^{208}Pb(^{7}Li,4nγ) 2001Ba79

History

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

2001Ba79 (also 1995Ba66 from the same group): Target: 99% enriched ^{208}Pb. Projectile: ^{7}Li, E=32-44 MeV, 53-56 MeV. Measured Eγ, Iγ, $\gamma\gamma$ coin, $\gamma\gamma$(t), pulsed-beam gamma-ray coincidence, γ-ray angular distributions. Deduced total conversion coefficients from transition intensity balances, γ-ray multipolarities, levels half-life. Detector: CAESAR array of six Compton-suppressed hyperpure Ge detectors and up to two LEPS detectors.

1995Ba66 (from the same group as 2001Ba79): E=42 MeV. Measured Eγ, Iγ, $\gamma\gamma$(t) using CAESAR array of Ge detectors and a LEPS detector. Main measurement is lifetimes of isomers by $\gamma\gamma$(t). Levels up to 4815 keV reported. Data in table 1 where listed γ branchings included contribution from internal conversion are superseded by those in table 4 in 2001Ba79.

2003By04: description of shell-model configurations in A=211 nuclei.

1976Ha62, 1975McZO: E=42 MeV; measured $\gamma\gamma(\theta$,H,t), g factor, level lifetimes.

1971Ma36: E=41 MeV. Measured Eγ, Iγ. Consult (α,2nγ) dataset for details of data from this paper.

^{211}At Levels

Configuration assignments are based on semi-empirical shell model calculations, which reproduced very well the energies of the Yrast states (2001Ba79).

E(level)[†]	J$^{\pi}$[‡]	T$_{1/2}$	Comments
0.0[&]	9/2$^-$		
674.32 *18*	(7/2$^-$)		
866.18 *18*	(7/2$^-$)		
947.61 *19*	(5/2$^-$)		
1066.84[&] *15*	(13/2$^-$)	≤0.14[#] ns	
1116.4 *4*	(3/2$^-$)		
1123.23[&] *16*	11/2$^-$		
1270.05[&] *17*	15/2$^-$	9.7[#] ns *28*	T$_{1/2}$: other: 11.1 ns *28* (1975McZO). g-factor=0.91 *8* (1975McZO).
1320.28[&] *21*	17/2$^-$	≤0.07[#] ns	
1354.94 *15*	13/2$^+$		
1416.27[&] *25*	21/2$^-$	35.1[#] ns *7*	g-factor=0.920 *12* (1975McZO). T$_{1/2}$: other: 34 ns *5* (1976Ha62).
1912.1 *3*			
1919.10 *25*			
1927.4[a] *3*	23/2$^-$	≤0.21[#] ns	
1946.21 *22*			
2139.6 *3*	(21/2)$^-$		
2169.3 *3*			
2189.4 *6*			
2222.5 *3*			
2241.0 *6*			
2244.1 *6*			
2284.6 *3*	(19/2)$^-$		
2399.14 *25*			
2436.0 *4*			
2555.4 *3*			
2581.5 *4*			
2609.4 *3*			
2616.3[b] *4*	25/2$^+$	≤0.28[#] ns	
2636.04 *24*			
2640.7[b] *4*	29/2$^+$	50.8[#] ns *7*	T$_{1/2}$: other: 54.1 ns *28* (1976Ha62).

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^{208}Pb(^{7}Li,4nγ) 2001Ba79 (continued)

^{211}At Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	$T_{1/2}$	Comments
			g-factor=1.069 *13* (1975McZO).
2678.0 *5*			
2693.1[b] *4*	27/2+	≤0.28[#] ns	
2717.9 *6*			
2729.9 *6*			
2731.3 *4*			
2792.3 *3*			
2797.9 *6*			
2836.6 *5*			
2847.1 *4*			
2867.0 *6*			
2883.3 *4*			
2898.0 *4*			
2916.5 *5*			
2920.1 *6*			
2959.9 *6*			
3024.0 *6*			
3287.4[c] *4*	(27/2+)	≤0.07[#] ns	
3312.8 *7*			
3341.7 *6*			
3391.7 *7*			
3431.4 *6*			
3475.0 *4*			
3487.4 *6*			
3509.3 *5*			
3555.5 *6*			
3814.2[c] *4*	29/2+	≤0.21[#] ns	
3822.6 *5*			
4027.7 *6*			
4165.4[d] *4*	[33/2−]		
4175.5[e] *4*	31/2+	≤0.35[#] ns	
4288.9 *6*			
4308.3 *6*			
4334.5 *5*			
4379.3[f] *5*	33/2+	≤0.28[#] ns	
4452.1 *7*			
4572.1 *7*			
4576.2 *7*			
4598.7 *7*			
4808.6 *7*			
4814.5[g] *5*	39/2−	4.23 μs *7*	%IT=100 $T_{1/2}$: from 254γ(t) and 1067γ(t) (2001Ba79) Other: 4.2 μs *4* (1971Ma36).
4875.8 *7*			
4917.9 *7*			
4942.9 *7*			
4995.9 *7*			
5331.4[h] *5*	41/2−		
5418.4[j] *5*	41/2−		
5909.8 *6*	(41/2,43/2)		
5917.4[i] *5*	43/2+	≤0.7[@] ns	
5940.3 *6*	(41/2,43/2)		
6017.3[k] *6*	45/2+	0.97[@] ns *14*	
6090.2 *7*			
6247.8 *8*			

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^{208}Pb(^{7}Li,4nγ) 2001Ba79 (continued)

^{211}At Levels (continued)

E(level)[†]	Jπ[‡]	T1/2	E(level)[†]	Jπ[‡]	T1/2	E(level)[†]	Jπ[‡]
6466.5 *6*	(45/2)		7239.2 *8*			7848.4 *8*	
6567.2[l] *6*	(49/2+)	50.6[@] ns *14*	7346.5 *8*			7920.2 *7*	
6569.1 *8*			7386.2 *7*	(51/2)		7972.2 *7*	
6600.4 *6*	(47/2)		7399.0 *8*			8120.3 *9*	
6649.1 *8*			7496.2 *8*			8232.8 *9*	
6770.9 *8*			7517.4[l] *6*	(55/2−)	24.3[@] ns *14*	8337.1 *7*	
6866.7 *8*			7573.2 *8*			8829.0[l] *7*	[59/2−]
6871.1 *8*			7621.2 *7*	(53/2)		9814.8 *9*	
6990.5 *8*			7658.2 *8*			10016.0 *10*	

