^{207}Bi ε decay

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	F. G. Kondev, S. Lalkovski	NDS 112, 707 (2011)	1-Aug-2010

Parent: ^{207}Bi: E=0; $J^\pi=9/2^-$; $T_{1/2}$=31.55 y *4*; Q(ε)=2397.5 *21*; %ε+%$β^+$ decay=100.0

Other references:
$T_{1/2}$: 2004Wo02 (evaluation), 1996ChZY (evaluation).
X-ray emission probabilities: 2008Ya10, 1998Ko50, 1995Da32.
Eγ, Iγ, coin. summing: 2005VaZY, 1996Ho28, 1996Ro16, 1995Ar30.
e^--e^+ coin. and summing: 1998Le10, 1998Wu02.
Conversion electrons: 1993Ap01, 1994Va14, 1993Cu07, 1993Me20, 1993Su28, 1991HiZW.
No anisotropy found in (570γ)(L x ray), A=2×10^{-3} *2* (1972Ru11).

^{207}Pb Levels

E(level)†	J^π‡	$T_{1/2}$	Comments
0	$1/2^-$	stable	
569.6988 *20*	$5/2^-$	130.5 ps *8*	$T_{1/2}$: Weighted average of 130.2 ps *15* (1971Ba32), 130.5 ps *15* and 130.7 ps *13* (1977Ku09). Others: 129 ps *3* (1966Ko16), 129 ps *3* (1974Aw01), 128 ps *5* (1966Go35), 134 ps *9* (1964Ro19), 110 ps *11* (1963Le15), 129 ps *3* (1978De14).
897.79 *7*	$3/2^-$		
1633.358 *4*	$13/2^+$	0.806 s *5*	$T_{1/2}$: From Adopted Levels. Other: 0.77 s 3 (1971Gl09).
2339.935 *10*	$7/2^-$		

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

ε,$β^+$ radiations

E(decay)	E(level)	Iβ+ †	Iε†	Log *ft*	I(ε+β+)†	Comments
(57.6 *21*)	2339.935		7.03 *3*	8.28 *5*	7.03 *3*	εL=0.651 *6*; εM+=0.349 *6* εL(exp)=0.663 *14* (1964De16); εL(exp)=0.59 *3* (1982Ta18), but this value depends on the assumed α(K)=0.0159 and α(T)=0.0218 for 570γ.
(764.1 *21*)	1633.358		84.0 *5*	10.576[1u] *6*	84.0 *5*	εK=0.7325 *3*; εL=0.19856 *21*; εM+=0.06897 *9* εK(exp)=0.73 *6*, εL(exp)+/εK(exp)=0.37 *12* (1985Ma38).
(1827.8 *21*)	569.6988	0.0380 *22*	8.9 *5*	12.090 *25*	8.9 *5*	av Eβ=382.99 *93*; εK=0.7965; εL=0.15007 *2*; εM+=0.049201 *7* εK(exp)=0.62 *8* and 0.54 *8*, and eL(exp)+/εK(exp)=0.68 *16* (1985Ma38). Iβ+: From 1972Ru10.

† Absolute intensity per 100 decays.

γ(^{207}Pb)

E_γ	I_γ‡	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α†	Comments
328.10 *12*	0.00069 *6*	897.79	$3/2^-$	569.6988	$5/2^-$	[M1]	0.334	α(K)=0.273 *4*; α(L)=0.0466 *7*; α(M)=0.01090 *16*; α(N+..)=0.00338 *5* E_γ: From adopted gammas.

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^{207}Bi ε decay (continued)

γ(^{207}Pb) (continued)

