^{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$^+$	

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

^{161}Lu Levels (continued)

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

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

^{161}Lu Levels (continued)

E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡
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 γγ(θ)(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 γγ 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_γ	E_i(level)	J^π_i	E_f	J^π_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_γ: 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_γ: 108.1 (2005Br14).
108.7	578.4+x	15/2$^-$	469.4+x	13/2$^-$	

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^{139}La(^{28}Si,6nγ) 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)

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

Continued on next page (footnotes at end of table)

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

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

E_γ	E_i(level)	J_i^π	E_f	J_f^π	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$^+$)		

Continued on next page (footnotes at end of table)

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

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

E_γ	E_i(level)	J_i^π	E_f	J_f^π	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,6nγ) 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.

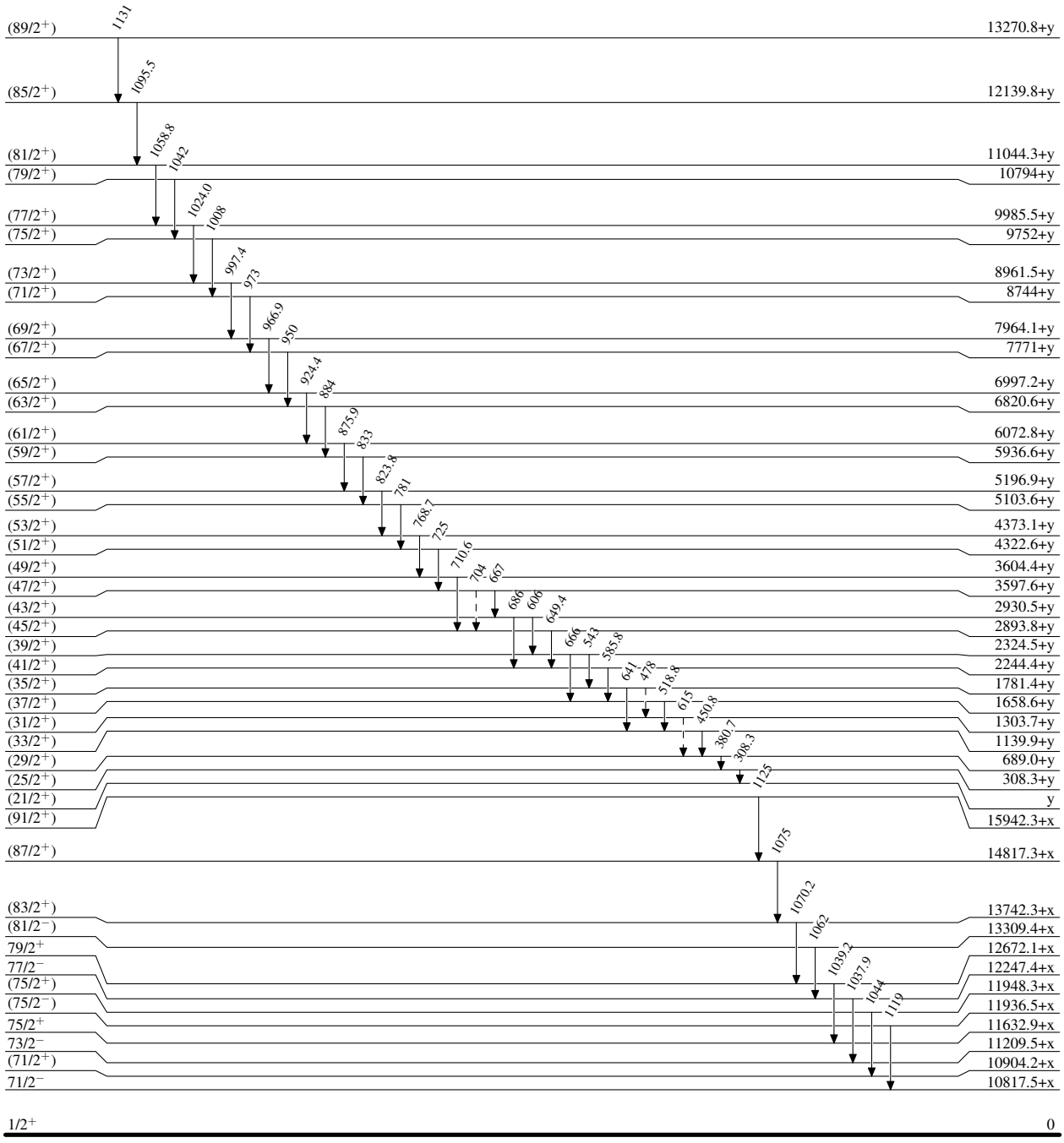
@ Placement of transition in the level scheme is uncertain.

