ‡	E_f	J^π_f
8154.9+x	(61/2$^+$)	941		7213.7+x	(57/2$^+$)	10245.1?	(71/2$^+$)	979.0[e] 5	100	9266.1	(67/2$^+$)
8232.9	(63/2$^-$)	899.3 5	100	7333.6	(59/2$^-$)	10521+x	(71/2$^-$)	980		9541+x	(67/2$^-$)
8341.6	(63/2$^+$)	870.6 5	100	7471.0	(59/2$^+$)	10817+x	(71/2$^+$)	976		9841+x	(67/2$^+$)
8382.5	(63/2$^+$)	911.5 5	100	7471.0	(59/2$^+$)	10930+x	(73/2$^+$)	988		9941.8+x	(69/2$^+$)
8616+x	(63/2$^-$)	871		7745.0+x	(59/2$^-$)	10995.7+x	(73/2$^-$)	1033		9962.7+x	(69/2$^-$)
8747.1	(65/2$^+$)	871 1	100	7876.1	(61/2$^+$)	11056+x	(73/2$^+$)	1016		10040+x	(69/2$^+$)
8917.8+x	(63/2$^+$)	870		8047.8+x	(59/2$^+$)	11558+x	(75/2$^-$)	1037		10521+x	(71/2$^-$)
8982.7+x	(65/2$^-$)	926 1	100	8056.7+x	(61/2$^-$)	11849+x	(75/2$^+$)	1032		10817+x	(71/2$^+$)
9009.8+x	(65/2$^+$)	810[e]		8200+x?	(61/2$^+$)	11984+x	(77/2$^+$)	1054		10930+x	(73/2$^+$)
		855		8154.9+x	(61/2$^+$)	12132+x	(77/2$^+$)	1076		11056+x	(73/2$^+$)
		894		8115.6+x	(61/2$^+$)	12657+x	(79/2$^-$)	1099		11558+x	(75/2$^-$)
9080.9+x	(65/2$^+$)	881[e]		8200+x?	(61/2$^+$)	12933+x	(79/2$^+$)	1084		11849+x	(75/2$^+$)
		926		8154.9+x	(61/2$^+$)	13104+x	(81/2$^+$)	1120		11984+x	(77/2$^+$)
9187.9?	(67/2$^-$)	955.0[e] 5		8232.9	(63/2$^-$)	13267+x	(81/2$^+$)	1135		12132+x	(77/2$^+$)
9266.1	(67/2$^+$)	924.5 5	100	8341.6	(63/2$^+$)	13821+x	(83/2$^-$)	1164		12657+x	(79/2$^-$)
9374.1	(67/2$^+$)	991.6 5	100	8382.5	(63/2$^+$)	14082+x	(83/2$^+$)	1149		12933+x	(79/2$^+$)
9541+x	(67/2$^-$)	925		8616+x	(63/2$^-$)	14287+x	(85/2$^+$)	1183		13104+x	(81/2$^+$)
9841+x	(67/2$^+$)	923		8917.8+x	(63/2$^+$)	14459+x	(85/2$^+$)	1192		13267+x	(81/2$^+$)
9941.8+x	(69/2$^+$)	932		9009.8+x	(65/2$^+$)	15282+x	(87/2$^+$)	1200		14082+x	(83/2$^+$)
9962.7+x	(69/2$^-$)	980		8982.7+x	(65/2$^-$)	15530+x	(89/2$^+$)	1243		14287+x	(85/2$^+$)
10040+x	(69/2$^+$)	959		9080.9+x	(65/2$^+$)	15706+x	(89/2$^+$)	1247		14459+x	(85/2$^+$)
10195.9?	(71/2$^-$)	1008[e] 1		9187.9?	(67/2$^-$)	16821+x	(93/2$^+$)	1291		15530+x	(89/2$^+$)

† From ^{123}Sb(^{48}Ca,4nγ), ^{123}Sb(^{48}Ca,4nγ):SD and ^{152}Sm(^{19}F,4nγ), except where noted.

‡ Relative photon branching from each level; values are from ^{123}Sb(^{48}Ca,4nγ), ^{152}Sm(^{19}F,4nγ), except where noted.

From DCO ratios measured in ^{123}Sb(^{48}Ca,4nγ), ^{152}Sm(^{19}F,4nγ), except as noted.

@ From ^{167}Hf ε decay.

& From (^{3}He,5nγ), (α,6nγ), (p,4nγ) data set.

[a] From ^{123}Sb(^{48}Ca,4nγ):SD.

[b] From $\gamma\gamma(\theta)$ and $\gamma(\theta)$ In ^{123}Sb(^{48}Ca,4nγ):SD.

[c] 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.

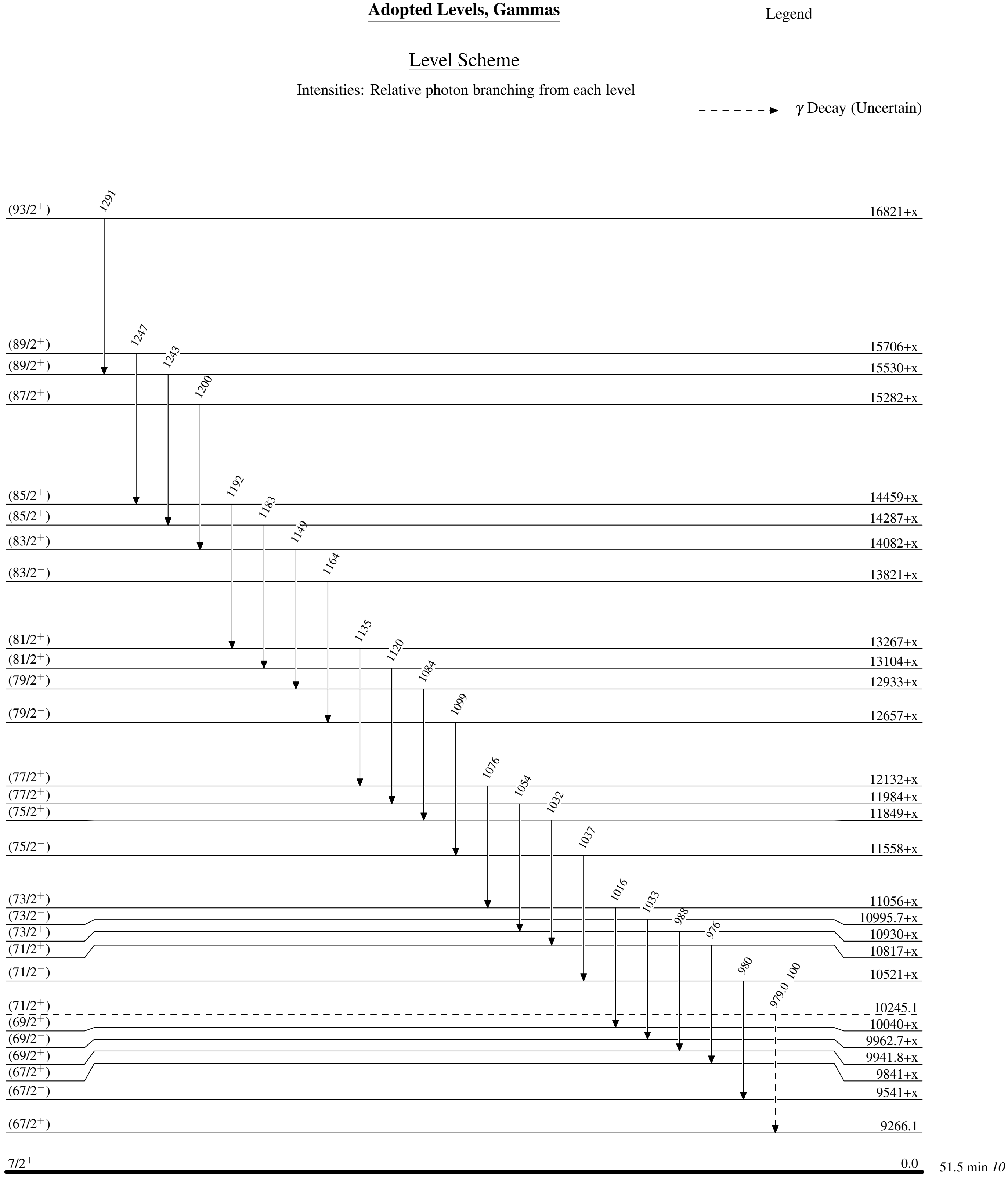
[d] Multiply placed with undivided intensity.

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

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level



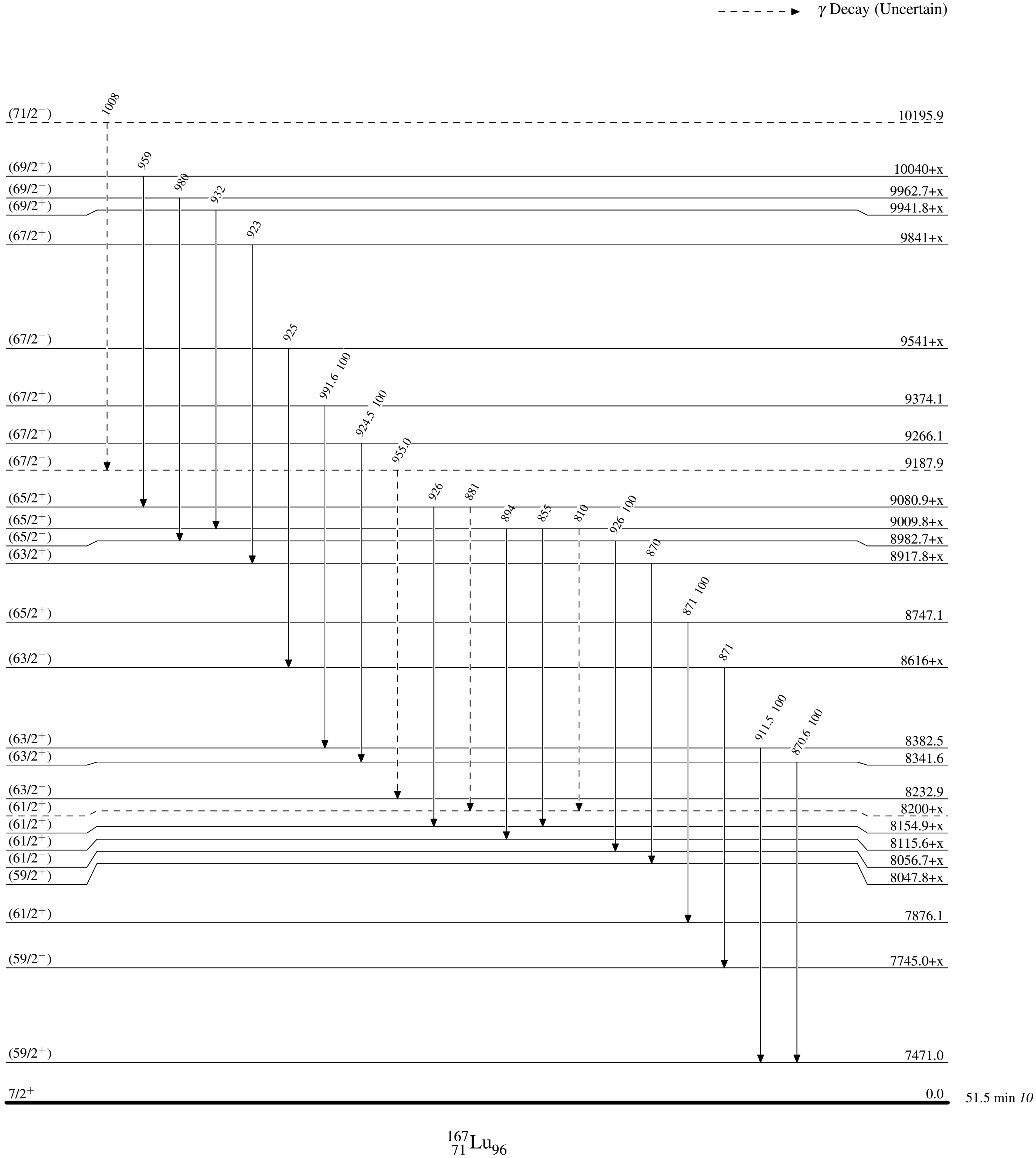
$^{167}_{71}Lu_{96}$

Adopted Levels, Gammas

Legend

Level Scheme (continued)

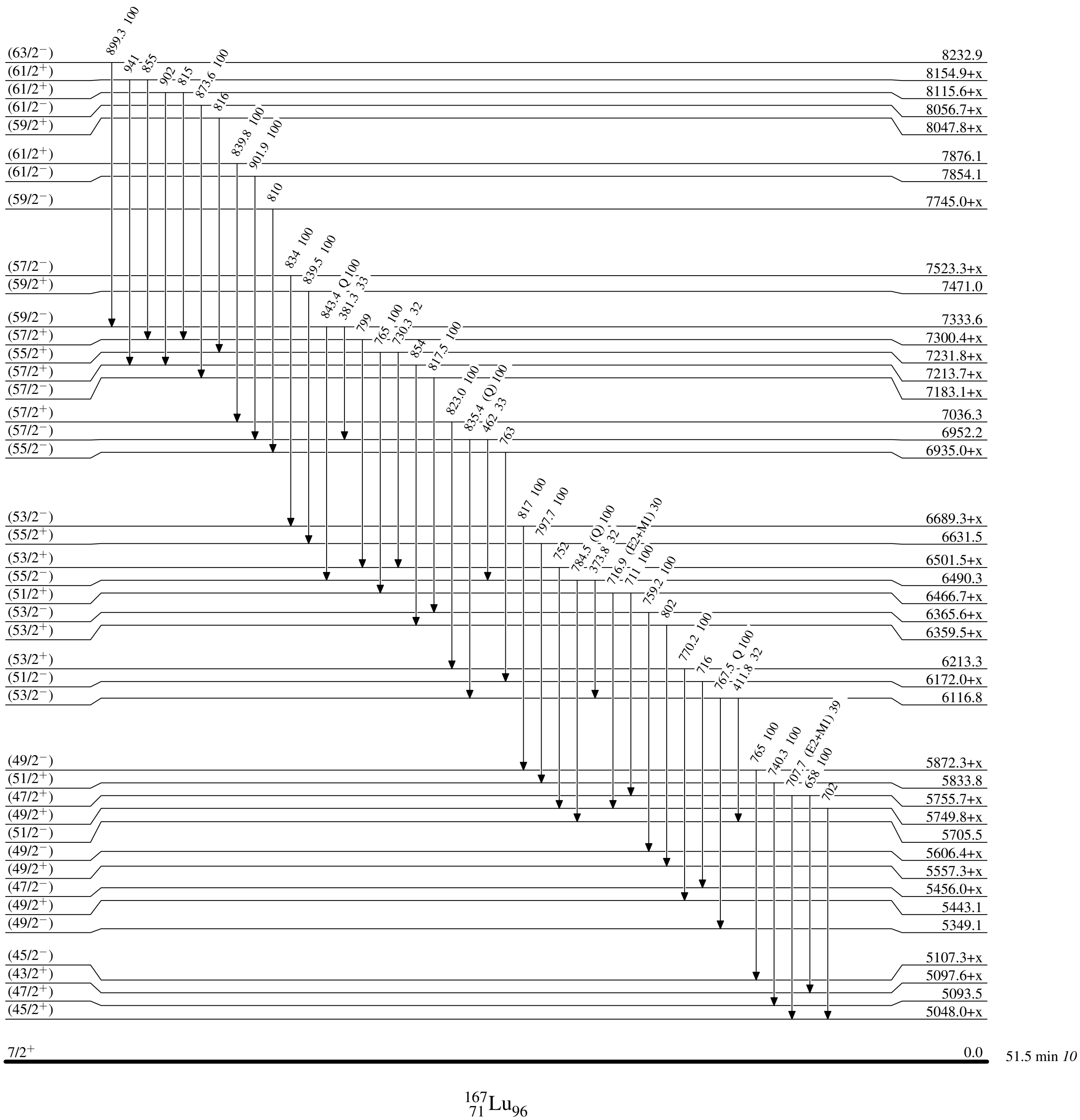
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



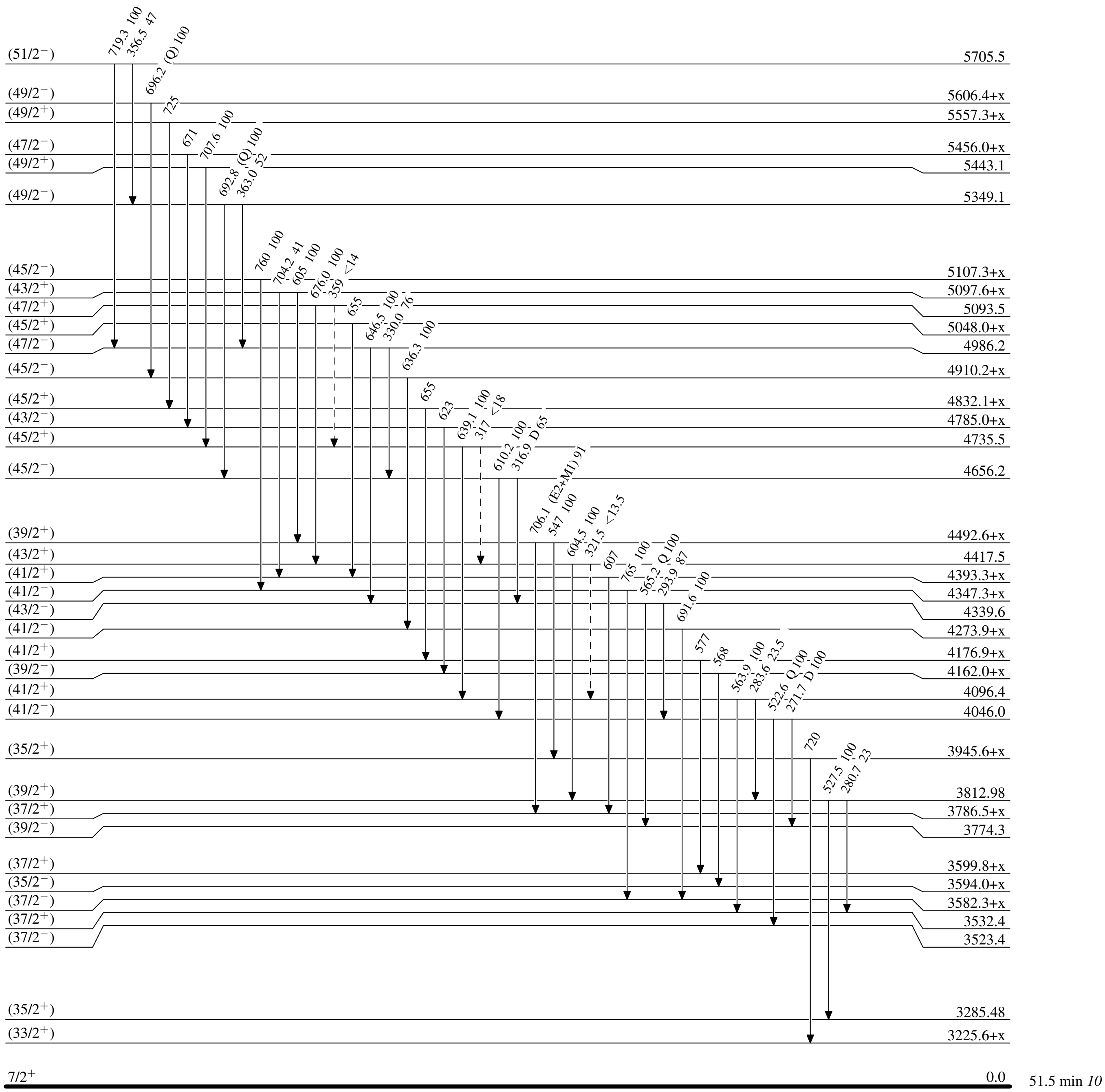
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

Legend

γ Decay (Uncertain)

