

**Adopted Levels, Gammas**

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen		NDS 194,460 (2024)	31-Oct-2022

Q( $\beta^-$ )=-4810 40; S(n)=9870 40; S(p)=2720 30; Q( $\alpha$ )=3030 40 [2021Wa16](#)

Q( $\epsilon$ )=3850 40, S(2n)=17790 40, S(2p)=8292 27 ([2021Wa16](#)).

Theory and analysis of rotational structures:

[2021Gh11](#): calculated transition energies, even-odd energy staggering parameter, axial asymmetry deformation parameter, rotational frequencies, kinematic and dynamic moments of inertia in triaxial superdeformed (TSD) odd nuclei using the cranked Nilsson-Strutinsky (CNS) model.

[2020Ra01](#): calculated levels,  $J^\pi$ , aligned angular momenta, wobbling energies, moments of inertia, quadrupole moment parameters, B(E2), B(M1), transition quadrupole moments, multiple mixing ratios of triaxial strongly-deformed bands (TSDBs) using the particle-triaxial rotor formalism.

[2008Ta14](#): calculated level energies of triaxial strongly-deformed bands, B(M1), B(E2) values.

Analysis of rotational bands in <sup>165</sup>Lu: [2017Ra25](#), [2004Ha21](#), [1999Li39](#), [1999Xi02](#).

[Additional information 1](#).

<sup>165</sup>Lu Levels

Q(transition)= Transition quadrupole moment.

Band assignments and level scheme are adopted from [2004Sc14](#) in <sup>139</sup>La(<sup>30</sup>Si,4n $\gamma$ ).

Nomenclature for quasi-particle orbitals used in band assignments:

- a:  $\pi 1/2[411]$ ,  $\alpha=+1/2$ .
- b:  $\pi 1/2[411]$ ,  $\alpha=-1/2$ .
- c:  $\pi 7/2[404]$ ,  $\alpha=+1/2$ .
- d:  $\pi 7/2[404]$ ,  $\alpha=-1/2$ .
- e:  $\pi 9/2[514]$ ,  $\alpha=+1/2$ .
- f:  $\pi 9/2[514]$ ,  $\alpha=-1/2$ .
- g:  $\pi 7/2[523]$ ,  $\alpha=+1/2$ .
- h:  $\pi 7/2[523]$ ,  $\alpha=-1/2$ .
- k:  $\pi 5/2[402]$ ,  $\alpha=+1/2$ .
- l:  $\pi 5/2[402]$ ,  $\alpha=-1/2$ .
- A:  $\nu 5/2[642]$ ,  $\alpha=+1/2$ .
- B:  $\nu 5/2[642]$ ,  $\alpha=-1/2$ .
- C:  $\nu 3/2[651]$ ,  $\alpha=+1/2$ .
- D:  $\nu 3/2[651]$ ,  $\alpha=-1/2$ .
- E:  $\nu 5/2[523]$ ,  $\alpha=+1/2$ .
- F:  $\nu 5/2[523]$ ,  $\alpha=-1/2$ .
- G:  $\nu 3/2[521]$ ,  $\alpha=+1/2$ .
- H:  $\nu 3/2[521]$ ,  $\alpha=-1/2$ .

Cross Reference (XREF) Flags

<b>A</b>	<sup>165</sup> Hf $\epsilon$ decay (76 s)	<b>D</b>	<sup>139</sup> La( <sup>30</sup> Si,4n $\gamma$ )
<b>B</b>	<sup>124</sup> Sn( <sup>45</sup> Sc,4n $\gamma$ )	<b>E</b>	<sup>150</sup> Sm( <sup>19</sup> F,4n $\gamma$ )
<b>C</b>	<sup>138</sup> Ba( <sup>31</sup> P,4n $\gamma$ )	<b>F</b>	<sup>153</sup> Eu( <sup>16</sup> O,4n $\gamma$ )

E(level) <sup>†</sup>	J $\pi$ <sup>‡</sup>	T <sub>1/2</sub> <sup>#</sup>	XREF	Comments
0.0 <sup>e</sup>	1/2 <sup>+</sup>	10.74 min 10		$\% \epsilon + \% \beta^+ = 100$ $\mu = -0.0245$ 3 ( <a href="#">1998Ge13</a> , <a href="#">2019StZV</a> ) The rms charge radius $\langle r^2 \rangle^{1/2} = 5.283$ fm 3I ( <a href="#">2013An02</a> , evaluation). Change in mean square radius $\delta \langle r^2 \rangle (\text{175Lu, 165Lu}) = -0.9372$ fm <sup>2</sup> 7 ( <a href="#">2013An02</a> , evaluation).

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**Adopted Levels, Gammas (continued)**

<sup>165</sup>Lu Levels (continued)

E(level) <sup>†</sup>	J <sup>π‡</sup>	T <sub>1/2</sub> <sup>#</sup>	XREF	Comments
0.0+x <sup>d</sup>	(3/2 <sup>+</sup> )		A CDEF	J <sup>π</sup> : spin from collinear laser spectroscopy of the hyperfine structure (1998Ge13). Earlier atomic beam magnetic resonance data of 1974Ek03 (see also 1976Ek02) also gave spin of 1/2 for a 12-min activity of <sup>165</sup> Lu. Parity is from agreement of the experimental μ with theoretical value of -0.03 (1998Ge13) for the π1/2[411] orbital. 1998Ge13 found no evidence of a higher-spin isomer such as 7/2 <sup>+</sup> . T <sub>1/2</sub> : from 1982Ra19. Others: 11.8 min 5 (1973Me25), 12 min (1974Ek03), 12.0 min 4 (1978Bu13). μ: Collinear laser spectroscopy of the hyperfine structure (1998Ge13). Measured δ<r <sup>2</sup> >( <sup>170</sup> Lu- <sup>165</sup> Lu)=-0.561 fm <sup>2</sup> (1998Ge13, laser spectroscopy). The systematic uncertainty is ≈10%. Additional information 2. E(level): x≈20 keV, from evaluators' estimate based on the trend of energy separation of 3/2 and 1/2 states for the π1/2[411] bands in odd-A Lu nuclides ( <sup>163</sup> Lu, <sup>167</sup> Lu to <sup>179</sup> Lu).
5.37+x <sup>h</sup> 19	(5/2 <sup>+</sup> )		A CDEF	
23.47+x <sup>b</sup> 20	(7/2 <sup>+</sup> )		ABCDEF	
54.79+x 21	(7/2 <sup>-</sup> )		D F	J <sup>π</sup> : probable bandhead of π7/2[523] band from systematic trend of bandhead energies for odd-A Lu nuclides.
141.43+x <sup>g</sup> 18	(7/2 <sup>+</sup> )		A CDEF	XREF: A(?).
147.69+x <sup>e</sup> 12	(5/2 <sup>+</sup> )		CDEF	
182.49+x <sup>c</sup> 20	(9/2 <sup>+</sup> )		A CDEF	XREF: A(?).
195.39+x <sup>d</sup> 9	(7/2 <sup>+</sup> )	133 ps 12	CDEF	
203.5+x 4			A	J <sup>π</sup> : possible ε+β <sup>+</sup> feeding from (5/2 <sup>-</sup> ) and γ to (7/2 <sup>+</sup> ) suggest (3/2 <sup>+</sup> , 5/2, 7/2). Configuration of π7/2[523] proposed by 1989Hi04 is questionable in view of another low-lying (7/2 <sup>-</sup> ) with the same configuration at 54.8+x reported in <sup>139</sup> La( <sup>30</sup> Si, 4nγ).
234.99+x <sup>&amp;</sup> 19	(9/2 <sup>-</sup> )		AB D F	XREF: A(?).
305.56+x <sup>h</sup> 17	(9/2 <sup>+</sup> )		CDEF	
335.49+x <sup>a</sup> 21	(11/2 <sup>-</sup> )		B D F	
345.5+x <sup>f</sup> 4	(5/2 <sup>-</sup> )		D F	
366.62+x <sup>b</sup> 20	(11/2 <sup>+</sup> )	15.7 ps 15	CDEF	
432.71+x <sup>e</sup> 14	(9/2 <sup>+</sup> )		CDEF	
466.49+x <sup>f</sup> 13	(9/2 <sup>-</sup> )	58.7 ps 35	D F	
494.76+x <sup>&amp;</sup> 21	(13/2 <sup>-</sup> )	13.0 ps 6	B D F	
499.26+x <sup>g</sup> 17	(11/2 <sup>+</sup> )		CDEF	
519.61+x <sup>d</sup> 13	(11/2 <sup>+</sup> )	14.9 ps 7	CDEF	
574.18+x <sup>c</sup> 20	(13/2 <sup>+</sup> )	6.70 ps 24	CDEF	
662.65+x <sup>a</sup> 22	(15/2 <sup>-</sup> )	6.65 ps 35	B D F	
694.79+x <sup>f</sup> 16	(13/2 <sup>-</sup> )	33.3 ps 14	D F	
711.23+x <sup>h</sup> 18	(13/2 <sup>+</sup> )		CDEF	
802.25+x <sup>b</sup> 20	(15/2 <sup>+</sup> )	3.66 ps 16	CDEF	
821.15+x <sup>e</sup> 17	(13/2 <sup>+</sup> )		CDEF	
893.49+x <sup>&amp;</sup> 22	(17/2 <sup>-</sup> )	2.91 ps 12	B D F	
943.36+x <sup>d</sup> 15	(15/2 <sup>+</sup> )	1.84 ps 17	CDEF	
955.36+x <sup>g</sup> 18	(15/2 <sup>+</sup> )		CDEF	
976.2+x 6			A	
1030.19+x <sup>f</sup> 19	(17/2 <sup>-</sup> )	7.77 ps 17	D F	
1048.87+x <sup>c</sup> 20	(17/2 <sup>+</sup> )	2.17 ps 8	CDEF	

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**Adopted Levels, Gammas (continued)**

<sup>165</sup>Lu Levels (continued)

E(level) <sup>†</sup>	J <sup>π</sup> <sup>‡</sup>	T <sub>1/2</sub> <sup>#</sup>	XREF	E(level) <sup>†</sup>	J <sup>π</sup> <sup>‡</sup>	T <sub>1/2</sub> <sup>#</sup>	XREF
1099.98+x <sup>a</sup> 22	(19/2 <sup>-</sup> )	1.70 ps 6	B D F	3201.18+x <sup>j</sup> 22	(33/2 <sup>+</sup> )		CDE
1197.33+x <sup>h</sup> 19	(17/2 <sup>+</sup> )		CDEF	3222.5+x <sup>p</sup> 4	(33/2 <sup>-</sup> )		D
1292.02+x <sup>e</sup> 17	(17/2 <sup>+</sup> )		CDEF	3224.3+x <sup>h</sup> 5	(33/2 <sup>+</sup> )		D
1310.68+x <sup>b</sup> 20	(19/2 <sup>+</sup> )		CDEF	3239.8+x <sup>r</sup> 4	(33/2 <sup>+</sup> )		CDE
1386.78+x <sup>&amp;</sup> 23	(21/2 <sup>-</sup> )	1.25 ps 18	B D F	3248.63+x <sup>a</sup> 25	(35/2 <sup>-</sup> )		B D F
1445.47+x <sup>d</sup> 18	(19/2 <sup>+</sup> )	2.16 ps 10	CDEF	3417.22+x <sup>b</sup> 22	(35/2 <sup>+</sup> )		CDE
1462.29+x <sup>f</sup> 21	(21/2 <sup>-</sup> )	2.8 ps 7	D F	3436.51+x <sup>i</sup> 24	(35/2 <sup>+</sup> )		CDE
1478.44+x <sup>g</sup> 20	(19/2 <sup>+</sup> )		CDEF	3471.7+x <sup>d</sup> 6	(35/2 <sup>+</sup> )		D
1587.11+x <sup>c</sup> 20	(21/2 <sup>+</sup> )	1.10 ps 8	CDEF	3475.35+x <sup>&amp;</sup> 25	(37/2 <sup>-</sup> )		B D F
1618.79+x <sup>a</sup> 23	(23/2 <sup>-</sup> )	0.98 ps 7	B D F	3485.13+x <sup>o</sup> 33	(35/2 <sup>-</sup> )		D
1740.09+x <sup>h</sup> 19	(21/2 <sup>+</sup> )		CDEF	3602.3+x <sup>q</sup> 7	(35/2 <sup>-</sup> )		D
1769.6+x <sup>q</sup> 6	(19/2 <sup>-</sup> )		D	3682.49+x <sup>c</sup> 23	(37/2 <sup>+</sup> )		CDE
1818.59+x <sup>e</sup> 20	(21/2 <sup>+</sup> )		CDEF	3705.22+x <sup>j</sup> 30	(37/2 <sup>+</sup> )		CDE
1871.67+x <sup>b</sup> 20	(23/2 <sup>+</sup> )		CDEF	3735.36+x <sup>a</sup> 26	(39/2 <sup>-</sup> )		B D F
1945.37+x <sup>&amp;</sup> 23	(25/2 <sup>-</sup> )		B D F	3754.2+x <sup>h</sup> 6	(37/2 <sup>+</sup> )		D
1978.69+x <sup>f</sup> 23	(25/2 <sup>-</sup> )		D F	3764.3+x <sup>r</sup> 4	(37/2 <sup>+</sup> )		CDE
1990.18+x <sup>d</sup> 19	(23/2 <sup>+</sup> )		CDEF	3824.1+x <sup>p</sup> 4	(37/2 <sup>-</sup> )		D
2048.19+x <sup>g</sup> 26	(23/2 <sup>+</sup> )		CDEF	3853.7+x <sup>f</sup> 6	(37/2 <sup>-</sup> )		D F
2155.7+x <sup>q</sup> 5	(23/2 <sup>-</sup> )		D	3864.1+x <sup>s</sup> 6	(35/2 <sup>+</sup> )		D
2166.77+x <sup>c</sup> 20	(25/2 <sup>+</sup> )		CDEF	3970.08+x <sup>b</sup> 30	(39/2 <sup>+</sup> )		CDE
2196.33+x <sup>a</sup> 24	(27/2 <sup>-</sup> )		B D F	3981.00+x <sup>i</sup> 25	(39/2 <sup>+</sup> )		CDE
2294.45+x <sup>h</sup> 20	(25/2 <sup>+</sup> )		CDEF	4010.31+x <sup>&amp;</sup> 26	(41/2 <sup>-</sup> )		B D F
2348.81+x <sup>e</sup> 22	(25/2 <sup>+</sup> )		CDEF	4034.6+x <sup>d</sup> 7	(39/2 <sup>+</sup> )		D
2409.4+x <sup>r</sup> 5	(25/2 <sup>+</sup> )		D	4117.1+x <sup>o</sup> 5	(39/2 <sup>-</sup> )		D
2458.67+x <sup>b</sup> 20	(27/2 <sup>+</sup> )		CDEF	4185.0+x <sup>q</sup> 8	(39/2 <sup>-</sup> )		D
2535.25+x <sup>&amp;</sup> 24	(29/2 <sup>-</sup> )		B D F	4269.85+x <sup>j</sup> 25	(41/2 <sup>+</sup> )		CDE
2538.65+x <sup>d</sup> 21	(27/2 <sup>+</sup> )		CDEF	4290.4+x <sup>c</sup> 4	(41/2 <sup>+</sup> )		D
2544.95+x <sup>i</sup> 30	(27/2 <sup>+</sup> )		D	4322.36+x <sup>a</sup> 27	(43/2 <sup>-</sup> )		B D F
2564.39+x <sup>f</sup> 24	(29/2 <sup>-</sup> )		D F	4346.6+x <sup>r</sup> 4	(41/2 <sup>+</sup> )		CDE
2585.7+x <sup>q</sup> 5	(27/2 <sup>-</sup> )		D	4373.4+x <sup>h</sup> 6	(41/2 <sup>+</sup> )		D
2612.22+x <sup>g</sup> 33	(27/2 <sup>+</sup> )		CDE	4402.7+x <sup>s</sup> 7	(39/2 <sup>+</sup> )		D
2730.30+x <sup>c</sup> 20	(29/2 <sup>+</sup> )		CDEF	4453.7+x <sup>p</sup> 5	(41/2 <sup>-</sup> )		D
2753.50+x <sup>h</sup> 22	(29/2 <sup>+</sup> )		CDEF	4490.8+x <sup>f</sup> 7	(41/2 <sup>-</sup> )		D
2765.23+x <sup>j</sup> 34	(29/2 <sup>+</sup> )		D	4575.4+x <sup>n</sup> 7	(41/2 <sup>-</sup> )		D
2789.43+x <sup>a</sup> 24	(31/2 <sup>-</sup> )		B D F	4579.24+x <sup>i</sup> 26	(43/2 <sup>+</sup> )		CDE
2794.4+x <sup>r</sup> 4	(29/2 <sup>+</sup> )		CDE	4613.8+x <sup>b</sup> 4	(43/2 <sup>+</sup> )		CDE
2947.54+x <sup>o</sup> 34	(31/2 <sup>-</sup> )		D	4645.26+x <sup>&amp;</sup> 27	(45/2 <sup>-</sup> )		B D
2956.73+x <sup>b</sup> 20	(31/2 <sup>+</sup> )		CDE	4686.6+x <sup>d</sup> 7	(43/2 <sup>+</sup> )		D
2968.37+x <sup>i</sup> 27	(31/2 <sup>+</sup> )		D	4773.5+x <sup>o</sup> 6	(43/2 <sup>-</sup> )		D
2999.7+x <sup>d</sup> 4	(31/2 <sup>+</sup> )		D	4787.5+x <sup>t</sup> 10	(41/2 <sup>+</sup> )		D
3038.99+x <sup>&amp;</sup> 25	(33/2 <sup>-</sup> )		B D F	4800.4+x <sup>q</sup> 8	(43/2 <sup>-</sup> )		D
3043.3+x <sup>g</sup> 9	(31/2 <sup>+</sup> )		D	4888.51+x <sup>j</sup> 27	(45/2 <sup>+</sup> )		CDE
3067.2+x <sup>q</sup> 7	(31/2 <sup>-</sup> )		D	4960.4+x <sup>c</sup> 5	(45/2 <sup>+</sup> )		D
3180.43+x <sup>c</sup> 21	(33/2 <sup>+</sup> )		CDE	4988.0+x <sup>r</sup> 6	(45/2 <sup>+</sup> )		D
3195.3+x <sup>f</sup> 4	(33/2 <sup>-</sup> )		D F	4996.50+x <sup>a</sup> 28	(47/2 <sup>-</sup> )	>0.19 <sup>@</sup> ps	B D

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**Adopted Levels, Gammas (continued)**

$^{165}\text{Lu}$ Levels (continued)					
E(level) <sup>†</sup>	J <sup>π</sup> <sup>‡</sup>	T <sub>1/2</sub> <sup>#</sup>	XREF	Comments	
5000.7+x <sup>s</sup> 7	(43/2 <sup>+</sup> )		D		
5068.2+x <sup>h</sup> 8	(45/2 <sup>+</sup> )		D		
5115.7+x <sup>p</sup> 6	(45/2 <sup>-</sup> )		D		
5145.3+x <sup>f</sup> 8	(45/2 <sup>-</sup> )		D		
5174.3+x <sup>n</sup> 7	(45/2 <sup>-</sup> )		D		
5220.60+x <sup>i</sup> 28	(47/2 <sup>+</sup> )		CDE		
5325.8+x <sup>b</sup> 6	(47/2 <sup>+</sup> )		CDE		
5363.92+x <sup>&amp;</sup> 29	(49/2 <sup>-</sup> )		B D		
5393.6+x 7	(47/2 <sup>+</sup> )		D		Level decays to (43/2 <sup>+</sup> ) member of the $\pi 1/2[411]$ band.
5435.6+x <sup>d</sup> 9	(47/2 <sup>+</sup> )		D		
5446.7+x <sup>q</sup> 7	(47/2 <sup>-</sup> )		D		
5448.8+x <sup>t</sup> 6	(45/2 <sup>+</sup> )		D		
5475.8+x <sup>o</sup> 6	(47/2 <sup>-</sup> )		D		
5539.46+x <sup>j</sup> 29	(49/2 <sup>+</sup> )		CDE		
5655.7+x <sup>s</sup> 8	(47/2 <sup>+</sup> )		D		
5684.1+x <sup>r</sup> 6	(49/2 <sup>+</sup> )		CDE		
5695.4+x <sup>c</sup> 6	(49/2 <sup>+</sup> )		D		
5740.6+x <sup>a</sup> 4	(51/2 <sup>-</sup> )	>0.13 <sup>@</sup> ps	B D		
5786.5+x <sup>p</sup> 8	(49/2 <sup>-</sup> )		D		
5823.2+x <sup>h</sup> 10	(49/2 <sup>+</sup> )		D		
5825.5+x <sup>n</sup> 7	(49/2 <sup>-</sup> )		D		
5845.3+x <sup>f</sup> 12	(49/2 <sup>-</sup> )		D		
5861.1+x <sup>m</sup> 12	(49/2 <sup>-</sup> )		D		
5899.51+x <sup>i</sup> 30	(51/2 <sup>+</sup> )		CDE		
6080.8+x <sup>k</sup> 6	(51/2 <sup>+</sup> )		D		
6101.6+x <sup>b</sup> 7	(51/2 <sup>+</sup> )		CDE		
6138.1+x <sup>q</sup> 8	(51/2 <sup>-</sup> )		D		
6147.1+x <sup>&amp;</sup> 4	(53/2 <sup>-</sup> )	0.13 <sup>@</sup> ps 2	B D		
6154.8+x <sup>t</sup> 7	(49/2 <sup>+</sup> )		D		
6178.8+x <sup>o</sup> 7	(51/2 <sup>-</sup> )		D		
6188.6+x <sup>d</sup> 9	(51/2 <sup>+</sup> )		D		
6236.43+x <sup>j</sup> 31	(53/2 <sup>+</sup> )		CDE		
6366.9+x <sup>s</sup> 8	(51/2 <sup>+</sup> )		D		
6434.9+x <sup>r</sup> 7	(53/2 <sup>+</sup> )		CDE		
6448.4+x <sup>l</sup> 7	(53/2 <sup>+</sup> )		D		
6507.7+x <sup>p</sup> 8	(53/2 <sup>-</sup> )		D		
6511.4+x <sup>c</sup> 10	(53/2 <sup>+</sup> )		D		
6539.2+x <sup>a</sup> 4	(55/2 <sup>-</sup> )		B D		
6552.5+x <sup>n</sup> 8	(53/2 <sup>-</sup> )		D		
6608.8+x <sup>f</sup> 14	(53/2 <sup>-</sup> )		D		
6612.7+x <sup>h</sup> 12	(53/2 <sup>+</sup> )		D		
6632.28+x <sup>i</sup> 32	(55/2 <sup>+</sup> )		CDE		
6642.4+x <sup>m</sup> 14	(53/2 <sup>-</sup> )		D		
6841.8+x <sup>k</sup> 8	(55/2 <sup>+</sup> )		D		
6886.7+x <sup>q</sup> 9	(55/2 <sup>-</sup> )		D		
6903.2+x <sup>t</sup> 8	(53/2 <sup>+</sup> )		D		
6907.5+x <sup>b</sup> 8	(55/2 <sup>+</sup> )		D		
6947.4+x <sup>o</sup> 9	(55/2 <sup>-</sup> )		D		

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**Adopted Levels, Gammas (continued)**

<sup>165</sup>Lu Levels (continued)