Legend

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

Level Scheme

– – – – – – ► γ Decay (Uncertain)



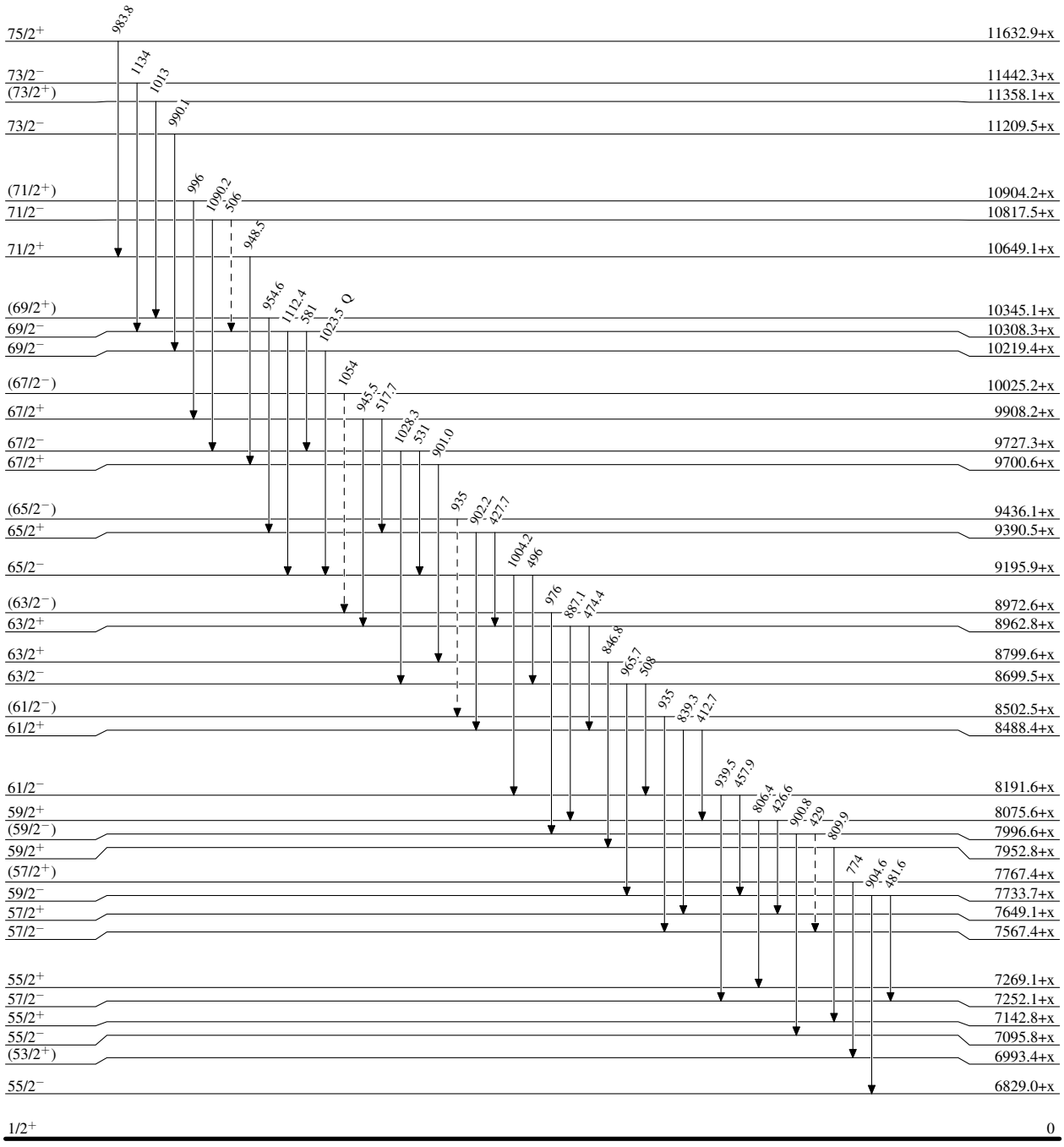
$^{161}_{71}Lu_{90}$

Legend

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

Level Scheme (continued)

- - - - - - ► γ Decay (Uncertain)



