^{183}Hg ε decay 1984Ma41

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 134, 149 (2016)	15-Apr-2015

Parent: ^{183}Hg: E=0.0; J^π=1/2$^-$; $T_{1/2}$=9.4 s *7*; Q(ε)=6385 *12*; %ε+%β^+ decay=88.3 *20*

^{183}Hg-$T_{1/2}$: From α decay. Other data: $T_{1/2}$=12 s *2* (1984Ma41); authors report no evidence for an isomeric state in ^{183}Hg with E>35 and $T_{1/2}$>1 s.

Sources produced by 200-MeV p on Au, Pt and 270-MeV ^{3}He on Pt. Hyperpure Ge detectors, magnetic spectrograph, mass separation. Measured Eγ, Iγ, Ice, x-γ(t), $\gamma\gamma$(t), γ(t).

The decay scheme presented here was constructed by the authors on the basis of coincidence measurements and internal conversion data. Substantial transition intensity remains unplaced, so no attempt is made to calculate normalizations and β feedings. The intense 60.5-keV γ deexcites a long-lived level and appears to be an anomalous E1 transition. Based on I(60.5γ) and on level systematics in neighboring Au and Ir isotopes, 1984Ma41 place this γ feeding the level at 12.8 keV; however g.s. feeding cannot be ruled out.

For this decay scheme, QxBR=5638 *128*.

^{183}Au Levels

E(level)†	J^π‡	$T_{1/2}$	Comments
0.0	(5/2)$^-$	42.8 s *10*	$T_{1/2}$: from Adopted Levels.
12.4 *4*	(9/2)$^-$		
12.78 *15*	(3/2)$^-$		
73.3 *4*	(1/2)$^+$	>1 μs	$T_{1/2}$: based on absence of 60.5γ in coincidence spectra (1984Ma41).
91.26 *25*	(5/2$^-$,7/2$^-$)		
172.67 *16*	(3/2,5/2)$^-$		
179.14 *24*	(1/2,3/2,5/2)$^-$		
230.6 *6*	(11/2)$^-$	<1 μs	$T_{1/2}$: 5 ns≤$T_{1/2}$≤1 μs (1984Ma41) based on delayed coincidence intensity.
263.53 *22*	(5/2,7/2)$^-$		
289.43 *18*	(3/2,5/2,7/2)$^-$		
296.8? *4*	(7/2)$^-$		
317.94 *17*	(1/2,3/2,5/2)$^-$		
517.1 *8*	(7/2$^-$)		
562.52 *25*	(≤7/2)		
779.86 *16*	(≤7/2)		
811.14 *24*	(≤7/2)		
817.67 *20*	(≤7/2)		
885.57 *21*	(≤7/2)		
1025.1 *3*			
1100.2 *10*			
1605.5 *3*	(≤7/2)		
1671.2 *4*			
1680.9 *3*			
1681.96 *17*	(≤7/2)		
1800.55 *18*	(≤7/2)		

† From least-squares fit to Eγ.
‡ From Adopted Levels.

γ(^{183}Au)

