Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Shaofei Zhu and E. A. Mccutchan	NDS 175, 1 (2021)	1-May-2021

Q(β^-)=3269 *11*; S(n)=4040 *12*; S(p)=5286 *13*; Q(α)=5621 *3* 2021Wa16
S(2n)=9225 *11*; S(2p)=14230 (syst) *200* (2021WA16).
^{214}Bi (RaC) was first identified as a descendent of ^{226}Ra decay chain, by Rutherford and Barnes (1904Ru04) in a study of radiations from radium (^{226}Ra), as reviewed in article 2013Fr04.
α: Additional information 1.

^{214}Bi Levels

Cross Reference (XREF) Flags

A ^{218}At α decay
B ^{214}Pb β^- decay

E(level)†	J$^\pi$	$T_{1/2}$‡	XREF	Comments
0.0	1$^-$	19.71 min *2*	AB	%β^-=99.9790 *13*; %α=0.0210 *13* $T_{1/2}$: from 1991Ma68; others: 19.9 min *4* (1956Da06), 19.7 min adopted in 1931Cu01. %α: from 1960Wa14; other: 0.04% adopted in 1931Cu01. J$^\pi$: log *ft*=7.872 *11* of β^- to 0$^+$ and log *ft*=9.05 *6* to 2$^+$ of ^{214}Po and β^- from 0$^+$ of ^{214}Pb with log *ft*=6.26 *4* consistent with J=1; M1+E2 γ from 2$^-$. Most possible configuration=((π h$_{9/2}$)(ν g$_{9/2}$)).
53.2260 *15*	2$^-$	≤15 ps	AB	J$^\pi$: E1 γ from 1$^+$; no observed β feeding from 0$^+$ excluding 0$^-$ assignments. $T_{1/2}$: from $\gamma\gamma$(t) fast timing (2011ReZZ). Others: ≤ 0.1 ns (1991Be06), 0.52 ns *5* (1984Pe13).
62.68 *5*	(2$^-$,3$^-$)		AB	J$^\pi$: 196.20γ from (2$^-$) state; favored 6693α from ^{218}At g.s. which is suggested to be (2,3) from hfs (2019Ba22) and α decay (2019Cu02) measurements.
101 *5*	(3$^-$,4$^-$)		A	E(level): deduced from Eα=6654 *4* to this level and Eα=6693 *3* to 62.68-keV level. J$^\pi$: unfavored 6654α from ^{218}At g.s., which is suggested to be (2,3) from hfs (2019Ba22) and α decay (2019Cu02) measurements.
258.869 *24*	(2)$^-$		B	J$^\pi$: M1 γ to 1$^-$ g.s.; γ to (2)$^-$.
295.2236 *19*	1$^-$	≤0.05 ns	B	J$^\pi$: M1+E2 γ to 1$^-$; M1(+E2) γ to 2$^-$; log *ft*=5.250 *24* from 0$^+$. $T_{1/2}$: from $\gamma\gamma$(t) gated on 242γ (1991Be06). Other: ≤0.10 ns from $\beta\gamma$(t) (1984Pe13).
351.9323 *21*	0$^-$,1$^-$	≤0.10 ns	B	J$^\pi$: M1+E2 γ to 1$^-$; log *ft*=5.07 *3* from 0$^+$. $T_{1/2}$: from $\beta\gamma$(t) (1984Pe13).
377.03 *4*	(2$^-$)		B	J$^\pi$: γ from 1$^+$; γ to (2)$^-$; γ to (3$^-$); no β feeding from 0$^+$;
533.672 *14*	(1$^-$)		B	J$^\pi$: log *ft*=6.22 *4* from 0$^+$; M1(+E2) γs to (2)$^-$; γ to 1$^-$.
539 *30*		>93 s		E(level),$T_{1/2}$: measured in Storage Ring at GSI using FRS and Schottky Mass Spectrometry with single-ion tracing method (2008ChZI).
797.30? *8*			B	
838.994 *22*	1$^+$		B	J$^\pi$: log *ft*=4.43 *9* from 0$^+$;
888.03? *10*			B	

† From a least square fit to Eγ's, except where noted.
‡ Half-lives of excited states were measured in ^{214}Pb β^- decay.

