^{209}Bi(p,2nγ)

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	M. J. Martin	NDS 108,1583 (2007)	1-Jun-2007

1968Tr06 E=14,15,16 MeV.
1970Go09 E=16 MeV.
1976Ju03 E=14.8 MeV.
1985Ra21 E(p)=11.5-20.7.

The decay scheme is that proposed by 1985Ra21 based on $\gamma\gamma$ data. The evaluators have added a level At 3399.9 on the basis of the agreement In energy of the 697.0γ, unplaced by 1985Ra21, with the transition deexciting the 3399.5 level In ^{208}Pb(α,4nγ).

^{208}Po Levels

E(level)	J$^\pi$[†]	T$_{1/2}$[#]	Comments
0.0	0$^+$		
686.5	2$^+$		
1263.0	2$^+$		
1271.6	0$^+$	465 ps *20*	T$_{1/2}$: from P,γ(t) (1976Ju03).
1346.5	4$^+$		
1420.0	3$^+$		J$^\pi$: J=3 from $\gamma(\theta)$ (1985Ra21).
1524.1	6$^+$	4.8 ns *5*	
1528.1	8$^+$		
1539.5	2$^+$		
1583.0	4$^+$		
2041.1	(6)$^+$		
2160.0	8$^+$[‡]		
2240.6	9$^+$		
2335.2	(7)$^+$		
2369.3	7$^-$		
2414.4	(7)$^+$		
2554.4	10$^+$		
2555.7	(7)$^+$		
2574.3	(6,7)$^-$		
2702.9	11$^-$	8.0 ns *5*	
2800.3	9$^-$[‡]		
3399.9	12$^-$		

[†] Except where noted otherwise, spin and parity values are from Adopted Levels. Assignments from this reaction are noted.
[‡] From $\gamma(\theta)$ and multipolarities of deexciting transitions (1985Ra21).
[#] From P,γ(t) (1985Ra21), except for the 1271 level As noted.

γ(^{208}Po)

E$_\gamma$[†]	I$_\gamma$[‡]	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.[#]	δ[#]	α[@]	Comments
4.02 *3*		1528.1	8$^+$	1524.1	6$^+$	E2			E$_\gamma$: from ^{208}At ε decay. 1985Ra21 report 4.0 *2* from differences of energy sums. Mult.: from Adopted Gammas.
148.5	2.5	2702.9	11$^-$	2554.4	10$^+$	E1		0.172	
177.5	35	1524.1	6$^+$	1346.5	4$^+$	E2		0.736	Mult.: α(L)exp=0.34 *3*.
205.3	1	2574.3	(6,7)$^-$	2369.3	7$^-$	M1(+E2)	≤0.27	1.47 *4*	Mult.: α(L)exp=0.30 *1*.
236.5	1	1583.0	4$^+$	1346.5	4$^+$	M1(+E2)	≤0.39	0.96 *5*	Mult.: α(K)exp=0.20 *1*.
294.1	<1	2335.2	(7)$^+$	2041.1	(6)$^+$	M1		0.558	Mult.: α(K)exp=0.50 *5*.
313.7	2.3	2554.4	10$^+$	2240.6	9$^+$	M1+E2	−0.09 *1*	0.465 *1*	Mult.: α(K)exp=0.39 *2*.

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^{209}Bi(p,2nγ) (continued)

γ(^{208}Po) (continued)

