Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	C. W. Reich	NDS 112,2497 (2011)	1-Jun-2011

Q(β^-)=−6.25×10^3 *4*; S(n)=1.036×10^4 *7*; S(p)=1.69×10^3 *4*; Q(α)=3.75×10^3 *4* 2012Wa38
Note: Current evaluation has used the following Q record.
2003Au03 report the following values: for Q(β^-), 6240 *40*; for S(n), 10360 *60*; for S(p), 1680 *30*; and, for Q(α), 3720 *40*.
Q(β^-)=−6244 *36*; S(n)=10364 *63*; S(p)=1683 *32*; Q(α)=3722 *39* 2009AuZZ
Additional information 1.

^{161}Lu Levels

Nomenclature for quasiparticle labels:
A: $\nu i_{13/2}$1/2[660], α=+1/2.
B: $\nu i_{13/2}$1/2[660], α=−1/2.
C: $\nu i_{13/2}$, α=+1/2.
D: $\nu i_{13/2}$, α=−1/2.
E: $\nu h_{9/2}$3/2[521], α=+1/2.
F: $\nu h_{9/2}$3/2[521], α=−1/2.
a: $\pi d_{3/2}$1/2[411], α=+1/2.
b: $\pi d_{3/2}$1/2[411], α=−1/2.
c: $\pi g_{7/2}$7/2[404], α=+1/2.
d: $\pi g_{7/2}$7/2[404], α=−1/2.
e: $\pi h_{11/2}$9/2[514], α=+1/2.
f: $\pi h_{11/2}$9/2[514], α=−1/2.
i: $\pi d_{5/2}$5/2[402], α=+1/2.
j: $\pi d_{5/2}$5/2[402], α=−1/2.

Cross Reference (XREF) Flags

A	^{161}Lu IT decay (7.3 ms)
B	^{161}Hf ε decay
C	^{120}Sn(^{45}Sc,4nγ)
D	^{139}La(^{28}Si,6nγ)

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$	XREF	Comments
0[l]	1/2$^+$	77 s *2*		%ε+%β^+=100 μ=+0.223 *3* (1998Ge13) Level not reported in the indicated studies, but it should be populated (at least via the decay of the first excited state (J$^\pi$=3/2$^+$)). J$^\pi$: measured value from collinear laser spectroscopy (1998Ge13). The proposed Nilsson-orbital assignment 1/2[411] is consistent with the measured μ value (1998Ge13). From an evaluation of data on nuclear rms charge radii, 2004An14 report <r^2>$^{1/2}$=5.231 fm *11*. T$_{1/2}$: weighted average of 72 s *6* (1979Al16,1980Be39) and 78 s *2* (1981RaZH,1983Ge08). %ε+%β^+: evaluator assumes that the α decay of this level is negligible. μ: from 1998Ge13, collinear laser spectroscopy. See also the compilation by 2005St24.
0+x[l]	(3/2$^+$)		AB D	Additional information 2. E(level): x ≈ 15 keV from trend of 3/2$^+$ to 1/2$^+$ spacings for the 1/2[411] band in selected odd-A Lu (A=163, 167, 169) nuclei. J$^\pi$: from 2005Br14, probable member of the 1/2[411] band.

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Adopted Levels, Gammas (continued)

^{161}Lu Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$	XREF	Comments
66.6+x[l] *5*	(5/2$^+$)		B D	
135.6+x[i] *3*	(5/2$^+$)		AB D	
166.5+x[c] *8*	(9/2$^-$)	7.3 ms *4*	A D	%IT≈100 The evaluator assumes that the ε decay of this level is negligible. E(level): the evaluator assumes that this level corresponds to the 7.4-ms isomer discovered by 1973An10.
204.0+x[d] *7*	(11/2$^-$)		CD	
226.6+x[h] *4*	(7/2$^+$)		B D	
275.8+x[@] *4*	(7/2$^+$)		B D	
334.9+x[l] *4*	(7/2$^+$)		B D	
443.5+x[i] *4*	(9/2$^+$)		B D	
469.9+x[c] *6*	(13/2$^-$)		CD	
579.0+x[d] *7*	(15/2$^-$)		CD	
677.5+x[h] *5*	(11/2$^+$)		D	
695.5+x[@] *5*	(11/2$^+$)		D	
935.2+x[i] *5*	(13/2$^+$)		D	
962.2+x[c] *6*	(17/2$^-$)		CD	
1087.1+x[d] *6*	(19/2$^-$)		CD	
1200.3+x[@] *5*	(15/2$^+$)		D	
1227.3+x[h] *7*	(15/2$^+$)		D	
1505.2+x[i] *6*	(17/2$^+$)		D	
1561.8+x[c] *6*	(21/2$^-$)		CD	
1692.1+x[d] *6*	(23/2$^-$)		CD	
1739.8+x[@] *6*	(19/2$^+$)		D	
1833.1+x[h] *7*	(19/2$^+$)		D	
2030.6+x[&] *6*	(21/2$^+$)		CD	
2133.1+x[i] *7*	(21/2$^+$)		D	
2213.9+x[@] *6*	(23/2$^+$)		CD	
2224.4+x *7*	(21/2$^+$)		D	
2229.5+x[c] *7*	(25/2$^-$)		CD	
2298.4+x *6*	(23/2$^+$)		D	
2364.4+x[d] *7*	(27/2$^-$)		CD	
2393.1+x[h] *6*	(23/2$^+$)		D	
2396.6+x[&] *6*	(25/2$^+$)		CD	
2489.5+x[j] *7*	(23/2$^+$)		D	
2514.5+x[k] *7*	(25/2$^+$)		D	
2527.3+x[@] *7*	(27/2$^+$)		CD	
2634.6+x[j] *7*	(27/2$^+$)		D	
2687.9+x[&] *7*	(29/2$^+$)		CD	
2786.8+x[b] *7*	(25/2$^+$)		D	
2866.4+x[k] *7*	(29/2$^+$)		D	
2883.2+x[c] *8*	(29/2$^-$)		CD	
2902.6+x[@] *7*	(31/2$^+$)		CD	
3008.7+x[b] *7*	(29/2$^+$)		D	
3022.7+x[d] *8*	(31/2$^-$)		CD	
3045.3+x[j] *7*	(31/2$^+$)		D	
3144.3+x *8*	(31/2$^-$)		D	
3153.2+x[&] *7*	(33/2$^+$)		CD	

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Adopted Levels, Gammas (continued)

^{161}Lu Levels (continued)

E(level)[†]	J^{π}[‡]	XREF
3249.1+x[c] *8*	(33/2$^-$)	CD
3279.3+x[a] *7*	(31/2$^+$)	D
3329.4+x[k] *7*	(33/2$^+$)	D
3407.9+x[@] *7*	(35/2$^+$)	CD
3466.3+x[d] *8*	(35/2$^-$)	CD
3469.0+x[b] *8*	(33/2$^+$)	D
3599.1+x[j] *8*	(35/2$^+$)	D
3706.0+x[c] *9*	(37/2$^-$)	CD
3743.5+x[&] *8*	(37/2$^+$)	CD
3782.2+x[a] *7*	(35/2$^+$)	D
3909.2+x[k] *8*	(37/2$^+$)	D
3988.4+x[d] *9*	(39/2$^-$)	CD
4037.0+x[@] *8*	(39/2$^+$)	CD
4271.0+x[c] *9*	(41/2$^-$)	CD
4272.2+x[j] *8*	(39/2$^+$)	D
4332.3+x[a] *8*	(39/2$^+$)	D
4439.4+x[&] *8*	(41/2$^+$)	CD
4510.1+x[g] *10*	(39/2$^-$)	D
4587.8+x[d] *10*	(43/2$^-$)	CD
4595.3+x[k] *8*	(41/2$^+$)	D
4723.1+x[f] *9*	(41/2$^-$)	D
4772.3+x[@] *8*	(43/2$^+$)	CD
4911.6+x[c] *10*	(45/2$^-$)	CD
4959.7+x[g] *9*	(43/2$^-$)	D
4960.3+x[a] *9*	(43/2$^+$)	D
5036.0+x[j] *9*	(43/2$^+$)	D
5216.1+x[&] *9*	(45/2$^+$)	CD
5264.9+x[d] *10*	(47/2$^-$)	CD
5266.7+x[f] *9*	(45/2$^-$)	D
5358.0+x[k] *10*	(45/2$^+$)	D
5581.7+x[@] *9*	(47/2$^+$)	CD
5586.8+x[g] *10*	(47/2$^-$)	D
5621.3+x[c] *10*	(49/2$^-$)	CD
5655.7+x[a] *9*	(47/2$^+$)	D
5865.3+x[j] *10*	(47/2$^+$)	D
5968.3+x[f] *10*	(49/2$^-$)	D
6012.5+x[d] *11*	(51/2$^-$)	CD
6058.2+x[&] *9*	(49/2$^+$)	CD
6155.0+x[k] *11*	(49/2$^+$)	D
6294.2+x[g] *10*	(51/2$^-$)	D
6363.0+x[a] *9*	(51/2$^+$)	CD
6398.9+x[c] *11*	(53/2$^-$)	CD
6492.4+x[@] *9*	(51/2$^+$)	D
6643.3+x[j] *11*	(51/2$^+$)	D
6726.6+x[f] *11*	(53/2$^-$)	D
6829.6+x[d] *11*	(55/2$^-$)	CD
6875.8+x[&] *9*	(53/2$^+$)	D

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Adopted Levels, Gammas (continued)

^{161}Lu Levels (continued)

E(level)[†]	J^{π}[‡]	XREF	Comments
6994.1+x[k] 12	(53/2$^+$)	D	
7096.4+x[g] 11	(55/2$^-$)	D	
7143.5+x[a] 11	(55/2$^+$)	CD	
7252.7+x[c] 11	(57/2$^-$)	CD	
7269.8+x[@] 10	(55/2$^+$)	D	
7568.0+x[f] 11	(57/2$^-$)	D	
7649.7+x[&] 10	(57/2$^+$)	D	
7734.3+x[d] 11	(59/2$^-$)	CD	
7768.1+x[k] 13	(57/2$^+$)	D	
7953.4+x[a] 12	(59/2$^+$)	D	
7997.2+x[g] 12	(59/2$^-$)	D	
8076.3+x[@] 10	(59/2$^+$)	D	
8192.2+x[c] 12	(61/2$^-$)	CD	
8489.0+x[&] 10	(61/2$^+$)	D	
8503.0+x[f] 12	(61/2$^-$)	D	
8700.0+x[d] 12	(63/2$^-$)	CD	
8800.2+x[a] 13	(63/2$^+$)	CD	
8963.4+x[@] 11	(63/2$^+$)	D	
8973.2+x[g] 13	(63/2$^-$)	D	
9196.4+x[c] 12	(65/2$^-$)	CD	
9391.2+x[&] 11	(65/2$^+$)	D	
9438.0+x[f] 13	(65/2$^-$)	D	
9701.2+x[a] 14	(67/2$^+$)	CD	
9727.9+x[d] 12	(67/2$^-$)	CD	
9908.9+x[@] 11	(67/2$^+$)	D	
10027.2+x[g] 14	(67/2$^-$)	D	
10219.9+x[e] 13	(69/2$^-$)	CD	
10308.8+x[c] 13	(69/2$^-$)	D	
10345.8+x[&] 12	(69/2$^+$)	D	
10649.7+x[a] 15	(71/2$^+$)	CD	
10818.1+x[d] 13	(71/2$^-$)	D	
10904.9+x[@] 12	(71/2$^+$)	D	
11210.0+x[e] 14	(73/2$^-$)	CD	
11358.8+x[&] 13	(73/2$^+$)	D	
11442.9+x[c] 14	(73/2$^-$)	D	
11633.5+x[a] 15	(75/2$^+$)	CD	
11937.1+x[d] 14	(75/2$^-$)	D	
11948.9+x[@] 13	(75/2$^+$)	D	
12247.9+x[e] 15	(77/2$^-$)	D	
12672.7+x[a] 16	(79/2$^+$)	CD	
13309.9+x[e] 16	(81/2$^-$)	CD	
13742.9+x[a] 17	(83/2$^+$)	D	
14817.9+x[a] 18	(87/2$^+$)	CD	
15942.9+x[a] 19	(91/2$^+$)	D	
y[m]	(21/2$^+$)	D	Additional information 3.
308.3+y[m] 5	(25/2$^+$)[#]	D	
689.0+y[m] 7	(29/2$^+$)	D	
1139.8+y[m] 9	(33/2$^+$)	D	

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Adopted Levels, Gammas (continued)

^{161}Lu Levels (continued)

E(level)[†]	J^{π}[‡]	XREF	E(level)[†]	J^{π}[‡]	XREF	E(level)[†]	J^{π}[‡]	XREF
1304.0+y[n] *9*	(31/2$^+$)	D	4322.2+y[n] *13*	(51/2$^+$)	D	7963.9+y[m] *17*	(69/2$^+$)	D
1658.4+y[m] *10*	(37/2$^+$)	D	4372.9+y[m] *14*	(53/2$^+$)	D	8743.2+y[n] *17*	(71/2$^+$)	D
1781.0+y[n] *10*	(35/2$^+$)	D	5103.2+y[n] *14*	(55/2$^+$)	D	8961.3+y[m] *18*	(73/2$^+$)	D
2244.2+y[m] *11*	(41/2$^+$)	D	5196.7+y[m] *15*	(57/2$^+$)	D	9751.2+y[n] *18*	(75/2$^+$)	D
2324.2+y[n] *10*	(39/2$^+$)	D	5936.2+y[n] *15*	(59/2$^+$)	D	9985.3+y[m] *19*	(77/2$^+$)	D
2893.6+y[m] *12*	(45/2$^+$)	D	6072.6+y[m] *16*	(61/2$^+$)	D	10793.2+y[n] *19*	(79/2$^+$)	D
2930.2+y[n] *11*	(43/2$^+$)	D	6820.2+y[n] *16*	(63/2$^+$)	D	11044.1+y[m] *19*	(81/2$^+$)	D
3597.2+y[n] *12*	(47/2$^+$)	D	6997.0+y[m] *16*	(65/2$^+$)	D	12139.6+y[m] *20*	(85/2$^+$)	D
3604.2+y[m] *13*	(49/2$^+$)	D	7770.2+y[n] *17*	(67/2$^+$)	D	13270.6+y[m] *21*	(89/2$^+$)	D

† From least-squares fit to Eγ's, assuming 0.5 keV uncertainty for Eγ, when not stated.

‡ As proposed by 2006Br12 In ^{139}La(^{28}Si,6nγ) based on γ cascades defining band structures and comparisons with cranked-shell model calculations. For selected transitions the assignments are also supported by angular correlation results from ^{120}Sn(^{45}Sc,4nγ). All assignments are given In parentheses here since strong arguments for bandheads are lacking.

The 308.5 transition is assigned by 2003Br03 as 25/2$^+$ to 21/2$^+$ transition in comparison with isospectral triaxial SD-1 band in ^{163}Lu. All other intraband transitions were proposed to be stretched quadrupole transitions from $\gamma\gamma(\theta)$(DCO) data (2003Br03).

@ Band(A): π7/2[404], α=−1/2. At higher spins, crossed by 7/2[404]⊗AB band, and second crossing by 7/2[404]ABef.

& Band(a): π7/2[404], α=+1/2. At higher spins crossed by 7/2[404]⊗AB band, and second crossing by 7/2[404]ABef.

a Band(b): Triaxial band, α=−1/2. The alignment is similar to TSD bands, thus it is expected to have a larger deformation.

b Band(B): α=+1/2.

c Band(C): π9/2[514], α=+1/2. At higher spins crossed by 9/2[514]⊗AB band.

d Band(c): π9/2[514], α=−1/2. At higher spins crossed by 9/2[514]⊗AB band.

e Band(D): 1/2[541]⊗ABef, α=+1/2.

f Band(E): 7/2[523]⊗AB, α=+1/2.

g Band(e): 7/2[523]⊗AB, α=−1/2.

h Band(F): π5/2[402], α=−1/2. At higher spins crossed by 5/2[404]⊗AB band.

i Band(f): π5/2[402], α=+1/2. At higher spins crossed by 5/2[404]⊗AB band.

j Band(G): 5/2[402]⊗AB, α=−1/2.

k Band(g): 5/2[402]⊗AB, α=+1/2.

l Band(H): π1/2[411].

m Band(I): Triaxial (wobbling mode) SD-1 band, α=+1/2. Band from 2006Br12 (also 2005Br14,2003Br03). Configuration=$\pi i_{13/2}\otimes\nu i^2_{13/2}$, phonon quantum number=0. Population intensity=1.4% of the reaction channel. This band is isospectral to triaxial SD-1 band in ^{163}Lu. On this basis, the 308.5 transition is proposed (by 2003Br03) as the 25/2$^+$ to 21/2$^+$ transition. The 308.5γ is also in coin with the 266.3, 375.3, 508.4 and 604.9 transitions in normal-deformed structures. See also 2005Ha24 and 2004Ha21 for discussion of triaxial SD bands.

n Band(i): Triaxial (wobbling mode) SD-2 band, α=−1/2. Band from 2006Br12 (also 2005Br14,2003Br03). Configuration=$\pi i_{13/2}\otimes\nu i^2_{13/2}$, phonon quantum number=1. Wobbling excitation built on triaxial SD-1 band. Population intensity=0.6% of the reaction channel. See also 2005Ha24, 2004Be53, 2004Ma34, 2004Ha21 and 1999Li39 for discussions and calculations related to triaxial SD bands and wobbling mode of excitation.

$\gamma(^{161}Lu)$

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Mult.[@]	δ	α[a]	Comments
135.6+x	$(5/2^+)$	135.6[#] *3*	100[#]	0+x	$(3/2^+)$	M1(+E2)	0.6 *6*	1.42 *16*	Mult.: 1973An10 report multipolarity from α(K)exp after rejecting the possibility of an E3 transition with a half-life of 7 ms. δ: see the comment in the ^{161}Lu IT decay data set.
166.5+x	$(9/2^-)$	(30.9)		135.6+x	$(5/2^+)$	[M2]		1715	E_γ: the evaluator assumes that the isomer decays to 135.6+x, $(5/2^+)$ through an M2 transition. This energy is consistent with a low-energy transition, below the K-shell binding energy of 63 keV as postulated by 1973An10. Transitions to other levels will be higher in energy than the K-shell binding energy. The M2 transition rate is consistent with RUL(M2)=1.
226.6+x	$(7/2^+)$	90.9[#] *5*	100[#]	135.6+x	$(5/2^+)$				
		160[c]		66.6+x	$(5/2^+)$				
275.8+x	$(7/2^+)$	209.2[#] *5*	95[#] *14*	66.6+x	$(5/2^+)$				
		275.9[#] *5*	100[#] *14*	0+x	$(3/2^+)$				
334.9+x	$(7/2^+)$	199.4[#] *4*	100[#]	135.6+x	$(5/2^+)$				
		335[c]		0+x	$(3/2^+)$				
443.5+x	$(9/2^+)$	108.6		334.9+x	$(7/2^+)$				
		217.0[#] *4*	100[#]	226.6+x	$(7/2^+)$				
		307.5		135.6+x	$(5/2^+)$				
469.9+x	$(13/2^-)$	265.9		204.0+x	$(11/2^-)$	D			
		303.4		166.5+x	$(9/2^-)$				
579.0+x	$(15/2^-)$	108.7	19 *4*	469.9+x	$(13/2^-)$	D			
		375.0[b]	100	204.0+x	$(11/2^-)$	Q			
677.5+x	$(11/2^+)$	234.0		443.5+x	$(9/2^+)$				
		343		334.9+x	$(7/2^+)$				
		450.5		226.6+x	$(7/2^+)$				
695.5+x	$(11/2^+)$	419.9		275.8+x	$(7/2^+)$				
935.2+x	$(13/2^+)$	257.7		677.5+x	$(11/2^+)$				
		491.7		443.5+x	$(9/2^+)$				
962.2+x	$(17/2^-)$	383.1	100	579.0+x	$(15/2^-)$	D			
		492.2	68 *4*	469.9+x	$(13/2^-)$	Q			
1087.1+x	$(19/2^-)$	124.5	5.7 *8*	962.2+x	$(17/2^-)$	D			
		508.0	100	579.0+x	$(15/2^-)$	Q			
1200.3+x	$(15/2^+)$	264.5		935.2+x	$(13/2^+)$				
		504.8		695.5+x	$(11/2^+)$				
		522.6		677.5+x	$(11/2^+)$	Q			
		730.7		469.9+x	$(13/2^-)$				
1227.3+x	$(15/2^+)$	532.0		695.5+x	$(11/2^+)$				
		550[c]		677.5+x	$(11/2^+)$				
1505.2+x	$(17/2^+)$	570.5		935.2+x	$(13/2^+)$				

$^{161}_{71}Lu_{90}$-6

γ(^{161}Lu) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[@]
1561.8+x	(21/2⁻)	474.7	65 11	1087.1+x	(19/2⁻)	D
		599.4	100	962.2+x	(17/2⁻)	Q
1692.1+x	(23/2⁻)	130.3	2.3 8	1561.8+x	(21/2⁻)	
		604.8	100	1087.1+x	(19/2⁻)	Q
1739.8+x	(19/2⁺)	539.1		1200.3+x	(15/2⁺)	
		777.9		962.2+x	(17/2⁻)	
1833.1+x	(19/2⁺)	605.9		1227.3+x	(15/2⁺)	
2030.6+x	(21/2⁺)	290.8		1739.8+x	(19/2⁺)	
		525.6		1505.2+x	(17/2⁺)	
		943.3		1087.1+x	(19/2⁻)	D[&]
2133.1+x	(21/2⁺)	628.3		1505.2+x	(17/2⁺)	
2213.9+x	(23/2⁺)	183.5	<140	2030.6+x	(21/2⁺)	
		474.3		1739.8+x	(19/2⁺)	
		522[bc]		1692.1+x	(23/2⁻)	
		651.9	100 16	1561.8+x	(21/2⁻)	D[&]
2224.4+x	(21/2⁺)	1137.2		1087.1+x	(19/2⁻)	
2229.5+x	(25/2⁻)	537.4		1692.1+x	(23/2⁻)	
		667.6		1561.8+x	(21/2⁻)	
2298.4+x	(23/2⁺)	74.0		2224.4+x	(21/2⁺)	
		165.2		2133.1+x	(21/2⁺)	
		558.7		1739.8+x	(19/2⁺)	
		736.6		1561.8+x	(21/2⁻)	
2364.4+x	(27/2⁻)	134.9		2229.5+x	(25/2⁻)	
		672.3		1692.1+x	(23/2⁻)	Q
2393.1+x	(23/2⁺)	362.4		2030.6+x	(21/2⁺)	
		560.2		1833.1+x	(19/2⁺)	
		653.2		1739.8+x	(19/2⁺)	
2396.6+x	(25/2⁺)	98.0		2298.4+x	(23/2⁺)	
		172		2224.4+x	(21/2⁺)	
		182.8		2213.9+x	(23/2⁺)	
		263.6		2133.1+x	(21/2⁺)	
		366.1		2030.6+x	(21/2⁺)	
		704.1		1692.1+x	(23/2⁻)	D[&]
2489.5+x	(23/2⁺)	797.3		1692.1+x	(23/2⁻)	
2514.5+x	(25/2⁺)	121.2		2393.1+x	(23/2⁺)	
		822.6		1692.1+x	(23/2⁻)	D[&]
2527.3+x	(27/2⁺)	130.4		2396.6+x	(25/2⁺)	D
		313.5		2213.9+x	(23/2⁺)	
2634.6+x	(27/2⁺)	119.7		2514.5+x	(25/2⁺)	
		145.1		2489.5+x	(23/2⁺)	
		238.2		2396.6+x	(25/2⁺)	
2687.9+x	(29/2⁺)	160.5	100	2527.3+x	(27/2⁺)	D
2687.9+x	(29/2⁺)	291.1	19 3	2396.6+x	(25/2⁺)	
2786.8+x	(25/2⁺)	654[c]		2133.1+x	(21/2⁺)	
2866.4+x	(29/2⁺)	231.6		2634.6+x	(27/2⁺)	
		339[c]		2527.3+x	(27/2⁺)	
		352.3		2514.5+x	(25/2⁺)	
2883.2+x	(29/2⁻)	518.8[b]	43 4	2364.4+x	(27/2⁻)	
		653.7	100 5	2229.5+x	(25/2⁻)	
2902.6+x	(31/2⁺)	214.6		2687.9+x	(29/2⁺)	
		375.0[b]		2527.3+x	(27/2⁺)	
3008.7+x	(29/2⁺)	222.3		2786.8+x	(25/2⁺)	
		374		2634.6+x	(27/2⁺)	
3022.7+x	(31/2⁻)	139.4	9 5	2883.2+x	(29/2⁻)	
		658.4	100	2364.4+x	(27/2⁻)	Q
3045.3+x	(31/2⁺)	179.1		2866.4+x	(29/2⁺)	
		410.6		2634.6+x	(27/2⁺)	
3144.3+x	(31/2⁻)	121.5		3022.7+x	(31/2⁻)	
		779.9		2364.4+x	(27/2⁻)	
3153.2+x	(33/2⁺)	250.4	95 8	2902.6+x	(31/2⁺)	D
		465.3	100	2687.9+x	(29/2⁺)	Q
3249.1+x	(33/2⁻)	104.7		3144.3+x	(31/2⁻)	
		226.5	100	3022.7+x	(31/2⁻)	D
		365.9	14 1	2883.2+x	(29/2⁻)	Q
3279.3+x	(31/2⁺)	270.8		3008.7+x	(29/2⁺)	
		413		2866.4+x	(29/2⁺)	
3329.4+x	(33/2⁺)	284.3		3045.3+x	(31/2⁺)	
		426.8		2902.6+x	(31/2⁺)	
		463.1		2866.4+x	(29/2⁺)	
3407.9+x	(35/2⁺)	254.6	83 7	3153.2+x	(33/2⁺)	D
		505.1	100	2902.6+x	(31/2⁺)	Q
3466.3+x	(35/2⁻)	217.0	100	3249.1+x	(33/2⁻)	D
		323[c]		3144.3+x	(31/2⁻)	
		443.7	44 2	3022.7+x	(31/2⁻)	Q
3469.0+x	(33/2⁺)	460.2		3008.7+x	(29/2⁺)	
3599.1+x	(35/2⁺)	269.5		3329.4+x	(33/2⁺)	
		553.5		3045.3+x	(31/2⁺)	
3706.0+x	(37/2⁻)	239.6	100	3466.3+x	(35/2⁻)	D
		457.0	40 2	3249.1+x	(33/2⁻)	Q
3743.5+x	(37/2⁺)	335.5	69 7	3407.9+x	(35/2⁺)	
		590.1	100	3153.2+x	(33/2⁺)	Q
3782.2+x	(35/2⁺)	313.2		3469.0+x	(33/2⁺)	
		453		3329.4+x	(33/2⁺)	
		503.3		3279.3+x	(31/2⁺)	

Adopted Levels, Gammas (continued)