E(level) <sup>†</sup>	J <sup>π</sup> <sup>‡</sup>	XREF	E(level) <sup>†</sup>	J <sup>π</sup> <sup>‡</sup>	XREF
6982.5+x <sup>&amp;</sup> 4	(57/2 <sup>-</sup> )	B D	9156.0+x <sup>n</sup> 15	(65/2 <sup>-</sup> )	D
6994.6+x <sup>d</sup> 12	(55/2 <sup>+</sup> )	D	9160.2+x <sup>h</sup> 19	(65/2 <sup>+</sup> )	D
6997.96+x <sup>j</sup> 33	(57/2 <sup>+</sup> )	CDE	9199.0+x <sup>a</sup> 8	(67/2 <sup>-</sup> )	B D
7132.7+x <sup>s</sup> 9	(55/2 <sup>+</sup> )	D	9242.6+x <sup>f</sup> 20	(65/2 <sup>-</sup> )	D
7238.4+x <sup>r</sup> 7	(57/2 <sup>+</sup> )	D	9265.2+x <sup>m</sup> 20	(65/2 <sup>-</sup> )	D
7240.4+x <sup>l</sup> 9	(57/2 <sup>+</sup> )	CDE	9308.9+x <sup>i</sup> 6	(67/2 <sup>+</sup> )	CDE
7288.1+x <sup>p</sup> 9	(57/2 <sup>-</sup> )	D	9456.2+x <sup>t</sup> 16	(65/2 <sup>+</sup> )	D
7338.4+x <sup>c</sup> 13	(57/2 <sup>+</sup> )	D	9475.3+x <sup>q</sup> 15	(67/2 <sup>-</sup> )	D
7354.9+x <sup>n</sup> 10	(57/2 <sup>-</sup> )	D	9544.8+x <sup>k</sup> 14	(67/2 <sup>+</sup> )	D
7383.7+x <sup>a</sup> 5	(59/2 <sup>-</sup> )	B D	9607.0+x <sup>b</sup> 16	(67/2 <sup>+</sup> )	D
7417.6+x <sup>h</sup> 15	(57/2 <sup>+</sup> )	D	9643.2+x <sup>o</sup> 16	(67/2 <sup>-</sup> )	D
7431.4+x <sup>f</sup> 16	(57/2 <sup>-</sup> )	D	9671.6+x <sup>d</sup> 19	(67/2 <sup>+</sup> )	D
7439.31+x <sup>i</sup> 35	(59/2 <sup>+</sup> )	CDE	9743.3+x <sup>j</sup> 7	(69/2 <sup>+</sup> )	D
7467.2+x <sup>m</sup> 16	(57/2 <sup>-</sup> )	D	9751.3+x <sup>s</sup> 17	(67/2 <sup>+</sup> )	D
7677.8+x <sup>k</sup> 10	(59/2 <sup>+</sup> )	D	9781.4+x <sup>&amp;</sup> 9	(69/2 <sup>-</sup> )	B D
7694.0+x <sup>q</sup> 10	(59/2 <sup>-</sup> )	D	9964.2+x <sup>r</sup> 12	(69/2 <sup>+</sup> )	CDE
7701.9+x <sup>t</sup> 11	(57/2 <sup>+</sup> )	D	9991.2+x <sup>p</sup> 14	(69/2 <sup>-</sup> )	D
7760.2+x <sup>b</sup> 12	(59/2 <sup>+</sup> )	D	10072.4+x <sup>l</sup> 15	(69/2 <sup>+</sup> )	D
7788.8+x <sup>o</sup> 12	(59/2 <sup>-</sup> )	D	10107.4+x <sup>c</sup> 19	(69/2 <sup>+</sup> )	D
7837.7+x <sup>j</sup> 4	(61/2 <sup>+</sup> )	CDE	10129.6+x <sup>n</sup> 17	(69/2 <sup>-</sup> )	D
7841.6+x <sup>d</sup> 15	(59/2 <sup>+</sup> )	D	10175.4+x <sup>a</sup> 9	(71/2 <sup>-</sup> )	D
7864.3+x <sup>&amp;</sup> 6	(61/2 <sup>-</sup> )	B D	10207.7+x <sup>f</sup> 21	(69/2 <sup>-</sup> )	D
7952.6+x <sup>s</sup> 12	(59/2 <sup>+</sup> )	D	10367.3+x <sup>i</sup> 8	(71/2 <sup>+</sup> )	D
8093.7+x <sup>r</sup> 8	(61/2 <sup>+</sup> )	CDE	10413.7+x <sup>t</sup> 18	(69/2 <sup>+</sup> )	D
8114.4+x <sup>l</sup> 10	(61/2 <sup>+</sup> )	D	10449.2+x <sup>q</sup> 17	(71/2 <sup>-</sup> )	D
8128.0+x <sup>p</sup> 10	(61/2 <sup>-</sup> )	D	10546.8+x <sup>k</sup> 16	(71/2 <sup>+</sup> )	D
8212.4+x <sup>c</sup> 15	(61/2 <sup>+</sup> )	D	10593.9+x <sup>b</sup> 18	(71/2 <sup>+</sup> )	D
8227.1+x <sup>n</sup> 13	(61/2 <sup>-</sup> )	D	10645.1+x <sup>o</sup> 18	(71/2 <sup>-</sup> )	D
8257.4+x <sup>h</sup> 17	(61/2 <sup>+</sup> )	D	10646.6+x <sup>d</sup> 20	(71/2 <sup>+</sup> )	D
8269.6+x <sup>a</sup> 6	(63/2 <sup>-</sup> )	B D	10732.4+x <sup>s</sup> 18	(71/2 <sup>+</sup> )	D
8312.4+x <sup>f</sup> 18	(61/2 <sup>-</sup> )	D	10794.5+x <sup>j</sup> 10	(73/2 <sup>+</sup> )	D
8331.0+x <sup>i</sup> 4	(63/2 <sup>+</sup> )	CDE	10827.4+x <sup>&amp;</sup> 12	(73/2 <sup>-</sup> )	D
8336.9+x <sup>m</sup> 18	(61/2 <sup>-</sup> )	D	10983.5+x <sup>r</sup> 14	(73/2 <sup>+</sup> )	D
8551.5+x <sup>t</sup> 14	(61/2 <sup>+</sup> )	D	11017.5+x <sup>p</sup> 16	(73/2 <sup>-</sup> )	D
8557.1+x <sup>q</sup> 12	(63/2 <sup>-</sup> )	D	11142.4+x <sup>n</sup> 19	(73/2 <sup>-</sup> )	D
8584.8+x <sup>k</sup> 11	(63/2 <sup>+</sup> )	D	11194.1+x <sup>f</sup> 23	(73/2 <sup>-</sup> )	D
8660.3+x <sup>b</sup> 14	(63/2 <sup>+</sup> )	D	11202.0+x <sup>a</sup> 11	(75/2 <sup>-</sup> )	D
8692.0+x <sup>o</sup> 14	(63/2 <sup>-</sup> )	D	11424.8+x <sup>t</sup> 19	(73/2 <sup>+</sup> )	D
8733.6+x <sup>d</sup> 17	(63/2 <sup>+</sup> )	D	11477.3+x <sup>q</sup> 19	(75/2 <sup>-</sup> )	D
8755.4+x <sup>j</sup> 4	(65/2 <sup>+</sup> )	CDE	11497.0+x <sup>i</sup> 12	(75/2 <sup>+</sup> )	D
8795.3+x <sup>&amp;</sup> 8	(65/2 <sup>-</sup> )	B D	11582.8+x <sup>k</sup> 18	(75/2 <sup>+</sup> )	D
8824.7+x <sup>s</sup> 14	(63/2 <sup>+</sup> )	D	11612.1+x <sup>b</sup> 20	(75/2 <sup>+</sup> )	D
9001.2+x <sup>r</sup> 8	(65/2 <sup>+</sup> )	CDE	11656.6+x <sup>d</sup> 22	(75/2 <sup>+</sup> )	D
9028.1+x <sup>p</sup> 11	(65/2 <sup>-</sup> )	D	11684.1+x <sup>o</sup> 20	(75/2 <sup>-</sup> )	D
9067.4+x <sup>l</sup> 13	(65/2 <sup>+</sup> )	D	11767.5+x <sup>s</sup> 20	(75/2 <sup>+</sup> )	D
9133.4+x <sup>c</sup> 17	(65/2 <sup>+</sup> )	D	11899.9+x <sup>j</sup> 13	(77/2 <sup>+</sup> )	D

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) $^{165}\text{Lu}$  Levels (continued)

E(level) <sup>†</sup>	J <sup>π‡</sup>	XREF	Comments
11936.3+x <sup>&amp;</sup> 15	(77/2 <sup>-</sup> )	D	
12059.8+x <sup>r</sup> 16	(77/2 <sup>+</sup> )	D	
12105.5+x <sup>p</sup> 18	(77/2 <sup>-</sup> )	D	
12190.2+x <sup>n</sup> 20	(77/2 <sup>-</sup> )	D	
12215.8+x <sup>f</sup> 24	(77/2 <sup>-</sup> )	D	
12278.0+x <sup>a</sup> 13	(79/2 <sup>-</sup> )	D	
12483.9+x <sup>t</sup> 21	(77/2 <sup>+</sup> )	D	
12558.9+x <sup>q</sup> 20	(79/2 <sup>-</sup> )	D	
12643.8+x <sup>k</sup> 20	(79/2 <sup>+</sup> )	D	
12649.8+x <sup>b</sup> 21	(79/2 <sup>+</sup> )	D	
12679.0+x <sup>i</sup> 14	(79/2 <sup>+</sup> )	D	
12720.6+x <sup>d</sup> 23	(79/2 <sup>+</sup> )	D	
12857.1+x <sup>s</sup> 22	(79/2 <sup>+</sup> )	D	
13042.1+x <sup>j</sup> 15	(81/2 <sup>+</sup> )	D	
13102.8+x <sup>&amp;</sup> 17	(81/2 <sup>-</sup> )	D	
13193.2+x <sup>r</sup> 18	(81/2 <sup>+</sup> )	D	
13245.2+x <sup>p</sup> 20	(81/2 <sup>-</sup> )	D	
13399.7+x <sup>a</sup> 16	(83/2 <sup>-</sup> )	D	
13591.3+x <sup>t</sup> 23	(81/2 <sup>+</sup> )	D	
13686.6+x <sup>q</sup> 22	(83/2 <sup>-</sup> )	D	
13714.8+x <sup>b</sup> 23	(83/2 <sup>+</sup> )	D	
13829.6+x <sup>d</sup> 25	(83/2 <sup>+</sup> )	D	
14008.1+x <sup>s</sup> 23	(83/2 <sup>+</sup> )	D	
14200.6+x <sup>j</sup> 17	(85/2 <sup>+</sup> )	D	
14382.5+x <sup>r</sup> 20	(85/2 <sup>+</sup> )	D	
14558.5+x <sup>a</sup> 17	(87/2 <sup>-</sup> )	D	
14849.1+x <sup>q</sup> 23	(87/2 <sup>-</sup> )	D	
15207.9+x <sup>s</sup> 24	(87/2 <sup>+</sup> )	D	
15621.8+x <sup>r</sup> 21	(89/2 <sup>+</sup> )	D	
15745.5+x <sup>a</sup> 19	(91/2 <sup>-</sup> )	D	
16461.6+x <sup>s</sup> 26	(91/2 <sup>+</sup> )	D	
y <sup>u</sup>	J	D	Additional information 3.
624.5+y <sup>u</sup> 8	J+2	D	
1308.3+y <sup>u</sup> 11	J+4	D	
2049.0+y <sup>u</sup> 14	J+6	D	
2847.3+y <sup>u</sup> 16	J+8	D	
3703.3+y <sup>u</sup> 18	J+10	D	
4618.9+y <sup>u</sup> 20	J+12	D	
5594.2+y <sup>u</sup> 21	J+14	D	
6631.2+y <sup>u</sup> 23	J+16	D	
z <sup>v</sup>	J1	D	Additional information 4.
712.2+z <sup>v</sup> 8	J1+2	D	
1482.4+z <sup>v</sup> 11	J1+4	D	
2311.3+z <sup>v</sup> 14	J1+6	D	
3197.1+z <sup>v</sup> 16	J1+8	D	
4140.8+z <sup>v</sup> 18	J1+10	D	
5143.3+z <sup>v</sup> 20	J1+12	D	
6206.3+z <sup>v</sup> 21	J1+14	D	

Continued on next page (footnotes at end of table)

**Adopted Levels, Gammas (continued)** $^{165}\text{Lu}$  Levels (continued)

- † From a least-squares fit to  $E\gamma$  data. Uncertainty of 0.5 or 1 keV is assigned for  $E\gamma$  values from ( $^{45}\text{Sc}, 4n\gamma$ ) only for fitting purpose.
- ‡ The assignments for the excited states are from [2004Sc14](#), based on multipolarity assignments primarily from  $\gamma\gamma(\theta)$ (DCO) data in  $^{139}\text{La}(^{30}\text{Si}, 4n\gamma)$ , and some from  $\gamma(\theta)$  data in  $^{153}\text{Eu}(^{16}\text{O}, 4n\gamma)$ , rotational band structures, and model predictions (for band heads at low-lying levels). Since firm assignments for bandheads seem lacking, evaluators have placed all the assignments in parentheses.
- # For excited states, the values are from differential decay curve method (DDCM) in recoil-distance measurements in  $^{139}\text{La}(^{30}\text{Si}, 4n\gamma)$  reaction ([2005An04](#)), unless otherwise stated.
- @ From DSAM in  $^{124}\text{Sn}(^{45}\text{Sc}, 4n\gamma)$  reaction ([1988Fr22](#)).
- & Band(A):  $\pi 9/2[514]$ ,  $\alpha = +1/2$ . Band changes to  $\pi 9/2[514] \otimes [\text{AB}]$  at  $\hbar\omega = 0.25$  MeV and spin range of 29/2 to 31/2, and  $\pi 9/2[514] \otimes [\text{ABCD}]$  at higher frequencies. A=11.8.
- a Band(a):  $\pi 9/2[514]$ ,  $\alpha = -1/2$ . See comment for the  $\alpha = +1/2$  signature partner of this band. A=11.9.
- b Band(B):  $\pi 7/2[404]$ ,  $\alpha = -1/2$ . From low to high spins, configuration changes to  $7/2[404] \otimes [\text{AB}]$ , then to  $\pi 7/2[404] \otimes [\text{ABCD}]$ , and finally to  $\pi 7/2[404] \otimes [\text{ABCDEF}]$ . A=16.2.
- c Band(b):  $\pi 7/2[404]$ ,  $\alpha = +1/2$ . See comment for the  $\alpha = -1/2$  signature partner of this band. A=15.4.
- d Band(C):  $\pi 1/2[411]$ ,  $\alpha = -1/2$ . At higher spins, configuration= $\pi 1/2[411] \otimes [\text{AB}]$ , and then  $\pi 1/2[411] \otimes [\text{ABCD}]$ .
- e Band(c):  $\pi 1/2[411]$ ,  $\alpha = +1/2$ . A=18.2, a=0.62 for both signatures combined.
- f Band(D):  $\pi 1/2[541]$ ,  $\alpha = +1/2$ . From low to high spins, configuration changes to  $\pi 1/2[541] \otimes [\text{AB}]$ , then to  $\pi 1/2[541] \otimes [\text{ABCD}]$  and finally to  $\pi 1/2[541] \otimes [\text{ABCDEF}]$ . A=13.4, a=3.5.
- g Band(E):  $\pi 5/2[402]$ ,  $\alpha = -1/2$ .
- h Band(e):  $\pi 5/2[402]$ ,  $\alpha = +1/2$ . From low to high spins, configuration changes to  $5/2[402] \otimes [\text{AB}]$ , and then to  $\pi 5/2[402] \otimes [\text{ABCD}]$ . A=17.6.
- i Band(F):  $\pi 9/2[514] \otimes [\text{AE}]$ ,  $\alpha = -1/2$ . At higher spins, the configuration changes to  $\pi 9/2[514] \otimes [\text{AEBC}]$ . The upbend at  $\hbar\omega \approx 0.56$  MeV near spin 59/2 may be due to the alignment of proton pair  $fg$  or  $gh$ , with the resulting configuration= $\pi 9/2[514] \otimes [\text{AEBC}(fg \text{ and/or } gh)]$ .
- j Band(f):  $\pi 9/2[514] \otimes [\text{AE}]$ ,  $\alpha = +1/2$ . See comment for  $\alpha = -1/2$  signature partner of this band.
- k Band(G):  $\pi 9/2[514] \otimes [\text{AHBC}]$ ,  $\alpha = -1/2$ . At higher frequencies, the configuration is probably  $\pi 9/2[514] \otimes [\text{AHBCEF}]$ .
- l Band(g):  $\pi 9/2[514] \otimes [\text{AHBC}]$ ,  $\alpha = +1/2$ . See comment for the  $\alpha = -1/2$  signature partner of this band.
- m Band(H): Band #1,  $\alpha = +1/2$ . This band probably decays into the  $\pi 1/2[541]$  band.
- n Band(I): Band #2,  $\alpha = +1/2$ . See comment for band #3. Configuration for band #2 changes from  $\pi 7/2[404] \otimes [\text{AE}]$  at high spins to  $\pi 9/2[514] \otimes [\text{BC}]$  at low spins.
- o Band(i): Band #3,  $\alpha = -1/2$ . Bands #2 to #5 form pairs of signature partners above 45/2 spin. At lower spins the bands seem to form different pairs, where band #4 interchanges character with band #2 and bands #3 and #4 seem to be signature partners. From low to high spins, configuration for band #3 is  $\pi 9/2[514]$ ,  $\pi 9/2[514] \otimes [\text{BC}]$ , and finally to  $\pi 9/2[514] \otimes [\text{BCEF}]$ .
- p Band(J): Band #4,  $\alpha = +1/2$ . See comment for band #3. Configuration for band #4 changes from  $\pi 9/2[514] \otimes [\text{BC}]$  at high spins to  $\pi 7/2[404] \otimes [\text{AE}]$  at low spins.
- q Band(j): BAND #5,  $\alpha = -1/2$ . See comment for band #3. The configuration changes from unfavored  $\pi 1/2[541]$  or from  $\pi 7/2[404]$ +octupole vibration at low spin to  $\pi 7/2[404] \otimes [\text{AE}]$  at high spins.
- r Band(K): Zero-phonon wobbling-mode (Triaxial) SD-1 band. ([2004Sc14](#),[2003Sc02](#),[1995Sc39](#)). Q(transition)=6.0 +12-2, 6.4 +19-7 ([2002Sc47](#)).  $\pi 1/2[660]$  band,  $\alpha = +1/2$ . Percent feeding=1.3 ([2003Sc02](#)).
- s Band(L): One-phonon wobbling mode (Triaxial) SD-2 band. ([2004Sc14](#),[2003Sc02](#)). Percent feeding=0.4.
- t Band(M): Two-phonon wobbling mode (Triaxial) SD-3 band. ([2004Sc14](#),[2003Sc02](#)). Percent feeding=0.1.
- u Band(N): Triaxial SD-4 band ([2004Sc14](#)).
- v Band(O): Triaxial SD-5 band ([2004Sc14](#)).

Adopted Levels, Gammas (continued)

E <sub>i</sub> (level)	J <sup>π</sup> <sub>i</sub>	E <sub>γ</sub> <sup>†</sup>	I <sub>γ</sub> <sup>‡</sup>	E <sub>f</sub>	J <sup>π</sup> <sub>f</sub>	Mult.#	γ( <sup>165</sup> Lu)		Comments
							δ <sup>@</sup>	α <sup>a</sup>	
141.43+x	(7/2 <sup>+</sup> )	136.10 12	100	5.37+x	(5/2 <sup>+</sup> )	D+Q			
147.69+x	(5/2 <sup>+</sup> )	147.67 14	100	0.0+x	(3/2 <sup>+</sup> )	D			
182.49+x	(9/2 <sup>+</sup> )	159.2 1	100	23.47+x	(7/2 <sup>+</sup> )	D+Q			
195.39+x	(7/2 <sup>+</sup> )	48.0		147.69+x	(5/2 <sup>+</sup> )				
		195.4 1	100 8	0.0+x	(3/2 <sup>+</sup> )	E2		0.300 4	B(E2)(W.u.)=214 +22-18 if no 48γ.
203.5+x		180.0 3	100	23.47+x	(7/2 <sup>+</sup> )				E <sub>γ</sub> : from <sup>165</sup> Hf ε decay only.
234.99+x	(9/2 <sup>-</sup> )	93.6 1		141.43+x	(7/2 <sup>+</sup> )				
		180.2 1	91 8	54.79+x	(7/2 <sup>-</sup> )	D			E <sub>γ</sub> : this 180.2γ must be different from 180.0γ from 203.3+x level populated in ε decay, since no 211.5γ is seen in ε decay.
		211.5 1	100 9	23.47+x	(7/2 <sup>+</sup> )	D			
305.56+x	(9/2 <sup>+</sup> )	164.28 12	100 3	141.43+x	(7/2 <sup>+</sup> )	D+Q			
		300.12 15	39 2	5.37+x	(5/2 <sup>+</sup> )	Q			I <sub>γ</sub> : weighted average of 40.2 23 from ( <sup>31</sup> P,4nγ), 31 7 from ( <sup>30</sup> Si,4nγ), and 37.5 16 from ( <sup>19</sup> F,4nγ). Other: 40 13 from ( <sup>16</sup> O,4nγ).
335.49+x	(11/2 <sup>-</sup> )	100.4 2	100 11	234.99+x	(9/2 <sup>-</sup> )	D+Q			
		152.6 6	12 4	182.49+x	(9/2 <sup>+</sup> )	D			I <sub>γ</sub> : weighted average of 10.0 33 from ( <sup>30</sup> Si,4nγ) and 21 7 from ( <sup>16</sup> O,4nγ).
345.5+x	(5/2 <sup>-</sup> )	345.5 5	100	0.0+x	(3/2 <sup>+</sup> )				
366.62+x	(11/2 <sup>+</sup> )	184.3 1	80 5	182.49+x	(9/2 <sup>+</sup> )	(M1+E2)	+0.47 7	0.599 15	B(M1)(W.u.)=0.063 7; B(E2)(W.u.)=1.9×10 <sup>2</sup> +6-5 I <sub>γ</sub> : unweighted average of 70.9 16 from ( <sup>31</sup> P,4nγ), 83 7 from ( <sup>30</sup> Si,4nγ), and 85.0 15 from ( <sup>19</sup> F,4nγ). Other: 109 9 from ( <sup>16</sup> O,4nγ) is discrepant.
		343.0 1	100 2	23.47+x	(7/2 <sup>+</sup> )	E2		0.0516 7	B(E2)(W.u.)=62 7
432.71+x	(9/2 <sup>+</sup> )	237.39 16	100 5	195.39+x	(7/2 <sup>+</sup> )	D			I <sub>γ</sub> : weighted average of 98 5 from ( <sup>31</sup> P,4nγ), 82 20 from ( <sup>30</sup> Si,4nγ), 104 5 from ( <sup>19</sup> F,4nγ), and 75 25 from ( <sup>16</sup> O,4nγ).
		284.96 17	100 5	147.69+x	(5/2 <sup>+</sup> )	Q			I <sub>γ</sub> : from ( <sup>19</sup> F,4nγ). Others: 100 6 from ( <sup>31</sup> P,4nγ), 100 25 from ( <sup>30</sup> Si,4nγ), 100 33 from ( <sup>16</sup> O,4nγ).
466.49+x	(9/2 <sup>-</sup> )	121.1 5	5.1 19	345.5+x	(5/2 <sup>-</sup> )	[E2]		1.626 34	B(E2)(W.u.)=5.3×10 <sup>2</sup> +13-14 α(K)=0.639 11; α(L)=0.753 18; α(M)=0.186 4 α(N)=0.0429 10; α(O)=0.00523 12; α(P)=3.36×10 <sup>-5</sup> 6 E <sub>γ</sub> : from ( <sup>16</sup> O,4nγ). I <sub>γ</sub> : weighted average of 4.3 14 from ( <sup>30</sup> Si,4nγ) and 9.5 32 from ( <sup>16</sup> O,4nγ).
		271.1 1	100 8	195.39+x	(7/2 <sup>+</sup> )	(E1)		0.0265 4	B(E1)(W.u.)=1.49×10 <sup>-4</sup> +14-12
494.76+x	(13/2 <sup>-</sup> )	159.4 1	100 8	335.49+x	(11/2 <sup>-</sup> )	(M1)		0.976 14	B(M1)(W.u.)=0.149 9
		259.8 1	74 6	234.99+x	(9/2 <sup>-</sup> )	E2		0.1190 17	B(E2)(W.u.)=181 +19-17
499.26+x	(11/2 <sup>+</sup> )	193.80 12	100 2	305.56+x	(9/2 <sup>+</sup> )	D			



