^{208}Pb(^{9}Be,α2nγ) 1998Mc03

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	J. K. Tuli, P. Blokhin, J. Kaur, J. Y. Lee and N. Sharma	NDS 114, 661 (2013)	28-Feb-2013

^{208}Pb(^{7}Li,p3nγ).

Target: 98% and 99% enriched 208Pb. Projectile: ^{9}Be, E=45^{-}, 50^{-}, 55^{-}, and 60 MeV.

Target: 98% enriched ^{208}Pb. Projectile: ^{7}Li, E=56 MeV. Incomplete fusion reaction. Measured Eγ, Iγ in γ-ray singles spectra. $\alpha\gamma$ coin, $\alpha\gamma\gamma$(t) coin, $\gamma\gamma(\theta)$. Deduced levels half-life, γ-ray multipolarities (from measured angular distribution coefficients and γ-ray transition-intensity balances). Detector: CAESAR array, which consisted of six Compton-suppressed hyperpure Ge detectors for γ rays, and an ANU Particle Detector Ball, an array of 14 phoswich detectors for particle detection.

^{211}Po Levels

E(level)[†]	J$^{\pi}$[@]	T$_{1/2}$	Comments
0.0	9/2^{+}[#]	0.516 s *3*	T$_{1/2}$: From Adopted Levels.
687.2 *7*	11/2^{+}[#]		
1050.9 *10*	5/2^{+}[#]		
1064.8 *8*	15/2^{-}[#]	14.0 ns *2*	
1121.8 *8*	7/2^{+}[#]		
1160.6 *7*	(9/2^{+})[#]		
1181.4 *8*	(13/2^{+})[#]		
1385.2 *15*	1/2^{+},3/2^{+}[#]		
1407.2 *13*			
1409.4 *7*			
1427.8 *13*	(17/2^{+})[#]		
1427.8+x	(21/2^{+})	25.0 ns *14*	
1436.6 *8*			
1443.0 *15*	(1/2^{+})		J$^{\pi}$: not adopted.
1458.9 *13*	(15/2^{+})		
1463 *6*	(25/2^{+})	25.2 s *6*	T$_{1/2}$,E(level),J$^{\pi}$: from Adopted Levels.
1508.3 *13*			
1517.2 *13*			
1541.8 *17*			
1578.0 *18*			
1579.9 *10*			
1585.1 *15*			
1612.4 *15*			
1614.6 *15*			
1615.6 *17*			
1637.8 *13*			
1656.8+x *17*			
1696.6 *17*			
1716.2 *13*			
1735.9+x *9*	(23/2^{+})		
1786.3 *17*			
1798.0 *13*			
1820.3[‡] *9*	(27/2^{+})		J$^{\pi}$: 357γ (M1) to (25/2^{+}).
1852.5 *17*			
1902.8+x *10*			
1904.2+x *13*			
1914.7 *17*			
1939.1+x *10*			
1944.3 *13*			
1978.3+x *10*			
1994.9+x *9*			

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^{208}Pb(^{9}Be,α2nγ) 1998Mc03 (continued)

^{211}Po Levels (continued)

E(level)[†]	J$^{\pi}$[@]	T$_{1/2}$	Comments
2093.7 *17*			
2104.3+x *10*			
2135.7[‡] *9*	(31/2$^-$)	243 ns *21*	J$^{\pi}$: 673γ E3 to (25/2$^+$), 315γ (M2) (27/2$^+$).
2186.9+x *10*			
2218.8 *17*			
2223.7 *20*			
2277.9 *15*			
2339.5 *18*			
2353.2 *17*			
2431.4 *17*			
2443.2+x *10*			
2840.2[‡] *13*			
2866.6[‡] *12*	(33/2$^-$)		
3443.2[‡] *12*	(37/2$^+$)	≤2 ns	J$^{\pi}$: 1307γ E3 to (31/2$^-$).
4364.7[‡] *13*	(37/2$^-$)		
4873.3[‡] *17*	(43/2$^+$)	2.8 μs *7*	
4912.5[‡] *16*			

[†] Deduced by evaluator from a least-squares fit to γ-ray energies using ΔE=0.5 keV for all γ rays.
[‡] Energy is relative to 1463 keV for the 25-s isomer. Uncertainty does not include the uncertainty (6 keV) of the isomer.
[#] From Adopted Levels.
[@] From γ-ray multipolarities and shell model calculations, unless given otherwise.

