

**Adopted Levels, Gammas**

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Shaofei Zhu and E. A. Mccutchan		NDS 175,1 (2021)	1-May-2021

Q( $\beta^-$ )=-6341 15; S(n)=8324 11; S(p)=3642 7; Q( $\alpha$ )=7273 3 2021Wa16  
 S(2n)=15851 12; S(2p)=5826 6 (2021Wa16).  
 $\alpha$ : [Additional information 1](#).

<sup>214</sup>Ra Levels

Cross Reference (XREF) Flags

- A <sup>218</sup>Th  $\alpha$  decay
- B <sup>214</sup>Ra IT decay
- C (HI,xny)
- D <sup>214</sup>Ac  $\epsilon$  decay

E(level) <sup>†</sup>	J $\pi$ <sup>#</sup>	T <sub>1/2</sub> <sup>‡</sup>	XREF	Comments
0.0	0 <sup>+</sup> @	2.438 s 20	ABCD	% $\epsilon$ =0.059 4; % $\alpha$ =99.941 4 % $\epsilon$ : deduced from the ratio of I $\alpha$ ( <sup>214</sup> Ra) and I $\alpha$ ( <sup>214</sup> Fr) (1968To10); other: % $\epsilon$ =0.09 3 (1967Va22). T <sub>1/2</sub> : weighted average of 2.6 s 2 (1967Va22), 2.5 s 1 (1968Lo15), 2.46 s 3 (1973Be33), 2.4 s 1 (1974Ho27), 2.435 s 20 (2012No08), and 2.36 s 6; others: 2.6 s (1961Gr42) and 2.27 s +98-53 (2018Br13). <r <sup>2</sup> > <sup>1/2</sup> =5.608 fm 18 for <sup>214</sup> Ra from a global fit to charge radius data for all nuclides (2013An02). Isotope shifts for Ra isotopes were measured with respect to <sup>214</sup> Ra (2012Wa24).
1382.30 10	2 <sup>+</sup> @		BC	J $\pi$ : E2 to 0 <sup>+</sup> .
1639.30 14	4 <sup>+</sup> @	35.1 ns 3	BC	J $\pi$ : E2 to 2 <sup>+</sup> .
1819.70 17	6 <sup>+</sup> @	118 ns 7	BC	J $\pi$ : E2 to 4 <sup>+</sup> .
1865.2 11	8 <sup>+</sup> @	67.8 $\mu$ s 15	BC	% $\alpha$ =0.09 7; % $\epsilon$ +% $\beta^+$ =99.91 7 $\mu$ =7.10 2 % $\alpha$ : branching estimated using ratio of I $\alpha$ and I $\gamma$ from the isomeric decay (2006Ku26). $\mu$ : from g=0.887 3 of weighted average of 0.88 1 from NMR measurement (1974Ya09), 0.890 4 from TDPAD measurement (1976Ha37) and 0.885 4 from TDPAD measurement (1977Be56). J $\pi$ : E2 to 6 <sup>+</sup> . T <sub>1/2</sub> : weighted average of 67 $\mu$ s 3 (1971MaXH,1971MaXI), 67 $\mu$ s 3 (1992St09) and 68.6 $\mu$ s 20 (2006Ku26); other: 57 $\mu$ s 6 (1972Co18). <a href="#">Additional information 2</a> .
2073.9 14	8 <sup>+</sup> &		C	J $\pi$ : M1 to 8 <sup>+</sup> ; E3 from 11 <sup>-</sup> .
2683.2 14	11 <sup>-</sup> <sup>a</sup>	295 ns 7	C	$\mu$ =11.97 7 $\mu$ : from g=1.088 6 of weighted average of 1.085 10 (1979Ho06) and 1.089 7 (1992St09). Both values were from TDPAD measurements. J $\pi$ : E3 to 8 <sup>+</sup> isomer.
2944.1 14	10 <sup>+</sup> @		C	J $\pi$ : E2 to 8 <sup>+</sup> .
3256.4 14	12 <sup>+</sup> &		C	J $\pi$ : E2 to 10 <sup>+</sup> , E1 to 11 <sup>-</sup> .
3329.4 15	12 <sup>+</sup> @		C	J $\pi$ : M1 to 12 <sup>+</sup> , E1 to 11 <sup>-</sup> .
3478.4 16	14 <sup>+</sup> &	279 ns 4	C	$\mu$ =14.29 6 $\mu$ : from g=1.021 4 of weighted average of 1.022 9 (1979Ho06) and 1.021 4 (1992St09). Both values were from TDPAD measurements. J $\pi$ : E2 to 12 <sup>+</sup> . T <sub>1/2</sub> : other: 285 ns (1979Ho06).

Continued on next page (footnotes at end of table)

**Adopted Levels, Gammas (continued)**

$^{214}\text{Ra}$  Levels (continued)