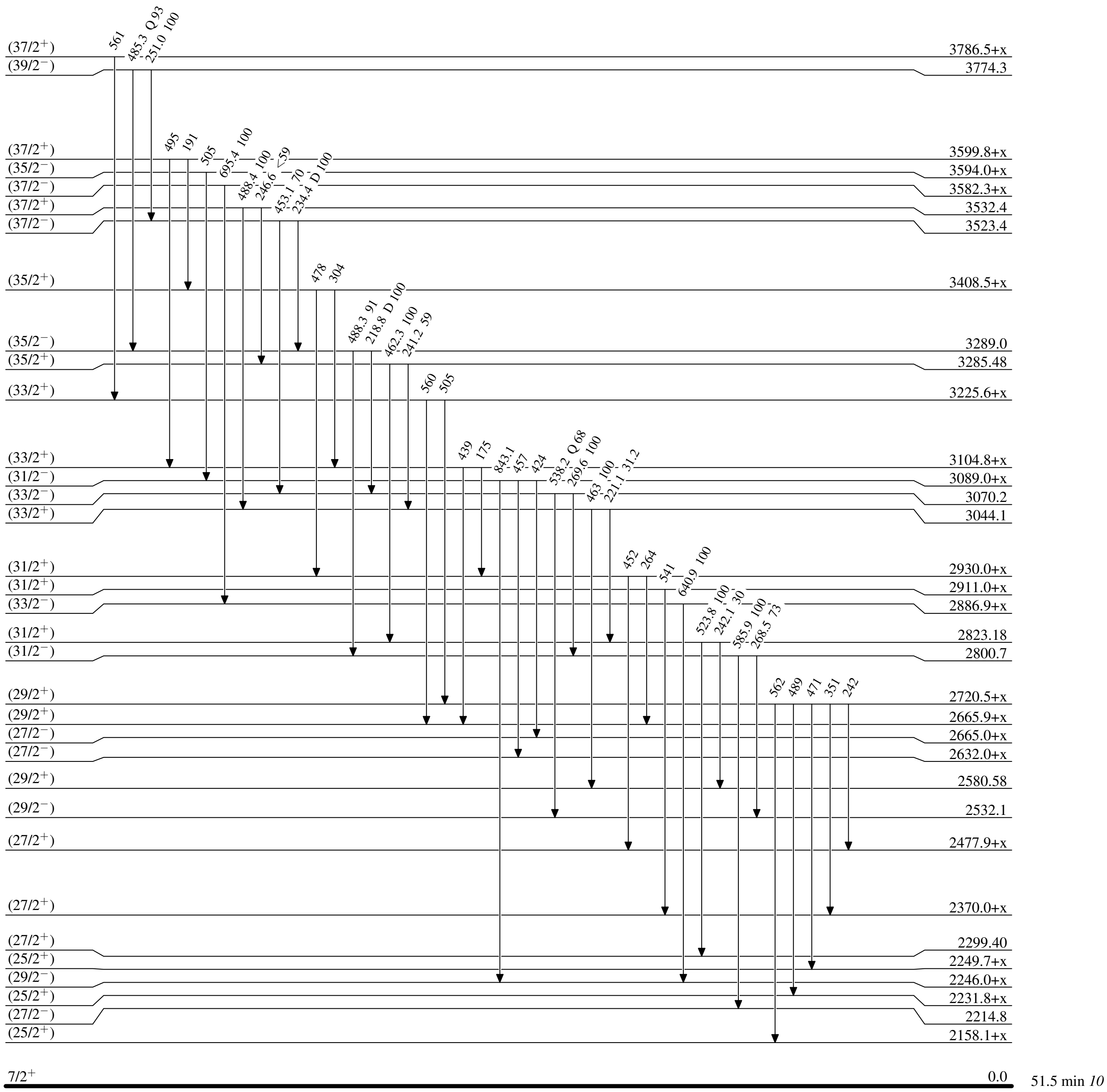


$^{167}_{71}Lu_{96}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

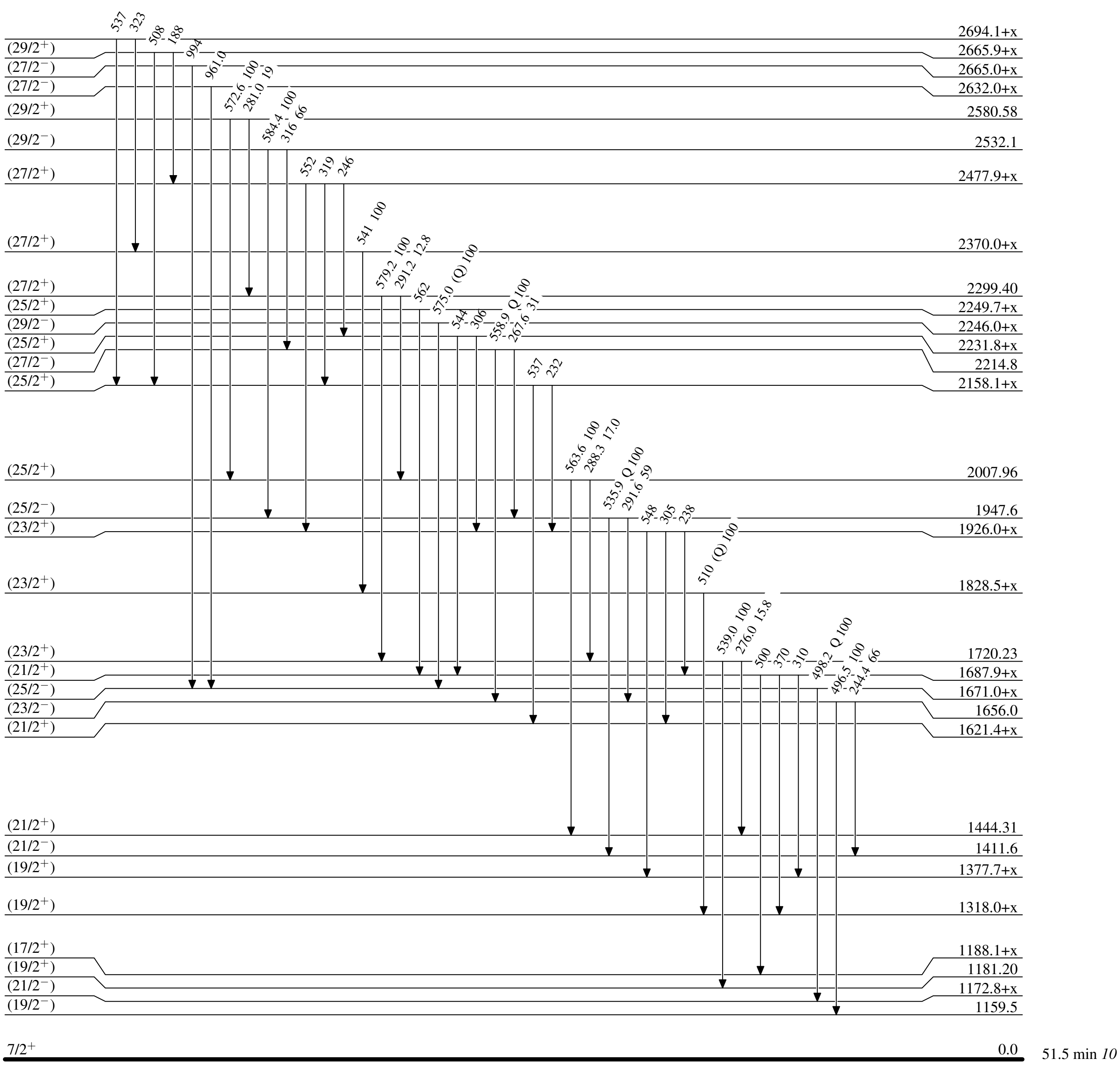


$^{167}_{71}Lu_{96}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

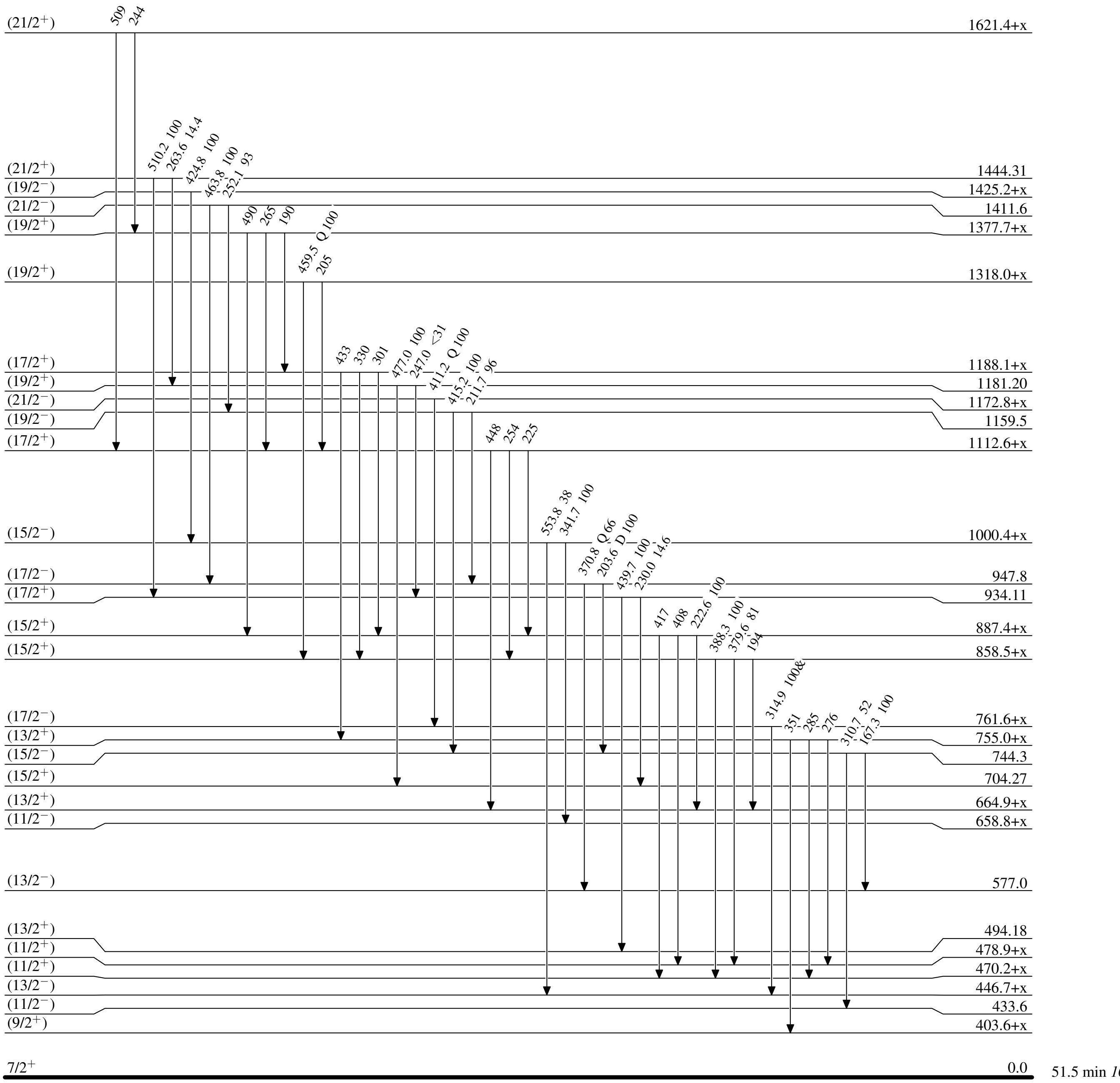


$^{167}_{71}Lu_{96}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given



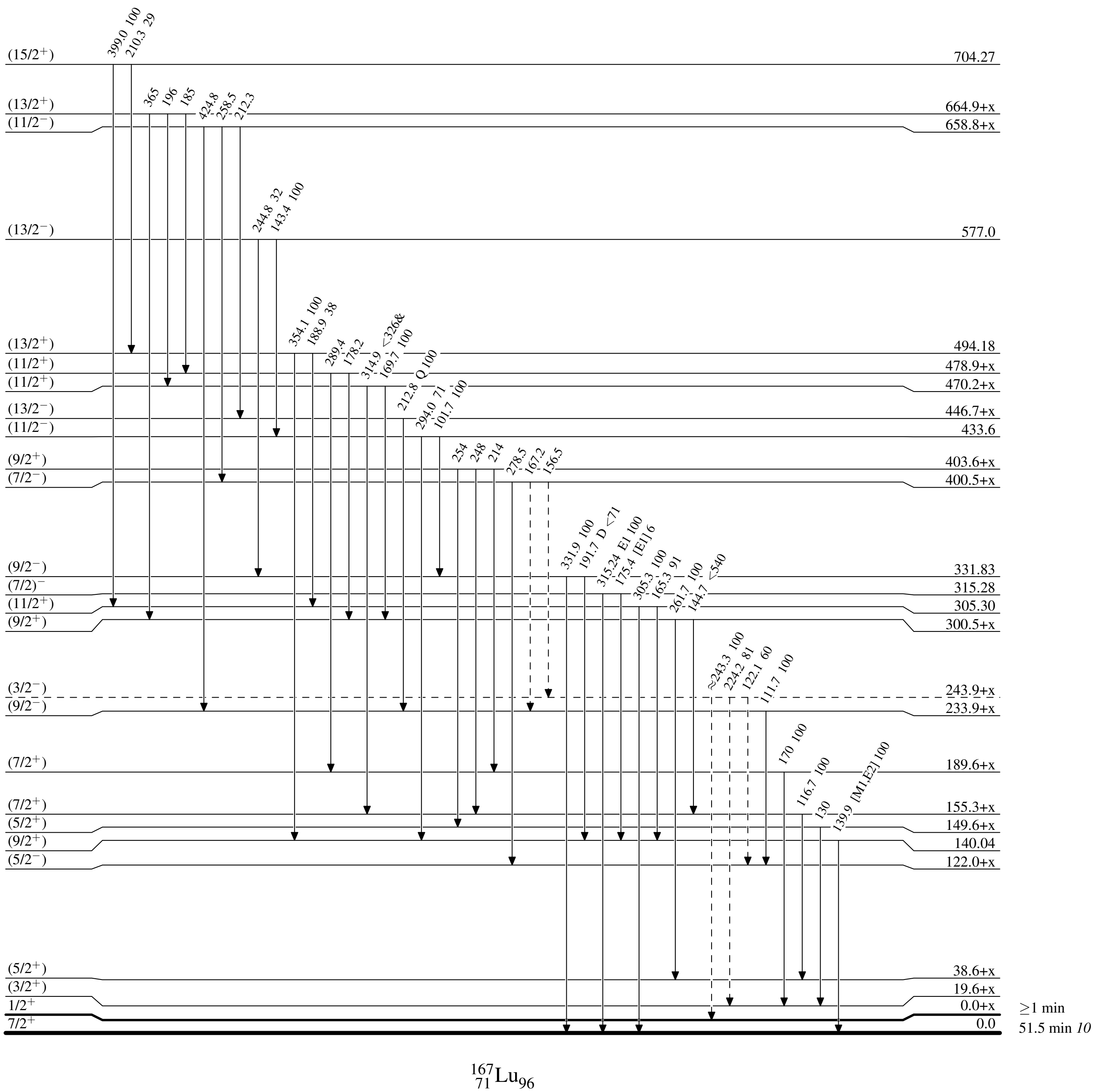
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

γ Decay (Uncertain)



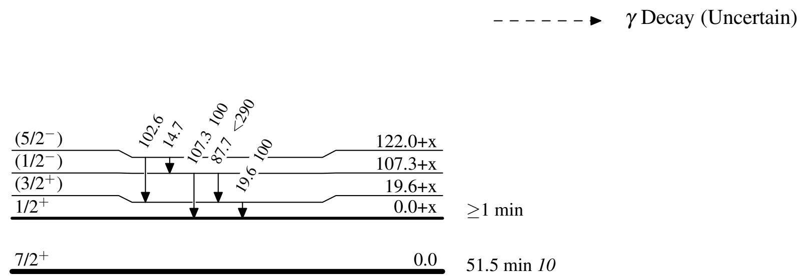
$^{167}_{71}Lu_{96}$

Adopted Levels, Gammas

Level Scheme (continued)

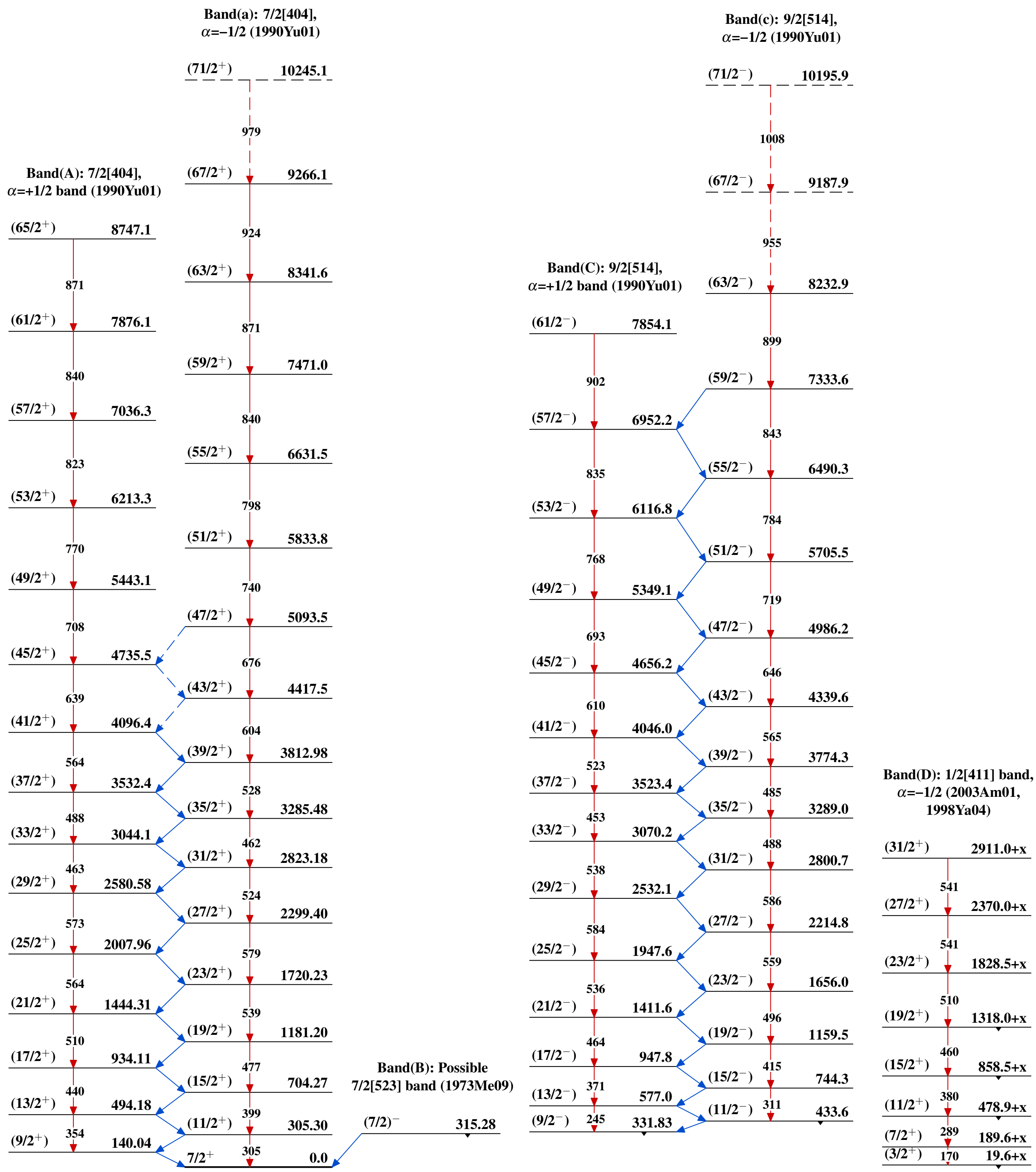
Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

Legend



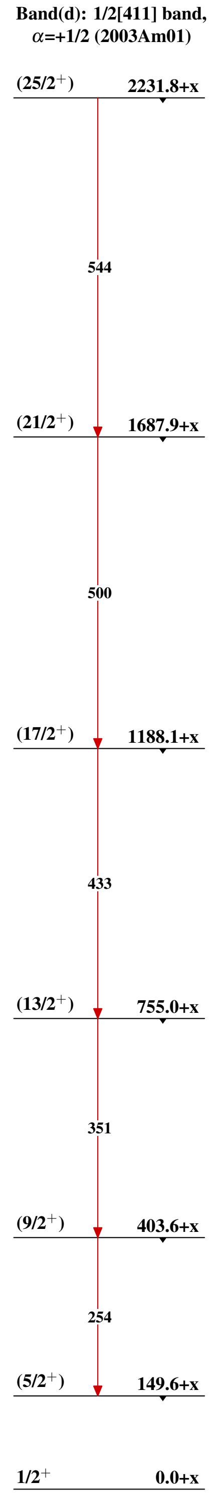
$^{167}_{71}Lu_{96}$

Adopted Levels, Gammas



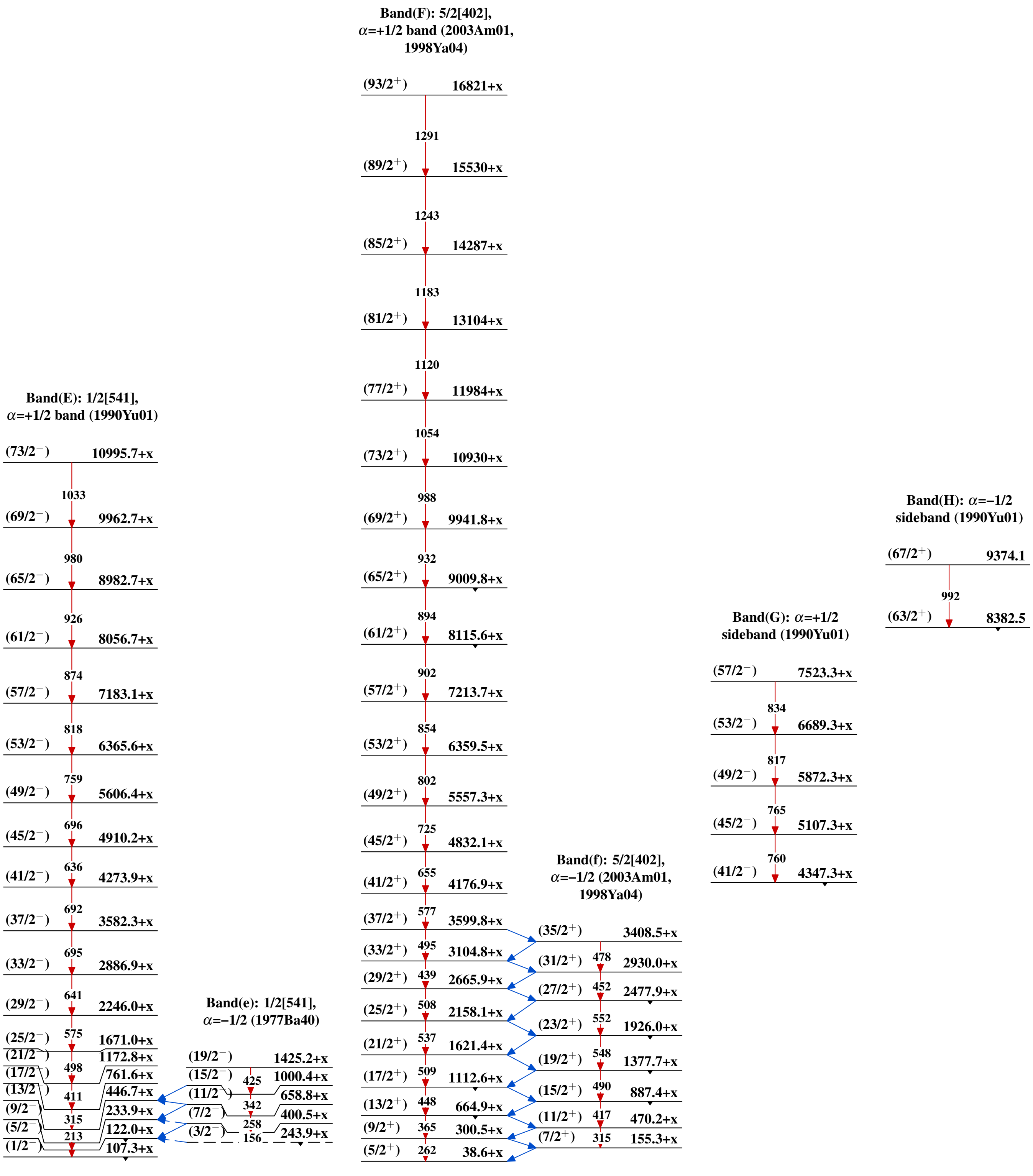
$^{167}_{71}Lu_{96}$

Adopted Levels, Gammas (continued)



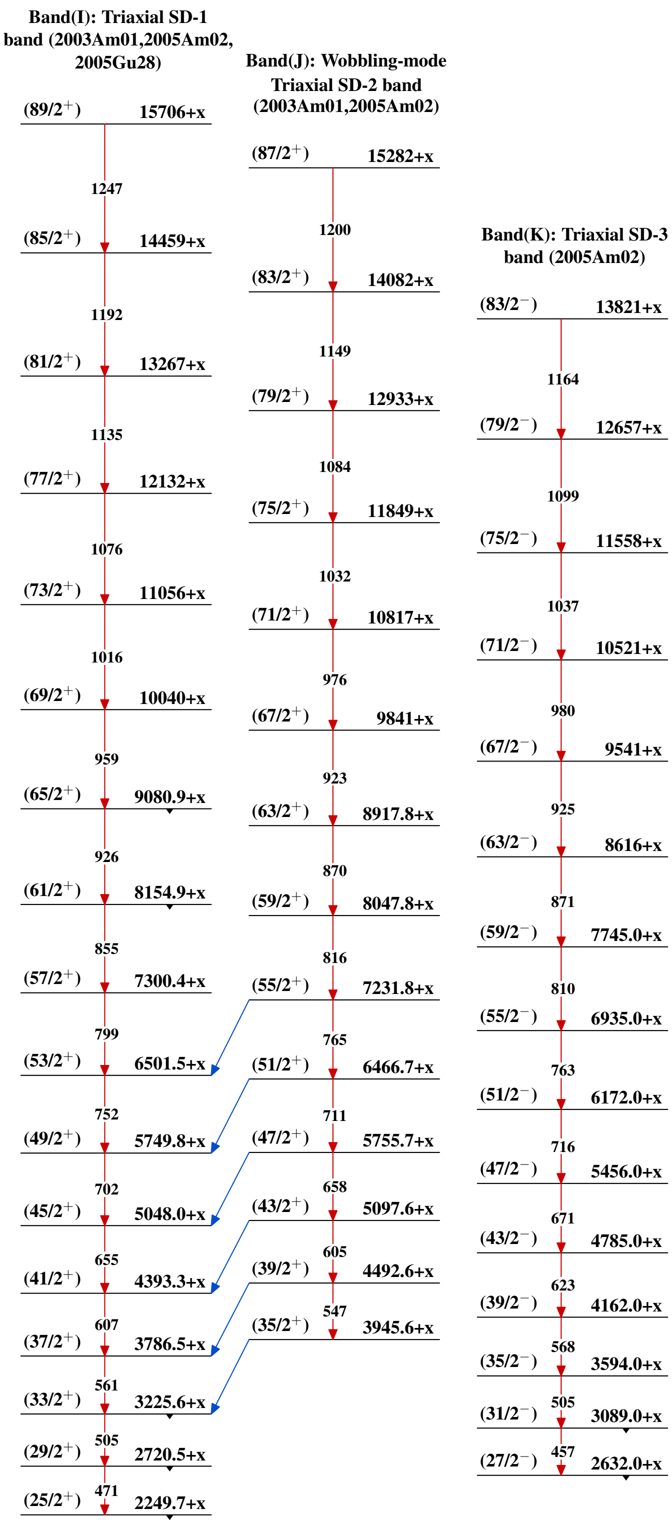
$^{167}_{71}Lu_{96}$

Adopted Levels, Gammas (continued)



$^{167}_{71}Lu_{96}$

Adopted Levels, Gammas (continued)



$^{167}_{71}Lu_{96}$

^{167}Hf ε decay 1973Me09

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 90, 431 (2000)	5-Jul-2000

Parent: ^{167}Hf: E=0.0; J$^{\pi}$=(5/2)$^{-}$; T$_{1/2}$=2.05 min *5*; Q(ε)=4000 *SY*; %ε+%β^+ decay=100.0

Others: 1969Ar23, 1970At01, 1987Es08, 1989Br19.

