^{208}Pb(^{7}Li,3nγ) 1999Ba30,1998By01

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	K. Auranen and E. A. Mccutchan	NDS 168, 117 (2020)	1-Aug-2020

1999Ba30: Target: ^{208}Pb. Projectile ^{7}Li, E=30-44 MeV. Measured Eγ, Iγ, $\gamma\gamma$ coin, $\gamma\gamma$(t), $\gamma(\theta)$ using the CAESAR array of six Compton-suppressed Ge detectors. Measured conversion electrons using a superconducting solenoide spectrometer. Deduced internal conversion coefficients and assigned γ-ray multipolarities. Subset of results presented in 1998By01.

Others: 1994By01, 1979Sj01.

This dataset presents a measurement made in-beam yielding prompt data. For off-beam data measured in the same experiment see ^{212}At IT decay (152 μs) dataset.

α: Additional information 1.

^{212}At Levels

E(level)[†]	J$^{\pi}$[‡]	T$_{1/2}$[#]	Comments
222.9	(9$^-$)[&]	0.121 s *2*	E(level),T$_{1/2}$,J$^{\pi}$: From Adopted Levels. Energy is rounded value.
701.4	10$^-$[a]	≤1.4 ns	
885.4	11$^+$[d]	18.7 ns *7*	g-factor=0.541 *11*, corrected for diagmagnetism and for Knight shift (1979Sj01,1994By01).
1262.4	12$^+$[b]	≤0.7 ns	
1283.0		≤4[@] ns	
1316.8	11$^-$	≤2 ns	
1321.4		≤4[@] ns	
1428.6			
1540.5	13$^-$[&]	≤1.4 ns	
1548.4			
1604.3	15$^-$[&]	35.4 ns *14*	g-factor=0.622 *10*, corrected for diagmagnetism and for Knight shift (1979Sj01). g-factor=0.631 *5*, measured in ^{208}Pb(^{11}B,α3nγ) (1994By01). T$_{1/2}$: other: 37.4 ns *14* (1979Sj01).
1710.6	14$^-$[&]		
1763.9	16$^-$[c]		
1806.0			
1832.4			
1954.7	16$^-$[a]		
2004.5			
2037.6			
2093.9			
2111.5			
2128.2			
2193.1	(15)[d]		
2212.5	16$^+$[d]		
2250.0	18$^+$[d]	42 ns *2*	
2263.5	19$^{(+)}$[d]		
2269.5			
2335.9			
2356.0			
2702.6			
2724.9			
2737.5			
2786.9			
2797.3	20$^{(+)}$[e]	≤0.7 ns	
3034.3	(19$^+$)[e]		
3322.7	(19$^+$)[g]		J$^{\pi}$: (21$^-$) in Table 2 of 1999Ba30 is likely a typo. J$^{\pi}$ from level scheme figure in 1999Ba30 and Table 5.
3364.1	(21$^-$)[i]		

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$^{208}Pb(^{7}Li,3n\gamma)$ **1999Ba30,1998By01 (continued)**

^{212}At Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	Comments
3506.0	$22^{(-)}$ [f]	2.8 ns *7*	
3519.6?			
3682.4	(21^{-}) [f]		
3882.6	(20^{+}) [h]		J^{π}: (20^{-}) in Table 2 of 1999Ba30 is likely a typo. J^{π} from level scheme figure in 1999Ba30 and Table 5.
4440.2	$21^{(+)}$ [j]		
4547.3	$22^{(+)}$ [k]		
4771.4	$25^{(-)}$ [l]	152 μs *5*	