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.‡	δ‡	α†	Comments
(12.4)		12.4	(9/2)$^-$	0.0	(5/2)$^-$	[E2]			E_γ: from level energy difference.
(12.78)		12.78	(3/2)$^-$	0.0	(5/2)$^-$	[M1]			E_γ: from level energy difference.
60.5 *3*	480 *96*	73.3	(1/2)$^+$	12.78	(3/2)$^-$	E1		0.323 *7*	α(L)=0.249 *5*; α(M)=0.0583 *12* α(N)=0.0142 *3*; α(O)=0.00236 *5*; α(P)=8.75$\times10^{-5}$ *16* α(L1)exp=0.17; α(L2)exp=0.19; α(L3)exp=0.079; α(M)exp=0.010 Mult.: interpreted by 1984Ma41 as an anomalous E1 transition. α: 0.45 based on experimental conversion coefficients.
78.3& *5*		91.26	(5/2$^-$,7/2$^-$)	12.78	(3/2)$^-$				
79.0& *5*		91.26	(5/2$^-$,7/2$^-$)	12.4	(9/2)$^-$				
90.7 *3*	13 *3*	263.53	(5/2,7/2)$^-$	172.67	(3/2,5/2)$^-$	M1+E2	0.5	9.24 *16*	α(K)=6.42 *11*; α(L)=2.14 *4*; α(M)=0.527 *10* α(N)=0.1303 *25*; α(O)=0.0223 *5*; α(P)=0.000788 *14* Mult.: α(L1)exp+α(L2)exp=1.7.
91.1 *5*	2.0 *4*	91.26	(5/2$^-$,7/2$^-$)	0.0	(5/2)$^-$				
^{x}150.0# *5*	<4								
159.9 *3*	100 *20*	172.67	(3/2,5/2)$^-$	12.78	(3/2)$^-$	M1+E2	0.7	1.551 *24*	α(K)=1.146 *18*; α(L)=0.308 *5*; α(M)=0.0749 *12* α(N)=0.0186 *3*; α(O)=0.00323 *5*; α(P)=0.0001356 *21* Mult.: α(K)exp=1.2.
^{x}161# *1*	<5								
166.3# *3*	51 *10*	179.14	(1/2,3/2,5/2)$^-$	12.78	(3/2)$^-$	M1+E2	0.65	1.412 *22*	α(K)=1.064 *16*; α(L)=0.265 *4*; α(M)=0.0641 *10* α(N)=0.01591 *25*; α(O)=0.00279 *5*; α(P)=0.0001260 *19* Mult.: α(K)exp=1.1.
172.7 *3*	81 *16*	172.67	(3/2,5/2)$^-$	0.0	(5/2)$^-$	M1		1.533	α(K)=1.260 *19*; α(L)=0.210 *4*; α(M)=0.0487 *8* α(N)=0.01214 *18*; α(O)=0.00223 *4*; α(P)=0.0001508 *23* Mult.: α(K)exp≈1.3.
^{x}173.3 *5*	4.0 *8*								
^{x}173.8 *3*	41 *8*					(M1)		1.506	α(K)=1.238 *19*; α(L)=0.206 *3*; α(M)=0.0479 *7* α(N)=0.01192 *18*; α(O)=0.00219 *4*; α(P)=0.0001481 *22* Mult.: α(K)exp≈1.37.
179.5# *5*	3.0 *6*	179.14	(1/2,3/2,5/2)$^-$	0.0	(5/2)$^-$				
^{x}188.1 *5*	19 *4*					M1		1.206 *20*	α(K)=0.991 *16*; α(L)=0.165 *3*; α(M)=0.0383 *6* α(N)=0.00954 *16*; α(O)=0.00175 *3*; α(P)=0.0001185 *19* Mult.: α(K)exp=1.0.
198.1 *3*	15 *3*	289.43	(3/2,5/2,7/2)$^-$	91.26	(5/2$^-$,7/2$^-$)	M1		1.044	α(K)=0.858 *13*; α(L)=0.1427 *21*; α(M)=0.0331 *5* α(N)=0.00825 *12*; α(O)=0.001516 *23*; α(P)=0.0001025 *15* Mult.: 0.7≤α(K)exp≤1.7.
^{x}206.2 *5*	2.0 *4*								
^{x}207.6 *5*	6.0 *12*								
^{x}215.3 *5*	5.6 *11*								
^{x}217.3 *5*	9.0 *18*					(M1)		0.806 *13*	α(K)=0.663 *11*; α(L)=0.1101 *17*; α(M)=0.0255 *4*

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γ(^{183}Au) (continued)