Sources from ^{170}Yb(^{3}He,6n); Yb oxide targets enriched to 67% in ^{170}Yb; chemical separation; measured Eγ, Iγ, (Compton-suppression Ge(Li) spectrometer (FWHM=1.9 keV at 1332 keV)), K x ray (surface-barrier Ge(Li) detector (FWHM=0.8 keV at 122 keV)), Ice (Si(Li)).

The decay scheme is tentative, and most certainly very incomplete; only three γ rays were observed, although Q+=4000 suggests there might be many more.

^{167}Lu Levels

E(level)	J$^{\pi}$†	T$_{1/2}$	Comments
0.0‡	7/2$^+$	51.5 min *10*	T$_{1/2}$: from Adopted Levels.
139.87‡ *15*	(9/2$^+$)		
315.25# *10*	(7/2)$^-$		

† Adopted values.
‡ Band(A): π 7/2[404] band.
# Band(B): π 7/2[523] band.

ε,β^+ radiations

1973Me09 estimate>65% ε+β^+ branching to 315.2 level from Iγ(K x ray)=58 *29* and I($\gamma^{\pm}$)=60 *30*, relative to Iγ=100 for 315.2γ. Intensity imbalance at 139.9 level indicates very little, if any, ε+β^+ feeding of that level (1.4% 17).

E(decay)	E(level)	Iβ^+ †	Iε†	Log *ft*	I(ε+β^+)†	Comments
(3684 *SY*)	315.25	>22	>43	<4.8	>65	av Eβ= 1203; εK=0.546; εL=0.0862; εM+=0.0262
(4000‡ *SY*)	0.0	<15	<20	>5.2	<35	av Eβ=1347; εK=0.481; εL=0.0758; εM+=0.0230

† Absolute intensity per 100 decays.
‡ Existence of this branch is questionable.

γ(^{167}Lu)

Iγ normalization: From K x ray intensity (corrected for internal conversion) and $\gamma^{\pm}$ intensity. However, see comment concerning tentative status of decay scheme.

Iγ(K x ray)=58 *29*, I($\gamma^{\pm}$)=60 *30*, relative to Iγ=100 for 315.2γ.

E$_{\gamma}$	I$_{\gamma}$†	E$_i$(level)	J$^{\pi}_i$	E$_f$	J$^{\pi}_f$	Mult.	α‡	Comments
139.9 *2*	3.8 *8*	139.87	(9/2$^+$)	0.0	7/2$^+$	[M1,E2]	1.21 *24*	α(K)=0.8 *4*; α(L)=0.29 *11*; α(M)=0.07 *3*; α(N+..)=0.019 *8*
175.4 *2*	6 *1*	315.25	(7/2)$^-$	139.87	(9/2$^+$)	[E1]	0.0809	α(K)=0.0674; α(L)=0.0105; α(M)=0.00234; α(N+..)=0.00063
315.24 *10*	100	315.25	(7/2)$^-$	0.0	7/2$^+$	E1	0.0184	α(K)=0.0154; α(L)=0.00229; α(M)=0.00051; α(N+..)=0.00016

Continued on next page (footnotes at end of table)

^{167}Hf ε decay 1973Me09 (continued)

$\gamma(^{167}Lu)$ (continued)

E_γ	E_i(level)	Comments
		Mult.: from α(K)exp=0.014 *3*, as deduced from a simultaneous measurement of Ice(315.2γ) and Iγ(315.2γ) (detector calibration from α(L)=0.0823 (E2 theory) for 198.8γ in ^{168}Yb).

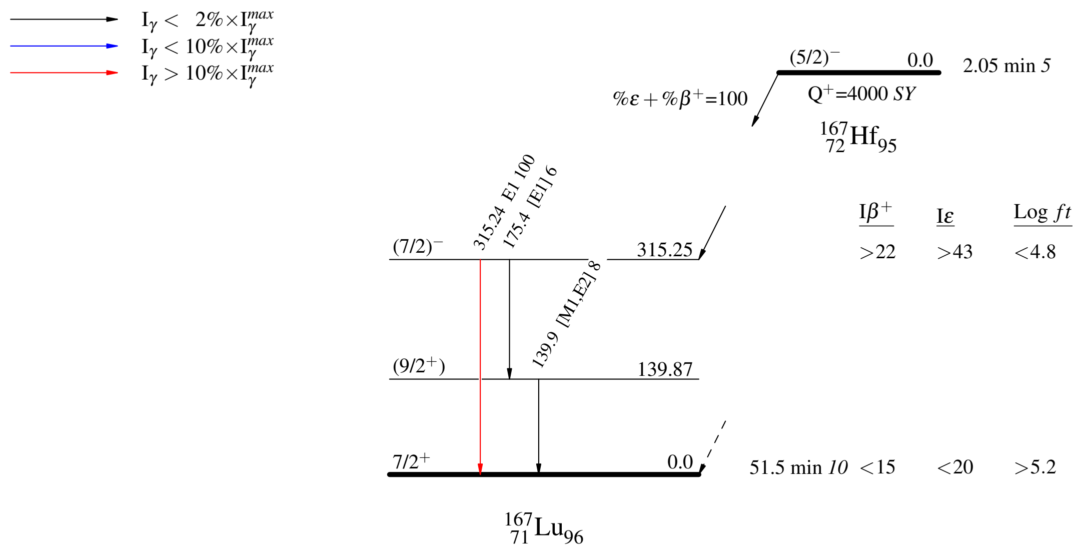
† For absolute intensity per 100 decays, multiply by 1.0 *5*.

‡ 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.

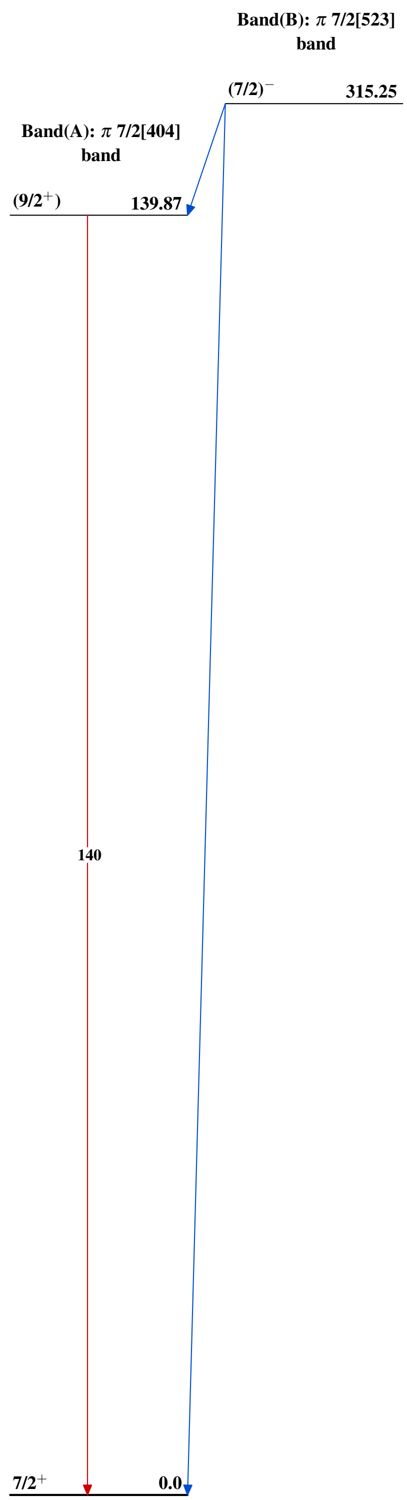
^{167}Hf ε decay 1973Me09

Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays



^{167}Hf ε decay 1973Me09



$^{167}_{71}Lu_{96}$

^{123}Sb(^{48}Ca,4nγ),^{152}Sm(^{19}F,4nγ) 1990Yu01,1998Ya04

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 90, 431 (2000)	5-Jul-2000

Other: 1997Wu03.

1990Yu01: ^{123}Sb(^{48}Ca,4nγ), 206 MeV; ESSA30 detector array (29 escape-suppressed Ge detectors), θ=37°, 63°, 79°, 101°, 117°, 143°; measured Eγ, Iγ, $\gamma\gamma$ coin, DCO ratios (37°, 79°).

1998Ya04,1997Wu03: ^{152}Sm(^{19}F,4nγ), E=85, 87 MeV; 98.4% ^{152}Sm targets, six Compton-suppressed HPGe-BGO spectrometers, HPGe planar detector; measured Eγ, Iγ (not reported), $\gamma\gamma$ coin; observed 15 new transitions associated with previously-known 1/2[411] and 5/2[402] bands, and established a previously unknown band which may be a triaxial SD band.

^{167}Lu Levels

The level scheme is a combination of schemes in 1990Yu01 and 1998Ya04. The conclusions of 1998Ya04 are presumed by the evaluator to supersede those of 1997Wu03 (same authors, same experimental conditions); 1997Wu03 propose a very different interconnection between the possible SD-band and normal-deformation levels, leading to different J$^\pi$ for levels of the former band, and several gammas present in 1997Wu03 are absent in 1998Ya04 (and vice versa).

E(level)[†]	J$^\pi$[‡]	E(level)[†]	J$^\pi$[‡]
0.0[@]	7/2+	3532.4[#] 4	37/2+
140.02[#] 13	9/2+	3774.3[b] 5	39/2−
305.29[@] 10	11/2+	3812.9[@] 3	39/2+
332.0[a] 4	9/2−	4046.0[a] 5	41/2−
433.6[b] 4	11/2−	4096.3[#] 4	41/2+
494.17[#] 12	13/2+	4339.7[b] 5	43/2−
577.0[a] 4	13/2−	4417.4[@] 3	43/2+
704.26[@] 13	15/2+	4656.2[a] 5	45/2−
744.3[b] 4	15/2−	4735.4[#] 4	45/2+
934.10[#] 14	17/2+	4986.2[b] 5	47/2−
947.8[a] 4	17/2−	5093.4[@] 6	47/2+
1159.5[b] 4	19/2−	5349.1[a] 5	49/2−
1181.19[@] 16	19/2+	5443.0[#] 4	49/2+
1411.7[a] 4	21/2−	5705.5[b] 5	51/2−
1444.36[#] 16	21/2+	5833.7[@] 8	(51/2+)
1656.0[b] 4	23/2−	6116.8[a] 6	53/2−
1720.16[@] 18	23/2+	6213.2[#] 7	(53/2+)
1947.6[a] 4	25/2−	6490.3[b] 6	55/2−
2007.99[#] 18	25/2+	6631.4[@] 9	(55/2+)
2214.9[b] 4	27/2−	6952.3[a] 7	57/2−
2299.34[@] 20	27/2+	7036.2[#] 8	(57/2+)
2532.1[a] 4	29/2−	7333.6[b] 7	59/2−
2580.60[#] 20	29/2+	7470.9[@] 11	(59/2+)
2800.7[b] 4	31/2−	7854.2[a] 9	(61/2−)
2823.12[@] 22	31/2+	7876.0[#] 10	(61/2+)
3044.0[#] 4	33/2+	8232.9[b] 9	63/2−
3070.3[a] 4	33/2−	8341.5[@] 12	(63/2+)
3285.43[@] 24	35/2+	8382.4[&] 12	(63/2+)
3289.0[b] 4	35/2−	8747.0[#] 14	(65/2+)
3523.4[a] 4	37/2−	9187.9?[b] 10	(67/2−)

Continued on next page (footnotes at end of table)

^{123}Sb(^{48}Ca,4nγ),^{152}Sm(^{19}F,4nγ) 1990Yu01,1998Ya04 (continued)

^{167}Lu Levels (continued)

E(level)[†]	Jπ[‡]	Comments
9266.0[@] 13	(67/2+)	
9374.0[&] 13	(67/2+)	
10195.9?[b] 14	(71/2−)	
10245.0?[@] 14	(71/2+)	
19.6+x[e] 5	(3/2+)	E(level): from Adopted Levels.
39.4+x[f] 14	(5/2+)	
122.2+x[c] 5	5/2−	E(level): from Adopted Levels.
156.1+x[g] 13	(7/2+)	
189.6+x[e] 10	(7/2+)	
233.8+x[c] 7	9/2−	
300.7+x[f] 12	(9/2+)	
446.6+x[c] 8	13/2−	
470.3+x[g] 12	(11/2+)	
479.0+x[e] 12	(11/2+)	Jπ: misprinted as 13/2+ in 1998Ya04 and 1997Wu03.
663.8+x[f] 13	(13/2+)	
761.5+x[c] 8	17/2−	
858.6+x[e] 12	(15/2+)	
886.2+x[g] 14	(15/2+)	
1112.0+x[f] 13	(17/2+)	
1172.7+x[c] 8	21/2−	
1318.1+x[e] 12	(19/2+)	
1376.6+x[g] 14	19/2+[i]	
1619.9+x[f] 15	21/2+[i]	
1670.9+x[c] 8	25/2−	
1828.3+x[e] 15	(23/2+)	
1925.1+x[g] 15	23/2+[i]	
2156.9+x[f] 16	25/2+[i]	
2245.9+x[c] 8	29/2−	
2370.5+x[e] 17	(27/2+)	
2693.8+x 17		
2703.9+x[h] 18	(29/2)+[i]	
2886.8+x[c] 8	33/2−	
2989.5+x[e] 19	31/2+[i]	
3254.8+x[h] 18	(33/2)+[i]	
3582.2+x[c] 8	37/2−	
3855.8+x[h] 20	(37/2)+[i]	
4273.8+x[c] 9	41/2−	
4347.2+x[d] 13	(41/2−)	
4508.8+x[h] 23	(41/2)+[i]	
4910.1+x[c] 11	45/2−	
5107.2+x[d] 16	(45/2−)	
5213.8+x[h] 25	(45/2)+[i]	
5606.3+x[c] 12	49/2−	
5872.2+x[d] 19	(49/2−)	
5967+x[h] 3	(49/2)+[i]	
6365.5+x[c] 13	53/2−	
6689.2+x[d] 22	(53/2−)	
6771+x[h] 3	(53/2)+[i]	

Continued on next page (footnotes at end of table)

^{123}Sb(^{48}Ca,4nγ),^{152}Sm(^{19}F,4nγ) 1990Yu01,1998Ya04 (continued)

^{167}Lu Levels (continued)

E(level)[†]	J$^{\pi}$[‡]
7183.0+x[c] *14*	57/2$^-$
7523.2+x[d] *24*	(57/2$^-$)
7625+x[h] *3*	(57/2$^+$)[i]
8056.6+x[c] *15*	61/2$^-$
8529+x?[h] *4*	(61/2)$^+$[i]
8982.6+x[c] *18*	65/2$^-$

[†] From least-squares adjustment of Eγ, allowing ΔE$_\gamma$=1 keV for Eγ values to which authors did not assign uncertainty.
[‡] From 1990Yu01, except as noted; based on measured DCO ratios, deduced band structure, γ branching and comparison with structure for lighter Lu isotopes.
[#] Band(A): 7/2[404], α=+1/2 (1990Yu01).
[@] Band(a): 7/2[404], α=−1/2 (1990Yu01).
[&] Band(B): α=−1/2 sideband (1990Yu01).
[a] Band(C): 9/2[514], α=+1/2 (1990Yu01).
[b] Band(c): 9/2[514], α=−1/2 (1990Yu01).
[c] Band(D): 1/2[541], α=+1/2 (1990Yu01).
[d] Band(E): α=+1/2 sideband (1990Yu01). J is taken from fig. 4 of 1990Yu01; table 1 gives values which are two units higher, requiring that this band connect to the 1/2[541] band at the J=41/2 member rather than the 37/2 member shown in fig. 4.
[e] Band(F): 1/2[411], α=−1/2 (1998Ya04). Signature partner band not observed, consistent with knowledge of 1/2[411] bands in neighboring odd-A Lu isotopes.
[f] Band(G): 5/2[402], α=+1/2 (1998Ya04).
[g] Band(g): 5/2[402], α=−1/2 (1998Ya04).
[h] Band(H): SD (triaxial) band? (1998Ya04). Transition energies in the upper part of this band and dynamic moment of inertia values are very similar to those for possible 1/2[660] triaxial SD bands in ^{163}Lu and ^{165}Lu (1998Ya04), and ^{164}Lu (1999To08).
[i] Authors′ value (1998Ya04).

γ(^{167}Lu)

E$_\gamma$[†]	I$_\gamma$[‡]	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$	Mult.[#]	Comments
101.5 *5*		433.6	11/2$^-$	332.0	9/2$^-$		
(102.6 *5*)		122.2+x	5/2$^-$	19.6+x	(3/2$^+$)		E$_\gamma$: from adopted gammas.
111.7 *5*		233.8+x	9/2$^-$	122.2+x	5/2$^-$		
117 *1*		156.1+x	(7/2$^+$)	39.4+x	(5/2$^+$)		
139.9 *5*		140.02	9/2$^+$	0.0	7/2$^+$		
143.4 *1*	75 *5*	577.0	13/2$^-$	433.6	11/2$^-$		DCO ratio= 0.84 *5*.
144.8 *5*		300.7+x	(9/2$^+$)	156.1+x	(7/2$^+$)		DCO ratio= 1.0 *4* (ΔJ=2 γ in gate).
165.3 *1*	63 *6*	305.29	11/2$^+$	140.02	9/2$^+$		
167.3 *1*	105 *9*	744.3	15/2$^-$	577.0	13/2$^-$		DCO ratio= 0.75 *5*.
170 *1*		189.6+x	(7/2$^+$)	19.6+x	(3/2$^+$)		DCO ratio= 1.0 *3* (ΔJ=2 γ in gate).
170 *1*		470.3+x	(11/2$^+$)	300.7+x	(9/2$^+$)		DCO ratio= 1.0 *3* (ΔJ=2 γ in gate).
178.2 *5*		479.0+x	(11/2$^+$)	300.7+x	(9/2$^+$)		DCO ratio= 1.5 *9* (ΔJ=2 γ in gate).
185[@]		663.8+x	(13/2$^+$)	479.0+x	(11/2$^+$)		
188.9 *1*	42 *5*	494.17	13/2$^+$	305.29	11/2$^+$		
191.7 *5*		332.0	9/2$^-$	140.02	9/2$^+$	D	DCO ratio= 0.99 *9*.
193 *1*		663.8+x	(13/2$^+$)	470.3+x	(11/2$^+$)		
194[@]		858.6+x	(15/2$^+$)	663.8+x	(13/2$^+$)		
203.6 *1*	82 *5*	947.8	17/2$^-$	744.3	15/2$^-$	D	DCO ratio= 0.90 *5*.

Continued on next page (footnotes at end of table)

$^{123}Sb(^{48}Ca,4n\gamma),^{152}Sm(^{19}F,4n\gamma)$ 1990Yu01,1998Ya04 (continued)

$\gamma(^{167}Lu)$ (continued)

E_γ [†]	I_γ [‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [#]	Comments
205 [@]		1318.1+x	(19/2+)	1112.0+x	(17/2+)		
210.3 *1*	40 *4*	704.26	15/2+	494.17	13/2+		
211.7 *1*	77 *6*	1159.5	19/2−	947.8	17/2−		DCO ratio= 0.77 *4*.
212.8 *1*	114 *6*	446.6+x	13/2−	233.8+x	9/2−	Q	DCO ratio= 1.1 *1* (ΔJ=2 γ in gate).
218.8 *1*	40.7 *25*	3289.0	35/2−	3070.3	33/2−	D	DCO ratio= 0.95 *5*.
221.1 *5*	18.4 *15*	3044.0	33/2+	2823.12	31/2+		
223 *1*		886.2+x	(15/2+)	663.8+x	(13/2+)		
225 *1*		1112.0+x	(17/2+)	886.2+x	(15/2+)		
230.0 *1*	36 *5*	934.10	17/2+	704.26	15/2+		
232 [@]		2156.9+x	25/2+	1925.1+x	23/2+		
234.4 *1*	41.5 *25*	3523.4	37/2−	3289.0	35/2−	D	DCO ratio= 0.97 *5*.
241.2 *5*	18.2 *20*	3285.43	35/2+	3044.0	33/2+		
242.1 *5*	13.5 *12*	2823.12	31/2+	2580.60	29/2+		
243 [@]		1619.9+x	21/2+	1376.6+x	19/2+		
244.4 *1*	53 *5*	1656.0	23/2−	1411.7	21/2−		
244.8 *5*	24 *4*	577.0	13/2−	332.0	9/2−		
246.6 *5*	<36	1181.19	19/2+	934.10	17/2+		
246.6 *5*	<23	3532.4	37/2+	3285.43	35/2+		
251.0 *5*	29 *3*	3774.3	39/2−	3523.4	37/2−		DCO ratio= 0.86 *4* for (251.0γ+252.1γ) doublet.
252.1 *1*	66 *5*	1411.7	21/2−	1159.5	19/2−		DCO ratio= 0.86 *4* for (251.0γ+252.1γ) doublet.
254 [@]		1112.0+x	(17/2+)	858.6+x	(15/2+)		
261 *1*		300.7+x	(9/2+)	39.4+x	(5/2+)		
263.6 *5*	21.4 *17*	1444.36	21/2+	1181.19	19/2+		
265 [@]		1376.6+x	19/2+	1112.0+x	(17/2+)		
267.6 *5*	24 *4*	2214.9	27/2−	1947.6	25/2−		
268.5 *1*	58 *10*	2800.7	31/2−	2532.1	29/2−		DCO ratio= 0.83 *4* for (268.5γ+269.6γ) doublet. The 269γ is coincident with itself.
269.6 *1*	63 *10*	3070.3	33/2−	2800.7	31/2−		DCO ratio= 0.83 *4* for (268.5γ+269.6γ) doublet. The 269γ is coincident with itself.
271.7 *1*	34.9 *22*	4046.0	41/2−	3774.3	39/2−	D	DCO ratio= 0.89 *5*.
275.8 *5*	16.7 *14*	1720.16	23/2+	1444.36	21/2+		
280.7 *5*	8.0 *14*	3812.9	39/2+	3532.4	37/2+		
281.0 *5*	12.6 *20*	2580.60	29/2+	2299.34	27/2+		
283.6 *5*	8.7 *9*	4096.3	41/2+	3812.9	39/2+		
288.3 *5*	18.4 *15*	2007.99	25/2+	1720.16	23/2+		
289.4 *5*		479.0+x	(11/2+)	189.6+x	(7/2+)		
291.2 *5*	11.3 *11*	2299.34	27/2+	2007.99	25/2+		
291.6 *1*	42.0 *26*	1947.6	25/2−	1656.0	23/2−		DCO ratio= 0.80 *6* for (291.6γ+293.9γ) double dominated by the 291.6γ.
293.9 *5*	24.2 *26*	4339.7	43/2−	4046.0	41/2−		DCO ratio= 0.88 *6* for (291.6γ+293.9γ) doublet dominated by 291.6γ.
294.0 *5*		433.6	11/2−	140.02	9/2+		
305 [@]		1925.1+x	23/2+	1619.9+x	21/2+		
305.3 *1*	74 *6*	305.29	11/2+	0.0	7/2+		
310.7 *1*	55 *4*	744.3	15/2−	433.6	11/2−		DCO ratio= 0.78 *5*.
314 *1*		470.3+x	(11/2+)	156.1+x	(7/2+)		
314.9 *1*	104 *5*	761.5+x	17/2−	446.6+x	13/2−		DCO ratio= 1.3 *2* (ΔJ=2 γ in gate).
316 *1*	33 *5*	2532.1	29/2−	2214.9	27/2−		
316.9 *5*	22 *4*	4656.2	45/2−	4339.7	43/2−	D	DCO ratio= 0.89 *5*.
317 [&] *1*	<8.0	4735.4	45/2+	4417.4	43/2+		
321.5 [&] *5*	<5.0	4417.4	43/2+	4096.3	41/2+		
323 [@]		2693.8+x		2370.5+x	(27/2+)		
330.0 *1*	23.0 *20*	4986.2	47/2−	4656.2	45/2−		DCO ratio= 0.68 *9*.

