

Adopted Levels, Gammas

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	B. Singh, S. Singh, H. X. Nguyen, M. Patial		NDS 114, 661 (2013)	28-Feb-2013

$Q(\beta^-) = -2892.7$; $S(n) = 7746.8$; $S(p) = 2983.1$; 25 ; $Q(\alpha) = 5982.4$; 13 [2012Wa38](#)
 $S(2n) = 14907.6$, $S(2p) = 7966.6$; 24 ([2012Wa38](#)).

^{211}At evaluated by **B. Singh, S. Singh, H.X. Nguyen, M. Patial**.

Nuclear structure calculations, and systematics:

Configurations: [2003Ca21](#), [2003By04](#), [1999Co30](#), [1991Wa22](#), [1985Be22](#), [1985Zw01](#), [1984Ci02](#), [1983Is09](#).

Additional information 1.

Intruder states: [1988Ar12](#).

Yrast levels: [1978Ma38](#).

Nuclear moments: [1988Sa08](#), [1977To04](#), [1974Is08](#).

Quadrupole-octupole deformation of g.s.: [1987Sh24](#).

B(E3) systematics: [1985Be05](#).

α decay probabilities: [1973Ma52](#).

Charged particle emission: [1986Pi11](#), [1984Po26](#).

Other reaction:

$^{209}\text{Bi}(^6\text{He}, 4n)$: [2002Pe03](#), [2000Pe16](#), [1998De50](#), [1994PuZZ](#).

 ^{211}At Levels

Configuration assignments are based on semi-empirical shell model calculations, which reproduced very well the energies of the yrast states (see [2001Ba79](#) for details).

Cross Reference (XREF) Flags

A	^{211}At IT decay (4.23 μs)	F	^{215}Fr α decay:prompt:1440 keV
B	^{211}Rn ε decay (14.6 h)	G	^{215}Fr α decay:prompt:1573 keV
C	^{215}Fr α decay (86 ns)	H	$^{208}\text{Pb}(^7\text{Li}, 4n\gamma)$
D	^{215}Fr α decay:prompt:835 keV	I	$^{209}\text{Bi}(\alpha, 2n\gamma)$
E	^{215}Fr α decay:prompt:1121 keV		

E(level) [†]	J ^π	T _{1/2} [‡]	XREF	Comments
0.0 [@]	9/2 ⁻	7.214 h 7	ABCDEFGH	$\% \alpha = 41.80$ 8; $\% \varepsilon = 58.20$ 8 J ^π : spin from atomic beam (1958Ga16); parity from favored α transition (HF=1.54) from ^{211}At g.s. to 9/2 ⁻ ^{207}Bi g.s. T _{1/2} : from 1961Ap01 (quoted uncertainty is at the 95% confidence level). Others: 7.23 h 2 (1978Ya04), 7.17 h 9 (1962Th08), 7.23 h 4 (1959Ra08), 7.20 h 5 (1956Gr11). $\% \alpha$: weighted average of 41.94 16 (1985La17), 41.74 10 (1978Ya04), 41.8 2 (1969Go23). Others: 41.9 5 (1975Ja04), 40.9 5 (1951Ne02). J ^π : E1→E2 cascade from (1/2) ⁺ ; (M1+E2) γ to 9/2 ⁻ and $\gamma\gamma(\theta)$ in ^{211}Rn ε . J ^π : E1,E2 cascade from (1/2) ⁺ ; M1(+E2) γ to (7/2) ⁻ and $\gamma\gamma(\theta)$ in ^{211}Rn ε . J ^π : E2+M1 γ from (3/2) ⁻ ; (E2) γ to 9/2 ⁻ and $\gamma\gamma(\theta)$ in ^{211}Rn ε . J ^π : (E2) γ to 9/2 ⁻ level. J ^π : E1 γ from (1/2) ⁺ ; E2,M1+E2 sequence to 9/2 ⁻ and $\gamma\gamma(\theta)$ in ^{211}Rn ε . T _{1/2} : from (ce(K))(γ)(t) (1972As12 , ^{211}Rn ε decay).
674.11 7	(7/2) ⁻		B HI	
865.99 7	(7/2) ⁻		B HI	
947.44 7	(5/2) ⁻		B HI	
1066.83 [@] 15	(13/2) ⁻	≤0.14 ns	A HI	
1116.21 8	(3/2) ⁻	0.57 ns 4	B HI	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) ^{211}At Levels (continued)

E(level) [†]	J ^π	T _{1/2} [‡]	XREF	Comments
1123.24 [@] 16	(11/2) ⁻		HI	J ^π : γ to 9/2 ⁻ g.s.; E2 γ from (15/2 ⁻).
1270.09 [@] 17	(15/2) ⁻	12.1 ns 15	HI	g=0.91 8 (1975McZO). J ^π : E2 γ to (13/2) ⁻ level; expected configuration suggests π=-. T _{1/2} : weighted average of 9.7 ns 28 (1995Ba66), 11.1 ns 28 (1975McZO), 13.0 ns 15 (1970Be37,1972As04). g: from $^{208}\text{Pb}(^7\text{Li},4n\gamma)$ reaction.
1320.28 [@] 21	(17/2) ⁻	≤0.07 ns	A HI	J ^π : stretched E2 γ to (13/2) ⁻ level.
1354.94 15	(13/2) ⁺		HI	J ^π : E1 gammas to (11/2) ⁻ and (13/2) ⁻ .
1416.27 [@] 25	(21/2) ⁻	35.1 ns 7	A HI	μ=+9.56 9 (1976Ha62,1989Ra17,2011StZZ) Q=0.53 5 (1990Ha30,2011StZZ) J ^π : stretched E2 γ to (17/2) ⁻ level. T _{1/2} : from γγ(t) (1995Ba66). Others: 50 ns 5 (1970Be37,1972As04), 34 ns 5 (1975McZO,1976Ha62). μ: TDPAD method, for J=21/2 and g-factor=0.910 9 (weighted average of measurements by 1976Ha62 and 1975In01). Q: level mixing resonance technique (1990Ha30). Q=0.524 10 from B(E2) deduced from T _{1/2} =35.1 ns 7 (1995Ba66). Negative sign is suggested by 1995Ba66 from shell-model predictions.
1800.80 8	(3/2) ⁻		B	J ^π : M1 γ from 1/2 ⁻ ,3/2 ⁻ level; (E2) γ to (7/2) ⁻ and γγ(θ) in ^{211}Rn ε.
1912.1 3			H	
1919.12 25			H	
1927.4 ^{&} 3	(23/2) ⁻ #	≤0.21 ns	A HI	J ^π : M1 γ to (21/2) ⁻ level.
1946.23 22			H	
1992.57 9	(5/2) ⁻		B	J ^π : M1 γ from (3/2) ⁻ ; γ to 9/2 ⁻ g.s.
2062.87 9	1/2 ⁻ ,3/2 ⁻		B	J ^π : E1 γ from (1/2) ⁺ level.
2108.72 10	(3/2) ⁻		B	J ^π : E1 γ from (1/2) ⁺ level; γ to (7/2) ⁻ level.
2128.71 9	(5/2) ⁻		B	J ^π : (M2) γ from (1/2) ⁺ level. (5/2 ⁻) is inconsistent with log ft=8.15 from 1/2 ⁻ parent state.
2139.6 3	(21/2) ⁻		H	J ^π : 212γ M1 to (23/2) ⁻ ; M1 γ between 2139.6 and 2284.6 levels.
2169.3 3			H	
2189.4 6			H	
2222.6 4			H	
2241.0 6			H	
2244.1 6			H	
2284.6 3	(19/2) ⁻		H	J ^π : gammas to (15/2) ⁻ and (21/2) ⁻ ; M1 γ between 2139.6 and 2284.6 levels.
2399.14 25			H	
2436.0 4			H	
2479.19 8	(1/2) ⁺		B	J ^π : log ft=5.59 from 1/2 ⁻ ; E1 ->E2 ->M1+E2 cascade to 9/2 ⁻ ; γγ(θ) in ^{211}Rn ε.
2555.4 3			H	
2581.5 4			H	
2609.4 3			H	
2616.3 ^a 4	(25/2) ⁺	≤0.28 ns	A HI	J ^π : γ to (23/2) ⁻ ; shell model indicates 25/2 ⁺ .
2636.08 24			H	
2640.7 ^a 4	(29/2) ⁺	50.8 ns 7	A HI	μ=+15.31 13 (1976Ha62,1989Ra17,2011StZZ) Q=1.00 5 (1995Ba66,2011StZZ) J ^π : E3 γ to (23/2) ⁻ level. T _{1/2} : from γ(t) ($^{208}\text{Pb}(^7\text{Li},4n\gamma)$). Others: ≈50 ns in IT decay, 70 ns 5 ($^{209}\text{Bi}(\alpha,2n\gamma)$). μ: TDPAD method, if J=29/2; g-factor measurements of 1976Ha62, 1975McZO, and 1975In01. Q: TDPAD method (1983Ma08); recalculated by 1995Ba66 from Q(1417, 21/2 ⁻)=0.524 10 and Q(21/2 ⁻)/Q(29/2 ⁺)=0.52 2. Negative sign is suggested by 1995Ba66 from shell-model predictions.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{211}At Levels (continued)					
E(level) [†]	J ^π	T _{1/2} [‡]	XREF	Comments	
2655.16 <i>10</i>	1/2,3/2		B	J ^π : log ft=6.08 from 1/2 ⁻ .	
2678.0 <i>5</i>			H		
2693.1 <i>a</i> <i>4</i>	(27/2) ⁺ #	≤0.28 ns	H		
2717.9 <i>6</i>			H		
2729.9 <i>6</i>			H		
2731.3 <i>4</i>			H		
2792.3 <i>4</i>			H		
2797.9 <i>6</i>			H		
2836.6 <i>5</i>			H		
2847.1 <i>4</i>			H		
2867.0 <i>6</i>			H		
2883.3 <i>4</i>			H		
2898.0 <i>4</i>			H		
2916.5 <i>5</i>			H		
2920.1 <i>6</i>			H		
2959.9 <i>6</i>			H		
3024.0 <i>6</i>			H		
3287.4 <i>b</i> <i>4</i>	(27/2 ⁺) #	≤0.07 ns	H		
3312.8 <i>7</i>			H		
3341.7 <i>7</i>			H		
3391.7 <i>7</i>			H		
3431.4 <i>6</i>			H		
3475.0 <i>4</i>			H		
3487.4 <i>6</i>			H		
3509.3 <i>5</i>			H		
3555.5 <i>7</i>			H		
3814.2 <i>b</i> <i>4</i>	(29/2 ⁺) #	≤0.21 ns	H		
3822.6 <i>5</i>			H		
4027.7 <i>6</i>			H		
4165.4 <i>c</i> <i>4</i>	[33/2 ⁻]		H	J ^π : assignment based on shell-model calculations.	
4175.5 <i>d</i> <i>4</i>	(31/2 ⁺)	≤0.35 ns	A	J ^π : (M1) γ to (29/2) ⁺ level; shell-model calc. (1985Be22).	
4288.9 <i>6</i>			H		
4308.3 <i>6</i>			H		
4334.5 <i>6</i>			H		
4379.3 <i>e</i> <i>5</i>	(33/2 ⁺)	≤0.28 ns	A	J ^π : M1+E2 γ to (31/2 ⁺) level; shell-model calc. (1985Be22).	
4452.1 <i>7</i>			H		
4572.1 <i>7</i>			H		
4576.2 <i>7</i>			H		
4598.7 <i>7</i>			H		
4808.6 <i>7</i>			H		
4814.5 <i>f</i> <i>5</i>	(39/2 ⁻)	4.23 μs <i>7</i>	A	%IT=100 μ=13.46 <i>14</i> (1985Be22,1989Ra17,2011StZZ) Q=1.91 <i>25</i> (1991Sc15,2011StZZ) J ^π : E3 γ to (33/2 ⁺) level; shell-model calc. (1985Be22). T _{1/2} : from 2001Ba79. Other: 4.2 μs <i>4</i> (1971Ma36). μ: TDPAD method, if J=39/2, g-factor=0.690 <i>7</i> (1985Be22). Q: level mixing resonance technique (1991Sc15,1990Ha30).	
4875.8 <i>7</i>			H		
4917.9 <i>7</i>			H		
4942.9 <i>7</i>			H		
4995.9 <i>7</i>			H		
5331.4 <i>g</i> <i>5</i>	(41/2 ⁻)		H	J ^π : M1+E2 γ to (39/2 ⁻).	
5418.4 <i>i</i> <i>5</i>	(41/2 ⁻)		H	J ^π : M1 γ to (41/2 ⁻).	
5909.8 <i>6</i>	(41/2,43/2)		H	J ^π : gammas to (41/2 ⁻) and (39/2 ⁻).	
5917.4 <i>h</i> <i>5</i>	(43/2 ⁺) #	≤0.7 ns	H	J ^π : E1 γ rays to (41/2 ⁻).	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{211}At Levels (continued)				
E(level) [†]	J ^π	T _{1/2} [‡]	XREF	Comments
5940.3 6	(41/2,43/2)		H	
6017.3 ^j 6	(45/2 ⁺) [#]	0.97 ns 14	H	J ^π : γ M1 to (43/2 ⁺).
6090.1 7			H	
6247.8 8			H	
6466.5 6	(45/2)		H	
6567.2 ^k 6	(49/2 ⁺)	50.6 ns 14	H	J ^π : E2 γ to (45/2 ⁺).
6569.1 8			H	
6600.4 6	(47/2)		H	
6649.1 8			H	
6770.9 8			H	
6866.7 8			H	
6871.1 8			H	
6990.5 8			H	
7239.2 8			H	
7346.5 8			H	
7386.2 7	(51/2)		H	
7399.0 8			H	
7496.2 8			H	
7517.4 ^k 6	(55/2 ⁻) [#]	24.3 ns 14	H	
7573.2 8			H	
7621.2 7			H	
7658.2 8			H	
7848.4 8			H	
7920.2 7			H	
7972.2 7			H	
8120.3 9			H	
8232.8 9			H	
8337.1 7			H	
8829.0 ^k 7	[59/2 ⁻]		H	
9814.8 9			H	
10016.0 10			H	