[†] Deduced by evaluators from a least-squares fit to Eγ.
[‡] As proposed by 1999Ba30 based on γ(θ) and ce measurements.
[#] From 1999Ba30, unless otherwise specified.
[@] From 1979Sj01.
[&] Possible configuration=($(\pi\ h_{9/2})^{+3}(\nu\ g_{9/2})$).
[a] Possible configuration=($(\pi\ h_{9/2})^{+3}(\nu\ i_{11/2})$).
[b] Possible configuration=($(\pi\ h_{9/2})^{+3}(\nu\ j_{15/2})$).
[c] Possible configuration=($(\pi\ h_{9/2})^{+2}(\pi\ f_{7/2})(\nu\ g_{9/2})$).
[d] Possible configuration=($(\pi\ h_{9/2})^{+2}(\pi\ i_{13/2})(\nu\ g_{9/2})$).
[e] Possible configuration=($(\pi\ h_{9/2})^{+2}(\pi\ i_{13/2})(\nu\ i_{11/2})$).
[f] Possible configuration=($(\pi\ h_{9/2})^{+2}(\pi\ i_{13/2})(\nu\ j_{15/2})$).
[g] Possible configuration=($(\pi\ h_{9/2})(\pi\ i_{13/2})(\pi\ f_{7/2})(\nu\ g_{9/2})$).
[h] Possible configuration=($(\pi\ h_{9/2})(\pi\ i_{13/2})(\pi\ f_{7/2})(\nu\ i_{11/2})$).
[i] Possible configuration=($(\pi\ h_{9/2})(\pi\ i_{13/2})^{+2}(\nu\ g_{9/2})$).
[j] Possible configuration=($(\pi\ h_{9/2})^{+3}(\nu\ g_{9/2})(\nu\ i_{11/2})(\nu\ p_{1/2})^{-1}$).
[k] Possible configuration=($(\pi\ h_{9/2})^{+2}(\pi\ f_{7/2})(\nu\ g_{9/2})(\nu\ i_{11/2})(\nu\ p_{1/2})^{-1}$).
[l] Possible configuration=($(\pi\ h_{9/2})^{+2}(\pi\ i_{13/2})(\nu\ g_{9/2})(\nu\ i_{11/2})(\nu\ p_{1/2})^{-1}$).

$\gamma(^{212}At)$

E_{γ}[†]	I_{γ}[‡]	E_i(level)	J^{π}_i	E_f	J^{π}_f	Mult.[#]	α	Comments
(13.5)		2263.5	$19^{(+)}$	2250.0	18^{+}			
(19.2)		2212.5	16^{+}	2193.1	(15)			
(37.7)		2250.0	18^{+}	2212.5	16^{+}	(E2)[&]	814	α(L)=603 *9*; α(M)=160.5 *23*; α(N)=41.3 *6*; α(O)=8.06 *12*; α(P)=0.795 *12* Mult.: from α(exp)>55.
63.9	16 *2*	1604.3	15^{-}	1540.5	13^{-}	(E2)[&]	62.4	α(L)=46.2 *7*; α(M)=12.37 *18*; α(N)=3.19 *5*; α(O)=0.623 *9*; α(P)=0.0620 *9* Mult.: from α(exp)=58 *9*.
106.3	11 *1*	1710.6	14^{-}	1604.3	15^{-}			
107.2	3 *1*	4547.3	$22^{(+)}$	4440.2	$21^{(+)}$	M1[&]	9.92	α(K)=8.02 *12*; α(L)=1.449 *21*; α(M)=0.343 *5*; α(N)=0.0889 *13*; α(O)=0.0190 *3* α(P)=0.00263 *4* Mult.: from α(exp)=11.6 *6*.
159.3	56 *1*	1763.9	16^{-}	1604.3	15^{-}	M1[&]	3.22	α(K)=2.60 *4*; α(L)=0.466 *7*; α(M)=0.1102 *16*; α(N)=0.0286 *4*; α(O)=0.00611 *9* α(P)=0.000844 *12* Mult.: from α(exp)=3.7 *10*.