**Adopted Levels, Gammas (continued)**

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

$E_i(\text{level})$	$J_i^\pi$	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	$E_f$	$J_f^\pi$	Mult.#	$\delta^@$	$\alpha^a$	Comments
499.26+x	(11/2 <sup>+</sup> )	357.56 16	43 9	141.43+x	(7/2 <sup>+</sup> )	Q			$I_\gamma$ : unweighted average of 58.5 22 from ( <sup>31</sup> P,4n $\gamma$ ), 31 8 from ( <sup>30</sup> Si,4n $\gamma$ ), 23.8 7 from ( <sup>19</sup> F,4n $\gamma$ ), and 57 19 from ( <sup>16</sup> O,4n $\gamma$ ).
519.61+x	(11/2 <sup>+</sup> )	214.07 16 324.2 1	15.0 5 100.0 16	305.56+x (9/2 <sup>+</sup> ) 195.39+x (7/2 <sup>+</sup> )		[M1+E2] E2		0.33 10 0.0608 9	B(M1)(W.u.)<0.02; B(E2)(W.u.)<208 B(E2)(W.u.)=157 8
574.18+x	(13/2 <sup>+</sup> )	207.6 1	44 5	366.62+x (11/2 <sup>+</sup> )		(M1+E2)	+0.57 10	0.413 15	B(M1)(W.u.)=0.077 8; B(E2)(W.u.)=2.8×10 <sup>2</sup> 8 $\alpha(K)$ =0.331 16; $\alpha(L)$ =0.0630 12; $\alpha(M)$ =0.01449 35 $\alpha(N)$ =0.00340 8; $\alpha(O)$ =0.000482 8; $\alpha(P)$ =2.41×10 <sup>-5</sup> 14
662.65+x	(15/2 <sup>-</sup> )	391.7 1 168.2 1	100.0 13 100 8	182.49+x (9/2 <sup>+</sup> ) 494.76+x (13/2 <sup>-</sup> )		E2 (M1+E2)	+0.16 3	0.0354 5 0.831 12	B(E2)(W.u.)=100 49 B(M1)(W.u.)=0.259 17; B(E2)(W.u.)=112 +45-38 $\alpha(K)$ =0.690 11; $\alpha(L)$ =0.1093 17; $\alpha(M)$ =0.0247 4 $\alpha(N)$ =0.00582 9; $\alpha(O)$ =0.000857 13; $\alpha(P)$ =5.15×10 <sup>-5</sup> 8 $E_\gamma$ : level-energy difference=167.9. $\delta$ : other: +0.15 5 from ( <sup>16</sup> O,4n $\gamma$ ).
694.79+x	(13/2 <sup>-</sup> )	327.0 1 175.1 5	61 5 12 4	335.49+x (11/2 <sup>-</sup> ) 519.61+x (11/2 <sup>+</sup> )		(E2) (E1)		0.0592 8 0.0807 13	B(E2)(W.u.)=121 12 B(E1)(W.u.)=1.57×10 <sup>-4</sup> 34
711.23+x	(13/2 <sup>+</sup> )	228.3 1 191.6 8 212.2 3 344.8 5 405.6 5	100 8 23 7 100 3 37 10 75 8	466.49+x (9/2 <sup>-</sup> ) 519.61+x (11/2 <sup>+</sup> ) 499.26+x (11/2 <sup>+</sup> ) 366.62+x (11/2 <sup>+</sup> ) 305.56+x (9/2 <sup>+</sup> )		(E2) D+Q Q	+0.25 6	0.1797 25	B(E2)(W.u.)=374 20
802.25+x	(15/2 <sup>+</sup> )	228.18 14	31.3 23	574.18+x (13/2 <sup>+</sup> )		(M1)		0.360 5	$I_\gamma$ : unweighted average of 90 4 from ( <sup>31</sup> P,4n $\gamma$ ), 70 17 from ( <sup>30</sup> Si,4n $\gamma$ ), and 63.7 22 from ( <sup>19</sup> F,4n $\gamma$ ). B(M1)(W.u.)=0.105 10
821.15+x	(13/2 <sup>+</sup> )	435.6 1 301.5 5 388.46 14	100.0 12 49.2 17 100.0 25	366.62+x (11/2 <sup>+</sup> ) 519.61+x (11/2 <sup>+</sup> ) 432.71+x (9/2 <sup>+</sup> )		(E2) D(+Q) Q	+0.07 7	0.0266 4	B(E2)(W.u.)=132 7
893.49+x	(17/2 <sup>-</sup> )	230.7 1	100 8	662.65+x (15/2 <sup>-</sup> )		(M1+E2)	+0.25 3	0.339 5	B(M1)(W.u.)=0.254 19; B(E2)(W.u.)=143 +36-32 $\delta$ : other: +0.22 4 from ( <sup>16</sup> O,4n $\gamma$ ).
943.36+x	(15/2 <sup>+</sup> )	398.6 1 231.88 20	80 8 23 7	494.76+x (13/2 <sup>-</sup> ) 711.23+x (13/2 <sup>+</sup> )		E2 (M1)		0.0338 5 0.344 5	B(E2)(W.u.)=144 14 B(M1)(W.u.)=0.130 +34-37
955.36+x	(15/2 <sup>+</sup> )	423.70 12 444.10 15 244.33 15	100.0 14 34.6 9 83 11	519.61+x (11/2 <sup>+</sup> ) 499.26+x (11/2 <sup>+</sup> ) 711.23+x (13/2 <sup>+</sup> )		E2 E2		0.0286 4 0.02524 35	$I_\gamma$ : unweighted average of 11.3 8 from ( <sup>31</sup> P,4n $\gamma$ ), 34 9 from ( <sup>30</sup> Si,4n $\gamma$ ), and 22.4 7 from ( <sup>19</sup> F,4n $\gamma$ ). B(E2)(W.u.)=248 +30-25 B(E2)(W.u.)=68 +8-7
		436.3 4	46 8	519.61+x (11/2 <sup>+</sup> )		(Q)			$I_\gamma$ : unweighted average of 71.5 29 from ( <sup>31</sup> P,4n $\gamma$ ) and 93.5 25 from ( <sup>19</sup> F,4n $\gamma$ ). $I_\gamma$ : unweighted average of 33 4 from ( <sup>31</sup> P,4n $\gamma$ ), 46 12 from ( <sup>30</sup> Si,4n $\gamma$ ), and 60.1 29 from ( <sup>19</sup> F,4n $\gamma$ ).

## Adopted Levels, Gammas (continued)

$\gamma(^{165}\text{Lu})$ (continued)									
$E_i(\text{level})$	$J_i^\pi$	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	$E_f$	$J_f^\pi$	Mult. #	$\delta^@$	$\alpha^a$	Comments
955.36+x	(15/2 <sup>+</sup> )	455.88 18	100 3	499.26+x	(11/2 <sup>+</sup> )	Q			
976.2+x		772.7 5	100	203.5+x					$E_\gamma$ : from $^{165}\text{Hf}$ $\varepsilon$ decay only.
1030.19+x	(17/2 <sup>-</sup> )	335.4 1	100	694.79+x	(13/2 <sup>-</sup> )	E2		0.0550 8	B(E2)(W.u.)=303 7
1048.87+x	(17/2 <sup>+</sup> )	246.69 13	21.3 15	802.25+x	(15/2 <sup>+</sup> )	(M1+E2)	+0.38 13	0.272 13	B(M1)(W.u.)=0.103 +11-13; B(E2)(W.u.)=1.2×10 <sup>2</sup> +7-6
									$I_\gamma$ : unweighted average of 20.7 4 from ( $^{31}\text{P},4n\gamma$ ), 21.2 32 from ( $^{30}\text{Si},4n\gamma$ ), 25.1 4 from ( $^{19}\text{F},4n\gamma$ ), and 18 6 from ( $^{16}\text{O},4n\gamma$ ).
1099.98+x	(19/2 <sup>-</sup> )	474.7 1	100.0 10	574.18+x	(13/2 <sup>+</sup> )	E2		0.02121 30	B(E2)(W.u.)=153 7
		206.4 1	73 7	893.49+x	(17/2 <sup>-</sup> )	(M1+E2)	+0.16 3	0.469 7	B(M1)(W.u.)=0.493 +37-40; B(E2)(W.u.)=1.4×10 <sup>2</sup> +6-5
									$\alpha(\text{K})=0.391$ 6; $\alpha(\text{L})=0.0610$ 9; $\alpha(\text{M})=0.01374$ 20
									$\alpha(\text{N})=0.00324$ 5; $\alpha(\text{O})=0.000479$ 7; $\alpha(\text{P})=2.91\times 10^{-5}$ 5
									$\delta$ : other: +0.15 3 from ( $^{16}\text{O},4n\gamma$ ).
1197.33+x	(17/2 <sup>+</sup> )	437.6 1	100 8	662.65+x	(15/2 <sup>-</sup> )	E2		0.0262 4	B(E2)(W.u.)=186 15
		241.82 15	53.1 18	955.36+x	(15/2 <sup>+</sup> )	D			
		486.10 15	100.0 22	711.23+x	(13/2 <sup>+</sup> )	Q			
1292.02+x	(17/2 <sup>+</sup> )	348.32 20	27.8 11	943.36+x	(15/2 <sup>+</sup> )	D(+Q)	+0.06 6		
		470.89 15	100.0 22	821.15+x	(13/2 <sup>+</sup> )	Q			
1310.68+x	(19/2 <sup>+</sup> )	262.00 14	19.3 27	1048.87+x	(17/2 <sup>+</sup> )	D			$I_\gamma$ : unweighted average of 14.4 4 from ( $^{31}\text{P},4n\gamma$ ), 18 5 from ( $^{30}\text{Si},4n\gamma$ ), 17.86 33 from ( $^{19}\text{F},4n\gamma$ ), and 27 8 from ( $^{16}\text{O},4n\gamma$ ).
1386.78+x	(21/2 <sup>-</sup> )	508.4 1	100.0 8	802.25+x	(15/2 <sup>+</sup> )	Q			
		287.0 1	79 7	1099.98+x	(19/2 <sup>-</sup> )	(M1+E2)	+0.20 3	0.1886 29	B(M1)(W.u.)=0.292 47; B(E2)(W.u.)=66 +25-20
		493.1 1	100 11	893.49+x	(17/2 <sup>-</sup> )	E2		0.01924 27	B(E2)(W.u.)=149 +27-22
1445.47+x	(19/2 <sup>+</sup> )	502.1 1	100	943.36+x	(15/2 <sup>+</sup> )	E2		0.01838 26	B(E2)(W.u.)=150 7
1462.29+x	(21/2 <sup>-</sup> )	432.1 1	100	1030.19+x	(17/2 <sup>-</sup> )	E2		0.0271 4	B(E2)(W.u.)=2.4×10 <sup>2</sup> +8-5
1478.44+x	(19/2 <sup>+</sup> )	281.10 16	53 3	1197.33+x	(17/2 <sup>+</sup> )				
		523.49 18	100 5	955.36+x	(15/2 <sup>+</sup> )	Q			
1587.11+x	(21/2 <sup>+</sup> )	276.52 13	24.3 9	1310.68+x	(19/2 <sup>+</sup> )	(M1+E2)	+0.26 7	0.206 5	B(M1)(W.u.)=0.158 14; B(E2)(W.u.)=67 +38-31
									$I_\gamma$ : unweighted average of 22.0 4 from ( $^{31}\text{P},4n\gamma$ ), 26 4 from ( $^{30}\text{Si},4n\gamma$ ), 24.0 4 from ( $^{19}\text{F},4n\gamma$ ), and 25 4 from ( $^{16}\text{O},4n\gamma$ ).
1618.79+x	(23/2 <sup>-</sup> )	538.2 1	100.0 8	1048.87+x	(17/2 <sup>+</sup> )	E2		0.01546 22	B(E2)(W.u.)=164 +13-11
		232.1 1	38 5	1386.78+x	(21/2 <sup>-</sup> )	(M1+E2)	+0.11 3	0.341 5	B(M1)(W.u.)=0.479 +50-46; B(E2)(W.u.)=51 +32-25
									$I_\gamma$ : unweighted average of 43.0 30 from ( $^{30}\text{Si},4n\gamma$ ) and 33 4 from ( $^{16}\text{O},4n\gamma$ ).
									B(E2)(W.u.)=179 +16-14
1740.09+x	(21/2 <sup>+</sup> )	518.8 1	100 8	1099.98+x	(19/2 <sup>-</sup> )	E2		0.01693 24	
		262.05 18	44 7	1478.44+x	(19/2 <sup>+</sup> )	Q			$I_\gamma$ : unweighted average of 32.0 17 from ( $^{31}\text{P},4n\gamma$ ), 55 14 from ( $^{30}\text{Si},4n\gamma$ ), and 44.8 14 from ( $^{19}\text{F},4n\gamma$ ).

## Adopted Levels, Gammas (continued)

$\gamma(^{165}\text{Lu})$ (continued)								
$E_i(\text{level})$	$J_i^\pi$	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	$E_f$	$J_f^\pi$	Mult.#	$\delta^@$	Comments
1740.09+x	(21/2 <sup>+</sup> )	448.60 27	14.6 25	1292.02+x	(17/2 <sup>+</sup> )			$I_\gamma$ : unweighted average of 17.0 17 from ( <sup>31</sup> P,4n $\gamma$ ) and 12.1 12 from ( <sup>19</sup> F,4n $\gamma$ ). Other: 2.8 9 from ( <sup>30</sup> Si,4n $\gamma$ ) is discrepant.
		542.58 16	100.0 23	1197.33+x	(17/2 <sup>+</sup> )	Q		
1769.6+x	(19/2 <sup>-</sup> )	720.7 8	100	1048.87+x	(17/2 <sup>+</sup> )	D		
1818.59+x	(21/2 <sup>+</sup> )	373.0 8	26 8	1445.47+x	(19/2 <sup>+</sup> )			
		526.14 17	100 26	1292.02+x	(17/2 <sup>+</sup> )	Q		
1871.67+x	(23/2 <sup>+</sup> )	284.49 15	13.8 9	1587.11+x	(21/2 <sup>+</sup> )	D		$I_\gamma$ : unweighted average of 11.6 5 from ( <sup>31</sup> P,4n $\gamma$ ), 13.3 33 from ( <sup>30</sup> Si,4n $\gamma$ ), 15.3 4 from ( <sup>19</sup> F,4n $\gamma$ ), and 15 5 from ( <sup>16</sup> O,4n $\gamma$ ).
		561.0 1	100.0 11	1310.68+x	(19/2 <sup>+</sup> )	Q		
1945.37+x	(25/2 <sup>-</sup> )	326.6 1	75 5	1618.79+x	(23/2 <sup>-</sup> )	D+Q	+0.09 5	
		558.5 1	100 8	1386.78+x	(21/2 <sup>-</sup> )	Q		
1978.69+x	(25/2 <sup>-</sup> )	516.4 1	100	1462.29+x	(21/2 <sup>-</sup> )	Q		
1990.18+x	(23/2 <sup>+</sup> )	544.7 1	100	1445.47+x	(19/2 <sup>+</sup> )	Q		
2048.19+x	(23/2 <sup>+</sup> )	308.2 8	31 10	1740.09+x	(21/2 <sup>+</sup> )			
		569.75 18	100.0 25	1478.44+x	(19/2 <sup>+</sup> )			
2155.7+x	(23/2 <sup>-</sup> )	386.0 8	21 6	1769.6+x	(19/2 <sup>-</sup> )	Q		
		568.9 5	100 26	1587.11+x	(21/2 <sup>+</sup> )	D		
2166.77+x	(25/2 <sup>+</sup> )	295.04 14	17.3 4	1871.67+x	(23/2 <sup>+</sup> )	D+Q	+0.40 12	$I_\gamma$ : from ( <sup>31</sup> P,4n $\gamma$ ). $I_\gamma(295.0)/I_\gamma(579.7)=0.97$ in ( <sup>19</sup> F,4n $\gamma$ ) is discrepant. This branching ratio is 0.18 6 in ( <sup>16</sup> O,4n $\gamma$ ). It seems that the relative intensity of the 579.7 $\gamma$ is too low by a factor of about 5.
		579.7 1	100.0 11	1587.11+x	(21/2 <sup>+</sup> )	Q		
2196.33+x	(27/2 <sup>-</sup> )	251.0 1	23 6	1945.37+x	(25/2 <sup>-</sup> )	D(+Q)	+0.01 3	$I_\gamma$ : unweighted average of 28.8 23 from ( <sup>30</sup> Si,4n $\gamma$ ) and 18 4 from ( <sup>16</sup> O,4n $\gamma$ ).
		577.6 1	100 8	1618.79+x	(23/2 <sup>-</sup> )	Q		
2294.45+x	(25/2 <sup>+</sup> )	246.3 8	13 4	2048.19+x	(23/2 <sup>+</sup> )			
		475.01 24	29.5 13	1818.59+x	(21/2 <sup>+</sup> )	Q		
		554.59 15	100 3	1740.09+x	(21/2 <sup>+</sup> )	Q		
2348.81+x	(25/2 <sup>+</sup> )	530.23 20	100 3	1818.59+x	(21/2 <sup>+</sup> )	Q		
		608.84 20	89 9	1740.09+x	(21/2 <sup>+</sup> )	Q		$I_\gamma$ : unweighted average of 98 6 from ( <sup>31</sup> P,4n $\gamma$ ) and 80.5 33 from ( <sup>19</sup> F,4n $\gamma$ ).
2409.4+x	(25/2 <sup>+</sup> )	590.7 5	100	1818.59+x	(21/2 <sup>+</sup> )	Q		
2458.67+x	(27/2 <sup>+</sup> )	291.80 14	21.8 5	2166.77+x	(25/2 <sup>+</sup> )	D+Q	+0.44 12	
		587.0 1	100.0 15	1871.67+x	(23/2 <sup>+</sup> )	Q		
2535.25+x	(29/2 <sup>-</sup> )	338.9 1	59 5	2196.33+x	(27/2 <sup>-</sup> )	D+Q	+0.18 3	
		589.8 1	100 7	1945.37+x	(25/2 <sup>-</sup> )	Q		
2538.65+x	(27/2 <sup>+</sup> )	548.45 15	100	1990.18+x	(23/2 <sup>+</sup> )	Q		
2544.95+x	(27/2 <sup>+</sup> )	554.8 3	100	1990.18+x	(23/2 <sup>+</sup> )	Q		
2564.39+x	(29/2 <sup>-</sup> )	585.7 1	100	1978.69+x	(25/2 <sup>-</sup> )	Q		
2585.7+x	(27/2 <sup>-</sup> )	418.3 8	36 11	2166.77+x	(25/2 <sup>+</sup> )	D		
		430.3 5	100 25	2155.7+x	(23/2 <sup>-</sup> )	Q		
2612.22+x	(27/2 <sup>+</sup> )	317.7 8	52 17	2294.45+x	(25/2 <sup>+</sup> )			

## Adopted Levels, Gammas (continued)

$\gamma(^{165}\text{Lu})$ (continued)								
$E_i(\text{level})$	$J_i^\pi$	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	$E_f$	$J_f^\pi$	Mult.#	$\delta^@$	Comments
2612.22+x	(27/2 <sup>+</sup> )	564.03 23	100 25	2048.19+x	(23/2 <sup>+</sup> )	Q		
2730.30+x	(29/2 <sup>+</sup> )	271.40 14	43.7 7	2458.67+x	(27/2 <sup>+</sup> )	D		
		435.82 16	28 3	2294.45+x	(25/2 <sup>+</sup> )			$I_\gamma$ : unweighted average of 24.8 10 from ( <sup>31</sup> P,4n $\gamma$ ) and 30.8 8 from ( <sup>19</sup> F,4n $\gamma$ ).
2753.50+x	(29/2 <sup>+</sup> )	563.6 1	100.0 17	2166.77+x	(25/2 <sup>+</sup> )	Q		
		404.85 20	42.4 18	2348.81+x	(25/2 <sup>+</sup> )			
		458.97 15	100.0 22	2294.45+x	(25/2 <sup>+</sup> )	Q		
		587.7 10	21 3	2166.77+x	(25/2 <sup>+</sup> )			
2765.23+x	(29/2 <sup>+</sup> )	220.2 8	36 10	2544.95+x	(27/2 <sup>+</sup> )			
		598.2 5	100 24	2166.77+x	(25/2 <sup>+</sup> )	Q		
2789.43+x	(31/2 <sup>-</sup> )	254.1 1	32.5 26	2535.25+x	(29/2 <sup>-</sup> )	D+Q	+0.18 4	
		593.2 1	100 8	2196.33+x	(27/2 <sup>-</sup> )	Q		
2794.4+x	(29/2 <sup>+</sup> )	384.8 8	57 17	2409.4+x	(25/2 <sup>+</sup> )			
		445.3 5	100 26	2348.81+x	(25/2 <sup>+</sup> )	Q		
2947.54+x	(31/2 <sup>-</sup> )	751.2 3	100	2196.33+x	(27/2 <sup>-</sup> )	Q		
2956.73+x	(31/2 <sup>+</sup> )	226.52 14	100 2	2730.30+x	(29/2 <sup>+</sup> )	D		
		418.06 14	57 8	2538.65+x	(27/2 <sup>+</sup> )	Q		$I_\gamma$ : unweighted average of 72.6 15 from ( <sup>31</sup> P,4n $\gamma$ ), 49 13 from ( <sup>30</sup> Si,4n $\gamma$ ), and 49.5 10 from ( <sup>19</sup> F,4n $\gamma$ ).
		498.27 18	66 11	2458.67+x	(27/2 <sup>+</sup> )	Q		$I_\gamma$ : unweighted average of 83.0 25 from ( <sup>31</sup> P,4n $\gamma$ ), 47 12 from ( <sup>30</sup> Si,4n $\gamma$ ), and 69.3 15 from ( <sup>19</sup> F,4n $\gamma$ ).
2968.37+x	(31/2 <sup>+</sup> )	203.1 5	50 12	2765.23+x	(29/2 <sup>+</sup> )	D		
		423.4 5	55 13	2544.95+x	(27/2 <sup>+</sup> )	Q		
		429.7 5	31 8	2538.65+x	(27/2 <sup>+</sup> )			
		509.8 3	100 15	2458.67+x	(27/2 <sup>+</sup> )			
2999.7+x	(31/2 <sup>+</sup> )	269.4 8	45 13	2730.30+x	(29/2 <sup>+</sup> )	D		
		455.0 8	32 11	2544.95+x	(27/2 <sup>+</sup> )	Q		
		461.0 8	50 16	2538.65+x	(27/2 <sup>+</sup> )	Q		
		540.9 5	100 26	2458.67+x	(27/2 <sup>+</sup> )	Q		
3038.99+x	(33/2 <sup>-</sup> )	249.7 1	100 8	2789.43+x	(31/2 <sup>-</sup> )	D+Q	+0.09 3	
		503.7 1	80 6	2535.25+x	(29/2 <sup>-</sup> )	Q		
3043.3+x	(31/2 <sup>+</sup> )	431.1 <sup>b</sup> 8	100	2612.22+x	(27/2 <sup>+</sup> )			
3067.2+x	(31/2 <sup>-</sup> )	481.5 5	100	2585.7+x	(27/2 <sup>-</sup> )	Q		
3180.43+x	(33/2 <sup>+</sup> )	224.33 16	42 7	2956.73+x	(31/2 <sup>+</sup> )			$I_\gamma$ : unweighted average of 35.3 12 from ( <sup>31</sup> P,4n $\gamma$ ) and 48.9 11 from ( <sup>19</sup> F,4n $\gamma$ ).
		450.08 13	100.0 18	2730.30+x	(29/2 <sup>+</sup> )	Q		
3195.3+x	(33/2 <sup>-</sup> )	630.9 3	100	2564.39+x	(29/2 <sup>-</sup> )	Q		
3201.18+x	(33/2 <sup>+</sup> )	244.11 14	82 5	2956.73+x	(31/2 <sup>+</sup> )	D		$I_\gamma$ : unweighted average of 77.3 19 from ( <sup>31</sup> P,4n $\gamma$ ) and 87.1 17 from ( <sup>19</sup> F,4n $\gamma$ ). Other: $I_\gamma(244.1\gamma)/I_\gamma(470.6\gamma)=100\ 25/9.8\ 25$ is significantly discrepant.
		435.7 5		2765.23+x	(29/2 <sup>+</sup> )			$E_\gamma$ : from ( <sup>30</sup> Si,4n $\gamma$ ) only, contaminated by a $\gamma$ of similar energy.