[†] From a least-squares fit to E_γ data.[‡] From γγ(t), from 1995Ba66 and 2001Ba79, unless otherwise stated.[#] Assignment based on γ-ray transition strengths in $^{211}\text{Rn}(^7\text{Li},4n\gamma)$.[@] Configuration= $\pi h_{9/2}^3$.[&] Configuration= $\pi h_{9/2}^2 \otimes \pi f_{7/2}^1$.^a Configuration= $\pi h_{9/2}^2 \otimes \pi i_{13/2}^1$.^b Configuration= $\pi h_{9/2}^1 \otimes \pi i_{13/2}^1 \otimes \pi f_{7/2}^1$.^c Configuration= $\pi h_{9/2}^1 \otimes \pi i_{13/2}^2$.^d Configuration= $\pi h_{9/2}^3 \otimes \pi g_{9/2}^1 \otimes \pi p_{1/2}^{-1}$.^e Configuration= $\pi h_{9/2}^2 \otimes \pi f_{7/2}^1 \otimes \pi p_{1/2}^{-1} \otimes \pi g_{9/2}^1$.^f Configuration= $\pi h_{9/2}^2 \otimes \pi i_{13/2}^1 \otimes \pi p_{1/2}^{-1} \otimes \pi g_{9/2}^1$.^g Configuration= $\pi h_{9/2}^2 \otimes \pi i_{13/2}^1 \otimes \pi i_{11/2}^1 \otimes \pi p_{1/2}^{-1}$.^h Configuration= $\pi h_{9/2}^1 \otimes \pi i_{13/2}^2 \otimes \pi g_{9/2}^1 \otimes \pi p_{1/2}^{-1}$.ⁱ Configuration= $\pi h_{9/2}^2 \otimes \pi i_{13/2}^1 \otimes \pi g_{9/2}^1 \otimes \pi f_{5/2}^{-1}$.^j Configuration= $\pi h_{9/2}^2 \otimes \pi i_{13/2}^1 \otimes \pi j_{15/2}^1 \otimes \pi p_{1/2}^{-1}$.^k Double-core excitation.

Adopted Levels, Gammas (continued)