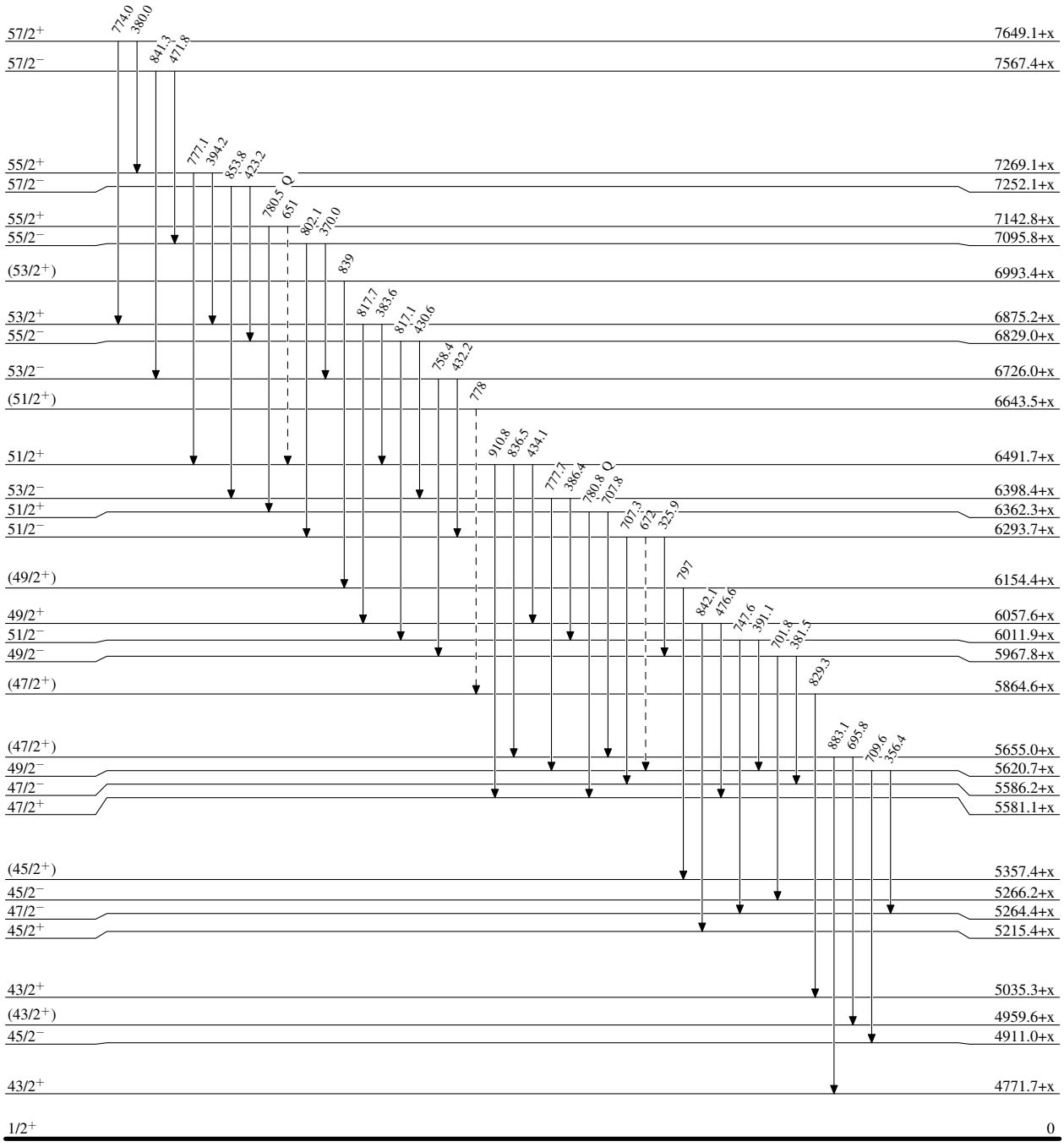
$^{161}_{71}Lu_{90}$

Legend

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

Level Scheme (continued)

- - - - - - ► γ Decay (Uncertain)