## Adopted Levels, Gammas (continued)

$\gamma(^{165}\text{Lu})$ (continued)								
$E_i(\text{level})$	$J_i^\pi$	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	$E_f$	$J_f^\pi$	Mult.#	$\delta^@$	Comments
3201.18+x	(33/2 <sup>+</sup> )	470.65 18	100.0 25	2730.30+x	(29/2 <sup>+</sup> )	Q		
3222.5+x	(33/2 <sup>-</sup> )	275.0 8	21 6	2947.54+x	(31/2 <sup>-</sup> )	D		
		658.1 8	48 15	2564.39+x	(29/2 <sup>-</sup> )			
		687.3 5	100 25	2535.25+x	(29/2 <sup>-</sup> )	Q		
3224.3+x	(33/2 <sup>+</sup> )	471.0 5	100	2753.50+x	(29/2 <sup>+</sup> )	Q		
3239.8+x	(33/2 <sup>+</sup> )	445.28 24	100 5	2794.4+x	(29/2 <sup>+</sup> )	Q		
		486.38 40	59 9	2753.50+x	(29/2 <sup>+</sup> )	Q		$I_\gamma$ : unweighted average of 50 5 from ( <sup>31</sup> P,4n $\gamma$ ) and 67 5 from ( <sup>19</sup> F,4n $\gamma$ ).
3248.63+x	(35/2 <sup>-</sup> )	209.7 1	100 8	3038.99+x	(33/2 <sup>-</sup> )	D+Q	+0.07 3	
		301.1 8	1.9 6	2947.54+x	(31/2 <sup>-</sup> )			
		459.1 1	44 4	2789.43+x	(31/2 <sup>-</sup> )	Q		
3417.22+x	(35/2 <sup>+</sup> )	214.14 26	35 3	3201.18+x	(33/2 <sup>+</sup> )			$E_\gamma$ : poor fit; level-energy difference=215.5. $I_\gamma$ : unweighted average of 31.8 15 from ( <sup>31</sup> P,4n $\gamma$ ) and 38.3 12 from ( <sup>19</sup> F,4n $\gamma$ ).
		237.23 14	59.1 14	3180.43+x	(33/2 <sup>+</sup> )	D		$I_\gamma$ : weighted average of 60.2 18 from ( <sup>31</sup> P,4n $\gamma$ ) and 58.4 14 from ( <sup>19</sup> F,4n $\gamma$ ). Other: 100 15 from ( <sup>30</sup> Si,4n $\gamma$ ) is discrepant.
		449.0 5	66 17	2968.37+x	(31/2 <sup>+</sup> )	Q		
		460.51 15	100.0 21	2956.73+x	(31/2 <sup>+</sup> )	Q		
3436.51+x	(35/2 <sup>+</sup> )	235.6 3	100.0 19	3201.18+x	(33/2 <sup>+</sup> )	D		
		468.2 5	58 15	2968.37+x	(31/2 <sup>+</sup> )	Q		
		479.83 17	81 7	2956.73+x	(31/2 <sup>+</sup> )	Q		$I_\gamma$ : unweighted average of 86.8 30 from ( <sup>31</sup> P,4n $\gamma$ ), 67.8 17 from ( <sup>30</sup> Si,4n $\gamma$ ), and 88.4 26 from ( <sup>19</sup> F,4n $\gamma$ ).
3471.7+x	(35/2 <sup>+</sup> )	472.0 5	100	2999.7+x	(31/2 <sup>+</sup> )	Q		
3475.35+x	(37/2 <sup>-</sup> )	226.8 1	100 9	3248.63+x	(35/2 <sup>-</sup> )	D+Q	+0.09 2	
		436.4 1	40 3	3038.99+x	(33/2 <sup>-</sup> )	Q		
3485.13+x	(35/2 <sup>-</sup> )	262.6 5	43 11	3222.5+x	(33/2 <sup>-</sup> )			
		537.6 8	20 6	2947.54+x	(31/2 <sup>-</sup> )			
		695.7 3	100 15	2789.43+x	(31/2 <sup>-</sup> )	Q		
3602.3+x	(35/2 <sup>-</sup> )	535.1 5	100	3067.2+x	(31/2 <sup>-</sup> )	Q		
3682.49+x	(37/2 <sup>+</sup> )	265.33 14	60.4 14	3417.22+x	(35/2 <sup>+</sup> )	D		
		502.04 16	100.0 25	3180.43+x	(33/2 <sup>+</sup> )	Q		
3705.22+x	(37/2 <sup>+</sup> )	268.63 20	100	3436.51+x	(35/2 <sup>+</sup> )	D		
3735.36+x	(39/2 <sup>-</sup> )	260.0 1	100 7	3475.35+x	(37/2 <sup>-</sup> )			
		486.6 1	53 4	3248.63+x	(35/2 <sup>-</sup> )	Q		$I_\gamma$ : from ( <sup>30</sup> Si,4n $\gamma$ ). Other: 86 9 from ( <sup>45</sup> Sc,4n $\gamma$ ).
3754.2+x	(37/2 <sup>+</sup> )	530.1 5	100	3224.3+x	(33/2 <sup>+</sup> )	Q		
3764.3+x	(37/2 <sup>+</sup> )	524.44 20	100	3239.8+x	(33/2 <sup>+</sup> )	Q		
3824.1+x	(37/2 <sup>-</sup> )	339.0 5	100 25	3485.13+x	(35/2 <sup>-</sup> )	D		
		601.6 5	100 25	3222.5+x	(33/2 <sup>-</sup> )	Q		
		628.8 8	42 13	3195.3+x	(33/2 <sup>-</sup> )	Q		
3853.7+x	(37/2 <sup>-</sup> )	658.4 5	100	3195.3+x	(33/2 <sup>-</sup> )	Q		
3864.1+x	(35/2 <sup>+</sup> )	624.4	100	3239.8+x	(33/2 <sup>+</sup> )			
3970.08+x	(39/2 <sup>+</sup> )	287.6 5	44.1 22	3682.49+x	(37/2 <sup>+</sup> )	D		

Adopted Levels, Gammas (continued)

γ(<sup>165</sup>Lu) (continued)

E <sub>i</sub> (level)	J <sup>π</sup> <sub>i</sub>	E <sub>γ</sub> <sup>†</sup>	I <sub>γ</sub> <sup>‡</sup>	E <sub>f</sub>	J <sup>π</sup> <sub>f</sub>	Mult.#	δ <sup>@</sup>	Comments
3970.08+x	(39/2 <sup>+</sup> )	552.9 3	100.0 27	3417.22+x	(35/2 <sup>+</sup> )	Q		
3981.00+x	(39/2 <sup>+</sup> )	275.2 5	22.8 12	3705.22+x	(37/2 <sup>+</sup> )	D		
		544.65 15	100.0 24	3436.51+x	(35/2 <sup>+</sup> )	Q		
		562.5 4	15.6 21	3417.22+x	(35/2 <sup>+</sup> )			E <sub>γ</sub> : poor fit; level-energy difference=563.8.
4010.31+x	(41/2 <sup>-</sup> )	275.0 1	100 9	3735.36+x	(39/2 <sup>-</sup> )	D+Q	+0.06 2	
		535.1 1	94 9	3475.35+x	(37/2 <sup>-</sup> )	Q		
4034.6+x	(39/2 <sup>+</sup> )	563.0 5	100	3471.7+x	(35/2 <sup>+</sup> )	Q		
4117.1+x	(39/2 <sup>-</sup> )	292.9 8	52 16	3824.1+x	(37/2 <sup>-</sup> )	D		
		632.0 5	100 24	3485.13+x	(35/2 <sup>-</sup> )	Q		
4185.0+x	(39/2 <sup>-</sup> )	582.7 5	100	3602.3+x	(35/2 <sup>-</sup> )	Q		
4269.85+x	(41/2 <sup>+</sup> )	288.46 15	74 3	3981.00+x	(39/2 <sup>+</sup> )	D		
		299.8 5	90 11	3970.08+x	(39/2 <sup>+</sup> )	D		I <sub>γ</sub> : unweighted average of 99.3 35 from ( <sup>31</sup> P,4nγ), 103 27 from ( <sup>30</sup> Si,4nγ), and 68.5 28 from ( <sup>19</sup> F,4nγ).
		564.8 8	10 3	3705.22+x	(37/2 <sup>+</sup> )			I <sub>γ</sub> : other: 32 9 from ( <sup>30</sup> Si,4nγ) is discrepant. Unweighted of the two values is 21 11.
		587.46 21	100 5	3682.49+x	(37/2 <sup>+</sup> )			
4290.4+x	(41/2 <sup>+</sup> )	309.4 8	26 8	3981.00+x	(39/2 <sup>+</sup> )	Q		
		608.0 5	100 26	3682.49+x	(37/2 <sup>+</sup> )	Q		
4322.36+x	(43/2 <sup>-</sup> )	312.0 1	100 8	4010.31+x	(41/2 <sup>-</sup> )	D+Q	+0.19 3	
		586.8 1	81 7	3735.36+x	(39/2 <sup>-</sup> )	Q		
4346.6+x	(41/2 <sup>+</sup> )	582.36 18	100 25	3764.3+x	(37/2 <sup>+</sup> )	Q		
		592.7 8	25 7	3754.2+x	(37/2 <sup>+</sup> )			
4373.4+x	(41/2 <sup>+</sup> )	608.8 8	34 11	3764.3+x	(37/2 <sup>+</sup> )	Q		
		619.4 5	100 25	3754.2+x	(37/2 <sup>+</sup> )	Q		
4402.7+x	(39/2 <sup>+</sup> )	538.9 8	100 29	3864.1+x	(35/2 <sup>+</sup> )			
		638.2 8	41 12	3764.3+x	(37/2 <sup>+</sup> )			
4453.7+x	(41/2 <sup>-</sup> )	336.6 8	27 8	4117.1+x	(39/2 <sup>-</sup> )			
		629.6 5	100 26	3824.1+x	(37/2 <sup>-</sup> )	Q		
4490.8+x	(41/2 <sup>-</sup> )	637.1 5	100	3853.7+x	(37/2 <sup>-</sup> )	Q		
4575.4+x	(41/2 <sup>-</sup> )	840.0 <sup>b</sup> 8	100	3735.36+x	(39/2 <sup>-</sup> )			
4579.24+x	(43/2 <sup>+</sup> )	309.08 20	49 5	4269.85+x	(41/2 <sup>+</sup> )	D		I <sub>γ</sub> : unweighted average of 40.1 20 from ( <sup>31</sup> P,4nγ), 58 15 from ( <sup>30</sup> Si,4nγ), and 47.8 21 from ( <sup>19</sup> F,4nγ).
		598.55 15	100.0 24	3981.00+x	(39/2 <sup>+</sup> )	Q		
		609.3 5	49.4 22	3970.08+x	(39/2 <sup>+</sup> )	Q		
4613.8+x	(43/2 <sup>+</sup> )	643.7 3	100	3970.08+x	(39/2 <sup>+</sup> )	Q		
4645.26+x	(45/2 <sup>-</sup> )	322.7 1	84 7	4322.36+x	(43/2 <sup>-</sup> )	D		
		635.2 1	100 8	4010.31+x	(41/2 <sup>-</sup> )	Q		
4686.6+x	(43/2 <sup>+</sup> )	652.0 5	100	4034.6+x	(39/2 <sup>+</sup> )	Q		
4773.5+x	(43/2 <sup>-</sup> )	320.1 8	38 11	4453.7+x	(41/2 <sup>-</sup> )			
		656.3 5	100 25	4117.1+x	(39/2 <sup>-</sup> )	Q		
4800.4+x	(43/2 <sup>-</sup> )	615.4 5	100	4185.0+x	(39/2 <sup>-</sup> )	Q		

## Adopted Levels, Gammas (continued)

$\gamma(^{165}\text{Lu})$ (continued)									
$E_i(\text{level})$	$J_i^\pi$	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	$E_f$	$J_f^\pi$	Mult.#	$\delta^@$	$\alpha^a$	Comments
4888.51+x	(45/2 <sup>+</sup> )	309.36 15	83.3 20	4579.24+x	(43/2 <sup>+</sup> )	D			
		618.51 15	100.0 18	4269.85+x	(41/2 <sup>+</sup> )	Q			
4960.4+x	(45/2 <sup>+</sup> )	346.6 8	60 17	4613.8+x	(43/2 <sup>+</sup> )				
		670.0 5	100 26	4290.4+x	(41/2 <sup>+</sup> )	Q			
		690.5 8	43 13	4269.85+x	(41/2 <sup>+</sup> )				
4988.0+x	(45/2 <sup>+</sup> )	641.3 5	100	4346.6+x	(41/2 <sup>+</sup> )	Q			
4996.50+x	(47/2 <sup>-</sup> )	351.2 3	68 10	4645.26+x	(45/2 <sup>-</sup> )	D			B(E2)(W.u.)<240
		674.1 1	100 8	4322.36+x	(43/2 <sup>-</sup> )	Q			
5000.7+x	(43/2 <sup>+</sup> )	598.0 8	100 30	4402.7+x	(39/2 <sup>+</sup> )				
		654.1 8	27 8	4346.6+x	(41/2 <sup>+</sup> )				
5068.2+x	(45/2 <sup>+</sup> )	694.8 5	100	4373.4+x	(41/2 <sup>+</sup> )	Q			
5115.7+x	(45/2 <sup>-</sup> )	625.0 8	37 10	4490.8+x	(41/2 <sup>-</sup> )				
		662.0 5	100 27	4453.7+x	(41/2 <sup>-</sup> )	Q			
5145.3+x	(45/2 <sup>-</sup> )	654.5 5	100	4490.8+x	(41/2 <sup>-</sup> )	Q			
5174.3+x	(45/2 <sup>-</sup> )	598.8 5	100	4575.4+x	(41/2 <sup>-</sup> )				
5220.60+x	(47/2 <sup>+</sup> )	331.86 14	66.8 13	4888.51+x	(45/2 <sup>+</sup> )	D			
		641.44 17	100.0 27	4579.24+x	(43/2 <sup>+</sup> )	Q			
5325.8+x	(47/2 <sup>+</sup> )	712.0 5	100	4613.8+x	(43/2 <sup>+</sup> )	Q			
5363.92+x	(49/2 <sup>-</sup> )	367.2 3	46 7	4996.50+x	(47/2 <sup>-</sup> )	D			
		718.7 1	100 8	4645.26+x	(45/2 <sup>-</sup> )	Q			
5393.6+x	(47/2 <sup>+</sup> )	707.0 5	100	4686.6+x	(43/2 <sup>+</sup> )	Q			
5435.6+x	(47/2 <sup>+</sup> )	749.0 8	100	4686.6+x	(43/2 <sup>+</sup> )	Q			
5446.7+x	(47/2 <sup>-</sup> )	331.0 <sup>b</sup> 8	25 8	5115.7+x	(45/2 <sup>-</sup> )				
		646.3 5	100 25	4800.4+x	(43/2 <sup>-</sup> )	Q			
5448.8+x	(45/2 <sup>+</sup> )	661.3 8	100	4787.5+x	(41/2 <sup>+</sup> )				
		1102.2 <sup>b</sup>		4346.6+x	(41/2 <sup>+</sup> )				
5475.8+x	(47/2 <sup>-</sup> )	702.31 5	100	4773.5+x	(43/2 <sup>-</sup> )	Q			
5539.46+x	(49/2 <sup>+</sup> )	318.58 13	69.3 15	5220.60+x	(47/2 <sup>+</sup> )	D			
		651.13 15	100.0 27	4888.51+x	(45/2 <sup>+</sup> )	Q			
5655.7+x	(47/2 <sup>+</sup> )	655.1 8	100 30	5000.7+x	(43/2 <sup>+</sup> )				
		667.9 8	27 8	4988.0+x	(45/2 <sup>+</sup> )	(E2+M1)&	+3.1& 4	0.01039 35	$\alpha(\text{K})=0.00845$ 30; $\alpha(\text{L})=0.00150$ 4; $\alpha(\text{M})=0.000343$ 9 $\alpha(\text{N})=8.05\times 10^{-5}$ 21; $\alpha(\text{O})=1.148\times 10^{-5}$ 31; $\alpha(\text{P})=5.86\times 10^{-7}$ 22
5684.1+x	(49/2 <sup>+</sup> )	696.10 20	100	4988.0+x	(45/2 <sup>+</sup> )	Q			
5695.4+x	(49/2 <sup>+</sup> )	735.0 5	100	4960.4+x	(45/2 <sup>+</sup> )	Q			
5740.6+x	(51/2 <sup>-</sup> )	377.0 5	51 13	5363.92+x	(49/2 <sup>-</sup> )	D			
		743.9 3	100 15	4996.50+x	(47/2 <sup>-</sup> )	Q			B(E2)(W.u.)<240
5786.5+x	(49/2 <sup>-</sup> )	339.8 8	39 12	5446.7+x	(47/2 <sup>-</sup> )				
		670.8 8	100 31	5115.7+x	(45/2 <sup>-</sup> )	Q			
5823.2+x	(49/2 <sup>+</sup> )	755.0 5	100	5068.2+x	(45/2 <sup>+</sup> )	Q			
5825.5+x	(49/2 <sup>-</sup> )	349.5 8	42 12	5475.8+x	(47/2 <sup>-</sup> )				

## Adopted Levels, Gammas (continued)

$\gamma(^{165}\text{Lu})$ (continued)									
$E_i(\text{level})$	$J_i^\pi$	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	$E_f$	$J_f^\pi$	Mult.#	$\delta^@$	$\alpha^a$	Comments
5825.5+x	(49/2 <sup>-</sup> )	651.2 5	100 24	5174.3+x	(45/2 <sup>-</sup> )				
5845.3+x	(49/2 <sup>-</sup> )	700.0 8	100	5145.3+x	(45/2 <sup>-</sup> )	Q			
5861.1+x	(49/2 <sup>-</sup> )	715.8 <sup>b</sup> 8	100	5145.3+x	(45/2 <sup>-</sup> )				
5899.51+x	(51/2 <sup>+</sup> )	360.06 14	87 6	5539.46+x	(49/2 <sup>+</sup> )	(D)			$I_\gamma$ : unweighted average of 94.2 21 from ( <sup>31</sup> P,4n $\gamma$ ), 92 23 from ( <sup>30</sup> Si,4n $\gamma$ ), and 75.5 22 from ( <sup>19</sup> F,4n $\gamma$ ).
		679.18 18	100 3	5220.60+x	(47/2 <sup>+</sup> )	Q			
6080.8+x	(51/2 <sup>+</sup> )	687.2 8	36 11	5393.6+x	(47/2 <sup>+</sup> )	Q			
		755.0 5	100 25	5325.8+x	(47/2 <sup>+</sup> )	Q			
6101.6+x	(51/2 <sup>+</sup> )	708.1 8	14 5	5393.6+x	(47/2 <sup>+</sup> )				
		775.8 5	100 26	5325.8+x	(47/2 <sup>+</sup> )	Q			
6138.1+x	(51/2 <sup>-</sup> )	351.5 8	33 10	5786.5+x	(49/2 <sup>-</sup> )				
		691.4 5	100 3	5446.7+x	(47/2 <sup>-</sup> )	Q			
6147.1+x	(53/2 <sup>-</sup> )	406.0 5	46 12	5740.6+x	(51/2 <sup>-</sup> )	D			
		783.3 3	100 15	5363.92+x	(49/2 <sup>-</sup> )	Q			B(E2)(W.u.)=180 +40-30
6154.8+x	(49/2 <sup>+</sup> )	706.0 8	100	5448.8+x	(45/2 <sup>+</sup> )				
		1166.9 <sup>b</sup>		4988.0+x	(45/2 <sup>+</sup> )				
6178.8+x	(51/2 <sup>-</sup> )	352.8 8	29 10	5825.5+x	(49/2 <sup>-</sup> )				
		703.0 5	100 24	5475.8+x	(47/2 <sup>-</sup> )	Q			
6188.6+x	(51/2 <sup>+</sup> )	753.0 8	100 31	5435.6+x	(47/2 <sup>+</sup> )	Q			
		795.0 8	69 23	5393.6+x	(47/2 <sup>+</sup> )	Q			
6236.43+x	(53/2 <sup>+</sup> )	336.99 14	77 2	5899.51+x	(51/2 <sup>+</sup> )	D			$I_\gamma$ : other: 113.9 24 from ( <sup>19</sup> F,4n $\gamma$ ) is discrepant.
		696.73 17	100 3	5539.46+x	(49/2 <sup>+</sup> )	Q			
6366.9+x	(51/2 <sup>+</sup> )	682.5 8	20 6	5684.1+x	(49/2 <sup>+</sup> )	(E2+M1) <sup>&amp;</sup>	+3.1 <sup>&amp;</sup> 4	0.00988 33	
		711.4 8	100 31	5655.7+x	(47/2 <sup>+</sup> )	Q			
6434.9+x	(53/2 <sup>+</sup> )	750.73 20	100	5684.1+x	(49/2 <sup>+</sup> )	Q			
6448.4+x	(53/2 <sup>+</sup> )	367.6 8	86 24	6080.8+x	(51/2 <sup>+</sup> )				
		753.0 8	100 29	5695.4+x	(49/2 <sup>+</sup> )	Q			
6507.7+x	(53/2 <sup>-</sup> )	369.4 8	44 13	6138.1+x	(51/2 <sup>-</sup> )				
		721.2 5	100 26	5786.5+x	(49/2 <sup>-</sup> )	Q			
6511.4+x	(53/2 <sup>+</sup> )	816.0 8	100	5695.4+x	(49/2 <sup>+</sup> )	Q			
6539.2+x	(55/2 <sup>-</sup> )	391.8 5	41 25	6147.1+x	(53/2 <sup>-</sup> )	D			
		798.7 3	100 15	5740.6+x	(51/2 <sup>-</sup> )	Q			
6552.5+x	(53/2 <sup>-</sup> )	373.5 8	24 10	6178.8+x	(51/2 <sup>-</sup> )				
		727.3 8	100 29	5825.5+x	(49/2 <sup>-</sup> )				
6608.8+x	(53/2 <sup>-</sup> )	763.5 8	100	5845.3+x	(49/2 <sup>-</sup> )	Q			
6612.7+x	(53/2 <sup>+</sup> )	789.5 8	100	5823.2+x	(49/2 <sup>+</sup> )	Q			
6632.28+x	(55/2 <sup>+</sup> )	395.84 18	91 18	6236.43+x	(53/2 <sup>+</sup> )	D			$I_\gamma$ : unweighted average of 58.9 21 from ( <sup>31</sup> P,4n $\gamma$ ), 94 24 from ( <sup>30</sup> Si,4n $\gamma$ ), and 120 5 from ( <sup>19</sup> F,4n $\gamma$ ).
		732.95 20	100 4	5899.51+x	(51/2 <sup>+</sup> )	Q			
6642.4+x	(53/2 <sup>-</sup> )	781.3 8	100	5861.1+x	(49/2 <sup>-</sup> )				



Adopted Levels, Gammas (continued)