$\gamma(^{211}\text{At})$									
$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult. [‡]	$\delta^{\ddagger@}$	$\alpha^{\#\&a}$	Comments
674.11	(7/2) ⁻	674.1 1	100	0.0	9/2 ⁻	(M1+E2)	-0.65 6	0.0493 19	$\alpha(\text{K})=0.0398$ 16; $\alpha(\text{L})=0.00724$ 24; $\alpha(\text{M})=0.00172$ 6 $\alpha(\text{N})=0.000445$ 15; $\alpha(\text{O})=9.5\times 10^{-5}$ 3; $\alpha(\text{P})=1.29\times 10^{-5}$ 5 δ : from $\gamma\gamma(\theta)$ in ²¹¹ Rn ε .
865.99	(7/2) ⁻	191.8 1	11.4 6	674.11	(7/2) ⁻	M1(+E2)	-0.06 18	1.90 8	$\alpha(\text{K})=1.54$ 8; $\alpha(\text{L})=0.275$ 4; $\alpha(\text{M})=0.0652$ 12 $\alpha(\text{N})=0.0169$ 3; $\alpha(\text{O})=0.00361$ 6; $\alpha(\text{P})=0.000499$ 9 I_γ : 4.4 13 in (⁷ Li,4n γ) and 7.7 in (α ,2n γ) are in disagreement. δ : from $\gamma\gamma(\theta)$ in ²¹¹ Rn ε .
		866.0 1	100 5	0.0	9/2 ⁻	(E2)		0.01025	$\alpha(\text{K})=0.00792$ 11; $\alpha(\text{L})=0.001769$ 25; $\alpha(\text{M})=0.000430$ 6 $\alpha(\text{N})=0.0001113$ 16; $\alpha(\text{O})=2.33\times 10^{-5}$ 4; $\alpha(\text{P})=3.01\times 10^{-6}$ 5
947.44	(5/2) ⁻	947.4 1	100	0.0	9/2 ⁻	(E2)		0.00859	$\alpha(\text{K})=0.00671$ 10; $\alpha(\text{L})=0.001427$ 20; $\alpha(\text{M})=0.000345$ 5
1066.83	(13/2) ⁻	1066.9 2	100	0.0	9/2 ⁻	(E2)		0.00683	$\alpha(\text{N})=8.93\times 10^{-5}$ 13; $\alpha(\text{O})=1.88\times 10^{-5}$ 3; $\alpha(\text{P})=2.44\times 10^{-6}$ 4 $\alpha(\text{K})=0.00540$ 8; $\alpha(\text{L})=0.001086$ 16; $\alpha(\text{M})=0.000261$ 4 $\alpha(\text{N})=6.75\times 10^{-5}$ 10; $\alpha(\text{O})=1.422\times 10^{-5}$ 20; $\alpha(\text{P})=1.87\times 10^{-6}$ 3 B(E2)(W.u.)>0.039
1116.21	(3/2) ⁻	168.7 1	29.2 16	947.44	(5/2) ⁻	E2+M1	-2.9 4	1.12 6	Mult.: from ce data in IT decay; $\gamma(\theta)$ (²⁰⁹ Bi(α ,2n γ)). $\alpha(\text{K})=0.44$ 7; $\alpha(\text{L})=0.499$ 8; $\alpha(\text{M})=0.1318$ 23 $\alpha(\text{N})=0.0341$ 6; $\alpha(\text{O})=0.00676$ 12; $\alpha(\text{P})=0.000720$ 11 B(M1)(W.u.)=0.00013 4; B(E2)(W.u.)=12.8 14
		250.2 1	26.1 14	865.99	(7/2) ⁻	E2		0.232	δ : $\gamma\gamma(\theta)$ in ²¹¹ Rn ε . $\alpha(\text{K})=0.1017$ 15; $\alpha(\text{L})=0.0969$ 14; $\alpha(\text{M})=0.0255$ 4 $\alpha(\text{N})=0.00660$ 10; $\alpha(\text{O})=0.001316$ 19; $\alpha(\text{P})=0.0001419$ 20 B(E2)(W.u.)=1.78 18
		442.2 1	100 6	674.11	(7/2) ⁻	E2		0.0454	Mult.: from ce data, $\gamma\gamma(\theta)$ (²¹¹ Rn ε decay). $\alpha(\text{K})=0.0295$ 5; $\alpha(\text{L})=0.01192$ 17; $\alpha(\text{M})=0.00304$ 5 $\alpha(\text{N})=0.000786$ 11; $\alpha(\text{O})=0.0001601$ 23; $\alpha(\text{P})=1.88\times 10^{-5}$ 3 B(E2)(W.u.)=0.40 4
1123.24	(11/2) ⁻	1123.2 2	100	0.0	9/2 ⁻				Mult.: from ce data, $\gamma\gamma(\theta)$ (²¹¹ Rn ε decay).
1270.09	(15/2) ⁻	146.8 2	90 5	1123.24	(11/2) ⁻	E2		1.579	$\alpha(\text{K})=0.301$ 5; $\alpha(\text{L})=0.946$ 14; $\alpha(\text{M})=0.253$ 4 $\alpha(\text{N})=0.0654$ 10; $\alpha(\text{O})=0.01287$ 18; $\alpha(\text{P})=0.001321$ 19 B(E2)(W.u.)=1.7 3
		203.3 2	100 15	1066.83	(13/2) ⁻	E2		0.468	$\alpha(\text{K})=0.1601$ 23; $\alpha(\text{L})=0.229$ 4; $\alpha(\text{M})=0.0607$ 9 $\alpha(\text{N})=0.01569$ 23; $\alpha(\text{O})=0.00311$ 5; $\alpha(\text{P})=0.000328$ 5 B(E2)(W.u.)=0.37 8
1320.28	(17/2) ⁻	253.5 2	100	1066.83	(13/2) ⁻	E2		0.223	$\alpha(\text{K})=0.0987$ 15; $\alpha(\text{L})=0.0920$ 15; $\alpha(\text{M})=0.0242$ 4 $\alpha(\text{N})=0.00626$ 11; $\alpha(\text{O})=0.001248$ 21; $\alpha(\text{P})=0.0001348$ 22 B(E2)(W.u.)>84
1354.94	(13/2) ⁺	231.7 5	20.6 11	1123.24	(11/2) ⁻	E1		0.0590	Mult.: from ce data, $\gamma(\theta)$ in IT decay; $\alpha\gamma(\theta)$ (²⁰⁹ Bi(α ,2n γ)). $\alpha(\text{K})=0.0477$ 8; $\alpha(\text{L})=0.00864$ 13; $\alpha(\text{M})=0.00204$ 3 $\alpha(\text{N})=0.000525$ 8; $\alpha(\text{O})=0.0001092$ 17; $\alpha(\text{P})=1.396\times 10^{-5}$ 21
		288.1 2	47 3	1066.83	(13/2) ⁻	E1		0.0354	$\alpha(\text{K})=0.0288$ 4; $\alpha(\text{L})=0.00508$ 8; $\alpha(\text{M})=0.001198$ 17 $\alpha(\text{N})=0.000308$ 5; $\alpha(\text{O})=6.44\times 10^{-5}$ 9; $\alpha(\text{P})=8.34\times 10^{-6}$ 12

Adopted Levels, Gammas (continued) $\gamma(^{211}\text{At})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ †	I_γ †	E_f	J_f^π	Mult. ‡	$\delta^\ddagger @$	$\alpha^{\# \& a}$	Comments
1354.94	(13/2) ⁺	1354.9 2	100 5	0.0	9/2 ⁻	[M2]		0.0242	$\alpha(\text{K})=0.0194$ 3; $\alpha(\text{L})=0.00359$ 5; $\alpha(\text{M})=0.000856$ 12 $\alpha(\text{N})=0.000222$ 4; $\alpha(\text{O})=4.75 \times 10^{-5}$ 7; $\alpha(\text{P})=6.55 \times 10^{-6}$ 10; $\alpha(\text{IPF})=1.376 \times 10^{-5}$ 20
1416.27	(21/2) ⁻	95.9 2	100	1320.28	(17/2) ⁻	E2		9.04 16	$\alpha(\text{L})=6.69$ 12; $\alpha(\text{M})=1.79$ 3 $\alpha(\text{N})=0.463$ 8; $\alpha(\text{O})=0.0907$ 16; $\alpha(\text{P})=0.00913$ 16 B(E2)(W.u.)=2.66 10 Mult.: from ce data in IT decay; intensity balance and stretched E2 from $\alpha\gamma(\theta)$ ($^{209}\text{Bi}(\alpha, 2n\gamma)$).
1800.80	(3/2) ⁻	684.7 1 853.4 1	2.6 2 20.8 10	1116.21 (3/2) ⁻ 947.44 (5/2) ⁻		(M1+E2)	-0.38 11	0.0310 17	$\alpha(\text{K})=0.0252$ 14; $\alpha(\text{L})=0.00440$ 21; $\alpha(\text{M})=0.00104$ 5 $\alpha(\text{N})=0.000269$ 13; $\alpha(\text{O})=5.7 \times 10^{-5}$ 3; $\alpha(\text{P})=7.9 \times 10^{-6}$ 4
		934.7 1	16.5 8	865.99 (7/2) ⁻		(E2)		0.00882	$\alpha(\text{K})=0.00688$ 10; $\alpha(\text{L})=0.001473$ 21; $\alpha(\text{M})=0.000357$ 5 $\alpha(\text{N})=9.22 \times 10^{-5}$ 13; $\alpha(\text{O})=1.94 \times 10^{-5}$ 3; $\alpha(\text{P})=2.52 \times 10^{-6}$ 4
		1126.7 1	100 6	674.11 (7/2) ⁻		(E2)		0.00616	$\alpha(\text{K})=0.00489$ 7; $\alpha(\text{L})=0.000962$ 14; $\alpha(\text{M})=0.000231$ 4 $\alpha(\text{N})=5.96 \times 10^{-5}$ 9; $\alpha(\text{O})=1.258 \times 10^{-5}$ 18; $\alpha(\text{P})=1.666 \times 10^{-6}$ 24; $\alpha(\text{IPF})=3.94 \times 10^{-7}$ 6
1912.1		642.0 2	100	1270.09 (15/2) ⁻					
1919.12		502.8 2 598.9 2	29.8 18 100 4	1416.27 (21/2) ⁻ 1320.28 (17/2) ⁻					
1927.4	(23/2) ⁻	511.1 2	100	1416.27 (21/2) ⁻		M1		0.1306	$\alpha(\text{K})=0.1062$ 16; $\alpha(\text{L})=0.0185$ 3; $\alpha(\text{M})=0.00438$ 7 $\alpha(\text{N})=0.001133$ 17; $\alpha(\text{O})=0.000243$ 4; $\alpha(\text{P})=3.36 \times 10^{-5}$ 5 B(M1)(W.u.)>0.00069 Mult.: from ce and $\gamma(\theta)$ in IT decay.
1946.23		626.0 2 676.1 2	91 4 100 9	1320.28 (17/2) ⁻ 1270.09 (15/2) ⁻					
1992.57	(5/2) ⁻	1044.7 4 1318.3 1 1992.7 2	12 4 25 3 100 5	947.44 (5/2) ⁻ 674.11 (7/2) ⁻ 0.0 9/2 ⁻					
2062.87	1/2 ⁻ , 3/2 ⁻	262.1 1	4.5 5	1800.80 (3/2) ⁻		M1		0.798	$\alpha(\text{K})=0.647$ 9; $\alpha(\text{L})=0.1148$ 17; $\alpha(\text{M})=0.0272$ 4 $\alpha(\text{N})=0.00703$ 10; $\alpha(\text{O})=0.001506$ 22; $\alpha(\text{P})=0.000208$ 3
		946.7 1	100 27	1116.21 (3/2) ⁻		(M1)		0.0259	$\alpha(\text{K})=0.0212$ 3; $\alpha(\text{L})=0.00363$ 5; $\alpha(\text{M})=0.000855$ 12 $\alpha(\text{N})=0.000221$ 4; $\alpha(\text{O})=4.75 \times 10^{-5}$ 7; $\alpha(\text{P})=6.57 \times 10^{-6}$ 10
2108.72	(3/2) ⁻	1115.5 ^b 3 116.0 1	1.8 9 100 10	947.44 (5/2) ⁻ 1992.57 (5/2) ⁻		M1(+E2)	<0.65	7.4 6	$\alpha(\text{K})=5.5$ 9; $\alpha(\text{L})=1.39$ 24; $\alpha(\text{M})=0.34$ 7 $\alpha(\text{N})=0.089$ 18; $\alpha(\text{O})=0.018$ 4; $\alpha(\text{P})=0.0023$ 3
		992.5 ^b	≈1500	1116.21 (3/2) ⁻					
		1242.9 2	75 15	865.99 (7/2) ⁻					
		1435.1 2	75 10	674.11 (7/2) ⁻					
2128.71	(5/2) ⁻	1012.5 1 1181.3 1 2129.0 ^b 3	14.7 13 100 6 0.31 12	1116.21 (3/2) ⁻ 947.44 (5/2) ⁻ 0.0 9/2 ⁻					

