^{215}Bi β^- decay (7.6 min) 2003Ku26

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation		NDS 114, 2023 (2013)	23-Sep-2013

Parent: ^{215}Bi: E=0.0; J^π=(9/2$^-$); $T_{1/2}$=7.6 min *2*; Q(β^-)=2189 *15*; %β^- decay=100.0

^{215}Bi-J^π,$T_{1/2}$: From ^{215}Bi Adopted Levels.

^{215}Bi-Q(β^-): From 2012Wa38.

2003Ku26: ^{215}Bi produced by ^{232}Th(p,X) and ^{238}U(p,X) at 1 GeV proton energy, followed by mass separation. Measured Eγ, Iγ, α, $\gamma\gamma$, $\beta\gamma$ coin, $\alpha\gamma$ coin, γ x ray coin using large Ge detector for γ-rays, low-energy Ge detector for x rays and low-energy γ rays, plastic scintillator for β.

2004DeZV: estimated β feeding to the ground state.

See also evaluation of this decay scheme by the Decay Data Evaluation Project (DDEP on www.nucleide.org); published in M.M. Be et al., Table of Radionuclides, volume 7, BIPM Monographie-5 (2013).

1990Ru02: ^{215}Bi mass-separated source produced by spallation of 200-MeV protons on targets of ^{232}Th. Measured Eγ, Iγ, $\gamma\gamma$ coin, $\beta\gamma$ coin. Detectors: 4π plastic scintillator, Ge(Li).

^{215}Po Levels

E(level)[†]	J^π[‡]	E(level)[†]	J^π[‡]	E(level)[†]
0.0	9/2$^+$	517.53 *17*	7/2$^+$,9/2$^+$	1077.6 *15*
271.11 *10*	7/2$^+$	609.0 *5*	(11/2$^+$,13/2$^+$)	1176.1 *20*
293.53 *10*	(11/2)$^+$	677.6 *7*		1294.43 *18*
401.6 *10*	5/2$^+$	835.7 *5*		1398.8 *3*

† From least-squares fit of Eγ data.

‡ From Adopted Levels.

β^- radiations

E(decay)	E(level)	Iβ^-[†‡]	Log *ft*[†]	Comments
(790 *15*)	1398.8	5.7	5.7	av Eβ=249.2 *55* Iβ^-: 6.2% (2003Ku26).
(895 *15*)	1294.43	4.2	6.0	av Eβ=287.5 *56* Iβ^-: 4.5% (2003Ku26).
(1013 *15*)	1176.1	0.4	7.2	av Eβ=331.9 *58*
(1111 *15*)	1077.6	1.5	6.8	av Eβ=369.6 *59* Iβ^-: 1.7% (2003Ku26).
(1353 *15*)	835.7	3.1	6.8	av Eβ=464.4 *60* Iβ^-: 3.3% (2003Ku26).
(1511 *15*)	677.6	1.1	7.4	av Eβ=527.7 *61*
(1580 *15*)	609.0	1.4	7.4	av Eβ=555.5 *61* Iβ^-: 1.5% (2003Ku26).
(1671 *15*)	517.53	0.7	7.8	av Eβ=592.7 *62* Iβ^-: 0.5% (2003Ku26).
(1787 *15*)	401.6	1.0	7.7	av Eβ=640.3 *62*
(1895 *15*)	293.53	71 *9*	6.0 *1*	av Eβ=685.0 *63* Iβ^-: 77% (2003Ku26).
(1918[#] *15*)	271.11	<0.4	>8.2	av Eβ=694.3 *63* Iβ^-: 2.2% in 2003Ku26 could not be reproduced by the evaluators. Intensity balance gives 0.0% 4.
(2189[#] *15*)	0.0	10 *10*	>6.9	av Eβ=807.6 *63* Iβ^-: from 12% 8 (2004DeZV), and <3% from log *ft*>7.7 in 2003Ku26. In DDEP evaluation, a large feeding of 61% 6 was suggested based on an approach which is "approximate and of highly questionable merit" as stated by the DDEP evaluators.

Continued on next page (footnotes at end of table)

^{215}Bi β^- decay (7.6 min) 2003Ku26 (continued)

β^- radiations (continued)

† Except for the strongly populated level at 293.5 keV, all other values should be considered as limits (upper for Iβ and lower for log *ft* values), since the level scheme is likely incomplete above the excitation energy of 1400 keV. The Iβ feedings given here are deduced from γ-intensity balances based on 10% *10* β feeding to g.s. Values listed in 2003Ku26 are given under comments.

