Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	M. S. Basunia	NDS 181, 475 (2022)	1-Jan-2022

Q(β^-)=−74 *6*; S(n)=4355 *3*; S(p)=5825 *3*; Q(α)=8536 *3* 2021Wa16

2020De36: ^{238}U(^{48}Ca,X), E=233.3 MeV; measured multi-nucleon transfer reaction cross section $\sigma_{cumulative}$=2350 nb/sr *9* for ^{213}Po.

2015Ba20: ^{136}Xe + ^{208}Pb, E(c.m.)=450 MeV, measured multi-nucleon transfer reaction cross section $\sigma_{cumulative\ yield}$=0.193 mb *39* and $\sigma_{independent\ yield}$=0.190 mb *38* for ^{213}Po.

^{213}Po Levels

Cross Reference (XREF) Flags

- A ^{213}Bi β^- decay (45.59 min)
- B ^{217}Rn α decay
- C ^{208}Pb(^{18}O,Xγ)

E(level)†	J$^\pi$#	$T_{1/2}$	XREF	Comments
0.0‡	9/2$^+$	3.706 μs *1*	ABC	%α=100 J$^\pi$: favored α decay to ^{209}Pb g.s. (J$^\pi$=9/2$^+$). $T_{1/2}$: Weighted average of 3.709 μs *2* (2020Ko06 − 440γ-α(t)), 3.705 μs *1* (2018Al32 − deduced from the 622-day decay curve using parent ^{229}Th), 3.5 μs *3* (2018Sa45 − α_1-α_2-α_3 correlations), 3.65 μs *4* (1998Wa25), 3.75 μs *4* (1997Wa27), 3.70 μs *3* (1997VaZV), and 3.74 μs *2* (1995WaZQ), 4.2 μs *8* (1948Je05), 3.708 μs *8* (2013Su13 − ^{213}Po α decay). Others: 4.2 μs (1949Me54), and 3.65 μs (2002Mo46). Eα (group 1)=8376 *3* (1982Bo04), 8377 *5* (1964Va20), 8368 *10* (1960Vo05); Eα (group 2)=7614 *10* (1964Va20).
292.805 *8*	(11/2$^+$)	78 ps *14*	A	J$^\pi$: 292.78γ (M1+E2) to 9/2$^+$ state. 2011As05 (^{18}O,Xγ) proposed spin parity 7/2$^+$ instead of 11/2$^+$. $T_{1/2}$: From delayed $\gamma\gamma$-coin in ^{213}Bi β^- decay (1997Wa27).
440.446 *9*	(7/2$^+$)	93 ps *3*	A	%α<0.001 from 1997Wa27 (see ^{213}Bi β- decay). J$^\pi$: 440γ M1 to 9/2$^+$ state. log *ft*=6.1 in 9/2$^-$ ^{213}Bi β^- decay. HF≥70 estimated in 1997Wa27. 2011As05 (^{18}O,Xγ) proposed spin-parity 11/2$^+$ instead of 7/2$^+$. $T_{1/2}$: From β-γ coincidences in ^{213}Bi β^- decay (1997Wa27).
600.87? *17*	(5/2$^+$)		A	
645.6‡ *5*	13/2$^+$@		C	
867.98 *3*	(13/2$^+$)		A	J$^\pi$: 2011As05 (^{18}O,Xγ) proposed spin-parity to be 9/2$^+$ instead of 13/2$^+$, since it was not populated in their work.
1003.605 *22*	(9/2$^+$)		A	
1045.65 *9*	(9/2$^+$,11/2$^+$)		A	
1068.4‡ *5*	17/2$^+$@		C	
1100.173 *8*	(7/2,9/2,11/2)		A	
1119.38 *4*	(7/2,9/2,11/2)		A	
1328.2 *3*	(7/2,9/2,11/2)		A	
1357.4‡ *6*	21/2$^+$@		C	
1412.9 *8*			C	
1503.6 *8*	(25/2$^+$)@		C	Possible configuration: $\pi\ h^{+2}_{9/2}\otimes\nu\ i^{+1}_{11/2}$.
1619.1 *8*	(23/2$^+$)		C	J$^\pi$: 261.7γ to 21/2$^+$.
1779.6 *6*			C	
2017.2 *9*			C	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{213}Po Levels (continued)

† Deduced by evaluator from a least square fit to the γ-ray energies.

‡ Yrast sequence. Possible configuration: $9/2^+$: $\nu\,(g^{+1}_{9/2})$, $13/2^+$: $\nu\,(g^{+1}_{9/2})\otimes 2^+$, $17/2^+$: $\nu\,(g^{+1}_{9/2})\otimes 4^+$, and $21/2^+$: $\nu\,(g^{+1}_{9/2})\otimes 6^+$.

From 1998Ar03 (^{213}Bi β^- decay), except where otherwise noted. In 1998Ar03, semiempirical shell-model calculation results were compared as a guide for parity and spin assignments. Additional arguments are given as comments.