E_γ	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	δ	α[†]	Comments
569.698 *2*	97.75 *3*	569.6988	5/2⁻	0	1/2⁻	E2		0.0217 *3*	I_γ: from Iγ(328)/Iγ(897) = 0.0054 *4* in adopted gammas. α: From BRICC. α(K)exp=0.01572 *23*; α(L)exp=0.00452 *6*; α(M)exp=0.00114 *5*; α(M+...)exp=0.00149 *4* α: from experimental conversion coefficients. E_γ: from 2000He14 evaluation. I_γ: from I_γ(569) = (100.0-0.131)/[(1.0 + α(569)]). Mult.: From α(K)exp, α(L)exp and α(M)exp; K/L=3.58 *5* (1988Fu05), 3.52 *11* (1973Fr15), 3.31 *13* (1974Av03), 3.49 *12* (1969He19), 3.57 (E2 theory). L12/L3=7.4 *4* (1969He19), 7.25 (E2 theory). K:L:M:N+=1000:279 *4*:70 *2*:21.0 *11* (1988Fu05), 1000:302 *12*:86 *6*:18 *2* (1974Av03), 1000 *23*:287 *7*:70 *4*:20.5 *18* (1969He19). α(K)exp=0.0155 *5* (1969He19), 0.0159 *6* (1967Va25), both relative to α(K)(661γ) in ^{137}Ba)=0.0890 *8*. α=0.0219 *3* from (ce)(ce) coin (1968An04). α(K)exp: 0.01572 23, weighted average of 0.0156 *7* (1967Kl02), 0.0159 *6* (1967Va25), 0.0160 *10* (1967Se15), 0.0156 *5* (1968An04), 0.0155 *5* (1969He19), 0.0160 *5* [V. Anderson, Riso report 195 (1969)], and 0.0150 *15* (1969Ba53). Other: 0.0230 *3* (1974Mu16) omitted since it is discrepant. α(L)exp: 0.00452 6, weighted average of 0.0049 *3* (1967Se15), 0.0045 *5* (1968An04), 0.00444 *21* (1969He19), 0.0050 *10* (1969Ba53), 0.00483 *18* (1974Av03) and 0.00446 *7* (1988Fu05). α(M)exp: 0.00114 5, weighted average of 0.0010 *5* (1967Se15), 0.00138 *10* (1974Av03) and 0.00112 *3* (1988Fu05). α(M+...)exp: 0.00149 4 weighted average of 0.0017 *5* (1968An04), 0.0017 *4* (1969Ba53), 0.00167 *10* (1974Av03) and 0.00146 *3* (1988Fu05). α(N+...)exp: 0.00029 3 (1974Av03) and 0.000341 17 (1988Fu05).
897.77 *12*	0.128 *5*	897.79	3/2⁻	0	1/2⁻	M1+E2	+0.091 *9*	0.0233 *4*	α(K)=0.0192 *3*; α(L)=0.00318 *5*; α(M)=0.000741 *11*; α(N+..)=0.000230 *4* E_γ: from adopted gammas; Eγ=897.8 keV 1 in 1975Ja04. I_γ: from weighted average (LWM) of [I_γ(897)/I_γ(569)]x100 values of 0.150 *15* (1969Ra13), 0.14 *2* (1975Ja04), 0.122 *13* (1980Yo05), 0.127 *5* (F. Schima in 1991BaZS, p 134), and 0.153 *15* (1991Li10).

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^{207}Bi ε decay (continued)

γ(^{207}Pb) (continued)

E_γ	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	δ	α[†]	Comments
1063.656 *3*	74.5 *3*	1633.358	$13/2^+$	569.6988	$5/2^-$	M4+E5	+0.02 *1*	0.128 *4*	Mult.: α(K)exp=0.0182 *13*, weighted average of 0.019 *3* (1970AhZX), 0.0181 *25* (1974Av03), 0.016 *3* (1975Ja04), and 0.0190 *23* (1988Fu05). δ: From adopted gammas. δ<0.3 from α(K)exp. α: From BRICC. α(K)exp=0.0951 *23*; α(L)exp=0.0247 *6*; α(M)exp=0.0059 *4*; α(N+...)exp=0.00194 *12* α: from experimental conversion coefficients. E_γ: from 2000He14. I_γ: weighted average of [I_γ(1063)/I_γ(569)]x100 values of 78.4 *24* (1967Do09), 74.0 *20* (1969He19) 78.7 *40* (1969Ra13), 75.6 *5* (1972Ro03), 75.5 *23* (1975Ja04), 77.7 *5* (1973Wi10), 75.79 *25* (1980Yo05), 76.5 *5* (Debertin and Schotzig as quoted in 1991BaZS), 76.6 *4* (F. Schima in 1991BaZS, p 134), 76.4 *5* (1990He16), and 77.7 *14* (1991Li10). Mult.: From α(K)exp, α(L)exp and α(M)exp; L12/L3=13 *2*, M/NO=3.3 *5*,and K:L:M+=1000 *20*:267 *8*:83 *4* (1969He19); K/L=3.83 *14* (1973Fr15); K:L:M:N+=4740 *168*:1206 *46*:296 *13*:95 *6* (1988Fu05); K:L:M:N+=4605 *138*:1089 *44*:269 *19*:82 *11* (1974Av03). δ: from γγ(θ), as deduced by 1976Av01 using all available data at that time. Others: 1976Ku10, 1980Si17. 1977Ku09 measured A_2=+0.259 *16* (A_4 is not reported) and deduce δ=+0.12 *+8−6*. α(K)exp: 0.0951 23, weighted average of 0.090 *9* (1967Kl02), 0.096 *3* (1969He19), 0.095 *14* (1969Ba53), 0.094 *5* (1974Av03), and 0.095 *11* (1974Mu16). Others: 0.094 *9* [V. Andersen, Riso report 195 (1969)], 0.099 *4* (1988Fu05) and 0.085 *5* (1967Se15). α(L)exp: 0.0247 6, weighted average of 0.0233 *15* (1967Se15), 0.0256 *10* (1969He19), 0.030 *5* (1969Ba53), 0.0225 *16* (1974Av03), and 0.0251 *10* (1988Fu05). α(M)exp: 0.0059 4, weighted average of 0.0044 *9* (1967Se15), 0.0055 *5* (1974Av03), and 0.0062 *3*