E_γ [†]	I_γ [‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	δ[#]	α[@]	Comments
430.9	1.5	2800.3	9^-	2369.3	7^-	E2		0.0469	Mult.: α(K)exp=0.025 *5*.
x465.9									
517.0	4.7	2041.1	$(6)^+$	1524.1	6^+	M1+E2	0.37 *5*	0.111 *3*	Mult.: α(K)exp=0.088 *2*.
x566.1									
576.5	2.6	1263.0	2^+	686.5	2^+	M1(+E2)	≤0.48	0.085 *7*	Mult.: α(K)exp=0.075 *5*.
585.1	<1	1271.6	0^+	686.5	2^+				E_γ,I_γ: No transition to the 2^+ level is seen ($E\gamma$=585 from the level energy difference), $I\gamma<0.3I\gamma(1272\gamma)$ (1976Ju03). Note that 1970Go09 report Ice(K)/Ice(K)(1273)=0.86 *11* for $E\gamma$=575 *7*, apparently incorrectly interpreted by these authors As the 0^+ to 2^+ cascade transition.
x601.4									
631.8	6.2	2160.0	8^+	1528.1	8^+	M1+E2	0.42 *11*	0.064 *3*	Mult.: α(K)exp=0.049 *4*.
660.0	73	1346.5	4^+	686.5	2^+	E2		0.0173	Mult.: α(K)exp=0.0125 *5*.
686.5	100	686.5	2^+	0.0	0^+	E2		0.0159	Mult.: from Adopted Gammas.
694.5	2	2041.1	$(6)^+$	1346.5	4^+				
697.0		3399.9	12^-	2702.9	11^-	M1+E2	−0.21 *5*	0.0542 *8*	
712.5	8	2240.6	9^+	1528.1	8^+	M1+E2	−0.29 *18*	0.049 *3*	Mult.: α(K)exp=0.041 *5*.
x724.1									
733.5	7	1420.0	3^+	686.5	2^+	M1+E2	0.71 *17*	0.037 *4*	Mult.: α(K)exp=0.029 *7*.
807.1	2	2335.2	$(7)^+$	1528.1	8^+	M1(+E2)	≤0.27	0.0373 *9*	Mult.: α(K)exp=0.03 *1*.
x836.8									
x843.7[&]									
845.0	9	2369.3	7^-	1524.1	6^+	E1		0.00371	Mult.: α(K)exp=0.0033 *5*.
852.5	2	1539.5	2^+	686.5	2^+	M1+E2	0.70 *20*	0.026 *3*	Mult.: α(K)exp=0.024 *4*.
x863.6									
886.6	2	2414.4	$(7)^+$	1528.1	8^+	M1+E2	0.6 *3*	0.023 *5*	
896.5	9	1583.0	4^+	686.5	2^+	E2		0.0092	Mult.: α(K)exp=0.007 *1*.
x934.7									
x948.3									
x992.3[&]									
x1014.4[&]									
1026.3	2	2554.4	10^+	1528.1	8^+	E2		0.0071	Mult.: α(K)exp=0.007 *3*.
x1027.2									
1027.6	2	2555.7	$(7)^+$	1528.1	8^+	M1+E2	0.42 *+20−25*	0.0185 *17*	
x1146.3									
1174.8	1	2702.9	11^-	1528.1	8^+	E3		0.0119	
x1203.9									
x1257.3									
1263.0	1.2	1263.0	2^+	0.0	0^+				
1271.6 *8*		1271.6	0^+	0.0	0^+	E0			E_γ: from 1976Ju03. monopole strength, ρ=0.030 to 0.037. Mult.: strong ce transition, No photons (1976Ju03).
x1280.9									
1539[&]		1539.5	2^+	0.0	0^+				E_γ: not listed In authors′ table, but shown In their level scheme.

[†] From 1985Ra21. Others: 1968Tr06, 1970Go09.

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^{209}Bi(p,2nγ) (continued)

γ(^{208}Po) (continued)