Adopted Levels, Gammas (continued)

$\gamma(^{214}Bi)$

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[†]	δ[†]	α	Comments
53.2260	2^-	53.2256 *16*	100	0.0	1^-	M1+E2	0.038 *+26−18*	12.20 *35*	α(L)=9.32 *26*; α(M)=2.20 *7*; α(N)=0.562 *17*; α(O)=0.1146 *32*; α(P)=0.01356 *27* B(M1)(W.u.) > 0.73 Mult.,δ: from L1:L2:L3=650:124:10.1 (1954Ml77) and L1/L2=10 *3*, L1/L3=85 *15* (1957Ni11) (^{214}Pb β^- decay) and α(tot)=8.6 *4* (2019Cu02) (^{218}At α decay).
62.68	$(2^-,3^-)$	(9.5)	100	53.2260	2^-				Transition not observed, but expected to be the dominant decay path (1991Be06,2019Cu02).
258.869	$(2)^-$	196.20 *5*	12.8 *17*	62.68	$(2^-,3^-)$				
		205.68 *9*	2.1 *3*	53.2260	2^-				
		258.86 *4*	100.0 *8*	0.0	1^-	M1		0.696 *10*	α(K)=0.567 *8*; α(L)=0.0983 *14*; α(M)=0.02310 *32*; α(N)=0.00591 *8*; α(O)=0.001207 *17* α(P)=0.0001437 *20*
295.2236	1^-	241.995 *4*	39.32 *12*	53.2260	2^-	M1+E2	0.50 *+8−7*	0.718 *33*	α(K)=0.568 *31*; α(L)=0.1138 *20*; α(M)=0.0272 *4*; α(N)=0.00696 *11*; α(O)=0.001402 *24* α(P)=0.000159 *4* B(E2)(W.u.) > 5.0; B(M1)(W.u.) > 0.0043
		295.224 *2*	100.0 *4*	0.0	1^-	M1+E2	0.39 *7*	0.438 *16*	α(K)=0.352 *15*; α(L)=0.0650 *14*; α(M)=0.01541 *30*; α(N)=0.00394 *8*; α(O)=0.000800 *17* α(P)=9.30×10^{-5} *26* B(E2)(W.u.) > 2.9; B(M1)(W.u.) > 0.0067
351.9323	$0^-,1^-$	351.9320 *21*	100	0.0	1^-	M1+E2	0.49 *10*	0.257 *15*	α(K)=0.207 *13*; α(L)=0.0384 *14*; α(M)=0.00911 *30*; α(N)=0.00233 *8*; α(O)=0.000472 *17* α(P)=5.47×10^{-5} *25* B(E2)(W.u.) > 1.4; B(M1)(W.u.) > 0.0030
377.03	(2^-)	314.32 *7*	100 *12*	62.68	$(2^-,3^-)$				
		323.83 *4*	38 *5*	53.2260	2^-				
533.672	(1^-)	274.80 *5*	99.7 *24*	258.869	$(2)^-$	M1		0.590 *8*	α(K)=0.481 *7*; α(L)=0.0833 *12*; α(M)=0.01957 *27*; α(N)=0.00501 *7*; α(O)=0.001023 *14* α(P)=0.0001218 *17*
		480.43 *2*	100.0 *13*	53.2260	2^-	M1		0.1303 *18*	α(K)=0.1066 *15*; α(L)=0.01818 *25*; α(M)=0.00427 *6*; α(N)=0.001091 *15* α(O)=0.0002230 *31*; α(P)=2.66×10^{-5} *4*
		533.66 *2*	54 *3*	0.0	1^-				
797.30?		538.43[‡] *8*	100	258.869	$(2)^-$				
838.994	1^+	305.26 *3*	3.00 *21*	533.672	(1^-)				
		462.01 *7*	20.0 *6*	377.03	(2^-)				
		487.11 *7*	40.9 *5*	351.9323	$0^-,1^-$	(E1)		0.01046 *15*	α(K)=0.00863 *12*; α(L)=0.001406 *20*; α(M)=0.000328 *5*; α(N)=8.33×10^{-5} *12* α(O)=1.676×10^{-5} *23*; α(P)=1.909×10^{-6} *27*
		543.82 *7*	4.7 *9*	295.2236	1^-				

$^{214}_{83}Bi_{131}$-2

Adopted Levels, Gammas (continued)

$\gamma(^{214}Bi)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[†]	α	Comments
838.994	1^+	580.13 *3*	34.8 *5*	258.869	$(2)^-$	(E1)	0.00732 *10*	α(K)=0.00605 *8*; α(L)=0.000970 *14*; α(M)=0.0002257 *32*; α(N)=5.74×10^{-5} *8* α(O)=1.158×10^{-5} *16*; α(P)=1.331×10^{-6} *19*
		785.96 *9*	100 *7*	53.2260	2^-	E1	0.00406 *6*	α(K)=0.00337 *5*; α(L)=0.000527 *7*; α(M)=0.0001222 *17*; α(N)=3.11×10^{-5} *4*; α(O)=6.30×10^{-6} *9* α(P)=7.35×10^{-7} *10*
		839.06 *9*	54.8 *10*	0.0	1^-	(E1)	0.00359 *5*	α(K)=0.00299 *4*; α(L)=0.000465 *7*; α(M)=0.0001077 *15*; α(N)=2.74×10^{-5} *4*; α(O)=5.56×10^{-6} *8* α(P)=6.49×10^{-7} *9*
888.03?		511.00[‡] *9*	100	377.03	(2^-)			

[†] From ^{214}Pb β^- decay, unless otherwise noted.
[‡] Placement of transition in the level scheme is uncertain.