Adopted Levels, Gammas (continued)

$\gamma(^{211}\text{At})$ (continued)									
$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult. [‡]	$\delta^{\ddagger@}$	$\alpha^{\#\&a}$	Comments
2139.6	(21/2) ⁻	212.0 5	7.2 3	1927.4	(23/2) ⁻	M1		1.439 23	$\alpha(\text{K})=1.166$ 17; $\alpha(\text{L})=0.208$ 3; $\alpha(\text{M})=0.0491$ 7 $\alpha(\text{N})=0.01273$ 18; $\alpha(\text{O})=0.00272$ 4; $\alpha(\text{P})=0.000376$ 6
		723.3 2	100 3	1416.27	(21/2) ⁻				
2169.3		899.2 2	100	1270.09	(15/2) ⁻				
2189.4		834.5 5	100	1354.94	(13/2) ⁺				
2222.6		303.5 5	21 3	1919.12					
		902.2 5	100 6	1320.28	(17/2) ⁻				
		952.4 5	32 4	1270.09	(15/2) ⁻				
2241.0		886.1 5	100	1354.94	(13/2) ⁺				
2244.1		332.0 5	100	1912.1					
2284.6	(19/2) ⁻	144.8 5	29.3 24	2139.6	(21/2) ⁻	M1		4.21 8	$\alpha(\text{K})=3.41$ 5; $\alpha(\text{L})=0.611$ 9; $\alpha(\text{M})=0.1447$ 21 $\alpha(\text{N})=0.0375$ 6; $\alpha(\text{O})=0.00803$ 12; $\alpha(\text{P})=0.001108$ 16
		338.5 5	63 10	1946.23					
		365.5 5	51 7	1919.12					
		868.1 5	27 12	1416.27	(21/2) ⁻				
		964.6 5	100 5	1320.28	(17/2) ⁻				
		1014.5 5	76 10	1270.09	(15/2) ⁻				
2399.14		1044.2 2	100	1354.94	(13/2) ⁺				
2436.0		1081.0 5	100 25	1354.94	(13/2) ⁺				
		1312.8 5	96 21	1123.24	(11/2) ⁻				
2479.19	(1/2) ⁺	350.5 1	1.22 8	2128.71	(5/2) ⁻	(M2)		1.200	$\alpha(\text{K})=0.903$ 13; $\alpha(\text{L})=0.224$ 4; $\alpha(\text{M})=0.0555$ 8 $\alpha(\text{N})=0.01449$ 21; $\alpha(\text{O})=0.00308$ 5; $\alpha(\text{P})=0.000416$ 6
		370.5 1	4.2 3	2108.72	(3/2) ⁻	E1		0.0201	$\alpha(\text{K})=0.01642$ 23; $\alpha(\text{L})=0.00282$ 4; $\alpha(\text{M})=0.000663$ 10 $\alpha(\text{N})=0.0001703$ 24; $\alpha(\text{O})=3.58\times 10^{-5}$ 5; $\alpha(\text{P})=4.70\times 10^{-6}$ 7
		416.4 1	10.7 6	2062.87	1/2 ⁻ , 3/2 ⁻	E1		0.01561	$\alpha(\text{K})=0.01278$ 18; $\alpha(\text{L})=0.00216$ 3; $\alpha(\text{M})=0.000508$ 8 $\alpha(\text{N})=0.0001308$ 19; $\alpha(\text{O})=2.75\times 10^{-5}$ 4; $\alpha(\text{P})=3.64\times 10^{-6}$ 5
		678.4 1	89 4	1800.80	(3/2) ⁻	(E1+M2)	0.23 5	0.014 4	$\alpha(\text{K})=0.011$ 3; $\alpha(\text{L})=0.0020$ 6; $\alpha(\text{M})=0.00049$ 14 $\alpha(\text{N})=0.00013$ 4; $\alpha(\text{O})=2.7\times 10^{-5}$ 8; $\alpha(\text{P})=3.7\times 10^{-6}$ 11
		1362.9 1	100 6	1116.21	(3/2) ⁻	E1+M2	-0.12 3	0.00204 18	$\alpha(\text{K})=0.00162$ 14; $\alpha(\text{L})=0.00026$ 3; $\alpha(\text{M})=6.0\times 10^{-5}$ 7 $\alpha(\text{N})=1.56\times 10^{-5}$ 17; $\alpha(\text{O})=3.3\times 10^{-6}$ 4; $\alpha(\text{P})=4.6\times 10^{-7}$ 5; $\alpha(\text{IPF})=7.95\times 10^{-5}$ 13
		1531.8 3	0.14 7	947.44	(5/2) ⁻				
		1805.0 2	0.36 7	674.11	(7/2) ⁻	[E3]		0.00528	$\alpha(\text{K})=0.00410$ 6; $\alpha(\text{L})=0.000825$ 12; $\alpha(\text{M})=0.000198$ 3 $\alpha(\text{N})=5.14\times 10^{-5}$ 8; $\alpha(\text{O})=1.088\times 10^{-5}$ 16; $\alpha(\text{P})=1.455\times 10^{-6}$ 21; $\alpha(\text{IPF})=9.61\times 10^{-5}$ 14
2555.4		1235.1 2	100	1320.28	(17/2) ⁻				
2581.5		662.4 2	100	1919.12					
2609.4		469.7 5	10.0 20	2139.6	(21/2) ⁻				
		682.0 5	26.7 13	1927.4	(23/2) ⁻				
		1193.1 2	100 7	1416.27	(21/2) ⁻				
2616.3	(25/2 ⁺)	688.9 2	100	1927.4	(23/2) ⁻	(E1)		0.00563	$\alpha(\text{K})=0.00465$ 7; $\alpha(\text{L})=0.000750$ 11; $\alpha(\text{M})=0.0001752$ 25 $\alpha(\text{N})=4.51\times 10^{-5}$ 7; $\alpha(\text{O})=9.57\times 10^{-6}$ 14; $\alpha(\text{P})=1.292\times 10^{-6}$ 19

Adopted Levels, Gammas (continued)

$\gamma(^{211}\text{At})$ (continued)

$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult. [‡]	$\alpha^{\# \& a}$	$I_{(\gamma+ce)}$	Comments
									B(E1)(W.u.) $>2.0 \times 10^{-6}$ Mult.: E1, E2 from ce data in IT decay, ΔJ^π favors E1.
2636.08		1281.0 5	14 3	1354.94	(13/2) ⁺				
		1366.0 2	100 8	1270.09	(15/2) ⁻				
2640.7	(29/2) ⁺	(24.4 5)	0.048 7	2616.3	(25/2 ⁺)	[E2]	6.9×10^3 8	344 31	ce(L)/($\gamma+ce$)=0.74 6; ce(M)/($\gamma+ce$)=0.20 3 ce(N)/($\gamma+ce$)=0.051 8; ce(O)/($\gamma+ce$)=0.0098 15; ce(P)/($\gamma+ce$)=0.00097 15 $\alpha(L)=5.2 \times 10^3$ 6; $\alpha(M)=1.36 \times 10^3$ 15; $\alpha(N)=3.5 \times 10^2$ 4; $\alpha(O)=68$ 8; $\alpha(P)=6.7$ 8 B(E2)(W.u.)=1.8 3 E_γ : deduced from level scheme; γ unobserved. $I_{(\gamma+ce)}$: $I(\gamma+ce)(24.2\gamma)/I(\gamma+ce)(713.6\gamma)=3.3$ 3, deduced from intensity balance in IT decay. I_γ : from $I(\gamma+ce)$ and α . $\alpha(K)=0.0265$ 4; $\alpha(L)=0.01142$ 16; $\alpha(M)=0.00294$ 5 $\alpha(N)=0.000763$ 11; $\alpha(O)=0.0001567$ 22; $\alpha(P)=1.89 \times 10^{-5}$ 3 B(E3)(W.u.)=21.5 19 Mult.: from ce data and RUL ($^{209}\text{Bi}(\alpha, 2n\gamma)$) and IT decay.
		713.3 2	100 5	1927.4	(23/2) ⁻	E3	0.0418		
2655.16	1/2,3/2	176.0 1	1.3 3	2479.19	(1/2) ⁺				
		592.3 1	5.6 5	2062.87	1/2 ⁻ ,3/2 ⁻				
		1538.8 2	100 11	1116.21	(3/2) ⁻				
2678.0		455.4 5	<53	2222.6					
		759.0 5	100 25	1919.12					
2693.1	(27/2) ⁺	52.5 5	100 6	2640.7	(29/2) ⁺	M1	15.2 5		$\alpha(L)=11.6$ 4; $\alpha(M)=2.75$ 9 $\alpha(N)=0.712$ 23; $\alpha(O)=0.152$ 5; $\alpha(P)=0.0211$ 7 B(M1)(W.u.) >0.024 $\alpha(L)=3.80$ 9; $\alpha(M)=0.899$ 22 $\alpha(N)=0.233$ 6; $\alpha(O)=0.0499$ 12; $\alpha(P)=0.00689$ 17 B(M1)(W.u.) >0.0071
		76.9 5	92 6	2616.3	(25/2 ⁺)	M1	4.99 12		
2717.9		1363.0 5	100	1354.94	(13/2) ⁺				
2729.9		810.8 5	100	1919.12					
2731.3		591.7 5	100 10	2139.6	(21/2) ⁻				
		803.8 5	36.1 21	1927.4	(23/2) ⁻				
		1315.0 5	79 5	1416.27	(21/2) ⁻				
2792.3		236.7 5	17 1	2555.4					
		1376.1 5	75 5	1416.27	(21/2) ⁻				
		1472.0 5	100 10	1320.28	(17/2) ⁻				
2797.9		1443.0 5	100	1354.94	(13/2) ⁺				
2836.6		552.0 5	25 6	2284.6	(19/2) ⁻				
		697.0 5	100 25	2139.6	(21/2) ⁻				
2847.1		211.0 5	10.0 25	2636.08					
		1577.0 5	100 9	1270.09	(15/2) ⁻				
2867.0		1512.1 5	100	1354.94	(13/2) ⁺				