Continued on next page (footnotes at end of table)

^{123}Sb(^{48}Ca,4nγ),^{152}Sm(^{19}F,4nγ) **1990Yu01,1998Ya04 (continued)**

γ(^{167}Lu) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	Comments
331.9 *5*		332.0	9/2$^-$	0.0	7/2$^+$		DCO ratio= 1.24 *9*.
354.1 *1*	110 *10*	494.17	13/2$^+$	140.02	9/2$^+$		
356.5 *5*	14.5 *11*	5705.5	51/2$^-$	5349.1	49/2$^-$		DCO ratio= 0.8 *1*.
359[&] *1*	<4.0	5093.4	47/2$^+$	4735.4	45/2$^+$		
363 *1*		663.8+x	(13/2$^+$)	300.7+x	(9/2$^+$)		
363.0 *5*	15 *3*	5349.1	49/2$^-$	4986.2	47/2$^-$		
370.8 *1*	56 *5*	947.8	17/2$^-$	577.0	13/2$^-$	Q	DCO ratio= 0.70 *7*.
373.8 *5*	5.5 *7*	6490.3	55/2$^-$	6116.8	53/2$^-$		
379.6 *5*	25 *4*	858.6+x	(15/2$^+$)	479.0+x	(11/2$^+$)		DCO ratio= 0.89 *15* (ΔJ=2 γ in gate).
381.3 *5*	4.6 *5*	7333.6	59/2$^-$	6952.3	57/2$^-$		
388.3 *1*	31 *4*	858.6+x	(15/2$^+$)	470.3+x	(11/2$^+$)		DCO ratio= 0.95 *15* (ΔJ=2 γ in gate).
399.0 *1*	138 *11*	704.26	15/2$^+$	305.29	11/2$^+$		
411.2 *1*	100 *5*	1172.7+x	21/2$^-$	761.5+x	17/2$^-$	Q	DCO ratio= 1.1 *1* (ΔJ=2 γ in gate).
411.8 *5*	6.3 *9*	6116.8	53/2$^-$	5705.5	51/2$^-$		
414 *1*		886.2+x	(15/2$^+$)	470.3+x	(11/2$^+$)		
415.2 *1*	80 *5*	1159.5	19/2$^-$	744.3	15/2$^-$		DCO ratio= 0.76 *6*.
439.7 *1*	160 *20*	934.10	17/2$^+$	494.17	13/2$^+$		
448 *1*		1112.0+x	(17/2$^+$)	663.8+x	(13/2$^+$)		
453.1 *1*	29.1 *19*	3523.4	37/2$^-$	3070.3	33/2$^-$		DCO ratio= 0.77 *7*.
459.5 *1*	34 *5*	1318.1+x	(19/2$^+$)	858.6+x	(15/2$^+$)	Q	DCO ratio= 1.14 *10* (ΔJ=2 γ in gate).
462 *1*	5.5 *6*	6952.3	57/2$^-$	6490.3	55/2$^-$		
462.3 *1*	31 *6*	3285.43	35/2$^+$	2823.12	31/2$^+$		
463 *1*	59 *8*	3044.0	33/2$^+$	2580.60	29/2$^+$		
463.8 *1*	71 *4*	1411.7	21/2$^-$	947.8	17/2$^-$		DCO ratio= 0.77 *6*.
477.0 *1*	117 *9*	1181.19	19/2$^+$	704.26	15/2$^+$		
485.3 *5*	26.9 *20*	3774.3	39/2$^-$	3289.0	35/2$^-$	Q	DCO ratio= 0.60 *8*.
488.3 *1*	36.9 *24*	3289.0	35/2$^-$	2800.7	31/2$^-$		DCO ratio= 0.80 *7*.
488.4 *1*	39 *3*	3532.4	37/2$^+$	3044.0	33/2$^+$		
490[@]		1376.6+x	19/2$^+$	886.2+x	(15/2$^+$)		
496.5 *1*	80 *5*	1656.0	23/2$^-$	1159.5	19/2$^-$		DCO ratio= 0.71 *11*.
498.2 *1*	91 *8*	1670.9+x	25/2$^-$	1172.7+x	21/2$^-$	Q	DCO ratio= 1.0 *1* (ΔJ=2 γ in gate).
508[@]		1619.9+x	21/2$^+$	1112.0+x	(17/2$^+$)		
510 *1*	<50	1828.3+x	(23/2$^+$)	1318.1+x	(19/2$^+$)	(Q)	DCO ratio= 0.9 *1* (ΔJ=2 γ in gate).
510.2 *1*	149 *11*	1444.36	21/2$^+$	934.10	17/2$^+$		
522.6 *1*	34.9 *23*	4046.0	41/2$^-$	3523.4	37/2$^-$	Q	DCO ratio= 0.45 *4*.
523.8 *1*	45 *4*	2823.12	31/2$^+$	2299.34	27/2$^+$		
527.5 *1*	35 *3*	3812.9	39/2$^+$	3285.43	35/2$^+$		
535.9 *1*	71 *5*	1947.6	25/2$^-$	1411.7	21/2$^-$	Q	DCO ratio= 0.57 *5*.
537[@]		2156.9+x	25/2$^+$	1619.9+x	21/2$^+$		
537[@]		2693.8+x		2156.9+x	25/2$^+$		
538.2 *1*	43 *3*	3070.3	33/2$^-$	2532.1	29/2$^-$	Q	DCO ratio= 0.47 *8*.
539.0 *1*	106 *8*	1720.16	23/2$^+$	1181.19	19/2$^+$		
542 *1*	<50	2370.5+x	(27/2$^+$)	1828.3+x	(23/2$^+$)		DCO ratio= 0.8 *1* (ΔJ=2 γ in gate). $\gamma\gamma$ coin indicates that this is a doublet, but placement of other component could not be determined.
547[@]		2703.9+x	(29/2)$^+$	2156.9+x	25/2$^+$		
549[@]		1925.1+x	23/2$^+$	1376.6+x	19/2$^+$		
551[@]		3254.8+x	(33/2)$^+$	2703.9+x	(29/2)$^+$		
558.9 *1*	78 *5*	2214.9	27/2$^-$	1656.0	23/2$^-$	Q	DCO ratio= 0.64 *4*.
561[@]		3254.8+x	(33/2)$^+$	2693.8+x			
563.6 *1*	108 *10*	2007.99	25/2$^+$	1444.36	21/2$^+$		
563.9 *1*	37 *6*	4096.3	41/2$^+$	3532.4	37/2$^+$		
565.2 *5*	27.7 *20*	4339.7	43/2$^-$	3774.3	39/2$^-$	Q	DCO ratio= 0.51 *5*.

Continued on next page (footnotes at end of table)

$^{123}Sb(^{48}Ca,4n\gamma),^{152}Sm(^{19}F,4n\gamma)$ 1990Yu01,1998Ya04 (continued)

$\gamma(^{167}Lu)$ (continued)

E_γ †	I_γ ‡	E_i(level)	J^π_i	E_f	J^π_f	Mult.#	Comments
572.6 1	67 5	2580.60	29/2+	2007.99	25/2+		
575.0 1	62 5	2245.9+x	29/2−	1670.9+x	25/2−	(Q)	DCO ratio= 1.1 2 (ΔJ=2 γ in gate).
579.2 1	88 7	2299.34	27/2+	1720.16	23/2+		
584.4 1	50 6	2532.1	29/2−	1947.6	25/2−		DCO ratio= 0.63 3 for (584.4γ+585.9γ) doublet.
585.9 1	80 9	2800.7	31/2−	2214.9	27/2−		DCO ratio= 0.63 3 for (584.4γ+585.9γ) doublet.
601@		3855.8+x	(37/2)+	3254.8+x	(33/2)+		
604.5 1	37 3	4417.4	43/2+	3812.9	39/2+		
610.2 1	33.6 23	4656.2	45/2−	4046.0	41/2−		DCO ratio= 0.70 7.
619@		2989.5+x	31/2+	2370.5+x	(27/2+)		
636.3 5	17.0 16	4910.1+x	45/2−	4273.8+x	41/2−		DCO ratio= 1.2 2 (ΔJ=2 γ in gate).
639.1 1	44 4	4735.4	45/2+	4096.3	41/2+		
640.9 1	49 4	2886.8+x	33/2−	2245.9+x	29/2−		DCO ratio= 0.8 1 (ΔJ=2 γ in gate).
646.5 1	30.1 25	4986.2	47/2−	4339.7	43/2−		DCO ratio= 0.78 7.
653@		4508.8+x	(41/2)+	3855.8+x	(37/2)+		
676.0 5	28.5 25	5093.4	47/2+	4417.4	43/2+		
691.6 5	19 3	4273.8+x	41/2−	3582.2+x	37/2−		DCO ratio= 0.9 2 (ΔJ=2 γ in gate).
692.8 5	29 4	5349.1	49/2−	4656.2	45/2−	(Q)	DCO ratio= 0.70 10.
695.4 1	32 7	3582.2+x	37/2−	2886.8+x	33/2−		DCO ratio= 0.81 9 (ΔJ=2 γ in gate).
696.2 5	15 3	5606.3+x	49/2−	4910.1+x	45/2−	(Q)	DCO ratio= 1.1 2 (ΔJ=2 γ in gate).
705@		5213.8+x	(45/2)+	4508.8+x	(41/2)+		
707.6 1	36 3	5443.0	49/2+	4735.4	45/2+		
719.3 1	31 4	5705.5	51/2−	4986.2	47/2−		DCO ratio= 0.73 8.
740.3 5	25 3	5833.7	(51/2+)	5093.4	47/2+		
753@		5967+x	(49/2)+	5213.8+x	(45/2)+		
759.2 5	12 3	6365.5+x	53/2−	5606.3+x	49/2−		DCO ratio= 0.9 2 (ΔJ=2 γ in gate).
760 1	<10.0	5107.2+x	(45/2−)	4347.2+x	(41/2−)		
765 1	<10	4347.2+x	(41/2−)	3582.2+x	37/2−		DCO ratio= 0.7 2 for doublet (ΔJ=2 γ in gate). The 765γ is coincident with itself.
765 1	<10	5872.2+x	(49/2−)	5107.2+x	(45/2−)		DCO ratio= 0.7 2 for doublet (ΔJ=2 γ in gate). The 765γ is coincident with itself.
767.5 5	19.5 16	6116.8	53/2−	5349.1	49/2−	Q	DCO ratio= 0.68 9.
770.2 5	26.8 24	6213.2	(53/2+)	5443.0	49/2+		
784.5 5	17.0 15	6490.3	55/2−	5705.5	51/2−	(Q)	DCO ratio= 0.7 1.
797.7 5	16.9 18	6631.4	(55/2+)	5833.7	(51/2+)		
804@		6771+x	(53/2)+	5967+x	(49/2)+		
817 1	<9.0	6689.2+x	(53/2−)	5872.2+x	(49/2−)		
817.5 5	11 3	7183.0+x	57/2−	6365.5+x	53/2−		
823.0 5	19 7	7036.2	(57/2+)	6213.2	(53/2+)		
834 1	<7.0	7523.2+x	(57/2−)	6689.2+x	(53/2−)		
835.4 5	16.8 16	6952.3	57/2−	6116.8	53/2−	(Q)	DCO ratio= 0.71 9.
839.5 5	10.2 13	7470.9	(59/2+)	6631.4	(55/2+)		
839.8 5	<9.0	7876.0	(61/2+)	7036.2	(57/2+)		
843.4 5	14.0 20	7333.6	59/2−	6490.3	55/2−	Q	DCO ratio= 0.61 9.
854@		7625+x	(57/2+)	6771+x	(53/2)+		
870.6 5	<7.0	8341.5	(63/2+)	7470.9	(59/2+)		
871 1	<6.0	8747.0	(65/2+)	7876.0	(61/2+)		
873.6 5	8.4 21	8056.6+x	61/2−	7183.0+x	57/2−		
899.3 5	<18.0	8232.9	63/2−	7333.6	59/2−		DCO ratio= 0.6 1 for (901.9γ+899.3γ) doublet.
901.9 5	<15	7854.2	(61/2−)	6952.3	57/2−		DCO ratio= 0.62 11 for (901.9γ+899.3γ) doublet.
904@&		8529+x?	(61/2)+	7625+x	(57/2+)		
911.5 5	<4.0	8382.4	(63/2+)	7470.9	(59/2+)		
924.5 5	<4.0	9266.0	(67/2+)	8341.5	(63/2+)		
926 1	<6.0	8982.6+x	65/2−	8056.6+x	61/2−		

Continued on next page (footnotes at end of table)

^{123}Sb(^{48}Ca,4nγ),^{152}Sm(^{19}F,4nγ) 1990Yu01,1998Ya04 (continued)

γ(^{167}Lu) (continued)

E_γ †	I_γ ‡	E_i(level)	J^π_i	E_f	J^π_f
955.0& *5*		9187.9?	(67/2$^-$)	8232.9	63/2$^-$
979.0& *5*	<4.0	10245.0?	(71/2$^+$)	9266.0	(67/2$^+$)
991.6 *5*	<4.0	9374.0	(67/2$^+$)	8382.4	(63/2$^+$)
1008& *1*		10195.9?	(71/2$^-$)	9187.9?	(67/2$^-$)

† From 1990Yu01, except as noted. ΔE_γ=0.1 keV for most transitions, 0.5 or 1 keV for weak or contaminated transitions (1990Yu01). The evaluator assigns as "weak" all transitions with Iγ<30; for these, ΔE_γ=0.5 keV is assumed except when Eγ is quoted to only the nearest keV (ΔE_γ=1 keV is assumed for the latter).

‡ From 1990Yu01.

Based on measured DCO ratio (1990Yu01). The latter was obtained at θ=37°, 79° using stretched D gating transition(s), unless noted to the contrary; typical values for stretched Q and stretched D transitions are 0.5 and 1.0, respectively.

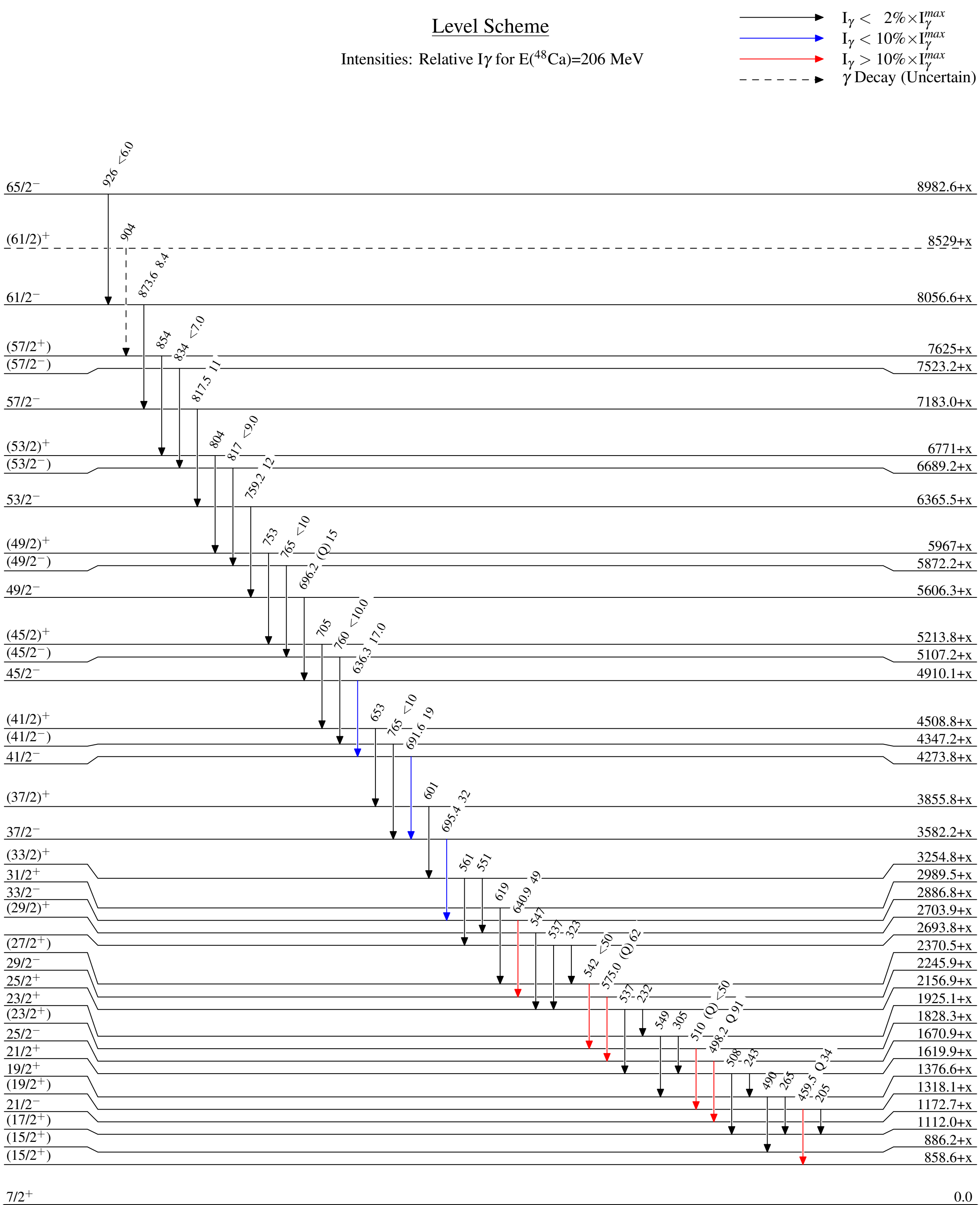
@ From 1998Ya04; uncertainty unstated by authors.

& Placement of transition in the level scheme is uncertain.

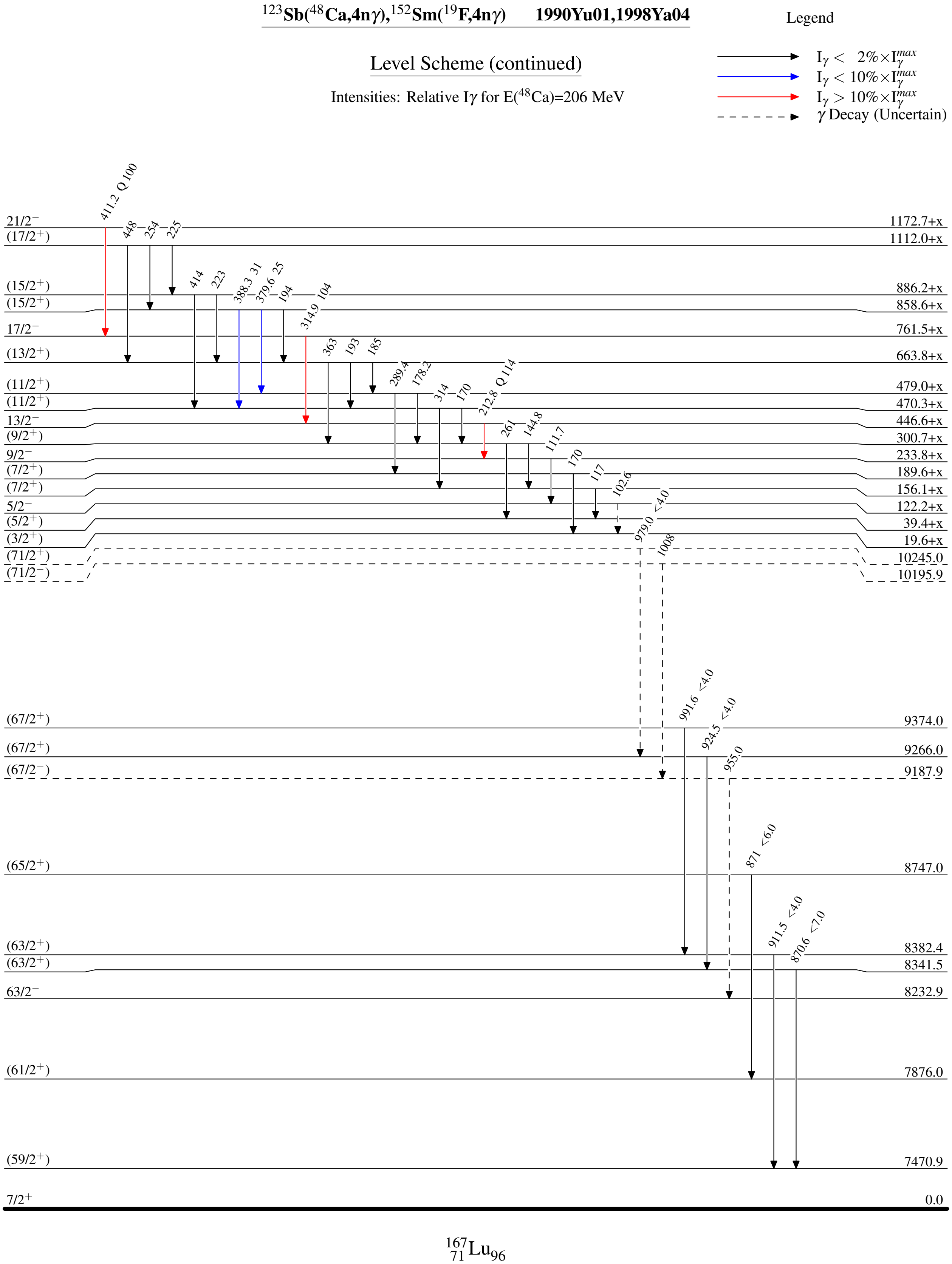
^{123}Sb(^{48}Ca,4nγ),^{152}Sm(^{19}F,4nγ) 1990Yu01,1998Ya04