γ(^{211}Po)

E$_{\gamma}$	I$_{\gamma}$	E$_i$(level)	J$_i^{\pi}$	E$_f$	J$_f^{\pi}$	Mult.	α[†]	Comments
(x)		1427.8+x	(21/2$^+$)	1427.8	(17/2$^+$)			E$_{\gamma}$: x ≤50 (1998Mc03).
114.0	22[‡] *4*	1541.8		1427.8	(17/2$^+$)			
152.1	3[‡] *1*	1579.9		1427.8	(17/2$^+$)			
168.3	2[‡] *1*	1904.2+x		1735.9+x	(23/2$^+$)			
187.8	35 *5*	1615.6		1427.8	(17/2$^+$)			A$_2$=−0.11 *13*.
192.8	50 *13*	1578.0		1385.2	1/2$^+$,3/2$^+$			A$_2$=+0.26 *10*.
229.0	18[‡] *3*	1656.8+x		1427.8+x	(21/2$^+$)			
248.8	≤2	1409.4		1160.6	(9/2$^+$)			
258.9	6[‡] *1*	1994.9+x		1735.9+x	(23/2$^+$)			
268.8	18[‡] *3*	1696.6		1427.8	(17/2$^+$)			
276.0	≤2	1436.6		1160.6	(9/2$^+$)			
277.5	97[‡] *10*	1458.9	(15/2$^+$)	1181.4	(13/2$^+$)			
285.4	26 *8*	1407.2		1121.8	7/2$^+$			
287.7	43 *12*	1409.4		1121.8	7/2$^+$			
308.1	61 *10*	1735.9+x	(23/2$^+$)	1427.8+x	(21/2$^+$)			A$_2$=−0.14 *11*.
315.4	20 *3*	2135.7	(31/2$^-$)	1820.3	(27/2$^+$)	(M2)	1.569	α(K)=1.177 *17*; α(L)=0.296 *5*; α(M)=0.0733 *11* α(N)=0.0190 *3*; α(O)=0.00396 *6*; α(P)=0.000497 *7* B(M2)(W.u.)=0.100 *18* Mult.: from A$_2$=+0.03 *18*.
334.3	47 *5*	1385.2	1/2$^+$,3/2$^+$	1050.9	5/2$^+$			
356.6	≤2	1517.2		1160.6	(9/2$^+$)			

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^{208}Pb(^{9}Be,α2nγ) 1998Mc03 (continued)

γ(^{211}Po) (continued)