E(level) <sup>†</sup>	J <sup>π</sup> #	T <sub>1/2</sub> <sup>‡</sup>	XREF	Comments
3771.4 16	13 <sup>-a</sup>		C	J <sup>π</sup> : E2 to 11 <sup>-</sup> .
3850.1 17	14 <sup>+b</sup>		C	J <sup>π</sup> : M1 to 14 <sup>+</sup> , D from 15 <sup>-</sup> .
3990.1 16	15 <sup>-a</sup>	3.6 ns 2	C	J <sup>π</sup> : E2 to 13 <sup>-</sup> .
4146.8 17	17 <sup>-a</sup>	225 ns 4	C	μ=17.37 5 μ: from g=1.022 3 of weighted average of 1.028 7 (1979Ho06) and 1.021 3 (1992St09). Both values were from TDPAD measurements.
4170.1 18	15 <sup>-e</sup>		C	J <sup>π</sup> : E2 to 15 <sup>-</sup> ; E3 to 14 <sup>+</sup> .
4237.2 17	16 <sup>+&amp;</sup>		C	J <sup>π</sup> : E1 to 14 <sup>+</sup> .
4376.8 18	(16 <sup>-</sup> )		C	J <sup>π</sup> : E2 to 14 <sup>+</sup> .
4401.5 17	17 <sup>-c</sup>		C	J <sup>π</sup> : (M1) to 15 <sup>-</sup> .
4618.3 18	16 <sup>+b</sup>		C	J <sup>π</sup> : M1 to 17 <sup>-</sup> ; E1 from 18 <sup>+</sup> .
4810.2 17	18 <sup>+b</sup>	0.76 ns 21	C	J <sup>π</sup> : E2 to 14 <sup>+</sup> .
4921.9 18	19 <sup>-</sup>		C	J <sup>π</sup> : E1 to 17 <sup>-</sup> .
4930.9 20	17 <sup>-</sup>		C	J <sup>π</sup> : E2 to 17 <sup>-</sup> .
4984.4 20	18 <sup>-</sup>		C	J <sup>π</sup> : E2 to 15 <sup>-</sup> .
5180.4 18	19 <sup>-c</sup>		C	J <sup>π</sup> : M1 to 17 <sup>-</sup> .
5243.8 18	20 <sup>+</sup>		C	J <sup>π</sup> : E1 to 18 <sup>+</sup> ; E2 to 17 <sup>-</sup> .
5390.3 19	21 <sup>-c</sup>	1.5 ns 3	C	J <sup>π</sup> : E1 to 19 <sup>-</sup> .
5461.8 20	(20 <sup>-</sup> )		C	J <sup>π</sup> : E1 to 20 <sup>+</sup> ; E2 to 19 <sup>-</sup> .
5948.1 20	(21 <sup>-</sup> )		C	J <sup>π</sup> : (M1) to 19 <sup>-</sup> .
6030.1 20	22 <sup>-c</sup>		C	J <sup>π</sup> : M1 to 21 <sup>-</sup> , γ to (20 <sup>-</sup> ).
6056.6 19	22 <sup>+</sup>		C	J <sup>π</sup> : M1 to 21 <sup>-</sup> , γ from 23 <sup>-</sup> .
6117.8 21	(21,22)		C	J <sup>π</sup> : E1 to 21 <sup>-</sup> ; E2 to 20 <sup>+</sup> .
6290.0 20	22 <sup>+</sup>		C	J <sup>π</sup> : γ to 21 <sup>-</sup> ; weakly populated, non-yrast state in (HI, xnγ).
6305.0 22	(22)		C	J <sup>π</sup> : M1+E2 to 22 <sup>+</sup> , γ to 21 <sup>-</sup> , γ from (24 <sup>+</sup> ).
6479.2 24	(22)		C	J <sup>π</sup> : γ to 22 <sup>+</sup> ; weakly populated, non-yrast state in (HI, xnγ).
6482.1 22	23 <sup>+</sup>		C	J <sup>π</sup> : γ to (22); weakly populated, non-yrast state in (HI, xnγ).
6530.2 22	(24 <sup>+</sup> ) <sup>d</sup>	1.6 ns 3	C	J <sup>π</sup> : M1 to 22 <sup>+</sup> .
6565.0 23	(23,24) <sup>+</sup>		C	J <sup>π</sup> : γ to 22 <sup>+</sup> and 23 <sup>+</sup> .
6577.0 24	(25 <sup>-</sup> )	128 ns 4	C	J <sup>π</sup> : M1 to 23 <sup>+</sup> .
6612.6 20	23 <sup>-</sup>		C	μ=16.5 3 J <sup>π</sup> : E1 to (24 <sup>+</sup> ).
6660.4 22			C	μ: from g=0.66 1 of TDPAD measurement (1992St09).
6765.7 22	(22 <sup>+</sup> , 23 <sup>+</sup> )		C	J <sup>π</sup> : E2 to 21 <sup>-</sup> .
6929.5 24	(24 <sup>+</sup> , 25 <sup>+</sup> )		C	J <sup>π</sup> : (M1) to 22 <sup>+</sup> .
6936.7 23			C	J <sup>π</sup> : (M1+E2) to (23,24) <sup>+</sup> .
7016 3			C	
7118 3	(25 <sup>-</sup> , 26 <sup>-</sup> )		C	J <sup>π</sup> : (M1) to (25 <sup>-</sup> ).
7243 3			C	
7301.8 25			C	
7394.3 24			C	
7542 3			C	
7870.0 23	(24)		C	J <sup>π</sup> : D to 23 <sup>+</sup> .

<sup>†</sup> From a least squares fit to E<sub>γ</sub>'s by evaluators, assuming 1 keV uncertainty for E<sub>γ</sub>'s without ΔE<sub>γ</sub>'s .

<sup>‡</sup> From (HI,xnγ) (1992St09) unless otherwise noted.

# Assigned using γ multipolarity from (HI,xnγ), unless otherwise noted.

@ Proposed configuration=(π h<sub>9/2</sub>)<sup>+6</sup> (1971MaXH,1979Ho06,1992St09).

& Proposed Configuration=(π h<sub>9/2</sub>)<sup>+5</sup>(π f<sub>7/2</sub>) (1979Ho06 and 1992St09).

<sup>a</sup> Proposed configuration=(π h<sub>9/2</sub>)<sup>+5</sup>(π i<sub>13/2</sub>) (1979Ho06,1992St09).

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**Adopted Levels, Gammas (continued)**

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 $^{214}\text{Ra}$  Levels (continued)

- <sup>b</sup> Configuration= $(\pi h_{9/2})^{+4}(\pi f_{7/2})^{+2}$  (1992St09).  
<sup>c</sup> Configuration= $(\pi h_{9/2})^{+4}(\pi f_{7/2})(\pi i_{13/2})$  (1992St09).  
<sup>d</sup> Configuration= $(\pi h_{9/2})^{+4}(\pi i_{13/2})^{+2}$  (1992St09).  
<sup>e</sup> Possible configuration= $(\pi h_{9/2})^{+3}(\pi f_{7/2})^{+2}(\pi i_{13/2})$  (1992St09).

Adopted Levels, Gammas (continued)