Level Scheme

Intensities: Relative Iγ for E(^{48}Ca)=206 MeV



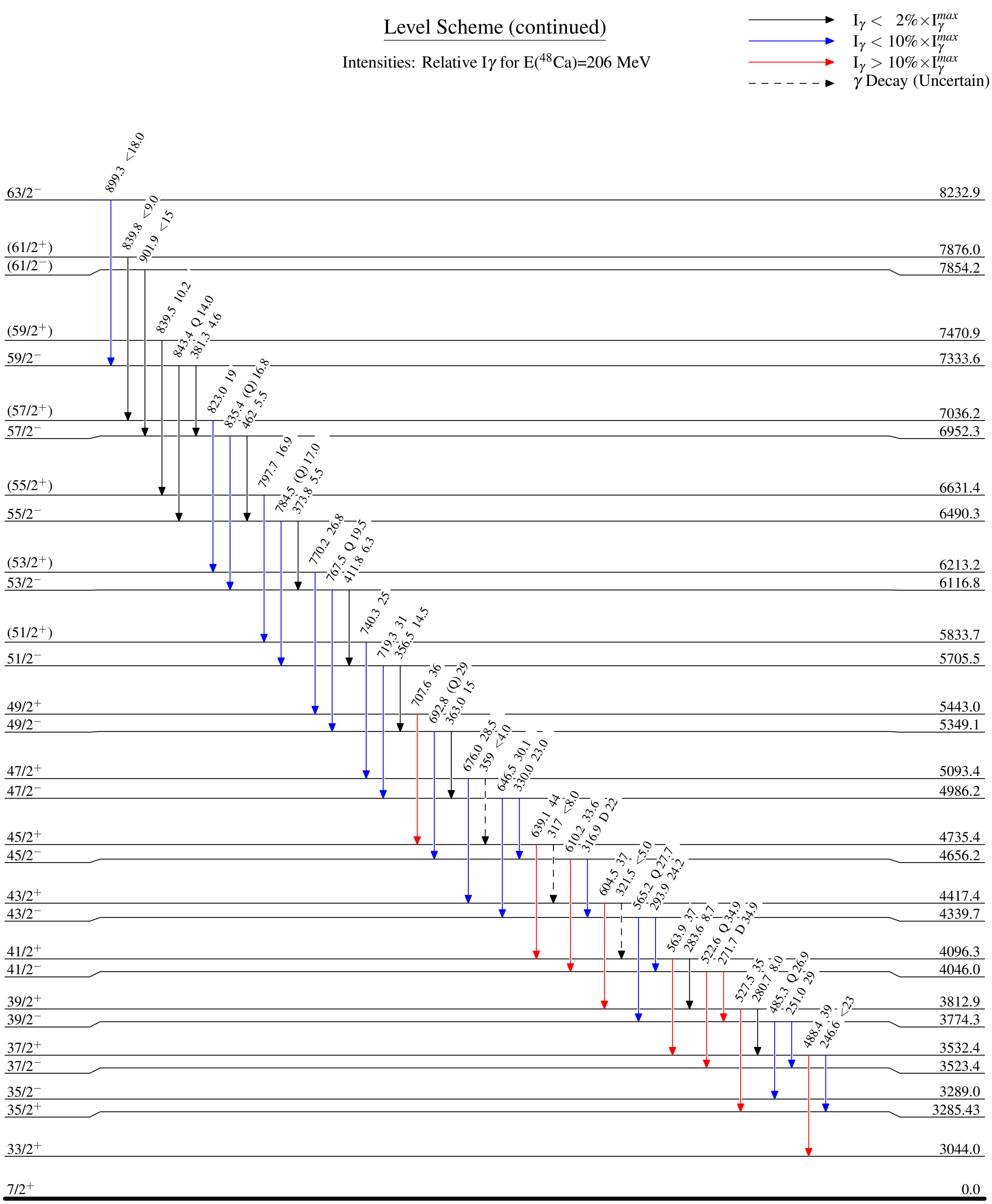
$^{167}_{71}Lu_{96}$


^{123}Sb(^{48}Ca,4nγ),^{152}Sm(^{19}F,4nγ) 1990Yu01,1998Ya04
Level Scheme (continued)
Intensities: Relative Iγ for E(^{48}Ca)=206 MeV
Legend
Iγ < 2%×Iγ max
Iγ < 10%×Iγ max
Iγ > 10%×Iγ max
γ Decay (Uncertain)
21/2− 1172.7+x
(17/2+) 1112.0+x
(15/2+) 886.2+x
(15/2+) 858.6+x
17/2− 761.5+x
(13/2+) 663.8+x
(11/2+) 479.0+x
(11/2+) 470.3+x
13/2− 446.6+x
(9/2+) 300.7+x
9/2− 233.8+x
(7/2+) 189.6+x
(7/2+) 156.1+x
5/2− 122.2+x
(5/2+) 39.4+x
(3/2+) 19.6+x
(71/2+) 10245.0
(71/2−) 10195.9
(67/2+) 9374.0
(67/2+) 9266.0
(67/2−) 9187.9
(65/2+) 8747.0
(63/2+) 8382.4
(63/2+) 8341.5
63/2− 8232.9
(61/2+) 7876.0
(59/2+) 7470.9
7/2+ 0.0
411.2 Q 100
448
254
225
414
223
388.3 31
379.6 25
194
314.9 104
363
193
185
289.4
178.2
314
170
212.8 Q 114
261
144.8
111.7
170
117
102.6
979.0 <4.0
1008
991.6 <4.0
924.5 <4.0
955.0
871 <6.0
911.5 <4.0
870.6 <7.0
$^{167}_{71}Lu_{96}$

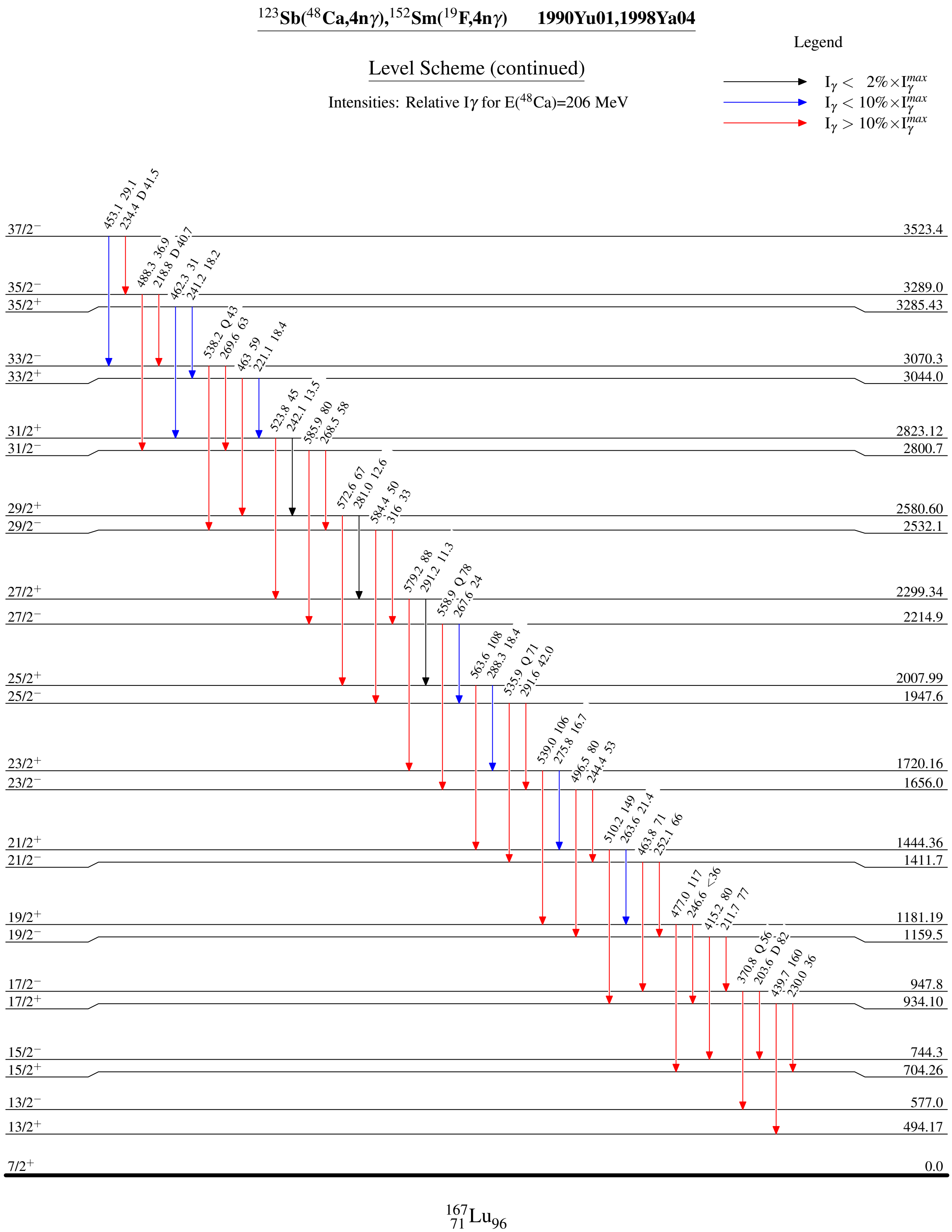
$^{123}Sb(^{48}Ca,4n\gamma),^{152}Sm(^{19}F,4n\gamma)$ 1990Yu01,1998Ya04

Level Scheme (continued)

Intensities: Relative Iγ for E(^{48}Ca)=206 MeV



$^{167}_{71}Lu_{96}$



^{123}Sb(^{48}Ca,4nγ),^{152}Sm(^{19}F,4nγ) 1990Yu01,1998Ya04
Level Scheme (continued)
Intensities: Relative Iγ for E(^{48}Ca)=206 MeV
Legend
$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$
37/2− 3523.4
35/2− 3289.0
35/2+ 3285.43
33/2− 3070.3
33/2+ 3044.0
31/2+ 2823.12
31/2− 2800.7
29/2+ 2580.60
29/2− 2532.1
27/2+ 2299.34
27/2− 2214.9
25/2+ 2007.99
25/2− 1947.6
23/2+ 1720.16
23/2− 1656.0
21/2+ 1444.36
21/2− 1411.7
19/2+ 1181.19
19/2− 1159.5
17/2− 947.8
17/2+ 934.10
15/2− 744.3
15/2+ 704.26
13/2− 577.0
13/2+ 494.17
7/2+ 0.0
453.1 29.1
234.4 D 41.5
488.3 36.9
218.8 D 40.7
462.3 31
241.2 18.2
538.2 Q 43
269.6 63
463 59
221.1 18.4
523.8 45
242.1 13.5
585.9 80
268.5 58
572.6 67
281.0 12.6
584.4 50
316 33
579.2 88
291.2 11.3
558.9 Q 78
267.6 24
563.6 108
288.3 18.4
535.9 Q 71
291.6 42.0
539.0 106
275.8 16.7
496.5 80
244.4 53
510.2 149
263.6 21.4
463.8 71
252.1 66
477.0 117
246.6 <36
415.2 80
211.7 77
370.8 Q 56
203.6 D 82
439.7 160
230.0 36
$^{167}_{71}Lu_{96}$

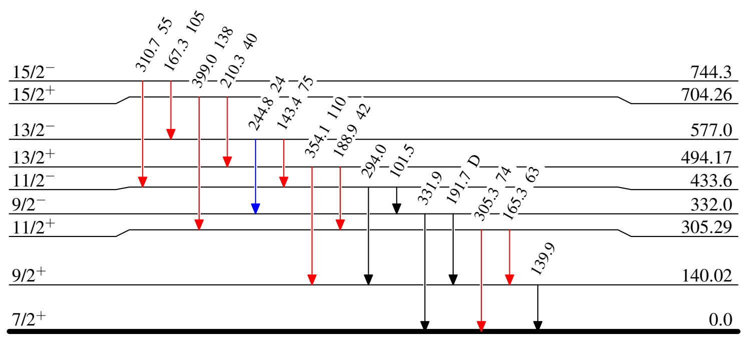
$^{123}Sb(^{48}Ca,4n\gamma),^{152}Sm(^{19}F,4n\gamma)$ 1990Yu01,1998Ya04

Level Scheme (continued)

Intensities: Relative Iγ for E(^{48}Ca)=206 MeV

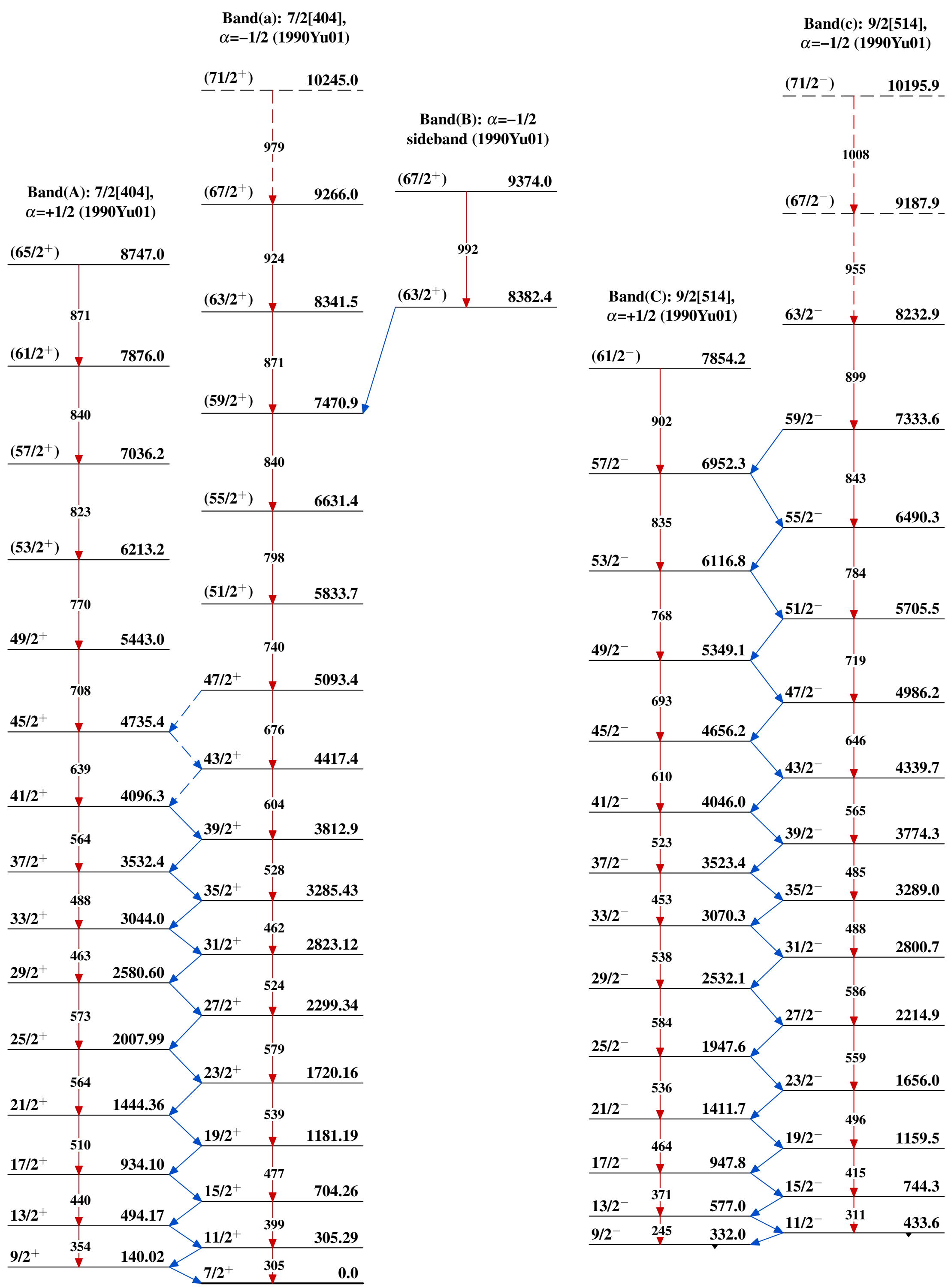
Legend

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



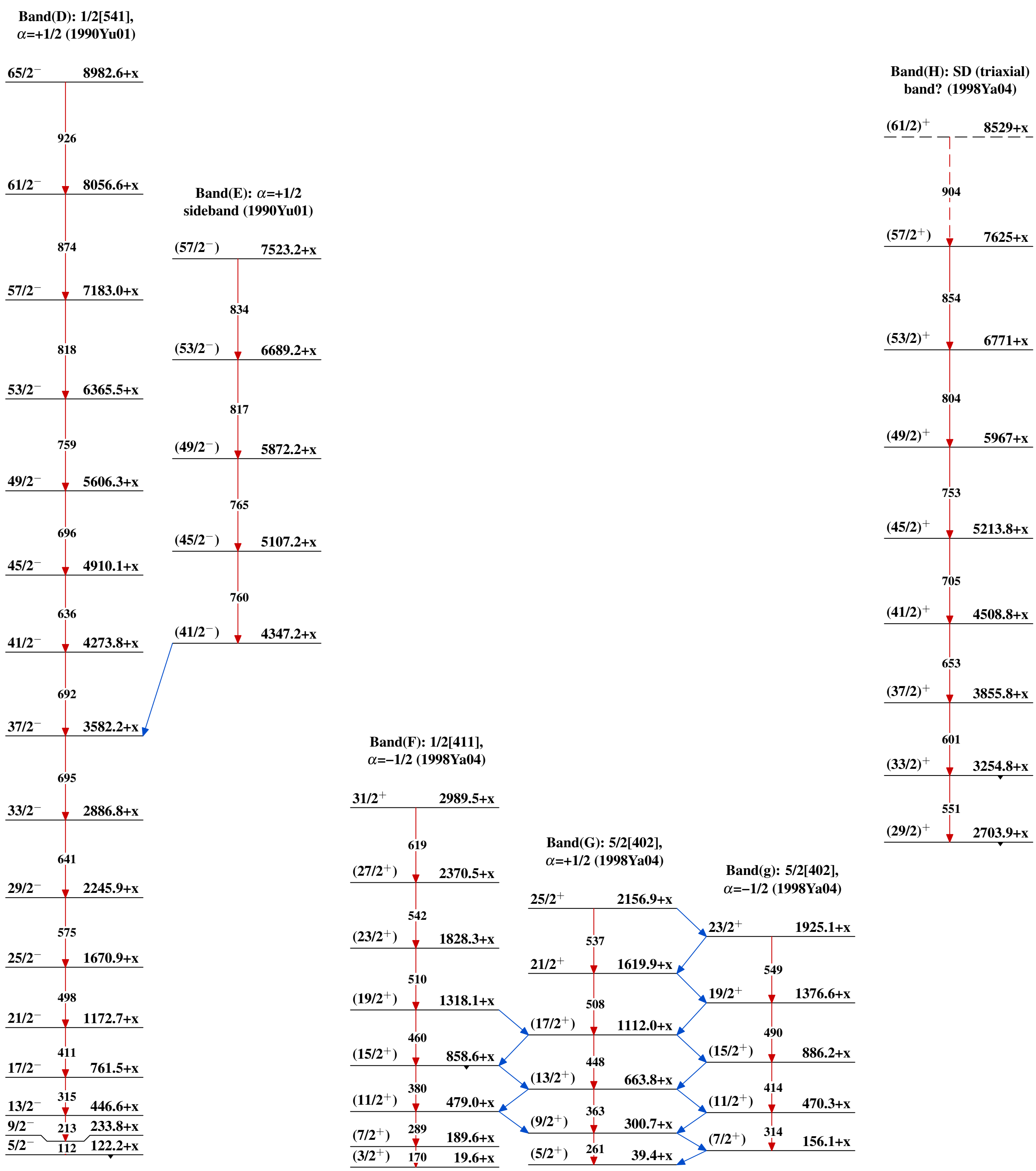
$^{167}_{71}Lu_{96}$

$^{123}Sb(^{48}Ca,4n\gamma),^{152}Sm(^{19}F,4n\gamma)$ 1990Yu01,1998Ya04



$^{167}_{71}Lu_{96}$

$^{123}Sb(^{48}Ca,4n\gamma),^{152}Sm(^{19}F,4n\gamma)$ 1990Yu01,1998Ya04 (continued)



$^{167}_{71}Lu_{96}$

^{123}Sb(^{48}Ca,4nγ):SD 2005Am02

Type	Author	History Citation	Literature Cutoff Date
Update	Balraj Singh		20-Sep-2006

Additional information 1.

2005Am02 (also 2003Am01): ^{123}Sb(^{48}Ca,4nγ) E=203 MeV. Measured Eγ, Iγ, $\gamma\gamma$ coin, $\gamma\gamma(\theta)$(DCO) using GAMMASPHERE array consisting of 100 Compton-suppressed Ge detectors. Three triaxial superdeformed structures were found, in addition to extending normal-deformed structures based on 1/2[411], 1/2[541] and 5/2[402] Nilsson orbitals.

Detailed results for normal-deformed bands and lifetime measurements for SD bands are yet to Be published by the same group As 2005Am02 (As per references 11 and 12 In 2005Am02).

2005Gu28 (same group As 2005Am02): E=203 MeV. Measured lifetimes using DSA method, deduced transition quadrupole moment for SD-1 band. Detector system: GAMMASPHERE array with 101 Compton-suppressed HPGe detectors.

^{167}Lu Levels

E(level)[†]	J$^\pi$	Comments
0+x[#]	(1/2$^+$)	Additional information 2. E(level),J$^\pi$: from Adopted Levels.
19.6+x[‡] *5*	(3/2$^+$)	E(level): from Adopted Levels. Additional information 3.
38.6+x[&] *11*	(5/2$^+$)	E(level): from Adopted Levels. Additional information 4.
122.6+x[@] *10*	(5/2$^-$)	
149.7+x[#] *8*	(5/2$^+$)	
155.6+x[a] *7*	(7/2$^+$)	
189.7+x[‡] *8*	(7/2$^+$)	
234.6+x[@] *11*	(9/2$^-$)	
300.4+x[&] *7*	(9/2$^+$)	
403.7+x[#] *8*	(9/2$^+$)	
447.6+x[@] *11*	(13/2$^-$)	
469.9+x[a] *8*	(11/2$^+$)	
478.9+x[‡] *8*	(11/2$^+$)	
664.8+x[&] *8*	(13/2$^+$)	
754.8+x[#] *9*	(13/2$^+$)	
761.6+x[@] *12*	(17/2$^-$)	
858.3+x[‡] *9*	(15/2$^+$)	
887.1+x[a] *9*	(15/2$^+$)	
1112.5+x[&] *9*	(17/2$^+$)	
1172.6+x[@] *12*	(21/2$^-$)	
1187.9+x[#] *9*	(17/2$^+$)	
1318.0+x[‡] *10*	(19/2$^+$)	
1377.6+x[a] *10*	(19/2$^+$)	
1621.4+x[&] *11*	(21/2$^+$)	
1670.6+x[@] *13*	(25/2$^-$)	
1687.8+x[#] *10*	(21/2$^+$)	
1828.1+x[‡] *13*	(23/2$^+$)	
1926.0+x[a] *11*	(23/2$^+$)	
2158.3+x[&] *11*	(25/2$^+$)	
2231.8+x[#] *11*	(25/2$^+$)	
2245.6+x[@] *13*	(29/2$^-$)	

Continued on next page (footnotes at end of table)

^{123}Sb(^{48}Ca,4nγ):SD 2005Am02 (continued)

^{167}Lu Levels (continued)

E(level)[†]	J$^{\pi}$	E(level)[†]	J$^{\pi}$	E(level)[†]	J$^{\pi}$
2249.6+x[b] *13*	(25/2$^+$)	5048.0+x[b] *18*	(45/2$^+$)	9081.0+x[b] *23*	(65/2$^+$)
2369.3+x[‡] *13*	(27/2$^+$)	5097.6+x[c] *17*	(43/2$^+$)	9541+x[d] *3*	(67/2$^-$)
2477.9+x[a] *12*	(27/2$^+$)	5455.6+x[d] *25*	(47/2$^-$)	9841+x[c] *3*	(67/2$^+$)
2631.6+x[d] *16*	(27/2$^-$)	5557.3+x[&] *20*	(49/2$^+$)	9941.8+x[&] *24*	(69/2$^+$)
2664.6+x *16*	(27/2$^-$)	5605.6+x[@] *19*	(49/2$^-$)	9963.6+x[@] *25*	(69/2$^-$)
2666.0+x[&] *12*	(29/2$^+$)	5749.8+x[b] *19*	(49/2$^+$)	10040.0+x[b] *25*	(69/2$^+$)
2720.4+x[b] *11*	(29/2$^+$)	5755.7+x[c] *18*	(47/2$^+$)	10521+x[d] *4*	(71/2$^-$)
2886.6+x[@] *15*	(33/2$^-$)	6171.6+x[d] *27*	(51/2$^-$)	10817+x[c] *3*	(71/2$^+$)
2910.3+x[‡] *17*	(31/2$^+$)	6359.5+x[&] *21*	(53/2$^+$)	10930+x[&] *3*	(73/2$^+$)
2930.1+x[a] *13*	(31/2$^+$)	6365.6+x[@] *21*	(53/2$^-$)	10997+x[@] *3*	(73/2$^-$)
3088.6+x[d] *15*	(31/2$^-$)	6466.7+x[c] *19*	(51/2$^+$)	11056+x[b] *3*	(73/2$^+$)
3104.9+x[&] *14*	(33/2$^+$)	6501.5+x[b] *19*	(53/2$^+$)	11558+x[d] *4*	(75/2$^-$)
3225.6+x[b] *13*	(33/2$^+$)	6934.6+x[d] *29*	(55/2$^-$)	11849+x[c] *3*	(75/2$^+$)
3408.6+x[a] *15*	(35/2$^+$)	7183.6+x[@] *21*	(57/2$^-$)	11984+x[&] *3*	(77/2$^+$)
3582.6+x[@] *15*	(37/2$^-$)	7213.7+x[&] *21*	(57/2$^+$)	12132+x[b] *3*	(77/2$^+$)
3593.6+x[d] *18*	(35/2$^-$)	7231.8+x[c] *20*	(55/2$^+$)	12657+x[d] *4*	(79/2$^-$)
3599.8+x[&] *15*	(37/2$^+$)	7300.4+x[b] *20*	(57/2$^+$)	12933+x[c] *4*	(79/2$^+$)
3786.5+x[b] *16*	(37/2$^+$)	7745+x[d] *3*	(59/2$^-$)	13104+x[&] *3*	(81/2$^+$)
3945.6+x[c] *16*	(35/2$^+$)	8047.8+x[c] *22*	(59/2$^+$)	13267+x[b] *3*	(81/2$^+$)
4161.6+x[d] *21*	(39/2$^-$)	8056.6+x[@] *22*	(61/2$^-$)	13821+x[d] *4*	(83/2$^-$)
4177.0+x[&] *18*	(41/2$^+$)	8115.6+x[&] *21*	(61/2$^+$)	14082+x[c] *4*	(83/2$^+$)
4273.6+x[@] *17*	(41/2$^-$)	8155.0+x[b] *21*	(61/2$^+$)	14287+x[&] *3*	(85/2$^+$)
4393.3+x[b] *17*	(41/2$^+$)	8199.9+x? *22*	(61/2$^+$)	14459+x[b] *4*	(85/2$^+$)
4492.6+x[c] *16*	(39/2$^+$)	8616+x[d] *3*	(63/2$^-$)	15282+x[c] *4*	(87/2$^+$)
4784.6+x[d] *23*	(43/2$^-$)	8917.8+x[c] *24*	(63/2$^+$)	15530+x[&] *4*	(89/2$^+$)
4832.2+x[&] *19*	(45/2$^+$)	8983.6+x[@] *22*	(65/2$^-$)	15706+x[b] *4*	(89/2$^+$)
4909.6+x[@] *18*	(45/2$^-$)	9009.8+x[&] *22*	(65/2$^+$)	16821+x[&] *4*	(93/2$^+$)

[†] From least-squares fit to Eγ's, assuming ΔE_{γ}=1 keV for each γ ray.
[‡] Band(A): 1/2[411], α=−1/2.
[#] Band(a): 1/2[411], α=+1/2.
[@] Band(B): 1/2[541], α=+1/2.
[&] Band(C): 5/2[402], α=+1/2.
[a] Band(c): 5/2[402], α=−1/2.
[b] Band(D): Triaxial SD-1 band (2003Am01,2005Am02,2005Gu28). Q(transition)=6.9 *3* (2005Gu28, preliminary value). The uncertainty does not include systematic error of ≈10-15% due to stopping power. Population≈8% relative to yrast band. Only a few of the γ rays assigned to a triaxial SD band by 1998Ya04 have been confirmed by 2003Am01. The connecting transitions to the normal bands are also different in 2003Am01.
[c] Band(E): Wobbling-mode, Triaxial SD-2 band (2003Am01,2005Am02). Population≈2% relative to yrast band.
[d] Band(F): Triaxial SD-3 band (2005Am02). Population≈4% relative to yrast band. Multi-quasiparticle excitation.