E_γ	I_γ	E_i(level)	J^π_i	E_f	J^π_f	Mult.‡	α†	Comments
								α(N)=0.00636 10; α(O)=0.001170 18; α(P)=7.91×10^{-5} 13 Mult.: α(K)exp=0.6.
218.2# 5	≈8	230.6	(11/2)$^-$	12.4	(9/2)$^-$	M1	0.797 13	α(K)=0.656 10; α(L)=0.1089 17; α(M)=0.0252 4 α(N)=0.00629 10; α(O)=0.001157 18; α(P)=7.82×10^{-5} 12 Mult.: α(K)exp=0.9.
^{x}226.5 3	28 6							
^{x}241.5 5	≈2.5							
244.6 5	≈2	562.52	(≤7/2)	317.94	(1/2,3/2,5/2)$^-$			
250.9 5	≈6	263.53	(5/2,7/2)$^-$	12.4	(9/2)$^-$			
^{x}252.5 3	13 3					M1	0.532	α(K)=0.438 7; α(L)=0.0725 11; α(M)=0.01681 25 α(N)=0.00419 6; α(O)=0.000770 11; α(P)=5.21×10^{-5} 8 Mult.: α(K)exp≈0.45.
254.7# 5	≈7	817.67	(≤7/2)	562.52	(≤7/2)			
273.0# 5	10 2	562.52	(≤7/2)	289.43	(3/2,5/2,7/2)$^-$			
276.7 3	18 4	289.43	(3/2,5/2,7/2)$^-$	12.78	(3/2)$^-$			
284.4 3	20 4	296.8?	(7/2)$^-$	12.4	(9/2)$^-$	(M1)^a	0.384	α(K)exp=1.6 α(K)=0.316 5; α(L)=0.0522 8; α(M)=0.01210 18 α(N)=0.00301 5; α(O)=0.000555 8; α(P)=3.76×10^{-5} 6
286.5 5	9.0 18	517.1	(7/2$^-$)	230.6	(11/2)$^-$			
289.5# 3	34 7	289.43	(3/2,5/2,7/2)$^-$	0.0	(5/2)$^-$	M1	0.366	α(K)=0.301 5; α(L)=0.0497 8; α(M)=0.01152 17 α(N)=0.00287 5; α(O)=0.000528 8; α(P)=3.58×10^{-5} 6 Mult.: α(K)exp=0.35.
296.7# 5	≈7	296.8?	(7/2)$^-$	0.0	(5/2)$^-$	(M1)^a	0.342	α(K)exp≈3.9 α(K)=0.282 5; α(L)=0.0465 7; α(M)=0.01077 16 α(N)=0.00268 4; α(O)=0.000494 8; α(P)=3.34×10^{-5} 5
305.1 3	76 15	317.94	(1/2,3/2,5/2)$^-$	12.78	(3/2)$^-$	M1	0.317	α(K)=0.261 4; α(L)=0.0431 7; α(M)=0.00998 15 α(N)=0.00249 4; α(O)=0.000457 7; α(P)=3.10×10^{-5} 5 Mult.: α(K)exp=0.29.
^{x}311.5 5	9.0 18							
318.1 3	14 3	317.94	(1/2,3/2,5/2)$^-$	0.0	(5/2)$^-$			
^{x}343.0# 5	<10							
^{x}349.6 5	6.0 12							
^{x}355.8 5	5.0 10							
^{x}366.4 3	11.0 22							
^{x}381.8 5	7.0 14							
^{x}384.5 5	7.0 14							
^{x}387.2 5	6.0 12							
^{x}389.3 3	15 3							
^{x}402.2# 5	≈5							
^{x}407.7 3	10 2							
^{x}410.7 5	4.0 8							

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γ(^{183}Au) (continued)