$E_i(\text{level})$	$J_i^\pi$	$E_\gamma^\dagger$	$I_\gamma^\dagger$	$E_f$	$J_f^\pi$	Mult. $^\dagger$	$\delta^\dagger$	$\gamma(^{214}\text{Ra})$	
								$\alpha$	Comments
1382.30	2 <sup>+</sup>	1382.3 1	100	0.0	0 <sup>+</sup>	E2		0.00493 7	$\alpha(\text{K})=0.00390$ 5; $\alpha(\text{L})=0.000755$ 11; $\alpha(\text{M})=0.0001816$ 25; $\alpha(\text{N})=4.78\times 10^{-5}$ 7 $\alpha(\text{O})=1.081\times 10^{-5}$ 15; $\alpha(\text{P})=1.848\times 10^{-6}$ 26; $\alpha(\text{Q})=1.297\times 10^{-7}$ 18 $E_\gamma$ : from IT decay (2006Ku26); others: 1381.2 10 (1971MaXI, 1971MaXH), 1381.9 5 (2004He25) and 1382.4 (1992St09).
1639.30	4 <sup>+</sup>	257.0 1	100	1382.30	2 <sup>+</sup>	E2		0.2472 35	$\alpha(\text{K})=0.0977$ 14; $\alpha(\text{L})=0.1103$ 16; $\alpha(\text{M})=0.0295$ 4; $\alpha(\text{N})=0.00779$ 11; $\alpha(\text{O})=0.001678$ 24 $\alpha(\text{P})=0.000253$ 4; $\alpha(\text{Q})=4.04\times 10^{-6}$ 6 $\text{B}(\text{E}2)(\text{W.u.})=0.1516$ 14 $E_\gamma$ : from IT decay (2006Ku26); others: 255.9 5 (1971MaXH, 1971MaXI), 256.6 2 (1972Co18), 256.8 4 (2004He25) and 256.9 (1992St09).
1819.70	6 <sup>+</sup>	180.4 1	100	1639.30	4 <sup>+</sup>	E2		0.856 12	$\alpha(\text{K})=0.1958$ 27; $\alpha(\text{L})=0.485$ 7; $\alpha(\text{M})=0.1313$ 19; $\alpha(\text{N})=0.0347$ 5; $\alpha(\text{O})=0.00742$ 11 $\alpha(\text{P})=0.001095$ 16; $\alpha(\text{Q})=9.70\times 10^{-6}$ 14 $\text{B}(\text{E}2)(\text{W.u.})=0.178$ 11 $E_\gamma$ : from IT decay (2006Ku26); others: 179.4 5 (1971MaXH, 1971MaXI), 180.4 2 (1972Co18), 180.7 4 (2004He25) and 180.4 (1992St09).
1865.2	8 <sup>+</sup>	45.5	100	1819.70	6 <sup>+</sup>	E2		414 6	$\alpha(\text{L})=304$ 4; $\alpha(\text{M})=82.3$ 12; $\alpha(\text{N})=21.71$ 30; $\alpha(\text{O})=4.60$ 6; $\alpha(\text{P})=0.659$ 9; $\alpha(\text{Q})=0.001332$ 19 $\text{B}(\text{E}2)(\text{W.u.})=0.00136$ 16
2073.9	8 <sup>+</sup>	208.7	100	1865.2	8 <sup>+</sup>	M1		1.941 27	$\alpha(\text{K})=1.561$ 22; $\alpha(\text{L})=0.288$ 4; $\alpha(\text{M})=0.0689$ 10; $\alpha(\text{N})=0.01817$ 25; $\alpha(\text{O})=0.00414$ 6 $\alpha(\text{P})=0.000722$ 10; $\alpha(\text{Q})=5.66\times 10^{-5}$ 8
2683.2	11 <sup>-</sup>	609.3	89.7 7	2073.9	8 <sup>+</sup>	E3		0.0766 11	$\alpha(\text{K})=0.0416$ 6; $\alpha(\text{L})=0.0259$ 4; $\alpha(\text{M})=0.00685$ 10; $\alpha(\text{N})=0.001817$ 25; $\alpha(\text{O})=0.000398$ 6 $\alpha(\text{P})=6.30\times 10^{-5}$ 9; $\alpha(\text{Q})=2.090\times 10^{-6}$ 29 $\text{B}(\text{E}3)(\text{W.u.})=21.8$ 6
		818.0	100.0 14	1865.2	8 <sup>+</sup>	E3		0.0350 5	$\alpha(\text{K})=0.02271$ 32; $\alpha(\text{L})=0.00915$ 13; $\alpha(\text{M})=0.002364$ 33; $\alpha(\text{N})=0.000626$ 9 $\alpha(\text{O})=0.0001386$ 19; $\alpha(\text{P})=2.248\times 10^{-5}$ 31; $\alpha(\text{Q})=9.98\times 10^{-7}$ 14 $\text{B}(\text{E}3)(\text{W.u.})=3.09$ 9
2944.1	10 <sup>+</sup>	1078.9	100	1865.2	8 <sup>+</sup>	E2		0.00779 11	$\alpha(\text{K})=0.00607$ 9; $\alpha(\text{L})=0.001296$ 18; $\alpha(\text{M})=0.000315$ 4; $\alpha(\text{N})=8.31\times 10^{-5}$ 12 $\alpha(\text{O})=1.869\times 10^{-5}$ 26; $\alpha(\text{P})=3.16\times 10^{-6}$ 4; $\alpha(\text{Q})=2.050\times 10^{-7}$ 29
3256.4	12 <sup>+</sup>	312.3	53.0 10	2944.1	10 <sup>+</sup>	E2		0.1349 19	$\alpha(\text{K})=0.0652$ 9; $\alpha(\text{L})=0.0515$ 7; $\alpha(\text{M})=0.01365$ 19; $\alpha(\text{N})=0.00360$ 5; $\alpha(\text{O})=0.000780$ 11 $\alpha(\text{P})=0.0001191$ 17; $\alpha(\text{Q})=2.57\times 10^{-6}$ 4
		573.2	100.0 17	2683.2	11 <sup>-</sup>	E1		0.00898 13	$\alpha(\text{K})=0.00735$ 10; $\alpha(\text{L})=0.001245$ 17; $\alpha(\text{M})=0.000294$ 4; $\alpha(\text{N})=7.71\times 10^{-5}$ 11 $\alpha(\text{O})=1.740\times 10^{-5}$ 24; $\alpha(\text{P})=2.97\times 10^{-6}$ 4; $\alpha(\text{Q})=2.133\times 10^{-7}$ 30

Adopted Levels, Gammas (continued) $\gamma(^{214}\text{Ra})$  (continued)