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^{207}Bi ε decay (continued)

γ(^{207}Pb) (continued)

E_γ	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	δ	α[†]	Comments
									(1988Fu05). α(M+...)exp: 0.0105 *17* (1969Ba53). α(N+...)exp: 0.0017 *3* (1974Av03) and 0.00198 *13* (1988Fu05).
1442.2 *2*	0.131 *2*	2339.935	7/2$^-$	897.79	3/2$^-$	E2		0.00337 *5*	α(K)=0.00271 *4*; α(L)=0.000468 *7*; α(M)=0.0001098 *16*; α(N+..)=8.08×10^{-5} *12* E_γ: from 1975Ja04. I_γ: weighted average of [I_γ(1442)/I_γ(569)]x100 values of 0.150 *15* (1969Ra13), 0.15 *2* (1975Ja04), 0.132 *5* (1980Yo05), 0.144 *24* (1979Si17), 0.1337 *26* (F. Schima in 1991BaZS, p 134), and 0.147 *12* (1991Li10). Mult.: α(K)exp=0.00244 *13*, α(L)exp=0.00042 *8* and K:L:M+=1000 *50*:157 *15*:44 *7* (1974Av03). α: from BRICC.
[x]1460.0 *15*	1.61 *6*								E_γ,I_γ: Reported by 1979Si17, but not confirmed by other authors. It is inconsistent with the known low-energy level structure of ^{207}Pb.
1770.228 *9*	6.87 *3*	2339.935	7/2$^-$	569.6988	5/2$^-$	M1+E2	+0.087 *5*	0.0041 *3*	α(K)exp=0.00346 *18*; α(L)exp=0.00049 *8*; α(M+...)exp=0.00013 *3* α: from experimental conversion coefficients. E_γ: from 2000He14. I_γ: weighted average of [I_γ(1770)/I_γ(569)]x100 values of 7.1 *4* (1967Do09), 6.95 *20* (1975Ja04), 7.03 *3* (1980Yo05), 7.02 *7* (F. Schima in 1991BaZS, p 134), and 7.11 *13* (1991Li10). The weighted average is 7.028 *26* with an internal uncertainty of 0.026, and a reduced-χ^2 of 0.14. Other: 7.5 *4* (1969Ra13) omitted as discrepant. Mult.: From α(K)exp, α(L)exp and α(M)exp; K:L:M+=1000 *111*:136 *15*:32 *5* (1988Fu05); 1000 *57*:157 *13*:43 *5* (1974Av03). K/L=5.5 *6* (1973Fr15). δ: from γγ(θ) as deduced by 1976Av01 using all available data at that time (1955La32,1973Ba38,1974Ka08, 1976Av01). α(K)exp: 0.00346 18, weighted average of 0.0034 *3*

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^{207}Bi ε decay (continued)

γ(^{207}Pb) (continued)

E_γ	E_i(level)	Comments
		(1971Al03), 0.0030 *5* (1974Av03), and 0.00362 *19* (1988Fu05). α(L)exp: 0.00049 8, unweighted average of 0.00041 *9* (1974Av03) and 0.00057 *5* (1988Fu05). α(M+...)exp: 0.00013 3, unweighted average of 0.00010 *2* (1974Av03) and 0.000157 *1* (1988Fu05). α(IPF): α_π = 0.00025 *5* 1971Al03; M1 theory 0.00027.

† From experimental results, unless otherwise noted.
‡ Absolute intensity per 100 decays.
[x] γ ray not placed in level scheme.

^{207}Bi ε decay

Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays