^{200}At ε decay (43 s+47 s) 1998Bi06,1992Hu04

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	F. G. Kondev, S. Lalkovski	NDS 108,1471 (2007)	1-Aug-2006

Parent: ^{200}At: E=0; J^π=(3$^+$); $T_{1/2}$=43 s *1*; Q(ε)=7967 *28*; %ε+%β^+ decay=43 *6*

Parent: ^{200}At: E=113 *5*; J^π=(7$^+$); $T_{1/2}$=47 s *1*; Q(ε)=7967 *28*; %ε+%β^+ decay≤57.0

1998Bi06: mass separated source produced using nat Re(^{20}Ne,xnγ) reaction at E(^{20}Ne)=200 MeV; Detectors: HPGE, LEPS, Si(Li); Measured: Eγ, Iγ, ce, γ, x and ce singles, $\gamma\gamma$(t), γX(t), γce(t) and xce(γ); Other: 1995Bi17.

1992Hu04: mass separated source was produced using nat Re(^{20}Ne,xnγ) reaction; Detectors:Ge(Li), Si(Li), surface barrier detectors; Measured: Eγ, Iγ, ce, Eα, Iα, γ-ray singles.

The data of 1998Bi08 and 1992Hu04 are consistent with each other, except that the level reported at 1842 keV in 1992Hu04 was not confirmed in 1998Bi08.

^{200}Po Levels

E(level)†	J^π‡	$T_{1/2}$	Comments
0	0$^+$	11.51 min *8*	$T_{1/2}$: From Adopted Levels.
665.90 *17*	2$^+$		
1136.50 *20*	0$^+$		
1276.8 *3*	4$^+$		
1392.30 *17*	2$^+$		
1652.0 *3*	(1,2,3)$^+$		
1761.3 *3*	6$^+$		
1772.9 *4*	(3,4,5)$^+$		
1773.6 *4*	8$^+$	61 ns *3*	$T_{1/2}$: From Adopted Levels.
1776.2 *3*			
1791.4 *4*			
1811.2 *3*	5$^-$		
1850.5 *4*			
1883.1 *4*	(3,4,5)$^+$		
2085.5 *8*	(2,6)$^+$		
2135.1 *4*	7$^-$		
2220.5 *4*	(4,5,6)$^-$		
2261.2 *4*	9$^-$		
2329.7 *5*			
2337.5 *4*	(7,8,9)$^+$		
2360.5 *5*			
2414.4 *4*	(5)$^-$		
2461.6 *4*	(5,6,7)$^+$		
2462.0 *4*	(4,5,6)$^-$		

† From least-squares fit to Eγ.

‡ From adopted gammas.

γ(^{200}Po)

E_γ†	I_γ†@	E_i(level)	J^π_i	E_f	J^π_f	Mult.‡	α&	Comments
(12.3 *4*)		1773.6	8$^+$	1761.3	6$^+$	[E2]	4.9×10^4 *9*	α(M)=3.7×10^4 *7*; α(N+..)=1.15×10^4 *21* α(N)=9.5×10^3 *17*; α(O)=1.8×10^3 *4*; α(P)=1.6×10^2 *3* α(N)=9.5×10^3 *22*; α(O)=1.8×10^3 *5*; α(P)=1.6×10^2 *4* E$_\gamma$: From Adopted Levels, based on the energy difference between the 373.8 keV *2* and 361.5 keV *2* gamma-rays that depopulate the J^π=7$^-$ level at 2135 keV.
125.7 *3*	0.3 *2*	2261.2	9$^-$	2135.1	7$^-$	E2#	2.77 *5*	α(K)=0.391 *6*; α(L)=1.76 *4*; α(M)=0.470 *9*;

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^{200}At ε decay (43 s+47 s) 1998Bi06,1992Hu04 (continued)

γ(^{200}Po) (continued)