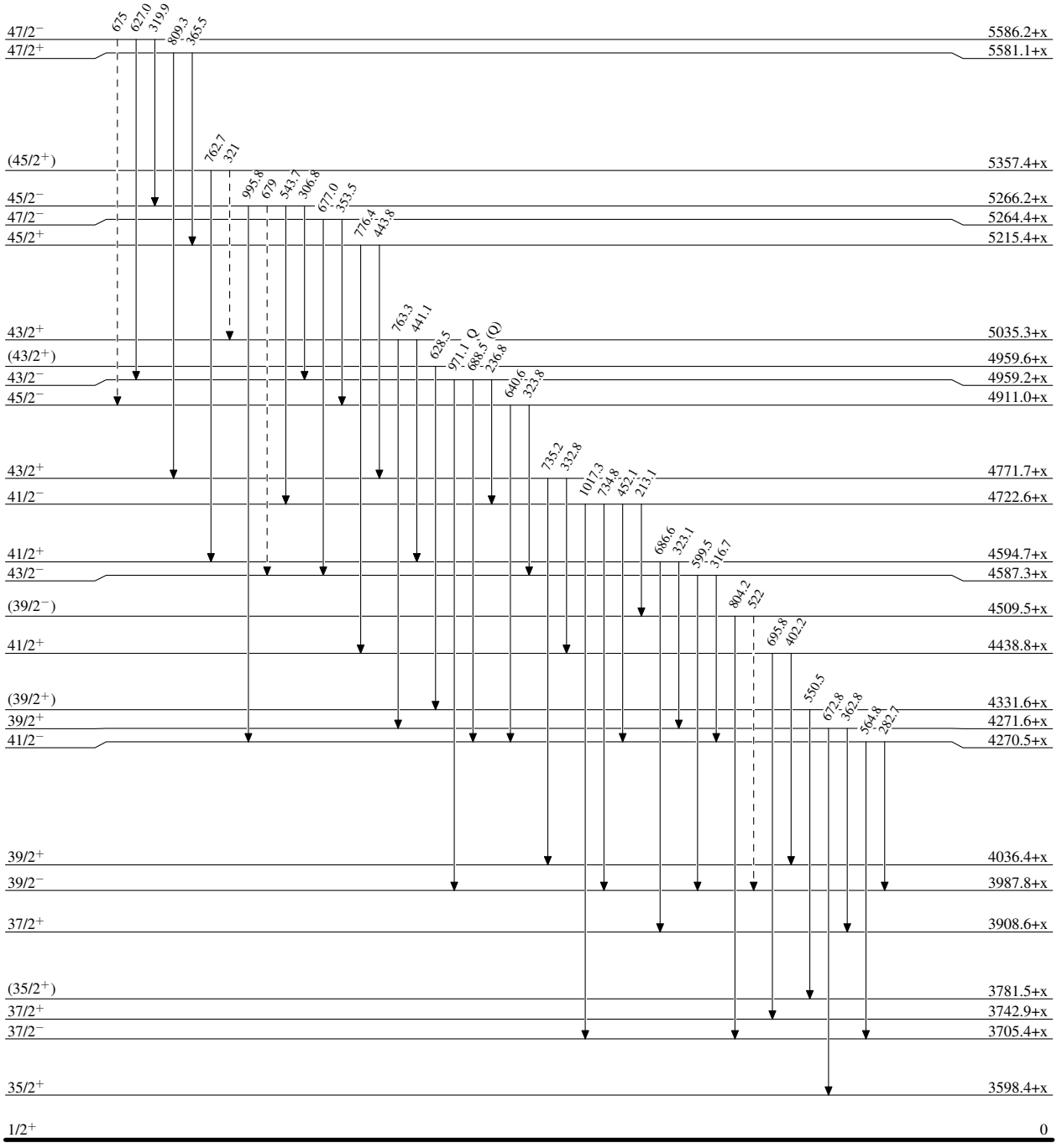
$^{161}_{71}Lu_{90}$

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

Legend

Level Scheme (continued)

– – – – – – ► γ Decay (Uncertain)



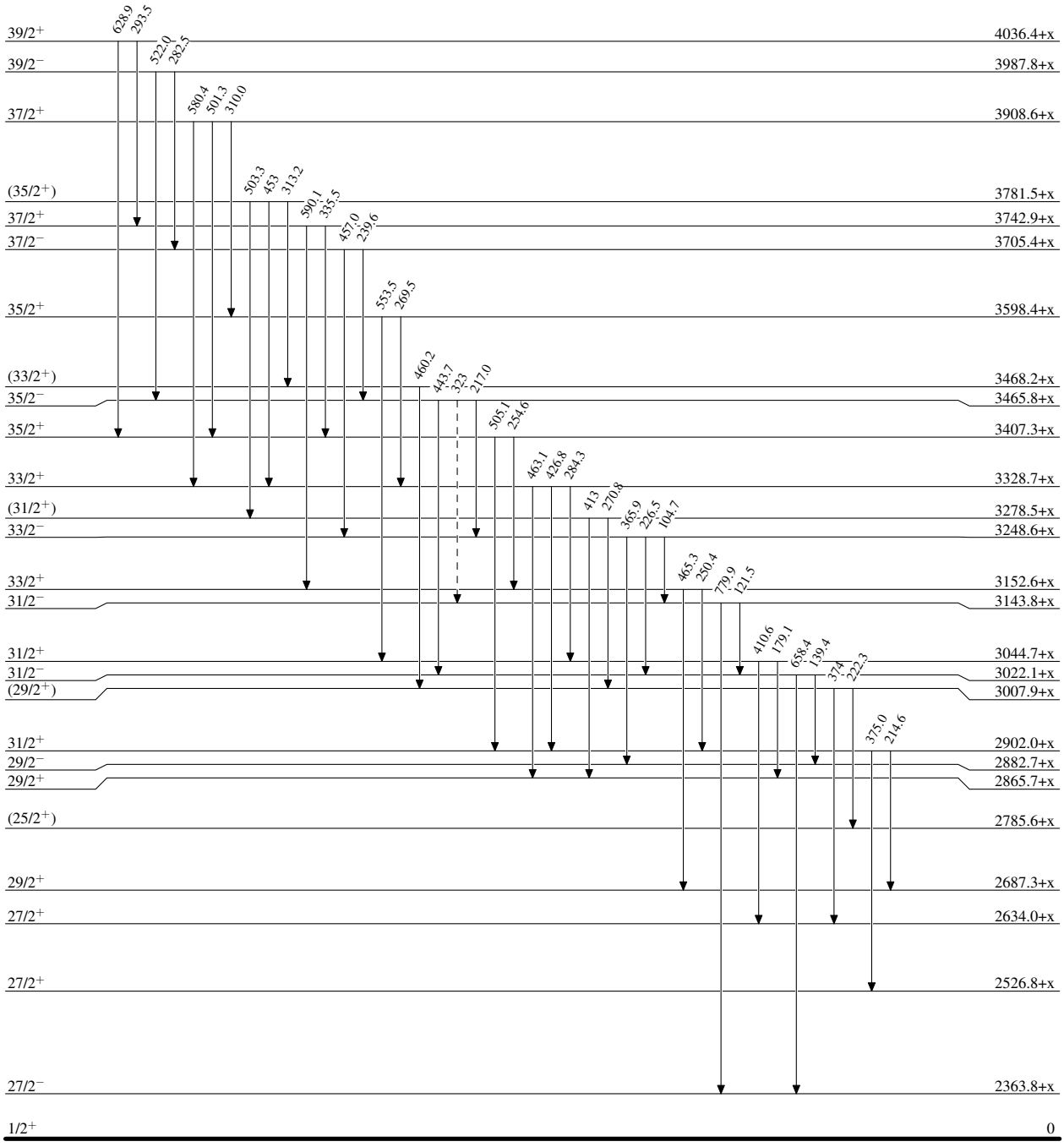
$^{161}_{71}Lu_{90}$

Legend

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

Level Scheme (continued)

- - - - - - ► γ Decay (Uncertain)



