^{195}Bi ε decay 1991Gr12,1984Co13

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Huang Xiaolong and Kang Mengxiao	NDS 121, 395 (2014)	1-Mar-2014

Parent: ^{195}Bi: E=0.0; J$^{\pi}$=[9/2^{-}]; T$_{1/2}$=183 s *4*; Q(ε)=5688 *24*; %ε+%β^{+} decay=99.97 *2*

Parent: ^{195}Bi: E=401 *7*; J$^{\pi}$=[1/2^{+}]; T$_{1/2}$=87 s *1*; Q(ε)=5688 *24*; %ε+%β^{+} decay=67 *17*

^{195}Bi(0.0)-%ε+%β^{+} decay: %ε+%β^{+}=99.97 *2* for the g.s., %α=0.03 *2* (1985Co06).

^{195}Bi(401)-%ε+%β^{+} decay: %ε+%β^{+}=67 *17* for the isomeric state (401, [1/2^{+}]), %α=33 *17*.

See also 1985Hu06 and 1985Co06.

Sources produced generally by ^{16}O on Re E=170 MeV, ^{181}Ta(^{20}Ne,X) E=137 MeV (1984Co13) and 190 MeV (1991Gr12), and ^{185}Re(^{16}O,6n) E=140, 210 MeV (1991Gr12).

Identification: mass separation and activation technique.

1984Co13: Eγ, Iγ, E(x-ray), I(x-ray), $\gamma\gamma$(t), γ(x-ray)(t), T$_{1/2}$ measured. Data not given, except T$_{1/2}$ of ^{195}Bi and g.s. J^{π} of ^{195}Pb.

1991Gr12: Iγ, Iγ, I(ce), I(x-ray), $\gamma\gamma$(t), (ce)γ(t), γ(x-ray)(t), ce(x-ray)(t) measured with Ge(Li), HPG, Si(Li), Si(Au) detectors and mass-separation; deduced β^{+}/ε and Q(β^{-})(g.s.)=−4800 *+600−500* keV.

Partial decay scheme can be obtained on the basis of coincidence data. Energy sums and differences were also used in conjunction with these data to place levels. Strong γ-rays observed without any coincident transitions are assumed to decay to the ground state or a low-lying isomeric level of ^{195}Pb. In all, 24 excited states have been established and 34 transitions have been assigned to the level scheme.

^{195}Pb Levels

E(level)†	J$^{\pi}$‡	T$_{1/2}$	E(level)†	J$^{\pi}$‡
0.0	3/2^{-}#		1180.1 *3*	(1/2 to 7/2)$^{-}$#
134.53 *20*	(5/2)$^{-}$#		1212.8 *6*	(1/2 to 7/2)$^{-}$
203.0 *7*	13/2^{+}#	15.0 min *12*	1308.1 *3*	(3/2,5/2,7/2)$^{-}$#
329.29 *16*	(1/2,3/2,5/2)$^{-}$		1328.7 *7*	(9/2)$^{+}$
829.9 *4*	(7/2)$^{-}$		1379.8 *7*	(11/2)$^{+}$
966.94 *20*	(3/2,5/2)$^{-}$		1391.5 *7*	(7/2)$^{+}$
978.9 *7*	(11/2)$^{+}$		1428.5 *3*	(3/2,5/2,7/2)$^{-}$#
1009.87 *24*	(1/2 to 7/2)$^{-}$#		1444.1 *7*	(5/2 to 13/2)$^{+}$
1010.8 *7*	(9/2)$^{+}$		1566.9 *8*	(9/2,11/2)$^{+}$
1093.1 *8*	(13/2)$^{+}$		1645.0 *7*	(7/2 to 11/2)$^{+}$#
1095.99 *15*	(3/2,5/2)$^{-}$,7/2^{-}		1670.2 *5*	(3/2 to 11/2)$^{-}$#
1120.3 *5*	9/2^{-},(1/2 to 7/2)$^{-}$		1780.0 *6*	($^{-}$)#

† From decay scheme and Eγ′s using least-squares fit to data.
‡ From γ-transition multipolarities and systematics of low-lying states in the odd-mass Pb isotopes, except as noted.
# From Adopted Levels.

ε,β^{+} radiations

Reliable ε+β^{+} intensities cannot be deduced without better information on γ-decay feeding from higher lying (unobserved) levels in ^{195}Pb.

E(decay)	E(level)	Comments
(4359 *24*)	1328.7	I(K x ray)/Iβ^{+}=6.1 *+114−40* (1991Gr12).
(4678 *24*)	1009.87	I(K x ray)/Iβ^{+}=2.5 *+30−10* (1991Gr12).
(5553 *24*)	134.53	

γ(^{195}Pb)

Iγ normalization, I(γ+ce) normalization: can not be given due to unobserved higher levels in ^{195}Pb.
All data are from 1991Gr12, except as noted.
α(K)exp normalized to α(K)exp(707γ in ^{195}Tl)(theory) for pure E2.