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$^{208}Pb(^{7}Li,3n\gamma)$ 1999Ba30,1998By01 (continued)

$\gamma(^{212}At)$ (continued)

E_γ [†]	I_γ [‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [#]	α	Comments
170.1	9 *1*	1710.6	14^-	1540.5	13^-			
176.5	≤5	3682.4	(21^-)	3506.0	$22^{(-)}$			
183.9 [@] *2*	420 *13*	885.4	11^+	701.4	10^-	E1 [&]	0.1030	α(K)=0.0827 *12*; α(L)=0.01549 *23*; α(M)=0.00367 *6*; α(N)=0.000940 *14*; α(O)=0.000195 *3* α(P)=2.45×10^{-5} *4* Mult.: from α(exp)=0.25 *8*; A_2=0.14 *5* in γ(θ).
223.7	77 *10*	1540.5	13^-	1316.8	11^-	E2 [&]	0.337	α(K)=0.1301 *19*; α(L)=0.1532 *22*; α(M)=0.0405 *6*; α(N)=0.01048 *15*; α(O)=0.00208 *3* α(P)=0.000222 *4* Mult.: from α(exp)=0.26 *12*; A_2=0.28 *5* in γ(θ).
224.2	10 *2*	4771.4	$25^{(-)}$	4547.3	$22^{(+)}$	E3	2.86	α(K)=0.330 *5*; α(L)=1.85 *3*; α(M)=0.514 *8*; α(N)=0.1342 *19*; α(O)=0.0266 *4*; α(P)=0.00278 *4* Mult.: from α(K)exp=0.3 *1*, α(L)exp=1.5 *2*, α(M)exp=0.5 *1*.
228.0	32 *2*	1832.4		1604.3	15^-	M1 [&]	1.175	α(K)=0.952 *14*; α(L)=0.1693 *24*; α(M)=0.0401 *6*; α(N)=0.01038 *15*; α(O)=0.00222 *4* α(P)=0.000307 *5* Mult.: from α(exp)=1.4 *10*.
231.6	17 *2*	1548.4		1316.8	11^-			
237.0	7 *1*	3034.3	(19^+)	2797.3	$20^{(+)}$	M1 [&]	1.055	α(K)=0.855 *12*; α(L)=0.1520 *22*; α(M)=0.0360 *5*; α(N)=0.00931 *13*; α(O)=0.00199 *3* α(P)=0.000275 *4* Mult.: from α(exp)=1.4 *10*.
257.6	4 *1*	1806.0		1548.4				
278.1 [@] *2*	1000 *13*	1540.5	13^-	1262.4	12^+	E1 [&]	0.0384	α(K)=0.0312 *5*; α(L)=0.00553 *8*; α(M)=0.001305 *19*; α(N)=0.000335 *5*; α(O)=7.00×10^{-5} *10* α(P)=9.05×10^{-6} *13* Mult.: from α(exp)=0.07 *2*; A_2≈0 in γ(θ).
295.4	8 *1*	2250.0	18^+	1954.7	16^-	M2 [&]	2.10	α(K)=1.555 *22*; α(L)=0.408 *6*; α(M)=0.1019 *15*; α(N)=0.0267 *4*; α(O)=0.00567 *8* α(P)=0.000762 *11* Mult.: from α(exp)=2.5 *7*.
318.3	5 *1*	3682.4	(21^-)	3364.1	(21^-)			
350.3	58 *3*	1954.7	16^-	1604.3	15^-			
360.6	26 *2*	2193.1	(15)	1832.4				
364.4	5 *2*	2128.2		1763.9	16^-			
377.0 [@] *2*	868 *2*	1262.4	12^+	885.4	11^+	M1	0.295	α(K)=0.240 *4*; α(L)=0.0422 *6*; α(M)=0.00998 *14*; α(N)=0.00258 *4*; α(O)=0.000553 *8* α(P)=7.65×10^{-5} *11* Mult.: from α(K)exp=0.28 *1*, α(L)exp=0.046 *5*; A_2≈0 in γ(θ).
397.6 [@] *2*	28 *4*	1283.0		885.4	11^+			
400.2	20 *2*	2004.5		1604.3	15^-			
401.2	10 *2*	2356.0		1954.7	16^-			
436.0 [@] *2*	41 *4*	1321.4		885.4	11^+			
439.1	21 *3*	2702.6		2263.5	$19^{(+)}$			
448.1	31 *2*	2212.5	16^+	1763.9	16^-			
452.6	11 *2*	2702.6		2250.0	18^+			
461.4	21 *2*	2724.9		2263.5	$19^{(+)}$			
478.5 [@] *2*	407 *8*	701.4	10^-	222.9	(9^-)	M1	0.1557	α(K)=0.1266 *18*; α(L)=0.0221 *4*; α(M)=0.00523 *8*; α(N)=0.001354 *19*; α(O)=0.000290 *4* α(P)=4.01×10^{-5} *6* Mult.: from α(K)exp=0.10 *4*; A_2≈0 in γ(θ).

