^{203}Tl(^{3}He,3nγ) 1982Lo14

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	F. G. Kondev	NDS 177, 509, 2021	4-Jul-2021

E(^{3}He)=20-27 MeV, pulsed beam; Targets: isotopically enriched ^{203}Tl; Detectors: Ge(Li), intrinsic germanium detectors, Si(Li) detector; Measured: excitation functions, Eγ, Iγ, γ singles, $\gamma\gamma$ coin, $\gamma(\theta)$, γ(t), ce; Deduced: level scheme, J^{π}, $T_{1/2}$, α(K)exp, α(L)exp, K/L, transition multipolarities.

^{203}Bi Levels

E(level)[†]	J^{π}[‡]	$T_{1/2}$[‡]	Comments
0[#]	9/2$^-$		
883.3[@] *3*	11/2$^-$		
893.6[@] *4*	5/2$^-$		
908.7[@] *4*	7/2$^-$		
932.4[@] *4*	13/2$^-$		
1091.0[&] *3*	7/2$^-$		
1097.7[a] *5*	1/2$^+$	≥3 μs	
1123.7 *3*	9/2$^-$		
1231.4 *4*	9/2$^-$		
1247.8 *4*	15/2$^-$		
1248.5 *4*	13/2$^-$		
1277.6 *4*	(7/2$^-$)		
1298.9 *6*			
1313.2[b] *6*	3/2$^+$		
1352.9 *4*	7/2$^-$		
1408.8 *6*	13/2$^-$		
1479.4 *6*	(5/2$^-$,7/2$^-$)		
1483.3 *6*	(13/2$^-$)		
1494.4 *6*	(15/2$^-$)		
1499.1 *5*	17/2$^-$		
1561.0[c] *6*	13/2$^+$		
1575.5 *6*	(17/2$^-$)		
1609.9 *6*	(7/2$^-$)		
1672.7 *5*	15/2$^-$		
1714.5 *6*	(5/2$^-$)		
1892.5[d] *6*	13/2$^+$		
1903.5[d] *5*	17/2$^+$		
1990.6[d] *7*	(21/2$^+$)	90 ns *7*	$T_{1/2}$: Using 655.6γ(t) and 883.4γ(t) in 1982Lo14.
2028.5? *7*			
2088.1 *7*	(21/2$^+$)		

[†] From least-squares fit to Eγ by assuming ΔEγ=0.5 keV.
[‡] From 1982Lo14.
[#] Configuration=$\pi(h^{+1}_{9/2})$.
[@] Configuration=$\pi(h^{+1}_{9/2})\otimes2^+$.
[&] Configuration=$\pi(f^{+1}_{7/2})$.
[a] Configuration=$\pi(s^{+1}_{1/2})$.
[b] Configuration=$\pi(d^{+1}_{3/2})$.
[c] Configuration=$\pi(i^{+1}_{13/2})$.
[d] Configuration=$\pi(h^{+1}_{9/2})\otimes\nu(f^{-1}_{5/2},i^{-1}_{13/2})_{4^-}$.

^{203}Tl(^{3}He,3nγ) 1982Lo14 (continued)

γ(^{203}Bi)