Eγ	Iγ†	Ei(level)	Jπi	Ef	Jπf	Mult.‡	α#	Comments
134.4 3	69 5	134.53	(5/2)⁻	0.0	3/2⁻	M1(+E2)	3.0 11	α(K)=1.8 15; α(L)=0.8 3; α(M)=0.21 8; α(N+..)=0.065 23 α(K)=1.9 16; α(L)=0.9 3; α(M)=0.22 8; α(N+..)=0.07 3 α(K)exp=3.2 3, α(K)exp/α(L)exp=4.8 2, α(L)exp/α(M)exp=4.6 4.
286.4 6	3.5 4	1379.8	(11/2)⁺	1093.1	(13/2)⁺	M1	0.488	α(K)=0.399 6; α(L)=0.0682 11; α(M)=0.01597 25; α(N+..)=0.00495 8 α(K)=0.412; α(L)=0.0706; α(M)=0.0165; α(N+..)=0.00536 α(K)exp=0.51 8.
317.7 5	0.3 2	1328.7	(9/2)⁺	1010.8	(9/2)⁺	E0+M1+E2	0.23 14	α(K)=0.18 13; α(L)=0.041 11; α(M)=0.0099 21; α(N+..)=0.0030 7 α(K)exp=5 3. Other: 1988ZgZY. α from Ie=1.6 2 and Iγ=0.3 2.
329.2 2	14.6 19	329.29	(1/2,3/2,5/2)⁻	0.0	3/2⁻	M1	0.334	α(K)=0.273 4; α(L)=0.0465 7; α(M)=0.01089 16; α(N+..)=0.00338 5 α(K)=0.282; α(L)=0.0481; α(M)=0.0113; α(N+..)=0.00365 α(K)exp=0.36 5.
368.9 3	9.4 7	1379.8	(11/2)⁺	1010.8	(9/2)⁺	M1(+E2)	0.15 9	α(K)=0.12 8; α(L)=0.026 9; α(M)=0.0062 18; α(N+..)=0.0019 6 α(K)=0.12 9; α(L)=0.027 9; α(M)=0.0064 19; α(N+..)=0.0021 6 α(K)exp=0.16 2.
380.6 3	12 4	1391.5	(7/2)⁺	1010.8	(9/2)⁺	M1+E2	0.14 9	α(K)=0.11 8; α(L)=0.024 8; α(M)=0.0057 17; α(N+..)=0.0017 6 α(K)=0.11 8; α(L)=0.024 9; α(M)=0.0058 18; α(N+..)=0.0019 6 α(K)exp=0.08 3.
401.3 4	1.0 3	1379.8	(11/2)⁺	978.9	(11/2)⁺	E0+M1+E2	0.12 8	α(K)=0.10 7; α(L)=0.020 7; α(M)=0.0049 15; α(N+..)=0.0015 5 α(K)exp=3.7 19. Other: 1988ZgZY. α from Ie=3.7 15 and Iγ=1.0 3.
412.7 2	10.4 16	1391.5	(7/2)⁺	978.9	(11/2)⁺	E2	0.0475	α(K)=0.0315 5; α(L)=0.01209 17; α(M)=0.00304 5; α(N+..)=0.000924 13 α(K)=0.0317; α(L)=0.0122; α(M)=0.00308; α(N+..)=0.00099 α(K)exp=0.040 9.
433.3 2	6.3 10	1444.1	(5/2 to 13/2)⁺	1010.8	(9/2)⁺	E2	0.0419	α(K)=0.0283 4; α(L)=0.01028 15; α(M)=0.00258 4; α(N+..)=0.000784 11 α(K)=0.0284; α(L)=0.0104; α(M)=0.00261; α(N+..)=0.00084 α(K)exp=0.035 17.
498.8 5	8.6 7	1328.7	(9/2)⁺	829.9	(7/2)⁻	E1	0.0096	α(K)=0.00795 12; α(L)=0.001278 19; α(M)=0.000297 5; α(N+..)=9.11×10^{-5} 13 α=0.0096; α(K)=0.00796; α(L)=0.00128; α(M)=0.00030 α(K)exp=0.012 6.
556.2 4	5.7 12	1566.9	(9/2,11/2)⁺	1010.8	(9/2)⁺	M1+E2	0.05 3	α(K)=0.04 3; α(L)=0.008 4; α(M)=0.0019 8; α(N+..)=0.00059 24 α(K)=0.04 3; α(L)=0.008 4 α(K)exp=0.037 9.
587.6 6	8.9 10	1566.9	(9/2,11/2)⁺	978.9	(11/2)⁺	M1+E2	0.05 3	α(K)=0.038 23; α(L)=0.007 3 α(K)exp=0.039 6.