$E_i(\text{level})$	$J_i^\pi$	$E_\gamma^\dagger$	$I_\gamma^\dagger$	$E_f$	$J_f^\pi$	Mult. <sup>†</sup>	$\delta^\dagger$	$\alpha$	Comments
3329.4	12 <sup>+</sup>	73.0	14 2	3256.4	12 <sup>+</sup>	M1+E2	0.15 10	8.5 13	$\alpha(\text{L})=6.4 9$ ; $\alpha(\text{M})=1.56 26$ ; $\alpha(\text{N})=0.41 7$ ; $\alpha(\text{O})=0.093 14$ ; $\alpha(\text{P})=0.0159 20$ ; $\alpha(\text{Q})=0.00114 4$
		646.2	100.0 14	2683.2	11 <sup>-</sup>	E1		0.00712 10	$\alpha(\text{K})=0.00584 8$ ; $\alpha(\text{L})=0.000977 14$ ; $\alpha(\text{M})=0.0002306 32$ ; $\alpha(\text{N})=6.04\times 10^{-5} 8$ ; $\alpha(\text{O})=1.367\times 10^{-5} 19$ ; $\alpha(\text{P})=2.339\times 10^{-6} 33$ ; $\alpha(\text{Q})=1.706\times 10^{-7} 24$
3478.4	14 <sup>+</sup>	148.9	66.9 11	3329.4	12 <sup>+</sup>	E2		1.804 25	$\alpha(\text{K})=0.265 4$ ; $\alpha(\text{L})=1.131 16$ ; $\alpha(\text{M})=0.307 4$ ; $\alpha(\text{N})=0.0811 11$ ; $\alpha(\text{O})=0.01731 24$
		222.1	100.0 17	3256.4	12 <sup>+</sup>	E2		0.404 6	$\alpha(\text{P})=0.002534 35$ ; $\alpha(\text{Q})=1.626\times 10^{-5} 23$ ; B(E2)(W.u.)=0.074 3
									$\alpha(\text{K})=0.1316 18$ ; $\alpha(\text{L})=0.2004 28$ ; $\alpha(\text{M})=0.0539 8$ ; $\alpha(\text{N})=0.01424 20$ ; $\alpha(\text{O})=0.00306 4$
									$\alpha(\text{P})=0.000456 6$ ; $\alpha(\text{Q})=5.74\times 10^{-6} 8$ ; B(E2)(W.u.)=0.0150 5
3771.4	13 <sup>-</sup>	1088.2	100	2683.2	11 <sup>-</sup>	E2		0.00766 11	$\alpha(\text{K})=0.00598 8$ ; $\alpha(\text{L})=0.001271 18$ ; $\alpha(\text{M})=0.000309 4$ ; $\alpha(\text{N})=8.14\times 10^{-5} 11$ ; $\alpha(\text{O})=1.832\times 10^{-5} 26$ ; $\alpha(\text{P})=3.10\times 10^{-6} 4$ ; $\alpha(\text{Q})=2.018\times 10^{-7} 28$
3850.1	14 <sup>+</sup>	371.7	100	3478.4	14 <sup>+</sup>	M1		0.395 6	$\alpha(\text{K})=0.318 4$ ; $\alpha(\text{L})=0.0581 8$ ; $\alpha(\text{M})=0.01386 19$ ; $\alpha(\text{N})=0.00365 5$ ; $\alpha(\text{O})=0.000834 12$
									$\alpha(\text{P})=0.0001454 20$ ; $\alpha(\text{Q})=1.140\times 10^{-5} 16$
3990.1	15 <sup>-</sup>	140.0	100.0 14	3850.1	14 <sup>+</sup>	D		0.2129 30	$\alpha(\text{K})=0.1673 23$ ; $\alpha(\text{L})=0.0346 5$ ; $\alpha(\text{M})=0.00831 12$ ; $\alpha(\text{N})=0.002166 30$ ; $\alpha(\text{O})=0.000477 7$
									$\alpha(\text{P})=7.64\times 10^{-5} 11$ ; $\alpha(\text{Q})=4.18\times 10^{-6} 6$ ; B(E1)(W.u.)=1.27 $\times 10^{-5}$ 8
		218.7	20.3 14	3771.4	13 <sup>-</sup>	E2		0.426 6	$\alpha(\text{K})=0.1357 19$ ; $\alpha(\text{L})=0.2137 30$ ; $\alpha(\text{M})=0.0575 8$ ; $\alpha(\text{N})=0.01519 21$ ; $\alpha(\text{O})=0.00326 5$
									$\alpha(\text{P})=0.000486 7$ ; $\alpha(\text{Q})=5.97\times 10^{-6} 8$ ; B(E2)(W.u.)=0.56 5
4146.8	17 <sup>-</sup>	156.6	9.3 6	3990.1	15 <sup>-</sup>	E2		1.476 21	$\alpha(\text{K})=0.2468 35$ ; $\alpha(\text{L})=0.903 13$ ; $\alpha(\text{M})=0.2451 34$ ; $\alpha(\text{N})=0.0648 9$ ; $\alpha(\text{O})=0.01382 19$
									$\alpha(\text{P})=0.002027 28$ ; $\alpha(\text{Q})=1.414\times 10^{-5} 20$ ; B(E2)(W.u.)=0.0253 17
		668.4	100.0 13	3478.4	14 <sup>+</sup>	E3		0.0591 8	$\alpha(\text{K})=0.0343 5$ ; $\alpha(\text{L})=0.01837 26$ ; $\alpha(\text{M})=0.00483 7$ ; $\alpha(\text{N})=0.001280 18$ ; $\alpha(\text{O})=0.000282 4$
									$\alpha(\text{P})=4.49\times 10^{-5} 6$ ; $\alpha(\text{Q})=1.646\times 10^{-6} 23$ ; B(E3)(W.u.)=25.8 7
4170.1	15 <sup>-</sup>	691.7	100	3478.4	14 <sup>+</sup>	E1		0.00626 9	$\alpha(\text{K})=0.00513 7$ ; $\alpha(\text{L})=0.000854 12$ ; $\alpha(\text{M})=0.0002014 28$ ; $\alpha(\text{N})=5.28\times 10^{-5} 7$ ; $\alpha(\text{O})=1.195\times 10^{-5} 17$ ; $\alpha(\text{P})=2.048\times 10^{-6} 29$ ; $\alpha(\text{Q})=1.506\times 10^{-7} 21$
4237.2	16 <sup>+</sup>	758.8	100	3478.4	14 <sup>+</sup>	E2		0.01552 22	$\alpha(\text{K})=0.01147 16$ ; $\alpha(\text{L})=0.00304 4$ ; $\alpha(\text{M})=0.000756 11$ ; $\alpha(\text{N})=0.0001992 28$ ; $\alpha(\text{O})=4.44\times 10^{-5} 6$ ; $\alpha(\text{P})=7.33\times 10^{-6} 10$ ; $\alpha(\text{Q})=4.00\times 10^{-7} 6$