$\gamma(^{161}Lu)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Mult.[@]
3909.2+x	$(37/2^+)$	310.0		3599.1+x	$(35/2^+)$	
		501.3		3407.9+x	$(35/2^+)$	
		580.4		3329.4+x	$(33/2^+)$	
3988.4+x	$(39/2^-)$	282.5	100	3706.0+x	$(37/2^-)$	
		522.0	50 *10*	3466.3+x	$(35/2^-)$	
4037.0+x	$(39/2^+)$	293.5	42 *4*	3743.5+x	$(37/2^+)$	D
		628.9	100	3407.9+x	$(35/2^+)$	Q
4271.0+x	$(41/2^-)$	282.7	100	3988.4+x	$(39/2^-)$	D
		564.8	78 *11*	3706.0+x	$(37/2^-)$	Q
4272.2+x	$(39/2^+)$	362.8		3909.2+x	$(37/2^+)$	
		672.8		3599.1+x	$(35/2^+)$	
4332.3+x	$(39/2^+)$	550.5		3782.2+x	$(35/2^+)$	
4439.4+x	$(41/2^+)$	402.2	53 *11*	4037.0+x	$(39/2^+)$	
		695.8[b]	100	3743.5+x	$(37/2^+)$	Q
4510.1+x	$(39/2^-)$	522[bc]		3988.4+x	$(39/2^-)$	
		804.2		3706.0+x	$(37/2^-)$	
4587.8+x	$(43/2^-)$	316.7	100	4271.0+x	$(41/2^-)$	D
		599.5	85 *7*	3988.4+x	$(39/2^-)$	Q
4595.3+x	$(41/2^+)$	323.1		4272.2+x	$(39/2^+)$	
		686.6		3909.2+x	$(37/2^+)$	
4723.1+x	$(41/2^-)$	213.1		4510.1+x	$(39/2^-)$	
		452.1		4271.0+x	$(41/2^-)$	
		734.8		3988.4+x	$(39/2^-)$	
		1017.3		3706.0+x	$(37/2^-)$	
4772.3+x	$(43/2^+)$	332.8	27 *3*	4439.4+x	$(41/2^+)$	
		735.2	100	4037.0+x	$(39/2^+)$	Q
4911.6+x	$(45/2^-)$	323.8	100	4587.8+x	$(43/2^-)$	D
		640.6	86 *7*	4271.0+x	$(41/2^-)$	Q
4959.7+x	$(43/2^-)$	236.8		4723.1+x	$(41/2^-)$	
		688.5		4271.0+x	$(41/2^-)$	(Q)
		971.1		3988.4+x	$(39/2^-)$	Q
4960.3+x	$(43/2^+)$	628.5		4332.3+x	$(39/2^+)$	
5036.0+x	$(43/2^+)$	441.1		4595.3+x	$(41/2^+)$	
		763.3		4272.2+x	$(39/2^+)$	
5216.1+x	$(45/2^+)$	443.8		4772.3+x	$(43/2^+)$	
		776.4		4439.4+x	$(41/2^+)$	
5264.9+x	$(47/2^-)$	353.5	88 *5*	4911.6+x	$(45/2^-)$	D
		677.0	100	4587.8+x	$(43/2^-)$	Q
5266.7+x	$(45/2^-)$	306.8		4959.7+x	$(43/2^-)$	
		543.7		4723.1+x	$(41/2^-)$	
		679[c]		4587.8+x	$(43/2^-)$	
		995.8		4271.0+x	$(41/2^-)$	
5358.0+x	$(45/2^+)$	321[c]		5036.0+x	$(43/2^+)$	
5358.0+x	$(45/2^+)$	762.7		4595.3+x	$(41/2^+)$	
5581.7+x	$(47/2^+)$	365.5		5216.1+x	$(45/2^+)$	
		809.3		4772.3+x	$(43/2^+)$	Q
5586.8+x	$(47/2^-)$	319.9		5266.7+x	$(45/2^-)$	
		627.0		4959.7+x	$(43/2^-)$	
		675[c]		4911.6+x	$(45/2^-)$	
5621.3+x	$(49/2^-)$	356.4	81 *5*	5264.9+x	$(47/2^-)$	D
		709.6	100	4911.6+x	$(45/2^-)$	Q
5655.7+x	$(47/2^+)$	695.8[b]		4960.3+x	$(43/2^+)$	
		883.1		4772.3+x	$(43/2^+)$	
5865.3+x	$(47/2^+)$	829.3		5036.0+x	$(43/2^+)$	
5968.3+x	$(49/2^-)$	381.5		5586.8+x	$(47/2^-)$	
		701.8		5266.7+x	$(45/2^-)$	
6012.5+x	$(51/2^-)$	391.1	79 *6*	5621.3+x	$(49/2^-)$	
		747.6	100	5264.9+x	$(47/2^-)$	Q
6058.2+x	$(49/2^+)$	476.6		5581.7+x	$(47/2^+)$	
		842.1		5216.1+x	$(45/2^+)$	
6155.0+x	$(49/2^+)$	797		5358.0+x	$(45/2^+)$	
6294.2+x	$(51/2^-)$	325.9		5968.3+x	$(49/2^-)$	
		672[c]		5621.3+x	$(49/2^-)$	
		707.3		5586.8+x	$(47/2^-)$	
6363.0+x	$(51/2^+)$	707.8		5655.7+x	$(47/2^+)$	
		780.8		5581.7+x	$(47/2^+)$	Q
6398.9+x	$(53/2^-)$	386.4	77 *8*	6012.5+x	$(51/2^-)$	D
		777.7	100	5621.3+x	$(49/2^-)$	Q
6492.4+x	$(51/2^+)$	434.1		6058.2+x	$(49/2^+)$	
		836.5		5655.7+x	$(47/2^+)$	
		910.8		5581.7+x	$(47/2^+)$	
6643.3+x	$(51/2^+)$	778[c]		5865.3+x	$(47/2^+)$	
6726.6+x	$(53/2^-)$	432.2		6294.2+x	$(51/2^-)$	
		758.4		5968.3+x	$(49/2^-)$	
6829.6+x	$(55/2^-)$	430.6	81 *8*	6398.9+x	$(53/2^-)$	D
		817.1	100	6012.5+x	$(51/2^-)$	Q
6875.8+x	$(53/2^+)$	383.6		6492.4+x	$(51/2^+)$	
		817.7		6058.2+x	$(49/2^+)$	
6994.1+x	$(53/2^+)$	839		6155.0+x	$(49/2^+)$	
7096.4+x	$(55/2^-)$	370.0		6726.6+x	$(53/2^-)$	
		802.1		6294.2+x	$(51/2^-)$	
7143.5+x	$(55/2^+)$	651[c]		6492.4+x	$(51/2^+)$	
		780.5		6363.0+x	$(51/2^+)$	Q
7252.7+x	$(57/2^-)$	423.2	62 *6*	6829.6+x	$(55/2^-)$	
		853.8	100	6398.9+x	$(53/2^-)$	
7269.8+x	$(55/2^+)$	394.2		6875.8+x	$(53/2^+)$	

$^{161}_{71}Lu_{90}$-8

Adopted Levels, Gammas (continued)

γ(^{161}Lu) (continued)

E_i(level)	J^{π}_i	E_{γ}[†]	I_{γ}[‡]	E_f	J^{π}_f	Mult.[@]
7269.8+x	$(55/2^{+})$	777.1		6492.4+x	$(51/2^{+})$	
7568.0+x	$(57/2^{-})$	471.8		7096.4+x	$(55/2^{-})$	
		841.3		6726.6+x	$(53/2^{-})$	
7649.7+x	$(57/2^{+})$	380.0		7269.8+x	$(55/2^{+})$	
		774.0		6875.8+x	$(53/2^{+})$	
7734.3+x	$(59/2^{-})$	481.6	70 *5*	7252.7+x	$(57/2^{-})$	
		904.6	100	6829.6+x	$(55/2^{-})$	
7768.1+x	$(57/2^{+})$	774		6994.1+x	$(53/2^{+})$	
7953.4+x	$(59/2^{+})$	809.9		7143.5+x	$(55/2^{+})$	
7997.2+x	$(59/2^{-})$	429[c]		7568.0+x	$(57/2^{-})$	
		900.8		7096.4+x	$(55/2^{-})$	
8076.3+x	$(59/2^{+})$	426.6		7649.7+x	$(57/2^{+})$	
		806.4		7269.8+x	$(55/2^{+})$	
8192.2+x	$(61/2^{-})$	457.9	52 *8*	7734.3+x	$(59/2^{-})$	
		939.5	100	7252.7+x	$(57/2^{-})$	
8489.0+x	$(61/2^{+})$	412.7		8076.3+x	$(59/2^{+})$	
		839.3		7649.7+x	$(57/2^{+})$	
8503.0+x	$(61/2^{-})$	935[b]		7568.0+x	$(57/2^{-})$	
8700.0+x	$(63/2^{-})$	508		8192.2+x	$(61/2^{-})$	
		965.7		7734.3+x	$(59/2^{-})$	
8800.2+x	$(63/2^{+})$	846.8	100	7953.4+x	$(59/2^{+})$	Q
8963.4+x	$(63/2^{+})$	474.4		8489.0+x	$(61/2^{+})$	
		887.1		8076.3+x	$(59/2^{+})$	
8973.2+x	$(63/2^{-})$	976		7997.2+x	$(59/2^{-})$	
9196.4+x	$(65/2^{-})$	496		8700.0+x	$(63/2^{-})$	
		1004.2		8192.2+x	$(61/2^{-})$	
9391.2+x	$(65/2^{+})$	427.7		8963.4+x	$(63/2^{+})$	
		902.2		8489.0+x	$(61/2^{+})$	
9438.0+x	$(65/2^{-})$	935[bc]		8503.0+x	$(61/2^{-})$	
9701.2+x	$(67/2^{+})$	901.0	100	8800.2+x	$(63/2^{+})$	Q
9727.9+x	$(67/2^{-})$	531		9196.4+x	$(65/2^{-})$	
		1028.3		8700.0+x	$(63/2^{-})$	
9908.9+x	$(67/2^{+})$	517.7		9391.2+x	$(65/2^{+})$	
		945.5		8963.4+x	$(63/2^{+})$	
10027.2+x	$(67/2^{-})$	1054[c]		8973.2+x	$(63/2^{-})$	
10219.9+x	$(69/2^{-})$	1023.5		9196.4+x	$(65/2^{-})$	Q
10308.8+x	$(69/2^{-})$	581		9727.9+x	$(67/2^{-})$	
		1112.4		9196.4+x	$(65/2^{-})$	
10345.8+x	$(69/2^{+})$	954.6		9391.2+x	$(65/2^{+})$	
10649.7+x	$(71/2^{+})$	948.5	100	9701.2+x	$(67/2^{+})$	Q
10818.1+x	$(71/2^{-})$	506[c]		10308.8+x	$(69/2^{-})$	
		1090.2		9727.9+x	$(67/2^{-})$	
10904.9+x	$(71/2^{+})$	996		9908.9+x	$(67/2^{+})$	

E_i(level)	J^{π}_i	E_{γ}[†]	I_{γ}[‡]	E_f	J^{π}_f
11210.0+x	$(73/2^{-})$	990.1	100	10219.9+x	$(69/2^{-})$
11358.8+x	$(73/2^{+})$	1013		10345.8+x	$(69/2^{+})$
11442.9+x	$(73/2^{-})$	1134		10308.8+x	$(69/2^{-})$
11633.5+x	$(75/2^{+})$	983.8	100	10649.7+x	$(71/2^{+})$
11937.1+x	$(75/2^{-})$	1119		10818.1+x	$(71/2^{-})$
11948.9+x	$(75/2^{+})$	1044		10904.9+x	$(71/2^{+})$
12247.9+x	$(77/2^{-})$	1037.9		11210.0+x	$(73/2^{-})$
12672.7+x	$(79/2^{+})$	1039.2		11633.5+x	$(75/2^{+})$
13309.9+x	$(81/2^{-})$	1062		12247.9+x	$(77/2^{-})$
13742.9+x	$(83/2^{+})$	1070.2		12672.7+x	$(79/2^{+})$
14817.9+x	$(87/2^{+})$	1075		13742.9+x	$(83/2^{+})$
15942.9+x	$(91/2^{+})$	1125		14817.9+x	$(87/2^{+})$
308.3+y	$(25/2^{+})$	308.3		y	$(21/2^{+})$
689.0+y	$(29/2^{+})$	380.7		308.3+y	$(25/2^{+})$
1139.8+y	$(33/2^{+})$	450.8		689.0+y	$(29/2^{+})$
1304.0+y	$(31/2^{+})$	615[c]		689.0+y	$(29/2^{+})$
1658.4+y	$(37/2^{+})$	518.8[b]		1139.8+y	$(33/2^{+})$
1781.0+y	$(35/2^{+})$	478[c]		1304.0+y	$(31/2^{+})$
		641		1139.8+y	$(33/2^{+})$
2244.2+y	$(41/2^{+})$	585.8		1658.4+y	$(37/2^{+})$
2324.2+y	$(39/2^{+})$	543		1781.0+y	$(35/2^{+})$
		666		1658.4+y	$(37/2^{+})$
2893.6+y	$(45/2^{+})$	649.4		2244.2+y	$(41/2^{+})$
2930.2+y	$(43/2^{+})$	606		2324.2+y	$(39/2^{+})$
		686		2244.2+y	$(41/2^{+})$
3597.2+y	$(47/2^{+})$	667		2930.2+y	$(43/2^{+})$
		704[c]		2893.6+y	$(45/2^{+})$
3604.2+y	$(49/2^{+})$	710.6		2893.6+y	$(45/2^{+})$
4322.2+y	$(51/2^{+})$	725		3597.2+y	$(47/2^{+})$
4372.9+y	$(53/2^{+})$	768.7		3604.2+y	$(49/2^{+})$
5103.2+y	$(55/2^{+})$	781		4322.2+y	$(51/2^{+})$
5196.7+y	$(57/2^{+})$	823.8		4372.9+y	$(53/2^{+})$
5936.2+y	$(59/2^{+})$	833		5103.2+y	$(55/2^{+})$
6072.6+y	$(61/2^{+})$	875.9		5196.7+y	$(57/2^{+})$
6820.2+y	$(63/2^{+})$	884		5936.2+y	$(59/2^{+})$
6997.0+y	$(65/2^{+})$	924.4		6072.6+y	$(61/2^{+})$
7770.2+y	$(67/2^{+})$	950		6820.2+y	$(63/2^{+})$
7963.9+y	$(69/2^{+})$	966.9		6997.0+y	$(65/2^{+})$
8743.2+y	$(71/2^{+})$	973		7770.2+y	$(67/2^{+})$
8961.3+y	$(73/2^{+})$	997.4		7963.9+y	$(69/2^{+})$
9751.2+y	$(75/2^{+})$	1008		8743.2+y	$(71/2^{+})$
9985.3+y	$(77/2^{+})$	1024.0		8961.3+y	$(73/2^{+})$
10793.2+y	$(79/2^{+})$	1042		9751.2+y	$(75/2^{+})$

$^{161}_{71}$Lu$_{90}$-9

Adopted Levels, Gammas (continued)

$\gamma(^{161}Lu)$ (continued)

E_i(level)	J_i^π	E_γ[†]	E_f	J_f^π
11044.1+y	$(81/2^+)$	1058.8	9985.3+y	$(77/2^+)$
12139.6+y	$(85/2^+)$	1095.5	11044.1+y	$(81/2^+)$
13270.6+y	$(89/2^+)$	1131	12139.6+y	$(85/2^+)$

† From $^{139}La(^{28}Si,6n\gamma)$ unless otherwise stated. Although some of the γ-ray energies may be more precise in $^{120}Sn(^{45}Sc,4n\gamma)$, but for the purpose of internal consistency, all γ-ray energies for high-spin (J>9/2) levels have been taken from $^{139}La(^{28}Si,6n\gamma)$, since it provides a much larger inventory of γ rays than the $^{120}Sn(^{45}Sc,4n\gamma)$ data set.

‡ From $^{120}Sn(^{45}Sc,4n\gamma)$ unless otherwise stated. The adopted γ branching may differ somewhat from those listed in the $^{120}Sn(^{45}Sc,4n\gamma)$ data set, since those given here are from coincidence spectra gated on specific transitions feeding the particular level, while those in the in-beam data set are from a more general methodology (see the discussion in that data set and values of branching ratios given under comments in that data set).

Energy from average of values from from ^{161}Hf ε decay and $^{139}La(^{28}Si,6n\gamma)$, intensity from ^{161}Hf ε decay.

@ From the $^{120}Sn(^{45}Sc,4n\gamma)$ study, unless noted otherwise.

& $\Delta J=1$, stretched dipole interpreted As E1 In $^{139}La(^{28}Si,6n\gamma)$.

[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] Multiply placed.

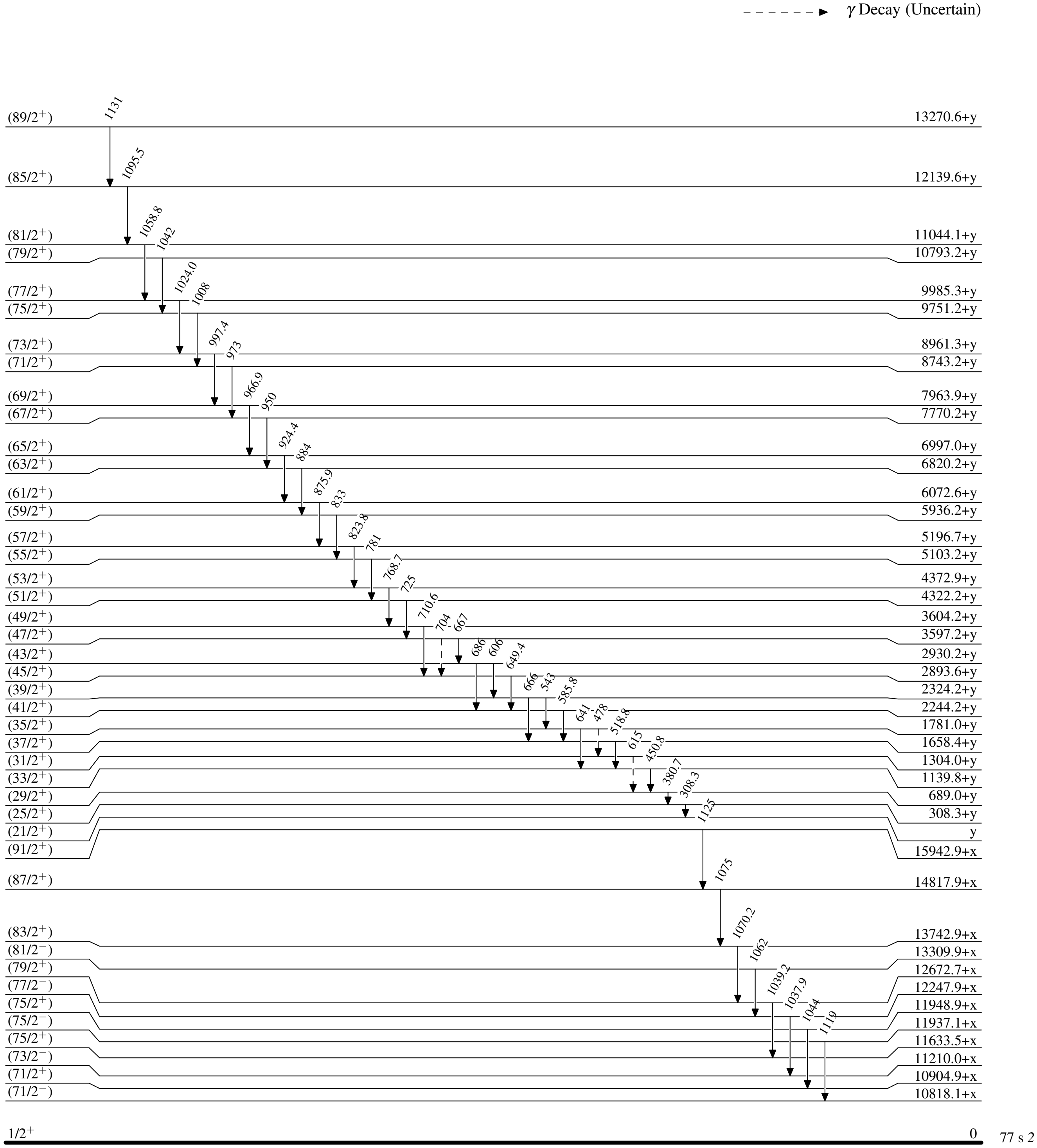
[c] Placement of transition in the level scheme is uncertain.

$^{161}_{71}Lu_{90}$-10

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level



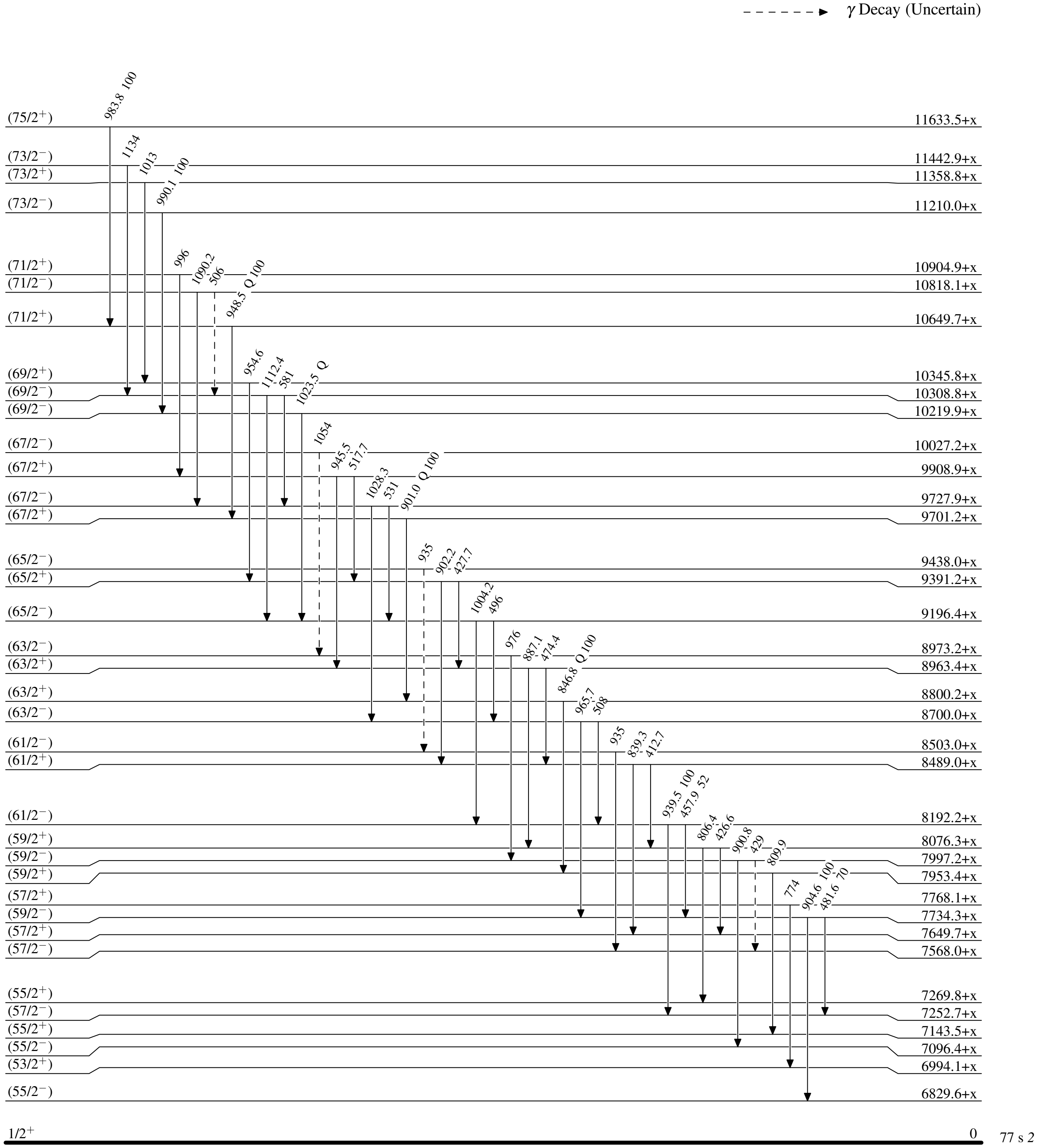
$^{161}_{71}Lu_{90}$

Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{161}_{71}Lu_{90}$

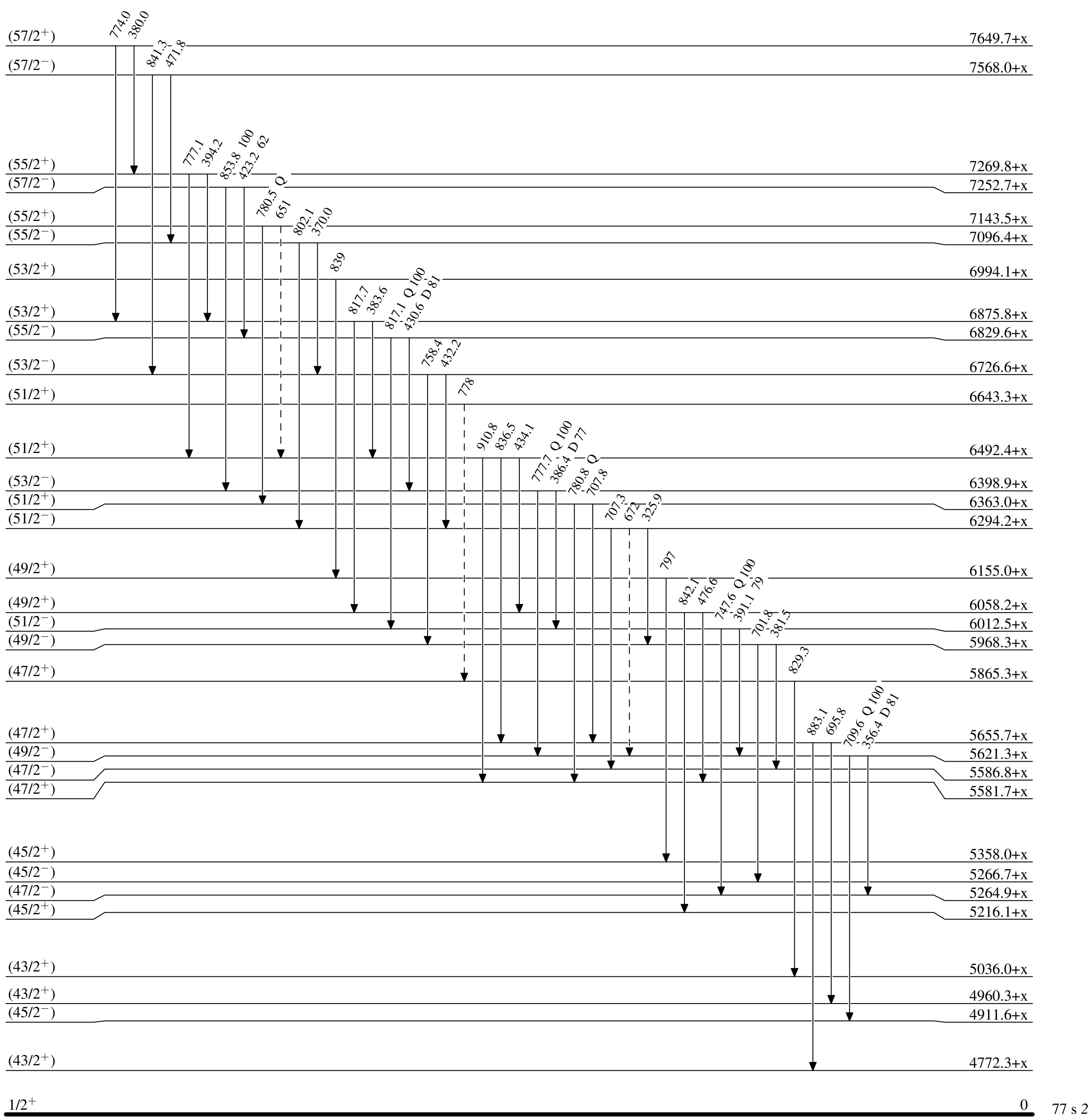
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{161}_{71}Lu_{90}$