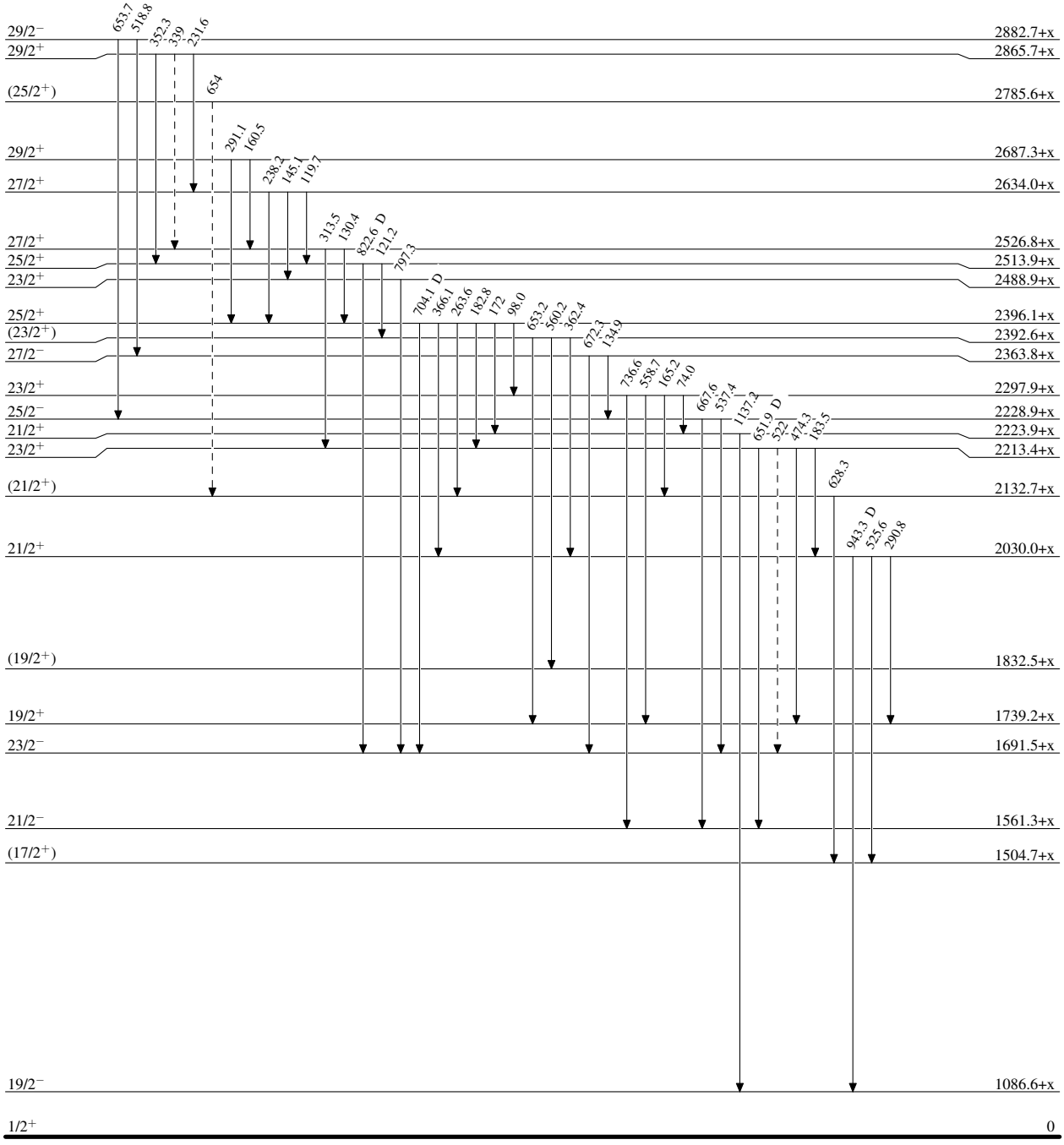
$^{161}_{71}Lu_{90}$

Legend

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

Level Scheme (continued)

– – – – – – ► γ Decay (Uncertain)