‡ Absolute intensity per 100 decays.

Existence of this branch is questionable.

$\gamma(^{215}Po)$

Iγ normalization: Based on β feeding of 10% 10 to g.s.; from 12% 8 (2004DeZV) summed gamma-transition intensity=90 *10* to ground state. 2003Ku26 estimated negligible β feeding to the ground state based on measured ratio of ^{215}Bi g.s. and isomer components in Iα in ^{215}Po α decay and in Iγ(294γ).

E_γ	I_γ [†#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[‡]	α[@]	Comments
271.1 *1*	2.9 *1*	271.11	7/2$^+$	0.0	9/2$^+$	M1+E2	3.6 *+7−5*	0.207 *12*	α(K)=0.117 *11*; α(L)=0.0672 *12*; α(M)=0.0174 *3* α(N)=0.00446 *7*; α(O)=0.000872 *15*; α(P)=8.84×10^{-5} *21*
293.5 *1*	35.2 *11*	293.53	(11/2)$^+$	0.0	9/2$^+$	M1		0.537	α(K)=0.437 *7*; α(L)=0.0763 *11*; α(M)=0.0180 *3* α(N)=0.00463 *7*; α(O)=0.000969 *14*; α(P)=0.0001253 *18*
384 *1*	0.2 *1*	677.6		293.53	(11/2)$^+$				Iγ(384)/Iγ(678)=0.33 is in severe disagreement from 0.025 in ^{219}Rn α decay.
401.6 *10*	0.7 *1*	401.6	5/2$^+$	0.0	9/2$^+$	E2		0.0555	α(K)=0.0351 *6*; α(L)=0.0153 *3*; α(M)=0.00391 *7* α(N)=0.001003 *17*; α(O)=0.000198 *4*; α(P)=2.09×10^{-5} *4*
517.5 *2*	1.5 *1*	517.53	7/2$^+$,9/2$^+$	0.0	9/2$^+$	M1(+E2)		0.1162	α(K)=0.0948 *14*; α(L)=0.01634 *23*; α(M)=0.00385 *6* α(N)=0.000990 *14*; α(O)=0.000207 *3*; α(P)=2.68×10^{-5} *4* α: for M1.
542.7 *25*	0.3 *1*	835.7		293.53	(11/2)$^+$				
564.4 *5*	1.0 *1*	835.7		271.11	7/2$^+$				
609.0 *5*	1.0 *1*	609.0	(11/2$^+$,13/2$^+$)	0.0	9/2$^+$				
677.6 *10*	0.6 *1*	677.6		0.0	9/2$^+$				
776.9 *1*	1.2 *2*	1294.43		517.53	7/2$^+$,9/2$^+$				
784 *2*	0.5 *1*	1077.6		293.53	(11/2)$^+$				
806.5 *22*	0.6 *1*	1077.6		271.11	7/2$^+$				
836.3 *10*	0.9 *1*	835.7		0.0	9/2$^+$				
905 *2*	0.3 *1*	1176.1		271.11	7/2$^+$				
1023.1 *12*	0.9 *1*	1294.43		271.11	7/2$^+$				
1104.5 *5*	2.2 *1*	1398.8		293.53	(11/2)$^+$				
1127.7 *7*	0.7 *1*	1398.8		271.11	7/2$^+$				
1294.5 *3*	0.9 *1*	1294.43		0.0	9/2$^+$				
1399.2 *4*	1.2 *1*	1398.8		0.0	9/2$^+$				

† In table 3 of their paper, 2003Ku26 state that gamma intensities are in percent per decay, but this is inconsistent with their decay scheme in their figure 6. The intensities quoted in table 3 of 2003Ku26 are relative intensities, instead, as communicated in a priv. comm. of April 2011 from J. Kurpeta (first author of 2003Ku26) to evaluator (Filip Kondev, ANL) of Decay Data Evaluation Project (DDEP).

‡ From Adopted Gammas.

For absolute intensity per 100 decays, multiply by 1.39 *16*.

@ 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.

$^{215}_{84}Po_{131}$-3

^{215}Bi β^- decay (7.6 min) 2003Ku26

Decay Scheme

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