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α[†]	Comments
357.3	49[‡] *5*	1820.3	(27/2$^+$)	1463	(25/2$^+$)	(M1)	0.314	α(K)=0.256 *4*; α(L)=0.0445 *7*; α(M)=0.01048 *15* α(N)=0.00270 *4*; α(O)=0.000565 *8*; α(P)=7.30×10^{-5} *11* Mult.: from γ-ray transition-intensity balance.
358.5	25[‡] *4*	1786.3		1427.8	(17/2$^+$)			
363.0	705 *18*	1427.8	(17/2$^+$)	1064.8	15/2$^-$			A$_2$=−0.14 *3*.
377.6	46 *3*	1064.8	15/2$^-$	687.2	11/2$^+$			A$_2$=+0.07 *13*.
386.5	34 *6*	1508.3		1121.8	7/2$^+$			
392.1	104 *6*	1443.0	(1/2$^+$)	1050.9	5/2$^+$			A$_2$=+0.25 *9*.
424.7	10[‡] *1*	1852.5		1427.8	(17/2$^+$)			
475.0	25[‡] *5*	1902.8+x		1427.8+x	(21/2$^+$)			
486.9	20[‡] *5*	1914.7		1427.8	(17/2$^+$)			
494.2	14 *3*	1181.4	(13/2$^+$)	687.2	11/2$^+$			
508.6	23[‡] *3*	4873.3	(43/2$^+$)	4364.7	(37/2$^-$)	[E3]		
511.3	11[‡] *2*	1939.1+x		1427.8+x	(21/2$^+$)			
516.0	17[‡] *5*	1637.8		1121.8	7/2$^+$			
534.2	≤2	1585.1		1050.9	5/2$^+$			
550.5	12[‡] *2*	1978.3+x		1427.8+x	(21/2$^+$)			
561.5	≤2	1612.4		1050.9	5/2$^+$			
563.7	≤2	1614.6		1050.9	5/2$^+$			
567.1	13[‡] *2*	1994.9+x		1427.8+x	(21/2$^+$)			
576.5	5[‡] *2*	3443.2	(37/2$^+$)	2866.6	(33/2$^-$)			
645.7	≤2	2223.7		1578.0				
665.9	27 *4*	2093.7		1427.8	(17/2$^+$)			A$_2$/A$_0$=0.25 *11*.
672.7	171 *5*	2135.7	(31/2$^-$)	1463	(25/2$^+$)	E3	0.0461	α(K)=0.0288 *4*; α(L)=0.01295 *19*; α(M)=0.00333 *5* α(N)=0.000859 *12*; α(O)=0.0001715 *24*; α(P)=1.87×10^{-5} *3* B(E3)(W.u.)=22.5 *23* Mult.: L=3 from A$_2$=+0.33 *6* and γ-ray transition-intensity balance. E3 from T$_{1/2}$.
676.5	16 *3*	2104.3+x		1427.8+x	(21/2$^+$)			
687.1	392 *8*	687.2	11/2$^+$	0.0	9/2$^+$			A$_2$=+0.04 *4*.
704.5	6[‡] *2*	2840.2		2135.7	(31/2$^-$)			
730.9	10[‡] *2*	2866.6	(33/2$^-$)	2135.7	(31/2$^-$)			
759.1	16[‡] *3*	2186.9+x		1427.8+x	(21/2$^+$)			
791.0	12 *3*	2218.8		1427.8	(17/2$^+$)			
896.5	≤2	2339.5		1443.0	(1/2$^+$)			
921.5	25 *4*	4364.7	(37/2$^-$)	3443.2	(37/2$^+$)			
925.4	18 *3*	2353.2		1427.8	(17/2$^+$)			
1003.6	16 *3*	2431.4		1427.8	(17/2$^+$)			
1015.4	33 *5*	2443.2+x		1427.8+x	(21/2$^+$)			
1029.0	≤2	1716.2		687.2	11/2$^+$			
1050.9	142 *6*	1050.9	5/2$^+$	0.0	9/2$^+$			A$_2$=−0.04 *8*.
1064.9	1000 *26*	1064.8	15/2$^-$	0.0	9/2$^+$	(E3)	0.01499	α(K)=0.01105 *16*; α(L)=0.00297 *5*; α(M)=0.000736 *11* α(N)=0.000190 *3*; α(O)=3.86×10^{-5} *6*; α(P)=4.55×10^{-6} *7* B(E3)(W.u.)=19.9 *8* A$_2$=+0.32 *4*. Mult.: from Adopted Levels.

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^{208}Pb(^{9}Be,α2nγ) 1998Mc03 (continued)

γ(^{211}Po) (continued)

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α[†]	Comments
1110.8	23 *2*	1798.0		687.2	$11/2^+$			
1122.0	180 *16*	1121.8	$7/2^+$	0.0	$9/2^+$			A_2=+0.08 *8*.
1160.6	70 *3*	1160.6	$(9/2^+)$	0.0	$9/2^+$			
1181.4	270[‡] *90*	1181.4	$(13/2^+)$	0.0	$9/2^+$			
1227.0	23 *11*	2277.9		1050.9	$5/2^+$			
1257.1	≤2	1944.3		687.2	$11/2^+$			
1307.5	53 *5*	3443.2	$(37/2^+)$	2135.7	$(31/2^-)$	E3	0.00957 *14*	B(E3)(W.u.)>32 α=0.00957 *14*; α(K)=0.00732 *11*; α(L)=0.001697 *24*; α(M)=0.000414 *6* α(N)=0.0001066 *15*; α(O)=2.19×10^{-5} *3*; α(P)=2.64×10^{-6} *4*; α(IPF)=6.12×10^{-6} *9* Mult.: from A_2=+0.41 *10* and γ-ray transition-intensity balance.
1409.2	60 *5*	1409.4		0.0	$9/2^+$			
1436.6	30 *4*	1436.6		0.0	$9/2^+$			
1469.3	6[‡] *2*	4912.5		3443.2	$(37/2^+)$			
1498.1	3[‡] *1*	4364.7	$(37/2^-)$	2866.6	$(33/2^-)$			

[†] Additional information 1.
[‡] Deduced from coincidence spectra due to contamination in the singles spectrum.