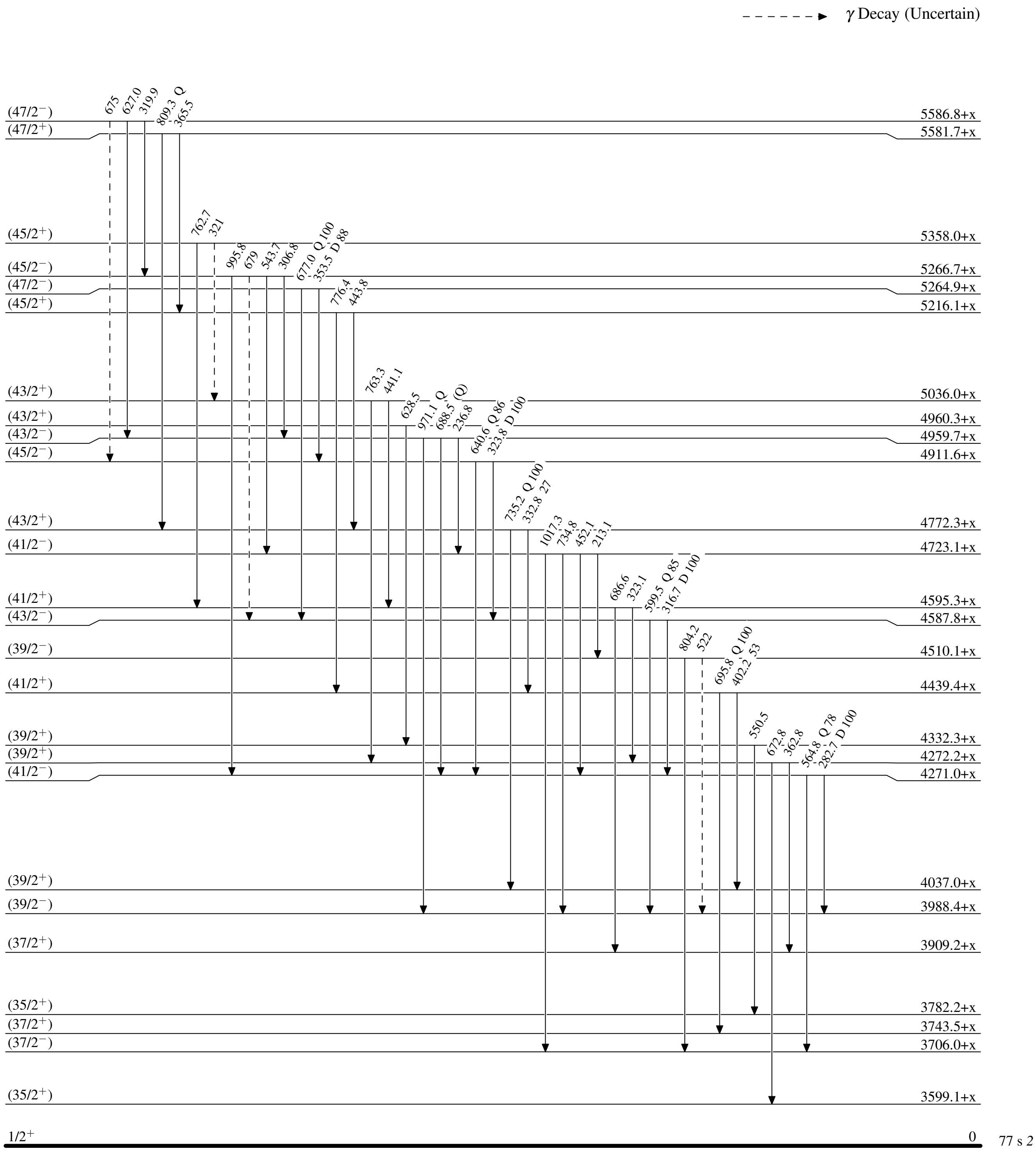
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)

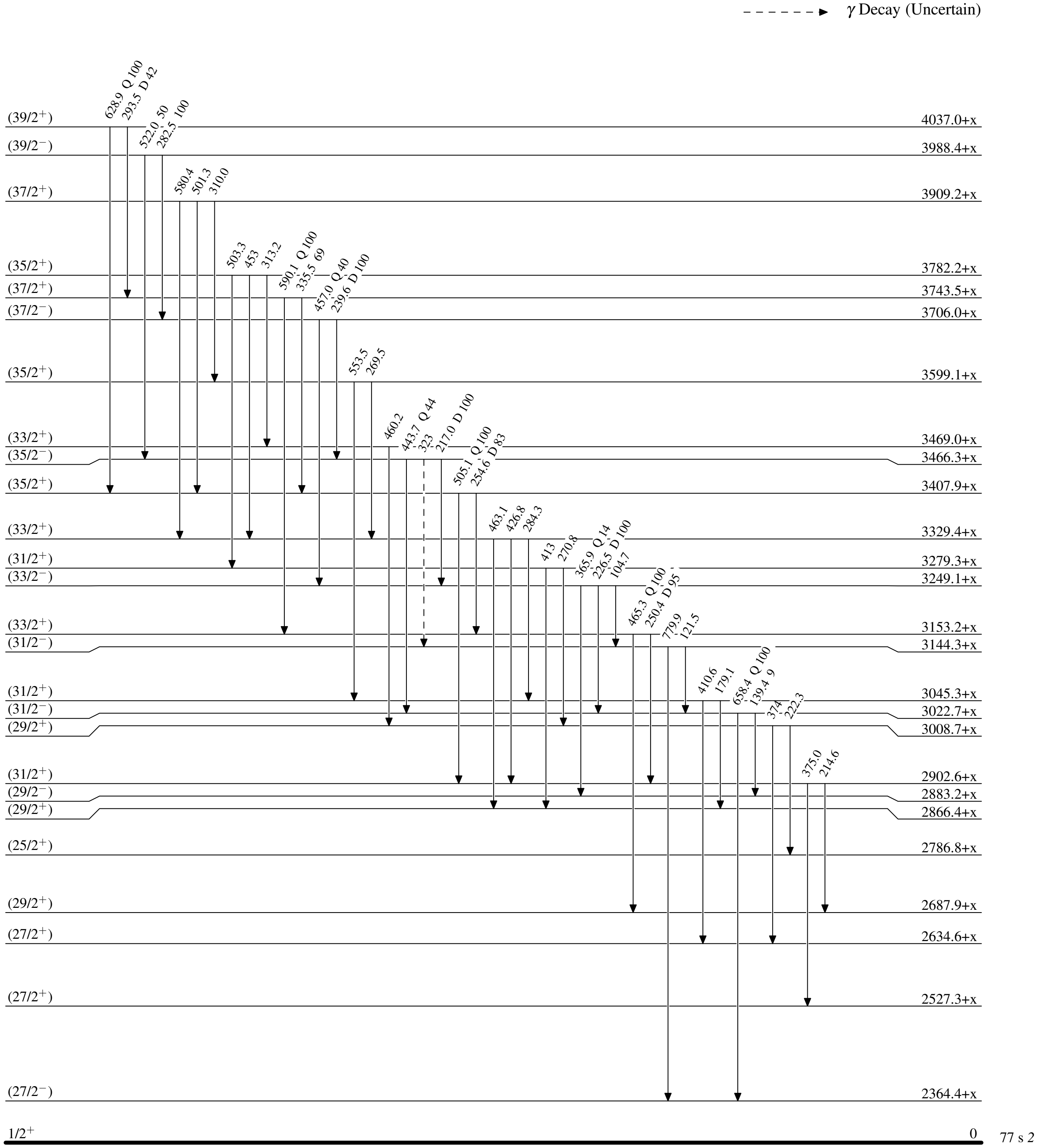


$^{161}_{71}Lu_{90}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{161}_{71}Lu_{90}$

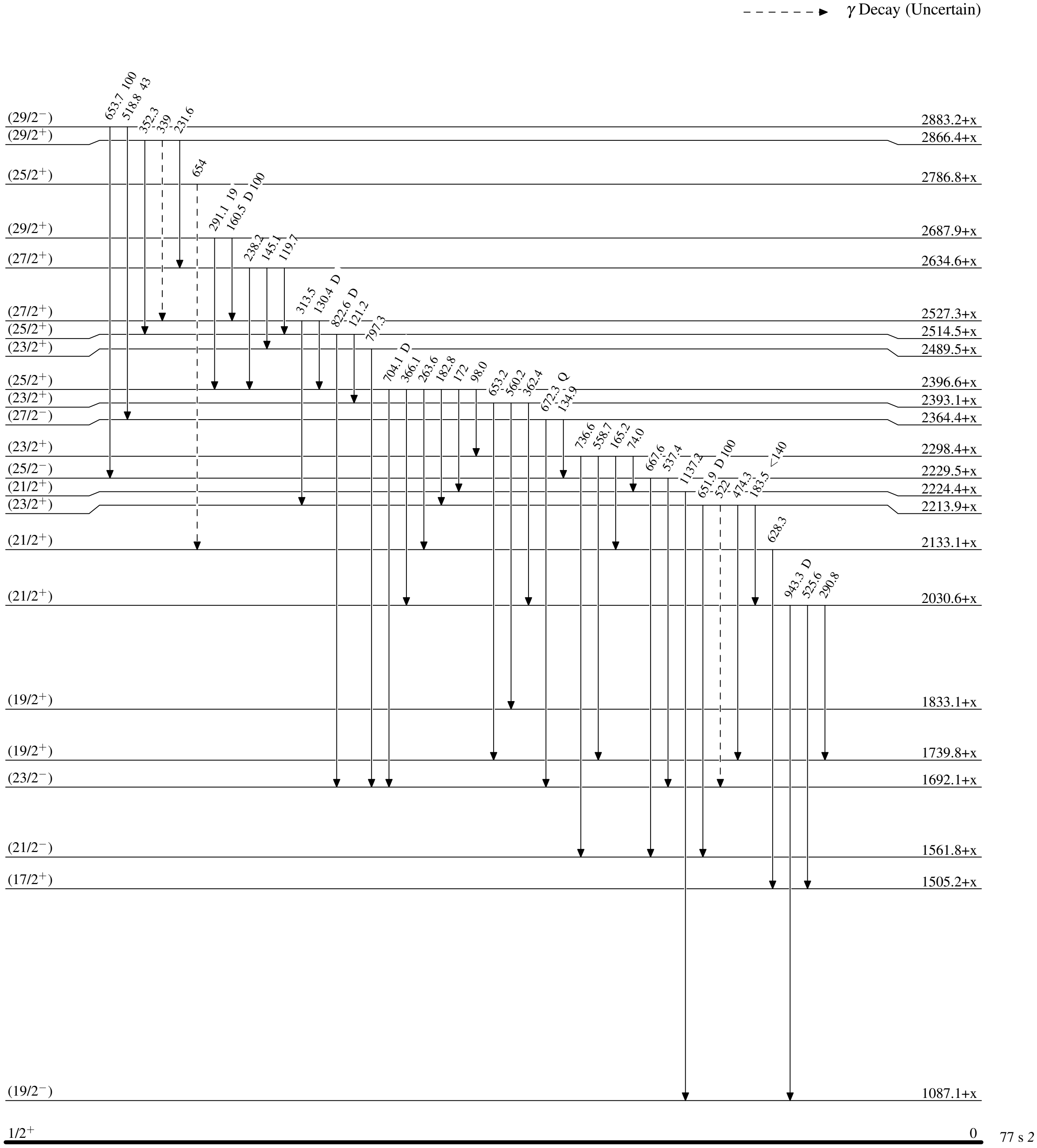
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)

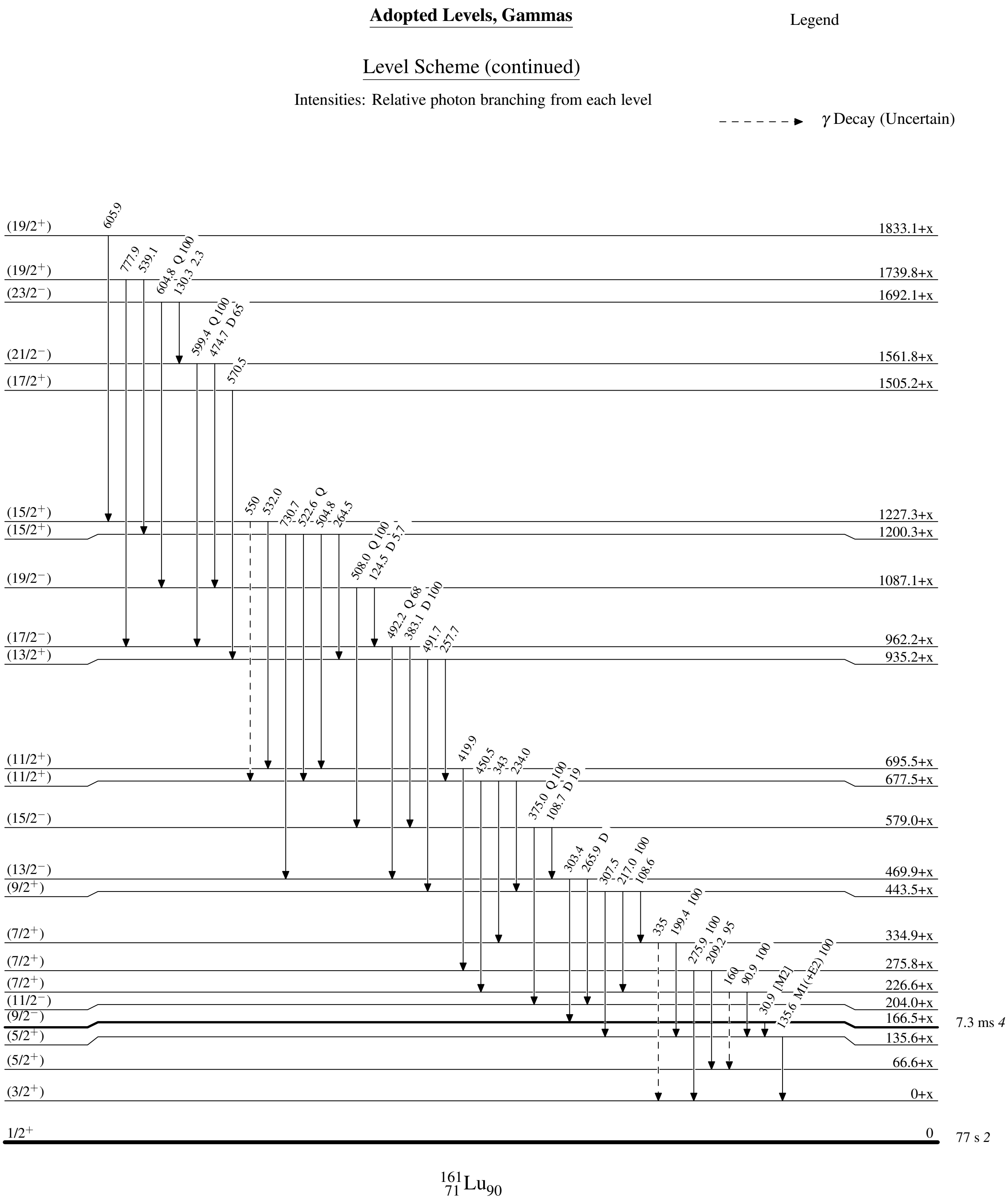


$^{161}_{71}Lu_{90}$

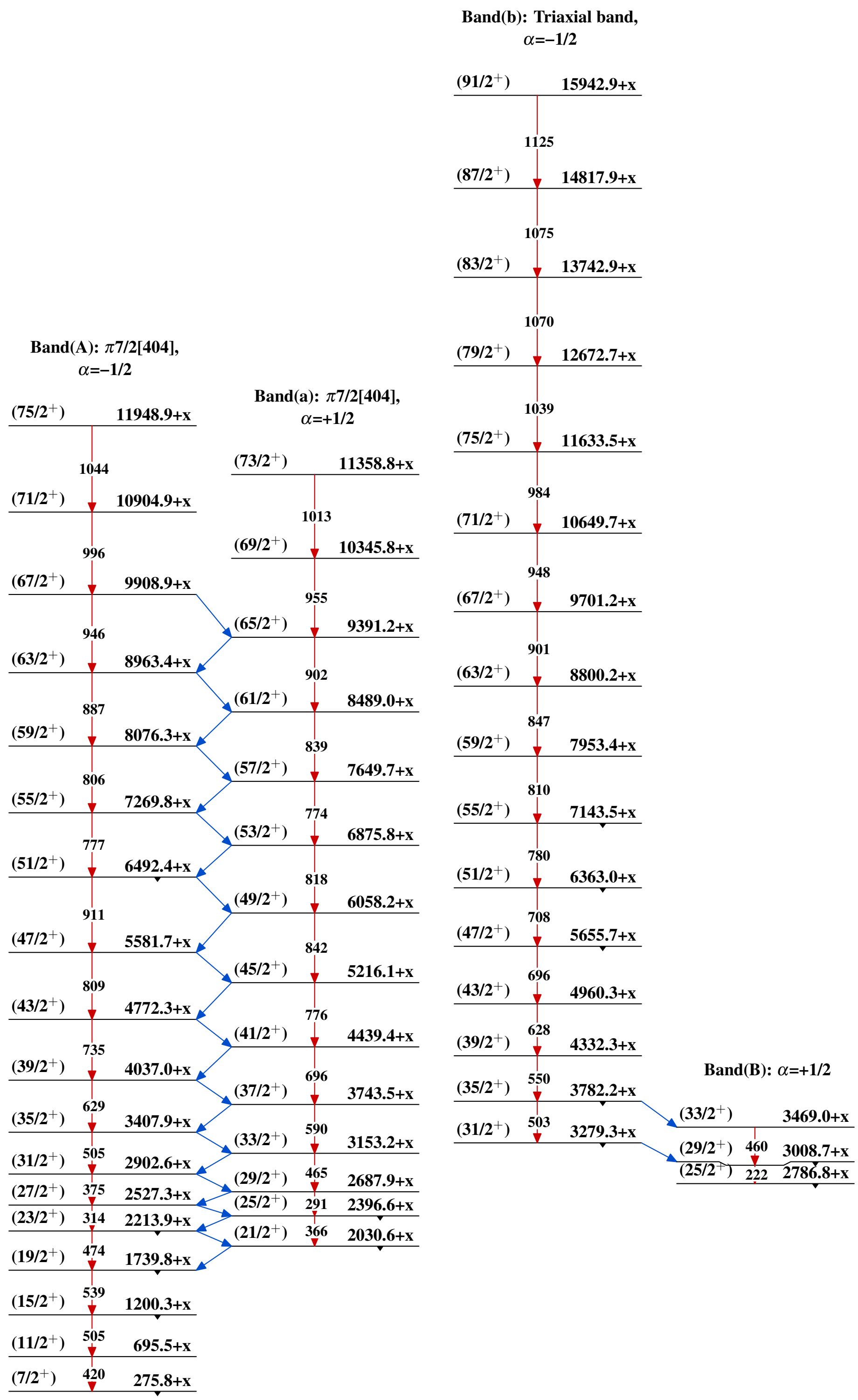
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

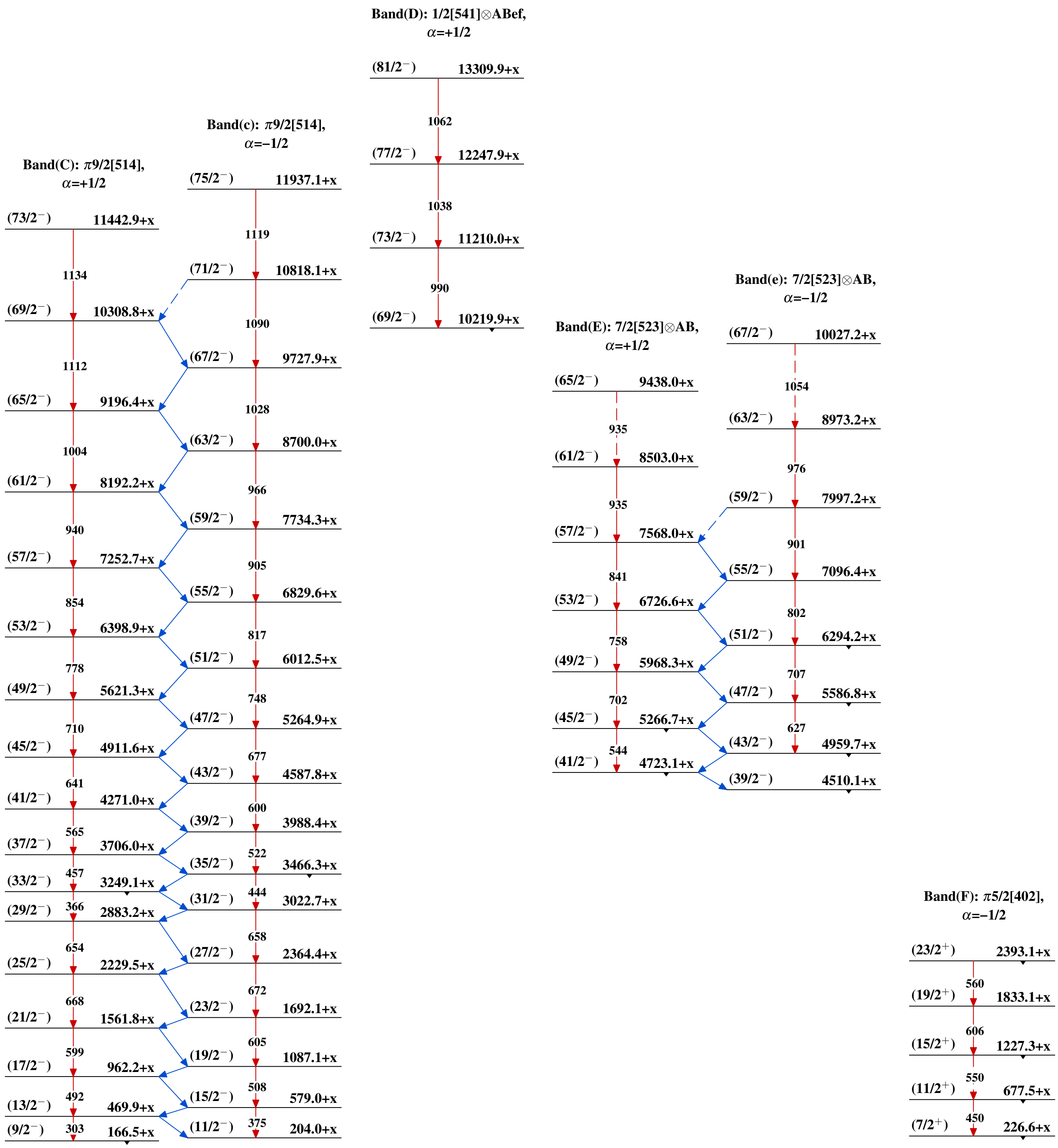


Adopted Levels, Gammas



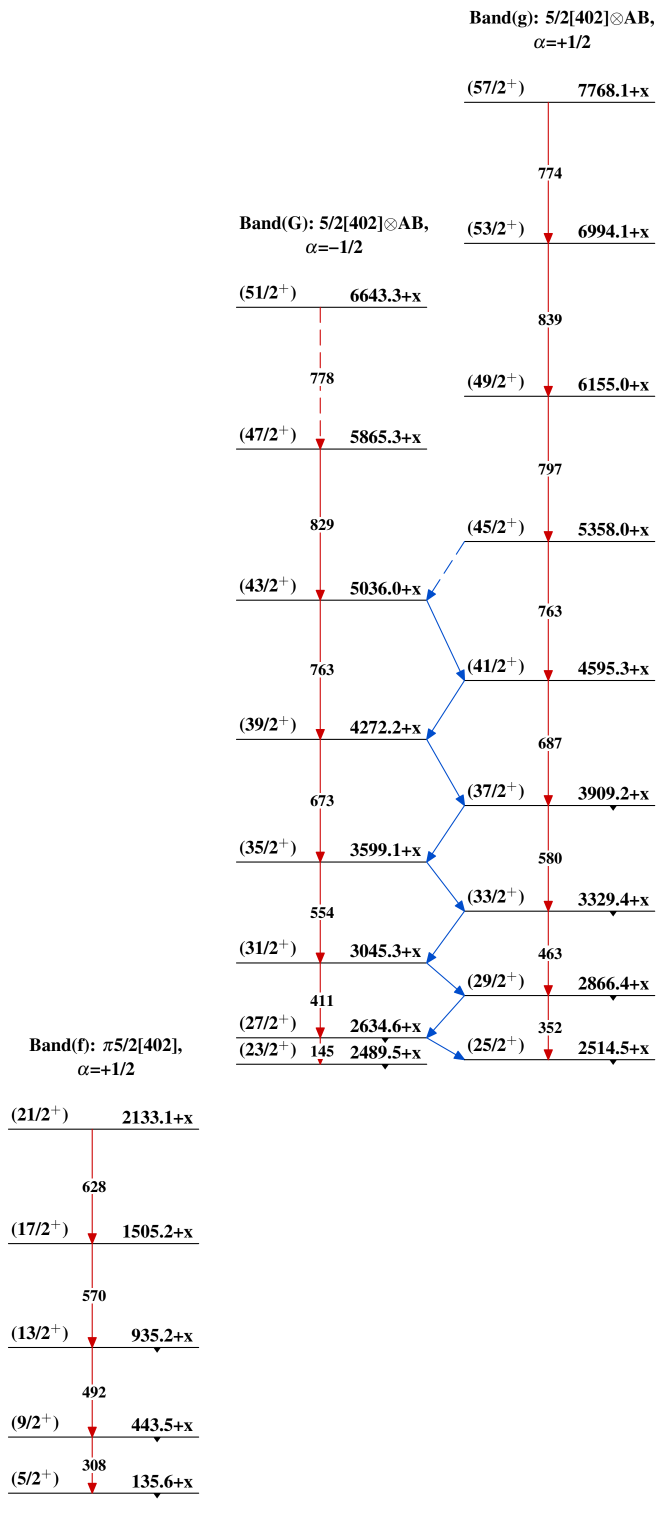
$^{161}_{71}Lu_{90}$

Adopted Levels, Gammas (continued)