[†] Deduced by evaluator from a least-squares fit to γ-ray energies with uncertainties assigned as explained in gamma table.
[‡] Spin and parity assignments are based on γ-ray multipolarities and angular distributions. The low-lying levels in ^{211}At can be described by the coupling of their valence protons outside the ^{208}Pb core.
[#] From γγ(t) (1995Ba66).
[@] From γγ(t) (2001Ba79).
[&] Configuration=$\pi h^3_{9/2}$.
[a] Configuration=$\pi h^2_{9/2}\otimes\pi f^1_{7/2}$.
[b] Configuration=$\pi h^2_{9/2}\otimes\pi i^1_{13/2}$.
[c] Configuration=$\pi h^1_{9/2}\otimes\pi[i^1_{13/2}pf^1_{7/2}]$.
[d] Configuration=$\pi h^1_{9/2}\otimes\pi i^2_{13/2}$.
[e] Configuration=$\pi h^3_{9/2}\otimes\nu[g^1_{9/2}p^{-1}_{1/2}]$.
[f] Configuration=$\pi[h^2_{9/2}f^1_{7/2}]\otimes\nu[p^{-1}_{1/2}\ g^1_{9/2}]$.
[g] Configuration=$\pi[h^2_{9/2}i^1_{13/2}]\otimes\nu[p^{-1}_{1/2}\ g^1_{9/2}]$.
[h] Configuration=$\pi[h^2_{9/2}i^1_{13/2}]\otimes\nu[i^1_{11/2}\ p^{-1}_{1/2}]$.
[i] Configuration=$\pi[h^1_{9/2}i^2_{13/2}]\otimes\nu[g^1_{9/2}\ p^{-1}_{1/2}]$.
[j] Configuration=$\pi[h^2_{9/2}i^1_{13/2}]\otimes\nu[g^1_{9/2}\ f^{-1}_{5/2}]$.
[k] Configuration=$\pi[h^2_{9/2}i^1_{13/2}]\otimes\nu[j^1_{15/2}\ p^{-1}_{1/2}]$.
[l] Double-core excitation.

γ(^{211}At)

Eγ[†]	Iγ[‡@]	Ei(level)	Jπi	Ef	Jπf	Mult.[#]	α[a]	Comments
(24.4 *5*)	≤0.1	2640.7	29/2+	2616.3	25/2+			Iγ(at 48 MeV)≤0.1.
52.5 *5*	0.30 *5*	2693.1	27/2+	2640.7	29/2+	M1	15.2 *5*	α(L)=11.6 *4*; α(M)=2.75 *9* α(N)=0.712 *23*; α(O)=0.152 *5*; α(P)=0.0211 *7* α(exp)=20 *4* Iγ(at 48 MeV)=0.31 *5*. Branching ratio=52 *3*.
76.9 *5*	0.30 *5*	2693.1	27/2+	2616.3	25/2+	M1	4.99 *12*	α(L)=3.80 *9*; α(M)=0.899 *22* α(N)=0.233 *6*; α(O)=0.0499 *12*; α(P)=0.00689 *17* α(exp)=7 *3* Iγ(at 48 MeV)=0.30 *5*. Branching ratio=48 *3*.
(87.0 *5*)	≤0.1[&]	5418.4	41/2−	5331.4	41/2−	M1	3.48 *8*	α(exp)>2 α(L)=2.65 *6*; α(M)=0.628 *14* α(N)=0.163 *4*; α(O)=0.0348 *8*; α(P)=0.00481 *11*
95.9 *2*	6.4 *3*	1416.27	21/2−	1320.28	17/2−	E2	9.04 *16*	α(L)=6.69 *12*; α(M)=1.79 *3*

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^{208}Pb(^{7}Li,4nγ) 2001Ba79 (continued)

γ(^{211}At) (continued)

Eγ[†]	Iγ[‡@]	Ei(level)	J^π_i	E_f	J^π_f	Mult.[#]	α[a]	Comments
								α(N)=0.463 *8*; α(O)=0.0907 *16*; α(P)=0.00913 *16* α(exp)=11 *1* Iγ(at 48 MeV)=7.2 *6*.
100.0 *5*	0.21[&] *3*	6017.3	45/2+	5917.4	43/2+	M1	12.05 *24*	α(exp)=14 *2* α(K)=9.72 *19*; α(L)=1.77 *4*; α(M)=0.419 *9* α(N)=0.1087 *22*; α(O)=0.0233 *5*; α(P)=0.00321 *7* Branching ratio=16 *1*.
134.0 *5*	≤0.1[&]	6600.4	(47/2)	6466.5	(45/2)	M1	5.25 *10*	α(exp)=6 *1* α(K)=4.25 *8*; α(L)=0.763 *14*; α(M)=0.181 *4* α(N)=0.0468 *9*; α(O)=0.01002 *18*; α(P)=0.001384 *25*
144.8 *5*	0.12 *1*	2284.6	(19/2)−	2139.6	(21/2)−	M1	4.21 *8*	α(exp)=6 *2* α(K)=3.41 *6*; α(L)=0.611 *11*; α(M)=0.1447 *25* α(N)=0.0375 *7*; α(O)=0.00803 *14*; α(P)=0.001108 *19*
146.8 *2*	1.8 *1*	1270.05	15/2−	1123.23	11/2−	E2	1.579	α(exp)=1.6 *2* α(K)=0.301 *5*; α(L)=0.946 *15*; α(M)=0.253 *4* α(N)=0.0654 *10*; α(O)=0.01287 *20*; α(P)=0.001321 *21*
158.9 *5*	0.15 *2*	4334.5		4175.5	31/2+			
168.8 *5*	0.24 *3*	1116.4	(3/2−)	947.61	(5/2−)			
172.8 *5*	0.22[&] *4*	6090.2		5917.4	43/2+			
182.6 *5*	0.35[&] *4*	6649.1		6466.5	(45/2)			
191.7 *5*	0.10 *3*	866.18	(7/2−)	674.32	(7/2−)			
201.2 *5*	≤0.1[&]	10016.0		9814.8				
203.2 *2*	2.0 *3*	1270.05	15/2−	1066.84	(13/2−)	E2	0.469	α(exp)=0.53 *6* α(K)=0.1602 *23*; α(L)=0.229 *4*; α(M)=0.0608 *9* α(N)=0.01572 *23*; α(O)=0.00312 *5*; α(P)=0.000328 *5*
203.7 *5*	0.41[&] *3*	6770.9		6567.2	(49/2+)			
203.8 *2*	2.9 *1*	4379.3	33/2+	4175.5	31/2+	M1	1.607	α(K)=1.302 *19*; α(L)=0.232 *4*; α(M)=0.0549 *8* α(N)=0.01422 *21*; α(O)=0.00304 *5*; α(P)=0.000420 *6* α(exp)=1.6 *1*; A_2=−0.32 *3* Iγ(at 48 MeV)=17.4 *4*.
211.0 *5*	0.08 *2*	2847.1		2636.04				
212.0 *5*	0.44 *2*	2139.6	(21/2)−	1927.4	23/2−	M1	1.439 *23*	α(exp)=1.4 *6* α(K)=1.166 *18*; α(L)=0.208 *4*; α(M)=0.0491 *8* α(N)=0.01273 *20*; α(O)=0.00272 *5*; α(P)=0.000376 *6*
231.7 *5*	0.78 *4*	1354.94	13/2+	1123.23	11/2−	E1	0.0590	α(exp)<0.2 α(K)=0.0477 *8*; α(L)=0.00864 *13*; α(M)=0.00204 *3* α(N)=0.000525 *8*; α(O)=0.0001092 *17*; α(P)=1.396×10^{-5} *21*
235.1 *5*	0.39[&] *2*	7621.2	(53/2)	7386.2	(51/2)			
236.7 *5*	0.17 *1*	2792.3		2555.4				
250.2 *5*	0.13 *4*	1116.4	(3/2−)	866.18	(7/2−)			