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^{208}Pb(^{7}Li,3nγ) 1999Ba30,1998By01 (continued)

γ(^{212}At) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	α	Comments
482.4	44 *4*	2193.1	(15)	1710.6	14^-			
486.0	17 *4*	2250.0	18^+	1763.9	16^-			
489.2	5 *1*	2037.6		1548.4				
489.6	19 *4*	2093.9		1604.3	15^-			
505.6	60 *5*	2269.5		1763.9	16^-			
523.7	8 *2*	2128.2		1604.3	15^-			
525.5	6 *2*	3322.7	(19^+)	2797.3	$20^{(+)}$			
533.8	137 *5*	2797.3	$20^{(+)}$	2263.5	$19^{(+)}$	M1	0.1164	α(K)=0.0947 *14*; α(L)=0.01651 *24*; α(M)=0.00390 *6*; α(N)=0.001009 *15*; α(O)=0.000216 *3* α(P)=2.99×10^{-5} *5* Mult.: from α(K)exp=0.096 *6*, α(L)exp=0.015 *2*; A_2=−0.86 *3* in $\gamma(\theta)$.
547.3	≤5	2797.3	$20^{(+)}$	2250.0	18^+			
557.5	5 *3*	4440.2	$21^{(+)}$	3882.6	(20^+)			
560.0	5 *3*	3882.6	(20^+)	3322.7	(19^+)			
566.8	54 *6*	3364.1	(21^-)	2797.3	$20^{(+)}$			
571.0	21 *3*	2111.5		1540.5	13^-			
572.0	22 *3*	2335.9		1763.9	16^-			
588.8	8 *2*	2193.1	(15)	1604.3	15^-			
592.2	15 *2*	2356.0		1763.9	16^-			
608.2[@] *2*	422 *15*	2212.5	16^+	1604.3	15^-	E1	0.00717	α(K)=0.00591 *9*; α(L)=0.000964 *14*; α(M)=0.000225 *4*; α(N)=5.81×10^{-5} *9*; α(O)=1.230×10^{-5} *18* α(P)=1.652×10^{-6} *24* Mult.: from α(K)exp<0.01; A_2=−0.52 *4* in $\gamma(\theta)$.
645.5	59 *3*	2250.0	18^+	1604.3	15^-	E3	0.0547	α(K)=0.0328 *5*; α(L)=0.01631 *23*; α(M)=0.00423 *6*; α(N)=0.001099 *16*; α(O)=0.000225 *4* α(P)=2.67×10^{-5} *4* Mult.: from α(K)exp<0.05; A_2=0.27 *8* in $\gamma(\theta)$.
662.5[@] *2*	856 *15*	885.4	11^+	222.9	(9^-)	M2	0.1714	α(K)=0.1343 *19*; α(L)=0.0281 *4*; α(M)=0.00681 *10*; α(N)=0.001772 *25*; α(O)=0.000378 *6* α(P)=5.17×10^{-5} *8* Mult.: from α(K)exp=0.133 *1*, α(L)exp=0.024 *3*; A_2=0.10 *4* in $\gamma(\theta)$.
708.7	6 *2*	3506.0	$22^{(-)}$	2797.3	$20^{(+)}$			
722.3[a]		3519.6?		2797.3	$20^{(+)}$			tentative placement in the level scheme.
727.2	5 *1*	1428.6		701.4	10^-			
757.8	≤5	4440.2	$21^{(+)}$	3682.4	(21^-)			
782.8	10 *2*	2737.5		1954.7	16^-			
784.3	6 *3*	3034.3	(19^+)	2250.0	18^+			
848.0	4 *1*	3882.6	(20^+)	3034.3	(19^+)			
885.0	5 *2*	3682.4	(21^-)	2797.3	$20^{(+)}$			
1023.0	16 *2*	2786.9		1763.9	16^-			
1059.3	11 *3*	3322.7	(19^+)	2263.5	$19^{(+)}$			
1076.0	4 *1*	4440.2	$21^{(+)}$	3364.1	(21^-)			
1085.4	11 *2*	3882.6	(20^+)	2797.3	$20^{(+)}$			
1094.0	200 *10*	1316.8	11^-	222.9	(9^-)	(E2)	0.00651	α(K)=0.00516 *8*; α(L)=0.001027 *15*; α(M)=0.000247 *4*; α(N)=6.37×10^{-5} *9*; α(O)=1.344×10^{-5} *19* α(P)=1.775×10^{-6} *25* Mult.: Q from A_2=0.15 *10* in $\gamma(\theta)$, M2 excluded by comparison to RUL.
1242.5	27 *3*	3506.0	$22^{(-)}$	2263.5	$19^{(+)}$	(E3)	0.01129	α(K)=0.00851 *12*; α(L)=0.00209 *3*;