$^{214}_{83}Bi_{131}$-3

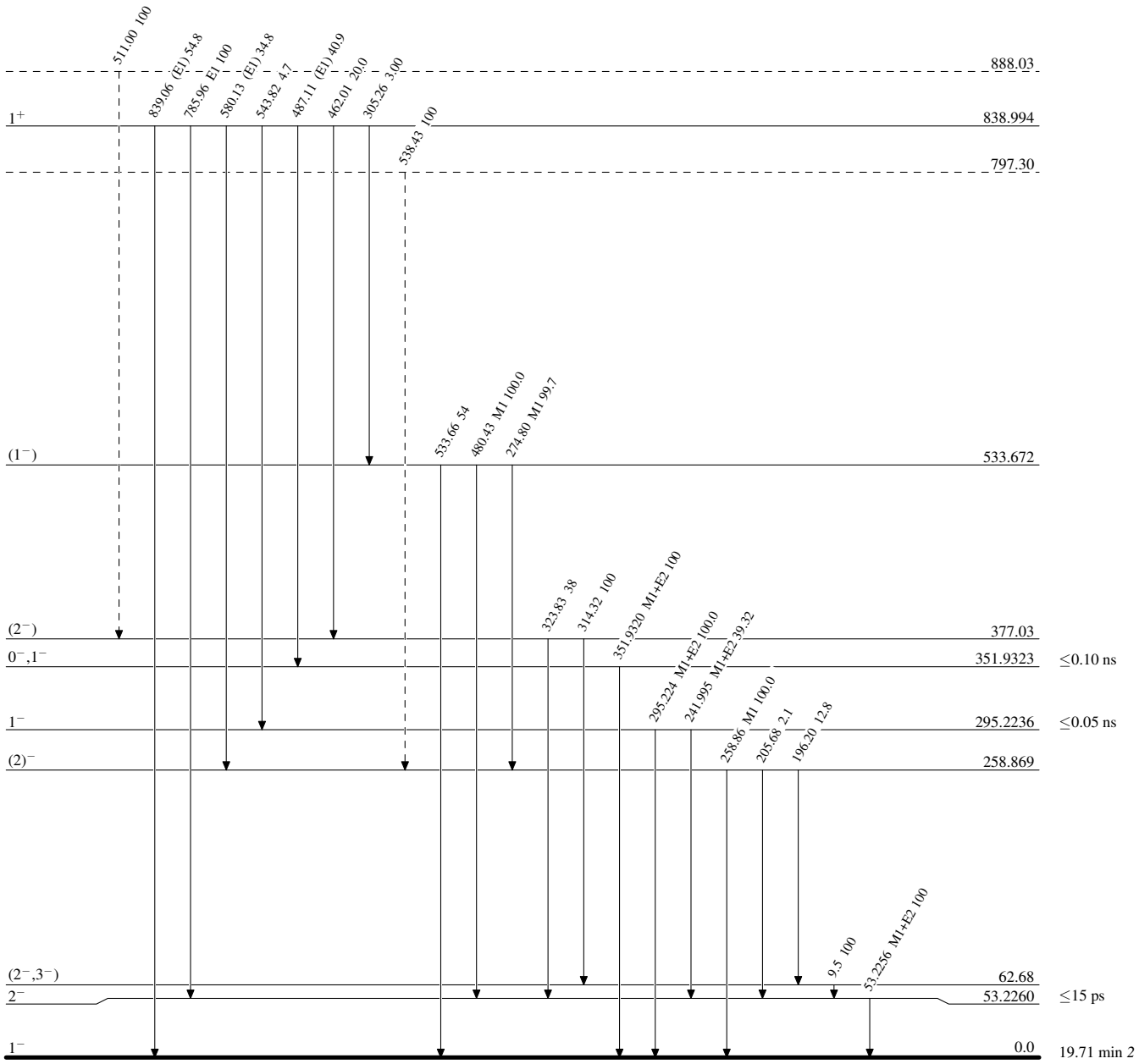
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{214}_{83}Bi_{131}$