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^{208}Pb(^{7}Li,4nγ) 2001Ba79 (continued)

γ(^{211}At) (continued)

Eγ[†]	Iγ[‡@]	Ei(level)	J^π_i	Ef	J^π_f	Mult.[#]	α[a]	Comments
253.5 2	70.1 11	1320.28	17/2⁻	1066.84	(13/2⁻)			A_2=+0.13 4 Iγ(at 48 MeV)=72.2 11.
288.1 2	1.8 1	1354.94	13/2⁺	1066.84	(13/2⁻)	E1	0.0354	α(exp)=0.10 8 α(K)=0.0288 4; α(L)=0.00508 8; α(M)=0.001198 17 α(N)=0.000308 5; α(O)=6.44×10^{-5} 9; α(P)=8.34×10^{-6} 12
299.5 5	≤0.1[&]	6866.7		6567.2	(49/2⁺)			
303.5 5	0.33 5	2222.5		1919.10				
303.9 5	≤0.1[&]	6871.1		6567.2	(49/2⁺)			
330.4 5	0.30[&] 4	6247.8		5917.4	43/2⁺			
331.0 5	≤0.1[&]	7848.4		7517.4	(55/2⁻)			
332.0 5	0.12 2	2244.1		1912.1				
338.5 5	0.26 4	2284.6	(19/2)⁻	1946.21				
347.6 5	0.17 2	3822.6		3475.0				
361.2 5	0.37 3	4175.5	31/2⁺	3814.2	29/2⁺	M1	0.332	α(K)=0.269 4; α(L)=0.0475 7; α(M)=0.01122 17 α(N)=0.00291 5; α(O)=0.000622 9; α(P)=8.60×10^{-5} 13 α(exp)=0.34 9; A_2=−0.22 8 Iγ(at 48 MeV)=3.1 1.
365.5 5	0.21 3	2284.6	(19/2)⁻	1919.10				
396.6 5	0.52 6	4572.1		4175.5	31/2⁺			
402.7 5	≤0.1[&]	7920.2		7517.4	(55/2⁻)			
423.3 5	≤0.1[&]	6990.5		6567.2	(49/2⁺)			
435.2 2	2.6 1	4814.5	39/2⁻	4379.3	33/2⁺	E3	0.184	α(K)=0.0779 11; α(L)=0.0786 12; α(M)=0.0210 3 α(N)=0.00547 8; α(O)=0.001102 16; α(P)=0.0001235 18 α(exp)=0.20 2 Iγ(at 48 MeV)=36.0 9.
442.2 5	0.20 4	1116.4	(3/2⁻)	674.32	(7/2⁻)			
454.8 5	≤0.1[&]	7972.2		7517.4	(55/2⁻)			
455.4 5	<0.1	2678.0		2222.5				
469.7 5	0.15 3	2609.4		2139.6	(21/2)⁻			
491.4 5	0.63[&] 1	5909.8	(41/2,43/2)	5418.4	41/2⁻			
491.8 5	≤0.1[&]	8829.0	[59/2⁻]	8337.1				
496.5 5	0.34 3	4875.8		4379.3	33/2⁺			
499.0 2	5.7[&] 3	5917.4	43/2⁺	5418.4	41/2⁻	E1	0.01068	α(exp)<0.05; A_2=−0.28 9 α(K)=0.00877 13; α(L)=0.001457 21; α(M)=0.000342 5 α(N)=8.79×10^{-5} 13; α(O)=1.86×10^{-5} 3; α(P)=2.47×10^{-6} 4 Branching ratio=54 1.
502.8 2	1.7 1	1919.10		1416.27	21/2⁻			
511.1 2	41.6 5	1927.4	23/2⁻	1416.27	21/2⁻			Iγ(at 48 MeV)=82.0 22.
516.9 2	6.4[&] 8	5331.4	41/2⁻	4814.5	39/2⁻	M1+E2	0.08 5	α(exp)=0.13 5; A_2=−0.70 3 α(K)=0.06 4; α(L)=0.013 6; α(M)=0.0030 13 α(N)=0.0008 4; α(O)=0.00017 7; α(P)=2.2×10^{-5} 11
520.5 5	0.16 2	4334.5		3814.2	29/2⁺			
521.8 5	0.92[&] 1	5940.3	(41/2,43/2)	5418.4	41/2⁻			

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^{208}Pb(^{7}Li,4nγ) 2001Ba79 (continued)

γ(^{211}At) (continued)