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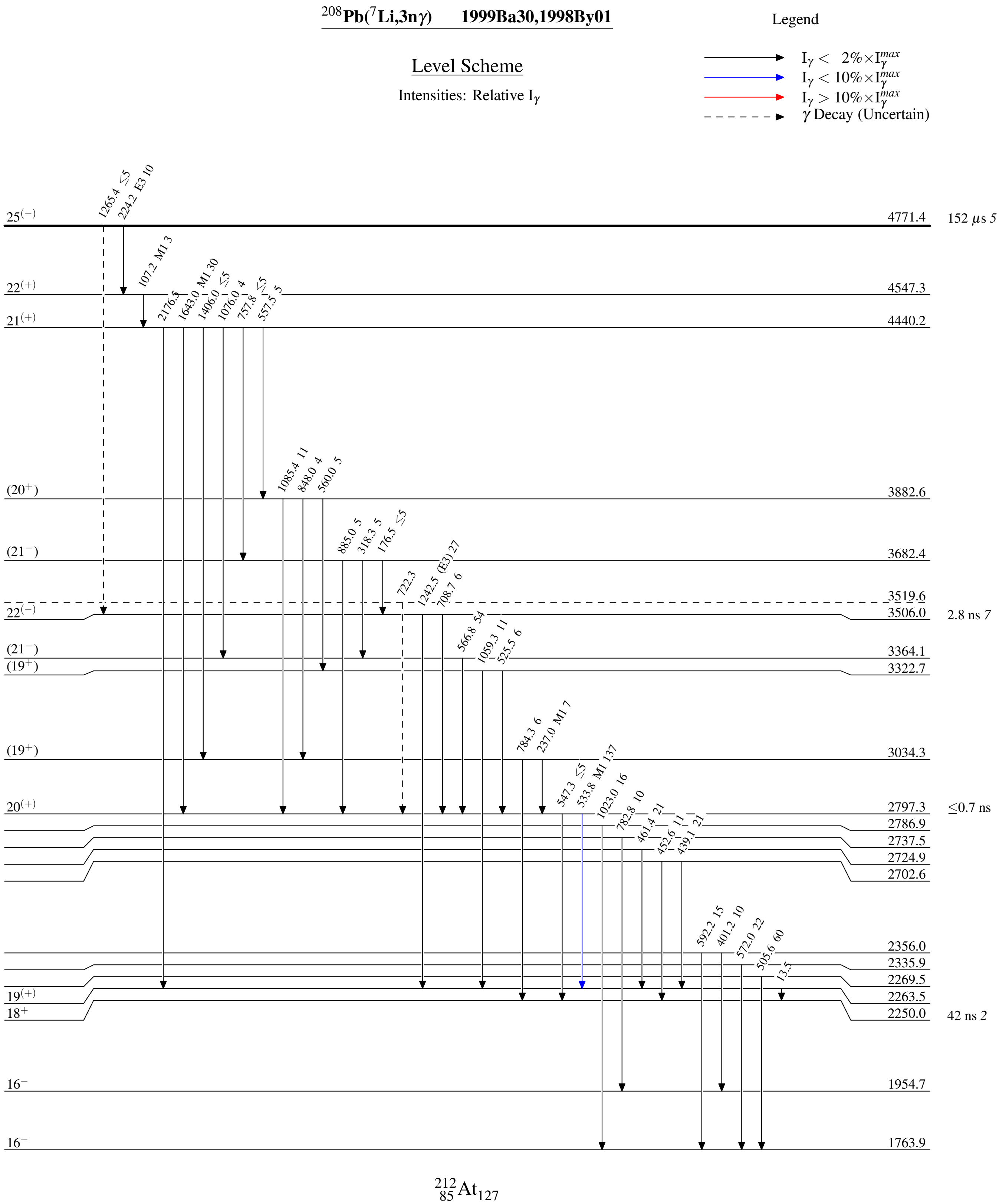
^{208}Pb(^{7}Li,3nγ) 1999Ba30,1998By01 (continued)