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

$E_i(\text{level})$	$J_i^\pi$	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	$E_f$	$J_f^\pi$	Mult. #	Comments
6841.8+x	(55/2 <sup>+</sup> )	393.4 8	63 21	6448.4+x	(53/2 <sup>+</sup> )		
		761.0 8	100 30	6080.8+x	(51/2 <sup>+</sup> )	Q	
6886.7+x	(55/2 <sup>-</sup> )	378.9 8	38 11	6507.7+x	(53/2 <sup>-</sup> )		
		748.6 5	100 26	6138.1+x	(51/2 <sup>-</sup> )	Q	
6903.2+x	(53/2 <sup>+</sup> )	748.8 8	100	6154.8+x	(49/2 <sup>+</sup> )		
		1218.9 <sup>b</sup>		5684.1+x	(49/2 <sup>+</sup> )		
6907.5+x	(55/2 <sup>+</sup> )	805.9 8	100 31	6101.6+x	(51/2 <sup>+</sup> )	Q	
		826.7 8	8 4	6080.8+x	(51/2 <sup>+</sup> )		
6947.4+x	(55/2 <sup>-</sup> )	394.8 8	25 8	6552.5+x	(53/2 <sup>-</sup> )		
		768.6 8	100 33	6178.8+x	(51/2 <sup>-</sup> )	Q	
6982.5+x	(57/2 <sup>-</sup> )	442.9 5	27 6	6539.2+x	(55/2 <sup>-</sup> )	D	
		835.4 3	100 15	6147.1+x	(53/2 <sup>-</sup> )	Q	
6994.6+x	(55/2 <sup>+</sup> )	806.0 8	100	6188.6+x	(51/2 <sup>+</sup> )	Q	
6997.96+x	(57/2 <sup>+</sup> )	365.94 20	40 6	6632.28+x	(55/2 <sup>+</sup> )	D	$I_\gamma$ : unweighted average of 29.3 16 from ( <sup>31</sup> P,4n $\gamma$ ), 42 11 from ( <sup>30</sup> Si,4n $\gamma$ ), and 48.4 32 from ( <sup>19</sup> F,4n $\gamma$ ).
		761.39 18	100.0 26	6236.43+x	(53/2 <sup>+</sup> )	Q	
7132.7+x	(55/2 <sup>+</sup> )	697.9 8	21 7	6434.9+x	(53/2 <sup>+</sup> )		
		765.7 8	100 30	6366.9+x	(51/2 <sup>+</sup> )	Q	
7238.4+x	(57/2 <sup>+</sup> )	803.52 26	100	6434.9+x	(53/2 <sup>+</sup> )	Q	
7240.4+x	(57/2 <sup>+</sup> )	398.6 8	96 27	6841.8+x	(55/2 <sup>+</sup> )		
		792.0 8	100 32	6448.4+x	(53/2 <sup>+</sup> )	Q	
7288.1+x	(57/2 <sup>-</sup> )	401.4 8	34 10	6886.7+x	(55/2 <sup>-</sup> )		
		780.4 5	100 25	6507.7+x	(53/2 <sup>-</sup> )	Q	
7338.4+x	(57/2 <sup>+</sup> )	827.0 8	100	6511.4+x	(53/2 <sup>+</sup> )	Q	
7354.9+x	(57/2 <sup>-</sup> )	407.5 <sup>b</sup> 8	21 7	6947.4+x	(55/2 <sup>-</sup> )		
		802.5 8	100 29	6552.5+x	(53/2 <sup>-</sup> )		
7383.7+x	(59/2 <sup>-</sup> )	401.2 5	36 9	6982.5+x	(57/2 <sup>-</sup> )		
		844.5 3	100 15	6539.2+x	(55/2 <sup>-</sup> )	Q	
7417.6+x	(57/2 <sup>+</sup> )	804.9 8	100	6612.7+x	(53/2 <sup>+</sup> )		
7431.4+x	(57/2 <sup>-</sup> )	822.6 8	100	6608.8+x	(53/2 <sup>-</sup> )	Q	
7439.31+x	(59/2 <sup>+</sup> )	441.98 28	21.0 18	6997.96+x	(57/2 <sup>+</sup> )		$I_\gamma$ : weighted average of 20.6 18 from ( <sup>31</sup> P,4n $\gamma$ ) and 27 7 from ( <sup>30</sup> Si,4n $\gamma$ ). Other: 59 4 from ( <sup>19</sup> F,4n $\gamma$ ) is discrepant.
		806.93 20	100 3	6632.28+x	(55/2 <sup>+</sup> )	Q	
7467.2+x	(57/2 <sup>-</sup> )	824.8 8	100	6642.4+x	(53/2 <sup>-</sup> )		
7677.8+x	(59/2 <sup>+</sup> )	437.4 8	72 20	7240.4+x	(57/2 <sup>+</sup> )		
		836.0 8	100 32	6841.8+x	(55/2 <sup>+</sup> )	Q	
7694.0+x	(59/2 <sup>-</sup> )	405.9 8	28 9	7288.1+x	(57/2 <sup>-</sup> )		
		807.3 5	100 25	6886.7+x	(55/2 <sup>-</sup> )	Q	
7701.9+x	(57/2 <sup>+</sup> )	798.7 8	100	6903.2+x	(53/2 <sup>+</sup> )		
7760.2+x	(59/2 <sup>+</sup> )	852.7 8	100	6907.5+x	(55/2 <sup>+</sup> )		
7788.8+x	(59/2 <sup>-</sup> )	841.4 8	100	6947.4+x	(55/2 <sup>-</sup> )	Q	

Adopted Levels, Gammas (continued)

$\gamma(^{165}\text{Lu})$ (continued)							
$E_i(\text{level})$	$J_i^\pi$	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	$E_f$	$J_f^\pi$	Mult.#	Comments
7837.7+x	(61/2 <sup>+</sup> )	398.62 20	59.8 27	7439.31+x	(59/2 <sup>+</sup> )	D	$I_\gamma$ : weighted average of 60.2 27 from ( <sup>31</sup> P,4n $\gamma$ ) and 51 12 from ( <sup>30</sup> Si,4n $\gamma$ ). Other: 90 4 from ( <sup>19</sup> F,4n $\gamma$ ) is discrepant.
		839.50 22	100 4	6997.96+x	(57/2 <sup>+</sup> )	Q	
7841.6+x	(59/2 <sup>+</sup> )	847.0 8	100	6994.6+x	(55/2 <sup>+</sup> )	Q	
7864.3+x	(61/2 <sup>-</sup> )	881.6 5	100	6982.5+x	(57/2 <sup>-</sup> )	Q	
7952.6+x	(59/2 <sup>+</sup> )	819.9 8	100	7132.7+x	(55/2 <sup>+</sup> )	Q	
8093.7+x	(61/2 <sup>+</sup> )	855.31 25	100	7238.4+x	(57/2 <sup>+</sup> )	Q	
8114.4+x	(61/2 <sup>+</sup> )	436.6 8	24 8	7677.8+x	(59/2 <sup>+</sup> )		
		874.0 8	100 32	7240.4+x	(57/2 <sup>+</sup> )	Q	
8128.0+x	(61/2 <sup>-</sup> )	434.0 8	16 5	7694.0+x	(59/2 <sup>-</sup> )		
		839.9 5	100 26	7288.1+x	(57/2 <sup>-</sup> )	Q	
8212.4+x	(61/2 <sup>+</sup> )	874.0 8	100	7338.4+x	(57/2 <sup>+</sup> )	Q	
8227.1+x	(61/2 <sup>-</sup> )	872.2 8	100	7354.9+x	(57/2 <sup>-</sup> )		
8257.4+x	(61/2 <sup>+</sup> )	839.8 8	100	7417.6+x	(57/2 <sup>+</sup> )		
8269.6+x	(63/2 <sup>-</sup> )	405.0 5	34 9	7864.3+x	(61/2 <sup>-</sup> )	D	
		886.2 5	100 25	7383.7+x	(59/2 <sup>-</sup> )	Q	
8312.4+x	(61/2 <sup>-</sup> )	881.0 8	100	7431.4+x	(57/2 <sup>-</sup> )	Q	
8331.0+x	(63/2 <sup>+</sup> )	493.21 31	30 6	7837.7+x	(61/2 <sup>+</sup> )		$I_\gamma$ : unweighted average of 29 4 from ( <sup>31</sup> P,4n $\gamma$ ) and 52 16 from ( <sup>30</sup> Si,4n $\gamma$ ). Other: $I_\gamma(493\gamma)/I_\gamma(892\gamma)=100$ 6/53 5 from ( <sup>19</sup> F,4n $\gamma$ ) is significantly discrepant.
		891.77 25	100 5	7439.31+x	(59/2 <sup>+</sup> )	Q	
8336.9+x	(61/2 <sup>-</sup> )	869.7 8	100	7467.2+x	(57/2 <sup>-</sup> )		
8551.5+x	(61/2 <sup>+</sup> )	849.6 8	100	7701.9+x	(57/2 <sup>+</sup> )		
8557.1+x	(63/2 <sup>-</sup> )	863.1 8	100	7694.0+x	(59/2 <sup>-</sup> )		
8584.8+x	(63/2 <sup>+</sup> )	470.4 8	17 5	8114.4+x	(61/2 <sup>+</sup> )		
		907.0 8	100 30	7677.8+x	(59/2 <sup>+</sup> )	Q	
8660.3+x	(63/2 <sup>+</sup> )	900.1 8	100	7760.2+x	(59/2 <sup>+</sup> )	Q	
8692.0+x	(63/2 <sup>-</sup> )	903.2 8	100	7788.8+x	(59/2 <sup>-</sup> )	Q	
8733.6+x	(63/2 <sup>+</sup> )	892.0 8	100	7841.6+x	(59/2 <sup>+</sup> )	Q	
8755.4+x	(65/2 <sup>+</sup> )	917.66 24	100	7837.7+x	(61/2 <sup>+</sup> )	Q	
8795.3+x	(65/2 <sup>-</sup> )	931.0 5	100	7864.3+x	(61/2 <sup>-</sup> )	Q	
8824.7+x	(63/2 <sup>+</sup> )	872.1 8	100	7952.6+x	(59/2 <sup>+</sup> )	Q	
9001.2+x	(65/2 <sup>+</sup> )	907.47 34	100	8093.7+x	(61/2 <sup>+</sup> )	Q	
9028.1+x	(65/2 <sup>-</sup> )	900.1 5	100	8128.0+x	(61/2 <sup>-</sup> )	Q	
9067.4+x	(65/2 <sup>+</sup> )	953.0 8	100	8114.4+x	(61/2 <sup>+</sup> )		
9133.4+x	(65/2 <sup>+</sup> )	921.0 8	100	8212.4+x	(61/2 <sup>+</sup> )		
9156.0+x	(65/2 <sup>-</sup> )	928.9 8	100	8227.1+x	(61/2 <sup>-</sup> )		
9160.2+x	(65/2 <sup>+</sup> )	902.8 8	100	8257.4+x	(61/2 <sup>+</sup> )		
9199.0+x	(67/2 <sup>-</sup> )	929.4 5	100	8269.6+x	(63/2 <sup>-</sup> )	Q	
9242.6+x	(65/2 <sup>-</sup> )	930.2 8	100	8312.4+x	(61/2 <sup>-</sup> )		
9265.2+x	(65/2 <sup>-</sup> )	928.3 8	100	8336.9+x	(61/2 <sup>-</sup> )		
9308.9+x	(67/2 <sup>+</sup> )	977.9 5	100	8331.0+x	(63/2 <sup>+</sup> )		$E_\gamma$ : from ( <sup>30</sup> Si,4n $\gamma$ ). Other: 974.78 31 from ( <sup>31</sup> P,4n $\gamma$ ) and ( <sup>30</sup> Si,4n $\gamma$ ) by 2004Sc14

Adopted Levels, Gammas (continued)

							$\gamma(^{165}\text{Lu})$ (continued)		
$E_i(\text{level})$	$J_i^\pi$	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	$E_f$	$J_f^\pi$	Mult.#	Comments		
							is discrepant, however, it could correspond to 975.0 $\gamma$ from 10646.7+x, 71/2 <sup>+</sup> level in ( <sup>30</sup> Si,4n $\gamma$ ).		
9456.2+x	(65/2 <sup>+</sup> )	904.7 8	100	8551.5+x	(61/2 <sup>+</sup> )				
9475.3+x	(67/2 <sup>-</sup> )	918.2 8	100	8557.1+x	(63/2 <sup>-</sup> )				
9544.8+x	(67/2 <sup>+</sup> )	960.0 8	100	8584.8+x	(63/2 <sup>+</sup> )	Q			
9607.0+x	(67/2 <sup>+</sup> )	946.7 8	100	8660.3+x	(63/2 <sup>+</sup> )				
9643.2+x	(67/2 <sup>-</sup> )	951.2 8	100	8692.0+x	(63/2 <sup>-</sup> )	Q			
9671.6+x	(67/2 <sup>+</sup> )	938.0 8	100	8733.6+x	(63/2 <sup>+</sup> )				
9743.3+x	(69/2 <sup>+</sup> )	987.9 5	100	8755.4+x	(65/2 <sup>+</sup> )	Q			
9751.3+x	(67/2 <sup>+</sup> )	926.6 8	100	8824.7+x	(63/2 <sup>+</sup> )	Q			
9781.4+x	(69/2 <sup>-</sup> )	986.0 5	100	8795.3+x	(65/2 <sup>-</sup> )	Q			
9964.2+x	(69/2 <sup>+</sup> )	963.0 8	100	9001.2+x	(65/2 <sup>+</sup> )	Q			
9991.2+x	(69/2 <sup>-</sup> )	963.1 8	100	9028.1+x	(65/2 <sup>-</sup> )				
10072.4+x	(69/2 <sup>+</sup> )	1005.0 8	100	9067.4+x	(65/2 <sup>+</sup> )				
10107.4+x	(69/2 <sup>+</sup> )	974.0 8	100	9133.4+x	(65/2 <sup>+</sup> )				
10129.6+x	(69/2 <sup>-</sup> )	973.5 8	100	9156.0+x	(65/2 <sup>-</sup> )				
10175.4+x	(71/2 <sup>-</sup> )	976.4 5	100	9199.0+x	(67/2 <sup>-</sup> )	Q			
10207.7+x	(69/2 <sup>-</sup> )	965.1 8	100	9242.6+x	(65/2 <sup>-</sup> )				
10367.3+x	(71/2 <sup>+</sup> )	1058.4 5	100	9308.9+x	(67/2 <sup>+</sup> )				
10413.7+x	(69/2 <sup>+</sup> )	957.5 8	100	9456.2+x	(65/2 <sup>+</sup> )				
10449.2+x	(71/2 <sup>-</sup> )	973.9 8	100	9475.3+x	(67/2 <sup>-</sup> )				
10546.8+x	(71/2 <sup>+</sup> )	1002.0 8	100	9544.8+x	(67/2 <sup>+</sup> )	Q			
10593.9+x	(71/2 <sup>+</sup> )	986.9 8	100	9607.0+x	(67/2 <sup>+</sup> )				
10645.1+x	(71/2 <sup>-</sup> )	1001.9 8	100	9643.2+x	(67/2 <sup>-</sup> )				
10646.6+x	(71/2 <sup>+</sup> )	975.0 8	100	9671.6+x	(67/2 <sup>+</sup> )				
10732.4+x	(71/2 <sup>+</sup> )	981.1 8	100	9751.3+x	(67/2 <sup>+</sup> )	Q			
10794.5+x	(73/2 <sup>+</sup> )	1051.2 8	100	9743.3+x	(69/2 <sup>+</sup> )				
10827.4+x	(73/2 <sup>-</sup> )	1046.0 8	100	9781.4+x	(69/2 <sup>-</sup> )				
10983.5+x	(73/2 <sup>+</sup> )	1019.3 8	100	9964.2+x	(69/2 <sup>+</sup> )	Q			
11017.5+x	(73/2 <sup>-</sup> )	1026.3 8	100	9991.2+x	(69/2 <sup>-</sup> )				
11142.4+x	(73/2 <sup>-</sup> )	1012.8 8	100	10129.6+x	(69/2 <sup>-</sup> )				
11194.1+x	(73/2 <sup>-</sup> )	986.4 8	100	10207.7+x	(69/2 <sup>-</sup> )				
11202.0+x	(75/2 <sup>-</sup> )	1026.6 5	100	10175.4+x	(71/2 <sup>-</sup> )	Q			
11424.8+x	(73/2 <sup>+</sup> )	1011.1 8	100	10413.7+x	(69/2 <sup>+</sup> )				
11477.3+x	(75/2 <sup>-</sup> )	1028.1 8	100	10449.2+x	(71/2 <sup>-</sup> )				
11497.0+x	(75/2 <sup>+</sup> )	1129.7 8	100	10367.3+x	(71/2 <sup>+</sup> )				
11582.8+x	(75/2 <sup>+</sup> )	1036.0 8	100	10546.8+x	(71/2 <sup>+</sup> )	Q			
11612.1+x	(75/2 <sup>+</sup> )	1018.2 8	100	10593.9+x	(71/2 <sup>+</sup> )				
11656.6+x	(75/2 <sup>+</sup> )	1010.0 8	100	10646.6+x	(71/2 <sup>+</sup> )				
11684.1+x	(75/2 <sup>-</sup> )	1039.0 8	100	10645.1+x	(71/2 <sup>-</sup> )				
11767.5+x	(75/2 <sup>+</sup> )	1035.1 8	100	10732.4+x	(71/2 <sup>+</sup> )	Q			
11899.9+x	(77/2 <sup>+</sup> )	1105.4 8	100	10794.5+x	(73/2 <sup>+</sup> )				

**Adopted Levels, Gammas (continued)**

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

$E_i(\text{level})$	$J_i^\pi$	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	$E_f$	$J_f^\pi$	Mult.#	$E_i(\text{level})$	$J_i^\pi$	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	$E_f$	$J_f^\pi$
11936.3+x	(77/2 <sup>-</sup> )	1108.9 8	100	10827.4+x	(73/2 <sup>-</sup> )		14200.6+x	(85/2 <sup>+</sup> )	1158.5 8	100	13042.1+x	(81/2 <sup>+</sup> )
12059.8+x	(77/2 <sup>+</sup> )	1076.3 8	100	10983.5+x	(73/2 <sup>+</sup> )		14382.5+x	(85/2 <sup>+</sup> )	1189.3 8	100	13193.2+x	(81/2 <sup>+</sup> )
12105.5+x	(77/2 <sup>-</sup> )	1088.0 8	100	11017.5+x	(73/2 <sup>-</sup> )		14558.5+x	(87/2 <sup>-</sup> )	1158.8 8	100	13399.7+x	(83/2 <sup>-</sup> )
12190.2+x	(77/2 <sup>-</sup> )	1047.8 8	100	11142.4+x	(73/2 <sup>-</sup> )		14849.1+x	(87/2 <sup>-</sup> )	1162.5 8	100	13686.6+x	(83/2 <sup>-</sup> )
12215.8+x	(77/2 <sup>-</sup> )	1021.7 8	100	11194.1+x	(73/2 <sup>-</sup> )		15207.9+x	(87/2 <sup>+</sup> )	1199.8 8	100	14008.1+x	(83/2 <sup>+</sup> )
12278.0+x	(79/2 <sup>-</sup> )	1076.0 8	100	11202.0+x	(75/2 <sup>-</sup> )	Q	15621.8+x	(89/2 <sup>+</sup> )	1239.3 8	100	14382.5+x	(85/2 <sup>+</sup> )
12483.9+x	(77/2 <sup>+</sup> )	1059.1 8	100	11424.8+x	(73/2 <sup>+</sup> )		15745.5+x	(91/2 <sup>-</sup> )	1187.0 <sup>b</sup> 8	100	14558.5+x	(87/2 <sup>-</sup> )
12558.9+x	(79/2 <sup>-</sup> )	1081.6 8	100	11477.3+x	(75/2 <sup>-</sup> )		16461.6+x	(91/2 <sup>+</sup> )	1253.7 <sup>b</sup> 8	100	15207.9+x	(87/2 <sup>+</sup> )
12643.8+x	(79/2 <sup>+</sup> )	1061.0 8	100	11582.8+x	(75/2 <sup>+</sup> )		624.5+y	J+2	624.5 8	100	y	J
12649.8+x	(79/2 <sup>+</sup> )	1037.7 8	100	11612.1+x	(75/2 <sup>+</sup> )		1308.3+y	J+4	683.8 8	100	624.5+y	J+2
12679.0+x	(79/2 <sup>+</sup> )	1182.0 8	100	11497.0+x	(75/2 <sup>+</sup> )		2049.0+y	J+6	740.7 8	100	1308.3+y	J+4
12720.6+x	(79/2 <sup>+</sup> )	1064.0 8	100	11656.6+x	(75/2 <sup>+</sup> )		2847.3+y	J+8	798.3 8	100	2049.0+y	J+6
12857.1+x	(79/2 <sup>+</sup> )	1089.6 8	100	11767.5+x	(75/2 <sup>+</sup> )		3703.3+y	J+10	856.0 8	100	2847.3+y	J+8
13042.1+x	(81/2 <sup>+</sup> )	1142.2 8	100	11899.9+x	(77/2 <sup>+</sup> )		4618.9+y	J+12	915.6 8	100	3703.3+y	J+10
13102.8+x	(81/2 <sup>-</sup> )	1166.5 8	100	11936.3+x	(77/2 <sup>-</sup> )		5594.2+y	J+14	975.3 8	100	4618.9+y	J+12
13193.2+x	(81/2 <sup>+</sup> )	1133.4 8	100	12059.8+x	(77/2 <sup>+</sup> )		6631.2+y	J+16	1037.0 8	100	5594.2+y	J+14
13245.2+x	(81/2 <sup>-</sup> )	1139.7 8	100	12105.5+x	(77/2 <sup>-</sup> )		712.2+z	J1+2	712.2 8	100	z	J1
13399.7+x	(83/2 <sup>-</sup> )	1121.7 8	100	12278.0+x	(79/2 <sup>-</sup> )	Q	1482.4+z	J1+4	770.2 8	100	712.2+z	J1+2
13591.3+x	(81/2 <sup>+</sup> )	1107.4 8	100	12483.9+x	(77/2 <sup>+</sup> )		2311.3+z	J1+6	828.9 8	100	1482.4+z	J1+4
13686.6+x	(83/2 <sup>-</sup> )	1127.7 8	100	12558.9+x	(79/2 <sup>-</sup> )		3197.1+z	J1+8	885.8 8	100	2311.3+z	J1+6
13714.8+x	(83/2 <sup>+</sup> )	1065.0 8	100	12649.8+x	(79/2 <sup>+</sup> )		4140.8+z	J1+10	943.7 8	100	3197.1+z	J1+8
13829.6+x	(83/2 <sup>+</sup> )	1109.0 8	100	12720.6+x	(79/2 <sup>+</sup> )		5143.3+z	J1+12	1002.5 8	100	4140.8+z	J1+10
14008.1+x	(83/2 <sup>+</sup> )	1151.0 8	100	12857.1+x	(79/2 <sup>+</sup> )		6206.3+z	J1+14	1063.0 8	100	5143.3+z	J1+12

<sup>†</sup> From (<sup>31</sup>P,4n $\gamma$ ) (same values in (<sup>19</sup>F,4n $\gamma$ )) or (<sup>30</sup>Si,4n $\gamma$ ), unless otherwise noted. Values from (<sup>31</sup>P,4n $\gamma$ ) and (<sup>30</sup>Si,4n $\gamma$ ) are in very good agreement and the one with higher precision is adopted for each transition where applicable. For SD bands, most values are from <sup>139</sup>La(<sup>30</sup>Si,4n $\gamma$ ).

<sup>‡</sup> Weighted average of all the available data of comparable precision. Large uncertainties imply that the values available from (<sup>31</sup>P,4n $\gamma$ ) and (<sup>19</sup>F,4n $\gamma$ ) have a fairly large deviation.

# From DCO ratios in heavy-ion reactions such as (<sup>30</sup>Si,4n $\gamma$ ) and (<sup>16</sup>O,4n $\gamma$ ), mult=Q corresponds to  $\Delta J=2$ , stretched quadrupole (most likely E2) transition and mult=D corresponds to  $\Delta J=1$ , dipole (small quadrupole admixture is possible). The mult=E2 is from DCO ratio and application of RUL for levels of known lifetimes.

@ From (<sup>45</sup>Sc,4n $\gamma$ ) for negative-parity states and from from (<sup>16</sup>O,4n $\gamma$ ) for positive-parity states.