E_γ [†]	I_γ [‡@]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [#]	α [a]	Comments
526.8 5	0.89 2	3814.2	29/2+	3287.4	(27/2+)	M1	0.1205	α(K)=0.0981 14; α(L)=0.01711 25; α(M)=0.00404 6 α(N)=0.001046 15; α(O)=0.000224 4; α(P)=3.10×10^{-5} 5 α(exp)=0.14 9; A_2=−0.31 10 Iγ(at 48 MeV)=3.2 3. Branching ratio=40 1.
538.6 5	0.26 3	4917.9		4379.3	33/2+			
549.1 2	2.0[&] 3	6466.5	(45/2)	5917.4	43/2+	D		A_2=−0.28 9
549.4 5	0.24 2	3341.7		2792.3				
549.9 2	5.3[&] 5	6567.2	(49/2+)	6017.3	45/2+	E2	0.0269	α(exp)=0.04 2; A_2=+0.16 7 α(K)=0.0189 3; α(L)=0.00601 9; α(M)=0.001509 22 α(N)=0.000390 6; α(O)=8.03×10^{-5} 12; α(P)=9.74×10^{-6} 14
552.0 5	0.08 2	2836.6		2284.6	(19/2)−			
555.1 5	0.07 2	3391.7		2836.6				
563.6 5	0.29 4	4942.9		4379.3	33/2+			
578.3 5	0.64[&] 1	5909.8	(41/2,43/2)	5331.4	41/2−			
581.5 5	0.20 8	3312.8		2731.3				
583.1 2	1.4[&] 2	6600.4	(47/2)	6017.3	45/2+	D		A_2=−0.26 3
586.0 2	4.4[&] 3	5917.4	43/2+	5331.4	41/2−	E1	0.00772	α(exp)<0.1; A_2=−0.33 3 α(K)=0.00636 9; α(L)=0.001040 15; α(M)=0.000243 4 α(N)=6.27×10^{-5} 9; α(O)=1.327×10^{-5} 19; α(P)=1.780×10^{-6} 25 Branching ratio=43 1.
591.7 5	0.97 10	2731.3		2139.6	(21/2)−			
594.3 2	1.5 2	3287.4	(27/2+)	2693.1	27/2+			Iγ(at 48 MeV)=2.8 4. Branching ratio=68 2.
598.9 2	5.7 2	1919.10		1320.28	17/2−			
603.9 2	5.9[&] 2	5418.4	41/2−	4814.5	39/2−	M1+E2	0.05 4	α(exp)=0.10 7; A_2=−0.87 7 α(K)=0.04 3; α(L)=0.008 4; α(M)=0.0020 9 α(N)=0.00051 22; α(O)=0.00011 5; α(P)=1.5×10^{-5} 7
609.0 5	0.51[&] 1	5940.3	(41/2,43/2)	5331.4	41/2−			
616.6 5	0.09 2	4995.9		4379.3	33/2+			
626.0 2	2.1 1	1946.21		1320.28	17/2−			
633.1 5	0.20 4	4808.6		4175.5	31/2+			
637.9 5	0.19 2	4452.1		3814.2	29/2+			
642.0 2	1.0 1	1912.1		1270.05	15/2−			
646.7 5	0.53 5	3287.4	(27/2+)	2640.7	29/2+			Iγ(at 48 MeV)=1.0 2. Iγ: 646.7γ is listed twice in table 2 of 2001Ba79, one with Iγ=5.3 5 and the other with Iγ=3.2 5; the former value is adopted here since it agrees with the branching ratio of 24 2 and with Iγ values at 48 MeV. Branching ratio=24 2.
651.7 5	0.82[&] 1	6569.1		5917.4	43/2+			
[x]654.0	≤0.1[&]							
662.4 2	1.2 1	2581.5		1919.10				

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^{208}Pb(^{7}Li,4nγ) 2001Ba79 (continued)

γ(^{211}At) (continued)

Eγ[†]	Iγ[‡@]	Ei(level)	J_i^π	Ef	J_f^π	Mult.[#]	α[a]	Comments
671.0 5	0.18 4	3287.4	(27/2+)	2616.3	25/2+			Iγ(at 48 MeV)=0.35 4. Branching ratio=8 2.
671.7 5	0.69[&] 1	6090.2		5418.4	41/2−			
672.0 5	0.10[&] 2	7239.2		6567.2	(49/2+)			
674.3 2	7.2 1	674.32	(7/2−)	0.0	9/2−			
676.1 2	2.3 2	1946.21		1270.05	15/2−			
682.0 5	0.40 2	2609.4		1927.4	23/2−			
686.0 5	0.31[&] 4	6017.3	45/2+	5331.4	41/2−			Branching ratio=15 1.
688.9 2	25.3 6	2616.3	25/2+	1927.4	23/2−			A_2=−0.30 4 Iγ(at 48 MeV)=57.4 6.
697.0 5	0.32 8	2836.6		2139.6	(21/2)−			
713.3 2	6.9 4	2640.7	29/2+	1927.4	23/2−	E3	0.0418	α(K)=0.0265 4; α(L)=0.01142 16; α(M)=0.00294 5 α(N)=0.000763 11; α(O)=0.0001567 22; α(P)=1.89×10^{-5} 3 A_2=+0.40 8 Mult.: from Adopted Gammas. Iγ(at 48 MeV)=17.8 2.
723.3 2	6.1 2	2139.6	(21/2)−	1416.27	21/2−			
734.1 5	≤0.1[&]	8120.3		7386.2	(51/2)			
746.1 5	0.8[&] 1	7346.5		6600.4	(47/2)			
759.0 5	0.19 5	2678.0		1919.10				
762.0 5	0.11 2	4576.2		3814.2	29/2+			
763.2 5	0.12 3	3555.5		2792.3				
777.0 5	0.53 7	2916.5		2139.6	(21/2)−			
778.0 5	0.13 4	3509.3		2731.3				
784.5 5	0.10 2	4598.7		3814.2	29/2+			
803.8 5	0.35 2	2731.3		1927.4	23/2−			
810.8 5	0.88 6	2729.9		1919.10				
819.0 5	0.6[&] 1	7386.2	(51/2)	6567.2	(49/2+)	D+Q		A_2=−0.77 10 A_2 for 819.0γ+819.6γ.
819.6 5	0.35[&] 1	8337.1		7517.4	(55/2−)	D+Q		A_2=−0.77 10 A_2 for 819.0γ+819.6γ.
820.3 5	0.19 4	2959.9		2139.6	(21/2)−			
831.8 5	≤0.1[&]	7399.0		6567.2	(49/2+)			
834.5 5	0.44 6	2189.4		1354.94	13/2+			
846.6 5	0.10[&] 2	8232.8		7386.2	(51/2)			
866.2 2	2.3 1	866.18	(7/2−)	0.0	9/2−			
868.1 5	0.11 5	2284.6	(19/2)−	1416.27	21/2−			
886.1 5	0.18 5	2241.0		1354.94	13/2+			
899.2 2	1.4 1	2169.3		1270.05	15/2−			
902.2 2	1.6 1	2222.5		1320.28	17/2−			
929.0 5	≤0.1[&]	7496.2		6567.2	(49/2+)			
947.6 2	2.2 1	947.61	(5/2−)	0.0	9/2−			
950.2 2	1.8[&] 1	7517.4	(55/2−)	6567.2	(49/2+)	[E3]	0.0206	A_2=+0.42 13 α(K)=0.01461 21; α(L)=0.00450 7; α(M)=0.001129 16 α(N)=0.000293 5; α(O)=6.09×10^{-5} 9; α(P)=7.64×10^{-6} 11
952.4 5	0.51 6	2222.5		1270.05	15/2−			
964.6 5	0.41 2	2284.6	(19/2)−	1320.28	17/2−			
985.8 5	≤0.1[&]	9814.8		8829.0	[59/2−]			
989.1 5	0.34 2	2916.5		1927.4	23/2−			