E_γ †	I_γ †@	E_i(level)	J_i^π	E_f	J_f^π	Mult.‡	α&	Comments
								α(N+..)=0.145 3 α(N)=0.1203 22; α(O)=0.0229 4; α(P)=0.00208 4 E_γ,I_γ: From adopted gammas.
323.8 2	2.4 6	2135.1	7$^-$	1811.2	5$^-$	E2	0.1007	α(K)=0.0564 8; α(L)=0.0330 5; α(M)=0.00854 13; α(N+..)=0.00267 4 α(N)=0.00219 4; α(O)=0.000429 6; α(P)=4.34×10^{-5} 7 α(N)=0.00220 4; α(O)=0.000429 6; α(P)=4.35×10^{-5} 7 Mult.: α(K)exp=0.23 6, α(L)exp=0.047 13.
361.5 2	0.7 2	2135.1	7$^-$	1773.6	8$^+$	E1#	0.0206	α(K)=0.01683 24; α(L)=0.00286 4; α(M)=0.000671 10; α(N+..)=0.000211 3 α(N)=0.0001713 24; α(O)=3.52×10^{-5} 5; α(P)=4.30×10^{-6} 6 α(N)=0.0001712 24; α(O)=3.51×10^{-5} 5; α(P)=4.29×10^{-6} 6
373.8 2	7.1 7	2135.1	7$^-$	1761.3	6$^+$	E1	0.0191	α(K)=0.01564 22; α(L)=0.00265 4; α(M)=0.000621 9; α(N+..)=0.000195 3 α(N)=0.0001586 23; α(O)=3.26×10^{-5} 5; α(P)=3.99×10^{-6} 6 α(N)=0.0001584 23; α(O)=3.25×10^{-5} 5; α(P)=3.98×10^{-6} 6 Mult.: α(K)exp<0.09.
409.3 2	2.5 4	2220.5	(4,5,6)$^-$	1811.2	5$^-$	M1+E2	0.14 9	α(K)=0.11 8; α(L)=0.023 9; α(M)=0.0054 18; α(N+..)=0.0017 6 α(N)=0.0014 5; α(O)=0.00029 11; α(P)=3.5×10^{-5} 16 Mult.: α(K)exp=0.15 5.
484.4 2	48 4	1761.3	6$^+$	1276.8	4$^+$	E2	0.0346	α(K)=0.0237 4; α(L)=0.00826 12; α(M)=0.00208 3; α(N+..)=0.000653 10 α(N)=0.000534 8; α(O)=0.0001065 15; α(P)=1.162×10^{-5} 17 α(N)=0.000534 8; α(O)=0.0001064 15; α(P)=1.161×10^{-5} 17 Mult.: α(K)exp=0.0239, α(L)exp=0.00838.
488.4 2	1.8 6	2261.2	9$^-$	1773.6	8$^+$	E1#	0.01078	α(K)=0.00887 13; α(L)=0.001460 21; α(M)=0.000342 5; α(N+..)=0.0001076 15 α(N)=8.73×10^{-5} 13; α(O)=1.80×10^{-5} 3; α(P)=2.24×10^{-6} 4
496.3 2	2.2 6	1772.9	(3,4,5)$^+$	1276.8	4$^+$	M1(+E2)	0.08 5	α(K)=0.06 5; α(L)=0.013 6; α(M)=0.0031 12; α(N+..)=0.0010 4 α(N)=0.0008 3; α(O)=0.00017 7; α(P)=2.0×10^{-5} 10 α(N)=0.001107 16; α(O)=0.000232 4; α(P)=3.00×10^{-5} 5 Mult.: α(K)exp=0.11 4.
514.6 2	4.5 6	1791.4		1276.8	4$^+$			
518.5 3	1.5 4	2329.7		1811.2	5$^-$			
534.3 2	16 3	1811.2	5$^-$	1276.8	4$^+$	E1	0.00896	α(K)=0.00738 11; α(L)=0.001206 17; α(M)=0.000282 4; α(N+..)=8.88×10^{-5} 13 α(N)=7.20×10^{-5} 11; α(O)=1.488×10^{-5} 21; α(P)=1.86×10^{-6} 3 α(N)=7.20×10^{-5} 10; α(O)=1.487×10^{-5} 21; α(P)=1.85×10^{-6} 3

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^{200}At ε decay (43 s+47 s) 1998Bi06,1992Hu04 (continued)

γ(^{200}Po) (continued)