## Adopted Levels, Gammas (continued)

$\gamma(^{214}\text{Ra})$ (continued)									
$E_i(\text{level})$	$J_i^\pi$	$E_\gamma^\dagger$	$I_\gamma^\dagger$	$E_f$	$J_f^\pi$	Mult. $^\dagger$	$\delta^\dagger$	$\alpha$	Comments
4376.8	(16 <sup>-</sup> )	206.7	100	4170.1	15 <sup>-</sup>	(M1)		1.994 28	$\alpha(\text{K})=1.604\ 22$ ; $\alpha(\text{L})=0.296\ 4$ ; $\alpha(\text{M})=0.0708\ 10$ ; $\alpha(\text{N})=0.01867\ 26$ ; $\alpha(\text{O})=0.00426\ 6$
4401.5	17 <sup>-</sup>	(24.7) 254.7		4376.8 (16 <sup>-</sup> ) 4146.8 17 <sup>-</sup>		M1+E2	0.36 21	1.02 11	$\alpha(\text{P})=0.000742\ 10$ ; $\alpha(\text{Q})=5.82\times 10^{-5}\ 8$ $E_\gamma$ : not observed; deduced from coincidence data (1992St09). $\alpha(\text{K})=0.81\ 10$ ; $\alpha(\text{L})=0.159\ 7$ ; $\alpha(\text{M})=0.0384\ 13$ ; $\alpha(\text{N})=0.01013\ 33$ ; $\alpha(\text{O})=0.00230\ 9$
4618.3	16 <sup>+</sup>	768.2	100	3850.1	14 <sup>+</sup>	E2		0.01513 21	$\alpha(\text{P})=0.000396\ 21$ ; $\alpha(\text{Q})=2.9\times 10^{-5}\ 4$ $\alpha(\text{K})=0.01122\ 16$ ; $\alpha(\text{L})=0.00294\ 4$ ; $\alpha(\text{M})=0.000731\ 10$ ; $\alpha(\text{N})=0.0001928\ 27$ $\alpha(\text{O})=4.30\times 10^{-5}\ 6$ ; $\alpha(\text{P})=7.10\times 10^{-6}\ 10$ ; $\alpha(\text{Q})=3.91\times 10^{-7}\ 5$
4810.2	18 <sup>+</sup>	191.9	11 4	4618.3	16 <sup>+</sup>	[E2]		0.680 10	$\alpha(\text{K})=0.1749\ 24$ ; $\alpha(\text{L})=0.372\ 5$ ; $\alpha(\text{M})=0.1004\ 14$ ; $\alpha(\text{N})=0.0265\ 4$ ; $\alpha(\text{O})=0.00568\ 8$
		408.7	64 4	4401.5	17 <sup>-</sup>	E1		0.01790 25	$\alpha(\text{P})=0.000841\ 12$ ; $\alpha(\text{Q})=8.27\times 10^{-6}\ 12$ B(E2)(W.u.)=2.1 9 $\alpha(\text{K})=0.01453\ 20$ ; $\alpha(\text{L})=0.00256\ 4$ ; $\alpha(\text{M})=0.000607\ 8$ ; $\alpha(\text{N})=0.0001589\ 22$ ; $\alpha(\text{O})=3.57\times 10^{-5}\ 5$ $\alpha(\text{P})=6.03\times 10^{-6}\ 8$ ; $\alpha(\text{Q})=4.12\times 10^{-7}\ 6$ B(E1)(W.u.)=1.2 $\times 10^{-6}$ 4
		573.0	17 4	4237.2	16 <sup>+</sup>	[E2]		0.0282 4	$\alpha(\text{K})=0.01940\ 27$ ; $\alpha(\text{L})=0.00661\ 9$ ; $\alpha(\text{M})=0.001681\ 24$ ; $\alpha(\text{N})=0.000444\ 6$ ; $\alpha(\text{O})=9.79\times 10^{-5}\ 14$ $\alpha(\text{P})=1.578\times 10^{-5}\ 22$ ; $\alpha(\text{Q})=6.98\times 10^{-7}\ 10$ B(E2)(W.u.)=0.013 5
		663.4	100 6	4146.8	17 <sup>-</sup>	E1		0.00677 9	$\alpha(\text{K})=0.00555\ 8$ ; $\alpha(\text{L})=0.000928\ 13$ ; $\alpha(\text{M})=0.0002188\ 31$ ; $\alpha(\text{N})=5.74\times 10^{-5}\ 8$ $\alpha(\text{O})=1.297\times 10^{-5}\ 18$ ; $\alpha(\text{P})=2.221\times 10^{-6}\ 31$ ; $\alpha(\text{Q})=1.626\times 10^{-7}\ 23$ B(E1)(W.u.)=4.2 $\times 10^{-7}$ 12
4921.9	19 <sup>-</sup>	775.1	100	4146.8	17 <sup>-</sup>	E2		0.01486 21	$\alpha(\text{K})=0.01104\ 15$ ; $\alpha(\text{L})=0.00287\ 4$ ; $\alpha(\text{M})=0.0007141\ 99$ ; $\alpha(\text{N})=0.0001882\ 26$ $\alpha(\text{O})=4.20\times 10^{-5}\ 6$ ; $\alpha(\text{P})=6.94\times 10^{-6}\ 10$ ; $\alpha(\text{Q})=3.84\times 10^{-7}\ 5$
4930.9	17 <sup>-</sup>	760.8	100	4170.1	15 <sup>-</sup>	E2		0.01543 22	$\alpha(\text{K})=0.01142\ 16$ ; $\alpha(\text{L})=0.00302\ 4$ ; $\alpha(\text{M})=0.000750\ 11$ ; $\alpha(\text{N})=0.0001978\ 28$ $\alpha(\text{O})=4.41\times 10^{-5}\ 6$ ; $\alpha(\text{P})=7.28\times 10^{-6}\ 10$ ; $\alpha(\text{Q})=3.98\times 10^{-7}\ 6$
4984.4	18 <sup>-</sup>	582.9	100	4401.5	17 <sup>-</sup>	M1		0.1178 16	$\alpha(\text{K})=0.0952\ 13$ ; $\alpha(\text{L})=0.01719\ 24$ ; $\alpha(\text{M})=0.00409\ 6$ ; $\alpha(\text{N})=0.001079\ 15$ $\alpha(\text{O})=0.0002462\ 34$ ; $\alpha(\text{P})=4.30\times 10^{-5}\ 6$ ; $\alpha(\text{Q})=3.38\times 10^{-5}\ 5$
5180.4	19 <sup>-</sup>	258.6	2 1	4921.9	19 <sup>-</sup>	[M1+E2]		0.7 4	$\alpha(\text{K})=0.5\ 4$ ; $\alpha(\text{L})=0.133\ 25$ ; $\alpha(\text{M})=0.033\ 5$ ; $\alpha(\text{N})=0.0088\ 12$ ; $\alpha(\text{O})=0.00195\ 32$ $\alpha(\text{P})=0.00032\ 8$ ; $\alpha(\text{Q})=1.8\times 10^{-5}\ 14$
		370.2	66 1	4810.2	18 <sup>+</sup>	E1		0.02212 31	$\alpha(\text{K})=0.01792\ 25$ ; $\alpha(\text{L})=0.00319\ 4$ ; $\alpha(\text{M})=0.000758\ 11$ ; $\alpha(\text{N})=0.0001983\ 28$ $\alpha(\text{O})=4.45\times 10^{-5}\ 6$ ; $\alpha(\text{P})=7.49\times 10^{-6}\ 10$ ; $\alpha(\text{Q})=5.03\times 10^{-7}\ 7$
		778.9	100 3	4401.5	17 <sup>-</sup>	E2		0.01471 21	$\alpha(\text{K})=0.01094\ 15$ ; $\alpha(\text{L})=0.00284\ 4$ ; $\alpha(\text{M})=0.000705\ 10$ ; $\alpha(\text{N})=0.0001858\ 26$ $\alpha(\text{O})=4.14\times 10^{-5}\ 6$ ; $\alpha(\text{P})=6.85\times 10^{-6}\ 10$ ; $\alpha(\text{Q})=3.80\times 10^{-7}\ 5$

**Adopted Levels, Gammas (continued)**

$\gamma(^{214}\text{Ra})$  (continued)