& From DCO. The other solution with dominant M1 component is excluded in analogy with <sup>163</sup>Lu transitions in SD bands.

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

<sup>b</sup> Placement of transition in the level scheme is uncertain.

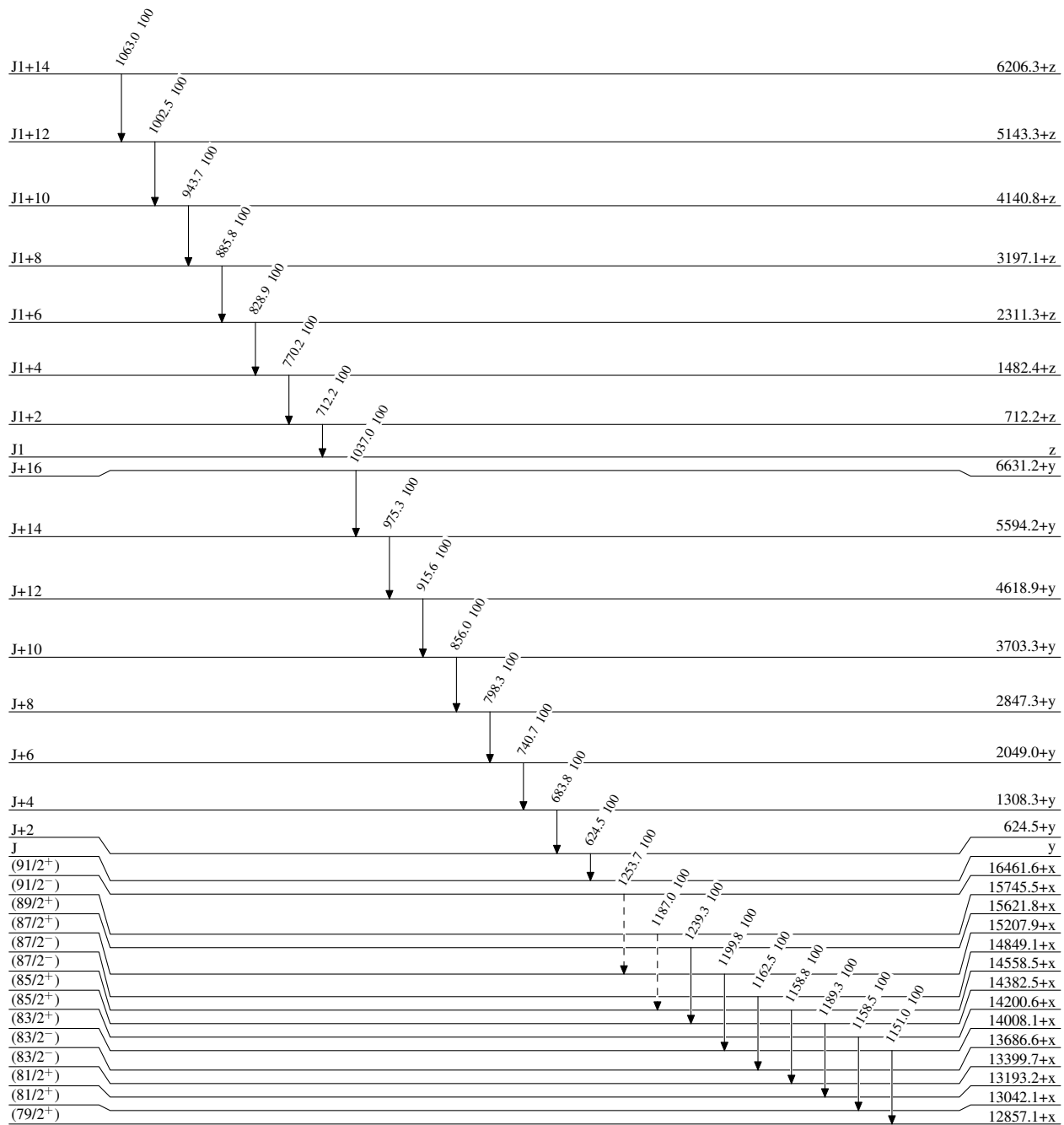
**Adopted Levels, Gammas**

Legend

**Level Scheme**

Intensities: Relative photon branching from each level

-----▶  $\gamma$  Decay (Uncertain)



$1/2^+$

0.0

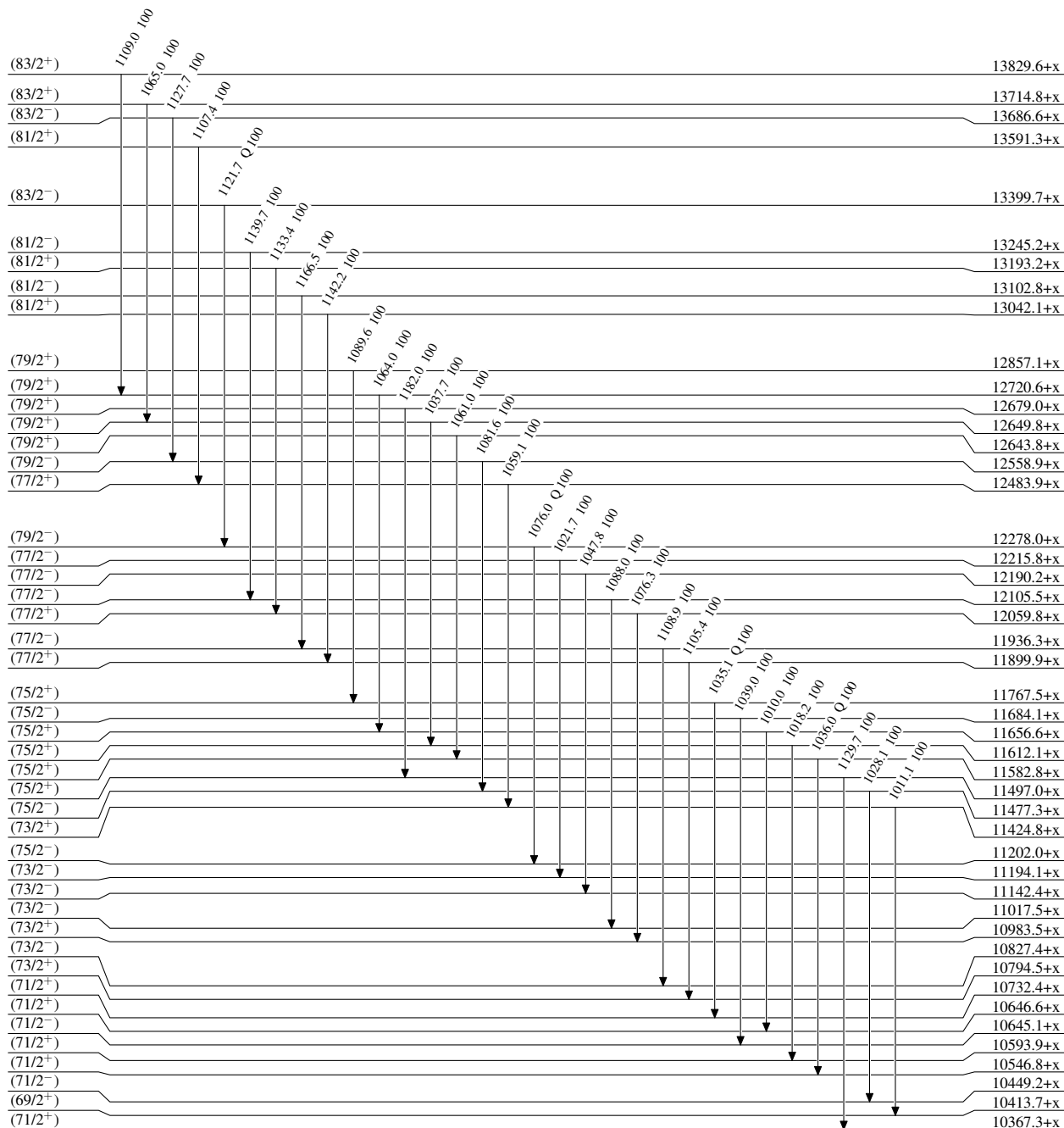
10.74 min 10

$^{165}_{71}\text{Lu}_{94}$

**Adopted Levels, Gammas**

Level Scheme (continued)

Intensities: Relative photon branching from each level



1/2<sup>+</sup>

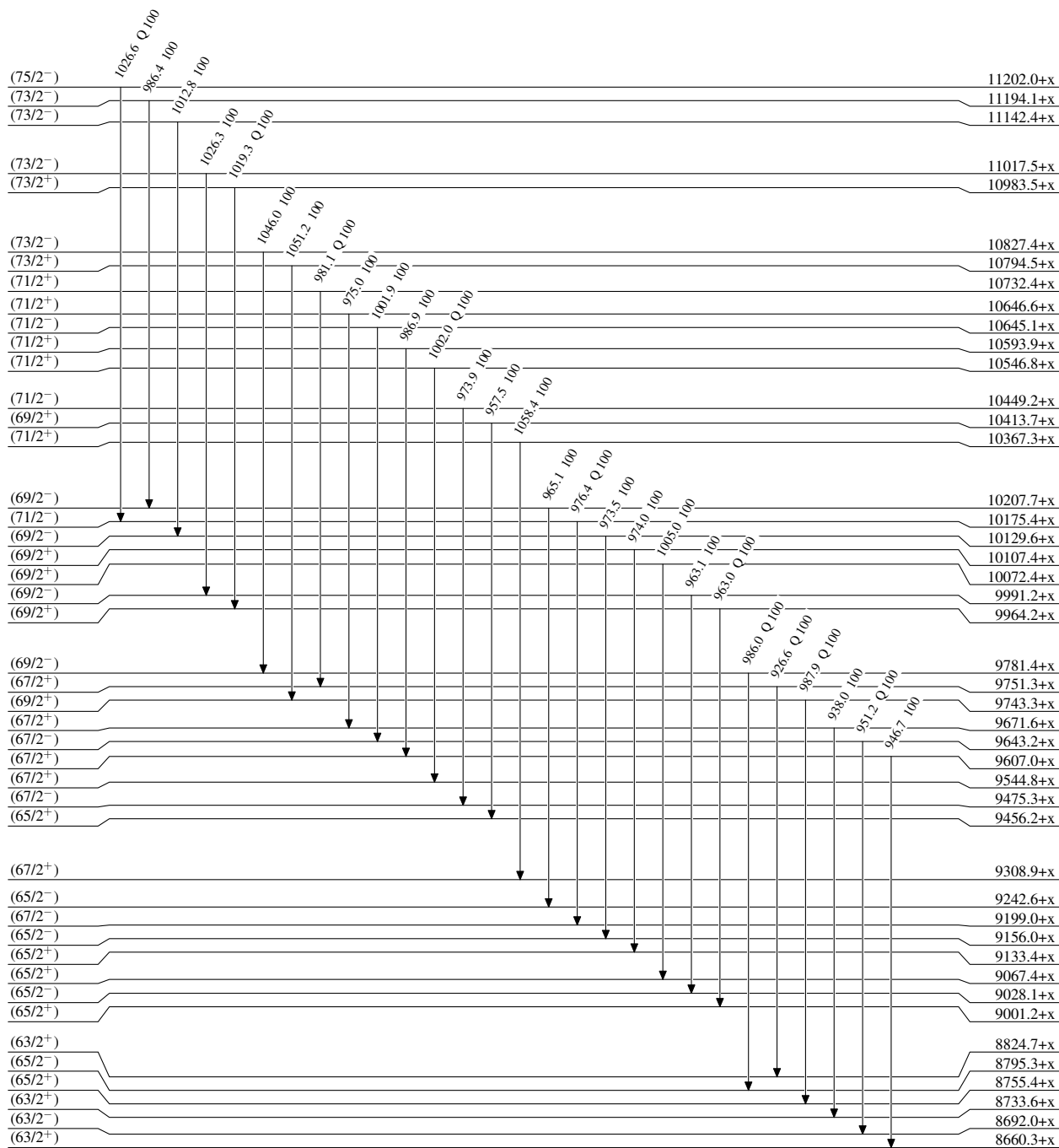
0.0

10.74 min 10

**Adopted Levels, Gammas**

**Level Scheme (continued)**

Intensities: Relative photon branching from each level



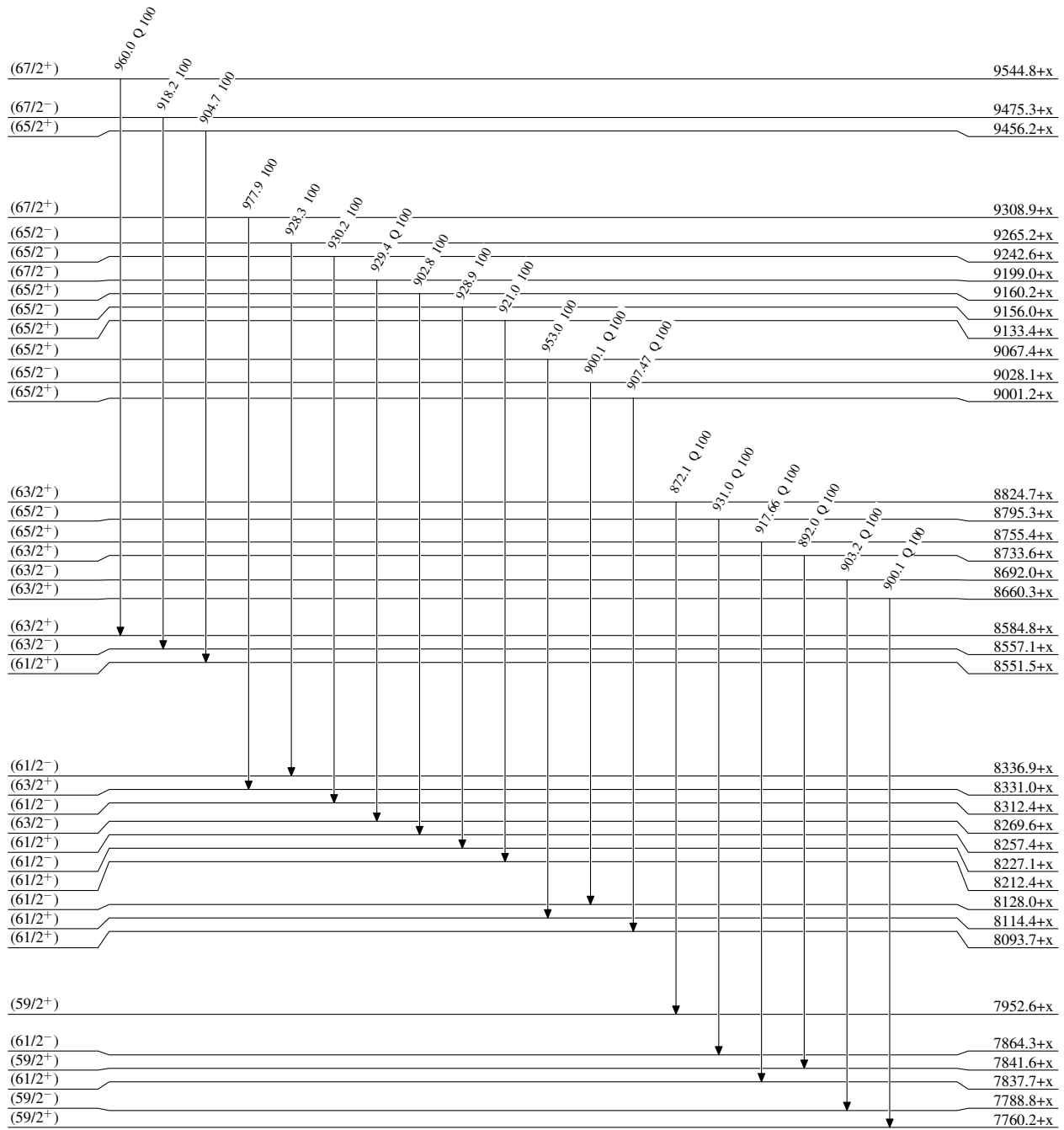
1/2<sup>+</sup>

0.0 10.74 min 10

**Adopted Levels, Gammas**

**Level Scheme (continued)**

Intensities: Relative photon branching from each level



$1/2^+$

0.0

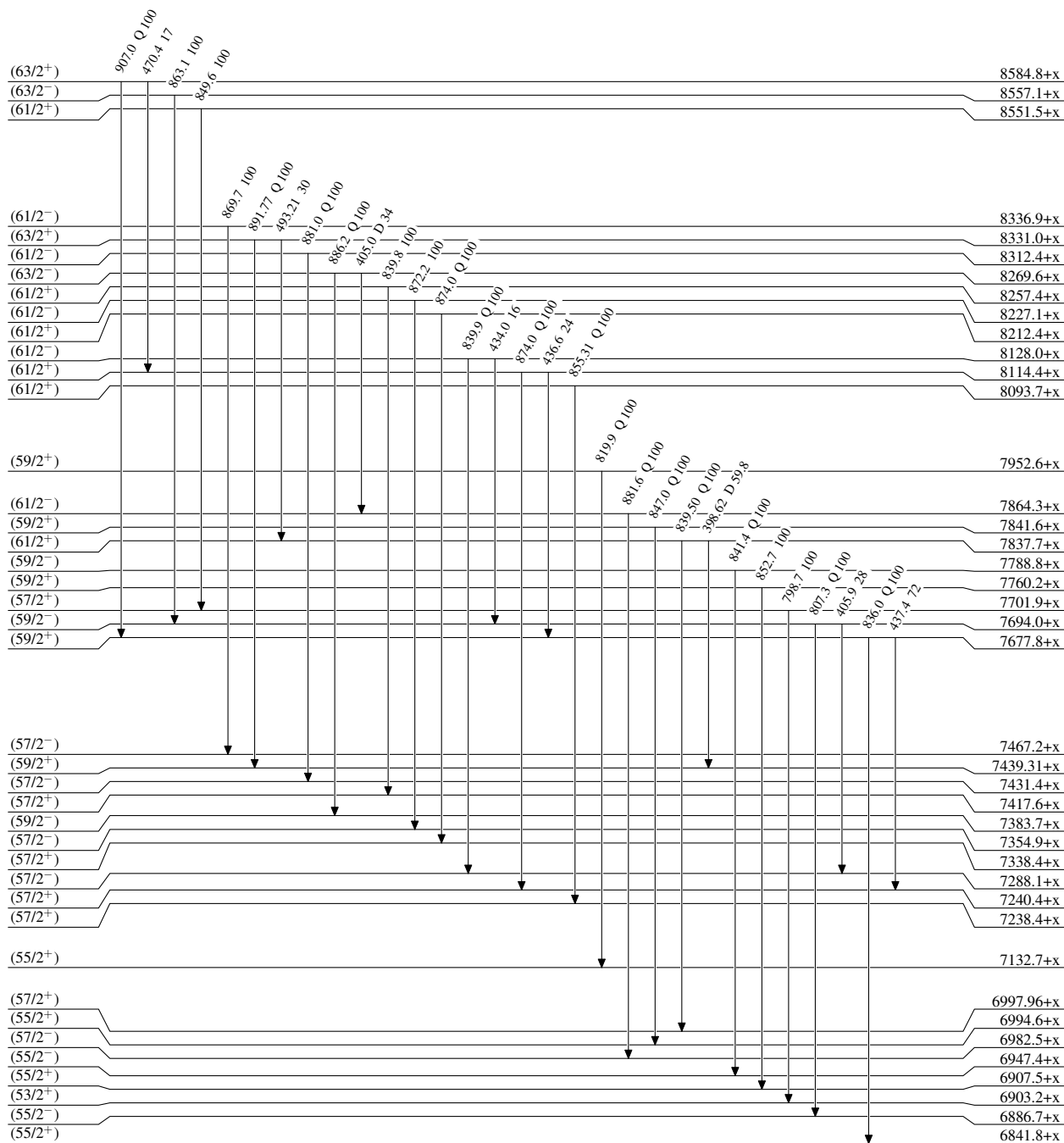
10.74 min 10



**Adopted Levels, Gammas**

**Level Scheme (continued)**

Intensities: Relative photon branching from each level



$1/2^+$

0.0

10.74 min 10

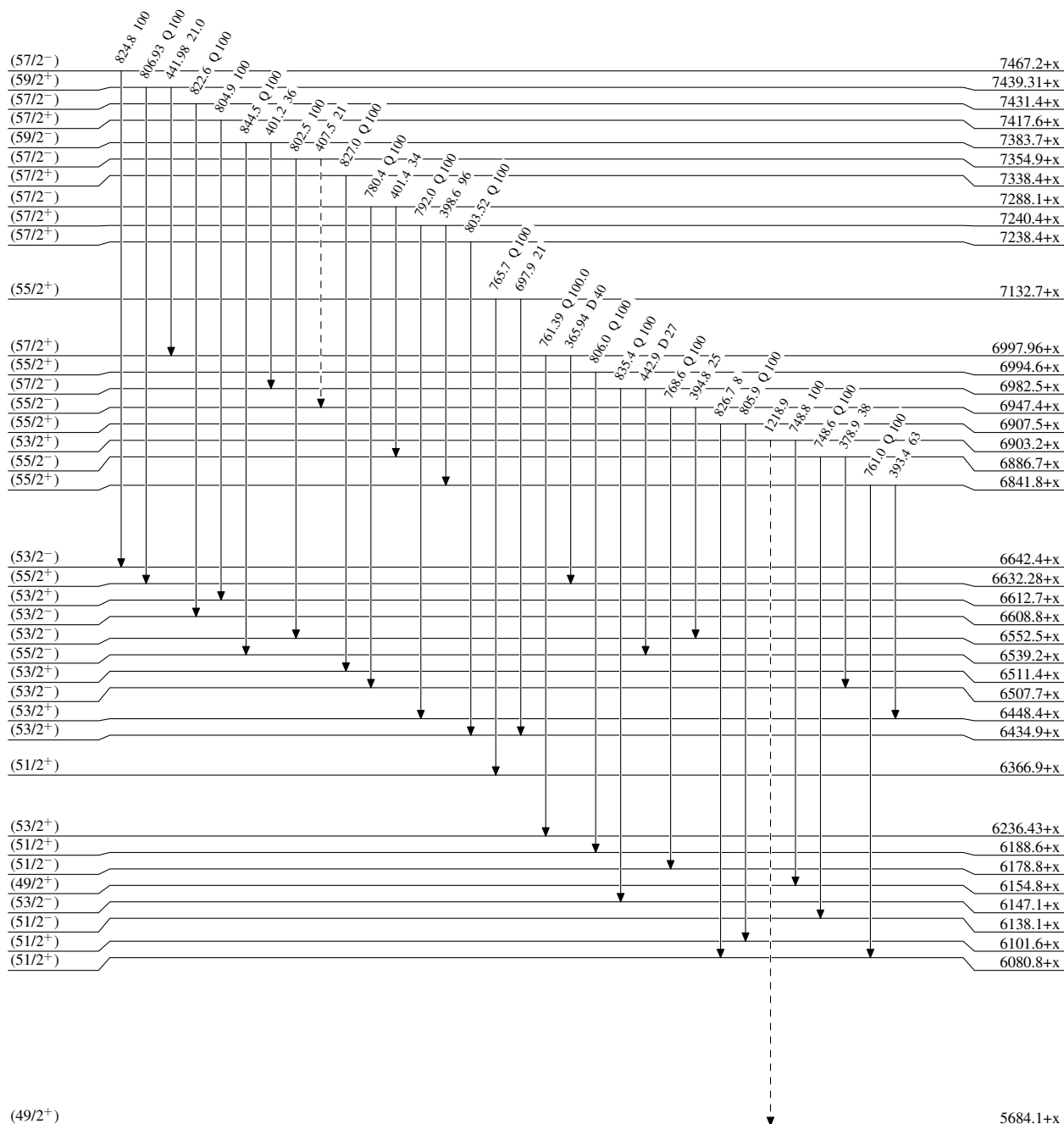
**Adopted Levels, Gammas**

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

-----▶  $\gamma$  Decay (Uncertain)