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Comments
^{x}415.6$^{\#}$ *5*	8.0 *16*					
^{x}418.7 *5*	≈4					
462.2 *3*	24 *5*	779.86	(≤7/2)	317.94	(1/2,3/2,5/2)$^-$	
^{x}466.5 *5*	2.0 *4*					
^{x}468.3 *3*	10 *2*					
^{x}484.0$^{\#}$ *5*	≈3					
490.4 *5*	5.0 *10*	779.86	(≤7/2)	289.43	(3/2,5/2,7/2)$^-$	
499.9 *5*	6.0 *12*	817.67	(≤7/2)	317.94	(1/2,3/2,5/2)$^-$	
^{x}501.8 *3*	12.0 *24*					
516.3$^{\#}$ *3*	≈25	779.86	(≤7/2)	263.53	(5/2,7/2)$^-$	
^{x}524.0 *5*	≈3					
^{x}535.5$^{\#}$ *5*	≈5					
549.6 *3*	28 *6*	562.52	(≤7/2)	12.78	(3/2)$^-$	
^{x}555.4 *3*	15 *3*					
^{x}562.0 *3*	13 *3*					
^{x}565.0$^{\#}$ *5*	≈3					
^{x}569.4 *5*	7.0 *14*					
^{x}572.4 *5*	4.0 *8*					
^{x}577.7 *5*	7.0 *14*					
^{x}579.4 *3*	13 *3*					
^{x}581.7 *5*	9.0 *18*					
583.1$^{\#}$ *5*	9.0 *18*	1100.2		517.1	(7/2$^-$)	
^{x}586.0 *3*	11.0 *22*					
607.7$^{\#}$ *3*	≈13	779.86	(≤7/2)	172.67	(3/2,5/2)$^-$	
^{x}614.4$^{\#}$ *5*	≈6					
^{x}623.0 *5*	7.0 *14*					
632.1 *5*	≈19	811.14	(≤7/2)	179.14	(1/2,3/2,5/2)$^-$	I_γ: for 632.1γ+634.8γ doublet.
^{x}634.8 *5*	≈19					I_γ: for 632.1+634.8 doublet.
^{x}636.8$^{@}$ *5*	5.0 *10*					
644.9$^{\#}$ *3*	14 *3*	817.67	(≤7/2)	172.67	(3/2,5/2)$^-$	
^{x}655.2 *5*	3.0 *6*					
^{x}662.7 *5*	4.0 *8*					
^{x}670.1 *5*	5.0 *10*					
^{x}676.6 *3*	15 *3*					
^{x}684.3 *3*	11.0 *22*					
^{x}691.0 *3*	16 *3*					
^{x}703.9 *3*	16 *3*					
707.0 *5*	9.0 *18*	1025.1		317.94	(1/2,3/2,5/2)$^-$	
712.7 *3*	20 *4*	885.57	(≤7/2)	172.67	(3/2,5/2)$^-$	
^{x}714.1 *3*	10.0 *20*					
^{x}730.5 *5*	9.0 *18*					

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γ(^{183}Au) (continued)