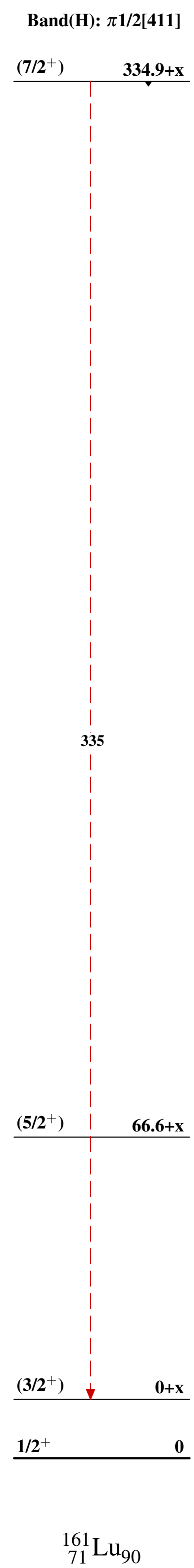
$^{161}_{71}Lu_{90}$

Adopted Levels, Gammas (continued)

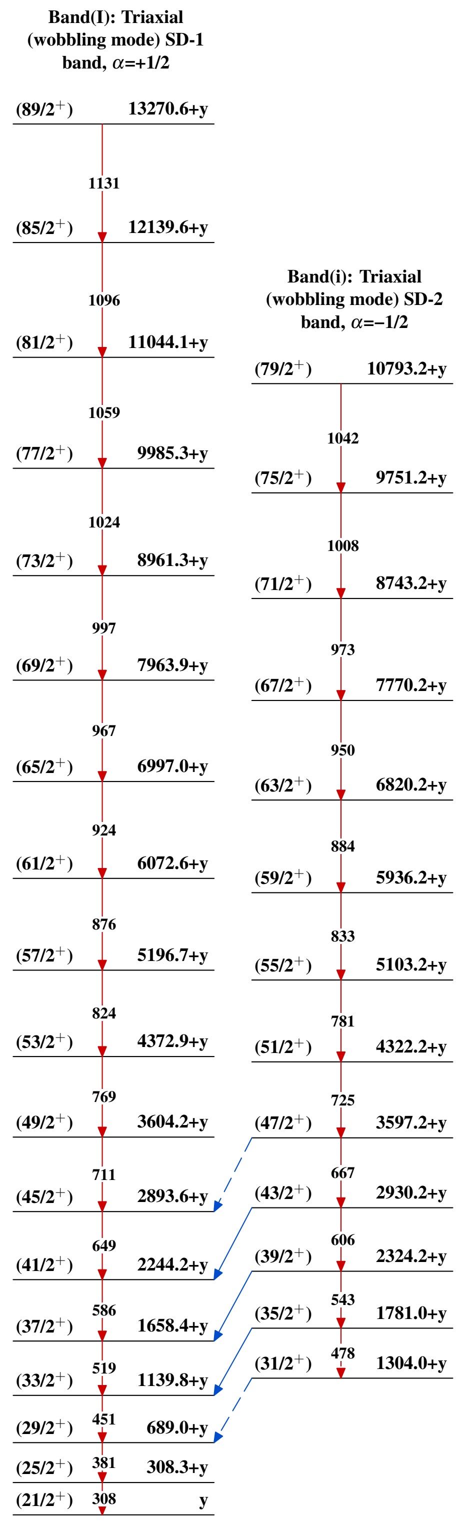


$^{161}_{71}Lu_{90}$

Adopted Levels, Gammas (continued)



Adopted Levels, Gammas (continued)



$^{161}_{71}Lu_{90}$

^{161}Lu IT decay (7.3 ms) 1973An10

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	C. W. Reich	NDS 112,2497 (2011)	1-Jun-2011

Parent: ^{161}Lu: E=166.5+x; J$^{\pi}$=(9/2$^-$); $T_{1/2}$=7.3 ms *4*; %IT decay=100.0 *SY*

^{161}Lu-%IT decay: evaluator assumes that the ε decay of the isomer is negligible.

Additional information 1.

^{161}Lu isomer produced in the ^{148}Sm(^{19}F,6n) reaction, E(^{19}F)=110-150 MeV, on an enriched metallic target and in the Eu(^{16}O,xn) reaction. γ's measured in a multiscaled manner between beam pulses (2-ms wide, 2% duty cycle), using a Ge(Li) detector of volume 8 cm^3. The mass assignment was deduced from excitation functions and the elemental assignment was made through observation of the decay of Lu K x-rays with the appropriate half-life. Measured $T_{1/2}$. Noted only one γ between 10 and 550 keV with the 7.3 ms half-life.

The problems In interpretation of the IT decay, noted In the previous evaluation (2000Re14), appear to have been resolved by recent heavy-ion studies (2006Br12). For a discussion of these problems, see (2000Re14).

^{161}Lu Levels

E(level)	J$^{\pi}$†	$T_{1/2}$	Comments
0	1/2$^+$		Level not reported in the IT decay, but expected from the decay of the first excited state. J$^{\pi}$: bandhead of 1/2[411].
0+x	(3/2$^+$)		E(level): x ≈ 15 keV based on systematics. See comment In the Adopted Levels.
135.8+x *2*	(5/2$^+$)		
166.5+x	(9/2$^-$)	7.3 ms *4*	E(level): from 'Adopted Levels' based on data from ^{139}La(^{28}Si,6nγ). J$^{\pi}$: bandhead of 9/2[514], the most likely candidate for the isomeric level.

† From the Adopted Levels.

γ(^{161}Lu)

Iγ normalization: value assumes a transition intensity of 100% for 135.8γ.

E$_{\gamma}$	I$_{\gamma}$†	E$_i$(level)	J$^{\pi}_i$	E$_f$	J$^{\pi}_f$	Mult.	δ	α‡	Comments
(30.7)		166.5+x	(9/2$^-$)	135.8+x	(5/2$^+$)	[M2]		1767	α(L)=1333 *19*; α(M)=341 *5*; α(N+..)=93.3 *13* α(N)=81.4 *12*; α(O)=11.34 *16*; α(P)=0.533 *8* E$_{\gamma}$: the evaluator assumes that the isomer decays to 135.8+x, (5/2$^+$) through an M2 transition. This energy is consistent with a low-energy transition, below the K-shell binding energy of 63 keV as postulated by 1973An10. Transitions to 0+x or g.s. would be higher than the K-shell binding energy.
135.8 *2*	100	135.8+x	(5/2$^+$)	0+x	(3/2$^+$)	M1(+E2)	0.6 *6*	1.41 *16*	α(K)=1.1 *3*; α(L)=0.26 *9*; α(M)=0.062 *22*; α(N+..)=0.017 *6* α(N)=0.014 *5*; α(O)=0.0020 *6*; α(P)=7.7×10^{-5} *23* Placement from 'Adopted Gammas', which is based on the work of 2006Br12 in ^{139}La(^{28}Si,6nγ). Mult.: 1973An10 report multipolarity

Continued on next page (footnotes at end of table)

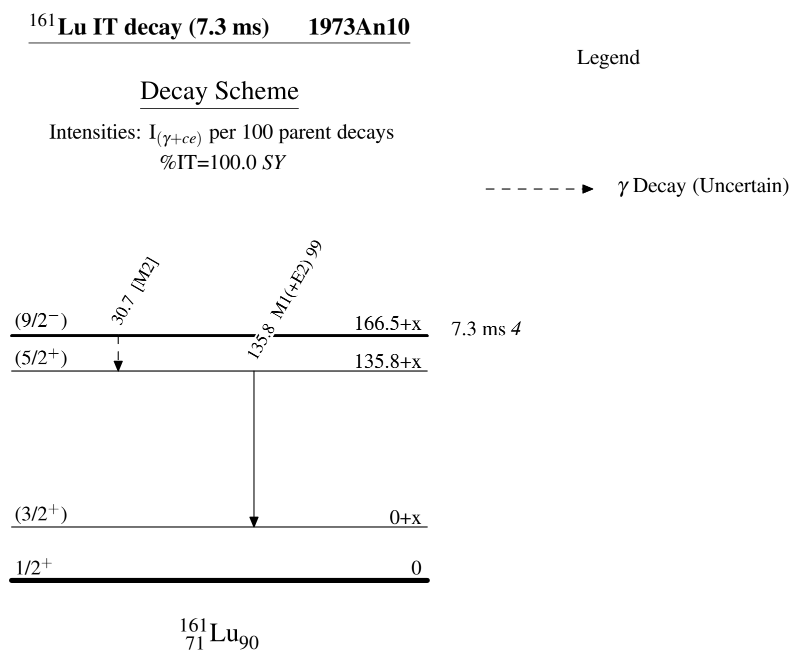
^{161}Lu IT decay (7.3 ms) 1973An10 (continued)

$\gamma(^{161}Lu)$ (continued)

E_γ	E_i(level)	Comments
		from α(K)exp=1.1 *3*, after rejecting the possibility of an E3 transition with a half-life of 7 ms. δ: evaluator's analysis of α(K)exp=1.1 *3* (1973An10); 1973An10 give ≈10% E2 (δ≈0.3).

† For absolute intensity per 100 decays, multiply by syst 0.41.

‡ 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.



^{161}Hf ε decay 1995Hi12,1989Br19

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	C. W. Reich	NDS 112,2497 (2011)	1-Jun-2011

Parent: ^{161}Hf: E=0; $T_{1/2}$=18.2 s *5*; Q(ε)=6244 *36*; %ε+%β^+ decay>99.9

^{161}Hf-E: Additional information 1.

^{161}Hf-$T_{1/2}$: Additional information 2.

^{161}Hf-Q(ε): Additional information 3.

^{161}Hf-%ε+%β^+ decay: %α<0.13.

Additional information 4.

Level scheme essentially based on the low-lying level structure shown by 2006Br12 In ^{139}La(^{28}Si,6nγ) and As listed In the XUNDL data file. The γ-ray placements are consistent with coincidence data of 1995Hi12.

1995Hi12: ^{161}Hf produced through bombardment of BaF_2 targets with 240-MeV S ions. Reaction products were thermalized and swept out using He-jet gas flow and deposited in a tape-transport system. γ radiation was studied with two high-resolution Ge detectors in a close geometry. α radiation was studied using a 450-mm^2 Si surface-barrier detector placed between the γ detectors. Measured excitation functions, Eγ,Iγ,Eα,$\gamma\gamma$ and Xγ coin. Mass assignment made on the basis of excitation functions.

1989Br19: ^{161}Hf produced in the ^{144}Sm(^{22}Ne,5n) and the ^{147}Sm(^{20}Ne,6n) reactions with 163-MeV ^{20}Ne ions. Reaction products were transported using a gas-jet transport system and absorbed in a solution, where chemical separation was performed. γ radiation was studied using a 2.1-cm^3 HPGe detector and a 35-cm^3 Ge(Li) detector. The authors report $T_{1/2}$ and 2 γ's, having Eγ=135.6 and 180.0. 1995Hi12, however, assign this latter γ to the ^{165}Hf decay.

The data are from 1995Hi12. The level scheme is based on low-lying level structure established by 2006Br12 in ^{139}La(^{28}Si,6nγ) study, where several γ-ray energies are found to be similar to those in 1995Hi12.

^{161}Lu Levels

E(level)[†]	J$^\pi$[‡]	Comments
0[#]	1/2$^+$	Level not reported in the ε decay, but expected from the decay of the first excited state.
0+x[#]	(3/2$^+$)	Additional information 5. E(level): x $\approx$ 15 keV based on systematics (see comment In the Adopted Levels).
66.7+x[#] *7*	(5/2$^+$)	
135.6+x *3*	(5/2$^+$)	
226.8+x *6*	(7/2$^+$)	
275.9+x? *5*	(7/2$^+$)	
335.2+x[#] *5*	(7/2$^+$)	
444.4+x *7*	(9/2$^+$)	

† The level energies are based on those in the Adopted Levels, which are essentially from 2006Br12 in ^{139}La(^{28}Si,6nγ).

‡ From adopted values.

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

γ(^{161}Lu)

An 180 γ, previously assigned to the ^{161}Hf decay, has been assigned instead by 1995Hi12 to the ^{165}Hf decay.

E$_\gamma$	I$_\gamma$	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$	Comments
91.2 *5*	5 *1*	226.8+x	(7/2$^+$)	135.6+x	(5/2$^+$)	
135.6 *3*	100	135.6+x	(5/2$^+$)	0+x	(3/2$^+$)	
199.6 *4*	15 *4*	335.2+x	(7/2$^+$)	135.6+x	(5/2$^+$)	
209.2[†] *5*	20 *3*	275.9+x?	(7/2$^+$)	66.7+x	(5/2$^+$)	
217.6 *4*	9 *4*	444.4+x	(9/2$^+$)	226.8+x	(7/2$^+$)	the ordering of 217.6-91.2 cascade follows from the work of 2006Br12

Continued on next page (footnotes at end of table)

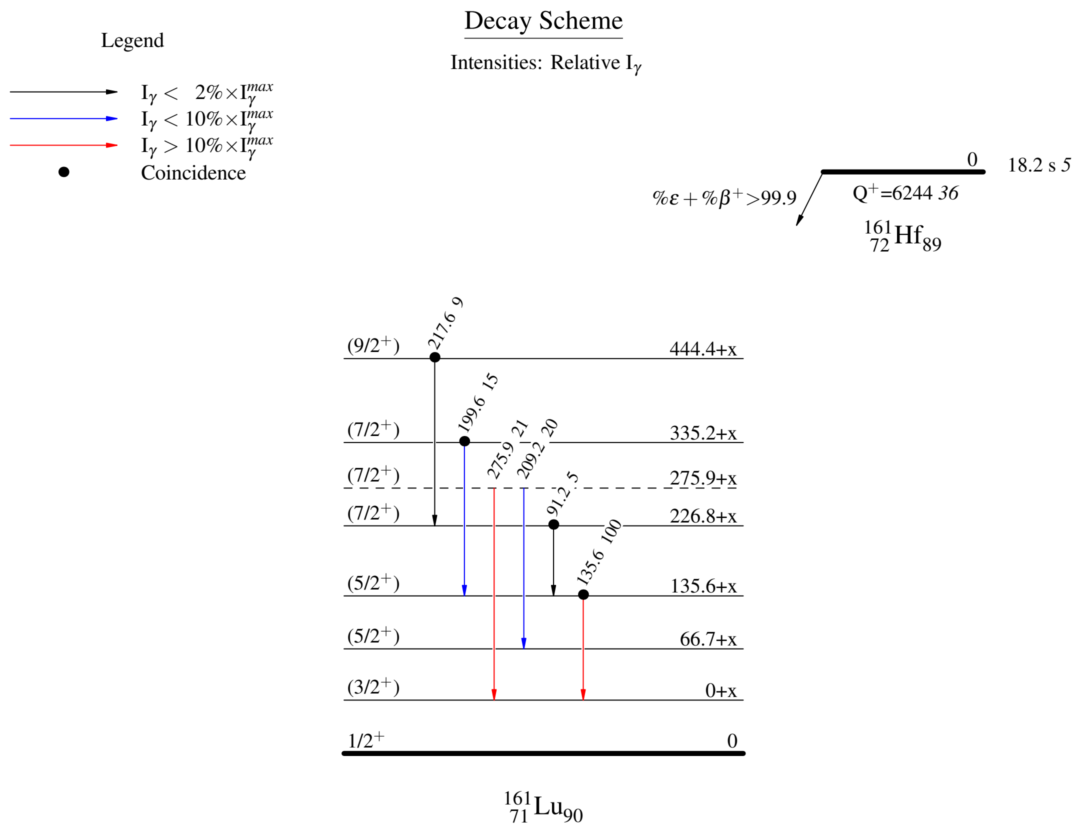
^{161}Hf ε decay 1995Hi12,1989Br19 (continued)

$\gamma(^{161}Lu)$ (continued)

E_γ	I_γ	E_i(level)	J^π_i	E_f	J^π_f	Comments
						In $^{139}La(^{28}Si,6n\gamma)$. I_γ: corrected (by 1995Hi12) for the contribution of a 215.8 γ from the decay of ^{160}Yb.
275.9[†] *5*	21 *3*	275.9+x?	$(7/2^+)$	0+x	$(3/2^+)$	

† Placement based on low-lying level structure shown In $^{139}La(^{28}Si,6n\gamma)$ by 2006Br12. γ unplaced by 1995Hi12.

^{161}Hf ε decay 1995Hi12,1989Br19



^{161}Hf ε decay 1995Hi12,1989Br19

^{120}Sn(^{45}Sc,4nγ) 1988Yu05

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	C. W. Reich	NDS 112,2497 (2011)	1-Jun-2011

Additional information 1.

Data are from the ^{120}Sn(^{45}Sc,4nγ) reaction, E(^{45}Sc)=205 MeV, with modifications based on data from 2006Br12 in ^{139}La(^{28}Si,6nγ). The product mass was deduced from the observation of γ's from this reaction and from the ^{118}Sn(^{48}Ti,p4nγ) reaction, E(^{48}Ti)=230 MeV, and from their lack of observation in ^{147}Sm(^{19}F,xng), with E(^{19}F)= 83, 90 and 94 MeV, where the energies are high enough to remove only 4 neutrons. Measured Eγ, Iγ, $\gamma\gamma$, $\gamma\gamma(\theta)$ using an array of 12 Compton-suppressed Ge detectors and 50 BGO detectors.

Half-life values have been measured for several levels. They have been mentioned (1993YuZZ) in abstracts and shown graphically as Q_t values in earlier laboratory reports from the group that carried out the measurements summarized in this data set, but they have not as yet been published.

^{161}Lu Levels

E(level)[†]	J^{π}[‡]	Comments
z[&]	11/2$^-$	E(level): z=204.0+x In the Adopted Levels and 203.5+x in ^{139}La(^{28}Si,6nγ).
266.3+z[@]	13/2$^-$	
375.3+z[&]	15/2$^-$	
758.7+z[@]	17/2$^-$	
883.7+z[&]	19/2$^-$	
1358.7+z[@]	21/2$^-$	
1488.5+z[&]	23/2$^-$	
1828.0+z[a]	21/2$^+$	
2011.5+z[b]	23/2$^+$	
2012.8+z[@]	25/2$^-$	E(level): 25/2$^-$ band member is defined At 2229.5+x In the Adopted Levels due to the reversed ordering of the 668.1-654.4 cascade by 2006Br12 In ^{139}La(^{28}Si,6nγ).
2161.0+z[&]	27/2$^-$	
2194.3+z[a]	25/2$^+$	
2325.0+z[b]	27/2$^+$	
2485.8+z[a]	29/2$^+$	
2680.8+z[@]	29/2$^-$	
2700.7+z[b]	31/2$^+$	
2819.7+z[&]	31/2$^-$	
2951.4+z[a]	33/2$^+$	
3046.4+z[@]	33/2$^-$	
3206.2+z[b]	35/2$^+$	
3263.8+z[&]	35/2$^-$	
3503.7+z[@]	37/2$^-$	
3541.9+z[a]	37/2$^+$	
3786.2+z[&]	39/2$^-$	
3835.6+z[b]	39/2$^+$	
4068.9+z[@]	41/2$^-$	
4238.2+z[a]	41/2$^+$	
4385.9+z[&]	43/2$^-$	
4571.2+z[b]	43/2$^+$	
4709.9+z[@]	45/2$^-$	
5015.6+z[a]	45/2$^+$	

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$^{120}Sn(^{45}Sc,4n\gamma)$ 1988Yu05 (continued)

^{161}Lu Levels (continued)

E(level)[†]	J^{π}[‡]	Comments
5063.5+z[&]	$47/2^-$	
5381.2+z[b]	$(47/2^+)$	
5419.9+z[@]	$49/2^-$	
5811.3+z[&]	$51/2^-$	
5859+z?[a]	$(49/2^+)$	
6162+z[b]	$(51/2^+)$	
6198+z[@]	$53/2^-$	
6629+z[&]	$55/2^-$	
6943+z[b]	$(55/2^+)$	
7053+z[@]	$57/2^-$	
7534+z[&]	$59/2^-$	
7791+z[#b]	$(59/2^+)$[#]	E(level): corresponds to 8800.2+x, $(63/2^+)$ level In the Adopted Levels.
7992+z[@]	$61/2^-$	
8499+z[&]	$63/2^-$	
8692+z[#b]	$(63/2^+)$[#]	E(level): corresponds to 9701.2+x, $(67/2^+)$ level In the Adopted Levels.
8996+z[@]	$65/2^-$	
9527+z?[&]	$(67/2^-)$	
9640+z[#b]	$(67/2^+)$[#]	E(level): corresponds to 10649.7+x, $(71/2^+)$ level In the Adopted Levels.
10019+z[@]	$(69/2^-)$	
10625+z[#b]	$(71/2^+)$[#]	E(level): corresponds to 11633.5+x, $(75/2^+)$ level In the Adopted Levels.
11009+z[@]	$(73/2^-)$	
11664+z[#b]	$(75/2^+)$[#]	E(level): corresponds to 12672.7+x, $(79/2^+)$ level In the Adopted Levels.
12070+z[@]	$(77/2^-)$	E(level): corresponds to 13309.9+x, $(81/2^-)$ level In the Adopted Levels. A 1037.9γ from $77/2^-$ to $73/2^-$ In the work of 2006Br12 In $^{139}La(^{28}Si,6n\gamma)$ is missing In the cascade defined by 1988Yu05.
12738+z?[b]	$(79/2^+)$	E(level): corresponds to 14817.9+x, $(87/2^+)$ level In the Adopted Levels. A 1070.2γ from $85/2^+$ to $81/2^+$ In the work of 2006Br12 In $^{139}La(^{28}Si,6n\gamma)$ is missing In the cascade defined by 1988Yu05.
13835+z?[b]	$(83/2^+)$	E(level): this level not reported by 2006Br12 In $^{139}La(^{28}Si,6n\gamma)$.

† From unweighted fit to γ energies; γ's with questionable placements are omitted from fit, except where they are the only γ's determining the level energies. The energy of the first level z here corresponds to 204.0+x in 'Adopted Levels', except as noted.

‡ Assignments are those of the authors and are based on the systematics of the transition energies and the signature splitting for the Ho, Tm and Lu isotopes and on the $h_{11/2}$ level sequences in other isotopes. Levels having two deexciting γ's which can be assigned as a cascade and a crossover transition with appropriate multipolarities (Q and D+Q, respectively) have J^{π}'s without parentheses, while those having only one reported deexciting γ are generally shown in parentheses. The relative parity of the bands is deduced by interpreting the high-energy dipole transitions as being E1, rather than M1. All assignments are consistent with those those in the Adopted Levels, except that these are given in parentheses there due to lack of strong supporting arguments.

An 809.9γ from $59/2^+$ to $55/2^+$ In the work of 2006Br12 In $^{139}La(^{28}Si,6n\gamma)$ reaction is missing In the cascade defined by 1988Yu05. Thus z=1009+x and spin should be increased by two units.

@ Band(A): Negative-parity band, α=+1/2. associated with the configuration=(π $h_{11/2}$).

& Band(a): Negative-parity band, α=−1/2. associated with the configuration=(π $h_{11/2}$).

a Band(B): Positive-parity band, α=+1/2.

b Band(b): Positive-parity band, α=−1/2.

$^{120}Sn(^{45}Sc,4n\gamma)$ 1988Yu05 (continued)

$\gamma(^{161}Lu)$

Iγ normalization: only relative Iγ, so no normalization given.
Angular correlation ratio: R=[$I_{\gamma\gamma}$(two detectors at 30°)]/ [$I_{\gamma\gamma}$(one detector at 30°, other at 90°)]. Authors use these data to distinguish between dipole and quadrupole multipolarities, but do not indicate which values correspond to these two possibilities.