E_γ [†]	I_γ [†]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [‡]	δ [†]	Comments
(87.1)		1990.6	(21/2+)	1903.5	17/2+			
125.0 [#]		2028.5?		1903.5	17/2+			
126.5	≤15.1	1479.4	(5/2−,7/2−)	1352.9	7/2−	M1(+E2)		Mult.: A_2=−0.14 *3*, A_4=−0.3 *4*.
140.2	5.1	1231.4	9/2−	1091.0	7/2−	M1+E2		Mult.: α(L)exp=0.50, A_2=−0.02 *9*, A_4=0.18 *14*.
161.0	2.8	1408.8	13/2−	1247.8	15/2−	M1(+E2)	−0.25	Mult.: α(L)exp≈0.36, A_2=−0.42 *16*, A_4=−0.10 *26*.
175.2	4.3	1298.9		1123.7	9/2−			Mult.: A_2=−0.14 *12*, A_4=−0.21 *20*. α(L)exp=1.0, but value too high for the proposed multipolarity.
184.6	≤5.6	2088.1	(21/2+)	1903.5	17/2+	(E2)		Mult.: α(L)exp=0.33, A_2=0.19 *35*, A_4=−0.2 *5*.
186.7	≤17.7	1277.6	(7/2−)	1091.0	7/2−	(M1+E2)		Mult.: A_2=−0.21 *34*, A_4=−0.4 *5*. α(L)exp=1.2, but value too high for the proposed multipolarity.
189.2	1.9	1097.7	1/2+	908.7	7/2−	E3		Mult.: α(L)exp=3.2.
197.4	5.0	1091.0	7/2−	893.6	5/2−	M1+E2	−0.3	Mult.: α(L)exp≤0.3, A_2=0.1 *6*, A_4=−0.0 *8*.
204.0	2.8	1097.7	1/2+	893.6	5/2−			A_2=0.2 *8*, A_4=−0.0 *2*; α(L)exp=0.43, but the value is inconsistent with the assigned multipolarity.
214.8	≤9.1	1123.7	9/2−	908.7	7/2−	M1+E2		Mult.: α(K)exp≤0.43, K/L≈4.3, A_2=0.06 *40*, A_4=0.1 *6*.
230.9	1.3	1903.5	17/2+	1672.7	15/2−	E1		Mult.: quoted in 1982Lo14 from 1978Lo12.
235.5	2.0	1483.3	(13/2−)	1247.8	15/2−	M1+E2		Mult.: α(K)exp=0.65, K/L≥1.3, A_2=−0.4 *9*, A_4=−0.5 *2*.
240.4	3.2	1123.7	9/2−	883.3	11/2−	M1+E2		Mult.: α(K)exp=0.34. Other: A_2=−0.21 *24*, A_4=−0.4 *4*.
246.6	2.2	1494.4	(15/2−)	1247.8	15/2−	M1(+E2)		Mult.: α(K)exp≤1.1.
250.5	≈8.3	1499.1	17/2−	1248.5	13/2−			
251.4	≈2.9	1499.1	17/2−	1247.8	15/2−			I_γ: Using Iγ (250.5γ + 251.4γ)=11.2 and branching ratios from (α,4nγ).
262.0	≈12	1352.9	7/2−	1091.0	7/2−	(M1+E2)		Mult.: α(K)exp=1.53, K/L=2.7, A_2=−0.1 *3*, A_4=−0.4 *5*.
315.4	42.1	1247.8	15/2−	932.4	13/2−	M1+E2	−0.07	Mult.: α(K)exp=0.37, K/L=5.3, A_2=−0.25 *22*, A_4=−0.4 *4*.
327.7	4.0	1575.5	(17/2−)	1247.8	15/2−	M1+E2	−0.05	Mult.: α(K)exp=0.4, K/L≥2, A_2=−0.23 *25*, A_4=−0.02 *38*.
328 [#]		1903.5	17/2+	1575.5	(17/2−)			
348.2	6.8	1231.4	9/2−	883.3	11/2−	M1+E2		Mult.: α(K)exp=0.04, A_2=−0.05 *33*, A_4=0.3 *4*.
361.6	4.5	1714.5	(5/2−)	1352.9	7/2−	M1+E2		Mult.: α(K)exp=0.13, K/L=3.3, A_2=−0.07 *11*, A_4=0.07 *17*.
364.4	≈3	1247.8	15/2−	883.3	11/2−			
365.2	27.0	1248.5	13/2−	883.3	11/2−	M1		Mult.: α(K)exp=0.26, K/L=6.5, A_2=−0.20 *45*, A_4=0.1 *6*. δ: 0.
404.5	12.5	1903.5	17/2+	1499.1	17/2−	E1		Mult.: α(K)exp=0.04, K/L=5.0, A_2=−0.16 *45*, A_4=−0.1 *8*.
419.6	2.0	1313.2	3/2+	893.6	5/2−			E_γ: Shown as 416.6γ in fig. 6 of 1982Lo14.
424.2	6.0	1672.7	15/2−	1248.5	13/2−	M1+E2	0.1	Mult.: α(K)exp=0.16, K/L=5.3, A_2=−0.27 *40*, A_4=−0.1 *7*.
486.2	3.8	1609.9	(7/2−)	1123.7	9/2−	E2		Mult.: α(K)exp=0.01, A_2=0.12 *14*, A_4=−0.18 *22*.
655.6	20.0	1903.5	17/2+	1247.8	15/2−	E1		Mult.: α(K)exp=0.005, A_2=−0.10 *3*, A_4≈0.
677.7	12.9	1561.0	13/2+	883.3	11/2−	E1		Mult.: α(K)exp=0.001, A_2=−0.16 *42*, A_4=0.1 *8*.
883.4	79.5	883.3	11/2−	0	9/2−	M1+E2	−0.2	Mult.: α(K)exp=0.021, K/L=4.8, A_2=−0.40 *13*, A_4=0.04 *20*.
893.5	33	893.6	5/2−	0	9/2−	E2		Mult.: α(K)exp=0.006, A_2=0.01 *40*, A_4=0.04 *60*.
908.6	45.7	908.7	7/2−	0	9/2−	M1+E2		Mult.: α(K)exp=0.013, K/L=6.5, A_2=−0.07 *10*, A_4=0.36 *15*.