$E_i(\text{level})$	$J_i^\pi$	$E_\gamma^\dagger$	$I_\gamma^\dagger$	$E_f$	$J_f^\pi$	Mult. <sup>†</sup>	$\delta^\dagger$	$\alpha$	Comments
5243.8	20 <sup>+</sup>	63.4	4.3 3	5180.4	19 <sup>-</sup>	[E1]		0.371 5	$\alpha(\text{L})=0.281\ 4$ ; $\alpha(\text{M})=0.0683\ 10$ ; $\alpha(\text{N})=0.01767\ 25$ ; $\alpha(\text{O})=0.00378\ 5$ ; $\alpha(\text{P})=0.000565\ 8$ $\alpha(\text{Q})=2.428\times 10^{-5}\ 34$
		321.9	100 2	4921.9	19 <sup>-</sup>	E1		0.0300 4	$\alpha(\text{K})=0.02426\ 34$ ; $\alpha(\text{L})=0.00439\ 6$ ; $\alpha(\text{M})=0.001045\ 15$ ; $\alpha(\text{N})=0.000274\ 4$ ; $\alpha(\text{O})=6.12\times 10^{-5}\ 9$ $\alpha(\text{P})=1.025\times 10^{-5}\ 14$ ; $\alpha(\text{Q})=6.72\times 10^{-7}\ 9$
5390.3	21 <sup>-</sup>	146.5	32 3	5243.8	20 <sup>+</sup>	E1		0.1908 27	$\alpha(\text{K})=0.1502\ 21$ ; $\alpha(\text{L})=0.0308\ 4$ ; $\alpha(\text{M})=0.00739\ 10$ ; $\alpha(\text{N})=0.001925\ 27$ ; $\alpha(\text{O})=0.000424\ 6$ $\alpha(\text{P})=6.82\times 10^{-5}\ 10$ ; $\alpha(\text{Q})=3.77\times 10^{-6}\ 5$ B(E1)(W.u.)= $6.8\times 10^{-6}\ 15$
		209.9	100 3	5180.4	19 <sup>-</sup>	E2		0.492 7	$\alpha(\text{K})=0.1472\ 21$ ; $\alpha(\text{L})=0.254\ 4$ ; $\alpha(\text{M})=0.0684\ 10$ ; $\alpha(\text{N})=0.01808\ 25$ ; $\alpha(\text{O})=0.00388\ 5$ $\alpha(\text{P})=0.000576\ 8$ ; $\alpha(\text{Q})=6.60\times 10^{-6}\ 9$ B(E2)(W.u.)= $6.5\ 14$
5461.8	(20) <sup>-</sup>	540.0	100	4921.9	19 <sup>-</sup>	(M1)		0.1444 20	$\alpha(\text{K})=0.1166\ 16$ ; $\alpha(\text{L})=0.02110\ 30$ ; $\alpha(\text{M})=0.00503\ 7$ ; $\alpha(\text{N})=0.001325\ 19$ ; $\alpha(\text{O})=0.000302\ 4$ $\alpha(\text{P})=5.27\times 10^{-5}\ 7$ ; $\alpha(\text{Q})=4.14\times 10^{-6}\ 6$
5948.1	(21) <sup>-</sup>	486.3 557.8	60 10 100 10	5461.8 5390.3	(20) <sup>-</sup> 21 <sup>-</sup>	M1		0.1324 19	$\alpha(\text{K})=0.1070\ 15$ ; $\alpha(\text{L})=0.01934\ 27$ ; $\alpha(\text{M})=0.00461\ 6$ ; $\alpha(\text{N})=0.001214\ 17$ ; $\alpha(\text{O})=0.000277\ 4$ $\alpha(\text{P})=4.83\times 10^{-5}\ 7$ ; $\alpha(\text{Q})=3.80\times 10^{-6}\ 5$
6030.1	22 <sup>-</sup>	639.8	100	5390.3	21 <sup>-</sup>	M1		0.0920 13	$\alpha(\text{K})=0.0744\ 10$ ; $\alpha(\text{L})=0.01340\ 19$ ; $\alpha(\text{M})=0.00319\ 4$ ; $\alpha(\text{N})=0.000841\ 12$ $\alpha(\text{O})=0.0001919\ 27$ ; $\alpha(\text{P})=3.35\times 10^{-5}\ 5$ ; $\alpha(\text{Q})=2.63\times 10^{-6}\ 4$
6056.6	22 <sup>+</sup>	666.3	100 10	5390.3	21 <sup>-</sup>	E1		0.00672 9	$\alpha(\text{K})=0.00551\ 8$ ; $\alpha(\text{L})=0.000920\ 13$ ; $\alpha(\text{M})=0.0002169\ 30$ ; $\alpha(\text{N})=5.69\times 10^{-5}\ 8$ $\alpha(\text{O})=1.286\times 10^{-5}\ 18$ ; $\alpha(\text{P})=2.202\times 10^{-6}\ 31$ ; $\alpha(\text{Q})=1.613\times 10^{-7}\ 23$
		812.8	30 2	5243.8	20 <sup>+</sup>	E2		0.01350 19	$\alpha(\text{K})=0.01012\ 14$ ; $\alpha(\text{L})=0.00255\ 4$ ; $\alpha(\text{M})=0.000631\ 9$ ; $\alpha(\text{N})=0.0001662\ 23$ ; $\alpha(\text{O})=3.71\times 10^{-5}\ 5$ $\alpha(\text{P})=6.16\times 10^{-6}\ 9$ ; $\alpha(\text{Q})=3.50\times 10^{-7}\ 5$
6117.8	(21,22)	727.5	100	5390.3	21 <sup>-</sup>				
6290.0	22 <sup>+</sup>	233.4	100 5	6056.6	22 <sup>+</sup>	M1(+E2)	<6	0.9 5	$\alpha(\text{K})=0.6\ 5$ ; $\alpha(\text{L})=0.188\ 23$ ; $\alpha(\text{M})=0.0471\ 32$ ; $\alpha(\text{N})=0.0124\ 8$ ; $\alpha(\text{O})=0.00276\ 27$ $\alpha(\text{P})=0.00045\ 8$ ; $\alpha(\text{Q})=2.4\times 10^{-5}\ 18$
		899.7	18 3	5390.3	21 <sup>-</sup>	[E1]		0.00385 5	$\alpha(\text{K})=0.00317\ 4$ ; $\alpha(\text{L})=0.000517\ 7$ ; $\alpha(\text{M})=0.0001215\ 17$ ; $\alpha(\text{N})=3.19\times 10^{-5}\ 4$ ; $\alpha(\text{O})=7.23\times 10^{-6}\ 10$ $\alpha(\text{P})=1.247\times 10^{-6}\ 17$ ; $\alpha(\text{Q})=9.43\times 10^{-8}\ 13$
6305.0	(22)	248.4	100	6056.6	22 <sup>+</sup>				
6479.2	(22)	174.2	100	6305.0	(22)				
6482.1	23 <sup>+</sup>	192.1	100	6290.0	22 <sup>+</sup>	M1		2.450 34	$\alpha(\text{K})=1.969\ 28$ ; $\alpha(\text{L})=0.364\ 5$ ; $\alpha(\text{M})=0.0870\ 12$ ; $\alpha(\text{N})=0.02295\ 32$ ;

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## Adopted Levels, Gammas (continued)

 $\gamma(^{214}\text{Ra})$  (continued)