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	Comments
109.0	10.8 *23*	375.3+z	15/2⁻	266.3+z	13/2⁻	D	R=0.73 *9*.
125.0	5.7 *9*	883.7+z	19/2⁻	758.7+z	17/2⁻	D	R=0.93 *17*.
130.0[&]	2.0 *7*	1488.5+z	23/2⁻	1358.7+z	21/2⁻		
130.8	19 *4*	2325.0+z	27/2⁺	2194.3+z	25/2⁺	D	R=0.72 *14*.
139.7	5.2 *8*	2819.7+z	31/2⁻	2680.8+z	29/2⁻		
148.6	<0.8	2161.0+z	27/2⁻	2012.8+z	25/2⁻		E_γ: γ not reported by 2006Br12 In $^{139}La(^{28}Si,6n\gamma)$.
160.8	23 *4*	2485.8+z	29/2⁺	2325.0+z	27/2⁺	D	R=0.84 *12*.
182.8	<13	2194.3+z	25/2⁺	2011.5+z	23/2⁺		R=1.00 *12*.
183.5	<13	2011.5+z	23/2⁺	1828.0+z	21/2⁺		R=1.00 *12*.
214.8	21 *3*	2700.7+z	31/2⁺	2485.8+z	29/2⁺		R=0.93 *11*.
217.3	36.4 *17*	3263.8+z	35/2⁻	3046.4+z	33/2⁻	D	R=0.87 *3*.
226.7	36.3 *19*	3046.4+z	33/2⁻	2819.7+z	31/2⁻	D	R=0.77 *4*.
239.9	32.3 *14*	3503.7+z	37/2⁻	3263.8+z	35/2⁻	D	R=0.82 *4*.
250.7	13 *3*	2951.4+z	33/2⁺	2700.7+z	31/2⁺	D	R=0.71 *7*.
254.8	18.1 *27*	3206.2+z	35/2⁺	2951.4+z	33/2⁺	D	R=0.83 *8*.
266.3	44 *3*	266.3+z	13/2⁻	z	11/2⁻	D	R=0.92 *7*.
282.5	18 *8*	3786.2+z	39/2⁻	3503.7+z	37/2⁻		
282.8	23 *1*	4068.9+z	41/2⁻	3786.2+z	39/2⁻	D	R=0.80 *3*.
291.3	4.4 *7*	2485.8+z	29/2⁺	2194.3+z	25/2⁺		R=0.99 *23*. Branching ratio: Iγ(291)/Iγ(161)=0.19 *3*.
293.7	9.0 *14*	3835.6+z	39/2⁺	3541.9+z	37/2⁺	D	R=0.89 *14*.
316.9	19.6 *15*	4385.9+z	43/2⁻	4068.9+z	41/2⁻	D	R=0.82 *3*.
324.0	20.3 *15*	4709.9+z	45/2⁻	4385.9+z	43/2⁻	D	R=0.85 *9*.
333.1	4.9 *9*	4571.2+z	43/2⁺	4238.2+z	41/2⁺		R=1.37 *22*.
335.8	7.9 *13*	3541.9+z	37/2⁺	3206.2+z	35/2⁺		R=0.90 *15*.
353.7	14.1 *10*	5063.5+z	47/2⁻	4709.9+z	45/2⁻	D	R=0.83 *4*.
356.4	14.0 *10*	5419.9+z	49/2⁻	5063.5+z	47/2⁻	D	R=0.88 *7*.
366.3	4.4 *7*	2194.3+z	25/2⁺	1828.0+z	21/2⁺		Branching ratio: Iγ(366)/Iγ(183)>0.34.
366.4	5.1 *1*	3046.4+z	33/2⁻	2680.8+z	29/2⁻	Q	R=1.08 *13*. Branching ratio: Iγ(366)/Iγ(227)=0.14 *1*.
375.3	69 *4*	375.3+z	15/2⁻	z	11/2⁻	Q	R=1.12 *3*. Branching ratio: Iγ(375)/Iγ(109)=5.2 *11*.
376.0		2700.7+z	31/2⁺	2325.0+z	27/2⁺		
383.4	27.4 *14*	758.7+z	17/2⁻	375.3+z	15/2⁻	D	R=0.95 *10*.
386.4	9.3 *6*	6198+z	53/2⁻	5811.3+z	51/2⁻	D	R=0.79 *5*.
391.4	11.0 *5*	5811.3+z	51/2⁻	5419.9+z	49/2⁻		R=0.98 *8*.
402.6	5.9 *9*	4238.2+z	41/2⁺	3835.6+z	39/2⁺		
423.4	5.2 *5*	7053+z	57/2⁻	6629+z	55/2⁻		
430.9	8.3 *5*	6629+z	55/2⁻	6198+z	53/2⁻	D	R=0.88 *5*.
444.0	16.9 *14*	3263.8+z	35/2⁻	2819.7+z	31/2⁻	Q	R=1.29 *6*. Branching ratio: Iγ(444)/Iγ(217)=0.44 *2*.
444[&]		5015.6+z	45/2⁺	4571.2+z	43/2⁺		E_γ: γ is shown in level scheme, but not in table.
457.4	13.8 *11*	3503.7+z	37/2⁻	3046.4+z	33/2⁻	Q	R=1.24 *7*. Branching ratio: Iγ(457)/Iγ(240)=0.40 *2*.
458.3[&]	3.9 *9*	7992+z	61/2⁻	7534+z	59/2⁻		
465.5	14 *3*	2951.4+z	33/2⁺	2485.8+z	29/2⁺	Q	R=1.46 *20*. Branching ratio: Iγ(465)/Iγ(251)=1.05 *9*.
474.9	19.2 *7*	1358.7+z	21/2⁻	883.7+z	19/2⁻	D	R=0.84 *12*.
481.5	6.3 *9*	7534+z	59/2⁻	7053+z	57/2⁻		

Continued on next page (footnotes at end of table)

^{120}Sn(^{45}Sc,4nγ) 1988Yu05 (continued)

γ(^{161}Lu) (continued)

E_γ [†]	I_γ [‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [#]	Comments
492.4	16.3 6	758.7+z	17/2⁻	266.3+z	13/2⁻	Q	R=1.26 18. Branching ratio: Iγ(492)/Iγ(383)=0.68 4.
505.4	22 4	3206.2+z	35/2⁺	2700.7+z	31/2⁺	Q	R=1.10 15. Branching ratio: Iγ(505)/Iγ(255)=1.20 10.
508.4	100.0 22	883.7+z	19/2⁻	375.3+z	15/2⁻	Q	R=1.13 4. Branching ratio: Iγ(508)/Iγ(125)=17.4 25.
519.3	7.7 7	2680.8+z	29/2⁻	2161.0+z	27/2⁻		
522.4	9 4	3786.2+z	39/2⁻	3263.8+z	35/2⁻		Branching ratio: Iγ(522)/Iγ(282)=0.50 10.
524.4	8 3	2012.8+z	25/2⁻	1488.5+z	23/2⁻		E_γ: γ not reported by 2006Br12 In ^{139}La(^{28}Si,6nγ). The 522.6 and 525.6 γ rays In ^{139}La(^{28}Si,6nγ) are placed from negative-parity levels.
565.2	18.2 9	4068.9+z	41/2⁻	3503.7+z	37/2⁻	Q	R=1.21 8. Branching ratio: Iγ(565)/Iγ(283)=0.78 11.
590.6	11.3 17	3541.9+z	37/2⁺	2951.4+z	33/2⁺	Q	R=1.15 25. Branching ratio: Iγ(591)/Iγ(336)=1.44 15.
599.7	16.7 20	4385.9+z	43/2⁻	3786.2+z	39/2⁻	Q	R=1.25 6. Branching ratio: Iγ(600)/Iγ(317)=0.85 7.
599.9	29 5	1358.7+z	21/2⁻	758.7+z	17/2⁻	Q	R=1.20 7. Branching ratio: Iγ(600)/Iγ(475)=1.53 26.
604.9	85.8 19	1488.5+z	23/2⁻	883.7+z	19/2⁻	Q	R=1.21 6. Branching ratio: Iγ(605)/Iγ(130)=43 14.
629.3	21 3	3835.6+z	39/2⁺	3206.2+z	35/2⁺	Q	R=1.25 16. Branching ratio: Iγ(629)/Iγ(294)=2.36 20.
641.0	17.0 7	4709.9+z	45/2⁻	4068.9+z	41/2⁻	Q	R=1.52 15. Branching ratio: Iγ(641)/Iγ(324)=0.86 7.
652.5	9.2 15	2011.5+z	23/2⁺	1358.7+z	21/2⁻	D [@]	R=0.76 7.
654.4	17.8 8	2012.8+z	25/2⁻	1358.7+z	21/2⁻		Branching ratio: Iγ(654)/Iγ(524)=2.0 7. 668.1-654.4 cascade is reversed In ^{139}La(^{28}Si,6nγ) (2006Br12).
658.7	54.0 14	2819.7+z	31/2⁻	2161.0+z	27/2⁻	Q	R=1.28 7. Branching ratio: Iγ(659)/Iγ(140)=12 6.
668.1	10.3 6	2680.8+z	29/2⁻	2012.8+z	25/2⁻		668.1-654.4 cascade is reversed In ^{139}La(^{28}Si,6nγ) (2006Br12). Branching ratio: Iγ(668)/Iγ(519)=1.34 10.
672.6	75.0 18	2161.0+z	27/2⁻	1488.5+z	23/2⁻	Q	R=1.12 6. Branching ratio: Iγ(673)/Iγ(149)>94.
677.5	17.1 7	5063.5+z	47/2⁻	4385.9+z	43/2⁻	Q	R=1.32 8. Branching ratio: Iγ(677)/Iγ(354)=1.14 6.
696.3	11.3 17	4238.2+z	41/2⁺	3541.9+z	37/2⁺	Q	R=1.15 20. Branching ratio: Iγ(696)/Iγ(403)=1.9 4.
710.1	17 2	5419.9+z	49/2⁻	4709.9+z	45/2⁻	Q	R=1.32 12. Branching ratio: Iγ(710)/Iγ(356)=1.24 8.
735.6	18.0 27	4571.2+z	43/2⁺	3835.6+z	39/2⁺	Q	R=1.18 14. Branching ratio: Iγ(736)/Iγ(333)=3.66 41.
747.8	13.7 8	5811.3+z	51/2⁻	5063.5+z	47/2⁻	Q	R=1.29 9. Branching ratio: Iγ(748)/Iγ(391)=1.27 9.
777.4	10.5 16	5015.6+z	45/2⁺	4238.2+z	41/2⁺		
777.8	12 2	6198+z	53/2⁻	5419.9+z	49/2⁻	Q	R=1.62 16. Branching ratio: Iγ(778)/Iγ(386)=1.30 14.
781	<20	6162+z	(51/2⁺)	5381.2+z	(47/2⁺)	Q	R=1.3 1.
781	<20	6943+z	(55/2⁺)	6162+z	(51/2⁺)	Q	R=1.3 1.
810	<22	5381.2+z	(47/2⁺)	4571.2+z	43/2⁺	Q	R=1.3 1.
817.3	10.2 8	6629+z	55/2⁻	5811.3+z	51/2⁻	Q	R=1.45 19. Branching ratio: Iγ(817)/Iγ(431)=1.24 12.

Continued on next page (footnotes at end of table)

^{120}Sn(^{45}Sc,4nγ) 1988Yu05 (continued)

γ(^{161}Lu) (continued)

E_γ [†]	I_γ [‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [#]	Comments
843.0 [&]	4.7 *8*	5859+z?	(49/2$^+$)	5015.6+z	45/2$^+$		
847.1	6.3 *11*	7791+z	(59/2$^+$)	6943+z	(55/2$^+$)	Q	R=1.4 *2*.
854.2	8.4 *7*	7053+z	57/2$^-$	6198+z	53/2$^-$		Branching ratio: Iγ(854)/Iγ(423)=1.62 *17*.
901.5	5.8 *11*	8692+z	(63/2$^+$)	7791+z	(59/2$^+$)	Q	R=1.2 *2*.
905.0	9.0 *1*	7534+z	59/2$^-$	6629+z	55/2$^-$		Branching ratio: Iγ(905)/Iγ(481)=1.42 *31*.
939.8	7.6 *12*	7992+z	61/2$^-$	7053+z	57/2$^-$		Branching ratio: Iγ(940)/Iγ(458)=1.93 *29*.
943.7 [&]	3.8 *7*	1828.0+z	21/2$^+$	883.7+z	19/2$^-$	D [@]	R=0.51 *9*.
948	3.9 *8*	9640+z	(67/2$^+$)	8692+z	(63/2$^+$)	Q	R=1.3 *3*.
965.8	≤1.8	8499+z	63/2$^-$	7534+z	59/2$^-$		
985	<2.3	10625+z	(71/2$^+$)	9640+z	(67/2$^+$)		
990	<2	11009+z	(73/2$^-$)	10019+z	(69/2$^-$)		
1004.4	4.3 *8*	8996+z	65/2$^-$	7992+z	61/2$^-$		
1023	<2.5	10019+z	(69/2$^-$)	8996+z	65/2$^-$		
1028 [&]	<1.5	9527+z?	(67/2$^-$)	8499+z	63/2$^-$		
1039	<2.5	11664+z	(75/2$^+$)	10625+z	(71/2$^+$)		
1061	<2	12070+z	(77/2$^-$)	11009+z	(73/2$^-$)		
1074 [&]	<1.2	12738+z?	(79/2$^+$)	11664+z	(75/2$^+$)		
1097 [&]	<1.0	13835+z?	(83/2$^+$)	12738+z?	(79/2$^+$)		E_γ: this γ not reported by 2006Br12 In ^{139}La(^{28}Si,6nγ).

† Uncertainties are 0.1 keV for most γ's; for weak or contaminated γ's, uncertainty is 0.5 or 1.0 keV (1988Yu05).

‡ For most γ's, value is the sum of the intensities observed in the coincidence gates on the 266 and 375 γ's. As noted by the authors, some intensities were deduced from other coincidence spectra. The intensities of the two gate γ's (i.e., 266 and 375) were obtained from the sum of the spectra in coincidence with the 383, 492, and 508 γ's. Branching ratios from coincidence spectra gated above a spin J are given under comments. These are generally more precise than those deduced relative gamma-ray intensities.

DCO ratios (the ratio of the coincidence intensity between two detectors at 30° with respect to the beam and between one detector at 30° and one at 90° with respect to the beam) are given for most γ's. These ratios generally distinguish between ΔJ=1 and ΔJ=2 transitions, but the implied multipolarities are not given by the authors. The listed values are those inferred by the evaluator from the consideration that those γ's having DCO ratios that are significantly greater than unity (of the order of 1.2) are Q and those whose ratios are significantly below unity (of the order of 0.8) are D. It is expected that these will generally be M1 and E2, rather than E1 and M2. Some amount of E2 admixture in the ΔJ=1 transitions is to be expected.

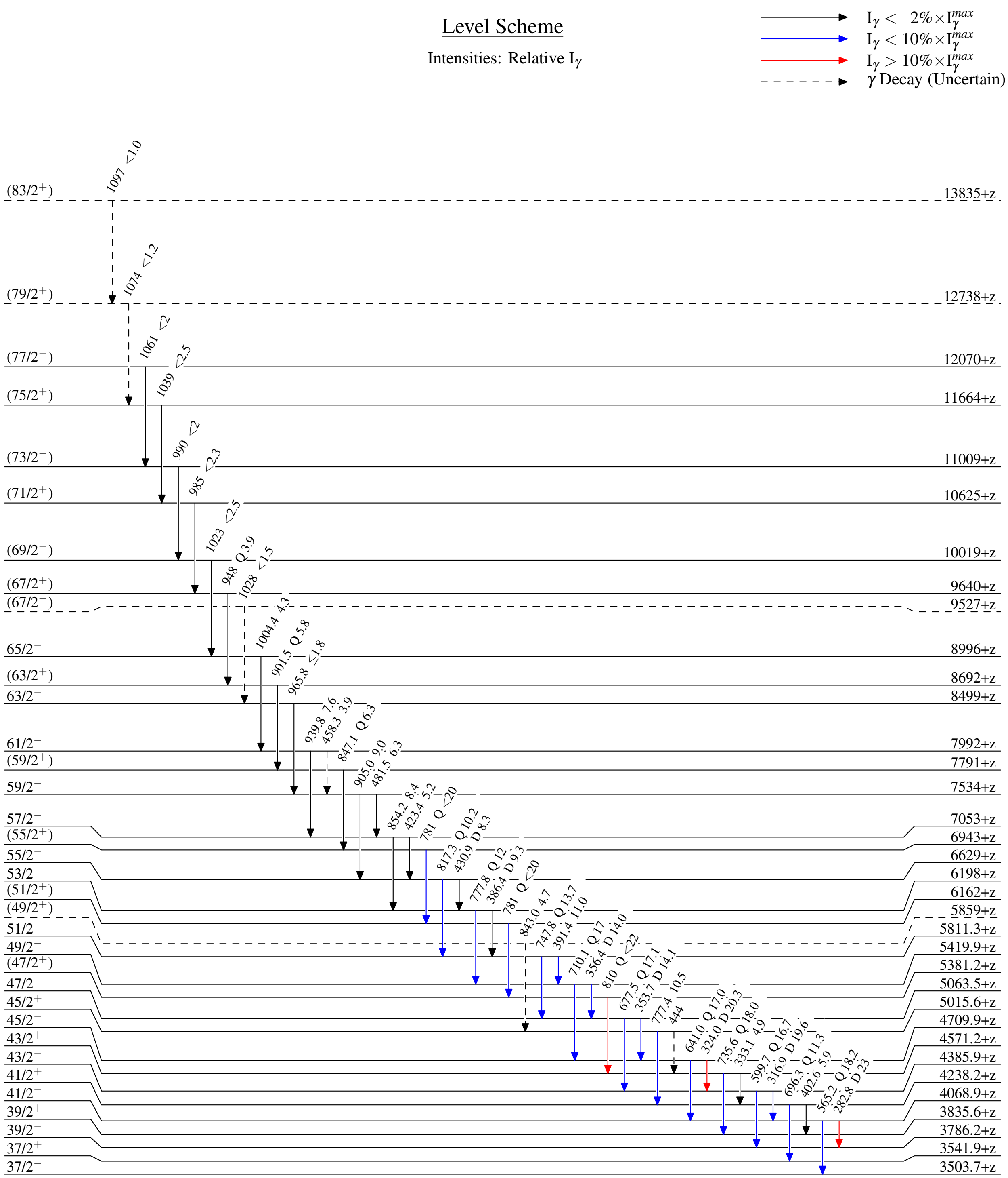
@ The DCO ratio indicates a stretched dipole transition (1988Yu05). These authors consider these to be E1 transitions, based on the fact that these energetic (interband) dipole transitions compete favorably with the intraband M1 and E2 transitions.

& Placement of transition in the level scheme is uncertain.

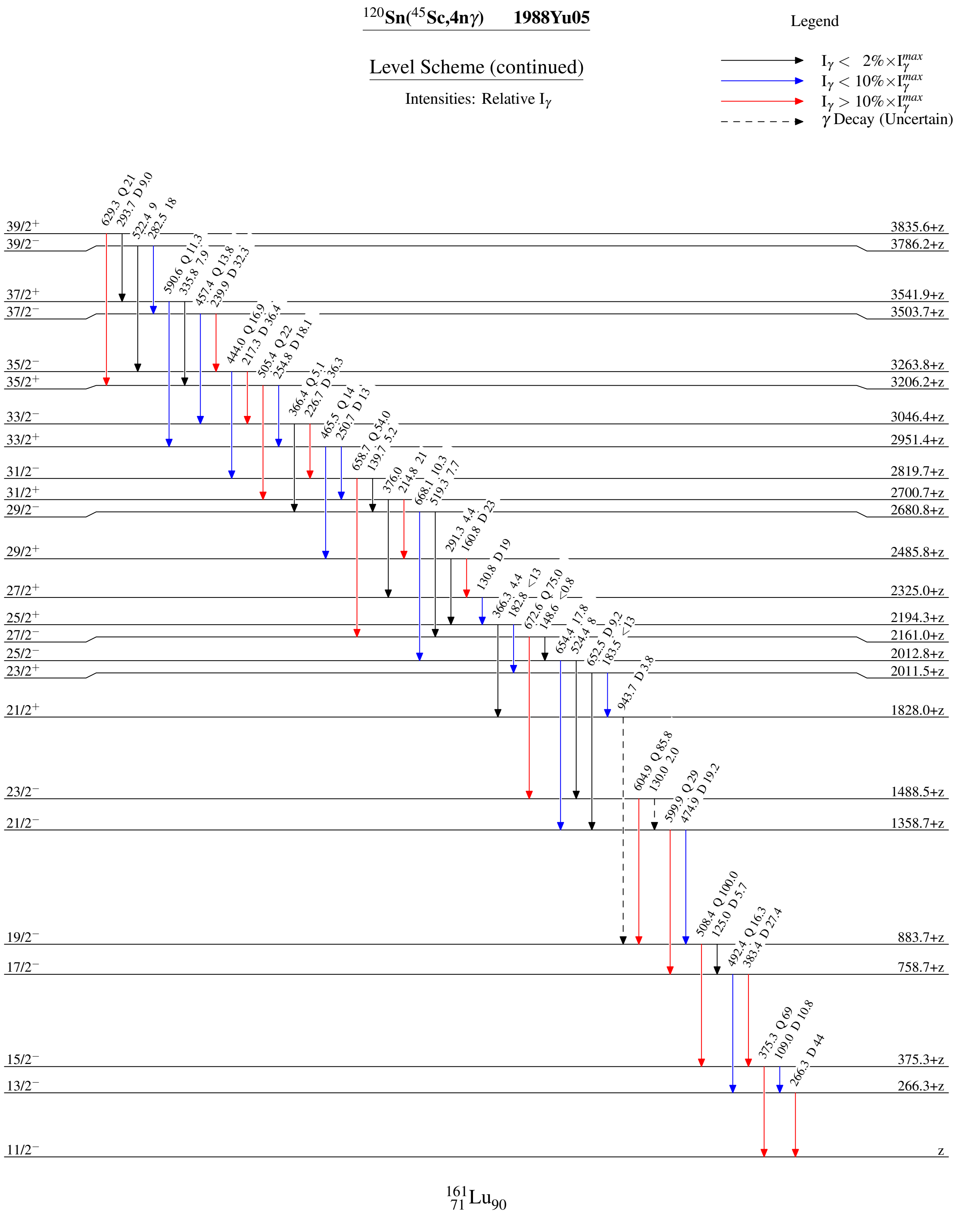
^{120}Sn(^{45}Sc,4nγ) 1988Yu05

Level Scheme

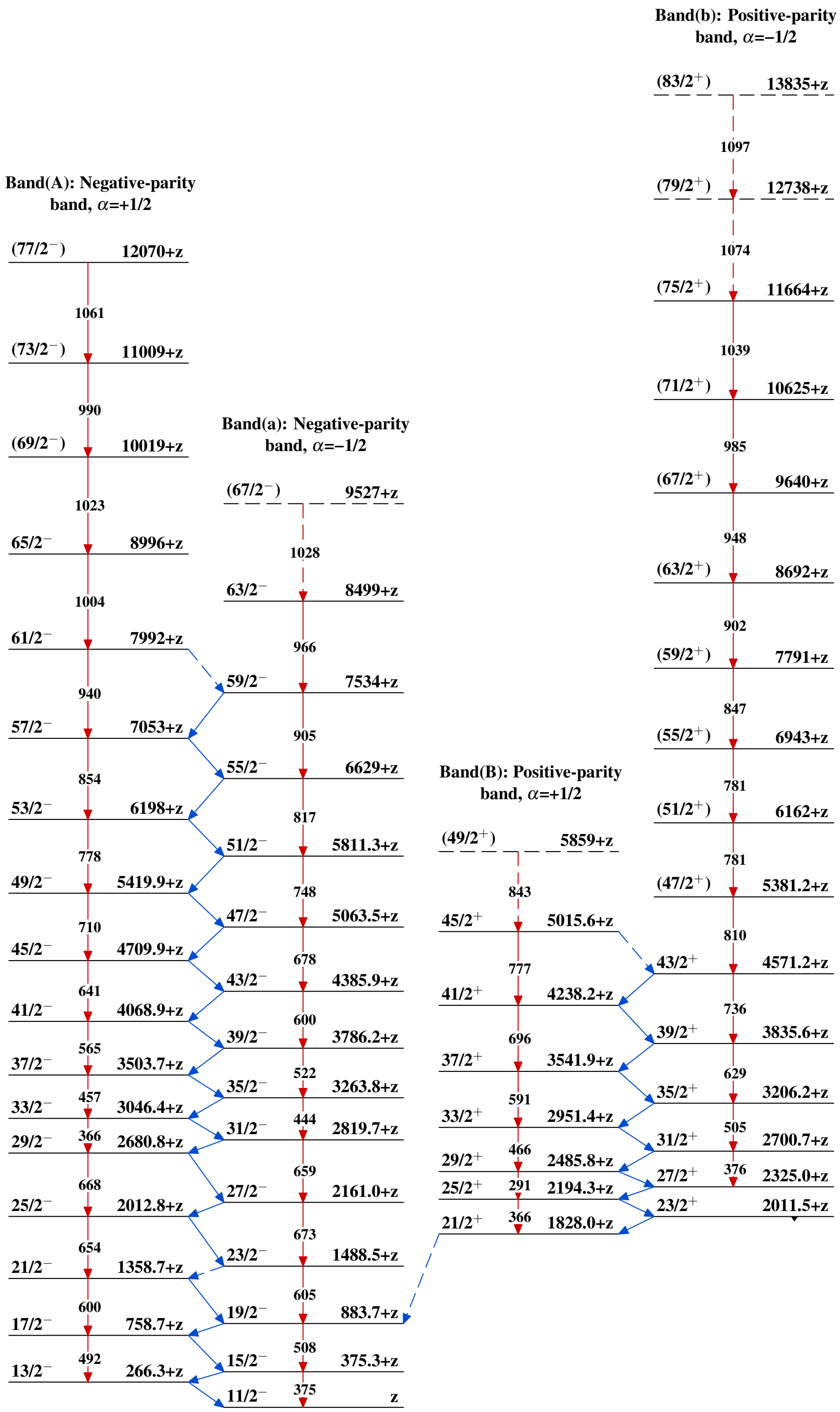
Intensities: Relative I_γ



$^{161}_{71}Lu_{90}$


^{120}Sn(^{45}Sc,4nγ) 1988Yu05
Level Scheme (continued)
Intensities: Relative Iγ
Legend
Iγ < 2%×Iγ^max
Iγ < 10%×Iγ^max
Iγ > 10%×Iγ^max
γ Decay (Uncertain)
39/2+ 3835.6+z
39/2− 3786.2+z
37/2+ 3541.9+z
37/2− 3503.7+z
35/2− 3263.8+z
35/2+ 3206.2+z
33/2− 3046.4+z
33/2+ 2951.4+z
31/2− 2819.7+z
31/2+ 2700.7+z
29/2− 2680.8+z
29/2+ 2485.8+z
27/2+ 2325.0+z
25/2+ 2194.3+z
27/2− 2161.0+z
25/2− 2012.8+z
23/2+ 2011.5+z
21/2+ 1828.0+z
23/2− 1488.5+z
21/2− 1358.7+z
19/2− 883.7+z
17/2− 758.7+z
15/2− 375.3+z
13/2− 266.3+z
11/2− z
629.3 Q 21
293.7 D 9.0
522.4 9
282.5 18
590.6 Q 11.3
335.8 7.9
457.4 Q 13.8
239.9 D 32.3
444.0 Q 16.9
217.3 D 36.4
505.4 Q 22
254.8 D 18.1
366.4 Q 5.1
226.7 D 36.3
465.5 Q 14
250.7 D 13
658.7 Q 54.0
139.7 5.2
376.0
214.8 21
668.1 10.3
519.3 7.7
291.3 4.4
160.8 D 23
130.8 D 19
366.3 4.4
182.8 <13
672.6 Q 75.0
148.6 ≤0.8
654.4 17.8
524.4 8
652.5 D 9.2
183.5 <13
943.7 D 3.8
604.9 Q 85.8
130.0 2.0
599.9 Q 29
474.9 D 19.2
508.4 Q 100.0
125.0 D 5.7
492.4 Q 16.3
383.4 D 27.4
375.3 Q 69
109.0 D 10.8
266.3 D 44
$^{161}_{71}Lu_{90}$

$^{120}Sn(^{45}Sc,4n\gamma)$ 1988Yu05



$^{161}_{71}Lu_{90}$

^{139}La(^{28}Si,6nγ) 2006Br12,2005Br14,2003Br03

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	C. W. Reich	NDS 112,2497 (2011)	1-Jun-2011

Additional information 1.
Includes ^{100}Mo(^{65}Cu,4nγ) reaction.

2006Br12: E=175 MeV. Measured Eγ, Iγ, $\gamma\gamma$ using EUROBALL spectrometer composed of 30 conventional Compton-suppressed Ge detectors, and 41 composite Compton-suppressed Ge detectors 26 'Clovers', (each with four Ge crystals) and 15 'Clusters', (each with seven Ge crystals), and a multiplicity filter of 210 BGO crystals.

2005Br14: ^{139}La(^{28}Si,6nγ) E=175 MeV. Measured Eγ, Eγ, $\gamma\gamma$, $\gamma\gamma(\theta)$(DCO) using EUROBALL array with 31 conventional Ge detectors, 26 'Clovers' (each with four Ge crystals), and 15 'Clusters' (each with seven Ge crystals); all the detectors with Compton-suppression shields. Inner ball consisted of 210 BGO crystals to serve as a multiplicity filter. Deduced superdeformed structure.

2003Br03: ^{100}Mo(^{65}Cu,4nγ) E=260 MeV. Measured Eγ, Eγ, $\gamma\gamma$, $\gamma\gamma(\theta)$(DCO) using GASP array with 40 Compton-suppressed Ge detectors combined with an inner ball of 80 BGO detectors. Deduced superdeformed structure.

All three papers are from the same group. The data given here are from 2006Br12 unless otherwise stated.