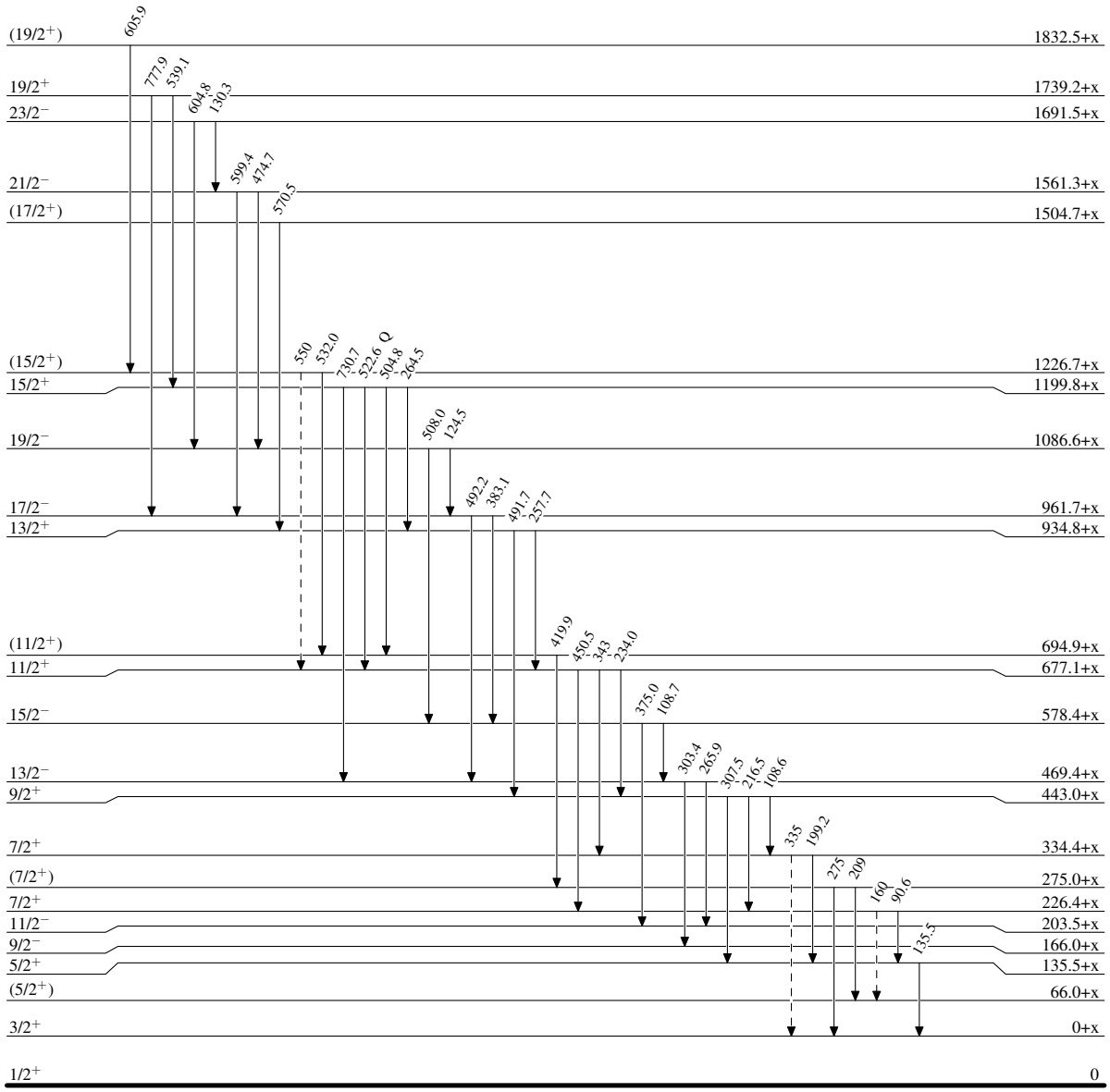
$^{161}_{71}Lu_{90}$

Legend

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

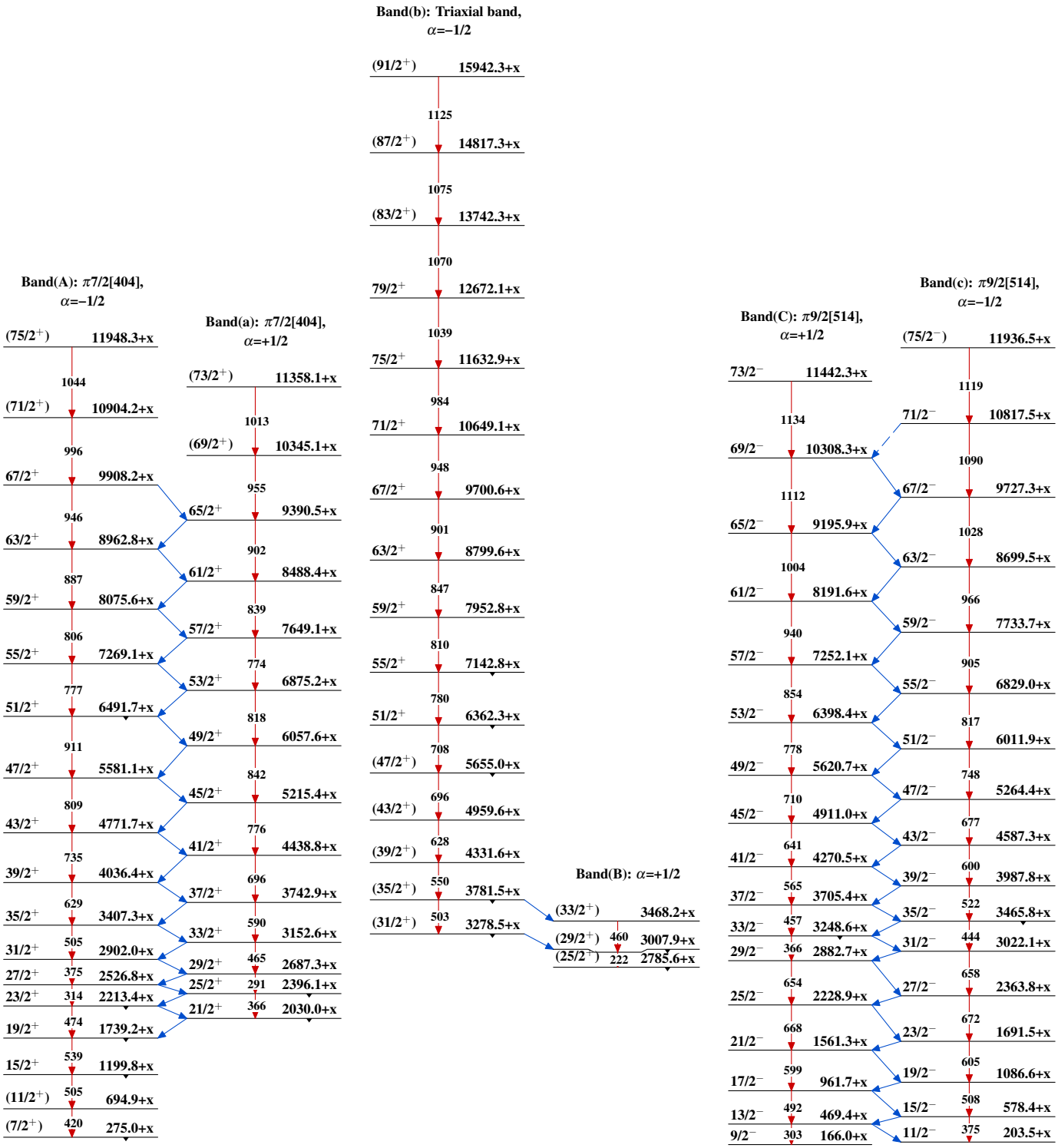
Level Scheme (continued)