$^{195}_{82}$Pb$_{113}$-2

γ(^{195}Pb) (continued)

E_γ	I_γ†	E_i(level)	J_i^π	E_f	J_f^π	Mult.‡	α#	Comments
634.2 *2*	5.0 *5*	1645.0	(7/2 to 11/2)$^+$	1010.8	(9/2)$^+$	M1+E2	0.038 *21*	α(K)=0.030 *18*; α(L)=0.0056 *24*; α(M)=0.0013 *6*; α(N+..)=0.00041 *17* α(K)=0.031 *19*; α(L)=0.006 *3* α(K)exp=0.032 *17*.
684.0 *5*	8.1 *16*	1780.0	($^-$)	1095.99	(3/2,5/2)$^-$,7/2$^-$	E2(+M1)	0.031 *17*	α(K)=0.025 *15*; α(L)=0.0046 *20*; α(M)=0.0011 *5*; α(N+..)=0.00034 *14* α(K)=0.026 *15*; α(L)=0.0047 *21* α(K)exp=0.019 *5*.
695.4 *3*	56 *4*	829.9	(7/2)$^-$	134.53	(5/2)$^-$	M1	0.0459	α(K)=0.0377 *6*; α(L)=0.00628 *9*; α(M)=0.001466 *21*; α(N+..)=0.000455 *7* α(K)=0.0390; α(L)=0.00652 α(K)exp=0.036 *5*, α(K)exp/α(L)exp=5.9 *9*.
766.6 *2*	6.2 *5*	1095.99	(3/2,5/2)$^-$,7/2$^-$	329.29	(1/2,3/2,5/2)$^-$			
776.2 *3*	95 *7*	978.9	(11/2)$^+$	203.0	13/2$^+$	E2	0.01108	α(K)=0.00858 *12*; α(L)=0.00190 *3*; α(M)=0.000459 *7*; α(N+..)=0.0001407 *20* α(K)=0.0086; α(L)=0.00192 α(K)exp=0.008 *1*.
807.6 *4*	100 *7*	1010.8	(9/2)$^+$	203.0	13/2$^+$	E2	0.01021	α(K)=0.00795 *12*; α(L)=0.001721 *25*; α(M)=0.000414 *6*; α(N+..)=0.0001272 *18* α(K)=0.00800; α(L)=0.00174 α(K)exp=0.009 *2*.
831.7 *7*	14 *3*	966.94	(3/2,5/2)$^-$	134.53	(5/2)$^-$	M1(+E2)	0.019 *10*	α(K)=0.016 *8*; α(L)=0.0028 *12*; α(M)=0.0007 *3*; α(N+..)=0.00020 *9* α(K)=0.016 *9*; α(L)=0.0029 *13* α(K)exp=0.021 *6*.
840.3 *3*	13 *5*	1670.2	(3/2 to 11/2)$^-$	829.9	(7/2)$^-$	E2	0.0095	α(K)=0.00737 *11*; α(L)=0.001560 *22*; α(M)=0.000375 *6*; α(N+..)=0.0001151 *17* α=0.0095; α(K)=0.00742; α(L)=0.00158 α(K)exp=0.008 *4*.
850.8 *2*	9.9 *8*	1180.1	(1/2 to 7/2)$^-$	329.29	(1/2,3/2,5/2)$^-$	M1	0.0272	α(K)=0.0224 *4*; α(L)=0.00371 *6*; α(M)=0.000865 *13*; α(N+..)=0.000268 *4* α(K)=0.0232; α(L)=0.00386 α(K)exp=0.026 *6*.
875.4 *3*	23 *3*	1009.87	(1/2 to 7/2)$^-$	134.53	(5/2)$^-$	E2	0.0088	α(K)=0.00682 *10*; α(L)=0.001413 *20*; α(M)=0.000339 *5*; α(N+..)=0.0001041 *15* α=0.0088; α(K)=0.00686; α(L)=0.00143 α(K)exp=0.006 *2*.
890.0 *4*	22 *6*	1093.1	(13/2)$^+$	203.0	13/2$^+$	E0+M1+E2	0.016 *8*	α(K)=0.013 *7*; α(L)=0.0023 *10*; α(M)=0.00055 *23*; α(N+..)=0.00017 *7* α(K)exp=0.043 *13*. α from Ie=0.94 *11* and Iγ=22.
^{x}894.1 *2*	31 *3*					E2	0.0084	α(K)=0.00655 *10*; α(L)=0.001343 *19*; α(M)=0.000322 *5*; α(N+..)=9.89×10^{-5} *14*