$\gamma(^{212}At)$ (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	α	Comments
								α(M)=0.000515 *8*; α(N)=0.0001336 *19*; α(O)=2.80×10^{-5} *4* α(P)=3.63×10^{-6} *5* Mult.: O from A_2=0.43 *11* in $\gamma(\theta)$, M3 excluded by comparison to RUL.
1265.4[a]	≤5	4771.4	$25^{(-)}$	3506.0	$22^{(-)}$			tentative placement in the level scheme.
1406.0	≤5	4440.2	$21^{(+)}$	3034.3	(19^{+})			
1643.0	30 *3*	4440.2	$21^{(+)}$	2797.3	$20^{(+)}$	M1	0.00646	α(K)=0.00512 *8*; α(L)=0.000865 *13*; α(M)=0.000203 *3*; α(N)=5.26×10^{-5} *8*; α(O)=1.129×10^{-5} *16* α(P)=1.566×10^{-6} *22* Mult.: from α(K)exp=0.0061 *4*; A_2≈0 in $\gamma(\theta)$.
2176.5		4440.2	$21^{(+)}$	2263.5	$19^{(+)}$			

[†] From 1999Ba30, except where noted. ΔE not explicitly stated by 1999Ba30.
[‡] Prompt Iγ measured at E=39 MeV; given relative to Iγ(278γ)=100. See IT decay dataset for delayed intensities.
[#] Based on $\gamma(\theta)$ and conversion electron measurements (1999Ba30), except where noted.
[@] From 1979Sj01.
[&] From total conversion coefficients deduced from γ-ray transition intensity balance (1999Ba30).
[a] Placement of transition in the level scheme is uncertain.


^{208}Pb(^{7}Li,3nγ) 1999Ba30,1998By01
Level Scheme
Intensities: Relative I_γ
Legend
$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$
γ Decay (Uncertain)
25(−) 4771.4 152 μs 5
22(+) 4547.3
21(+) 4440.2
(20+) 3882.6
(21−) 3682.4
3519.6
22(−) 3506.0 2.8 ns 7
(21−) 3364.1
(19+) 3322.7
(19+) 3034.3
20(+) 2797.3 ≤0.7 ns
2786.9
2737.5
2724.9
2702.6
2356.0
2335.9
2269.5
19(+) 2263.5
18+ 2250.0 42 ns 2
16− 1954.7
16− 1763.9
1265.4 ≲5
224.2 E3 10
107.2 M1 3
2176.5
1643.0 M1 30
1406.0 ≲5
1076.0 4
757.8 ≲5
557.5 5
1085.4 11
848.0 4
560.0 5
885.0 5
318.3 5
176.5 ≲5
722.3
1242.5 (E3) 27
708.7 6
566.8 54
1059.3 11
525.5 6
784.3 6
237.0 M1 7
547.3 ≲5
533.8 M1 137
1023.0 16
782.8 10
461.4 21
452.6 11
439.1 21
592.2 15
401.2 10
572.0 22
505.6 60
13.5
$^{212}_{85}At_{127}$