^{208}Pb(^{9}Be,α2nγ) 1998Mc03

Level Scheme

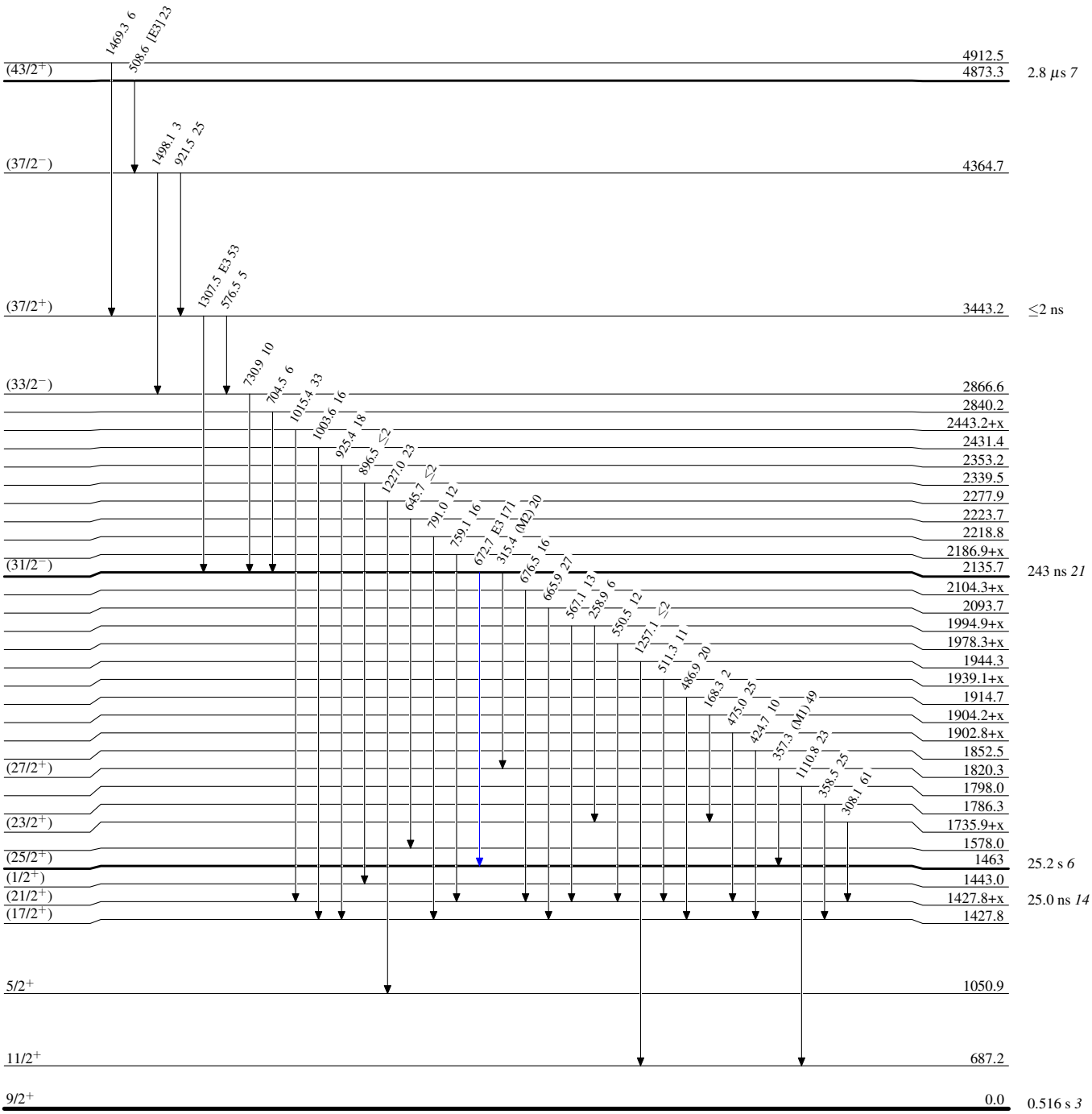
Intensities: Relative I_γ

Legend

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

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