0.13 ps 2

1/2<sup>+</sup>

0.0

10.74 min 10

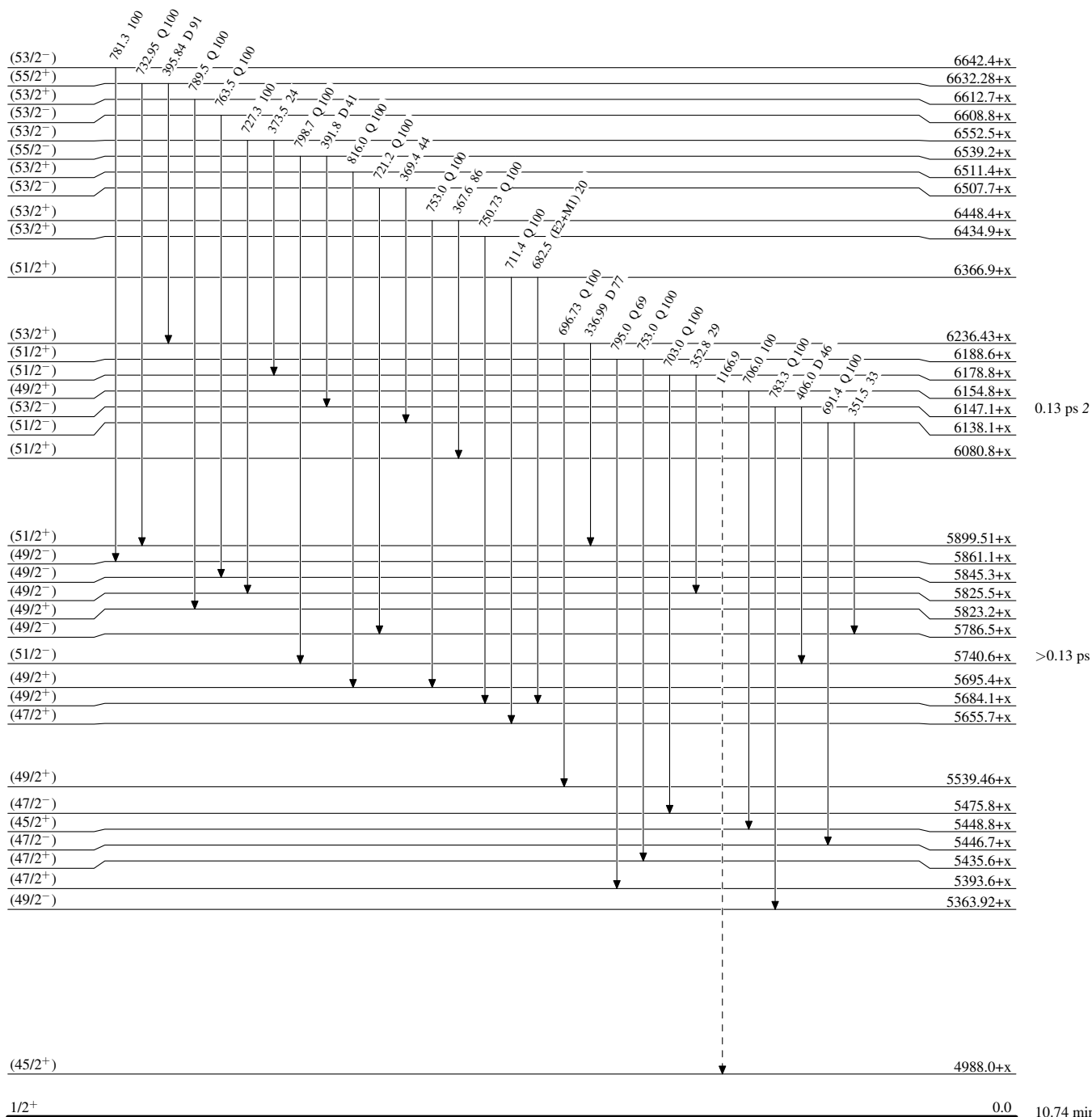
**Adopted Levels, Gammas**

Legend

**Level Scheme (continued)**

Intensities: Relative photon branching from each level

-----▶  $\gamma$  Decay (Uncertain)



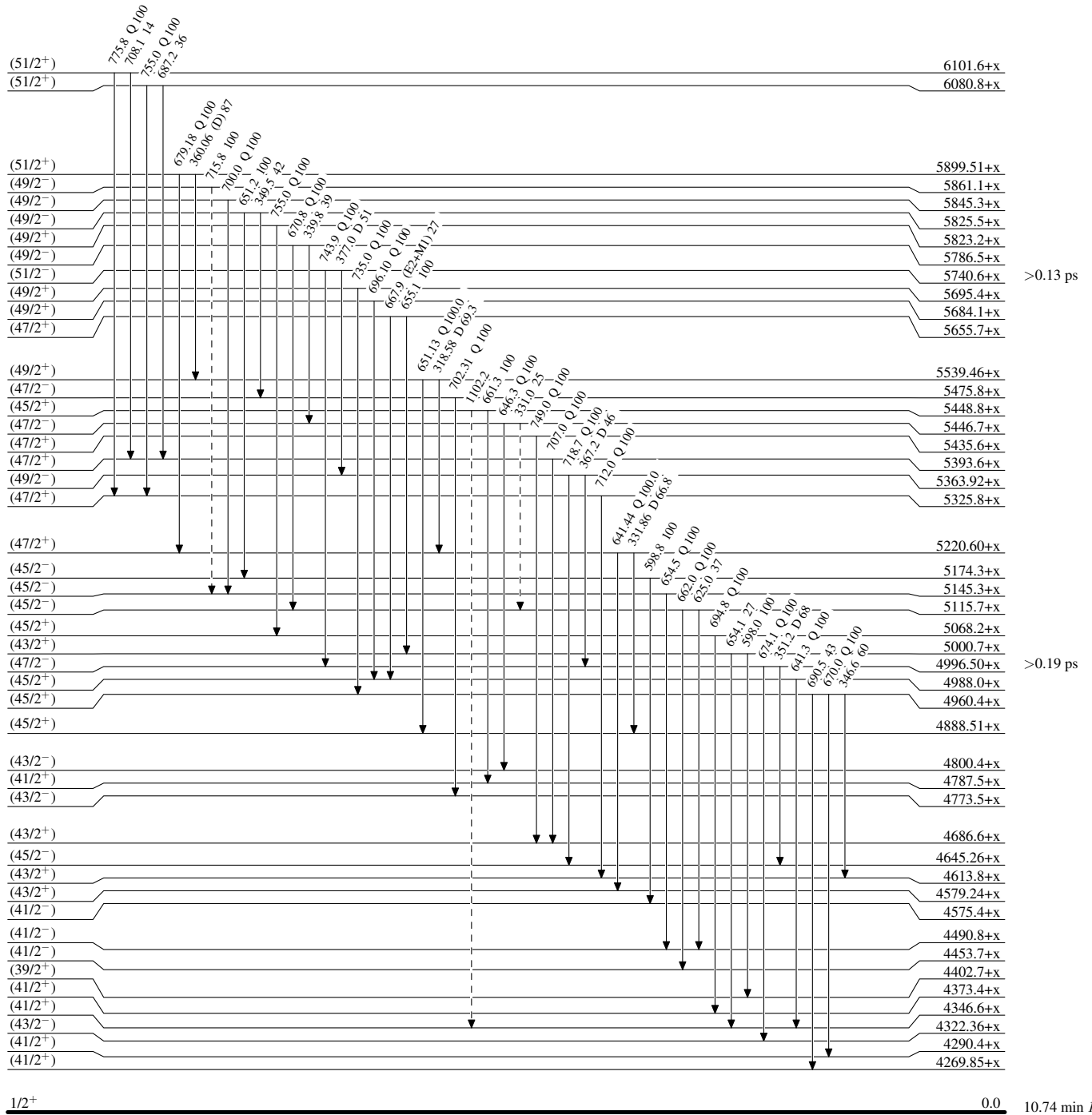
**Adopted Levels, Gammas**

Legend

**Level Scheme (continued)**

Intensities: Relative photon branching from each level

-----▶  $\gamma$  Decay (Uncertain)



<sup>165</sup><sub>71</sub>Lu<sub>94</sub>

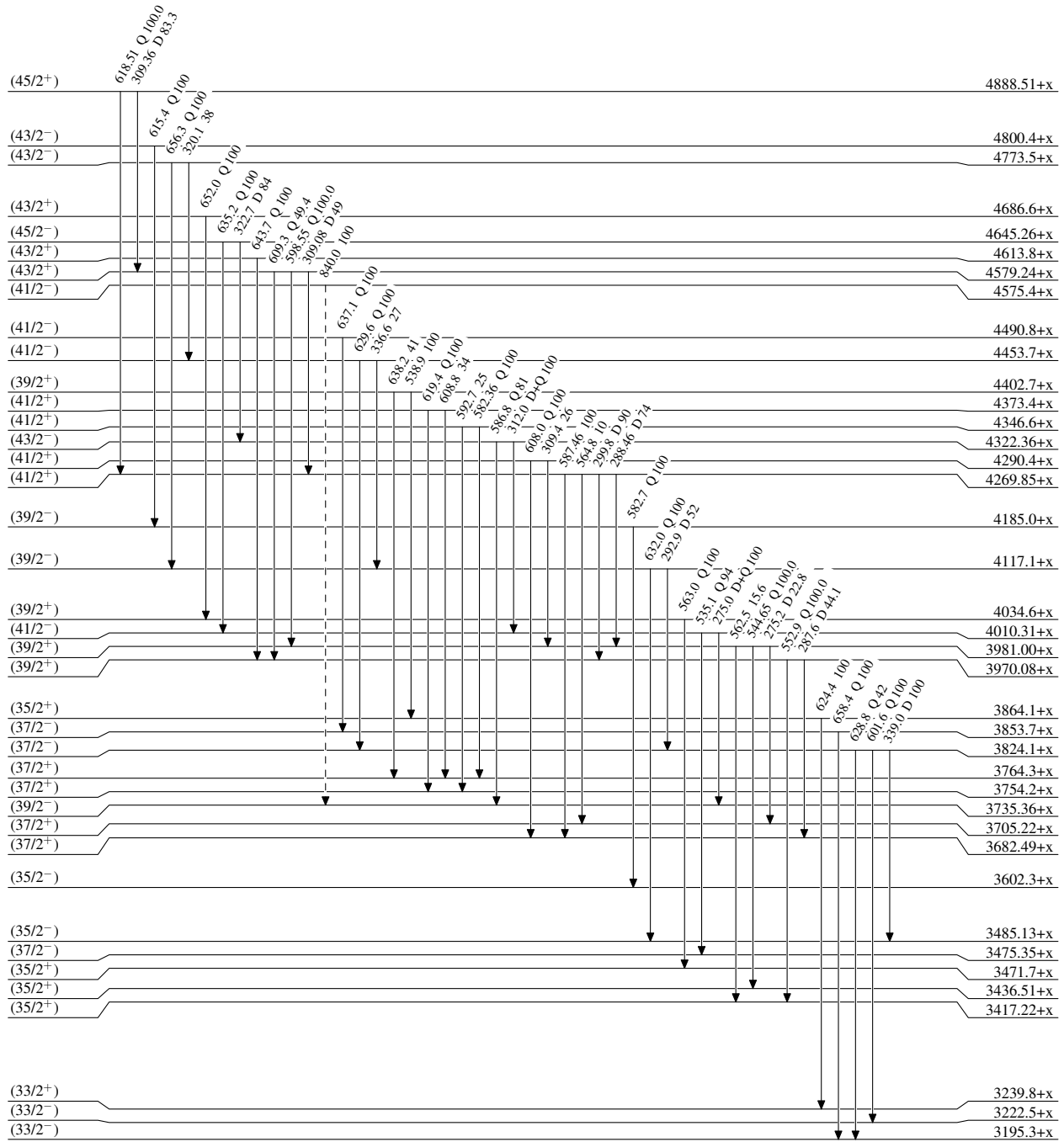
**Adopted Levels, Gammas**

Legend

**Level Scheme (continued)**

Intensities: Relative photon branching from each level

-----▶  $\gamma$  Decay (Uncertain)

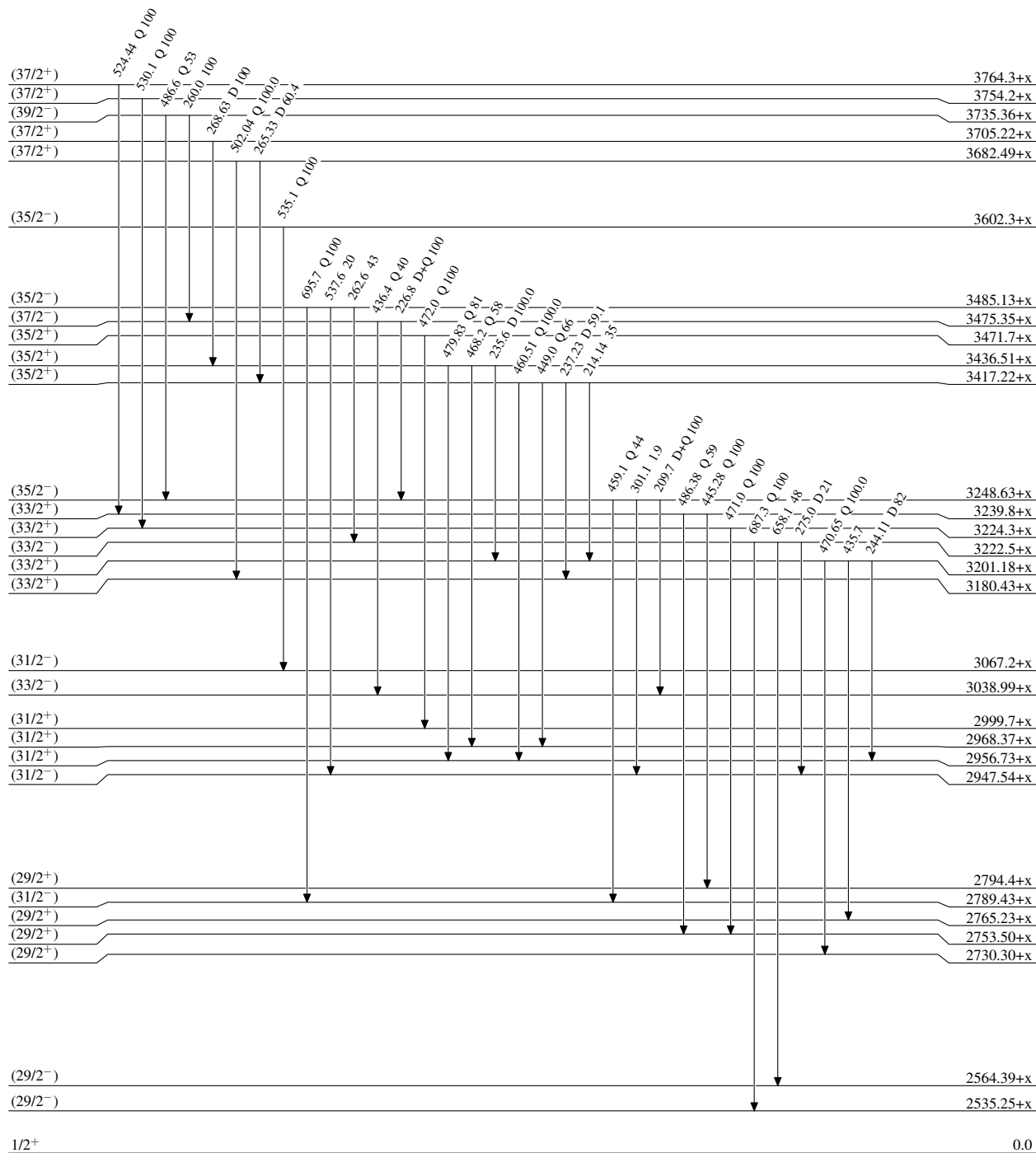


1/2<sup>+</sup> 0.0 10.74 min 10

**Adopted Levels, Gammas**

Level Scheme (continued)

Intensities: Relative photon branching from each level



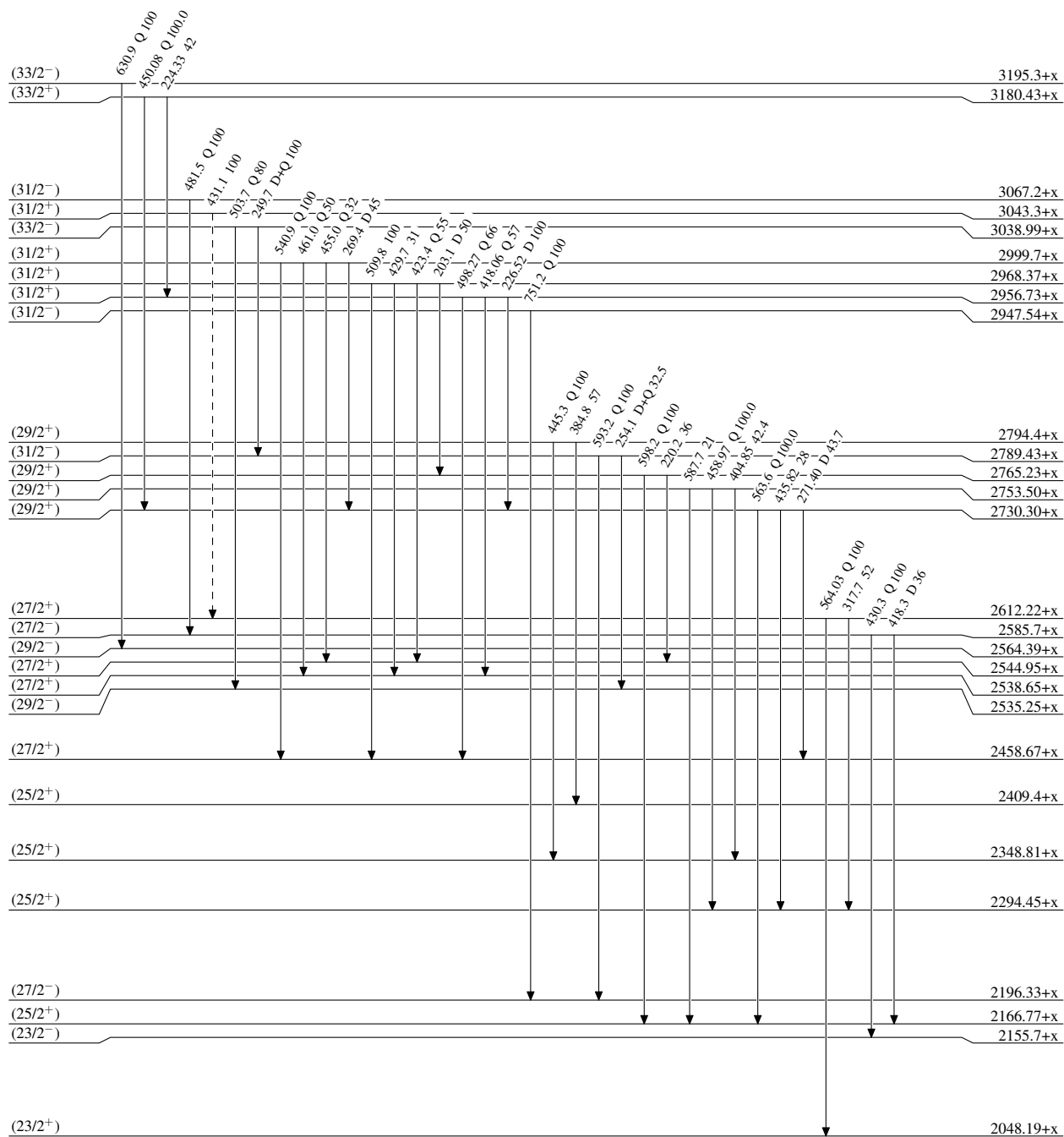
**Adopted Levels, Gammas**

Legend

**Level Scheme (continued)**

Intensities: Relative photon branching from each level

-----▶  $\gamma$  Decay (Uncertain)