^{123}Sb(^{48}Ca,4nγ):SD 2005Am02 (continued)

γ(^{167}Lu)

E_i(level)	J_i^π	E_γ	E_f	J_f^π
122.6+x	(5/2⁻)	103[‡]	19.6+x	(3/2⁺)
149.7+x	(5/2⁺)	130	19.6+x	(3/2⁺)
155.6+x	(7/2⁺)	117	38.6+x	(5/2⁺)
189.7+x	(7/2⁺)	170	19.6+x	(3/2⁺)
234.6+x	(9/2⁻)	112	122.6+x	(5/2⁻)
300.4+x	(9/2⁺)	145	155.6+x	(7/2⁺)
		262	38.6+x	(5/2⁺)
403.7+x	(9/2⁺)	214	189.7+x	(7/2⁺)
		248	155.6+x	(7/2⁺)
		254	149.7+x	(5/2⁺)
447.6+x	(13/2⁻)	213	234.6+x	(9/2⁻)
469.9+x	(11/2⁺)	170	300.4+x	(9/2⁺)
		314	155.6+x	(7/2⁺)
478.9+x	(11/2⁺)	178	300.4+x	(9/2⁺)
		289	189.7+x	(7/2⁺)
664.8+x	(13/2⁺)	185	478.9+x	(11/2⁺)
		196	469.9+x	(11/2⁺)
		365	300.4+x	(9/2⁺)
754.8+x	(13/2⁺)	276	478.9+x	(11/2⁺)
		285	469.9+x	(11/2⁺)
		351	403.7+x	(9/2⁺)
761.6+x	(17/2⁻)	314	447.6+x	(13/2⁻)
858.3+x	(15/2⁺)	194	664.8+x	(13/2⁺)
		380	478.9+x	(11/2⁺)
		388	469.9+x	(11/2⁺)
887.1+x	(15/2⁺)	222	664.8+x	(13/2⁺)
		408	478.9+x	(11/2⁺)
		417	469.9+x	(11/2⁺)
1112.5+x	(17/2⁺)	225	887.1+x	(15/2⁺)
		254	858.3+x	(15/2⁺)
		448	664.8+x	(13/2⁺)
1172.6+x	(21/2⁻)	411	761.6+x	(17/2⁻)
1187.9+x	(17/2⁺)	301	887.1+x	(15/2⁺)
		330	858.3+x	(15/2⁺)
		433	754.8+x	(13/2⁺)
1318.0+x	(19/2⁺)	205	1112.5+x	(17/2⁺)
		460	858.3+x	(15/2⁺)
1377.6+x	(19/2⁺)	190	1187.9+x	(17/2⁺)
		265	1112.5+x	(17/2⁺)
		490	887.1+x	(15/2⁺)
1621.4+x	(21/2⁺)	243.6	1377.6+x	(19/2⁺)
		509	1112.5+x	(17/2⁺)
1670.6+x	(25/2⁻)	498	1172.6+x	(21/2⁻)
1687.8+x	(21/2⁺)	310	1377.6+x	(19/2⁺)
		370	1318.0+x	(19/2⁺)
		500	1187.9+x	(17/2⁺)
1828.1+x	(23/2⁺)	510	1318.0+x	(19/2⁺)
1926.0+x	(23/2⁺)	238	1687.8+x	(21/2⁺)
		305	1621.4+x	(21/2⁺)
		548	1377.6+x	(19/2⁺)
2158.3+x	(25/2⁺)	232	1926.0+x	(23/2⁺)
		537	1621.4+x	(21/2⁺)
2231.8+x	(25/2⁺)	306	1926.0+x	(23/2⁺)
		544	1687.8+x	(21/2⁺)
2245.6+x	(29/2⁻)	575	1670.6+x	(25/2⁻)

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^{123}Sb(^{48}Ca,4nγ):SD 2005Am02 (continued)

γ(^{167}Lu) (continued)

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.	δ	Comments
2249.6+x	(25/2$^+$)	562		1687.8+x	(21/2$^+$)			
2369.3+x	(27/2$^+$)	541		1828.1+x	(23/2$^+$)			
2477.9+x	(27/2$^+$)	246		2231.8+x	(25/2$^+$)			
		319‡		2158.3+x	(25/2$^+$)			
		552		1926.0+x	(23/2$^+$)			
2631.6+x	(27/2$^-$)	961.0		1670.6+x	(25/2$^-$)	(M1+E2)		I_γ: %branching≈60 *5*. Mult.,δ: ΔJ=1 transition; δ=−1.9 *+11−200* or −0.5 *+5−8*.
2664.6+x	(27/2$^-$)	994		1670.6+x	(25/2$^-$)			
2666.0+x	(29/2$^+$)	188		2477.9+x	(27/2$^+$)			
		508		2158.3+x	(25/2$^+$)			
2720.4+x	(29/2$^+$)	242		2477.9+x	(27/2$^+$)			
		351		2369.3+x	(27/2$^+$)			
		471		2249.6+x	(25/2$^+$)			
		489		2231.8+x	(25/2$^+$)			
		562		2158.3+x	(25/2$^+$)			
2886.6+x	(33/2$^-$)	641		2245.6+x	(29/2$^-$)			
2910.3+x	(31/2$^+$)	541		2369.3+x	(27/2$^+$)			
2930.1+x	(31/2$^+$)	264		2666.0+x	(29/2$^+$)			
		452		2477.9+x	(27/2$^+$)			
3088.6+x	(31/2$^-$)	424		2664.6+x	(27/2$^-$)			
		457		2631.6+x	(27/2$^-$)			
		843.1		2245.6+x	(29/2$^-$)			I_γ: %branching=27 *5*. Mult.,δ: expected to Be the same As for 961.0γ from 2631.6+x, (27/2$^-$) level.
3104.9+x	(33/2$^+$)	175		2930.1+x	(31/2$^+$)			
		439		2666.0+x	(29/2$^+$)			
3225.6+x	(33/2$^+$)	505		2720.4+x	(29/2$^+$)			
		560		2666.0+x	(29/2$^+$)			
3408.6+x	(35/2$^+$)	304		3104.9+x	(33/2$^+$)			
		478		2930.1+x	(31/2$^+$)			
3582.6+x	(37/2$^-$)	696		2886.6+x	(33/2$^-$)			
3593.6+x	(35/2$^-$)	505		3088.6+x	(31/2$^-$)			
3599.8+x	(37/2$^+$)	191		3408.6+x	(35/2$^+$)			
		495		3104.9+x	(33/2$^+$)			
3786.5+x	(37/2$^+$)	561		3225.6+x	(33/2$^+$)			
3945.6+x	(35/2$^+$)	720		3225.6+x	(33/2$^+$)			
4161.6+x	(39/2$^-$)	568		3593.6+x	(35/2$^-$)			
4177.0+x	(41/2$^+$)	577		3599.8+x	(37/2$^+$)			
4273.6+x	(41/2$^-$)	691		3582.6+x	(37/2$^-$)			
4393.3+x	(41/2$^+$)	607		3786.5+x	(37/2$^+$)			
4492.6+x	(39/2$^+$)	547	100	3945.6+x	(35/2$^+$)			
		706.1	91 *4*	3786.5+x	(37/2$^+$)	(E2+M1)	−3.1† *+11−34*	
4784.6+x	(43/2$^-$)	623		4161.6+x	(39/2$^-$)			
4832.2+x	(45/2$^+$)	655		4177.0+x	(41/2$^+$)			
4909.6+x	(45/2$^-$)	636		4273.6+x	(41/2$^-$)			
5048.0+x	(45/2$^+$)	655		4393.3+x	(41/2$^+$)			
5097.6+x	(43/2$^+$)	605	100	4492.6+x	(39/2$^+$)			
		704.2	41 *6*	4393.3+x	(41/2$^+$)			
5455.6+x	(47/2$^-$)	671		4784.6+x	(43/2$^-$)			
5557.3+x	(49/2$^+$)	725		4832.2+x	(45/2$^+$)			
5605.6+x	(49/2$^-$)	696		4909.6+x	(45/2$^-$)			
5749.8+x	(49/2$^+$)	702		5048.0+x	(45/2$^+$)			
5755.7+x	(47/2$^+$)	658	100	5097.6+x	(43/2$^+$)			
		707.7	39 *4*	5048.0+x	(45/2$^+$)	(E2+M1)	−5.1† *+16−25*	

Continued on next page (footnotes at end of table)

^{123}Sb(^{48}Ca,4nγ):SD 2005Am02 (continued)

γ(^{167}Lu) (continued)

E_i(level)	J^π_i	E_γ	I_γ	E_f	J^π_f	Mult.	δ
6171.6+x	(51/2$^-$)	716		5455.6+x	(47/2$^-$)		
6359.5+x	(53/2$^+$)	802		5557.3+x	(49/2$^+$)		
6365.6+x	(53/2$^-$)	760		5605.6+x	(49/2$^-$)		
6466.7+x	(51/2$^+$)	711	100	5755.7+x	(47/2$^+$)		
		716.9	30 *8*	5749.8+x	(49/2$^+$)	(E2+M1)	−3.9[†] *+27−84*
6501.5+x	(53/2$^+$)	752		5749.8+x	(49/2$^+$)		
6934.6+x	(55/2$^-$)	763		6171.6+x	(51/2$^-$)		
7183.6+x	(57/2$^-$)	818		6365.6+x	(53/2$^-$)		
7213.7+x	(57/2$^+$)	854		6359.5+x	(53/2$^+$)		
7231.8+x	(55/2$^+$)	730.3	32 *7*	6501.5+x	(53/2$^+$)		
		765	100	6466.7+x	(51/2$^+$)		
7300.4+x	(57/2$^+$)	799		6501.5+x	(53/2$^+$)		
7745+x	(59/2$^-$)	810		6934.6+x	(55/2$^-$)		
8047.8+x	(59/2$^+$)	816		7231.8+x	(55/2$^+$)		
8056.6+x	(61/2$^-$)	873		7183.6+x	(57/2$^-$)		
8115.6+x	(61/2$^+$)	815		7300.4+x	(57/2$^+$)		
		902		7213.7+x	(57/2$^+$)		
8155.0+x	(61/2$^+$)	855		7300.4+x	(57/2$^+$)		
		941		7213.7+x	(57/2$^+$)		
8616+x	(63/2$^-$)	871		7745+x	(59/2$^-$)		
8917.8+x	(63/2$^+$)	870		8047.8+x	(59/2$^+$)		
8983.6+x	(65/2$^-$)	927		8056.6+x	(61/2$^-$)		
9009.8+x	(65/2$^+$)	810[‡]		8199.9+x?	(61/2$^+$)		
		855		8155.0+x	(61/2$^+$)		
		894		8115.6+x	(61/2$^+$)		
9081.0+x	(65/2$^+$)	881[‡]		8199.9+x?	(61/2$^+$)		
		926		8155.0+x	(61/2$^+$)		
9541+x	(67/2$^-$)	925		8616+x	(63/2$^-$)		
9841+x	(67/2$^+$)	923		8917.8+x	(63/2$^+$)		
9941.8+x	(69/2$^+$)	932		9009.8+x	(65/2$^+$)		
9963.6+x	(69/2$^-$)	980		8983.6+x	(65/2$^-$)		
10040.0+x	(69/2$^+$)	959		9081.0+x	(65/2$^+$)		
10521+x	(71/2$^-$)	980		9541+x	(67/2$^-$)		
10817+x	(71/2$^+$)	976		9841+x	(67/2$^+$)		
10930+x	(73/2$^+$)	988		9941.8+x	(69/2$^+$)		
10997+x	(73/2$^-$)	1033		9963.6+x	(69/2$^-$)		
11056+x	(73/2$^+$)	1016		10040.0+x	(69/2$^+$)		
11558+x	(75/2$^-$)	1037		10521+x	(71/2$^-$)		
11849+x	(75/2$^+$)	1032		10817+x	(71/2$^+$)		
11984+x	(77/2$^+$)	1054		10930+x	(73/2$^+$)		
12132+x	(77/2$^+$)	1076		11056+x	(73/2$^+$)		
12657+x	(79/2$^-$)	1099		11558+x	(75/2$^-$)		
12933+x	(79/2$^+$)	1084		11849+x	(75/2$^+$)		
13104+x	(81/2$^+$)	1120		11984+x	(77/2$^+$)		
13267+x	(81/2$^+$)	1135		12132+x	(77/2$^+$)		
13821+x	(83/2$^-$)	1164		12657+x	(79/2$^-$)		
14082+x	(83/2$^+$)	1149		12933+x	(79/2$^+$)		
14287+x	(85/2$^+$)	1183		13104+x	(81/2$^+$)		
14459+x	(85/2$^+$)	1192		13267+x	(81/2$^+$)		
15282+x	(87/2$^+$)	1200		14082+x	(83/2$^+$)		
15530+x	(89/2$^+$)	1243		14287+x	(85/2$^+$)		
15706+x	(89/2$^+$)	1247		14459+x	(85/2$^+$)		
16821+x	(93/2$^+$)	1291		15530+x	(89/2$^+$)		

Continued on next page (footnotes at end of table)

^{123}Sb(^{48}Ca,4nγ):SD 2005Am02 (continued)

γ(^{167}Lu) (continued)

† Lower values of −0.26 *16* for 706.1γ, −0.07 *7* for 707.7γ, and −0.35 *65* for 716.9γ are possible but not likely In comparison to similar transitions (of known mixing ratios) In ^{163}Lu SD bands.

‡ Placement of transition in the level scheme is uncertain.

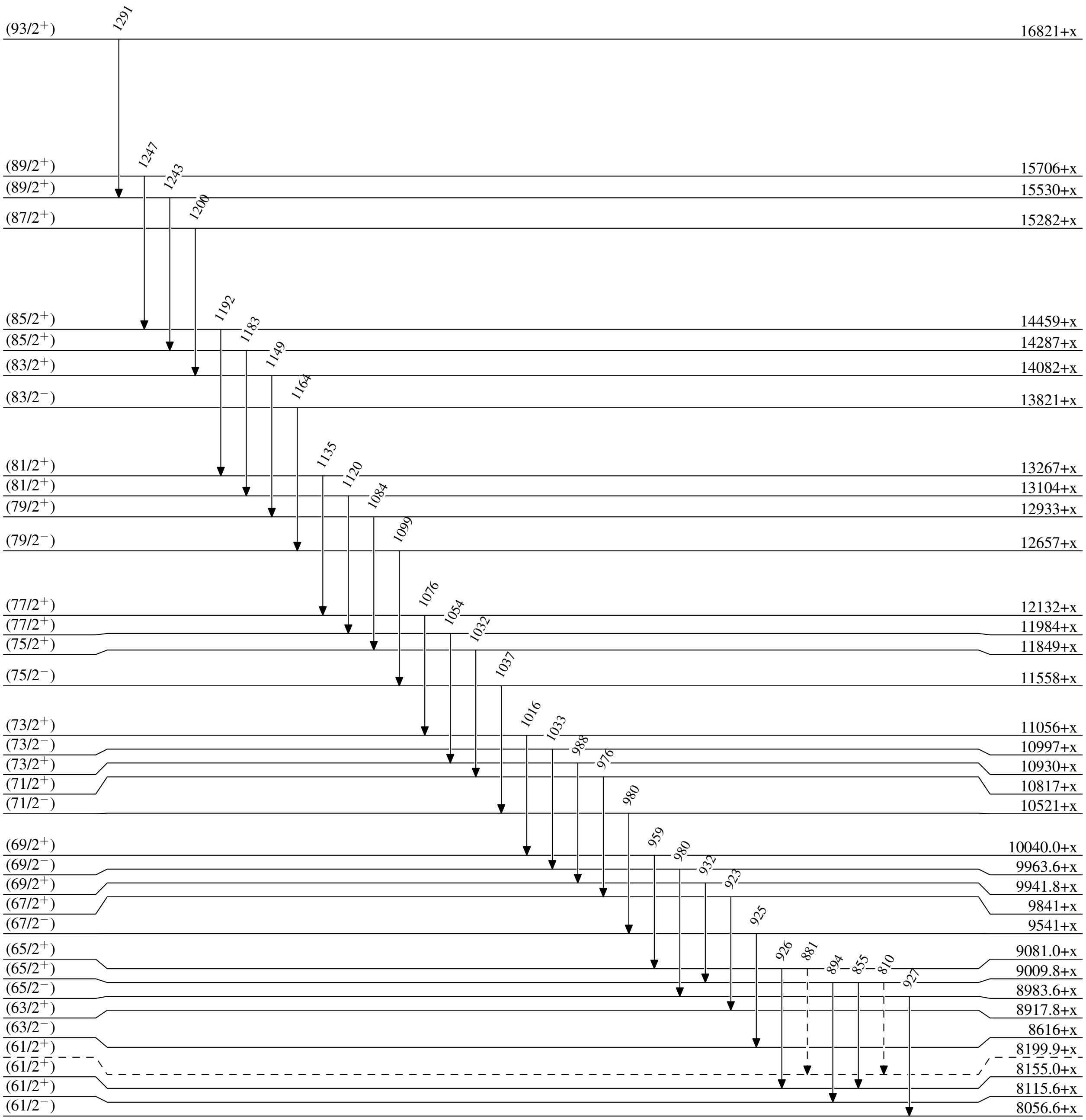
$^{123}Sb(^{48}Ca,4n\gamma)$:SD 2005Am02

Legend

Level Scheme

Intensities: Relative photon branching from each level

γ Decay (Uncertain)

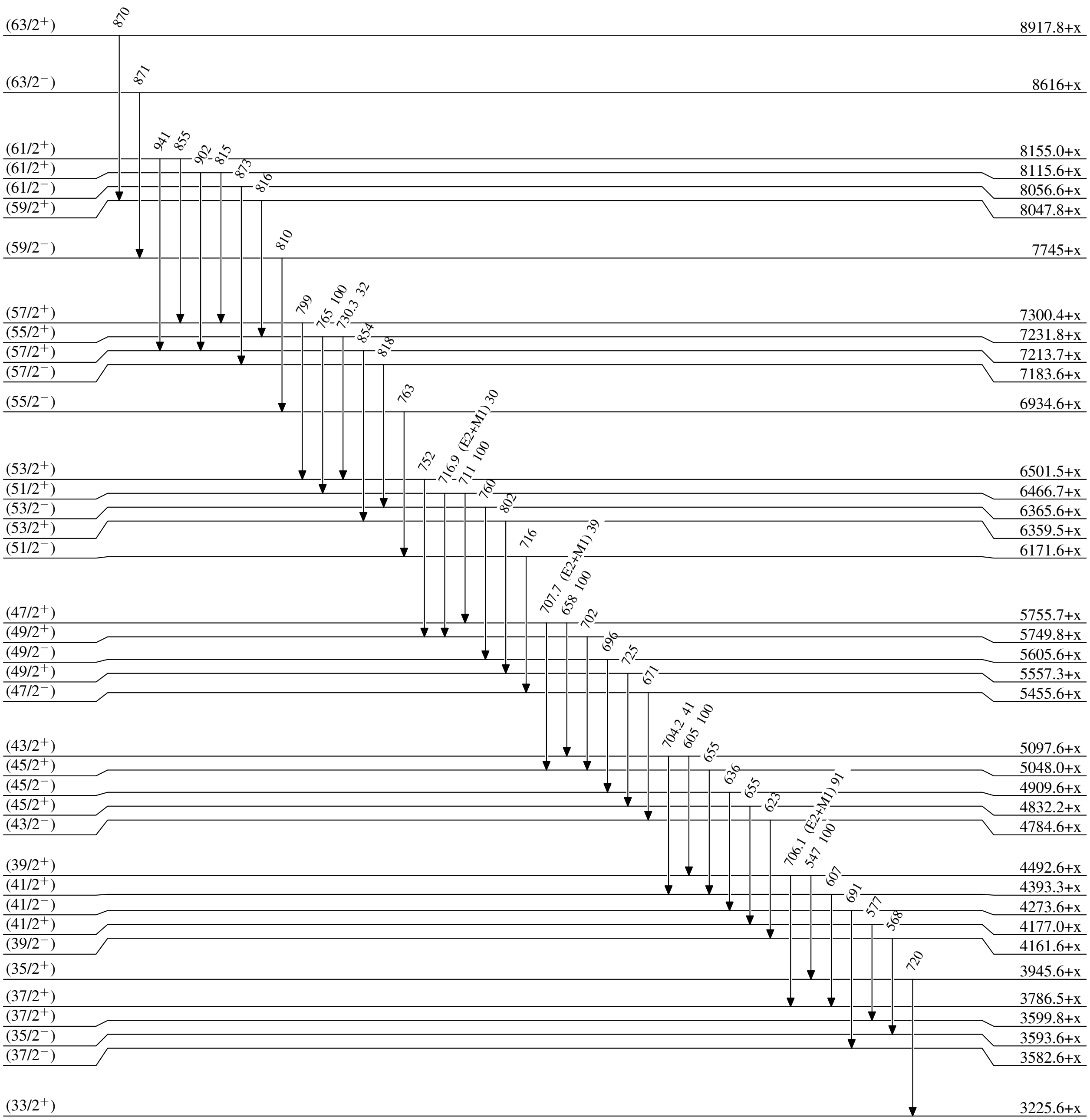


$^{167}_{71}Lu_{96}$

^{123}Sb(^{48}Ca,4nγ):SD 2005Am02

Level Scheme (continued)