∞

Adopted Levels, Gammas (continued)

$\gamma(^{211}\text{At})$ (continued)

E _i (level)	J ^{π} _i	E _{γ} [†]	I _{γ} [†]	E _f	J ^{π} _f	Mult. [‡]	$\alpha^{\# \& a}$	Comments
2883.3		1528.3 5	62 14	1354.94	(13/2) ⁺			
		1613.2 5	100 7	1270.09	(15/2) ⁻			
2898.0		1543.0 5	<42	1354.94	(13/2) ⁺			
		1628.0 5	100 8	1270.09	(15/2) ⁻			
2916.5		777.0 5	100 13	2139.6	(21/2) ⁻			
		989.1 5	64 4	1927.4	(23/2) ⁻			
2920.1		1650.0 5	100	1270.09	(15/2) ⁻			
2959.9		820.3 5	100	2139.6	(21/2) ⁻			
3024.0		1096.6 5	100	1927.4	(23/2) ⁻			
3287.4	(27/2 ⁺)	594.3 2	100 3	2693.1	(27/2) ⁺	[M1]	0.0876	$\alpha(\text{K})=0.0713$ 10; $\alpha(\text{L})=0.01239$ 18; $\alpha(\text{M})=0.00292$ 4 $\alpha(\text{N})=0.000757$ 11; $\alpha(\text{O})=0.0001622$ 23; $\alpha(\text{P})=2.24 \times 10^{-5}$ 4 B(M1)(W.u.)>0.00094
		646.7 5	35 3	2640.7	(29/2) ⁺	[M1]	0.0701	$\alpha(\text{K})=0.0571$ 8; $\alpha(\text{L})=0.00991$ 14; $\alpha(\text{M})=0.00234$ 4 $\alpha(\text{N})=0.000605$ 9; $\alpha(\text{O})=0.0001296$ 19; $\alpha(\text{P})=1.79 \times 10^{-5}$ 3 B(M1)(W.u.)>0.00026
		671.0 5	12 3	2616.3	(25/2 ⁺)	[M1]	0.0637	$\alpha(\text{K})=0.0519$ 8; $\alpha(\text{L})=0.00899$ 13; $\alpha(\text{M})=0.00212$ 3 $\alpha(\text{N})=0.000549$ 8; $\alpha(\text{O})=0.0001176$ 17; $\alpha(\text{P})=1.627 \times 10^{-5}$ 23 B(M1)(W.u.)>7.8×10 ⁻⁵
3312.8		581.5 5	100	2731.3				
3341.7		549.4 5	100	2792.3				
3391.7		555.1 5	100	2836.6				
3431.4		1504.0 5	100	1927.4	(23/2) ⁻			
3475.0		1547.6 2	100	1927.4	(23/2) ⁻			
3487.4		1560.0 5	100	1927.4	(23/2) ⁻			
3509.3		778.0 5	57 17	2731.3				
		1369.7 5	100 22	2139.6	(21/2) ⁻			
3555.5		763.2 5	100	2792.3				
3814.2	(29/2 ⁺)	526.8 5	93.0 23	3287.4	(27/2 ⁺)	M1	0.1205	$\alpha(\text{K})=0.0980$ 14; $\alpha(\text{L})=0.01710$ 24; $\alpha(\text{M})=0.00404$ 6 $\alpha(\text{N})=0.001045$ 15; $\alpha(\text{O})=0.000224$ 4; $\alpha(\text{P})=3.10 \times 10^{-5}$ 5 B(M1)(W.u.)>0.00027
		1121.0 5	27.9 23	2693.1	(27/2) ⁺	[M1]	0.01676	$\alpha(\text{K})=0.01369$ 20; $\alpha(\text{L})=0.00234$ 4; $\alpha(\text{M})=0.000550$ 8 $\alpha(\text{N})=0.0001423$ 20; $\alpha(\text{O})=3.05 \times 10^{-5}$ 5; $\alpha(\text{P})=4.23 \times 10^{-6}$ 6; $\alpha(\text{IPF})=6.50 \times 10^{-7}$ 16 B(M1)(W.u.)>8.5×10 ⁻⁶
		1173.5 5	100.0 23	2640.7	(29/2) ⁺	[M1]	0.01488	$\alpha(\text{K})=0.01216$ 17; $\alpha(\text{L})=0.00207$ 3; $\alpha(\text{M})=0.000488$ 7 $\alpha(\text{N})=0.0001262$ 18; $\alpha(\text{O})=2.71 \times 10^{-5}$ 4; $\alpha(\text{P})=3.75 \times 10^{-6}$ 6; $\alpha(\text{IPF})=3.83 \times 10^{-6}$ 6 B(M1)(W.u.)>2.7×10 ⁻⁵
		1197.8 5	9.3 23	2616.3	(25/2 ⁺)	[E2]	0.00549	$\alpha(\text{K})=0.00438$ 7; $\alpha(\text{L})=0.000841$ 12; $\alpha(\text{M})=0.000201$ 3 $\alpha(\text{N})=5.20 \times 10^{-5}$ 8; $\alpha(\text{O})=1.099 \times 10^{-5}$ 16; $\alpha(\text{P})=1.462 \times 10^{-6}$ 21; $\alpha(\text{IPF})=3.43 \times 10^{-6}$ 7 B(E2)(W.u.)>0.00056
3822.6		347.6 5	81 10	3475.0				

Adopted Levels, Gammas (continued)

$\gamma(^{211}\text{At})$ (continued)									
$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult. [‡]	$\delta^\ddagger_{\text{@}}$	$\alpha^{\# \& a}$	Comments
3822.6		1895.1 5	100 10	1927.4	(23/2) ⁻				
4027.7		1387.0 5	100	2640.7	(29/2) ⁺				
4165.4	[33/2 ⁻]	1524.7 2	100	2640.7	(29/2) ⁺				
4175.5	(31/2 ⁺)	361.2 5	5.3 5	3814.2	(29/2) ⁺	M1		0.332	$\alpha(\text{K})=0.270$ 4; $\alpha(\text{L})=0.0475$ 7; $\alpha(\text{M})=0.01123$ 16 $\alpha(\text{N})=0.00291$ 4; $\alpha(\text{O})=0.000623$ 9; $\alpha(\text{P})=8.60 \times 10^{-5}$ 12 $\text{B}(\text{M}1)(\text{W.u.}) > 6.5 \times 10^{-5}$
		1534.8 2	100.0 24	2640.7	(29/2) ⁺	(M1)		0.00759	$\alpha(\text{K})=0.00610$ 9; $\alpha(\text{L})=0.001032$ 15; $\alpha(\text{M})=0.000243$ 4 $\alpha(\text{N})=6.28 \times 10^{-5}$ 9; $\alpha(\text{O})=1.347 \times 10^{-5}$ 19; $\alpha(\text{P})=1.87 \times 10^{-6}$ 3; $\alpha(\text{IPF})=0.0001358$ 19 $\text{B}(\text{M}1)(\text{W.u.}) > 1.6 \times 10^{-5}$ Mult.: from ce data, $\gamma(\theta)$ and RUL.
4288.9		1648.2 5	100	2640.7	(29/2) ⁺				
4308.3		1667.6 5	100	2640.7	(29/2) ⁺				
4334.5		158.9 5	94 13	4175.5	(31/2 ⁺)				
		520.5 5	100 13	3814.2	(29/2 ⁺)				
4379.3	(33/2 ⁺)	203.8 2	100	4175.5	(31/2 ⁺)	M1+E2	0.8 4	1.2 3	$\text{B}(\text{M}1)(\text{W.u.}) > 0.0014$; $\text{B}(\text{E}2)(\text{W.u.}) > 4.6$ $\alpha(\text{K})=0.9$ 3; $\alpha(\text{L})=0.230$ 4; $\alpha(\text{M})=0.0570$ 16 $\alpha(\text{N})=0.0148$ 4; $\alpha(\text{O})=0.00306$ 5; $\alpha(\text{P})=0.000384$ 25
4452.1		637.9 5	100	3814.2	(29/2 ⁺)				
4572.1		396.6 5	100	4175.5	(31/2 ⁺)				
4576.2		762.0 5	100	3814.2	(29/2 ⁺)				
4598.7		784.5 5	100	3814.2	(29/2 ⁺)				
4808.6		633.1 5	100	4175.5	(31/2 ⁺)				
4814.5	(39/2 ⁻)	435.2 2	100	4379.3	(33/2 ⁺)	E3		0.184	$\alpha(\text{K})=0.0780$ 11; $\alpha(\text{L})=0.0787$ 12; $\alpha(\text{M})=0.0210$ 4 $\alpha(\text{N})=0.00547$ 9; $\alpha(\text{O})=0.001103$ 17; $\alpha(\text{P})=0.0001236$ 19 $\text{B}(\text{E}3)(\text{W.u.})=31.0$ 6
4875.8		496.5 5	100	4379.3	(33/2 ⁺)				
4917.9		538.6 5	100	4379.3	(33/2 ⁺)				
4942.9		563.6 5	100	4379.3	(33/2 ⁺)				
4995.9		616.6 5	100	4379.3	(33/2 ⁺)				
5331.4	(41/2 ⁻)	516.9 2	100	4814.5	(39/2 ⁻)	M1+E2		0.08 5	$\alpha(\text{K})=0.06$ 4; $\alpha(\text{L})=0.013$ 6; $\alpha(\text{M})=0.0030$ 13 $\alpha(\text{N})=0.0008$ 4; $\alpha(\text{O})=0.00017$ 7; $\alpha(\text{P})=2.2 \times 10^{-5}$ 11
5418.4	(41/2 ⁻)	(87.0 5)	≤ 2	5331.4	(41/2 ⁻)	M1		3.48 8	$\alpha(\text{L})=2.65$ 6; $\alpha(\text{M})=0.628$ 14
		603.9 2	100 4	4814.5	(39/2 ⁻)	M1+E2		0.05 4	$\alpha(\text{K})=0.04$ 3; $\alpha(\text{L})=0.008$ 4; $\alpha(\text{M})=0.0020$ 9 $\alpha(\text{N})=0.00051$ 22; $\alpha(\text{O})=0.00011$ 5; $\alpha(\text{P})=1.5 \times 10^{-5}$ 7
5909.8	(41/2,43/2)	491.4 5	98.4 16	5418.4	(41/2 ⁻)				
		578.3 5	100.0 16	5331.4	(41/2 ⁻)				
		1095.5	≤ 16	4814.5	(39/2 ⁻)				
5917.4	(43/2 ⁺)	499.0 2	100.0 19	5418.4	(41/2 ⁻)	E1		0.01068	$\alpha(\text{K})=0.00877$ 13; $\alpha(\text{L})=0.001457$ 21; $\alpha(\text{M})=0.000342$ 5 $\alpha(\text{N})=8.79 \times 10^{-5}$ 13; $\alpha(\text{O})=1.86 \times 10^{-5}$ 3; $\alpha(\text{P})=2.47 \times 10^{-6}$ 4 $\text{B}(\text{E}1)(\text{W.u.}) > 1.2 \times 10^{-6}$
		586.0 2	79.6 19	5331.4	(41/2 ⁻)	E1		0.00772	$\alpha(\text{K})=0.00636$ 9; $\alpha(\text{L})=0.001040$ 15; $\alpha(\text{M})=0.000243$ 4