^{161}Lu Levels

Nomenclature for quasiparticle labels:
A: $\nu i_{13/2}$1/2[660], α=+1/2.
B: $\nu i_{13/2}$1/2[660], α=−1/2.
C: $\nu i_{13/2}$, α=+1/2.
D: $\nu i_{13/2}$, α=−1/2.
E: $\nu h_{9/2}$3/2[521], α=+1/2.
F: $\nu h_{9/2}$3/2[521], α=−1/2.
a: $\pi d_{3/2}$1/2[411], α=+1/2.
b: $\pi d_{3/2}$1/2[411], α=−1/2.
c: $\pi g_{7/2}$7/2[404], α=+1/2.
d: $\pi g_{7/2}$7/2[404], α=−1/2.
e: $\pi h_{11/2}$9/2[514], α=+1/2.
f: $\pi h_{11/2}$9/2[514], α=−1/2.
i: $\pi d_{5/2}$5/2[402], α=+1/2.
j: $\pi d_{5/2}$5/2[402], α=−1/2.

E(level)[†]	J$^\pi$[‡]	Comments
0[l]	1/2$^+$	E(level),J$^\pi$: from the Adopted Levels. Level not reported in this reaction, but is expected from the decay of the first excited state.
0+x[l]	3/2$^+$	E(level): x ≈ 15 keV from trend of 3/2$^+$ to 1/2$^+$ spacings for 1/2[411] band in selected odd-A Lu (A=163, 167, 169) nuclei.
66.0+x[l] 7	(5/2$^+$)	
135.5+x[i] 5	5/2$^+$	
166.0+x[c] 9	9/2$^-$	
203.5+x[d] 8	11/2$^-$	
226.4+x[h] 6	7/2$^+$	
275.0+x[@] 5	(7/2$^+$)	
334.4+x[l] 6	7/2$^+$	
443.0+x[i] 6	9/2$^+$	
469.4+x[c] 7	13/2$^-$	
578.4+x[d] 7	15/2$^-$	
677.1+x[h] 6	11/2$^+$	

Continued on next page (footnotes at end of table)

^{139}La(^{28}Si,6nγ) 2006Br12,2005Br14,2003Br03 (continued)

^{161}Lu Levels (continued)

E(level)[†]	J$^\pi$[‡]	E(level)[†]	J$^\pi$[‡]	E(level)[†]	J$^\pi$[‡]
694.9+x[@] 6	(11/2$^+$)	4270.5+x[c] 10	41/2$^-$	8488.4+x[&] 11	61/2$^+$
934.8+x[i] 6	13/2$^+$	4271.6+x[j] 8	39/2$^+$	8502.5+x[f] 13	(61/2$^-$)
961.7+x[c] 7	17/2$^-$	4331.6+x[a] 9	(39/2$^+$)	8699.5+x[d] 12	63/2$^-$
1086.6+x[d] 7	19/2$^-$	4438.8+x[&] 9	41/2$^+$	8799.6+x[a] 13	63/2$^+$
1199.8+x[@] 6	15/2$^+$	4509.5+x[g] 10	(39/2$^-$)	8962.8+x[@] 11	63/2$^+$
1226.7+x[h] 7	(15/2$^+$)	4587.3+x[d] 10	43/2$^-$	8972.6+x[g] 13	(63/2$^-$)
1504.7+x[i] 7	(17/2$^+$)	4594.7+x[k] 9	41/2$^+$	9195.9+x[c] 12	65/2$^-$
1561.3+x[c] 7	21/2$^-$	4722.6+x[f] 10	41/2$^-$	9390.5+x[&] 11	65/2$^+$
1691.5+x[d] 7	23/2$^-$	4771.7+x[@] 9	43/2$^+$	9436.1+x[f] 24	(65/2$^-$)
1739.2+x[@] 7	19/2$^+$	4911.0+x[c] 10	45/2$^-$	9700.6+x[a] 14	67/2$^+$
1832.5+x[h] 7	(19/2$^+$)	4959.2+x[g] 10	43/2$^-$	9727.3+x[d] 13	67/2$^-$
2030.0+x[&] 7	21/2$^+$	4959.6+x[a] 9	(43/2$^+$)	9908.2+x[@] 12	67/2$^+$
2132.7+x[i] 7	(21/2$^+$)	5035.3+x[j] 9	43/2$^+$	10025.2+x[g] 24	(67/2$^-$)
2213.4+x[@] 7	23/2$^+$	5215.4+x[&] 9	45/2$^+$	10219.4+x[e] 13	69/2$^-$
2223.9+x 7	21/2$^+$	5264.4+x[d] 10	47/2$^-$	10308.3+x[c] 13	69/2$^-$
2228.9+x[c] 8	25/2$^-$	5266.2+x[f] 10	45/2$^-$	10345.1+x[&] 12	(69/2$^+$)
2297.9+x 7	23/2$^+$	5357.4+x[k] 10	(45/2$^+$)	10649.1+x[a] 15	71/2$^+$
2363.8+x[d] 8	27/2$^-$	5581.1+x[@] 9	47/2$^+$	10817.5+x[d] 14	71/2$^-$
2392.6+x[h] 7	(23/2$^+$)	5586.2+x[g] 10	47/2$^-$	10904.2+x[@] 13	(71/2$^+$)
2396.1+x[&] 7	25/2$^+$	5620.7+x[c] 11	49/2$^-$	11209.5+x[e] 14	73/2$^-$
2488.9+x[j] 8	23/2$^+$	5655.0+x[a] 9	(47/2$^+$)	11358.1+x[&] 13	(73/2$^+$)
2513.9+x[k] 7	25/2$^+$	5864.6+x[j] 11	(47/2$^+$)	11442.3+x[c] 14	73/2$^-$
2526.8+x[@] 7	27/2$^+$	5967.8+x[f] 10	49/2$^-$	11632.9+x[a] 16	75/2$^+$
2634.0+x[j] 7	27/2$^+$	6011.9+x[d] 11	51/2$^-$	11936.5+x[d] 15	(75/2$^-$)
2687.3+x[&] 8	29/2$^+$	6057.6+x[&] 9	49/2$^+$	11948.3+x[@] 14	(75/2$^+$)
2785.6+x[b] 10	(25/2$^+$)	6154.4+x[k] 11	(49/2$^+$)	12247.4+x[e] 15	77/2$^-$
2865.7+x[k] 8	29/2$^+$	6293.7+x[g] 11	51/2$^-$	12672.1+x[a] 17	79/2$^+$
2882.7+x[c] 8	29/2$^-$	6362.3+x[a] 10	51/2$^+$	13309.4+x[e] 16	(81/2$^-$)
2902.0+x[@] 8	31/2$^+$	6398.4+x[c] 11	53/2$^-$	13742.3+x[a] 17	(83/2$^+$)
3007.9+x[b] 8	(29/2$^+$)	6491.7+x[@] 9	51/2$^+$	14817.3+x[a] 18	(87/2$^+$)
3022.1+x[d] 8	31/2$^-$	6643.5+x[j] 22	(51/2$^+$)	15942.3+x[a] 19	(91/2$^+$)
3044.7+x[j] 8	31/2$^+$	6726.0+x[f] 11	53/2$^-$	y[m]	(21/2$^+$)[#]
3143.8+x 9	31/2$^-$	6829.0+x[d] 11	55/2$^-$	308.3+y[m] 5	(25/2$^+$)[#]
3152.6+x[&] 8	33/2$^+$	6875.2+x[&] 10	53/2$^+$	689.0+y[m] 7	(29/2$^+$)
3248.6+x[c] 9	33/2$^-$	6993.4+x[k] 12	(53/2$^+$)	1139.9+y[m] 9	(33/2$^+$)
3278.5+x[a] 8	(31/2$^+$)	7095.8+x[g] 11	55/2$^-$	1303.7+y[n] 11	(31/2$^+$)
3328.7+x[k] 8	33/2$^+$	7142.8+x[a] 11	55/2$^+$	1658.6+y[m] 10	(37/2$^+$)
3407.3+x[@] 8	35/2$^+$	7252.1+x[c] 12	57/2$^-$	1781.4+y[n] 11	(35/2$^+$)
3465.8+x[d] 9	35/2$^-$	7269.1+x[@] 10	55/2$^+$	2244.4+y[m] 11	(41/2$^+$)
3468.2+x[b] 9	(33/2$^+$)	7567.4+x[f] 11	57/2$^-$	2324.5+y[n] 12	(39/2$^+$)
3598.4+x[j] 8	35/2$^+$	7649.1+x[&] 10	57/2$^+$	2893.8+y[m] 12	(45/2$^+$)
3705.4+x[c] 9	37/2$^-$	7733.7+x[d] 12	59/2$^-$	2930.5+y[n] 12	(43/2$^+$)
3742.9+x[&] 8	37/2$^+$	7767.4+x[k] 13	(57/2$^+$)	3597.6+y[n] 13	(47/2$^+$)
3781.5+x[a] 8	(35/2$^+$)	7952.8+x[a] 12	59/2$^+$	3604.4+y[m] 13	(49/2$^+$)
3908.6+x[k] 8	37/2$^+$	7996.6+x[g] 12	(59/2$^-$)	4322.6+y[n] 17	(51/2$^+$)
3987.8+x[d] 9	39/2$^-$	8075.6+x[@] 11	59/2$^+$	4373.1+y[m] 14	(53/2$^+$)
4036.4+x[@] 8	39/2$^+$	8191.6+x[c] 12	61/2$^-$	5103.6+y[n] 20	(55/2$^+$)

Continued on next page (footnotes at end of table)

^{139}La(^{28}Si,6nγ) 2006Br12,2005Br14,2003Br03 (continued)

^{161}Lu Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	E(level)[†]	J$^{\pi}$[‡]	E(level)[†]	J$^{\pi}$[‡]
5196.9+y[m] 15	(57/2$^+$)	7771+y[n] 3	(67/2$^+$)	9985.5+y[m] 19	(77/2$^+$)
5936.6+y[n] 22	(59/2$^+$)	7964.1+y[m] 17	(69/2$^+$)	10794+y[n] 4	(79/2$^+$)
6072.8+y[m] 16	(61/2$^+$)	8744+y[n] 3	(71/2$^+$)	11044.3+y[m] 19	(81/2$^+$)
6820.6+y[n] 24	(63/2$^+$)	8961.5+y[m] 18	(73/2$^+$)	12139.8+y[m] 20	(85/2$^+$)
6997.2+y[m] 17	(65/2$^+$)	9752+y[n] 3	(75/2$^+$)	13270.8+y[m] 22	(89/2$^+$)

[†] From least-squares fit to Eγ's, assuming ΔEγ=0.5 keV for each γ ray.

[‡] As proposed by 2006Br12 based on γ cascades defining band structures and comparisons with cranked-shell model calculations. The authors state that DCO ratios and angular correlations were measured for transitions but the data are listed for nine transitions only. Assignments for some bands are supported by angular correlation results from ^{120}Sn(^{45}Sc,4nγ). All assignments are the same in 'Adopted Levels', except that these are given in parentheses in 'Adopted Levels' due to lack of strong supporting arguments.

[#] The 308.5 transition is assigned by 2003Br03 as 25/2$^+$ to 21/2$^+$ transition in comparison with isospectral triaxial SD-1 band in ^{163}Lu. All other intraband transitions were found to be stretched quadrupole transitions from $\gamma\gamma(\theta)$(DCO) data. However, results of such measurements were not quoted by 2003Br03 or 2006Br12.

[@] Band(A): π7/2[404], α=−1/2. At higher spins crossed by 7/2[404]⊗AB band, and second crossing by 7/2[404]ABef.

[&] Band(a): π7/2[404], α=+1/2. At higher spins crossed by 7/2[404]⊗AB band, and second crossing by 7/2[404]ABef.

[a] Band(b): Triaxial band, α=−1/2. The alignment is similar to TSD bands, thus it is expected to have large deformation.

[b] Band(B): α=+1/2.

[c] Band(C): π9/2[514], α=+1/2. At higher spins crossed by 9/2[514]⊗AB band.

[d] Band(c): π9/2[514], α=−1/2. At higher spins crossed by 9/2[514]⊗AB band.

[e] Band(D): 1/2[541]⊗ABef, α=+1/2.

[f] Band(E): 7/2[523]⊗AB, α=+1/2.

[g] Band(e): 7/2[523]⊗AB, α=−1/2.

[h] Band(F): π5/2[402], α=−1/2. At higher spins crossed by 5/2[404]⊗AB band.

[i] Band(f): π5/2[402], α=+1/2. At higher spins crossed by 5/2[404]⊗AB band.

[j] Band(G): 5/2[402]⊗AB, α=−1/2.

[k] Band(g): 5/2[402]⊗AB, α=+1/2.

[l] Band(H): π1/2[411].

[m] Band(I): Triaxial (wobbling mode) SD-1 band, α=+1/2. Band from 2006Br12 (also 2005Br14,2003Br03). Configuration=$\pi i_{13/2}\otimes\nu i^2_{13/2}$, phonon quantum number=0. Population intensity=1.4% of the reaction channel. This band is isospectral to triaxial SD-1 band in ^{163}Lu. On this basis the 308.5 transition is proposed (by 2003Br03) as 25/2$^+$ to 21/2$^+$ transition. The 308.5γ is also in $\gamma\gamma$ coin with 266.3, 375.3, 508.4 and 604.9 transitions in normal-deformed structures. See also 2005Ha24 and 2004Ha21 for discussion of triaxial SD bands.

[n] Band(i): Triaxial (wobbling mode) SD-2 band, α=−1/2. Band from 2006Br12 (also 2005Br14, 2003Br03). Configuration=$\pi i_{13/2}\otimes\nu i^2_{13/2}$, phonon quantum number=1. Wobbling excitation built on triaxial SD-1 band. Population intensity=0.6% of the reaction channel. See also 2005Ha24 and 2004Ha21 for discussion of triaxial SD bands.

γ(^{161}Lu)

E$_\gamma$	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$	Comments
74.0	2297.9+x	23/2$^+$	2223.9+x	21/2$^+$	
90.6	226.4+x	7/2$^+$	135.5+x	5/2$^+$	E$_\gamma$: 90.5 (2005Br14).
98.0	2396.1+x	25/2$^+$	2297.9+x	23/2$^+$	
104.7	3248.6+x	33/2$^-$	3143.8+x	31/2$^-$	
108.6	443.0+x	9/2$^+$	334.4+x	7/2$^+$	E$_\gamma$: 108.1 (2005Br14).
108.7	578.4+x	15/2$^-$	469.4+x	13/2$^-$	

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$^{139}La(^{28}Si,6n\gamma)$ 2006Br12,2005Br14,2003Br03 (continued)

$\gamma(^{161}Lu)$ (continued)

E_γ	E_i(level)	J_i^π	E_f	J_f^π	Comments
119.7	2634.0+x	27/2+	2513.9+x	25/2+	
121.2	2513.9+x	25/2+	2392.6+x	(23/2+)	
121.5	3143.8+x	31/2−	3022.1+x	31/2−	
124.5	1086.6+x	19/2−	961.7+x	17/2−	
130.3	1691.5+x	23/2−	1561.3+x	21/2−	E_γ: 130.1 (2005Br14).
130.4	2526.8+x	27/2+	2396.1+x	25/2+	
134.9	2363.8+x	27/2−	2228.9+x	25/2−	
135.5	135.5+x	5/2+	0+x	3/2+	
139.4	3022.1+x	31/2−	2882.7+x	29/2−	
145.1	2634.0+x	27/2+	2488.9+x	23/2+	
160@	226.4+x	7/2+	66.0+x	(5/2+)	
160.5	2687.3+x	29/2+	2526.8+x	27/2+	
165.2	2297.9+x	23/2+	2132.7+x	(21/2+)	
172	2396.1+x	25/2+	2223.9+x	21/2+	
179.1	3044.7+x	31/2+	2865.7+x	29/2+	
182.8	2396.1+x	25/2+	2213.4+x	23/2+	
183.5	2213.4+x	23/2+	2030.0+x	21/2+	
199.2	334.4+x	7/2+	135.5+x	5/2+	E_γ: 199.4 (2005Br14).
209	275.0+x	(7/2+)	66.0+x	(5/2+)	
213.1	4722.6+x	41/2−	4509.5+x	(39/2−)	
214.6	2902.0+x	31/2+	2687.3+x	29/2+	
216.5	443.0+x	9/2+	226.4+x	7/2+	E_γ: 217.0 (2005Br14).
217.0	3465.8+x	35/2−	3248.6+x	33/2−	
222.3	3007.9+x	(29/2+)	2785.6+x	(25/2+)	
226.5	3248.6+x	33/2−	3022.1+x	31/2−	
231.6	2865.7+x	29/2+	2634.0+x	27/2+	
234.0	677.1+x	11/2+	443.0+x	9/2+	E_γ: 233.7 (2005Br14).
236.8	4959.2+x	43/2−	4722.6+x	41/2−	
238.2	2634.0+x	27/2+	2396.1+x	25/2+	
239.6	3705.4+x	37/2−	3465.8+x	35/2−	
250.4	3152.6+x	33/2+	2902.0+x	31/2+	
254.6	3407.3+x	35/2+	3152.6+x	33/2+	
257.7	934.8+x	13/2+	677.1+x	11/2+	E_γ: 257.4 (2005Br14).
263.6	2396.1+x	25/2+	2132.7+x	(21/2+)	
264.5	1199.8+x	15/2+	934.8+x	13/2+	
265.9	469.4+x	13/2−	203.5+x	11/2−	
269.5	3598.4+x	35/2+	3328.7+x	33/2+	
270.8	3278.5+x	(31/2+)	3007.9+x	(29/2+)	
275	275.0+x	(7/2+)	0+x	3/2+	
282.5	3987.8+x	39/2−	3705.4+x	37/2−	
282.7	4270.5+x	41/2−	3987.8+x	39/2−	
284.3	3328.7+x	33/2+	3044.7+x	31/2+	
290.8	2030.0+x	21/2+	1739.2+x	19/2+	
291.1	2687.3+x	29/2+	2396.1+x	25/2+	
293.5	4036.4+x	39/2+	3742.9+x	37/2+	
303.4	469.4+x	13/2−	166.0+x	9/2−	
306.8	5266.2+x	45/2−	4959.2+x	43/2−	
307.5	443.0+x	9/2+	135.5+x	5/2+	
308.3	308.3+y	(25/2+)	y	(21/2+)	
310.0	3908.6+x	37/2+	3598.4+x	35/2+	
313.2	3781.5+x	(35/2+)	3468.2+x	(33/2+)	
313.5	2526.8+x	27/2+	2213.4+x	23/2+	
316.7	4587.3+x	43/2−	4270.5+x	41/2−	
319.9	5586.2+x	47/2−	5266.2+x	45/2−	
321@	5357.4+x	(45/2+)	5035.3+x	43/2+	

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^{139}La(^{28}Si,6nγ) 2006Br12,2005Br14,2003Br03 (continued)

γ(^{161}Lu) (continued)

E_γ	E_i(level)	J_i^π	E_f	J_f^π	Comments
323[@]	3465.8+x	35/2$^-$	3143.8+x	31/2$^-$	
323.1	4594.7+x	41/2$^+$	4271.6+x	39/2$^+$	
323.8	4911.0+x	45/2$^-$	4587.3+x	43/2$^-$	
325.9	6293.7+x	51/2$^-$	5967.8+x	49/2$^-$	
332.8	4771.7+x	43/2$^+$	4438.8+x	41/2$^+$	
335[@]	334.4+x	7/2$^+$	0+x	3/2$^+$	
335.5	3742.9+x	37/2$^+$	3407.3+x	35/2$^+$	
339[@]	2865.7+x	29/2$^+$	2526.8+x	27/2$^+$	
343	677.1+x	11/2$^+$	334.4+x	7/2$^+$	
352.3	2865.7+x	29/2$^+$	2513.9+x	25/2$^+$	
353.5	5264.4+x	47/2$^-$	4911.0+x	45/2$^-$	
356.4	5620.7+x	49/2$^-$	5264.4+x	47/2$^-$	
362.4	2392.6+x	(23/2$^+$)	2030.0+x	21/2$^+$	
362.8	4271.6+x	39/2$^+$	3908.6+x	37/2$^+$	
365.5	5581.1+x	47/2$^+$	5215.4+x	45/2$^+$	
365.9	3248.6+x	33/2$^-$	2882.7+x	29/2$^-$	
366.1	2396.1+x	25/2$^+$	2030.0+x	21/2$^+$	
370.0	7095.8+x	55/2$^-$	6726.0+x	53/2$^-$	
374	3007.9+x	(29/2$^+$)	2634.0+x	27/2$^+$	
375.0[#]	578.4+x	15/2$^-$	203.5+x	11/2$^-$	
375.0[#]	2902.0+x	31/2$^+$	2526.8+x	27/2$^+$	
380.0	7649.1+x	57/2$^+$	7269.1+x	55/2$^+$	
380.7	689.0+y	(29/2$^+$)	308.3+y	(25/2$^+$)	
381.5	5967.8+x	49/2$^-$	5586.2+x	47/2$^-$	
383.1	961.7+x	17/2$^-$	578.4+x	15/2$^-$	
383.6	6875.2+x	53/2$^+$	6491.7+x	51/2$^+$	
386.4	6398.4+x	53/2$^-$	6011.9+x	51/2$^-$	
391.1	6011.9+x	51/2$^-$	5620.7+x	49/2$^-$	
394.2	7269.1+x	55/2$^+$	6875.2+x	53/2$^+$	
402.2	4438.8+x	41/2$^+$	4036.4+x	39/2$^+$	
410.6	3044.7+x	31/2$^+$	2634.0+x	27/2$^+$	
412.7	8488.4+x	61/2$^+$	8075.6+x	59/2$^+$	
413	3278.5+x	(31/2$^+$)	2865.7+x	29/2$^+$	
419.9	694.9+x	(11/2$^+$)	275.0+x	(7/2$^+$)	
423.2	7252.1+x	57/2$^-$	6829.0+x	55/2$^-$	
426.6	8075.6+x	59/2$^+$	7649.1+x	57/2$^+$	
426.8	3328.7+x	33/2$^+$	2902.0+x	31/2$^+$	
427.7	9390.5+x	65/2$^+$	8962.8+x	63/2$^+$	
429[@]	7996.6+x	(59/2$^-$)	7567.4+x	57/2$^-$	
430.6	6829.0+x	55/2$^-$	6398.4+x	53/2$^-$	
432.2	6726.0+x	53/2$^-$	6293.7+x	51/2$^-$	
434.1	6491.7+x	51/2$^+$	6057.6+x	49/2$^+$	
441.1	5035.3+x	43/2$^+$	4594.7+x	41/2$^+$	
443.7	3465.8+x	35/2$^-$	3022.1+x	31/2$^-$	
443.8	5215.4+x	45/2$^+$	4771.7+x	43/2$^+$	
450.5	677.1+x	11/2$^+$	226.4+x	7/2$^+$	E_γ: 450.7 (2005Br14).
450.8	1139.9+y	(33/2$^+$)	689.0+y	(29/2$^+$)	
452.1	4722.6+x	41/2$^-$	4270.5+x	41/2$^-$	
453	3781.5+x	(35/2$^+$)	3328.7+x	33/2$^+$	
457.0	3705.4+x	37/2$^-$	3248.6+x	33/2$^-$	
457.9	8191.6+x	61/2$^-$	7733.7+x	59/2$^-$	
460.2	3468.2+x	(33/2$^+$)	3007.9+x	(29/2$^+$)	
463.1	3328.7+x	33/2$^+$	2865.7+x	29/2$^+$	
465.3	3152.6+x	33/2$^+$	2687.3+x	29/2$^+$	

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$^{139}La(^{28}Si,6n\gamma)$ 2006Br12,2005Br14,2003Br03 (continued)

$\gamma(^{161}Lu)$ (continued)

E_γ	E_i(level)	J^π_i	E_f	J^π_f	Mult.[†]	Comments
471.8	7567.4+x	57/2$^-$	7095.8+x	55/2$^-$		
474.3	2213.4+x	23/2$^+$	1739.2+x	19/2$^+$		
474.4	8962.8+x	63/2$^+$	8488.4+x	61/2$^+$		
474.7	1561.3+x	21/2$^-$	1086.6+x	19/2$^-$		
476.6	6057.6+x	49/2$^+$	5581.1+x	47/2$^+$		
478[@]	1781.4+y	(35/2$^+$)	1303.7+y	(31/2$^+$)		
481.6	7733.7+x	59/2$^-$	7252.1+x	57/2$^-$		
491.7	934.8+x	13/2$^+$	443.0+x	9/2$^+$		E_γ: 491.1 (2005Br14).
492.2	961.7+x	17/2$^-$	469.4+x	13/2$^-$		
496	9195.9+x	65/2$^-$	8699.5+x	63/2$^-$		
501.3	3908.6+x	37/2$^+$	3407.3+x	35/2$^+$		
503.3	3781.5+x	(35/2$^+$)	3278.5+x	(31/2$^+$)		
504.8	1199.8+x	15/2$^+$	694.9+x	(11/2$^+$)		
505.1	3407.3+x	35/2$^+$	2902.0+x	31/2$^+$		
506[@]	10817.5+x	71/2$^-$	10308.3+x	69/2$^-$		
508.0	1086.6+x	19/2$^-$	578.4+x	15/2$^-$		
508	8699.5+x	63/2$^-$	8191.6+x	61/2$^-$		
517.7	9908.2+x	67/2$^+$	9390.5+x	65/2$^+$		
518.8[#]	2882.7+x	29/2$^-$	2363.8+x	27/2$^-$		
518.8[#]	1658.6+y	(37/2$^+$)	1139.9+y	(33/2$^+$)		
522[#@]	2213.4+x	23/2$^+$	1691.5+x	23/2$^-$		
522.0	3987.8+x	39/2$^-$	3465.8+x	35/2$^-$		
522[#@]	4509.5+x	(39/2$^-$)	3987.8+x	39/2$^-$		
522.6	1199.8+x	15/2$^+$	677.1+x	11/2$^+$	Q	R_{ang}=0.77 *7*, DCO=1.05 *15*.
525.6	2030.0+x	21/2$^+$	1504.7+x	(17/2$^+$)		
531	9727.3+x	67/2$^-$	9195.9+x	65/2$^-$		
532.0	1226.7+x	(15/2$^+$)	694.9+x	(11/2$^+$)		
537.4	2228.9+x	25/2$^-$	1691.5+x	23/2$^-$		
539.1	1739.2+x	19/2$^+$	1199.8+x	15/2$^+$		
543	2324.5+y	(39/2$^+$)	1781.4+y	(35/2$^+$)		
543.7	5266.2+x	45/2$^-$	4722.6+x	41/2$^-$		
550[@]	1226.7+x	(15/2$^+$)	677.1+x	11/2$^+$		
550.5	4331.6+x	(39/2$^+$)	3781.5+x	(35/2$^+$)		
553.5	3598.4+x	35/2$^+$	3044.7+x	31/2$^+$		
558.7	2297.9+x	23/2$^+$	1739.2+x	19/2$^+$		
560.2	2392.6+x	(23/2$^+$)	1832.5+x	(19/2$^+$)		
564.8	4270.5+x	41/2$^-$	3705.4+x	37/2$^-$		
570.5	1504.7+x	(17/2$^+$)	934.8+x	13/2$^+$		
580.4	3908.6+x	37/2$^+$	3328.7+x	33/2$^+$		
581	10308.3+x	69/2$^-$	9727.3+x	67/2$^-$		
585.8	2244.4+y	(41/2$^+$)	1658.6+y	(37/2$^+$)		
590.1	3742.9+x	37/2$^+$	3152.6+x	33/2$^+$		
599.4	1561.3+x	21/2$^-$	961.7+x	17/2$^-$		
599.5	4587.3+x	43/2$^-$	3987.8+x	39/2$^-$		
604.8	1691.5+x	23/2$^-$	1086.6+x	19/2$^-$		
605.9	1832.5+x	(19/2$^+$)	1226.7+x	(15/2$^+$)		
606	2930.5+y	(43/2$^+$)	2324.5+y	(39/2$^+$)		
615[@]	1303.7+y	(31/2$^+$)	689.0+y	(29/2$^+$)		
627.0	5586.2+x	47/2$^-$	4959.2+x	43/2$^-$		
628.3	2132.7+x	(21/2$^+$)	1504.7+x	(17/2$^+$)		
628.5	4959.6+x	(43/2$^+$)	4331.6+x	(39/2$^+$)		
628.9	4036.4+x	39/2$^+$	3407.3+x	35/2$^+$		
640.6	4911.0+x	45/2$^-$	4270.5+x	41/2$^-$		
641	1781.4+y	(35/2$^+$)	1139.9+y	(33/2$^+$)		