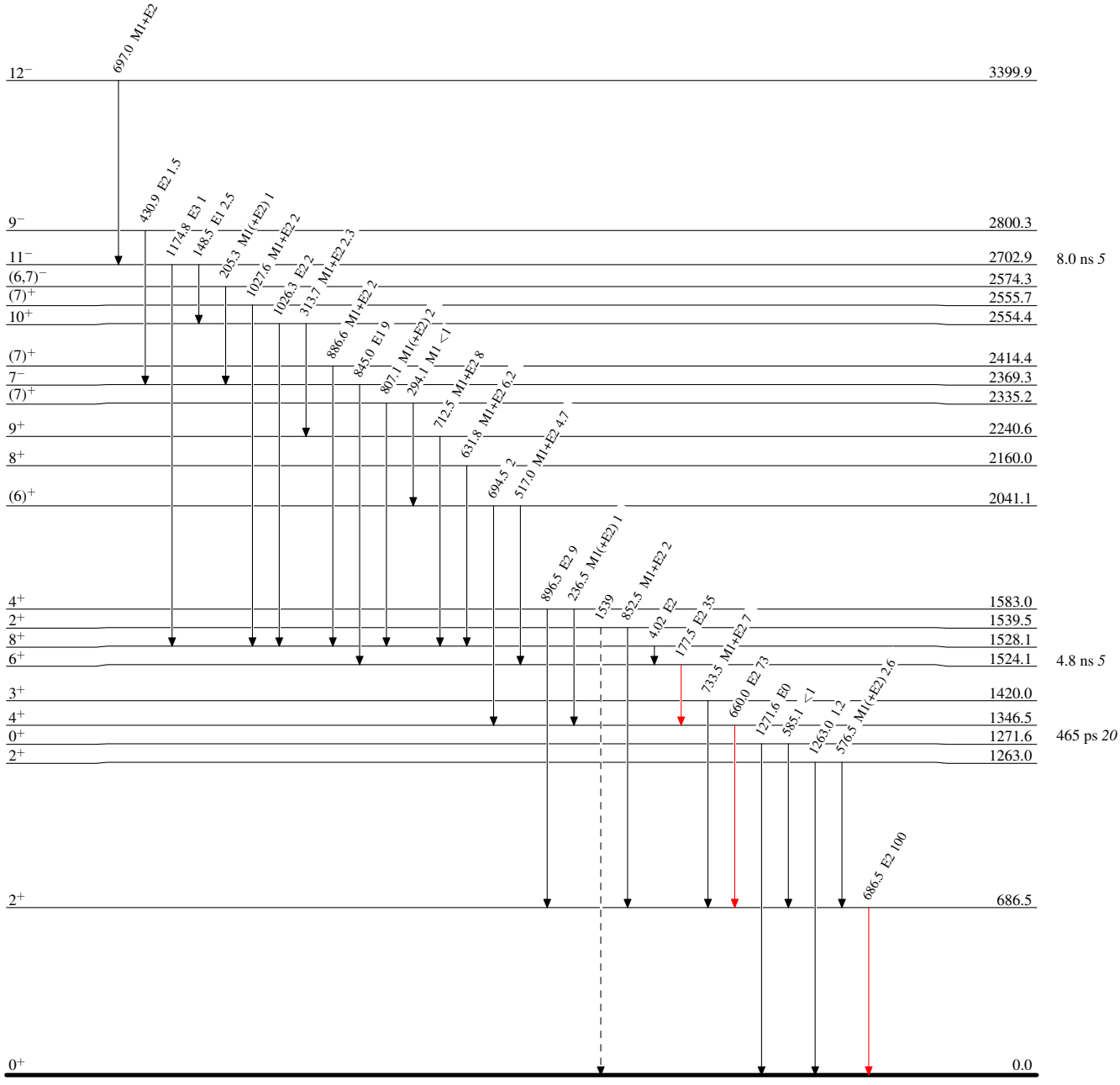
‡ From 1985Ra21. Relative prompt data taken At E(p)=20, θ=125°. ΔIγ are In the range 1-20%.
# From Adopted Gammas. α(K)exp data of 1985Ra21, given here, are based on I(ce(K))/Iγ normalized so that α(K)(686.5γ)=0.0118 (E2 theory). Other I(ce): 1970Go09.
@ Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.
& Placement of transition in the level scheme is uncertain.
x γ ray not placed in level scheme.

^{209}**Bi(p,2nγ)**

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)



$^{208}_{84}Po_{124}$