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^{208}Pb(^{7}Li,4nγ) 2001Ba79 (continued)

γ(^{211}At) (continued)

E_γ[†]	I_γ[‡@]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	α[a]	Comments
1006.0 *5*	≤0.1[&]	7573.2		6567.2	(49/2$^+$)			
1014.5 *5*	0.31 *4*	2284.6	(19/2)$^-$	1270.05	15/2$^-$			
1044.2 *2*	1.7 *2*	2399.14		1354.94	13/2$^+$			
1053.9 *5*	≤0.1[&]	7621.2	(53/2)	6567.2	(49/2$^+$)			
1066.9 *2*	100.0 *22*	1066.84	(13/2$^-$)	0.0	9/2$^-$			A_2=+0.12 *3* Iγ(at 48 MeV)=100.0 *14*.
1081.0 *5*	0.24 *6*	2436.0		1354.94	13/2$^+$			
1091.0 *5*	0.17[&] *2*	7658.2		6567.2	(49/2$^+$)			
1095.5 *5*	≤0.1[&]	5909.8	(41/2,43/2)	4814.5	39/2$^-$			
1096.6 *5*	0.94 *6*	3024.0		1927.4	23/2$^-$			
1102.8 *5*	0.30[&] *5*	5917.4	43/2$^+$	4814.5	39/2$^-$			Branching ratio=3.0 *3*.
1121.0 *5*	0.27 *4*	3814.2	29/2$^+$	2693.1	27/2$^+$			A_2=+0.21 *9* Iγ(at 48 MeV)=0.91 *1*. Branching ratio=12 *1*.
1123.2 *2*	9.7 *5*	1123.23	11/2$^-$	0.0	9/2$^-$			
1125.7 *5*	0.61[&] *4*	5940.3	(41/2,43/2)	4814.5	39/2$^-$			
1173.5 *5*	0.96 *9*	3814.2	29/2$^+$	2640.7	29/2$^+$			A_2=+0.08 *5* Iγ(at 48 MeV)=3.4 *1*. Branching ratio=43 *1*.
1193.1 *2*	1.5 *1*	2609.4		1416.27	21/2$^-$			
1197.8 *5*	0.09 *2*	3814.2	29/2$^+$	2616.3	25/2$^+$			Iγ(at 48 MeV)=0.30 *5*. Branching ratio=4 *1*.
1202.8 *2*	1.1[&] *1*	6017.3	45/2$^+$	4814.5	39/2$^-$	[E3]	0.01212	A_2=+0.46 *9* α(K)=0.00908 *13*; α(L)=0.00229 *4*; α(M)=0.000564 *8* α(N)=0.0001462 *21*; α(O)=3.06×10^{-5} *5*; α(P)=3.95×10^{-6} *6*; α(IPF)=1.227×10^{-6} *18* Branching ratio=69 *2*.
1235.1 *2*	1.1 *1*	2555.4		1320.28	17/2$^-$			
1281.0 *5*	0.17 *4*	2636.04		1354.94	13/2$^+$			
1311.6 *5*	≤0.1[&]	8829.0	[59/2$^-$]	7517.4	(55/2$^-$)			
1312.8 *5*	0.23 *5*	2436.0		1123.23	11/2$^-$			
1315.0 *5*	0.77 *5*	2731.3		1416.27	21/2$^-$			
1353.0 *5*	≤0.1[&]	7920.2		6567.2	(49/2$^+$)			
1354.9 *2*	3.8 *2*	1354.94	13/2$^+$	0.0	9/2$^-$			
1363.0 *5*	0.18 *3*	2717.9		1354.94	13/2$^+$			
1366.0 *2*	1.2 *1*	2636.04		1270.05	15/2$^-$			
1369.7 *5*	0.23 *5*	3509.3		2139.6	(21/2)$^-$			
1376.1 *5*	0.75 *5*	2792.3		1416.27	21/2$^-$			
1387.0 *5*	0.35 *3*	4027.7		2640.7	29/2$^+$			
1405.0 *5*	≤0.1[&]	7972.2		6567.2	(49/2$^+$)			
1443.0 *5*	0.14 *3*	2797.9		1354.94	13/2$^+$			
1472.0 *2*	1.0 *1*	2792.3		1320.28	17/2$^-$			
1504.0 *5*	0.54 *4*	3431.4		1927.4	23/2$^-$			
1512.1 *5*	0.24 *4*	2867.0		1354.94	13/2$^+$			
1524.7 *2*	1.1 *1*	4165.4	[33/2$^-$]	2640.7	29/2$^+$			
1528.3 *5*	0.18 *4*	2883.3		1354.94	13/2$^+$			
1534.8 *2*	7.0 *2*	4175.5	31/2$^+$	2640.7	29/2$^+$			A_2=−0.20 *7* Iγ(at 48 MeV)=50.0 *12*.
1543.0 *5*	<0.1	2898.0		1354.94	13/2$^+$			
1547.6 *2*	1.1 *1*	3475.0		1927.4	23/2$^-$			
1560.0 *5*	0.32 *6*	3487.4		1927.4	23/2$^-$			