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$^{139}La(^{28}Si,6n\gamma)$ 2006Br12,2005Br14,2003Br03 (continued)

$\gamma(^{161}Lu)$ (continued)

E_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	Comments
649.4	2893.8+y	$(45/2^+)$	2244.4+y	$(41/2^+)$		
651[@]	7142.8+x	$55/2^+$	6491.7+x	$51/2^+$		
651.9	2213.4+x	$23/2^+$	1561.3+x	$21/2^-$	D[‡]	R_{ang}=0.51 *4*, DCO=0.53 *9*.
653.2	2392.6+x	$(23/2^+)$	1739.2+x	$19/2^+$		
653.7	2882.7+x	$29/2^-$	2228.9+x	$25/2^-$		
654[@]	2785.6+x	$(25/2^+)$	2132.7+x	$(21/2^+)$		
658.4	3022.1+x	$31/2^-$	2363.8+x	$27/2^-$		
666	2324.5+y	$(39/2^+)$	1658.6+y	$(37/2^+)$		
667	3597.6+y	$(47/2^+)$	2930.5+y	$(43/2^+)$		
667.6	2228.9+x	$25/2^-$	1561.3+x	$21/2^-$		
672[@]	6293.7+x	$51/2^-$	5620.7+x	$49/2^-$		
672.3	2363.8+x	$27/2^-$	1691.5+x	$23/2^-$		
672.8	4271.6+x	$39/2^+$	3598.4+x	$35/2^+$		
675[@]	5586.2+x	$47/2^-$	4911.0+x	$45/2^-$		
677.0	5264.4+x	$47/2^-$	4587.3+x	$43/2^-$		
679[@]	5266.2+x	$45/2^-$	4587.3+x	$43/2^-$		
686	2930.5+y	$(43/2^+)$	2244.4+y	$(41/2^+)$		
686.6	4594.7+x	$41/2^+$	3908.6+x	$37/2^+$		
688.5	4959.2+x	$43/2^-$	4270.5+x	$41/2^-$	(Q)	R_{ang}=0.73 *12*, DCO=0.5 *3*.
695.8[#]	4438.8+x	$41/2^+$	3742.9+x	$37/2^+$		
695.8[#]	5655.0+x	$(47/2^+)$	4959.6+x	$(43/2^+)$		
701.8	5967.8+x	$49/2^-$	5266.2+x	$45/2^-$		
704[@]	3597.6+y	$(47/2^+)$	2893.8+y	$(45/2^+)$		
704.1	2396.1+x	$25/2^+$	1691.5+x	$23/2^-$	D[‡]	R_{ang}=0.51 *12*, DCO=0.8 *6*.
707.3	6293.7+x	$51/2^-$	5586.2+x	$47/2^-$		
707.8	6362.3+x	$51/2^+$	5655.0+x	$(47/2^+)$		
709.6	5620.7+x	$49/2^-$	4911.0+x	$45/2^-$		
710.6	3604.4+y	$(49/2^+)$	2893.8+y	$(45/2^+)$		
725	4322.6+y	$(51/2^+)$	3597.6+y	$(47/2^+)$		
730.7	1199.8+x	$15/2^+$	469.4+x	$13/2^-$		
734.8	4722.6+x	$41/2^-$	3987.8+x	$39/2^-$		
735.2	4771.7+x	$43/2^+$	4036.4+x	$39/2^+$		
736.6	2297.9+x	$23/2^+$	1561.3+x	$21/2^-$		
747.6	6011.9+x	$51/2^-$	5264.4+x	$47/2^-$		
758.4	6726.0+x	$53/2^-$	5967.8+x	$49/2^-$		
762.7	5357.4+x	$(45/2^+)$	4594.7+x	$41/2^+$		
763.3	5035.3+x	$43/2^+$	4271.6+x	$39/2^+$		
768.7	4373.1+y	$(53/2^+)$	3604.4+y	$(49/2^+)$		
774.0	7649.1+x	$57/2^+$	6875.2+x	$53/2^+$		
774	7767.4+x	$(57/2^+)$	6993.4+x	$(53/2^+)$		
776.4	5215.4+x	$45/2^+$	4438.8+x	$41/2^+$		
777.1	7269.1+x	$55/2^+$	6491.7+x	$51/2^+$		
777.7	6398.4+x	$53/2^-$	5620.7+x	$49/2^-$		
777.9	1739.2+x	$19/2^+$	961.7+x	$17/2^-$		
778[@]	6643.5+x	$(51/2^+)$	5864.6+x	$(47/2^+)$		
779.9	3143.8+x	$31/2^-$	2363.8+x	$27/2^-$		
780.5	7142.8+x	$55/2^+$	6362.3+x	$51/2^+$	Q	R_{ang}=0.93 *6*, DCO=1.02 *16* for 780.8+780.5.
780.8	6362.3+x	$51/2^+$	5581.1+x	$47/2^+$	Q	R_{ang}=0.93 *6*, DCO=1.02 *16* for 780.8+780.5.
781	5103.6+y	$(55/2^+)$	4322.6+y	$(51/2^+)$		
797	6154.4+x	$(49/2^+)$	5357.4+x	$(45/2^+)$		
797.3	2488.9+x	$23/2^+$	1691.5+x	$23/2^-$		
802.1	7095.8+x	$55/2^-$	6293.7+x	$51/2^-$		
804.2	4509.5+x	$(39/2^-)$	3705.4+x	$37/2^-$		

Continued on next page (footnotes at end of table)

$^{139}La(^{28}Si,6n\gamma)$ 2006Br12,2005Br14,2003Br03 (continued)

$\gamma(^{161}Lu)$ (continued)

E_γ	E_i(level)	J^π_i	E_f	J^π_f	Mult.[†]	Comments
806.4	8075.6+x	59/2+	7269.1+x	55/2+		
809.3	5581.1+x	47/2+	4771.7+x	43/2+		
809.9	7952.8+x	59/2+	7142.8+x	55/2+		
817.1	6829.0+x	55/2−	6011.9+x	51/2−		
817.7	6875.2+x	53/2+	6057.6+x	49/2+		
822.6	2513.9+x	25/2+	1691.5+x	23/2−	D[‡]	R_{ang}=0.56 *16*.
823.8	5196.9+y	(57/2+)	4373.1+y	(53/2+)		
829.3	5864.6+x	(47/2+)	5035.3+x	43/2+		
833	5936.6+y	(59/2+)	5103.6+y	(55/2+)		
836.5	6491.7+x	51/2+	5655.0+x	(47/2+)		
839	6993.4+x	(53/2+)	6154.4+x	(49/2+)		
839.3	8488.4+x	61/2+	7649.1+x	57/2+		
841.3	7567.4+x	57/2−	6726.0+x	53/2−		
842.1	6057.6+x	49/2+	5215.4+x	45/2+		
846.8	8799.6+x	63/2+	7952.8+x	59/2+		
853.8	7252.1+x	57/2−	6398.4+x	53/2−		
875.9	6072.8+y	(61/2+)	5196.9+y	(57/2+)		
883.1	5655.0+x	(47/2+)	4771.7+x	43/2+		
884	6820.6+y	(63/2+)	5936.6+y	(59/2+)		
887.1	8962.8+x	63/2+	8075.6+x	59/2+		
900.8	7996.6+x	(59/2−)	7095.8+x	55/2−		
901.0	9700.6+x	67/2+	8799.6+x	63/2+		
902.2	9390.5+x	65/2+	8488.4+x	61/2+		
904.6	7733.7+x	59/2−	6829.0+x	55/2−		
910.8	6491.7+x	51/2+	5581.1+x	47/2+		
924.4	6997.2+y	(65/2+)	6072.8+y	(61/2+)		
935[#]	8502.5+x	(61/2−)	7567.4+x	57/2−		
935[#@]	9436.1+x	(65/2−)	8502.5+x	(61/2−)		
939.5	8191.6+x	61/2−	7252.1+x	57/2−		
943.3	2030.0+x	21/2+	1086.6+x	19/2−	D[‡]	R_{ang}=0.54 *5*, DCO=0.49 *12*.
945.5	9908.2+x	67/2+	8962.8+x	63/2+		
948.5	10649.1+x	71/2+	9700.6+x	67/2+		
950	7771+y	(67/2+)	6820.6+y	(63/2+)		
954.6	10345.1+x	(69/2+)	9390.5+x	65/2+		
965.7	8699.5+x	63/2−	7733.7+x	59/2−		
966.9	7964.1+y	(69/2+)	6997.2+y	(65/2+)		
971.1	4959.2+x	43/2−	3987.8+x	39/2−	Q	R_{ang}=0.97 *9*, DCO=1.2 *8*.
973	8744+y	(71/2+)	7771+y	(67/2+)		
976	8972.6+x	(63/2−)	7996.6+x	(59/2−)		
983.8	11632.9+x	75/2+	10649.1+x	71/2+		
990.1	11209.5+x	73/2−	10219.4+x	69/2−		
995.8	5266.2+x	45/2−	4270.5+x	41/2−		
996	10904.2+x	(71/2+)	9908.2+x	67/2+		
997.4	8961.5+y	(73/2+)	7964.1+y	(69/2+)		
1004.2	9195.9+x	65/2−	8191.6+x	61/2−		
1008	9752+y	(75/2+)	8744+y	(71/2+)		
1013	11358.1+x	(73/2+)	10345.1+x	(69/2+)		
1017.3	4722.6+x	41/2−	3705.4+x	37/2−		
1023.5	10219.4+x	69/2−	9195.9+x	65/2−	Q	R_{ang}=0.98 *17*.
1024.0	9985.5+y	(77/2+)	8961.5+y	(73/2+)		
1028.3	9727.3+x	67/2−	8699.5+x	63/2−		
1037.9	12247.4+x	77/2−	11209.5+x	73/2−		
1039.2	12672.1+x	79/2+	11632.9+x	75/2+		
1042	10794+y	(79/2+)	9752+y	(75/2+)		
1044	11948.3+x	(75/2+)	10904.2+x	(71/2+)		

Continued on next page (footnotes at end of table)

$^{139}La(^{28}Si,6n\gamma)$ 2006Br12,2005Br14,2003Br03 (continued)

$\gamma(^{161}Lu)$ (continued)

E_γ	E_i(level)	J_i^π	E_f	J_f^π	E_γ	E_i(level)	J_i^π	E_f	J_f^π
1054[@]	10025.2+x	$(67/2^-)$	8972.6+x	$(63/2^-)$	1112.4	10308.3+x	$69/2^-$	9195.9+x	$65/2^-$
1058.8	11044.3+y	$(81/2^+)$	9985.5+y	$(77/2^+)$	1119	11936.5+x	$(75/2^-)$	10817.5+x	$71/2^-$
1062	13309.4+x	$(81/2^-)$	12247.4+x	$77/2^-$	1125	15942.3+x	$(91/2^+)$	14817.3+x	$(87/2^+)$
1070.2	13742.3+x	$(83/2^+)$	12672.1+x	$79/2^+$	1131	13270.8+y	$(89/2^+)$	12139.8+y	$(85/2^+)$
1075	14817.3+x	$(87/2^+)$	13742.3+x	$(83/2^+)$	1134	11442.3+x	$73/2^-$	10308.3+x	$69/2^-$
1090.2	10817.5+x	$71/2^-$	9727.3+x	$67/2^-$	1137.2	2223.9+x	$21/2^+$	1086.6+x	$19/2^-$
1095.5	12139.8+y	$(85/2^+)$	11044.3+y	$(81/2^+)$					

† From angular correlation ratios, mult=Q indicates ΔJ=2, stretched quadrupole (most likely E2), mult=D indicates ΔJ=1, stretched dipole with possible quadrupole admixture.

‡ ΔJ=1, stretched dipole interpreted As E1.

Multiply placed.

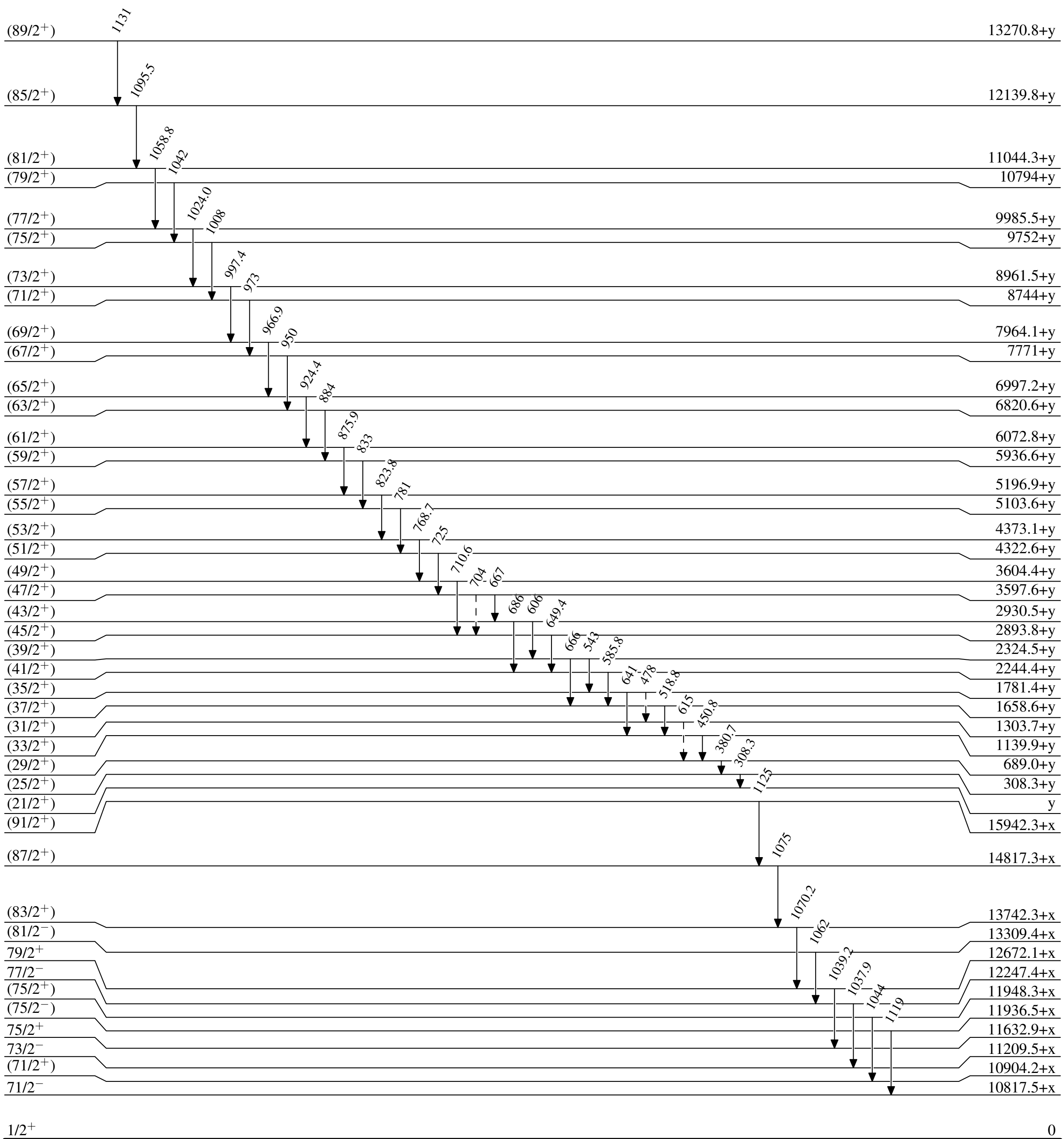
@ Placement of transition in the level scheme is uncertain.

$^{139}La(^{28}Si,6n\gamma)$ 2006Br12,2005Br14,2003Br03

Legend

Level Scheme

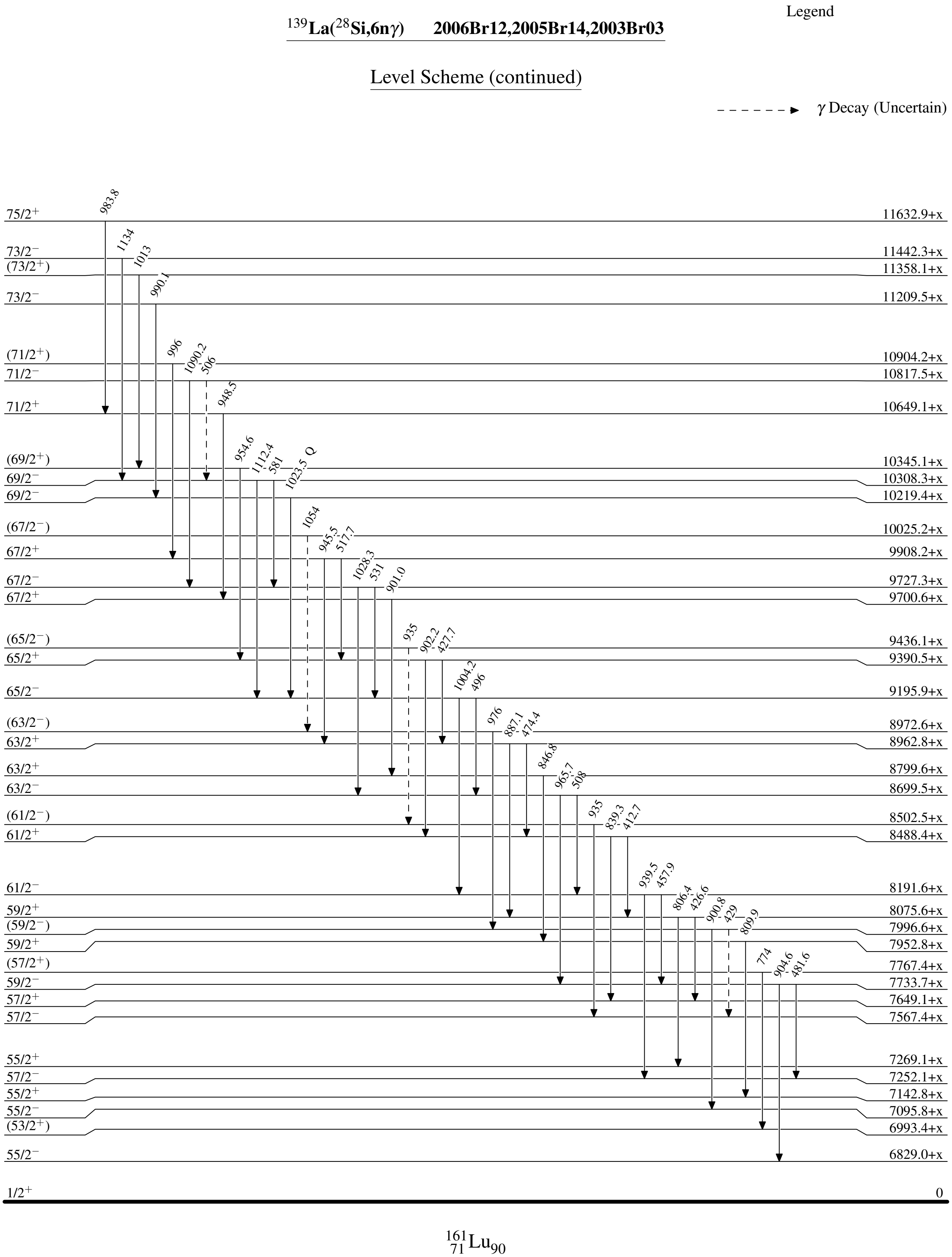
γ Decay (Uncertain)



$^{161}_{71}Lu_{90}$

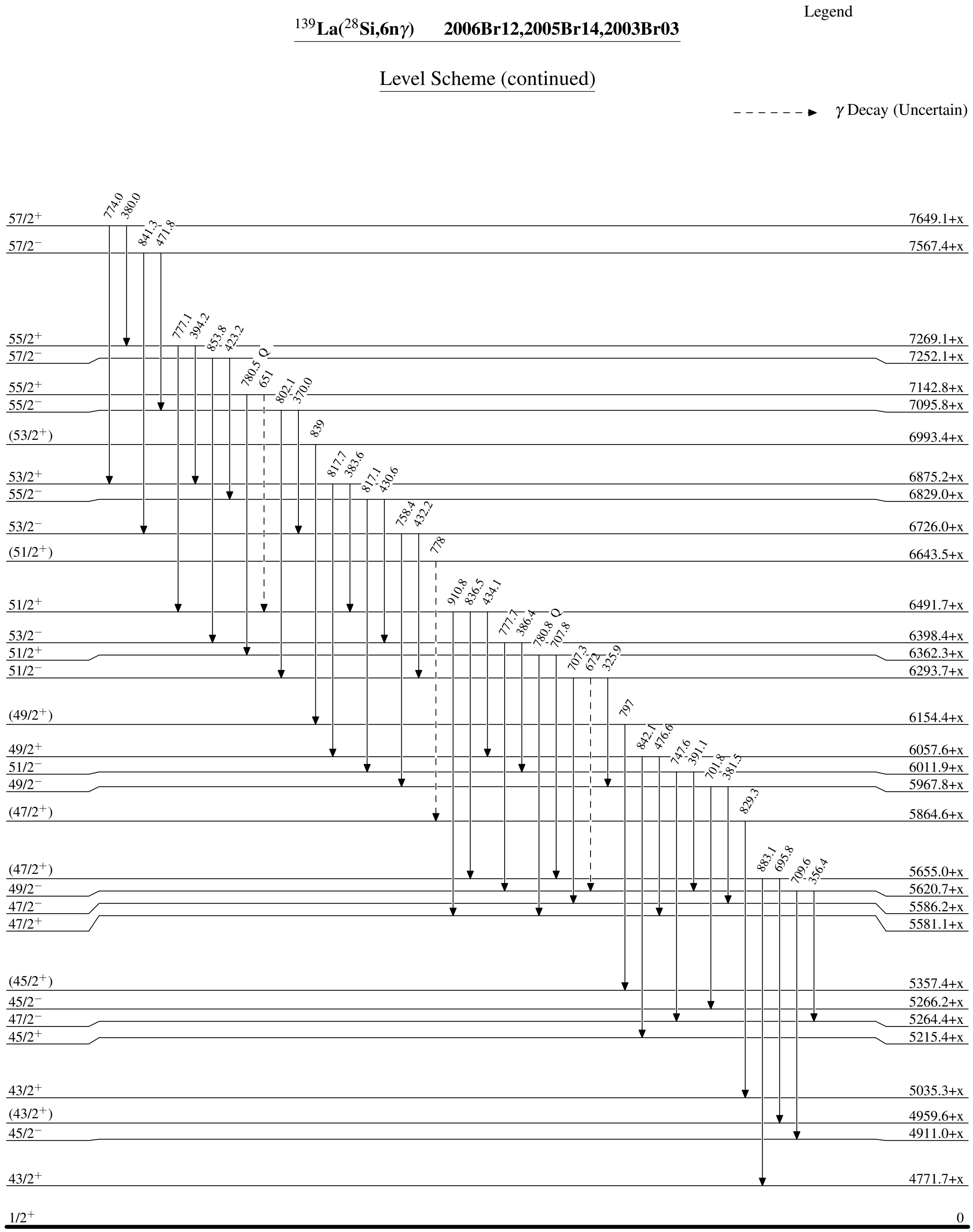
$^{139}La(^{28}Si,6n\gamma)$ 2006Br12,2005Br14,2003Br03

Level Scheme (continued)



$^{139}La(^{28}Si,6n\gamma)$ 2006Br12,2005Br14,2003Br03

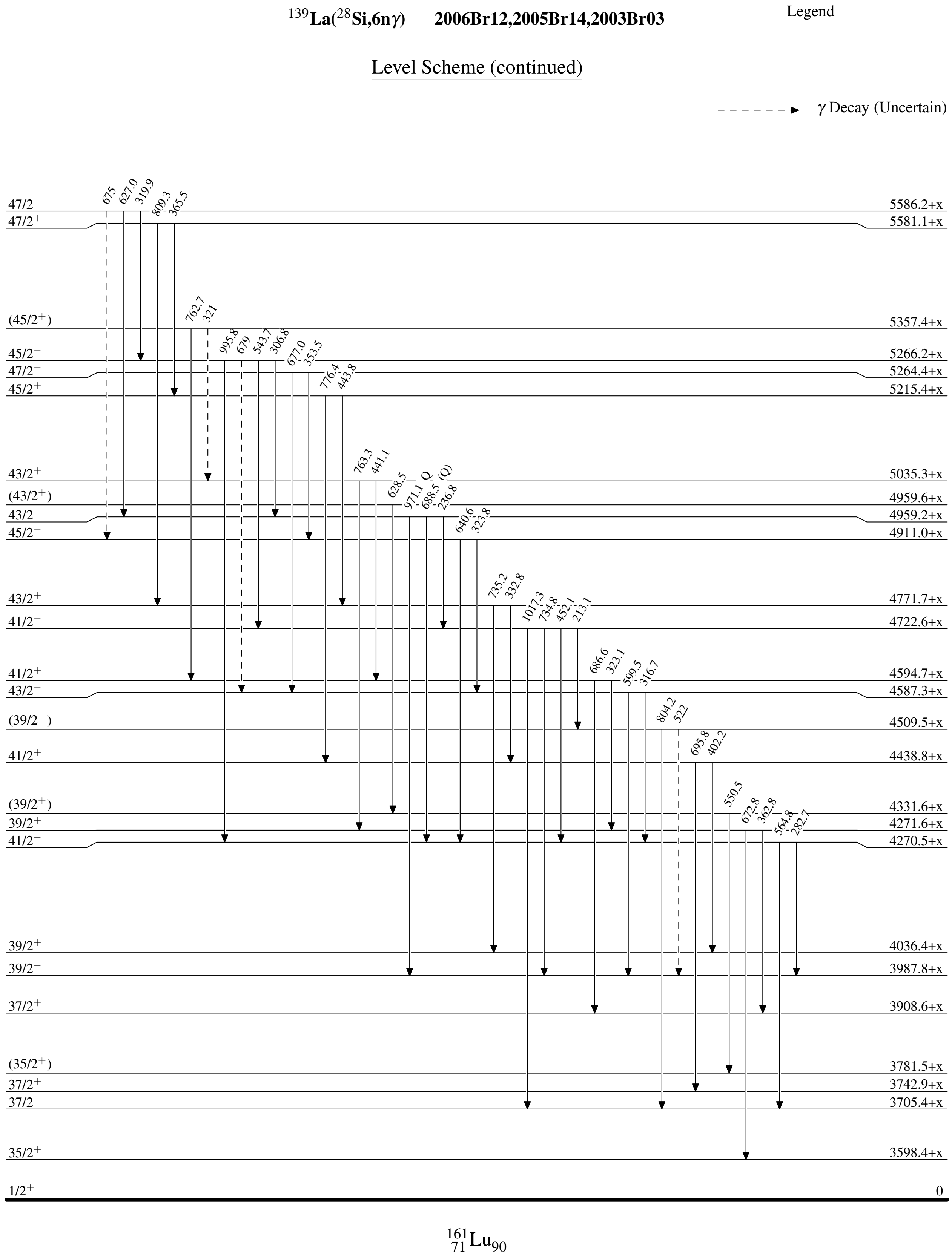
Level Scheme (continued)