$E_i(\text{level})$	$J_i^\pi$	$E_\gamma^\dagger$	$I_\gamma^\dagger$	$E_f$	$J_f^\pi$	Mult. $^\ddagger$	$\alpha$	Comments
								$\alpha(\text{O})=0.00524$ 7 $\alpha(\text{P})=0.000913$ 13; $\alpha(\text{Q})=7.15\times 10^{-5}$ 10 $E_\gamma$ : not observed; deduced from coincidence data (1992St09).
6530.2	(24 <sup>+</sup> )	(48.1)		6482.1	23 <sup>+</sup>			
		240.2	100	6290.0	22 <sup>+</sup>			
6565.0	(23,24) <sup>+</sup>	82.9	100	6482.1	23 <sup>+</sup>	M1	5.36 8	$\alpha(\text{L})=4.06$ 6; $\alpha(\text{M})=0.971$ 14; $\alpha(\text{N})=0.256$ 4; $\alpha(\text{O})=0.0585$ 8; $\alpha(\text{P})=0.01019$ 14 $\alpha(\text{Q})=0.000801$ 11
6577.0	(25 <sup>-</sup> )	46.8	100	6530.2	(24 <sup>+</sup> )	E1	0.835 12	$\alpha(\text{L})=0.631$ 9; $\alpha(\text{M})=0.1548$ 22; $\alpha(\text{N})=0.0399$ 6; $\alpha(\text{O})=0.00841$ 12; $\alpha(\text{P})=0.001207$ 17 $\alpha(\text{Q})=4.64\times 10^{-5}$ 7 $\text{B}(\text{E}1)(\text{W.u.})=7.9\times 10^{-6}$ 6
6612.6	23 <sup>-</sup>	582.6	30	6030.1	22 <sup>-</sup>	[M1]	0.1180 17	$\alpha(\text{K})=0.0953$ 13; $\alpha(\text{L})=0.01721$ 24; $\alpha(\text{M})=0.00410$ 6; $\alpha(\text{N})=0.001080$ 15 $\alpha(\text{O})=0.0002465$ 35; $\alpha(\text{P})=4.30\times 10^{-5}$ 6; $\alpha(\text{Q})=3.38\times 10^{-6}$ 5
		1222.3	100	5390.3	21 <sup>-</sup>	E2	0.00616 9	$\alpha(\text{K})=0.00486$ 7; $\alpha(\text{L})=0.000982$ 14; $\alpha(\text{M})=0.0002376$ 33; $\alpha(\text{N})=6.26\times 10^{-5}$ 9 $\alpha(\text{O})=1.411\times 10^{-5}$ 20; $\alpha(\text{P})=2.400\times 10^{-6}$ 34; $\alpha(\text{Q})=1.627\times 10^{-7}$ 23
6660.4		603.8	100	6056.6	22 <sup>+</sup>			
6765.7	(22 <sup>+</sup> ,23 <sup>+</sup> )	475.7 <sup>‡</sup>	100 <sup>‡</sup>	6290.0	22 <sup>+</sup>	(M1)	0.2027 28	$\alpha(\text{K})=0.1635$ 23; $\alpha(\text{L})=0.0297$ 4; $\alpha(\text{M})=0.00708$ 10; $\alpha(\text{N})=0.001866$ 26; $\alpha(\text{O})=0.000426$ 6 $\alpha(\text{P})=7.43\times 10^{-5}$ 10; $\alpha(\text{Q})=5.83\times 10^{-6}$ 8
6929.5	(24 <sup>+</sup> ,25 <sup>+</sup> )	364.4	100	6565.0	(23,24) <sup>+</sup>	(M1+E2)	0.25 16	$\alpha(\text{K})=0.19$ 14; $\alpha(\text{L})=0.045$ 16; $\alpha(\text{M})=0.0111$ 35; $\alpha(\text{N})=0.0029$ 9; $\alpha(\text{O})=6.6\times 10^{-4}$ 22 $\alpha(\text{P})=1.1\times 10^{-4}$ 4; $\alpha(\text{Q})=7.E-6$ 5
6936.7		324.1	100	6612.6	23 <sup>-</sup>			
7016		438.6	100	6577.0	(25 <sup>-</sup> )			
7118	(25 <sup>-</sup> ,26 <sup>-</sup> )	540.7	100	6577.0	(25 <sup>-</sup> )	(M1)	0.1439 20	$\alpha(\text{K})=0.1162$ 16; $\alpha(\text{L})=0.02103$ 29; $\alpha(\text{M})=0.00501$ 7; $\alpha(\text{N})=0.001320$ 18; $\alpha(\text{O})=0.000301$ 4 $\alpha(\text{P})=5.26\times 10^{-5}$ 7; $\alpha(\text{Q})=4.13\times 10^{-6}$ 6
7243		665.9	100	6577.0	(25 <sup>-</sup> )			
7301.8		365.1	100	6936.7		(M1+E2)	0.25 16	$\alpha(\text{K})=0.19$ 14; $\alpha(\text{L})=0.045$ 16; $\alpha(\text{M})=0.0111$ 35; $\alpha(\text{N})=0.0029$ 9; $\alpha(\text{O})=6.6\times 10^{-4}$ 22 $\alpha(\text{P})=1.1\times 10^{-4}$ 4; $\alpha(\text{Q})=7.E-6$ 5
7394.3		464.8	100	6929.5	(24 <sup>+</sup> ,25 <sup>+</sup> )			
7542		240.1	100	7301.8				
7870.0	(24)	475.7 <sup>‡</sup>	14 <sup>‡</sup>	7394.3				
		1304.9	57	6565.0	(23,24) <sup>+</sup>	D		Mult.: $\alpha(\text{K})_{\text{exp}}=0.018$ 7 (1992St09) could be M1 or E1.
		1387.9	100	6482.1	23 <sup>+</sup>	D		Mult.: $\alpha(\text{K})_{\text{exp}}=0.012$ 4 (1992St09) could be M1 or E1.

<sup>†</sup> From (HL,xny) (1992St09) unless otherwise noted.

<sup>‡</sup> Multiply placed with intensity suitably divided.