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$^{208}Pb(^{7}Li,4n\gamma)$ 2001Ba79 (continued)

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

E_γ [†]	I_γ [‡@]	E_i(level)	J^π_i	E_f	J^π_f
1577.0 *5*	0.80 *7*	2847.1		1270.05	15/2⁻
1613.2 *5*	0.29 *2*	2883.3		1270.05	15/2⁻
1628.0 *5*	0.24 *2*	2898.0		1270.05	15/2⁻
1648.2 *5*	0.44 *3*	4288.9		2640.7	29/2⁺
1650.0 *5*	0.43 *7*	2920.1		1270.05	15/2⁻
1667.6 *5*	0.29 *3*	4308.3		2640.7	29/2⁺
1895.1 *5*	0.21 *2*	3822.6		1927.4	23/2⁻

[†] Uncertainties assigned as follows based on suggestion in S. Bayer's Ph.D. Thesis, "Octupole Correlations and Residual Interactions," Australian National University, Canberra, 1998: $\Delta(E\gamma)$=0.2 keV for strong γ rays with $I\gamma \geq 1.0$, otherwise $\Delta(E\gamma)$=0.5 keV.

[‡] For some of the long-lived isomers 2001Ba79 determine γ branching ratios by coincidence gating procedure. These are more precise than the values from listed relative γ intensities, thus given in Adopted dataset.

[#] Multipolarities are from total conversion coefficients deduced from γ-ray transition intensity balances. Angular distribution coefficients A_2 (A_4 set to 0) were deduced from γ-ray intensity measurements at $\theta=\pm145°$, $\pm97°$, and $\pm48°$.

[@] At 39 MeV, unless otherwise stated. In beam intensities at 48 MeV are mostly given under comment.

[&] At 48 MeV beam energy.

[a] Additional information 1.

[x] γ ray not placed in level scheme.