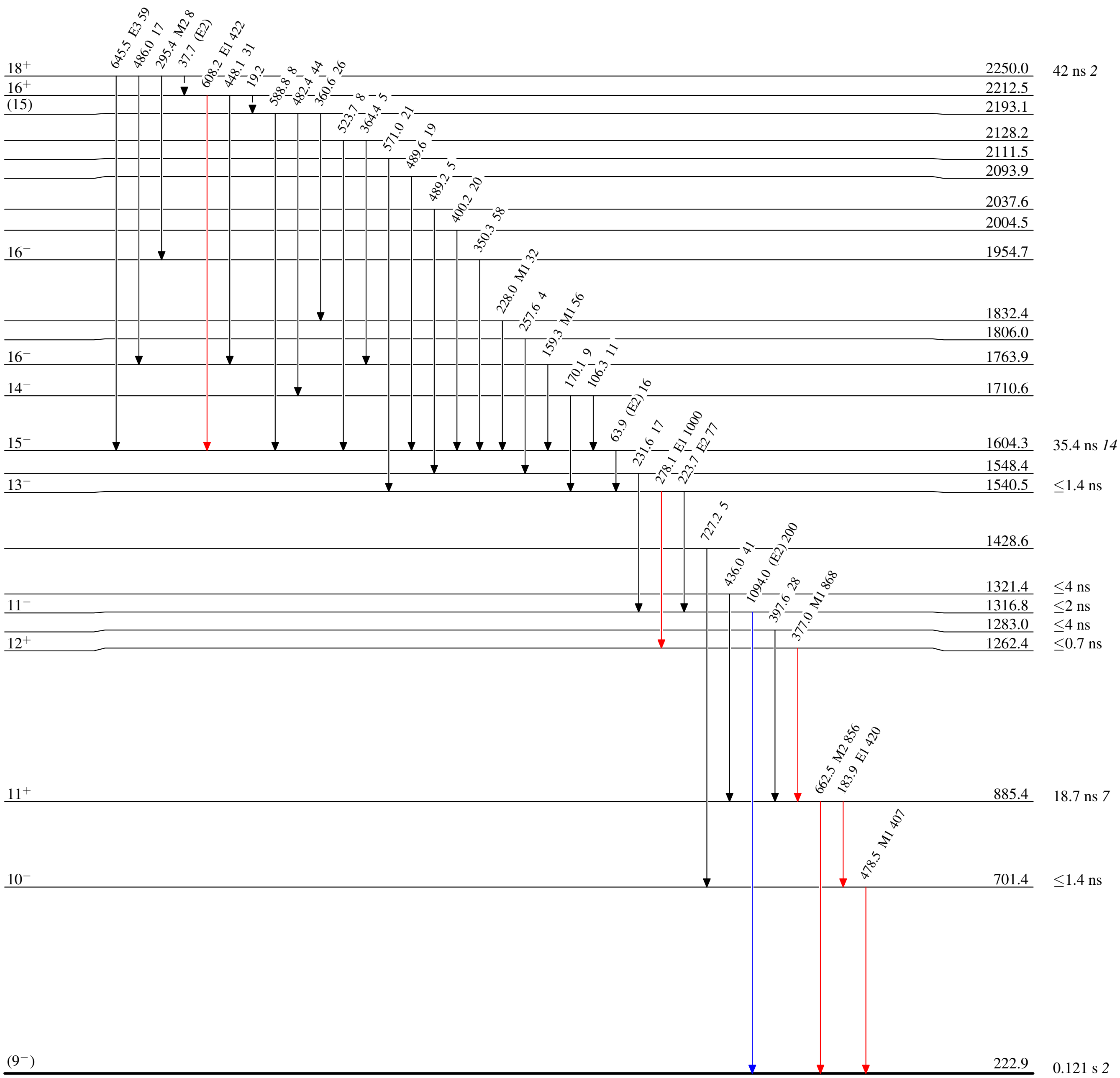
$^{208}Pb(^{7}Li,3n\gamma)$ 1999Ba30,1998By01

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)



$^{212}_{85}At_{127}$