$^{161}_{71}Lu_{90}$

$^{139}La(^{28}Si,6n\gamma)$ 2006Br12,2005Br14,2003Br03

Level Scheme (continued)

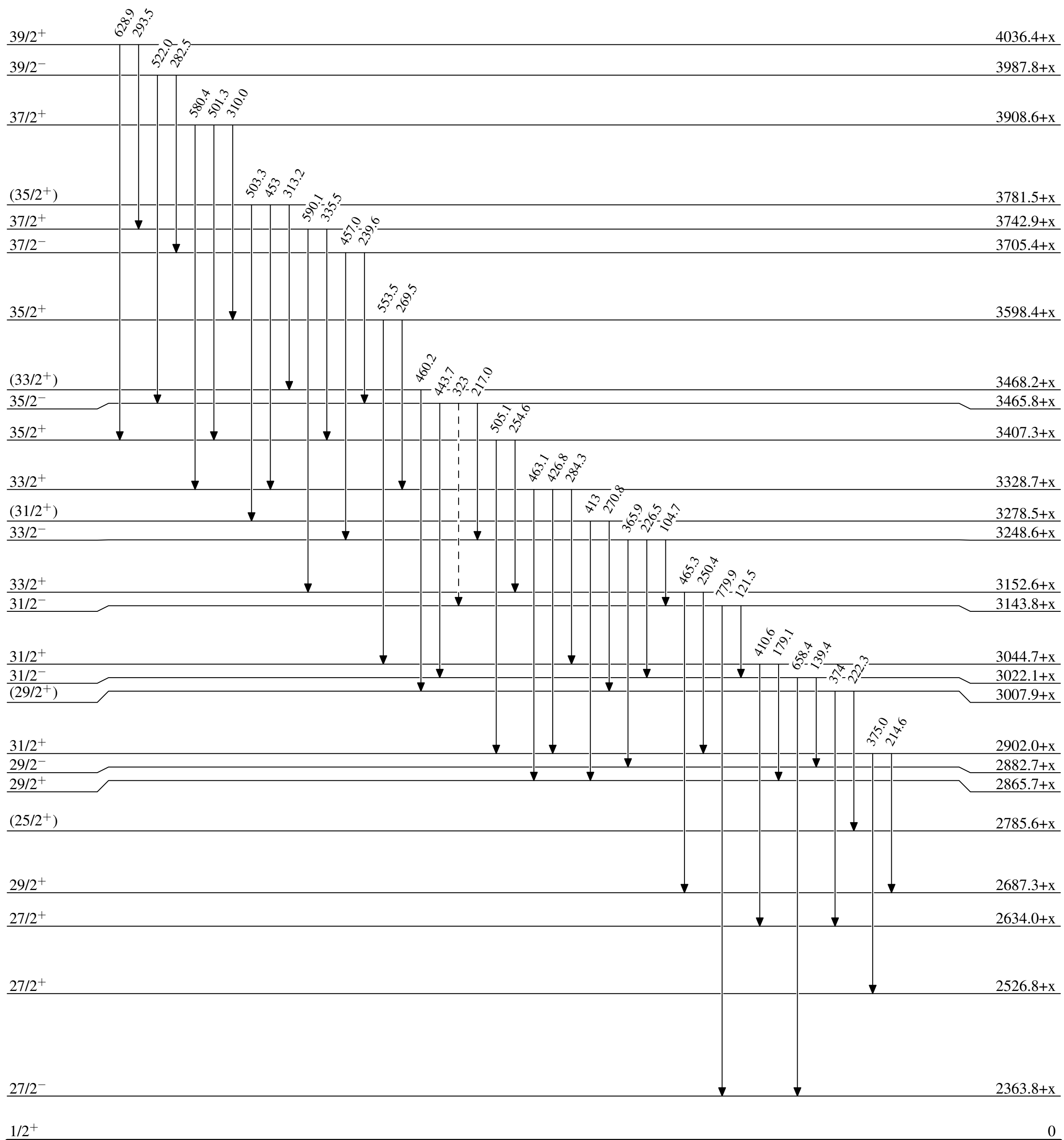


Legend

$^{139}La(^{28}Si,6n\gamma)$ 2006Br12,2005Br14,2003Br03

Level Scheme (continued)

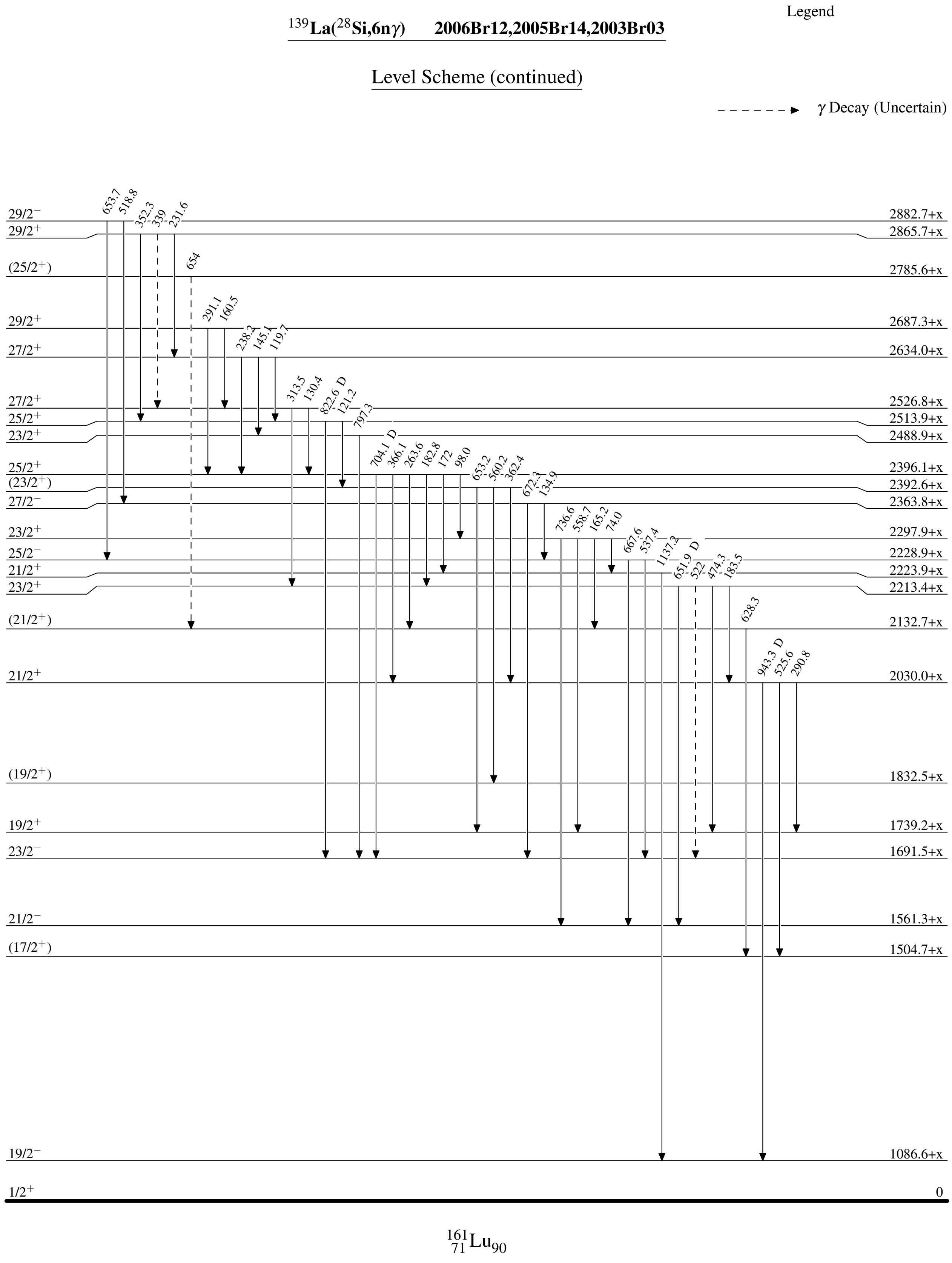
γ Decay (Uncertain)



$^{161}_{71}Lu_{90}$

$^{139}La(^{28}Si,6n\gamma)$ 2006Br12,2005Br14,2003Br03

Level Scheme (continued)

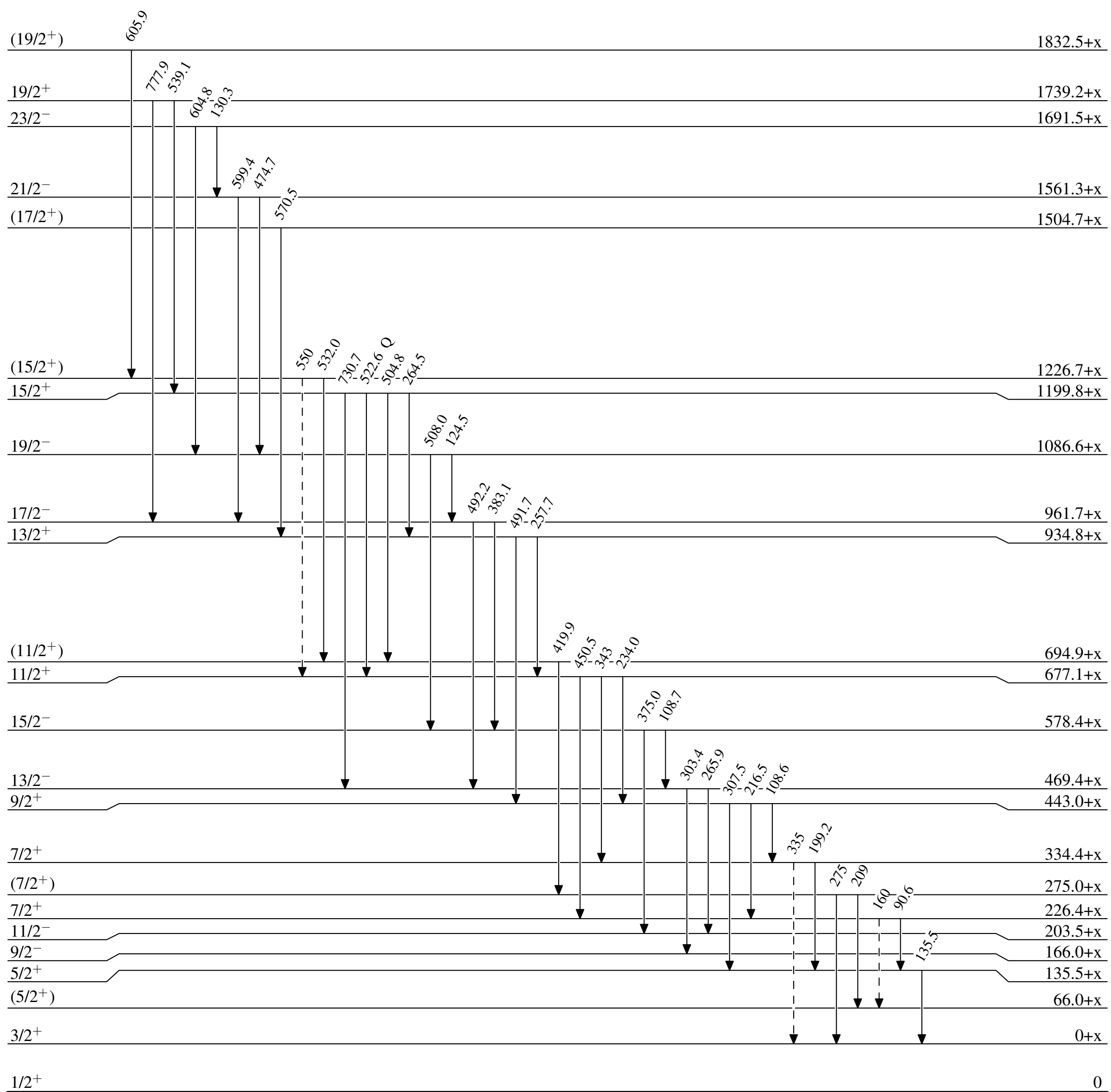


Legend

$^{139}La(^{28}Si,6n\gamma)$ **2006Br12,2005Br14,2003Br03**

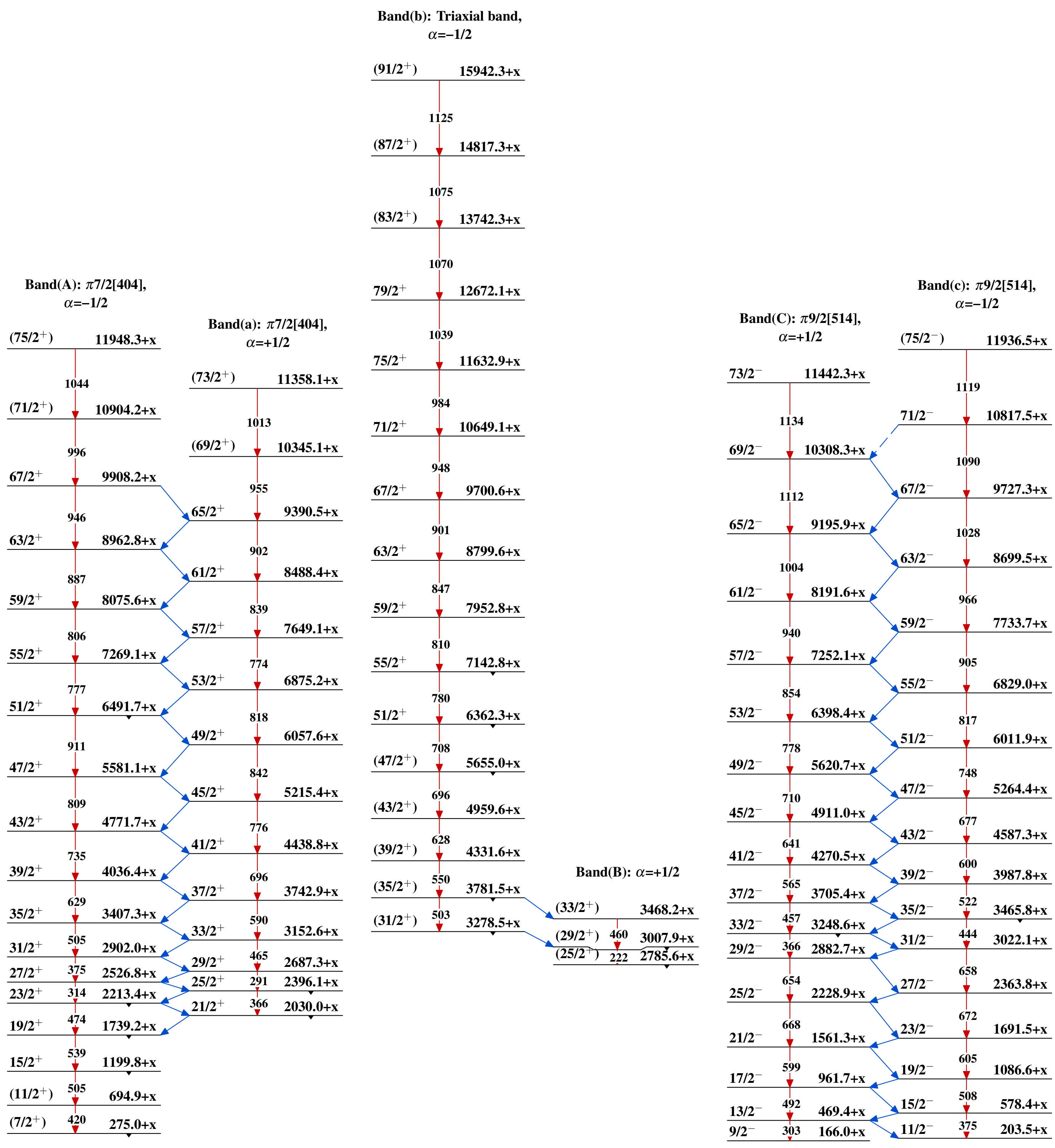
Level Scheme (continued)

γ Decay (Uncertain)



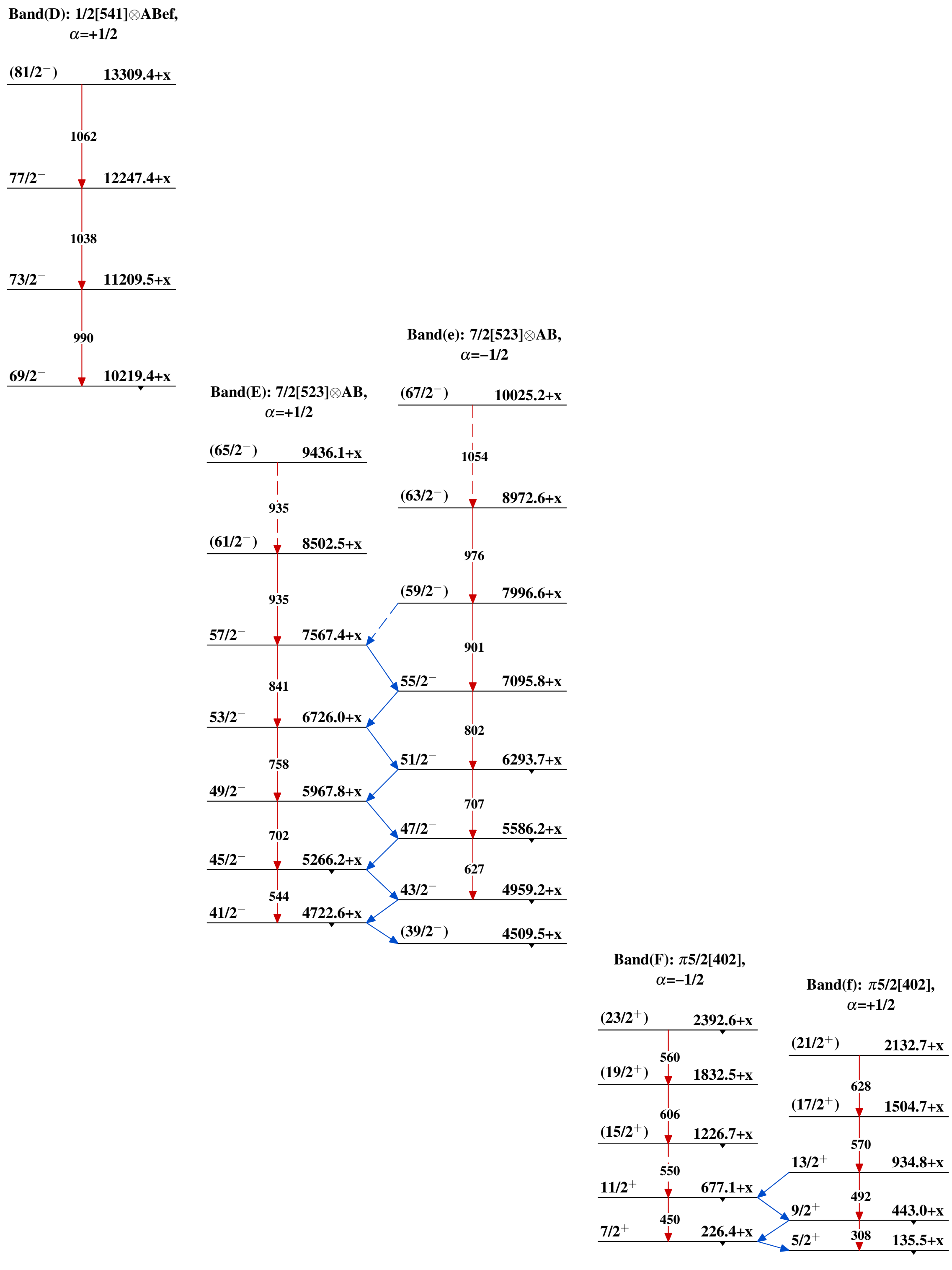
$^{161}_{71}Lu_{90}$

$^{139}La(^{28}Si,6n\gamma)$ 2006Br12,2005Br14,2003Br03



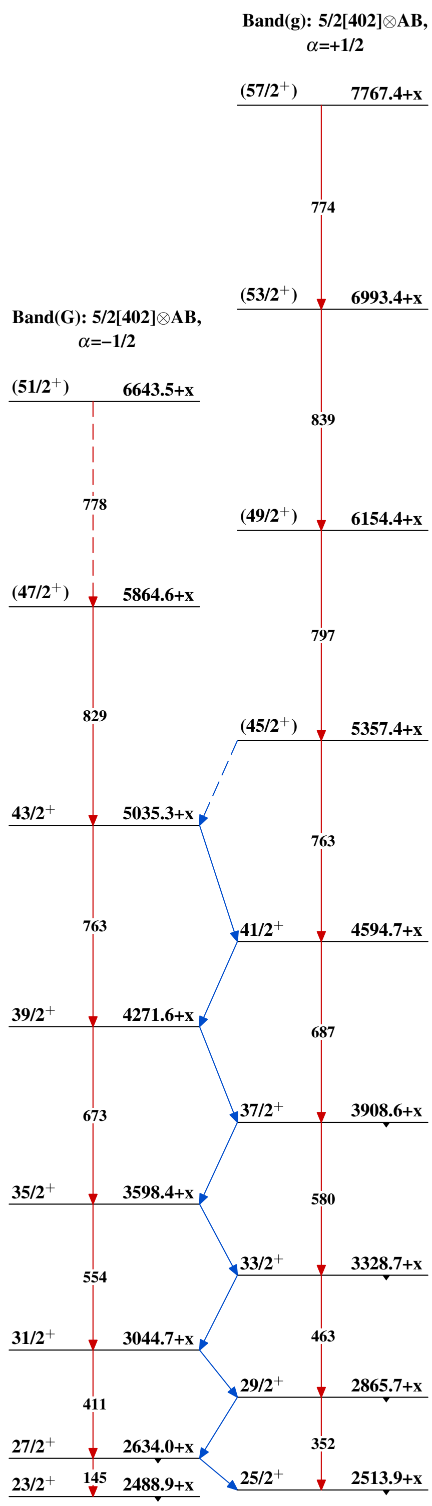
$^{161}_{71}Lu_{90}$

$^{139}La(^{28}Si,6n\gamma)$ 2006Br12,2005Br14,2003Br03 (continued)



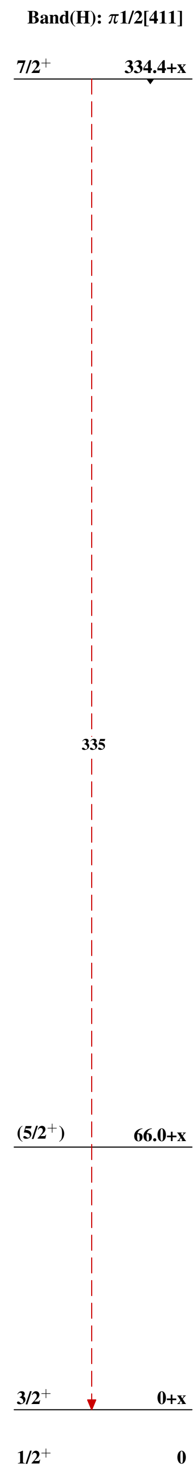
$^{161}_{71}Lu_{90}$

$^{139}La(^{28}Si,6n\gamma)$ 2006Br12,2005Br14,2003Br03 (continued)



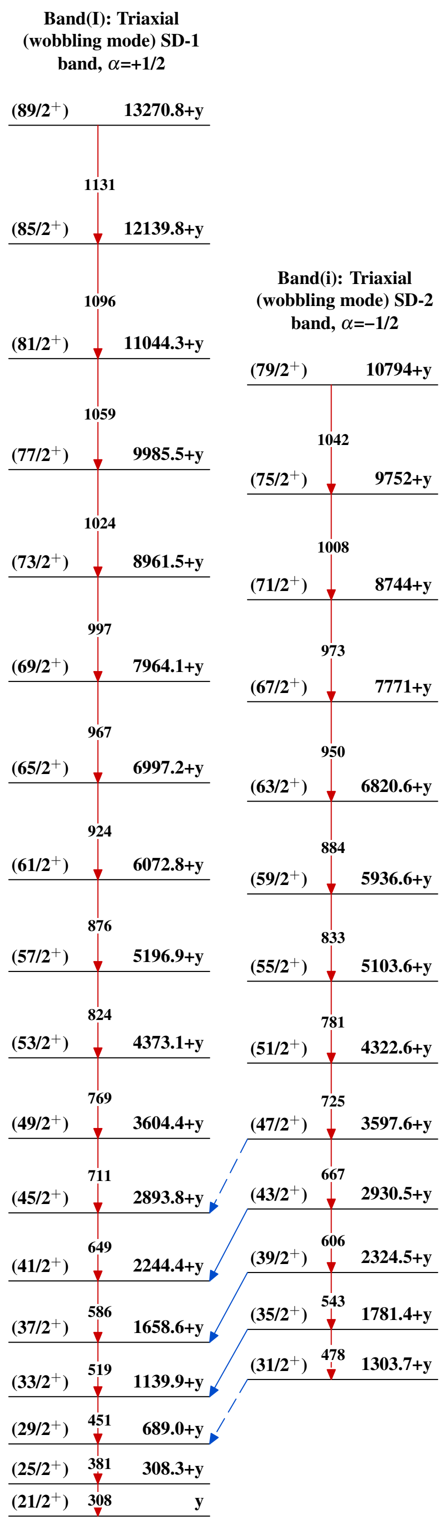
$^{161}_{71}Lu_{90}$

$^{139}La(^{28}Si,6n\gamma)$ 2006Br12,2005Br14,2003Br03 (continued)



$^{161}_{71}Lu_{90}$

$^{139}La(^{28}Si,6n\gamma)$ 2006Br12,2005Br14,2003Br03 (continued)



$^{161}_{71}Lu_{90}$