Intensities: Relative photon branching from each level

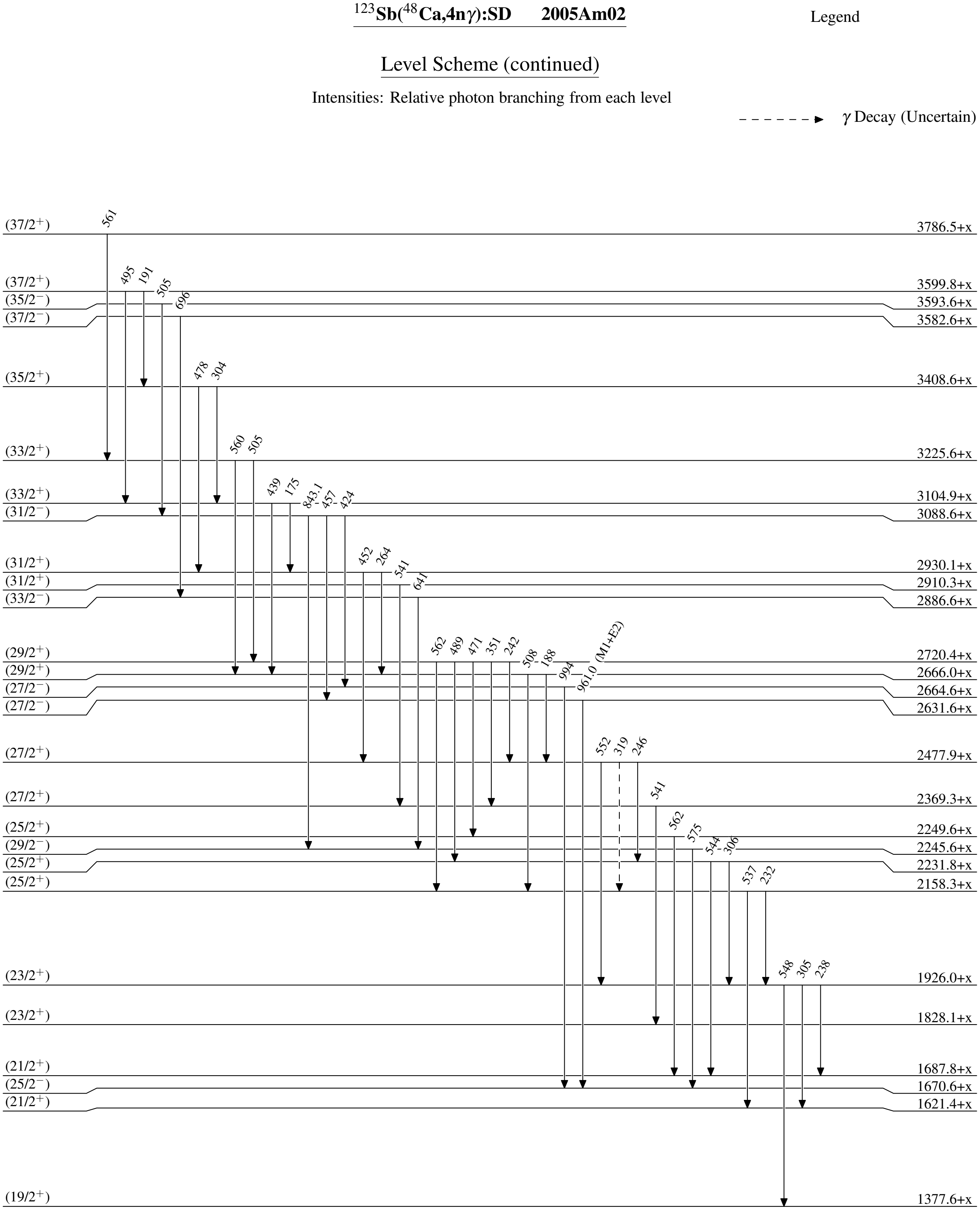


$^{167}_{71}Lu_{96}$

$^{123}Sb(^{48}Ca,4n\gamma)$:SD 2005Am02

Level Scheme (continued)

Intensities: Relative photon branching from each level

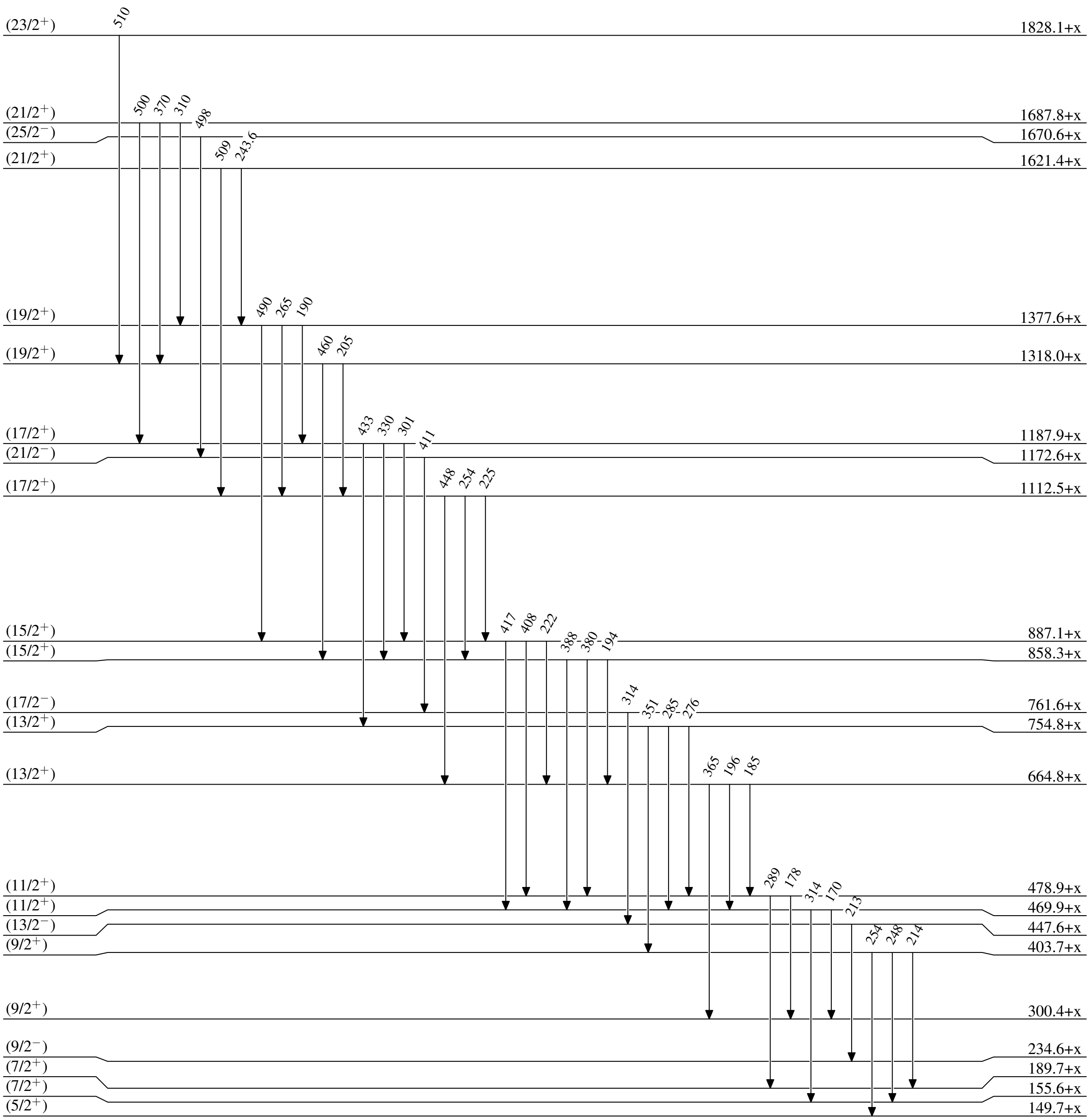


$^{167}_{71}Lu_{96}$

$^{123}Sb(^{48}Ca,4n\gamma)$:SD 2005Am02

Level Scheme (continued)

Intensities: Relative photon branching from each level



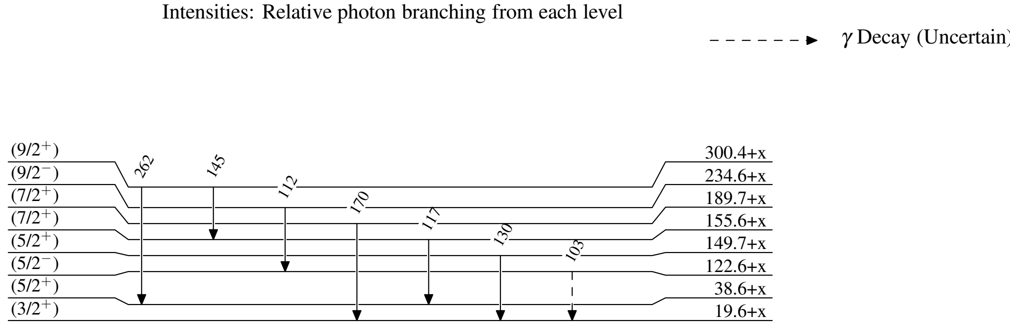
$^{167}_{71}Lu_{96}$

^{123}Sb(^{48}Ca,4nγ):SD 2005Am02

Level Scheme (continued)

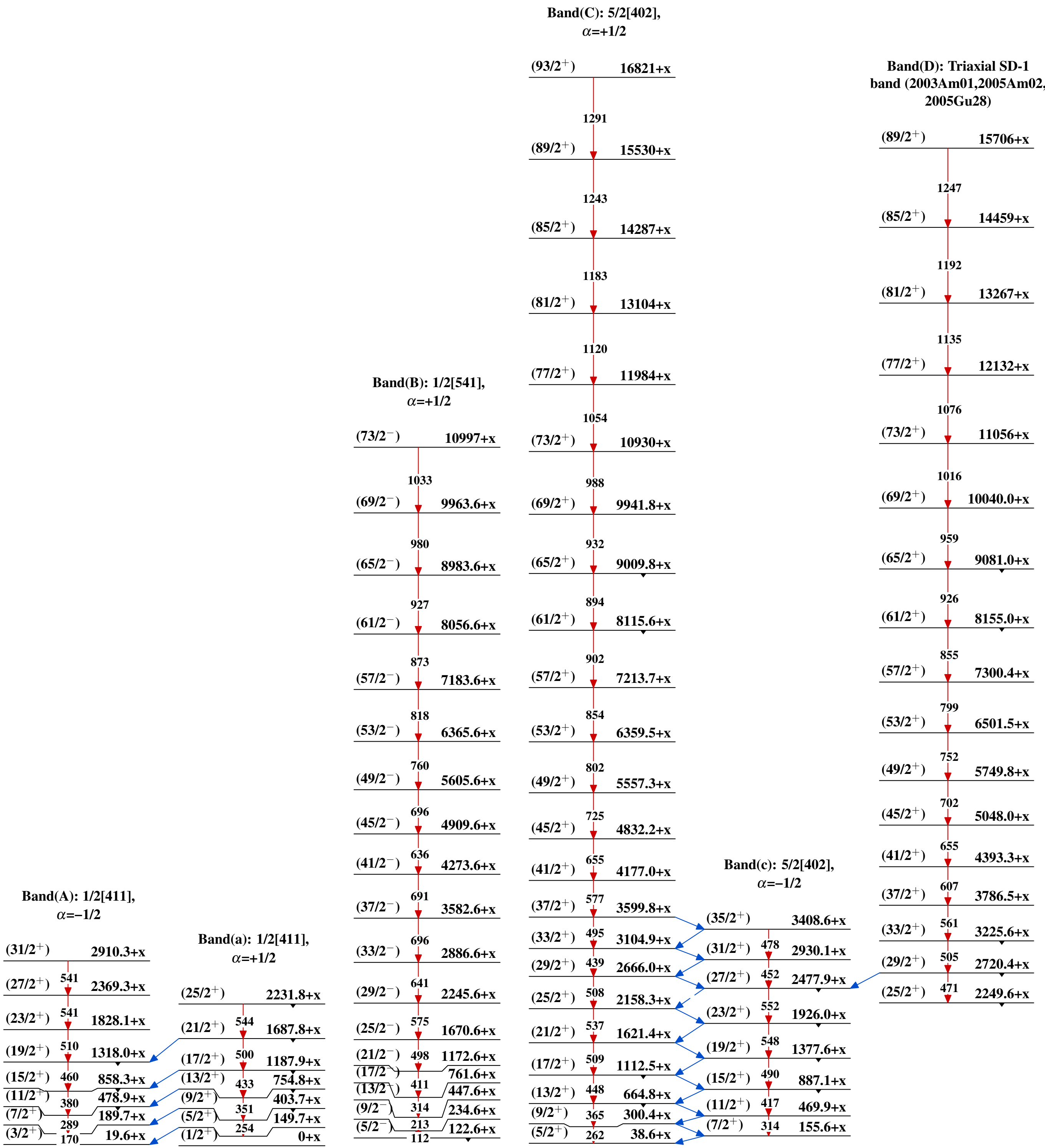
Intensities: Relative photon branching from each level

Legend



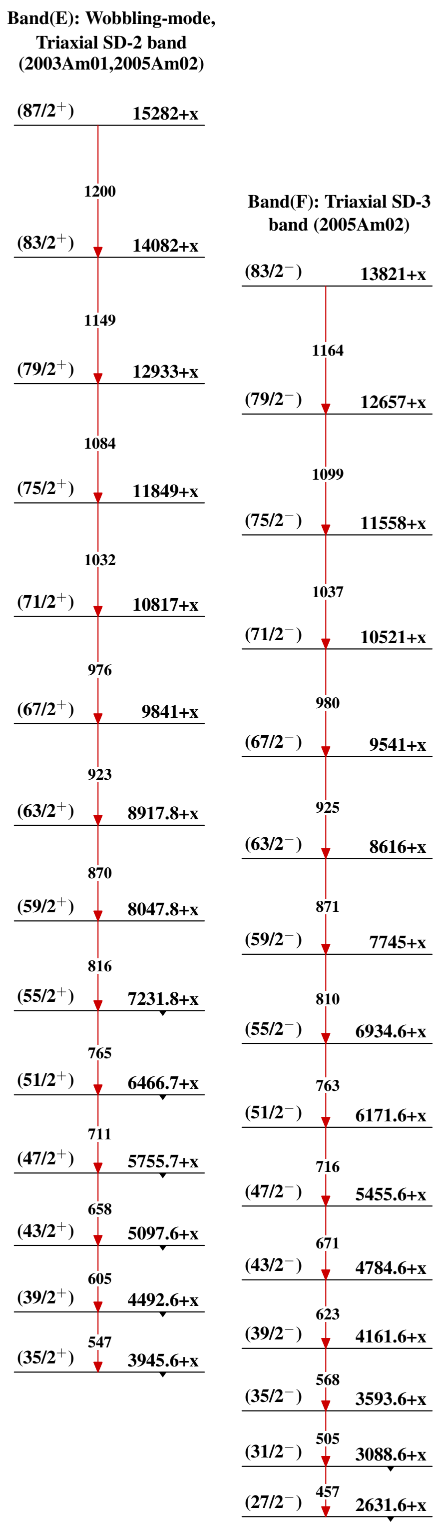
$^{167}_{71}Lu_{96}$

$^{123}Sb(^{48}Ca,4n\gamma)$:SD 2005Am02



$^{167}_{71}Lu_{96}$

$^{123}Sb(^{48}Ca,4n\gamma)$:SD 2005Am02 (continued)



$^{167}_{71}Lu_{96}$

^{169}Tm(^{3}He,5nγ), (α,6nγ),^{170}Yb(p,4nγ) 1977Ba40

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 90, 431 (2000)	5-Jul-2000

Others: 1976RoYE, 1974Fo19, 1974SiZT.

1977Ba40: E(^{3}He)=42-57 MeV, E(α)=72 MeV; metallic foil targets. Some data are from ^{170}Yb(p,4nγ) (E(p)=40 MeV, Yb oxide targets enriched to 67% in ^{170}Yb). Measured Eγ, Iγ (Ge(Li)), $\gamma\gamma$ coin, Ag(t). Authors found no delayed γ rays in ^{167}Lu. See also 1974Fo19.

Extensive data, including angular-distribution results, are reported in 1976RoYE, but are not incorporated in this evaluation. Agreement with 1977Ba40 is poor, and the many transitions of similar energy make it difficult to combine data for specific transitions.

^{167}Lu Levels

E(level)[†]	J^π[‡]	E(level)[†]	J^π[‡]	E(level)[†]	J^π[‡]	E(level)[†]	J^π[‡]
0.0[#]	$7/2^+$	331.82[@] *8*	$9/2^-$	847.0+y[b] *8*	$15/2^+$	1720.72[#] *16*	$23/2^+$
0.0+x[&]	$1/2^+$	400.5+x[a] *7*	$7/2^-$	934.29[#] *13*	$17/2^+$	1947.6[@] *6*	$25/2^-$
0.0+y[b]	$5/2^+$	431.3+y[b] *4*	$11/2^+$	947.9[@] *4*	$17/2^-$	2008.75[#] *21*	$25/2^+$
19.6+x[&] *5*	$3/2^+$	433.6[@] *4*	$11/2^-$	1000.5+x[a] *8*	$15/2^-$	2217.0[@] *6*	$27/2^-$
107.3+x[a] *5*	$1/2^-$	446.5+x[a] *9*	$13/2^-$	1159.4[@] *6*	$19/2^-$	2243.7+x[a] *12*	$29/2^-$
116.71+y[b] *10*	$7/2^+$	494.20[#] *11*	$13/2^+$	1172.6+x[a] *10*	$21/2^-$	2300.12[#] *19*	$27/2^+$
122.0+x[a] *7*	$5/2^-$	576.9[@] *4*	$13/2^-$	1181.30[#] *13*	$19/2^+$	2531.9[@] *6*	$29/2^-$
140.02[#] *7*	$9/2^+$	624.4+y[b] *7*	$13/2^+$	1411.7[@] *6*	$21/2^-$	2581.5[#] *6*	$29/2^+$
233.9+x[a] *8*	$9/2^-$	658.8+x[a] *8*	$11/2^-$	1425.3+x[a] *8*	$19/2^-$	2884.7+x[a] *13*	$33/2^-$
243.9+x?[a] *7*	$3/2^-$	704.38[#] *12*	$15/2^+$	1444.75[#] *18*	$21/2^+$		
261.6+y[b] *4*	$9/2^+$	744.5[@] *5*	$15/2^-$	1656.5[@] *7*	$23/2^-$		
305.27[#] *8*	$11/2^+$	761.4+x[a] *9*	$17/2^-$	1671.0+x[a] *11*	$25/2^-$		

[†] The evaluator estimates “x” to be about 30 keV based on a plot of the energies for the $1/2^+$ 1/2[411] states in ^{175}Lu(=627), ^{173}Lu(=425), ^{171}Lu(=208), ^{169}Lu(=97) (Nuclear Data Sheets), and ^{165}Lu(≈0.0) (1974Ek03). It would not be possible to see a photon peak for the expected M3 transition to g.s. ($\alpha\approx2.1\times10^5$). The evaluator estimates “y” to be about 75 keV based on an extrapolation of the 5/2[402] bandhead energies in ^{175}Lu(=343), ^{173}Lu(=357), ^{171}Lu(=296), ^{169}Lu(=186), ^{165}Lu (≥0) (Nuclear Data Sheets); the energy for this state is expected to decrease with decreasing mass value. No candidate for a depopulating transition has been identified. From Adopted Levels, (y-x)=39.2 keV.

[‡] From energy and intensity fits of coincident transitions into rotational bands based on expected Nilsson states (authors′ values).

[#] Band(A): 7/2[404] band.

[@] Band(B): 9/2[514] band.

[&] Band(C): 1/2[411] band.

[a] Band(D): 1/2[541] band.

[b] Band(E): tentative 5/2[402] band.

γ(^{167}Lu)

E_γ[†]	E_i(level)	J^π_i	E_f	J^π_f	Comments
(14.7[#] *8*)	122.0+x	$5/2^-$	107.3+x	$1/2^-$	
(19.6[#] *5*)	19.6+x	$3/2^+$	0.0+x	$1/2^+$	
[x]68.3 *5*					
[x]71.0 *5*					I$_\gamma$: weak.
[x]72.7 *5*					

Continued on next page (footnotes at end of table)

^{169}Tm(^{3}He,5nγ), (α,6nγ),^{170}Yb(p,4nγ) 1977Ba40 (continued)

γ(^{167}Lu) (continued)

E_γ [†]	I_γ [†]	E_i(level)	J^π_i	E_f	J^π_f	Comments
[x]75.2 *5*	1.0 *5*					
[x]78.7 *1*	20.4 *21*					
[x]80.7 *5*	10.8[‡] *11*					
[x]82.5 *5*	3.8[‡] *19*					
[x]85.9 *5*						
87.7 *1*	129[‡] *13*	107.3+x	1/2$^-$	19.6+x	3/2$^+$	
[x]90.2 *5*						
[x]90.9 *5*	13.3 *13*					Possibly a ^{169}Yb transition (1977Ba40).
[x]91.5 *5*	6 *3*					
[x]92.5 *5*						
[x]95.5 *5*						
[x]97.6 *5*						
[x]99.8 *5*	4.2 *21*					
101.7 *5*	27 *3*	433.6	11/2$^-$	331.82	9/2$^-$	
102.6 *5*	39[‡] *4*	122.0+x	5/2$^-$	19.6+x	3/2$^+$	
107.3 *5*	43 *4*	107.3+x	1/2$^-$	0.0+x	1/2$^+$	
111.7 *5*	95 *10*	233.9+x	9/2$^-$	122.0+x	5/2$^-$	
116.7 *1*	44[‡] *4*	116.71+y	7/2$^+$	0.0+y	5/2$^+$	
[x]119.9 *5*						
122.1[b] *5*	25 *4*	243.9+x?	3/2$^-$	122.0+x	5/2$^-$	I_γ: deduced from I(243γ):I(122γ)=28.7:17.1 in ^{170}Yb(p,3nγ) and I(243γ) in (^{3}He,5nγ).
[x]125.9 *5*						
[x]127.5 *5*	6 *3*					
[x]129.2 *5*	9 *5*					
[x]133.5 *5*	3.6 *18*					
[x]135.2 *5*	9 *5*					
[x]137.0 *5*						
139.9 *1*	100 *10*	140.02	9/2$^+$	0.0	7/2$^+$	
[x]142.2 *5*	12.8 *13*					
143.4 *5*	74[‡] *7*	576.9	13/2$^-$	433.6	11/2$^-$	
144.7 *5*	73[‡] *7*	261.6+y	9/2$^+$	116.71+y	7/2$^+$	
[x]147.0 *5*	14.7 *15*					
[x]148.5 *5*	4.8 *24*					
[x]154.3 *1*	10.8 *11*					
156.5[b] *1*	25[‡] *3*	400.5+x	7/2$^-$	243.9+x?	3/2$^-$	Shown in fig 3, but attributed to ^{168}Lu ε decay in table 1 of 1977Ba40.
[x]159.0 *5*						
[x]160.6 *5*	13.1 *13*					
[x]161.5 *5*	5.1 *26*					
165.2 *1*	61 *6*	305.27	11/2$^+$	140.02	9/2$^+$	
167.2[ab] *1*	47[a] *5*	400.5+x	7/2$^-$	233.9+x	9/2$^-$	
167.2[a] *1*	47[a] *5*	744.5	15/2$^-$	576.9	13/2$^-$	
169.7 *1*	51 *5*	431.3+y	11/2$^+$	261.6+y	9/2$^+$	
[x]174.8 *5*						
[x]179.0 *5*	24.1[‡] *24*					
[x]186.6 *5*						
188.8 *5*	55[‡] *6*	494.20	13/2$^+$	305.27	11/2$^+$	
191.7 *1*	67[‡] *7*	331.82	9/2$^-$	140.02	9/2$^+$	
193.1 *5*	41 *4*	624.4+y	13/2$^+$	431.3+y	11/2$^+$	
[x]197.3 *5*	74 *7*					
203.5 *5*	42 *4*	947.9	17/2$^-$	744.5	15/2$^-$	
[x]204.6 *5*	16.0 *16*					
210.1 *5*	20.9 *21*	704.38	15/2$^+$	494.20	13/2$^+$	