$^{208}Pb(^{7}Li,4n\gamma)$ 2001Ba79

Level Scheme

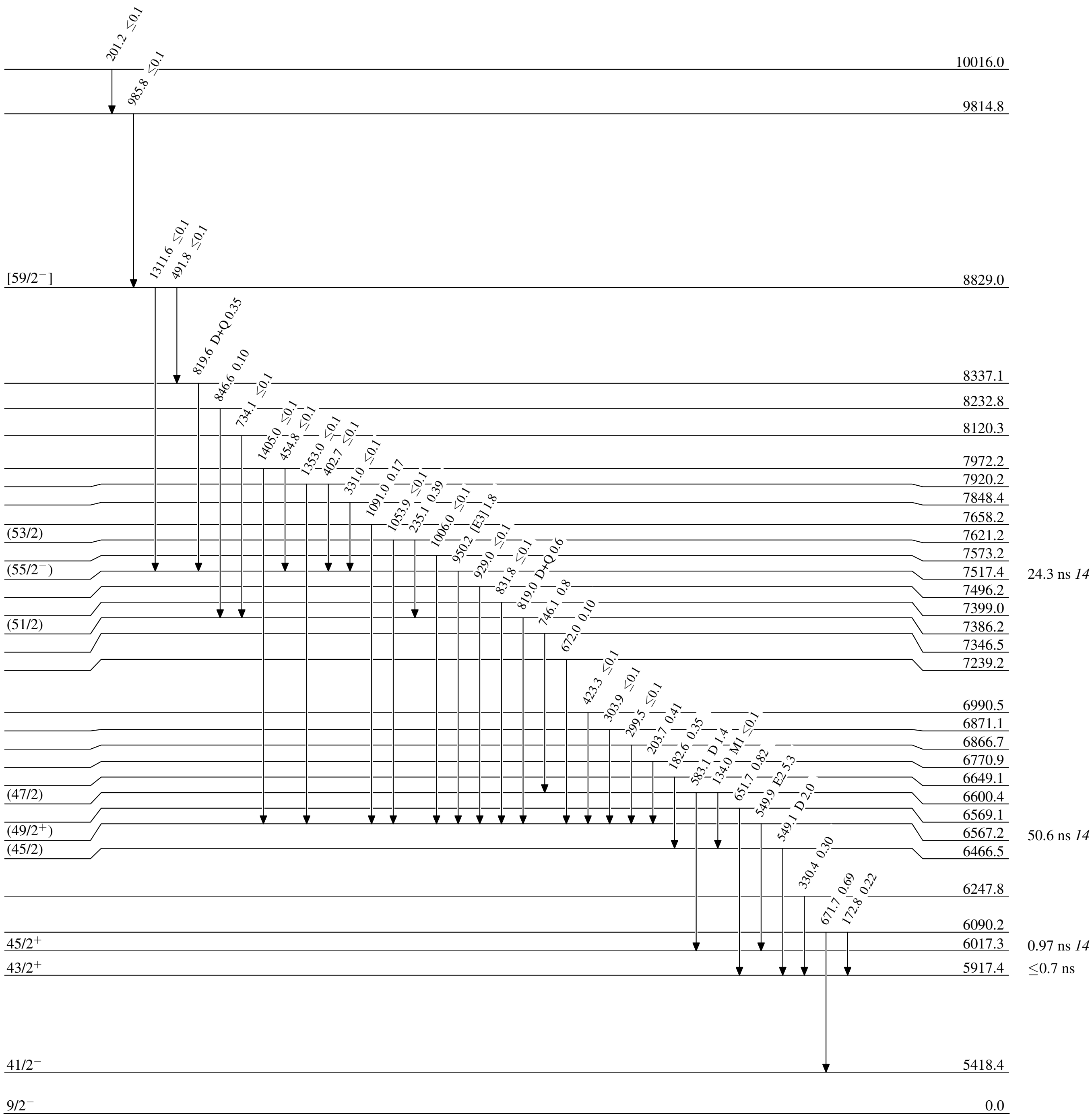
Intensities: Relative I_γ

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$

$I_\gamma < 10\% \times I_\gamma^{max}$

$I_\gamma > 10\% \times I_\gamma^{max}$



$^{211}_{85}At_{126}$

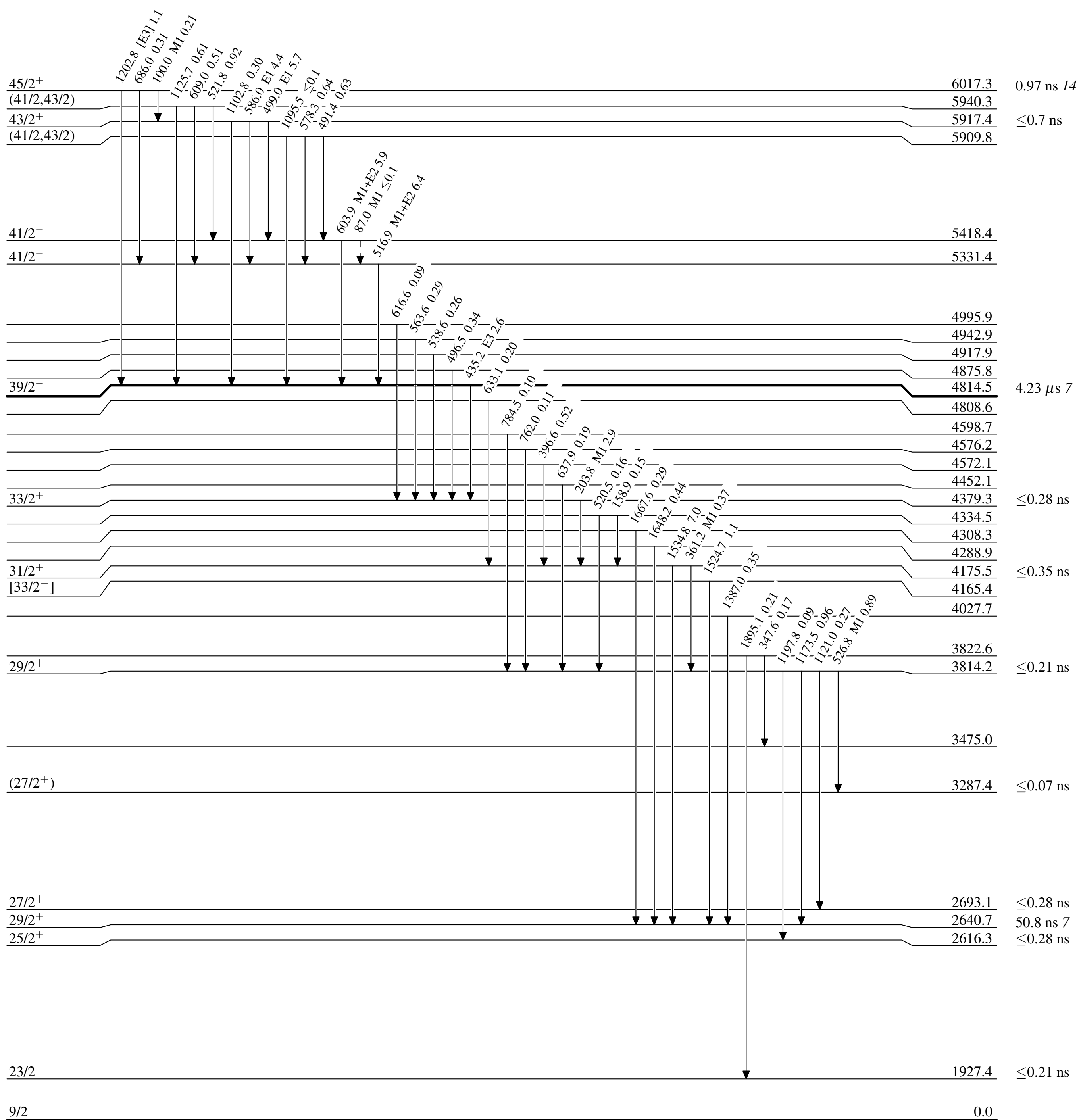
$^{208}Pb(^{7}Li,4n\gamma)$ 2001Ba79

Level Scheme (continued)

Intensities: Relative I_γ

Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)