Adopted Levels, Gammas (continued)

$\gamma(^{211}\text{At})$ (continued)

$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult. [‡]	$\alpha^{\# \& a}$	Comments
								$\alpha(\text{N})=6.27 \times 10^{-5}$ 9; $\alpha(\text{O})=1.327 \times 10^{-5}$ 19; $\alpha(\text{P})=1.780 \times 10^{-6}$ 25 B(E1)(W.u.) $>5.8 \times 10^{-7}$
5917.4	(43/2 ⁺)	1102.8 5	5.6 6	4814.5	(39/2 ⁻)	[M2]	0.0416	$\alpha(\text{K})=0.0332$ 5; $\alpha(\text{L})=0.00633$ 9; $\alpha(\text{M})=0.001515$ 22 $\alpha(\text{N})=0.000393$ 6; $\alpha(\text{O})=8.41 \times 10^{-5}$ 12; $\alpha(\text{P})=1.157 \times 10^{-5}$ 17; $\alpha(\text{IPF})=5.15 \times 10^{-8}$ 8 B(M2)(W.u.) >0.023
5940.3	(41/2,43/2)	521.8 5 609.0 5 1125.7 5	100.0 11 55.4 11 66 4	5418.4 (41/2 ⁻) 5331.4 (41/2 ⁻) 4814.5 (39/2 ⁻)				
6017.3	(45/2 ⁺)	100.0 5	23.2 15	5917.4 (43/2 ⁺)		M1	12.05 24	$\alpha(\text{K})=9.72$ 19; $\alpha(\text{L})=1.77$ 4; $\alpha(\text{M})=0.419$ 9 $\alpha(\text{N})=0.1087$ 22; $\alpha(\text{O})=0.0233$ 5; $\alpha(\text{P})=0.00321$ 7 B(M1)(W.u.) $=0.00123$ 21
		686.0 5	21.7 15	5331.4 (41/2 ⁻)		[M2]	0.1550	$\alpha(\text{K})=0.1216$ 17; $\alpha(\text{L})=0.0253$ 4; $\alpha(\text{M})=0.00612$ 9 $\alpha(\text{N})=0.001591$ 23; $\alpha(\text{O})=0.000340$ 5; $\alpha(\text{P})=4.64 \times 10^{-5}$ 7 B(M2)(W.u.) $=0.30$ 5
		1202.8 2	100 3	4814.5 (39/2 ⁻)		[E3]	0.01212	$\alpha(\text{K})=0.00908$ 13; $\alpha(\text{L})=0.00229$ 4; $\alpha(\text{M})=0.000564$ 8 $\alpha(\text{N})=0.0001462$ 21; $\alpha(\text{O})=3.06 \times 10^{-5}$ 5; $\alpha(\text{P})=3.95 \times 10^{-6}$ 6; $\alpha(\text{IPF})=1.227 \times 10^{-6}$ 18 B(E3)(W.u.) $=30$ 5
6090.1		172.8 5 671.7 5	32 6 100.0 15	5917.4 (43/2 ⁺) 5418.4 (41/2 ⁻)				
6247.8		330.4 5	100	5917.4 (43/2 ⁺)				
6466.5	(45/2)	549.1 2	100	5917.4 (43/2 ⁺)		D		
6567.2	(49/2 ⁺)	549.9 2	100	6017.3 (45/2 ⁺)		E2	0.0269	$\alpha(\text{K})=0.0189$ 3; $\alpha(\text{L})=0.00601$ 9; $\alpha(\text{M})=0.001509$ 22 $\alpha(\text{N})=0.000390$ 6; $\alpha(\text{O})=8.03 \times 10^{-5}$ 12; $\alpha(\text{P})=9.74 \times 10^{-6}$ 14 B(E2)(W.u.) $=0.00290$ 8
6569.1		651.7 5	100	5917.4 (43/2 ⁺)				
6600.4	(47/2)	134.0 5	≤ 7	6466.5 (45/2)		M1	5.25 10	$\alpha(\text{K})=4.25$ 8; $\alpha(\text{L})=0.763$ 14; $\alpha(\text{M})=0.181$ 4 $\alpha(\text{N})=0.0468$ 9; $\alpha(\text{O})=0.01002$ 18; $\alpha(\text{P})=0.001384$ 25
		583.1 2	100 14	6017.3 (45/2 ⁺)		D		
6649.1		182.6 5	100	6466.5 (45/2)				
6770.9		203.7 5	100	6567.2 (49/2 ⁺)				
6866.7		299.5 5	100	6567.2 (49/2 ⁺)				
6871.1		303.9 5	100	6567.2 (49/2 ⁺)				
6990.5		423.3 5	100	6567.2 (49/2 ⁺)				
7239.2		672.0 5	100	6567.2 (49/2 ⁺)				
7346.5		746.1 5	100	6600.4 (47/2)				
7386.2	(51/2)	819.0 5	100	6567.2 (49/2 ⁺)		D+Q		
7399.0		831.8 5	100	6567.2 (49/2 ⁺)				
7496.2		929.0 5	100	6567.2 (49/2 ⁺)				
7517.4	(55/2 ⁻)	950.2 2	100	6567.2 (49/2 ⁺)		[E3]	0.0206	B(E3)(W.u.) $=26.5$ 16 $\alpha(\text{K})=0.01461$ 21; $\alpha(\text{L})=0.00450$ 7; $\alpha(\text{M})=0.001129$ 16 $\alpha(\text{N})=0.000293$ 5; $\alpha(\text{O})=6.09 \times 10^{-5}$ 9; $\alpha(\text{P})=7.64 \times 10^{-6}$ 11

Adopted Levels, Gammas (continued)

$\gamma(^{211}\text{At})$ (continued)

$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult. [‡]
7573.2		1006.0 5	100	6567.2	(49/2 ⁺)	7972.2		1405.0 5		6567.2	(49/2 ⁺)	
7621.2		235.1 5	100 5	7386.2	(51/2)	8120.3		734.1 5	100	7386.2	(51/2)	
		1053.9 5	≤26	6567.2	(49/2 ⁺)	8232.8		846.6 5	100	7386.2	(51/2)	
7658.2		1091.0 5	100	6567.2	(49/2 ⁺)	8337.1		819.6 5	100	7517.4	(55/2 ⁻)	D+Q
7848.4		331.0 5	100	7517.4	(55/2 ⁻)	8829.0	[59/2 ⁻]	491.8 5		8337.1		
7920.2		402.7 5		7517.4	(55/2 ⁻)			1311.6 5		7517.4	(55/2 ⁻)	
		1353.0 5		6567.2	(49/2 ⁺)	9814.8		985.8 5	100	8829.0	[59/2 ⁻]	
7972.2		454.8 5		7517.4	(55/2 ⁻)	10016.0		201.2 5	100	9814.8		

[†] From ²¹¹Rn ε decay for transitions from low-spin levels, and from ²⁰⁸Pb(⁷Li,4n γ) for transitions from high-spin ($J>7/2$). Note that intensity and/or branching ratios given in comments in (⁷Li,4n γ) are also used in recommended branching ratios given here.

[‡] From ce-data in ²¹¹Rn ε decay for transitions from low-spin levels, and from $\alpha(\text{exp})$ values and $\gamma(\theta)$ data in ²⁰⁸Pb(⁷Li,4n γ) for transitions from high-spin ($J>7/2$) levels, unless otherwise stated.

[Additional information 2.](#)

@ If no value given it was assumed $\delta=1.00$ for E2/M1, $\delta=1.00$ for E3/M2 and $\delta=0.10$ for the other multipolarities.