$1/2^+$

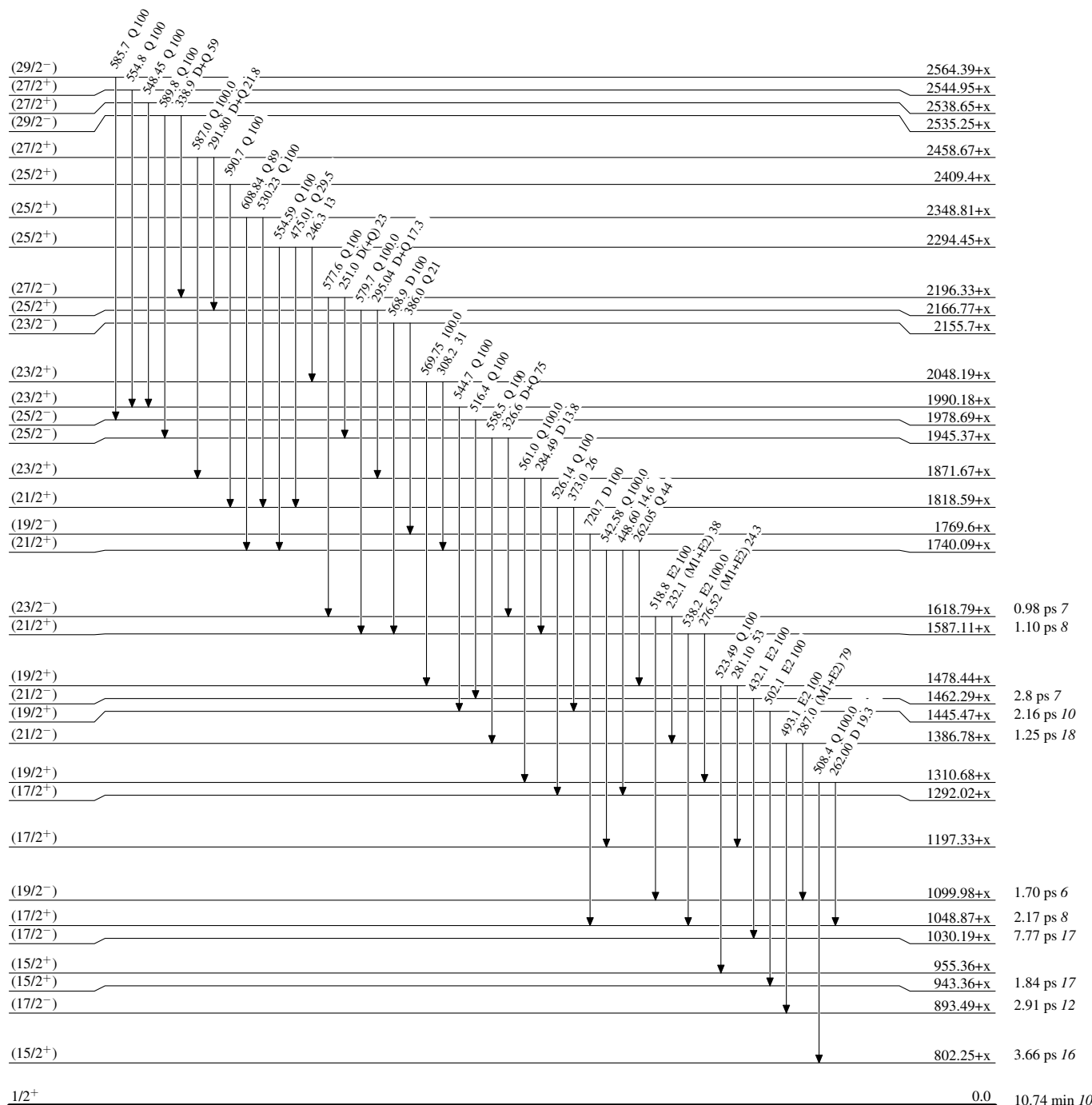
0.0

10.74 min 10

**Adopted Levels, Gammas**

**Level Scheme (continued)**

Intensities: Relative photon branching from each level

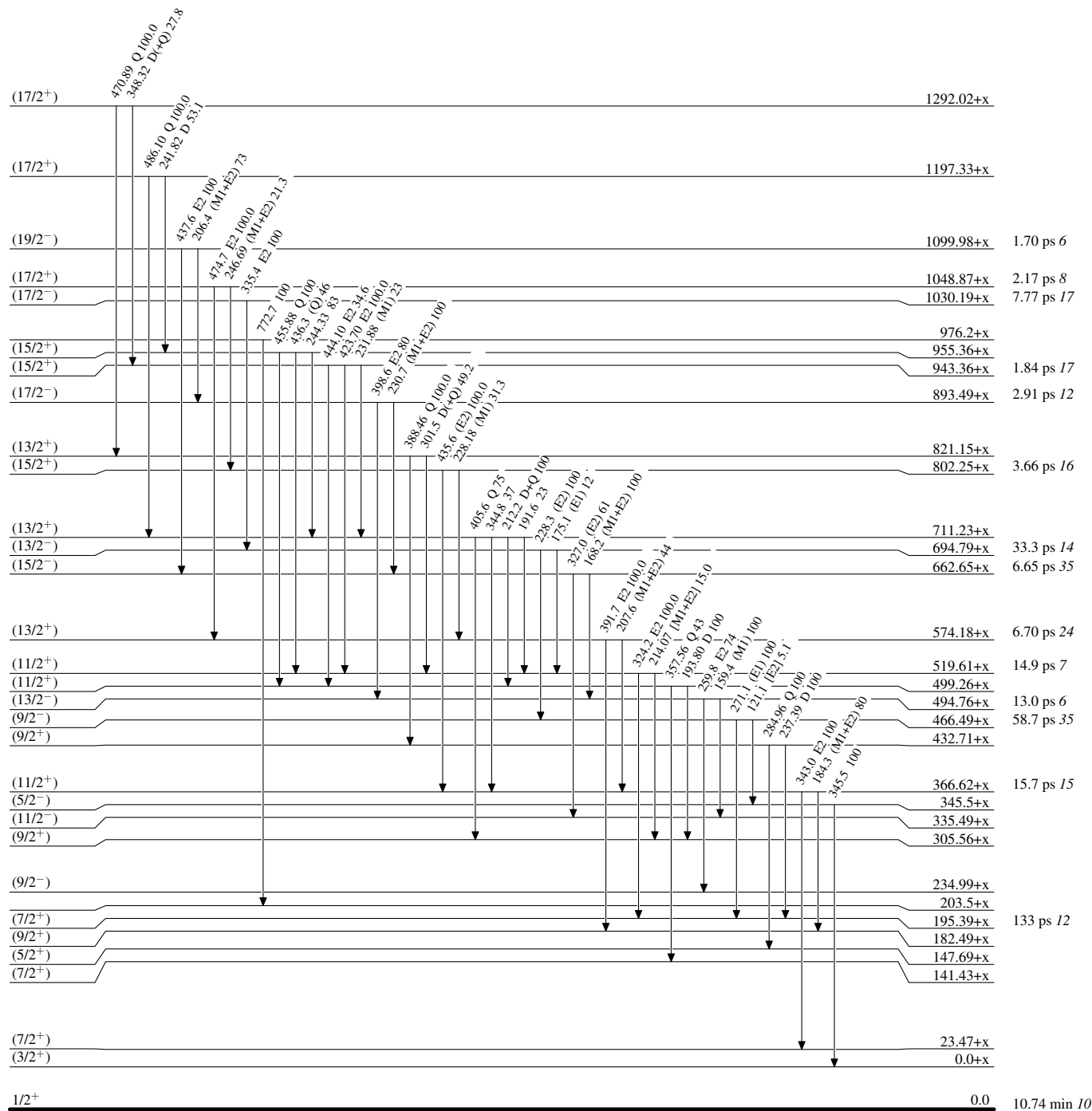




**Adopted Levels, Gammas**

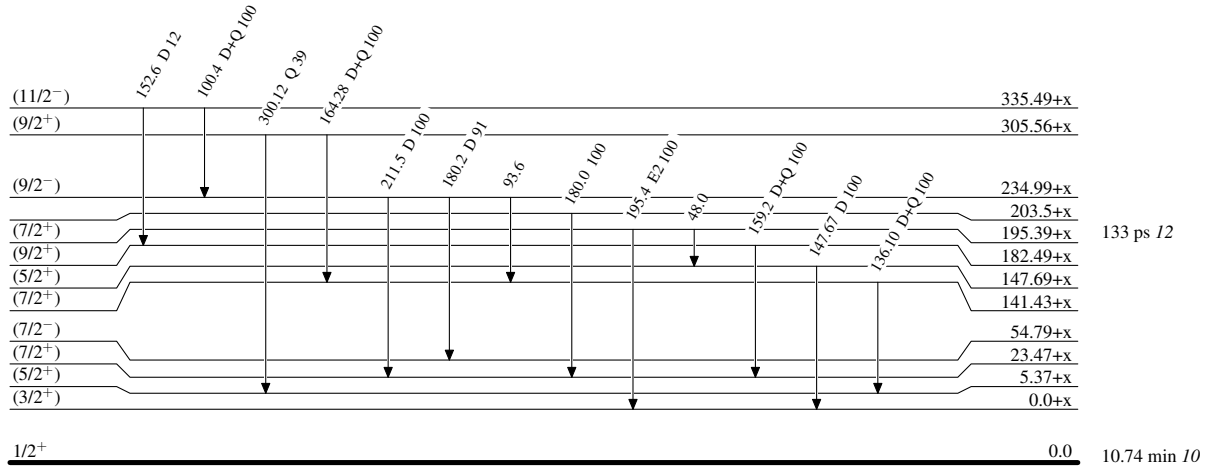
**Level Scheme (continued)**

Intensities: Relative photon branching from each level

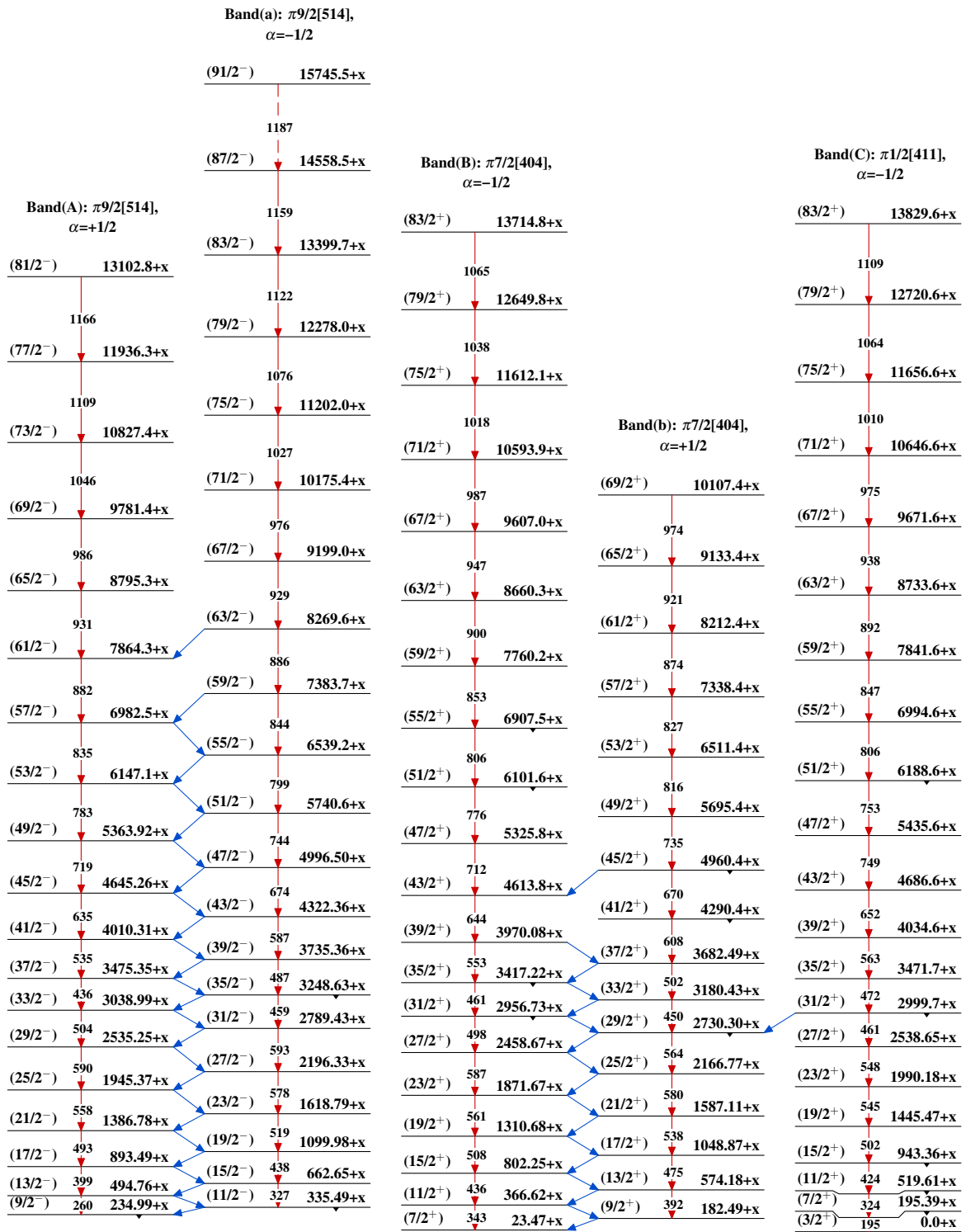


**Adopted Levels, Gammas****Level Scheme (continued)**

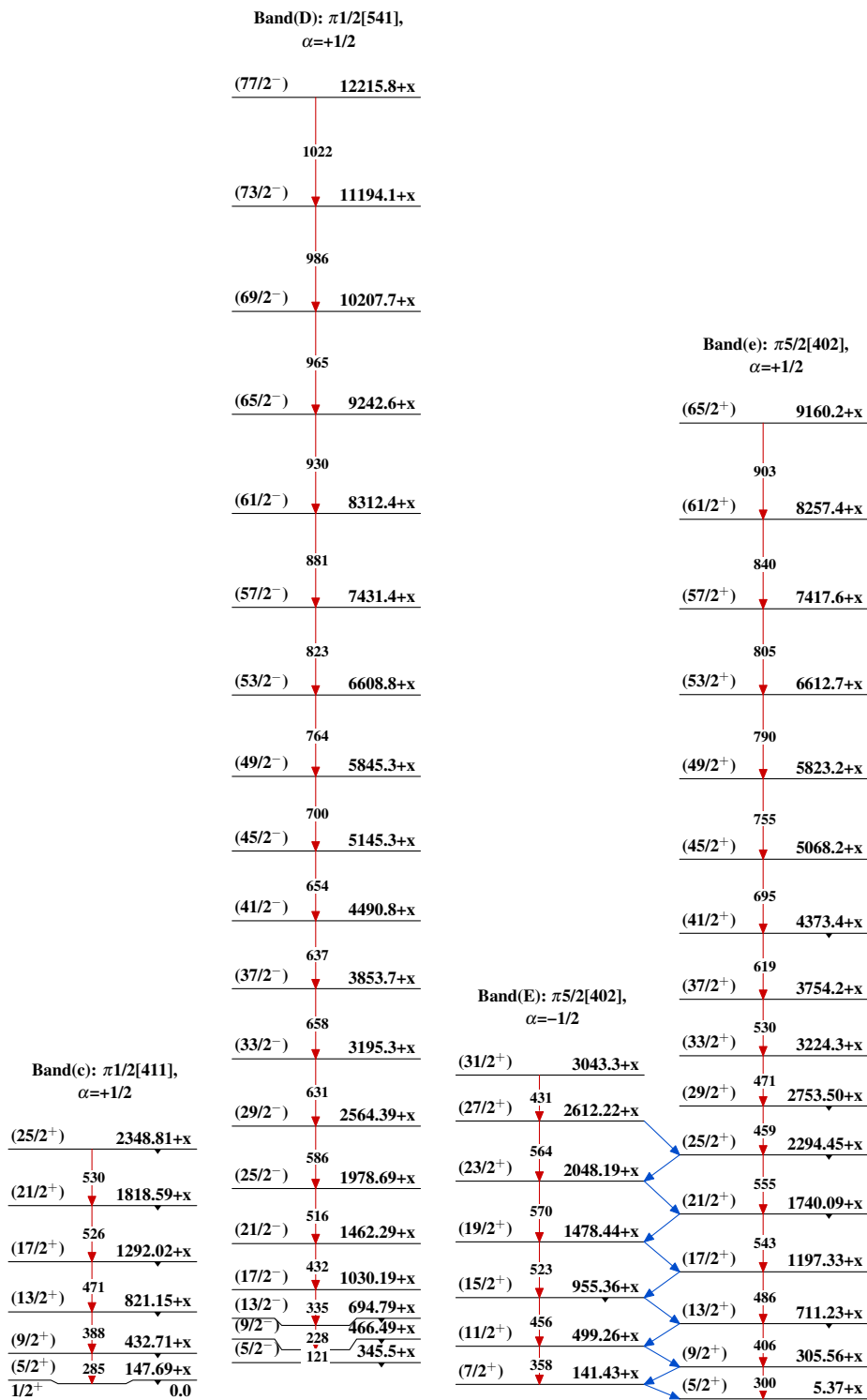
Intensities: Relative photon branching from each level

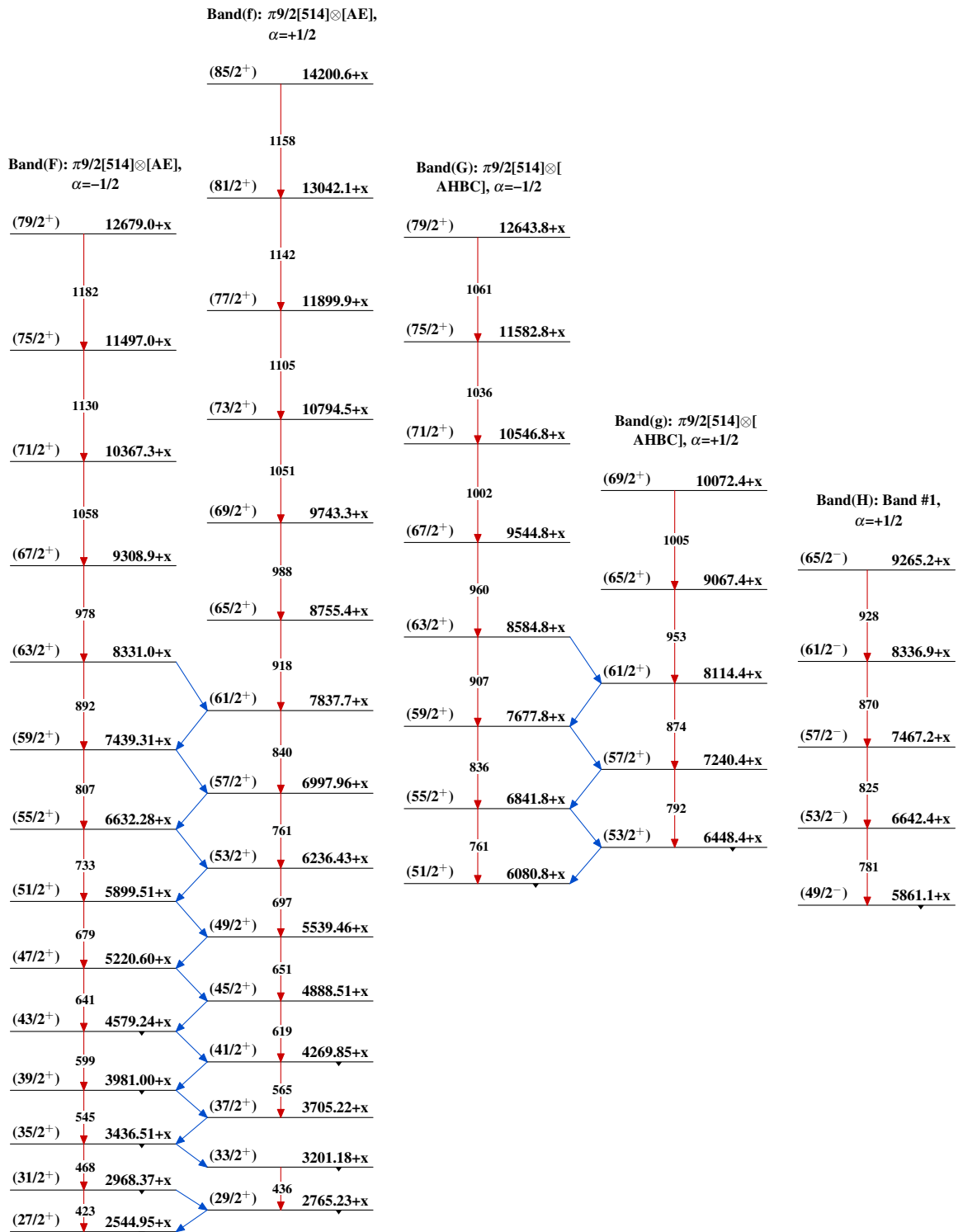
 $^{165}_{71}\text{Lu}_{94}$

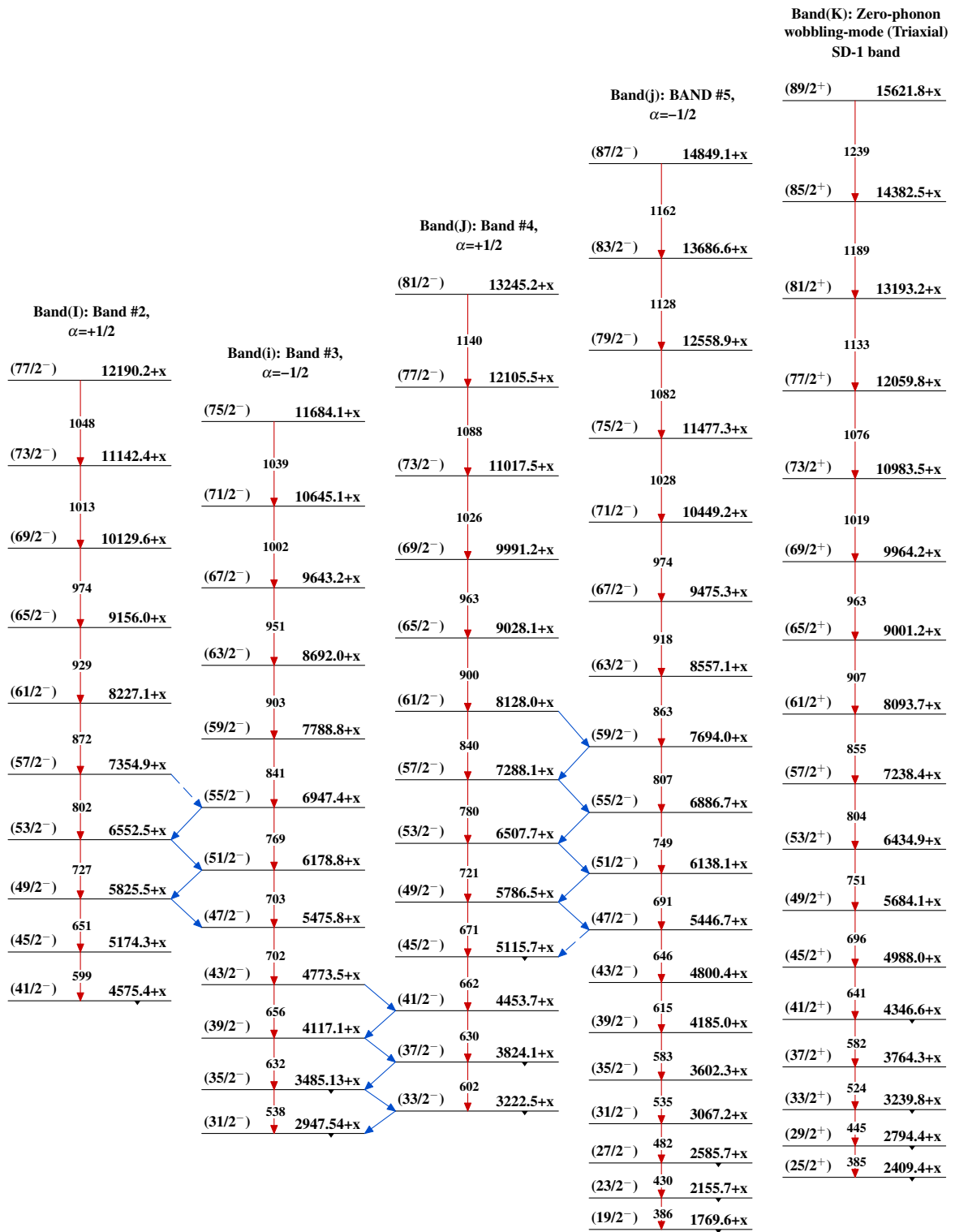
## Adopted Levels, Gammas

 $^{165}_{71}\text{Lu}_{94}$

**Adopted Levels, Gammas (continued)**



**Adopted Levels, Gammas (continued)** $^{165}_{71}\text{Lu}_{94}$

Adopted Levels, Gammas (continued)

**Adopted Levels, Gammas (continued)**

			<b>Band(O): Triaxial SD-5 band (2004Sc14)</b>
			J1+14    6206.3+z
		↓ 1063	J1+12    5143.3+z
		↓ 1002	J1+10    4140.8+z
		↓ 944	J1+8     3197.1+z
		↓ 886	J1+6     2311.3+z
		↓ 829	J1+4     1482.4+z
		↓ 770	J1+2     712.2+z
		↓ 712	J1        z
		<b>Band(N): Triaxial SD-4 band (2004Sc14)</b>	
		J+16    6631.2+y	
		↓ 1037	J+14    5594.2+y
		↓ 975	J+12    4618.9+y
		↓ 916	J+10    3703.3+y
		↓ 856	J+8     2847.3+y
		↓ 798	J+6     2049.0+y
		↓ 741	J+4     1308.3+y
		↓ 684	J+2     624.5+y
		↓ 624	J        y
		<b>Band(M): Two-phonon wobbling mode (Triaxial) SD-3 band</b>	
		(81/2 <sup>+</sup> )    13591.3+x	
		↓ 1107	(77/2 <sup>+</sup> )    12483.9+x
		↓ 1059	(73/2 <sup>+</sup> )    11424.8+x
		↓ 1011	(69/2 <sup>+</sup> )    10413.7+x
		↓ 958	(65/2 <sup>+</sup> )    9456.2+x
		↓ 905	(61/2 <sup>+</sup> )    8551.5+x
		↓ 850	(57/2 <sup>+</sup> )    7701.9+x
		↓ 799	(53/2 <sup>+</sup> )    6903.2+x
		↓ 749	(49/2 <sup>+</sup> )    6154.8+x
		↓ 706	(45/2 <sup>+</sup> )    5448.8+x
		↓ 661	(41/2 <sup>+</sup> )    4787.5+x
		<b>Band(L): One-phonon wobbling mode (Triaxial) SD-2 band</b>	
		(91/2 <sup>+</sup> )    16461.6+x	
		↓ 1254	(87/2 <sup>+</sup> )    15207.9+x
		↓ 1200	(83/2 <sup>+</sup> )    14008.1+x
		↓ 1151	(79/2 <sup>+</sup> )    12857.1+x
		↓ 1090	(75/2 <sup>+</sup> )    11767.5+x
		↓ 1035	(71/2 <sup>+</sup> )    10732.4+x
		↓ 981	(67/2 <sup>+</sup> )    9751.3+x
		↓ 927	(63/2 <sup>+</sup> )    8824.7+x
		↓ 872	(59/2 <sup>+</sup> )    7952.6+x
		↓ 820	(55/2 <sup>+</sup> )    7132.7+x
		↓ 766	(51/2 <sup>+</sup> )    6366.9+x
		↓ 711	(47/2 <sup>+</sup> )    5655.7+x
		↓ 655	(43/2 <sup>+</sup> )    5000.7+x
		↓ 598	(39/2 <sup>+</sup> )    4402.7+x
		↓ 539	(35/2 <sup>+</sup> )    3864.1+x