E_γ †	I_γ †@	E_i(level)	J^π_i	E_f	J^π_f	Mult.‡	α&	Comments
								Mult.: α(K)exp=0.0075 *14*; Other: α(K)exp in 1992Hu04.
549.3 *3*	0.7 *3*	2360.5		1811.2	5^-			
564.6 *2*	13 *3*	2337.5	$(7,8,9)^+$	1773.6	8^+	M1	0.0923	α(K)=0.0753 *11*; α(L)=0.01295 *19*; α(M)=0.00305 *5*; α(N+..)=0.000970 *14* α(N)=0.000784 *11*; α(O)=0.0001642 *23*; α(P)=2.12×10^{-5} *3* Mult.: α(K)exp=0.09 *2*, α(L)exp=0.014 *3*; Other: α(K)exp in 1992Hu04. E_γ: This transition is observed to be delayed with $T_{1/2}$≈72 ns using 564.6γ(t) (1998Bi06).
573.7 *2*	0.9 *3*	1850.5		1276.8	4^+			
603.2 *2*	0.6 *2*	2414.4	$(5)^-$	1811.2	5^-	E0+M1+E2	0.05 *3*	α(K)=0.039 *24*; α(L)=0.008 *4*; α(M)=0.0018 *8*; α(N+..)=0.00057 *24* α(N)=0.00046 *20*; α(O)=0.00010 *5*; α(P)=1.2×10^{-5} *6* Mult.: α(K)exp=0.15 *4*, α(L)exp=0.08 *3*.
606.3 *2*	1.1 *4*	1883.1	$(3,4,5)^+$	1276.8	4^+	M1+E2	0.05 *3*	α(K)=0.039 *24*; α(L)=0.007 *4*; α(M)=0.0018 *8*; α(N+..)=0.00057 *24* α(N)=0.00046 *19*; α(O)=9.E−5 *4*; α(P)=1.2×10^{-5} *6* α(N)=0.000649 *9*; α(O)=0.0001358 *19*; α(P)=1.758×10^{-5} *25* Mult.: α(K)exp=0.06 *2*.
610.9 *2*	84 *8*	1276.8	4^+	665.90	2^+	E2	0.0203	α(K)=0.01479 *21*; α(L)=0.00413 *6*; α(M)=0.001022 *15*; α(N+..)=0.000321 *5* α(N)=0.000263 *4*; α(O)=5.29×10^{-5} *8*; α(P)=6.02×10^{-6} *9* α(N)=0.000262 *4*; α(O)=5.28×10^{-5} *8*; α(P)=6.01×10^{-6} *9* Mult.: α(L)exp=0.00418; Other: α(K)exp in 1992Hu04.
650.8 *2*	1.2 *2*	2462.0	$(4,5,6)^-$	1811.2	5^-	M1+E2	0.041 *23*	α(K)=0.032 *20*; α(L)=0.006 *3*; α(M)=0.0015 *7*; α(N+..)=0.00047 *20* α(N)=0.00038 *16*; α(O)=8.E−5 *4*; α(P)=1.0×10^{-5} *5* Mult.: α(K)exp=0.033 *7*.
665.9 *2*	100	665.90	2^+	0	0^+	E2	0.01679	α(K)=0.01250 *18*; α(L)=0.00325 *5*; α(M)=0.000800 *12*; α(N+..)=0.000252 *4* α(N)=0.000205 *3*; α(O)=4.15×10^{-5} *6*; α(P)=4.79×10^{-6} *7* Mult.: α(K)exp=0.0126, α(L)exp=0.00329; Other: α(K)exp in 1992Hu04.
700.3 *2*	1.0 *6*	2461.6	$(5,6,7)^+$	1761.3	6^+	M1	0.0524	α(K)=0.0428 *6*; α(L)=0.00732 *11*; α(M)=0.001720 *25*; α(N+..)=0.000547 *8* α(N)=0.000443 *7*; α(O)=9.27×10^{-5} *13*; α(P)=1.200×10^{-5} *17* Mult.: α(K)exp=0.09 *5*.
726.4 *2*	1.4 *2*	1392.30	2^+	665.90	2^+	E0+M1+E2	0.031 *17*	α(K)=0.025 *15*; α(L)=0.0046 *21*; α(M)=0.0011 *5*; α(N+..)=0.00035 *15* α(N)=0.00028 *12*; α(O)=6.E−5 *3*; α(P)=7.E−6 *4* Mult.: α(K)exp=0.11 *3*.
808.7 *7*	2.9 *4*	2085.5	$(2,6)^+$	1276.8	4^+	E2	0.01120	α(K)=0.00862 *13*; α(L)=0.00196 *3*;

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^{200}At ε decay (43 s+47 s) 1998Bi06,1992Hu04 (continued)

$\gamma(^{200}Po)$ (continued)

E_γ †	I_γ †@	E_i(level)	J_i^π	E_f	J_f^π	Mult. ‡	α &	Comments
								α(M)=0.000476 *7*; α(N+..)=0.0001501 *22* α(N)=0.0001222 *18*; α(O)=2.49×10^{-5} *4*; α(P)=2.96×10^{-6} *5* Mult.: α(K)exp=0.009 *2*.
986.1 *2*	3.0 *6*	1652.0	(1,2,3)$^+$	665.90	2$^+$	M1+E2	0.015 *7*	α(K)=0.012 *6*; α(L)=0.0021 *9*; α(M)=0.00050 *21*; α(N+..)=0.00016 *7* α(N)=0.00013 *6*; α(O)=2.7×10^{-5} *12*; α(P)=3.4×10^{-6} *16* Mult.: α(K)exp=0.011 *3*.
1110.3 *2*	1.1 *2*	1776.2		665.90	2$^+$			
1136.5 *2*		1136.50	0$^+$	0	0$^+$	E0		Mult.: α(K)exp>0.08.
1392.3 *2*	1.2 *4*	1392.30	2$^+$	0	0$^+$	[E2]	0.00397	α(N)=3.48×10^{-5} *5*; α(O)=7.21×10^{-6} *10*; α(P)=9.04×10^{-7} *13* α(N)=3.48×10^{-5} *5*; α(O)=7.21×10^{-6} *10*; α(P)=9.04×10^{-7} *13*

† From 1998Bi06, unless otherwise specified. Iγ are a mixture of the ^{200}At g.s. (J^π=(3$^+$)) and ^{200}At isomer (J^π=(7$^+$)) ε decay intensities and hence no unambiguous normalization of the decay scheme can be achieved.

‡ From α(K)exp and α(L)exp in 1998Bi06.

From adopted gammas.

@ For absolute intensity per 100 decays, multiply by 0.43 *6*.

& 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.

^{200}At ε decay (43 s+47 s) 1998Bi06,1992Hu04

Decay Scheme