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



$^{211}_{84}Po_{127}$

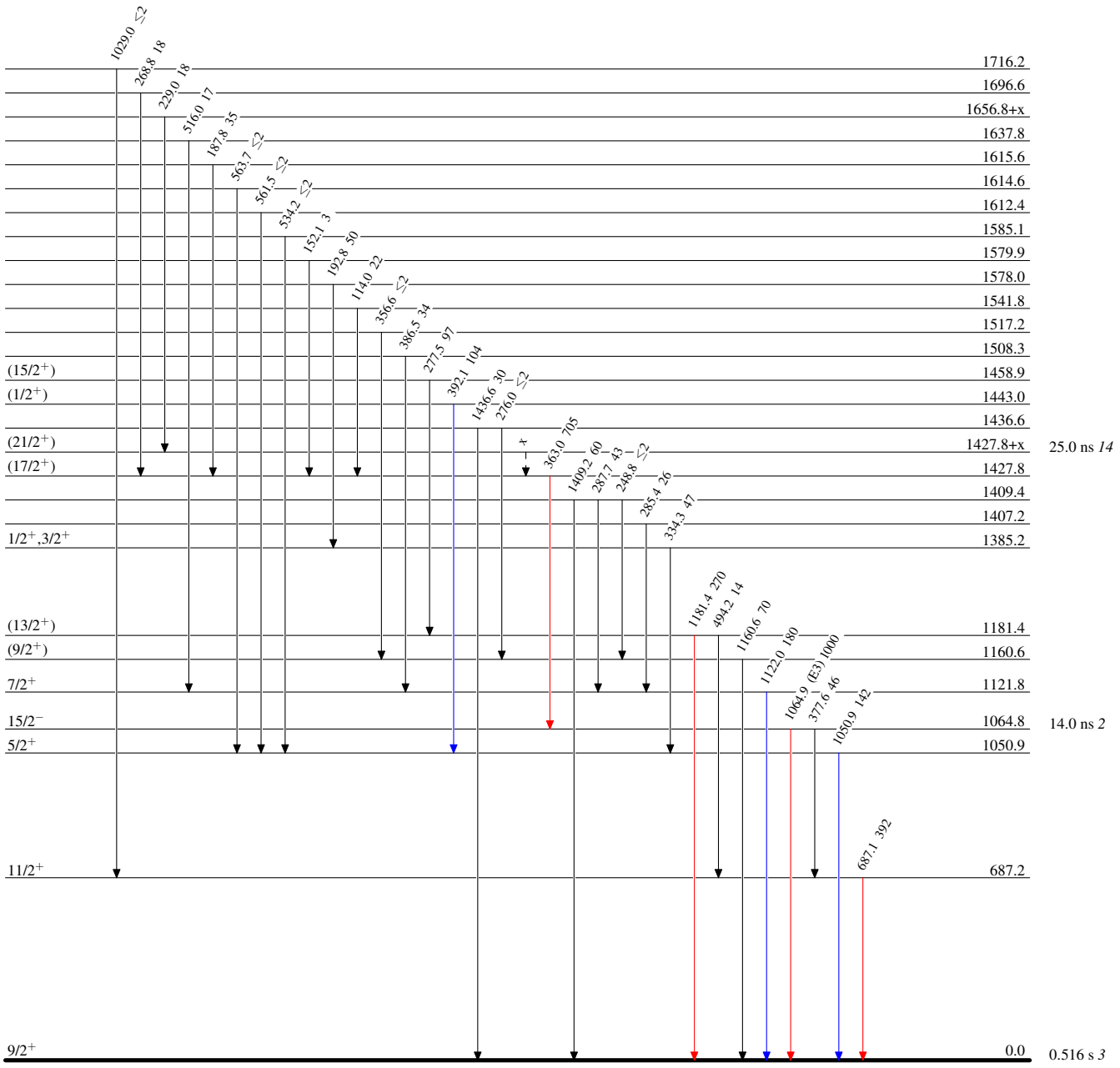
^{208}**Pb(**^{9}**Be,**α**2n**γ**)** **1998Mc03**

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)



$^{211}_{84}Po_{127}$