Continued on next page (footnotes at end of table)

^{203}Tl(^{3}He,3nγ) 1982Lo14 (continued)

γ(^{203}Bi) (continued)

E_γ †	I_γ †	E_i(level)	J^π_i	E_f	J^π_f	Mult.‡	δ†	Comments
932.5	100	932.4	13/2$^-$	0	9/2$^-$	E2		Mult.: α(K)exp=0.0064, K/L≤6, A_2=0.25 *32*, A_4=0.004 *50*.
1009.2	8.1	1892.5	13/2$^+$	883.3	11/2$^-$	E1		Mult.: α(K)exp=0.0012, A_2=0.01 *9*, A_4=0.08 *14*.
1090.9	25.9	1091.0	7/2$^-$	0	9/2$^-$	M1(+E2)	0.1	Mult.: α(K)exp=0.012, A_2=−0.041 *16*, A_4=0.03 *3*.
1123.8	10.9	1123.7	9/2$^-$	0	9/2$^-$	M1+E2	3.6 *8*	Mult.,δ: α(K)exp=0.005. Other: A_2=0.2 *7*, A_4=0.15 *11*.
1248.6	5.2	1248.5	13/2$^-$	0	9/2$^-$	E2		Mult.: α(K)exp=0.004, A_2=0.60 *11*, A_4=−0.14 *16*.
1277.6	4.0	1277.6	(7/2$^-$)	0	9/2$^-$	(M1+E2)		Mult.: α(K)exp=0.012.
1352.9	14.0	1352.9	7/2$^-$	0	9/2$^-$	(M1+E2)		Mult.: α(K)exp=0.0022, A_2=0.08 *2*, A_4=0.04 *10*.

† From 1982Lo14.
‡ Based on $\gamma(\theta)$, α(K)exp, α(L)exp, K/L and multiple decay branches in 1982Lo14. Uncertainties in α(K)exp and α(L)exp range between 10% and 50%.
# Placement of transition in the level scheme is uncertain.