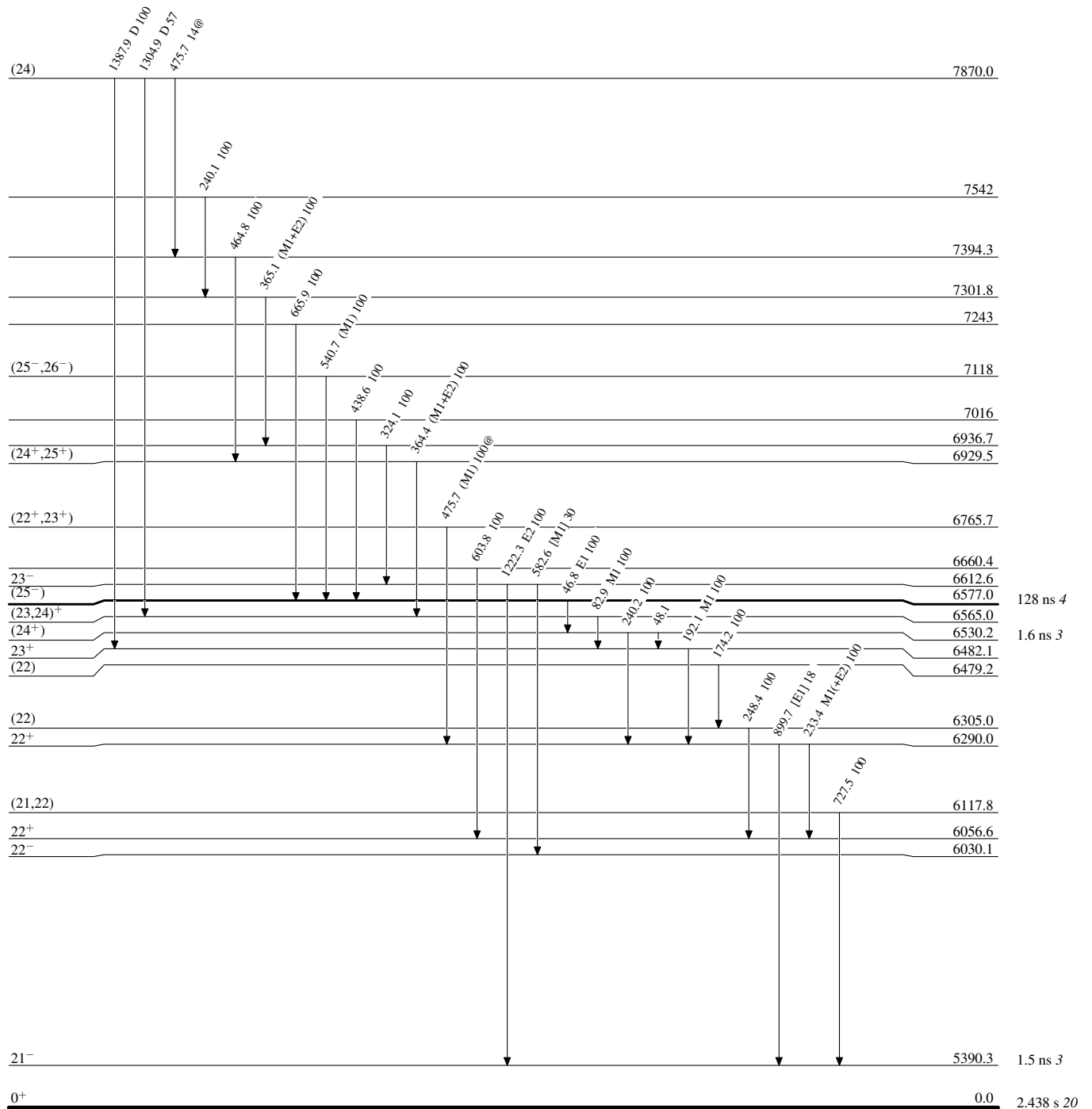


**Adopted Levels, Gammas**

Legend

**Level Scheme**

Intensities: Relative photon branching from each level  
 @ Multiply placed: intensity suitably divided

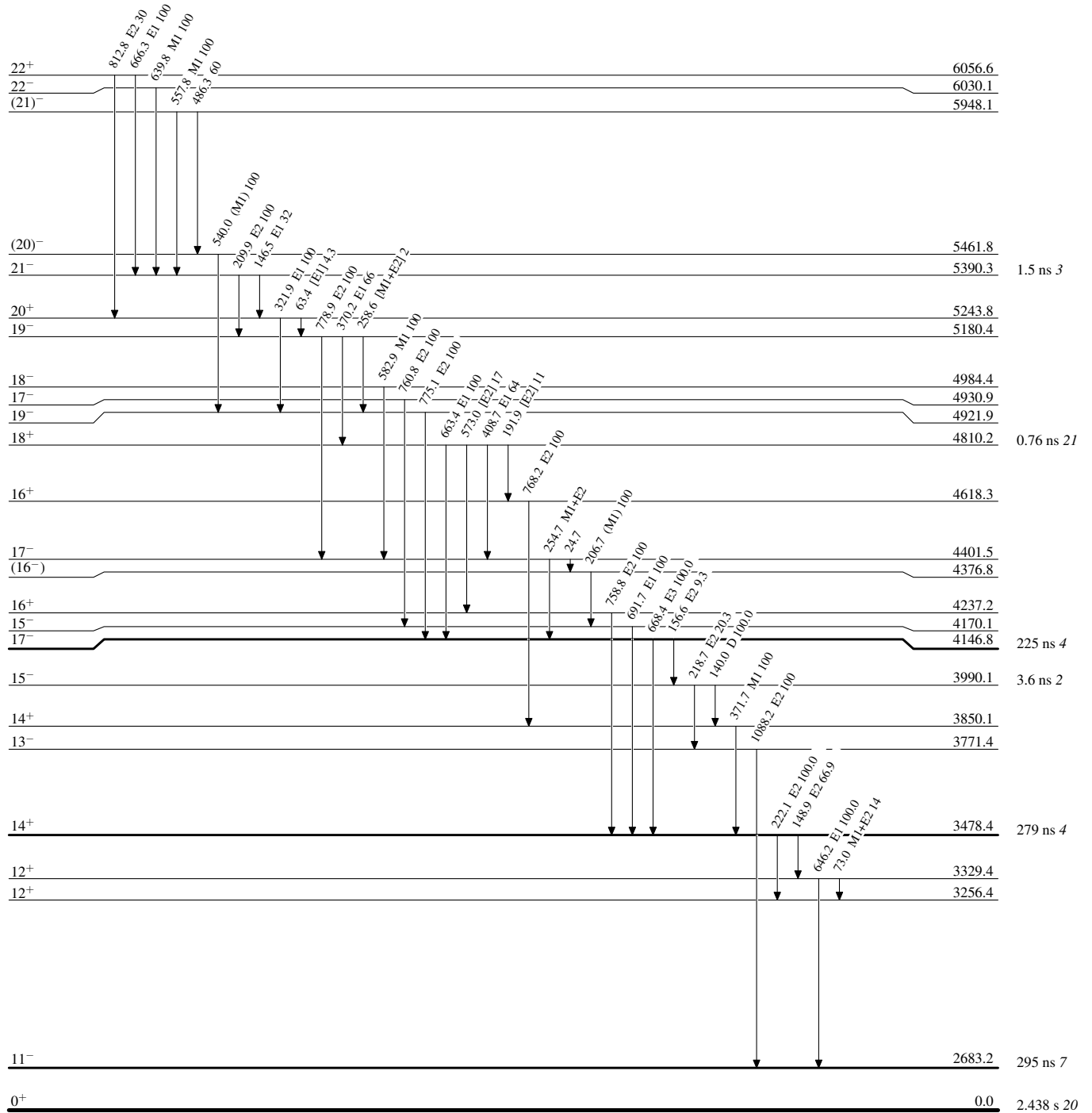
-----▶  $\gamma$  Decay (Uncertain) $^{214}_{88}\text{Ra}_{126}$

Adopted Levels, Gammas

Legend

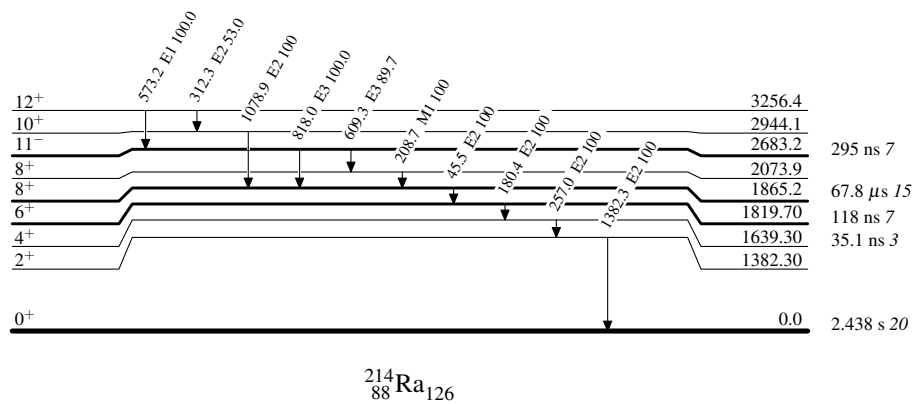
Level Scheme (continued)

Intensities: Relative photon branching from each level  
 @ Multiply placed: intensity suitably divided

-----►  $\gamma$  Decay (Uncertain)

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

Intensities: Relative photon branching from each level  
@ Multiply placed: intensity suitably divided

 $^{214}_{88}\text{Ra}_{126}$