γ Decay (Uncertain)

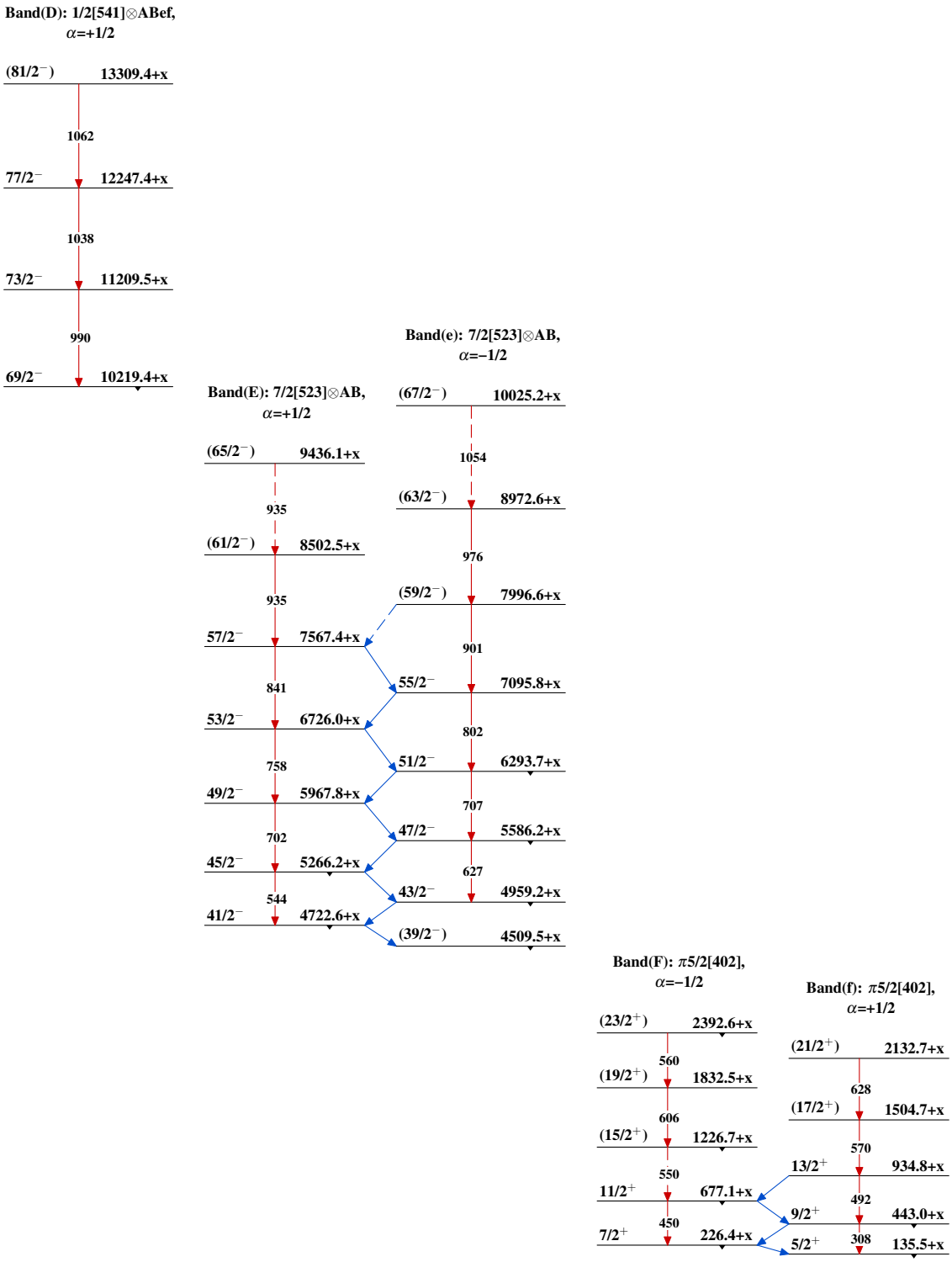


$^{161}_{71}Lu_{90}$

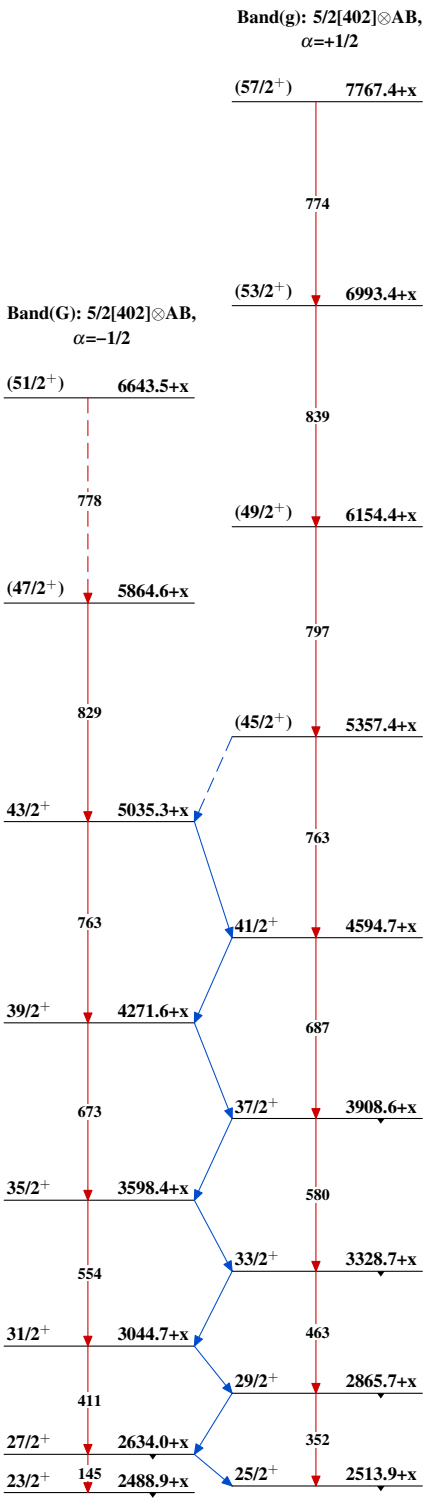
$^{139}La(^{28}Si,6n\gamma)$ 2006Br12,2005Br14,2003Br03



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

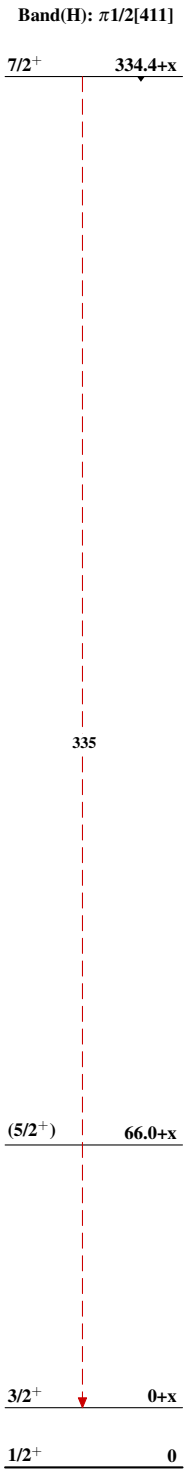


$^{139}La(^{28}Si,6n\gamma)$ 2006Br12,2005Br14,2003Br03 (continued)