Continued on next page (footnotes at end of table)

^{169}Tm(^{3}He,5nγ), (α,6nγ),^{170}Yb(p,4nγ) 1977Ba40 (continued)

γ(^{167}Lu) (continued)

E_γ[†]	I_γ[†]	E_i(level)	J^π_i	E_f	J^π_f	Comments
211.6 *5*	29 *3*	1159.4	19/2⁻	947.9	17/2⁻	
212.3[a] *5*	138[a‡] *14*	446.5+x	13/2⁻	233.9+x	9/2⁻	E_γ: 212.8 in table 1, but 212.3 in both places in fig. 3 and in text of 1977Ba40.
212.3[a] *5*	138[a‡] *14*	658.8+x	11/2⁻	446.5+x	13/2⁻	E_γ: 212.8 in table 1, but 212.3 in both places in fig. 3 and in text of 1977Ba40.
[x]217.9 *1*	17.3 *17*					
222.6 *5*	49[‡] *5*	847.0+y	15/2⁺	624.4+y	13/2⁺	
224.2[b] *5*	34 *6*	243.9+x?	3/2⁻	19.6+x	3/2⁺	I_γ: deduced from I(243γ):I(224γ)=28.7:23.3 in ^{170}Yb(p,3nγ) and I(243γ) in (^{3}He,5nγ).
[x]225.0 *5*	17.6 *18*					
[x]228.6 *5*	70 *7*					
230.1 *5*	10.8 *11*	934.29	17/2⁺	704.38	15/2⁺	
[x]236.1 *5*	7 *4*					
≈243.3[b]	42 *4*	243.9+x?	3/2⁻	0.0+x	1/2⁺	
244.8[a] *5*	19.2[a] *19*	576.9	13/2⁻	331.82	9/2⁻	
244.8[a] *5*	19.2[a] *19*	1656.5	23/2⁻	1411.7	21/2⁻	
247.0 *1*	21.9[‡] *22*	1181.30	19/2⁺	934.29	17/2⁺	
252.3 *1*	17.3 *17*	1411.7	21/2⁻	1159.4	19/2⁻	
[x]254.5 *1*	11.8 *12*					
[x]256.7 *5*	<19.3					I_γ: 19.3 *20* for 256.7γ+258.5γ doublet.
258.5 *5*	<19.3	658.8+x	11/2⁻	400.5+x	7/2⁻	I_γ: see comment with 256.7γ.
261.7 *5*	13.4 *13*	261.6+y	9/2⁺	0.0+y	5/2⁺	
263.5 *5*	7 *4*	1444.75	21/2⁺	1181.30	19/2⁺	
267.9[b] *5*	9 *5*	2217.0	27/2⁻	1947.6	25/2⁻	
[x]270.5 *5*	<14.1					I_γ: 14.1 *14* for 270.5γ+271.6γ doublet.
[x]271.6 *5*	<14.1					I_γ: see comment with 270.5γ.
276.0 *1*	12.7 *13*	1720.72	23/2⁺	1444.75	21/2⁺	
278.5 *1*	34[‡] *3*	400.5+x	7/2⁻	122.0+x	5/2⁻	
[x]280.6 *5*	8 *4*					
[x]284.3 *5*	8 *4*					
288.1 *5*	4 *2*	2008.75	25/2⁺	1720.72	23/2⁺	
291.3[&b] *5*		1947.6	25/2⁻	1656.5	23/2⁻	I_γ: weak.
291.3[&b] *5*		2300.12	27/2⁺	2008.75	25/2⁺	I_γ: weak.
294.0 *5*	19.1 *19*	433.6	11/2⁻	140.02	9/2⁺	
[x]296.7 *5*	30 *3*					
305.3 *1*	57 *6*	305.27	11/2⁺	0.0	7/2⁺	
[x]309.9 *5*						
310.9 *5*	27 *3*	744.5	15/2⁻	433.6	11/2⁻	
314.9[a] *1*	163[a@] *16*	431.3+y	11/2⁺	116.71+y	7/2⁺	
314.9[a] *1*	163[a@] *16*	761.4+x	17/2⁻	446.5+x	13/2⁻	
314.9[b] *1*	[@]	2531.9	29/2⁻	2217.0	27/2⁻	E_γ: for triply-placed G.
[x]321.5 *1*	14.0 *14*					
[x]324.4 *1*	17.0 *17*					
331.9 *1*	95 *10*	331.82	9/2⁻	0.0	7/2⁺	
[x]336.1 *5*						
341.7 *1*	22.8 *23*	1000.5+x	15/2⁻	658.8+x	11/2⁻	
[x]348.4 *1*	30 *3*					
[x]351.6 *1*	23.5 *24*					
354.2 *1*	72 *7*	494.20	13/2⁺	140.02	9/2⁺	
[x]357.9 *1*	11.4 *11*					
≈363		624.4+y	13/2⁺	261.6+y	9/2⁺	E_γ: from fig. 3 of 1977Ba40; presumed to differ from the unplaced 364.5γ.
[x]364.5 *5*	22.5 *23*					

Continued on next page (footnotes at end of table)

^{169}Tm(^{3}He,5nγ), (α,6nγ),^{170}Yb(p,4nγ) 1977Ba40 (continued)

γ(^{167}Lu) (continued)

E_γ [†]	I_γ [†]	E_i(level)	J^π_i	E_f	J^π_f	Comments
[x]367.3 *1*	14.0 *14*					
371.0 *1*	27 *3*	947.9	17/2⁻	576.9	13/2⁻	
[x]377.9 *5*						
[x]379.8 *5*	24.6 *25*					
[x]388.3 *5*	24.0 *24*					
[x]391.2 *5*	11.9 *12*					
[x]393.5 *1*	12.3 *12*					
[x]397.0 *5*						
399.1 *1*	74 *8*	704.38	15/2⁺	305.27	11/2⁺	
[x]401.1 *1*	42 *4*					
[x]408.6 *5*	21.7 *22*					
[x]409.7 *5*						
411.2 *5*	78 *8*	1172.6+x	21/2⁻	761.4+x	17/2⁻	
415.3[a] *1*	37[a] *4*	847.0+y	15/2⁺	431.3+y	11/2⁺	
415.3[a] *1*	37[a] *4*	1159.4	19/2⁻	744.5	15/2⁻	
[x]417.6 *1*	14.5 *15*					
[x]421.0 *5*	9 *5*					
424.8[a] *1*	26[a] *3*	658.8+x	11/2⁻	233.9+x	9/2⁻	
424.8[a] *1*	26[a] *3*	1425.3+x	19/2⁻	1000.5+x	15/2⁻	
[x]431.3 *5*	6 *3*					
[x]432.6 *5*						
[x]433.6 *5*	15.2 *15*					
[x]436.5 *5*						
440.1 *1*	74 *7*	934.29	17/2⁺	494.20	13/2⁺	
[x]448.0 *5*	24.0 *24*					
[x]449.9 *5*						
[x]459.5 *1*	31 *3*					
[x]462.1 *5*						
463.8 *5*	26 *3*	1411.7	21/2⁻	947.9	17/2⁻	
[x]467.9 *5*	7 *4*					
476.9 *1*	51 *5*	1181.30	19/2⁺	704.38	15/2⁺	
[x]479.1 *5*	7 *4*					
[x]482.5 *5*	4.4 *22*					
[x]486.8 *5*	6 *3*					
[x]490.2 *1*	11.1 *11*					
496.7 *5*	23.2 *23*	1656.5	23/2⁻	1159.4	19/2⁻	
498.4 *5*	32 *3*	1671.0+x	25/2⁻	1172.6+x	21/2⁻	
[x]500.8 *5*	9 *5*					
511.0 *5*	[‡]	1444.75	21/2⁺	934.29	17/2⁺	
535.9 *1*	21.3 *21*	1947.6	25/2⁻	1411.7	21/2⁻	
539.4 *1*	75[‡] *8*	1720.72	23/2⁺	1181.30	19/2⁺	
[x]544.8 *1*	12.9 *13*					
[x]548.3 *1*	15.0 *15*					
553.8 *5*	8 *4*	1000.5+x	15/2⁻	446.5+x	13/2⁻	I_γ: deduced from I(342γ):I(554γ)=16.0:5.9 in ^{170}Yb(p,3nγ) and I(342γ) in (^{3}He,5nγ).
560.0 *5*	10 *5*	2217.0	27/2⁻	1656.5	23/2⁻	
564.0 *1*	27 *3*	2008.75	25/2⁺	1444.75	21/2⁺	
572.7 *5*		2243.7+x	29/2⁻	1671.0+x	25/2⁻	E_γ: from fig. 3 of 1977Ba40; absent from table 1, but present in $\gamma\gamma$ coin.
572.7 *5*		2581.5	29/2⁺	2008.75	25/2⁺	
579.4 *1*	10.6 *11*	2300.12	27/2⁺	1720.72	23/2⁺	
584.3 *1*	38[‡] *4*	2531.9	29/2⁻	1947.6	25/2⁻	Attributed to ^{168}Yb in table 1, but included in ^{167}Lu level scheme in fig. 3 of 1977Ba40.
[x]610.1 *1*	11.3 *11*					
[x]634.4 *1*	10.1 *10*					

Continued on next page (footnotes at end of table)

^{169}Tm(^{3}He,5nγ), (α,6nγ),^{170}Yb(p,4nγ) 1977Ba40 (continued)

γ(^{167}Lu) (continued)

E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π	Comments
641.0 *5*	9 *5*	2884.7+x	33/2−	2243.7+x	29/2−	E_γ: from figs. 1 and 3 of 1977Ba40; misprinted as 614.0 in table 1. I_γ: weak.
x657.6 *5*						
x661.6 *5*						
x718.8 *1*	28 *3*					
x729.3 *5*	10 *5*					
x780.8 *1*	22.0 *22*					
x803.1 *5*						
x806.8 *5*						
x820.1 *5*						I_γ: weak.
x823.7 *5*						I_γ: weak.
x829.1 *5*						
x835.1 *1*	23.1 *23*					
x837.3 *5*						
x841.5 *5*						
x844.5 *1*	45 *5*					
x846.6 *1*	35 *4*					
x853.3 *1*	26 *3*					
x860.0 *1*	27 *3*					

† From ^{169}Tm(^{3}He,5nγ) at 45 MeV, except where noted. ΔE_γ=0.1 keV and ΔIγ=10% for strong, well-resolved peaks; ΔE_γ=0.5 keV for weak or barely-resolved peaks; ΔIγ=50% for weak peaks. Evaluator estimates weak peaks to be those with Iγ≤10. See 1977Ba40 for complete set of Iγ values from ^{170}Yb(p,4nγ) at 40 MeV.

‡ Includes component from contaminant line.

From energy difference between initial and final levels.

@ Triplet γ with Iγ=163 *16*. Based on I(267.9γ)=9 *5* and I(291.3γ)="weak" for the two transitions immediately below the 314.9γ in the 9/2[514] band's ΔJ=1 cascade, I(315γ from 2532 level) can reasonably be assumed to be <10, leaving essentially all the triplet intensity to be assigned from the 761+x-level and the 431+y-level.

& Multiply placed.

a Multiply placed with undivided intensity.

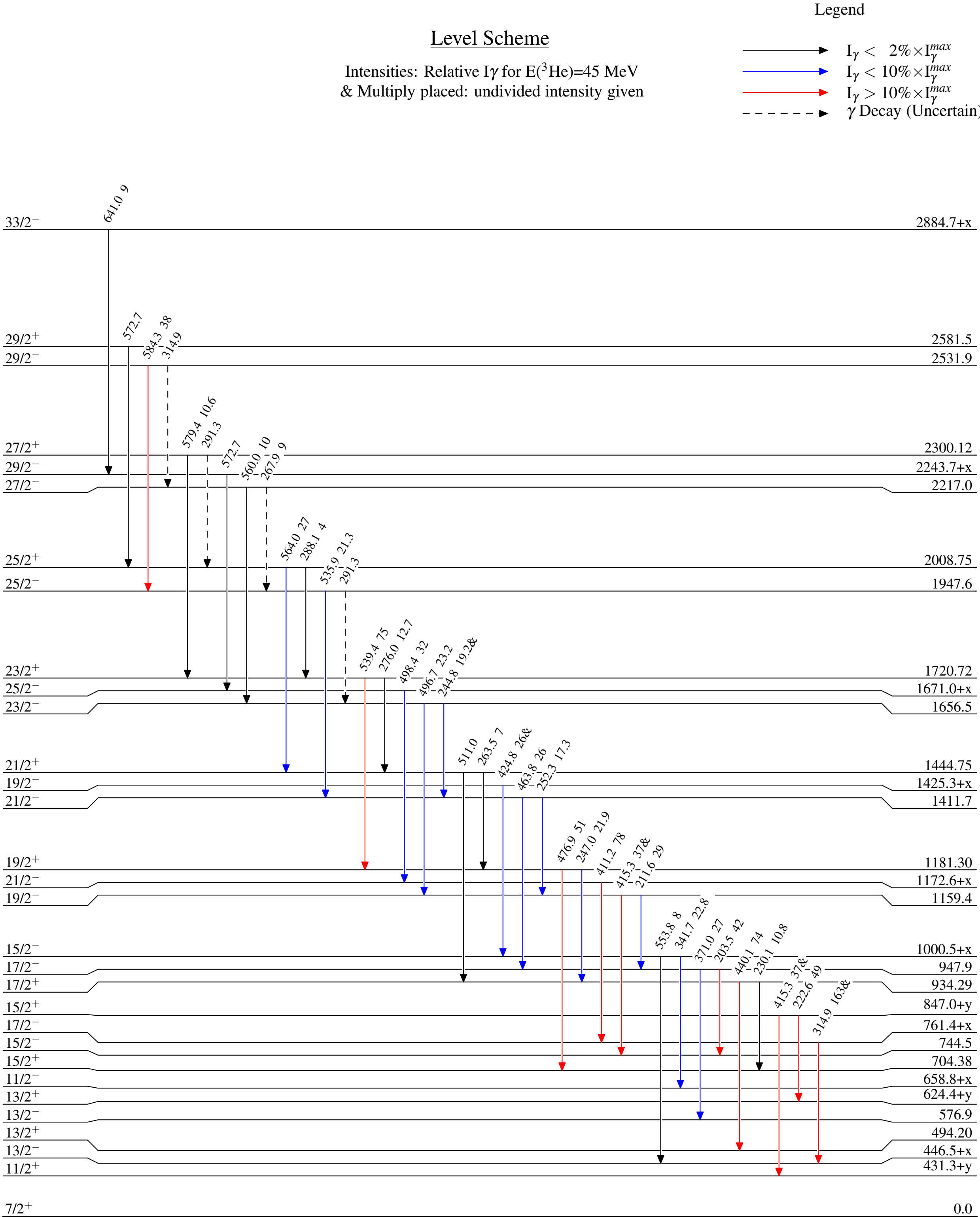
b Placement of transition in the level scheme is uncertain.

x γ ray not placed in level scheme.

$^{169}Tm(^3He,5n\gamma)$, $(\alpha,6n\gamma)$, $^{170}Yb(p,4n\gamma)$ 1977Ba40

Level Scheme

Intensities: Relative Iγ for E(^{3}He)=45 MeV
& Multiply placed: undivided intensity given

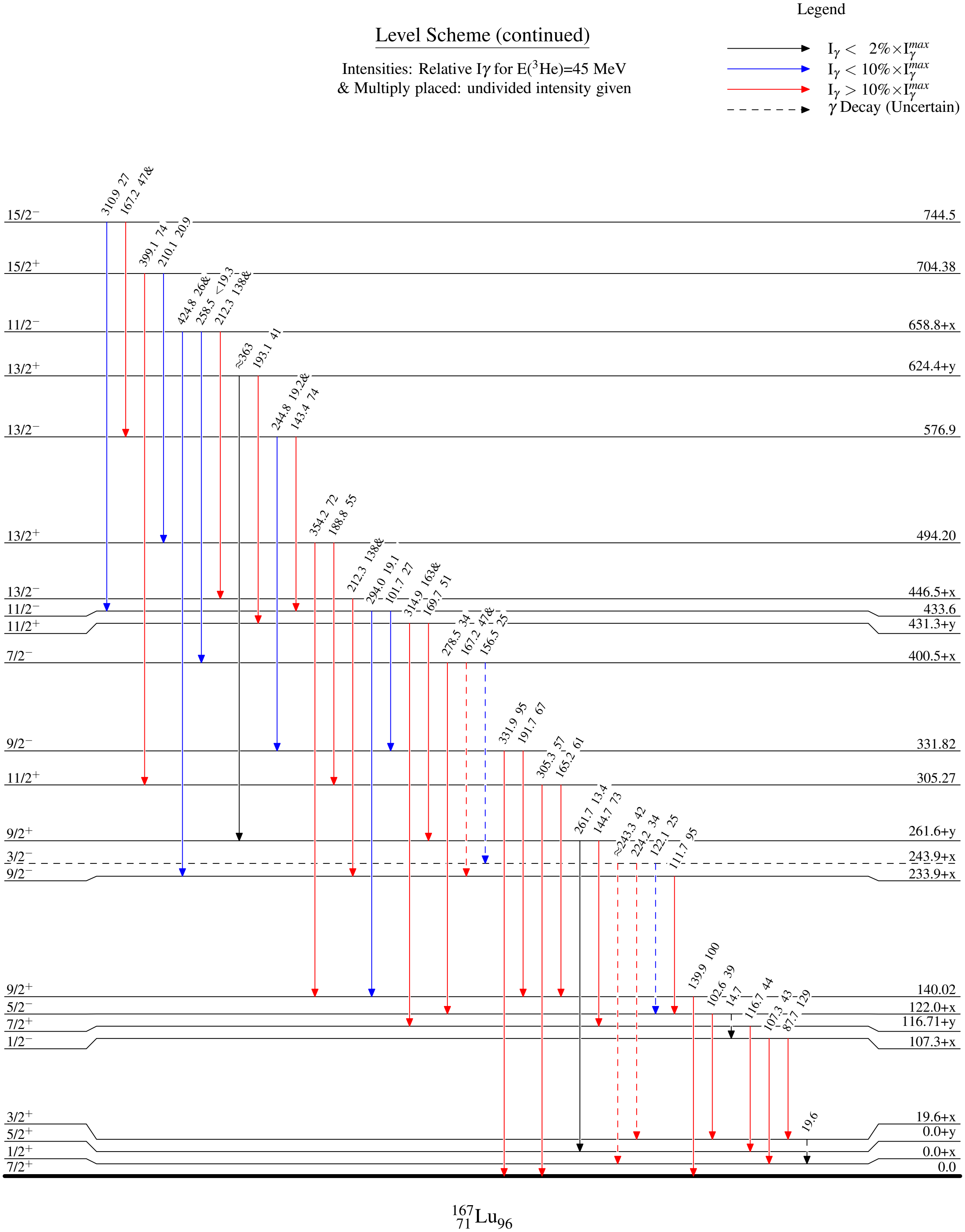


$^{167}_{71}Lu_{96}$

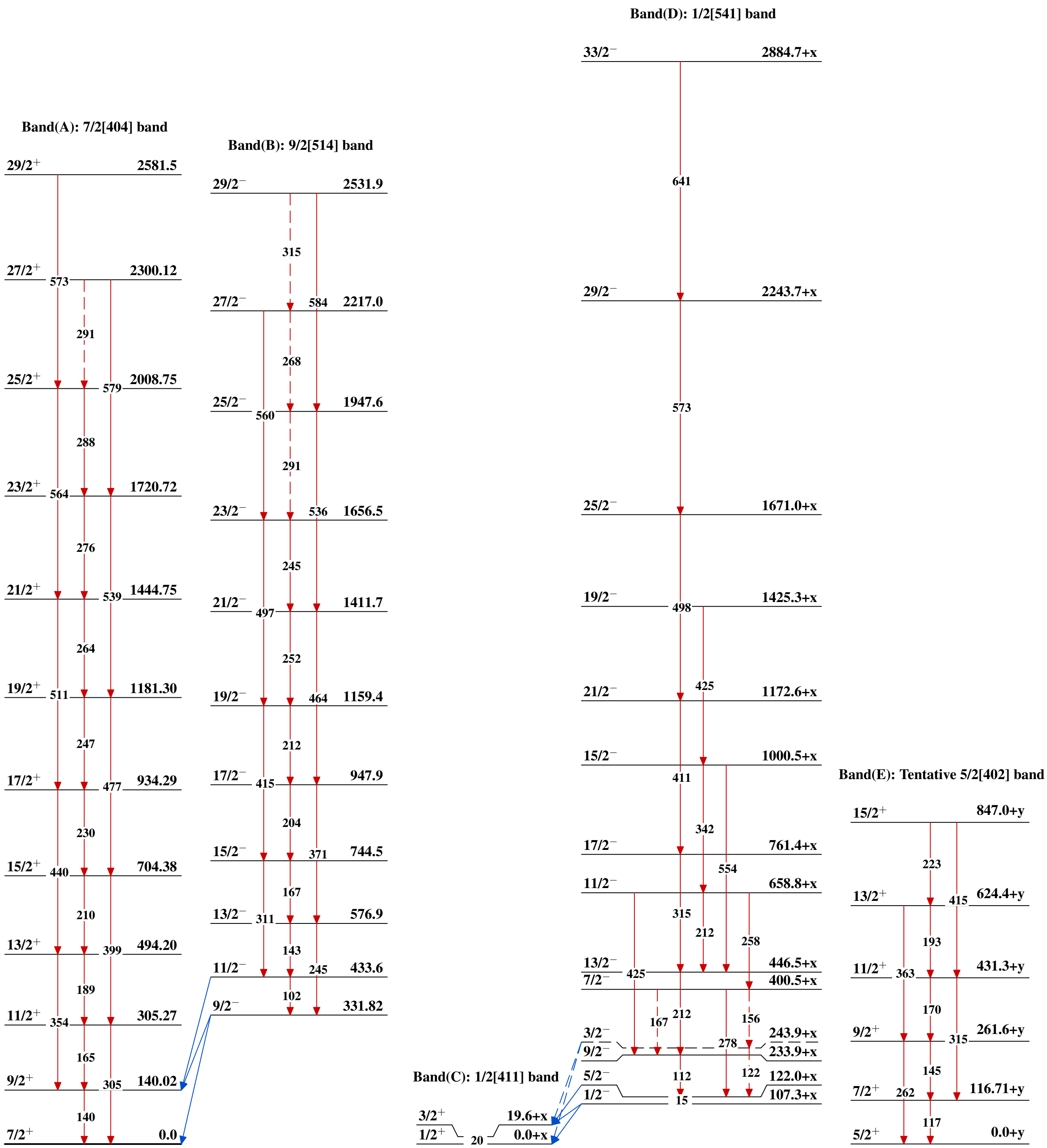
$^{169}Tm(^{3}He,5n\gamma), (\alpha,6n\gamma), ^{170}Yb(p,4n\gamma)$ 1977Ba40

Level Scheme (continued)

Intensities: Relative Iγ for E(^{3}He)=45 MeV
& Multiply placed: undivided intensity given



^{169}Tm(^{3}He,5nγ), (α,6nγ),^{170}Yb(p,4nγ) 1977Ba40



$^{167}_{71}Lu_{96}$