E_γ	I_γ	E_i(level)	J^π_i	E_f	J^π_f
[x]765.0[@] 3	15 3				
767.1[@] 3	24 5	779.86	(≤7/2)	12.78	(3/2)$^-$
[x]773.0[@] 5	6.0 12				
[x]775.2 3	14 3				
[x]777.2 3	11.0 22				
779.5 3	21 4	779.86	(≤7/2)	0.0	(5/2)$^-$
[x]781.7 3	13 3				
[x]783.7 5	7.0 14				
[x]790.0 5	6.0 12				
798.3 3	42 8	811.14	(≤7/2)	12.78	(3/2)$^-$
[x]799.8 3	14 3				
805.0[#] 5	≈10	817.67	(≤7/2)	12.78	(3/2)$^-$
[x]806.1 5	5.0 10				
[x]811.8 5	7.0 14				
817.9[#] 5	≈2	817.67	(≤7/2)	0.0	(5/2)$^-$
[x]850.8 5	6.0 12				
852.5 3	12.0 24	1025.1		172.67	(3/2,5/2)$^-$
[x]861.0 5	5.0 10				
864.2 3	21 4	1681.96	(≤7/2)	817.67	(≤7/2)
870.8 3	25 5	1681.96	(≤7/2)	811.14	(≤7/2)
872.8 3	13 3	885.57	(≤7/2)	12.78	(3/2)$^-$
[x]881.8 5	9.0 18				
885.9 5	8.0 16	885.57	(≤7/2)	0.0	(5/2)$^-$
[x]889.9 5	9.0 18				
902.2 3	30 6	1681.96	(≤7/2)	779.86	(≤7/2)
[x]906.2 3	10.0 20				
914.9 3	28 6	1800.55	(≤7/2)	885.57	(≤7/2)
[x]950.2 3	19 4				
[x]952.7 5	8.0 16				
[x]984.0 5	8.0 16				
[x]995.4 5	4.0 8				
[x]1003.7 5	3.0 6				
1021.0 3	13 3	1800.55	(≤7/2)	779.86	(≤7/2)
[x]1033.3 3	10.0 20				
[x]1041.3 3	11.0 22				
[x]1051.6 5	3.0 6				
[x]1216.2 3	19 4				
[x]1242.1 3	18 4				
[x]1274 1	12.0 24				
[x]1289.6 3	11.0 22				
[x]1297.9 3	15 3				
[x]1329.0 3	17 3				
1362.9 3	14 3	1680.9		317.94	(1/2,3/2,5/2)$^-$
[x]1375.0 5	8.0 16				
[x]1379.7 3	23 5				
1381.8 3	10.0 22	1671.2		289.43	(3/2,5/2,7/2)$^-$
1391.6 3	26 5	1680.9		289.43	(3/2,5/2,7/2)$^-$
[x]1398 1	5.0 10				
1426.4 3	73 15	1605.5	(≤7/2)	179.14	(1/2,3/2,5/2)$^-$
[x]1427.6 3	31 6				
[x]1454.9 3	29 6				
[x]1459.8 3	10.0 20				
1482.5 3	33 7	1800.55	(≤7/2)	317.94	(1/2,3/2,5/2)$^-$
[x]1498.5 5	7.0 14				
[x]1503.9 3	21 4				
1509.2 3	36 7	1681.96	(≤7/2)	172.67	(3/2,5/2)$^-$
[x]1532.4 3	26 5				
1536.8 3	14 3	1800.55	(≤7/2)	263.53	(5/2,7/2)$^-$
[x]1559.9 3	14 3				
[x]1564.9 3	26 5				
[x]1581.8 3	24 5				
1592.7 3	17 3	1605.5	(≤7/2)	12.78	(3/2)$^-$
[x]1617.2 3	14 3				
1627.9 3	17 3	1800.55	(≤7/2)	172.67	(3/2,5/2)$^-$
[x]1657.9 3	13 3				
[x]1665.4 3	12.0 24				
1669.4 3	11.0 22	1681.96	(≤7/2)	12.78	(3/2)$^-$
[x]1672.2 3	12.0 24				
1681.8 3	15 3	1681.96	(≤7/2)	0.0	(5/2)$^-$
[x]1691.0 3	21 4				
[x]1693.0 3	14 3				
[x]1738.1 3	14 3				
[x]1740.7 3	12.0 24				
[x]1750.5 3	23 5				
[x]1760.7 3	14 3				
[x]1764.8 3	31 6				
1787.8 3	73 15	1800.55	(≤7/2)	12.78	(3/2)$^-$
[x]1790.7 3	29 6				
[x]1808.7 3	17 3				
[x]1821.9 3	40 8				
[x]1825.6 3	11.0 22				
[x]1828.2 3	22 4				
[x]1841.7 3	12.0 24				
[x]2206.0 3	17 3				
[x]2242.0 3	21 4				

$^{183}_{79}Au_{104}$-5

$\gamma(^{183}Au)$ (continued)

† Additional information 1.
‡ From conversion coefficient data (1984Ma41).
\# Energy also belongs to another transition in ^{183}Hg decay chain.
@ Contaminated by background.
& Observed only in the conversion electron spectrum.
[a] α(K)exp greatly exceeds value expected from M1 theory; authors attribute this to either an E0 admixture or an anomalous M1 K conversion coefficient.
[x] γ ray not placed in level scheme.

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^{183}Hg ε decay 1984Ma41

Decay Scheme

Intensities: Relative I_γ