$^{195}_{82}$Pb$_{113}$-3

γ(^{195}Pb) (continued)

E_γ	I_γ†	E_i(level)	J^π_i	E_f	J^π_f	Mult.‡	α#	Comments
								α=0.0084; α(K)=0.00660; α(L)=0.00136 α(K)exp=0.005 *2*.
961.4 *3*	16.3 *14*	1095.99	$(3/2,5/2)^-,7/2^-$	134.53	$(5/2)^-$	M1(+E2)	0.014 *7*	α(K)=0.011 *6*; α(L)=0.0020 *9* α(K)exp=0.014 *4*.
967.0 *2*	17.9 *13*	966.94	$(3/2,5/2)^-$	0.0	$3/2^-$	M1(+E2)	0.013 *7*	α(K)=0.011 *6*; α(L)=0.0019 *8*; α(M)=0.00044 *18*; α(N+..)=0.00014 *6* α(K)=0.011 *6*; α(L)=0.0019 *9* α(K)exp=0.008 *2*.
985.8 *4*	46 *4*	1120.3	$9/2^-,(1/2\text{ to }7/2)^-$	134.53	$(5/2)^-$	E2	0.00692	α(K)=0.00546 *8*; α(L)=0.001069 *15*; α(M)=0.000255 *4*; α(N+..)=7.84×10^{-5} *11* α=0.00692; α(K)=0.00549; α(L)=0.00108 α(K)exp=0.005 *1*.
1009.8 *3*	30 *2*	1009.87	$(1/2\text{ to }7/2)^-$	0.0	$3/2^-$	E2	0.00661	α(K)=0.00522 *8*; α(L)=0.001012 *15*; α(M)=0.000241 *4*; α(N+..)=7.41×10^{-5} *11* α=0.00661; α(K)=0.00525; α(L)=0.00102 α(K)exp=0.005 *1*.
1078.3 *5*	31 *3*	1212.8	$(1/2\text{ to }7/2)^-$	134.53	$(5/2)^-$	E2	0.00582	α(K)=0.00462 *7*; α(L)=0.000873 *13*; α(M)=0.000207 *3*; α(N+..)=6.38×10^{-5} *9* α=0.00582; α(K)=0.00465; α(L)=0.00088 α(K)exp=0.004 *1*.
1096.1 *2*	31 *3*	1095.99	$(3/2,5/2)^-,7/2^-$	0.0	$3/2^-$	E2	0.00564	α(K)=0.00448 *7*; α(L)=0.000842 *12*; α(M)=0.000199 *3*; α(N+..)=6.14×10^{-5} *9* α=0.00564; α(K)=0.00451; α(L)=0.00085 α(K)exp=0.004 *1*.
1125.8 *2*	19.6 *14*	1328.7	$(9/2)^+$	203.0	$13/2^+$	E2	0.00536	α(K)=0.00427 *6*; α(L)=0.000793 *12*; α(M)=0.000188 *3*; α(N+..)=5.83×10^{-5} *9* α=0.00536; α(K)=0.00429; α(L)=0.00080 α(K)exp=0.005 *1*.
1173.6 *2*	13 *2*	1308.1	$(3/2,5/2,7/2)^-$	134.53	$(5/2)^-$	M1	0.01193	α(K)=0.00982 *14*; α(L)=0.001613 *23*; α(M)=0.000376 *6*; α(N+..)=0.0001203 *17* α(K)=0.0102; α(L)=0.00168 α(K)exp=0.013 *4*.
1176.5 *5*	7.4 *6*	1379.8	$(11/2)^+$	203.0	$13/2^+$	M1	0.01186	α(K)=0.00976 *14*; α(L)=0.001603 *23*; α(M)=0.000373 *6*; α(N+..)=0.0001198 *17* α(K)=0.0101; α(L)=0.00167 α(K)exp=0.012 *4*.
1294.0 *2*	5.0 *6*	1428.5	$(3/2,5/2,7/2)^-$	134.53	$(5/2)^-$	M1,E2	0.007 *3*	α(K)=0.0055 *22*; α(L)=0.0009 *4*; α(M)=0.00022 *8*; α(N+..)=9.E−5 *3* α=0.007 *3*; α(K)=0.0057 *24*; α(L)=0.0010 *4* α(K)exp=0.006 *4*.

† Intensities are relative to Iγ(Eγ=807.6 keV)=100 *7*.

‡ From α(K)exp data, also α(K)exp/α(L)exp, α(L)exp/α(M)exp for 134γ.

γ(^{195}Pb) (continued)

[#] 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.

[x] γ ray not placed in level scheme.

^{195}Bi ε decay 1991Gr12,1984Co13

Decay Scheme

Intensities: Relative $I_{(\gamma+ce)}$