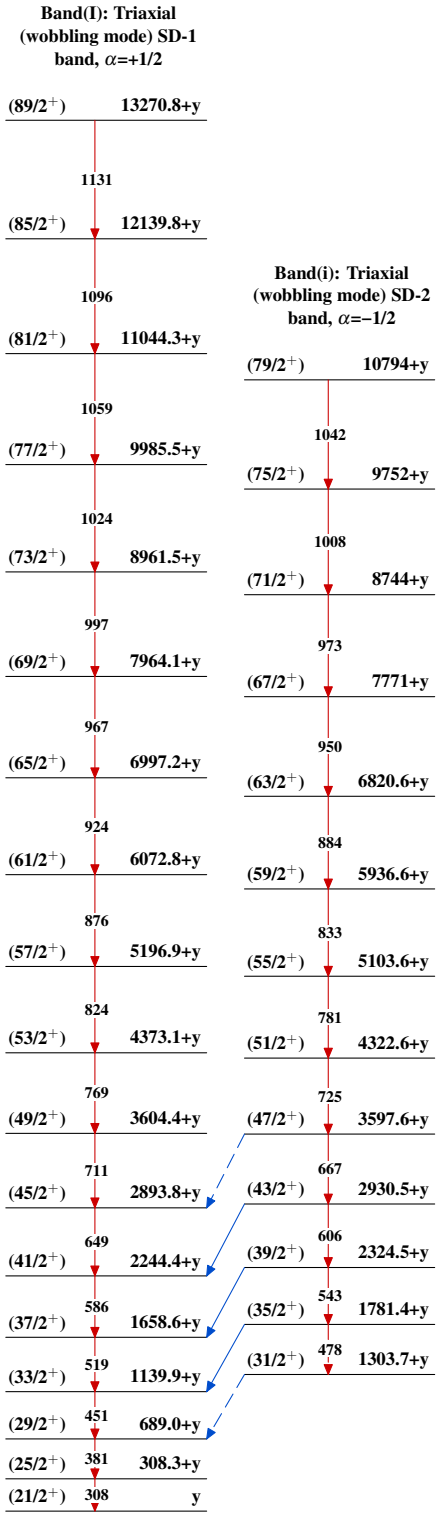
$^{161}_{71}Lu_{90}$

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



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

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



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