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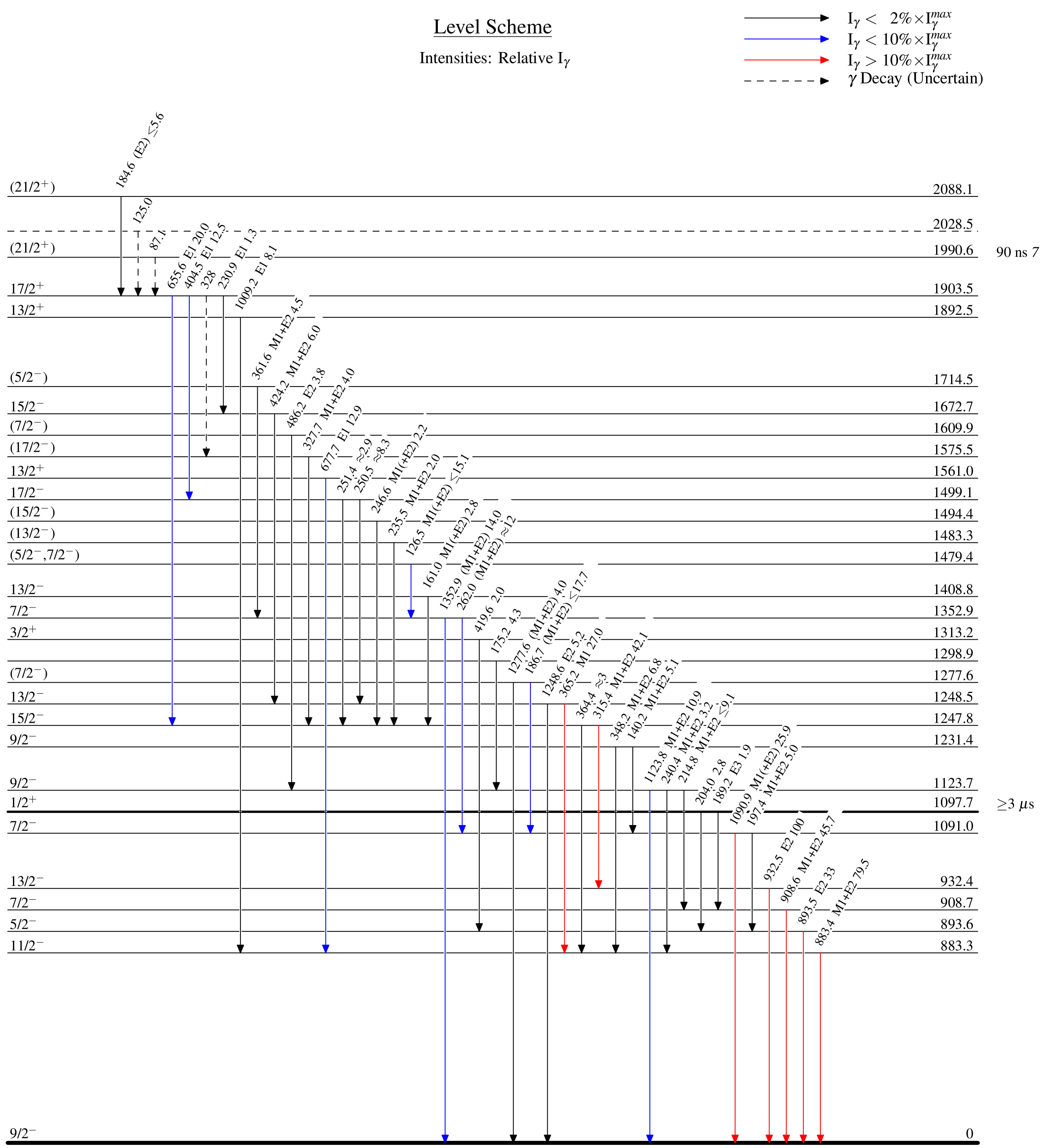
Level Scheme

Intensities: Relative I_γ



$^{203}_{83}Bi_{120}$