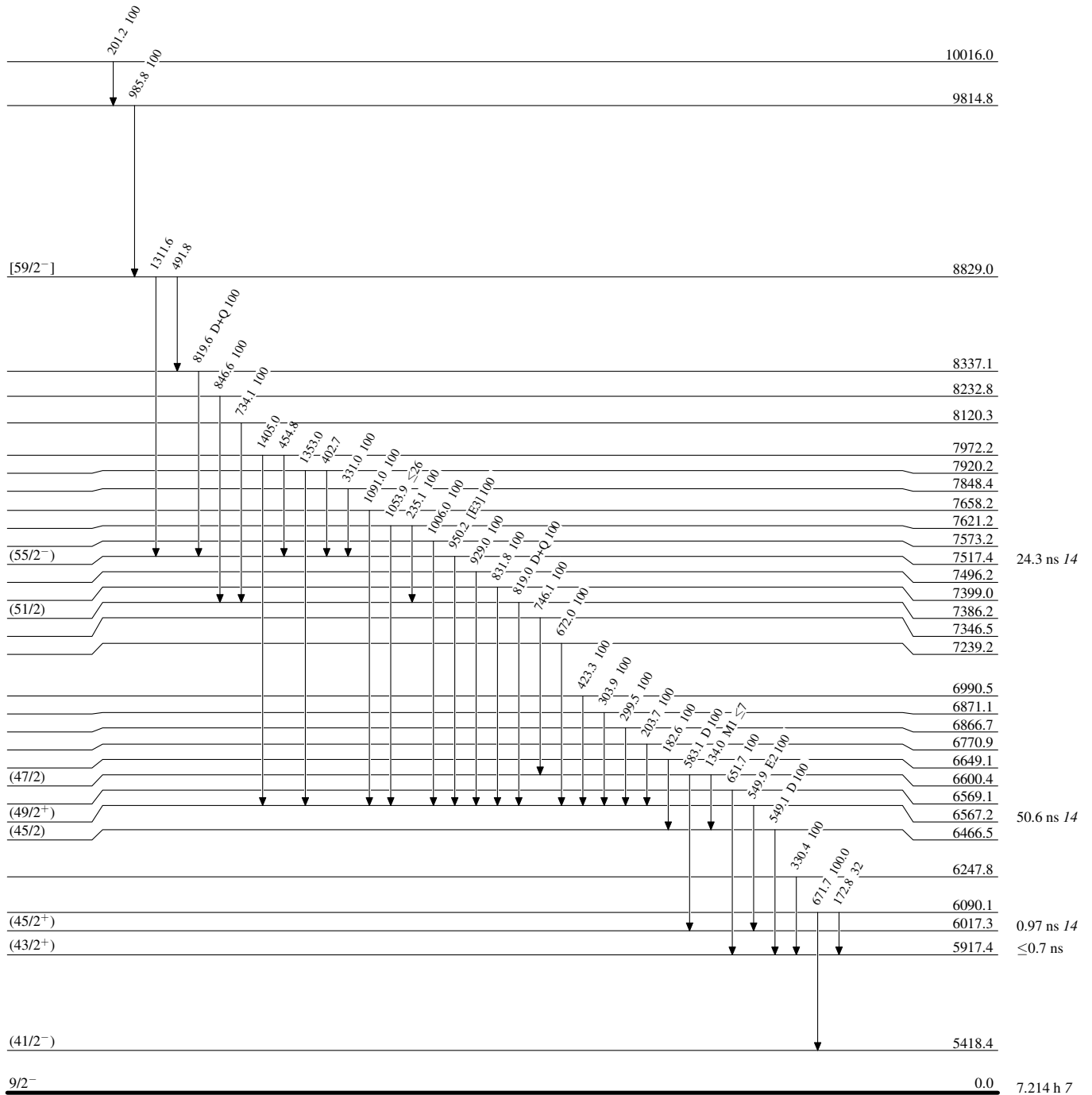
& [Additional information 3.](#)

^a [Additional information 4.](#)

^b Placement of transition in the level scheme is uncertain.

Adopted Levels, GammasLevel Scheme

Intensities: Relative photon branching from each level

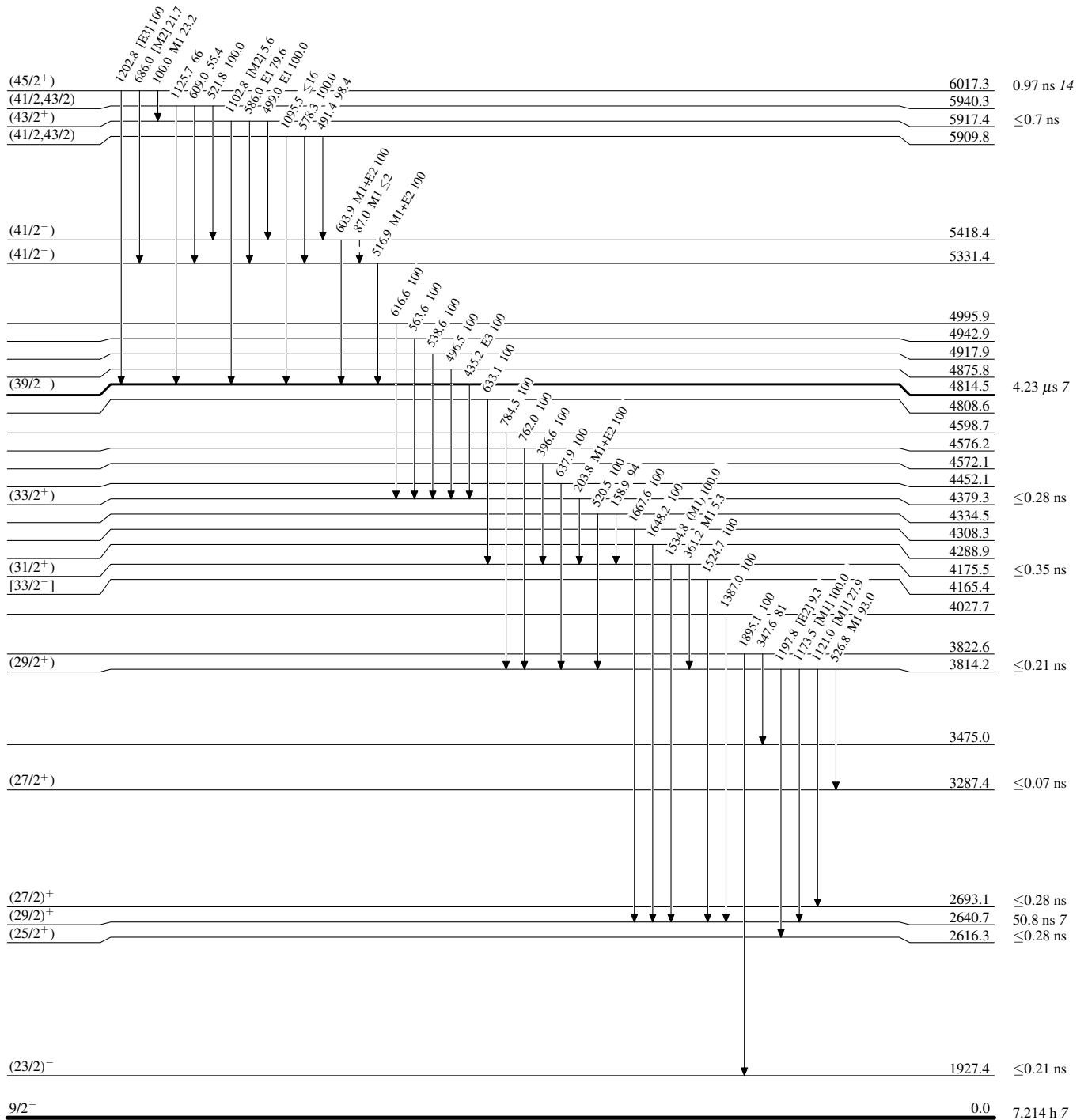


Adopted Levels, Gammas

Legend

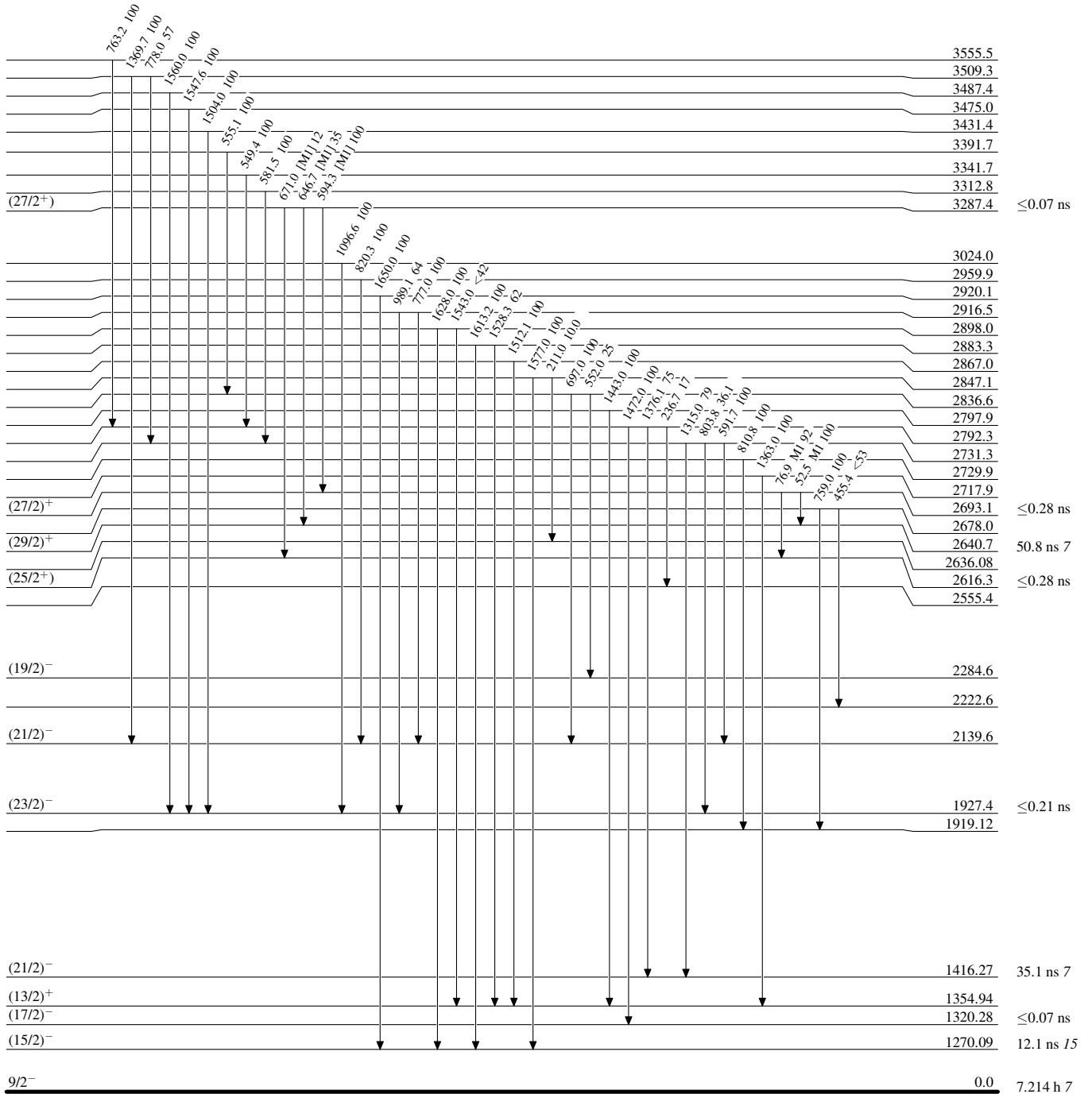
Level Scheme (continued)