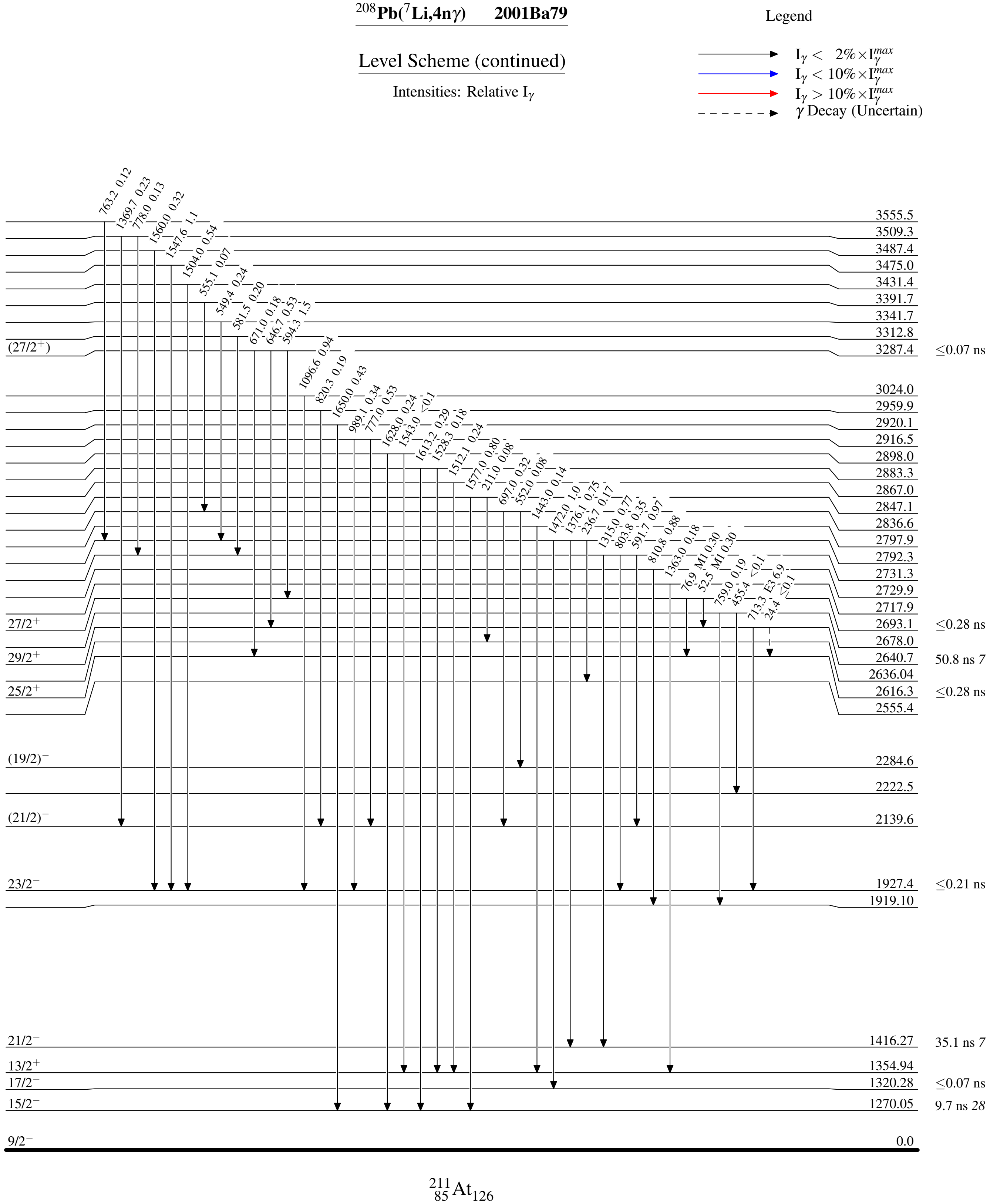


$^{211}_{85}At_{126}$

$^{208}Pb(^{7}Li,4n\gamma)$ 2001Ba79

Level Scheme (continued)

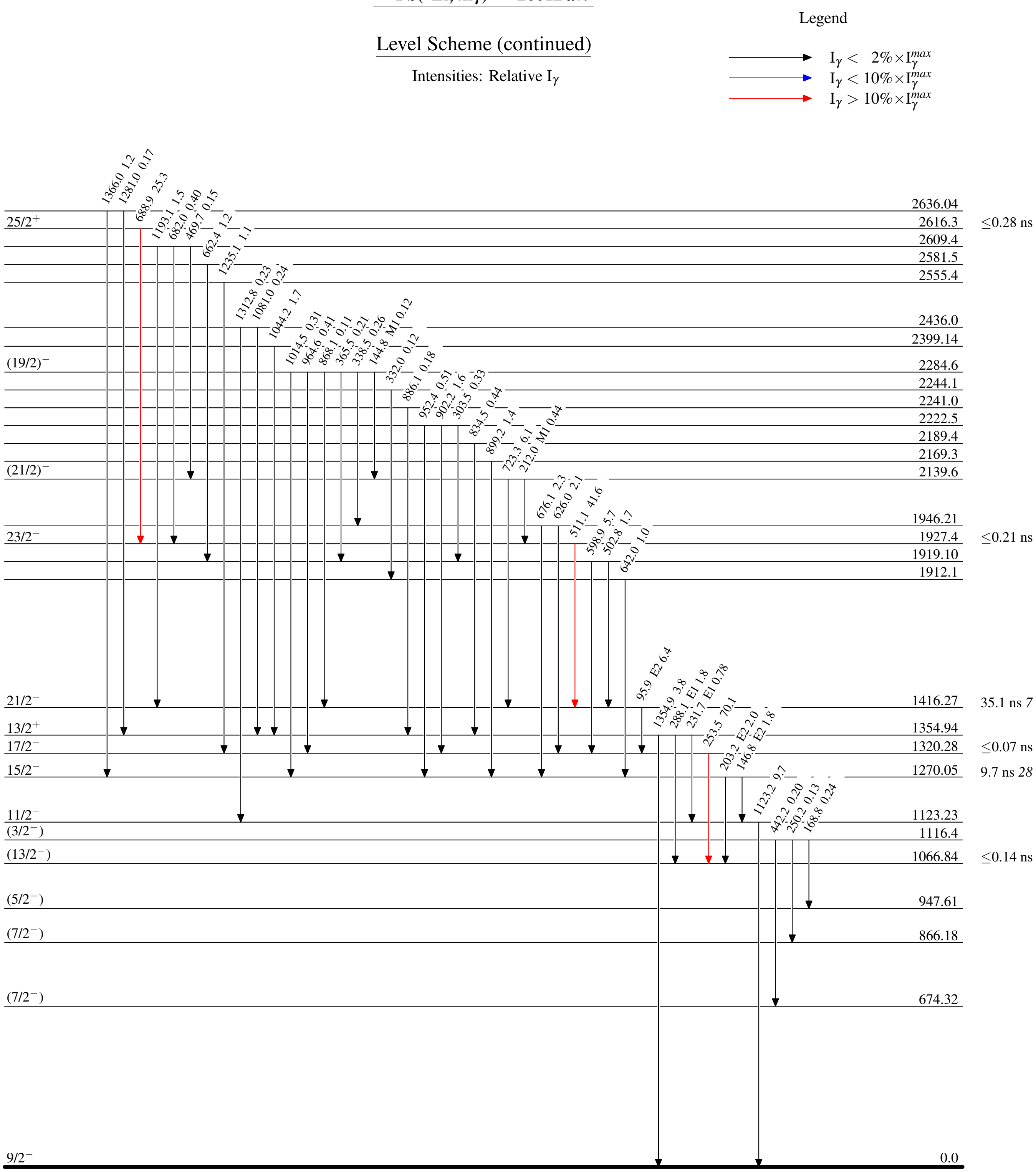
Intensities: Relative I_γ



$^{208}Pb(^{7}Li,4n\gamma)$ 2001Ba79

Level Scheme (continued)

Intensities: Relative I_γ



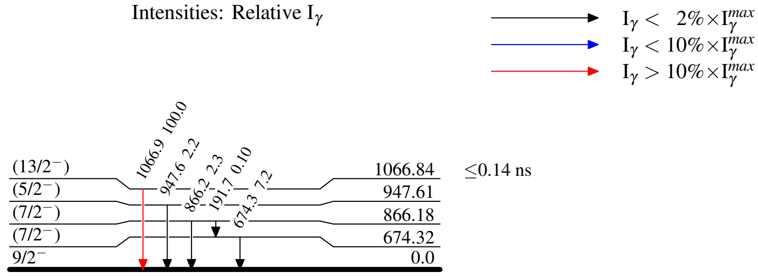
$^{211}_{85}At_{126}$

$^{208}Pb(^{7}Li,4n\gamma)$ 2001Ba79

Level Scheme (continued)

Intensities: Relative I_γ

Legend



$^{211}_{85}At_{126}$