Intensities: Relative photon branching from each level

-----► γ Decay (Uncertain)

Adopted Levels, GammasLevel Scheme (continued)

Intensities: Relative photon branching from each level

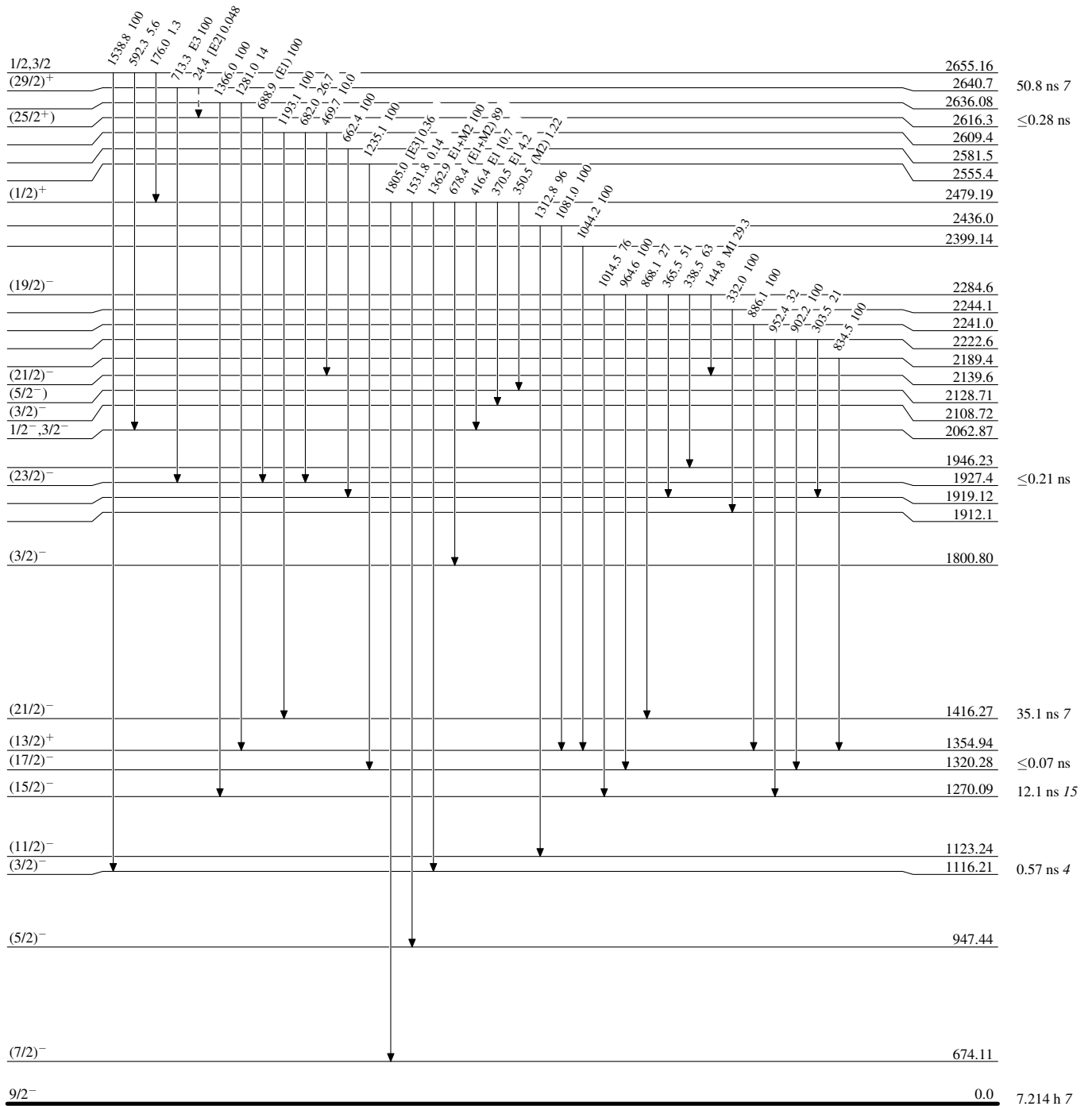


Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

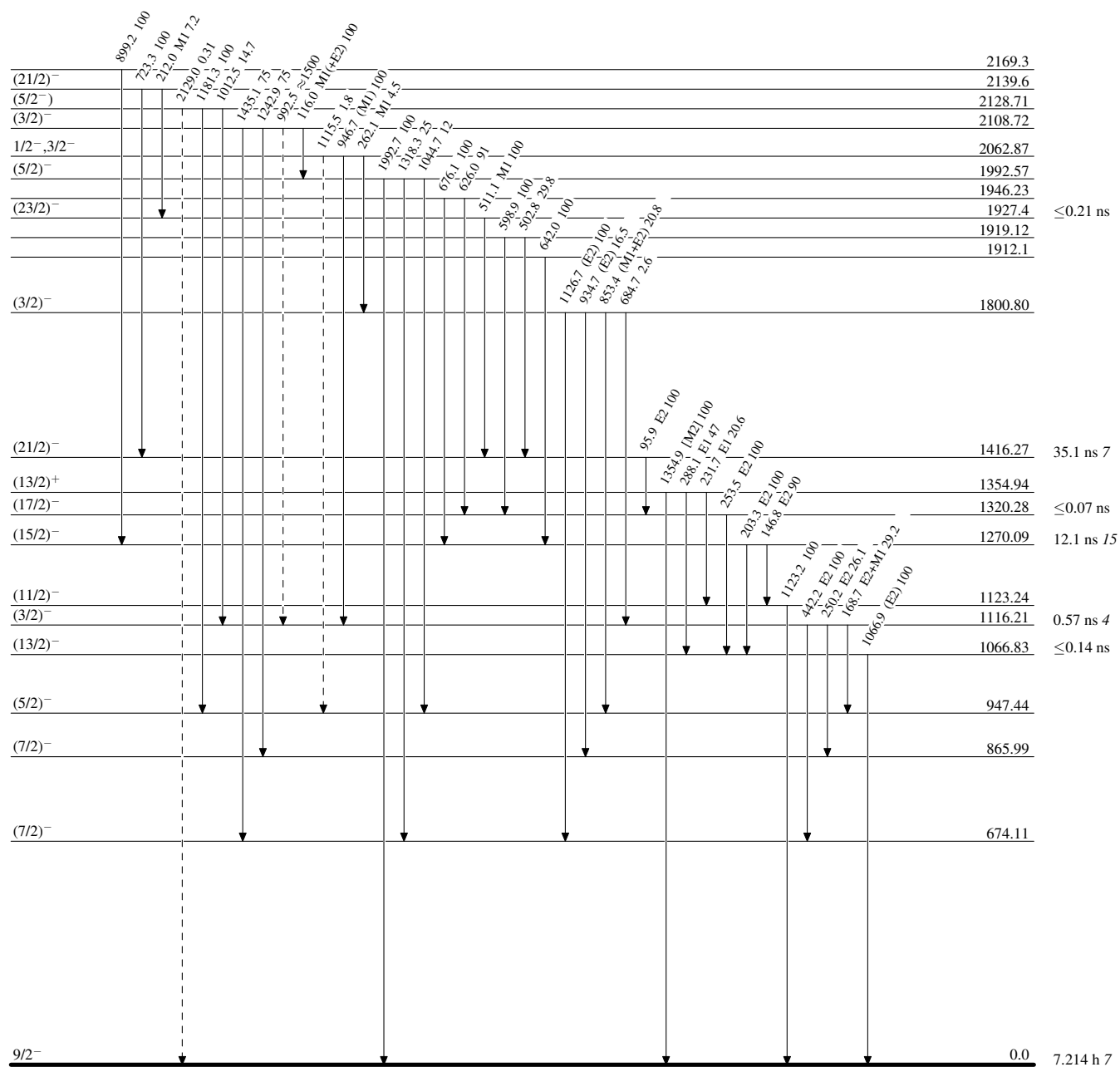
-----► γ Decay (Uncertain)

Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

-----► γ Decay (Uncertain)

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