@ From (^{18}O,Xγ) based on γ-ray multipole assignments.

Adopted Levels, Gammas (continued)

γ(^{213}Po)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[†]	δ[†]	α[@]	Comments
292.805	(11/2$^+$)	292.80 *1*	100	0.0	9/2$^+$	M1+E2	1.0 *+5−4*	0.34 *10*	B(M1)(W.u.)=0.0042 *+24−17*; B(E2)(W.u.)=17 *8* α(K)=0.26 *9*; α(L)=0.063 *7*; α(M)=0.0153 *13* α(N)=0.00394 *34*; α(O)=0.00080 *8*; α(P)=9.4×10^{-5} *15* Mult.,δ: Mult: from α(K)exp=0.24 *7* (1998MaZO – ^{213}Bi β$^-$ decay).
440.446	(7/2$^+$)	147.66 *5*	0.057 *4*	292.805	(11/2$^+$)	(E2)		1.454 *20*	B(E2)(W.u.)=0.563 *45* α(K)=0.307 *4*; α(L)=0.851 *12*; α(M)=0.2263 *32* α(N)=0.0580 *8*; α(O)=0.01109 *16*; α(P)=0.001015 *14* Mult.: B(E2)=0.0031 *6* (1997Wa27) is close to the B(E2, 2$^+$ to 0$^+$) values of the neighboring nuclei.
		440.45 *1*	100 *1*	0.0	9/2$^+$	M1+E2	0.39 *+15−19*	0.161 *13*	B(M1)(W.u.)=0.00207 *+21−24*; B(E2)(W.u.)=0.55 *+40−35* α(K)=0.130 *11*; α(L)=0.0234 *14*; α(M)=0.00553 *30* α(N)=0.00142 *8*; α(O)=0.000297 *17*; α(P)=3.80×10^{-5} *25* Mult.,δ: Mult: from α(K)exp=0.12 *1* (^{213}Bi β$^-$ decay).
600.87?	(5/2$^+$)	600.9 *2*	100	0.0	9/2$^+$				
645.6	13/2$^+$	645.6[‡] *5*	100	0.0	9/2$^+$	E2[#]		0.01796 *25*	α(K)=0.01327 *19*; α(L)=0.00354 *5*; α(M)=0.000872 *12* α(N)=0.0002241 *32*; α(O)=4.53×10^{-5} *6*; α(P)=5.20×10^{-6} *7*
867.98	(13/2$^+$)	574.9 *3*	22 *9*	292.805	(11/2$^+$)				
		867.98 *3*	100 *5*	0.0	9/2$^+$				
1003.605	(9/2$^+$)	402.8 *3*	0.20 *3*	600.87?	(5/2$^+$)				
		710.82 *3*	22.2 *10*	292.805	(11/2$^+$)				
		1003.58 *3*	100 *6*	0.0	9/2$^+$				
1045.65	(9/2$^+$,11/2$^+$)	604.94 *21*	13 *3*	440.446	(7/2$^+$)				
		1045.70 *9*	100 *17*	0.0	9/2$^+$				
1068.4	17/2$^+$	422.8[‡] *1*	100	645.6	13/2$^+$	E2[#]		0.0486 *7*	α(K)=0.0315 *4*; α(L)=0.01286 *18*; α(M)=0.00327 *5* α(N)=0.000840 *12*; α(O)=0.0001663 *23*; α(P)=1.768×10^{-5} *25*
1100.173	(7/2,9/2,11/2)	659.75 *2*	12.9 *7*	440.446	(7/2$^+$)				
		807.36 *1*	100.0 *25*	292.805	(11/2$^+$)				
		1100.17 *1*	91 *6*	0.0	9/2$^+$				
1119.38	(7/2,9/2,11/2)	826.55 *5*	13.7 *19*	292.805	(11/2$^+$)				
		1119.40 *6*	100 *4*	0.0	9/2$^+$				

From ENSDF

$^{213}_{84}Po_{129}$-3

Adopted Levels, Gammas (continued)

γ(^{213}Po) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[†]	α[@]	Comments
1328.2	(7/2,9/2,11/2)	886.66[&] *14* 1328.2 *3*	100 *20* 40 *10*	440.446 0.0	(7/2$^+$) 9/2$^+$			
1357.4	21/2$^+$	289.0[‡] *1*	100	1068.4	17/2$^+$	(E2)[#]	0.1410 *20*	α(K)=0.0729 *10*; α(L)=0.0508 *7*; α(M)=0.01322 *19* α(N)=0.00339 *5*; α(O)=0.000661 *9*; α(P)=6.56×10^{-5} *9*
1412.9		344.5[‡] *5*	100	1068.4	17/2$^+$			
1503.6	(25/2$^+$)	146.2[‡] *5*	100	1357.4	21/2$^+$	(E2)	1.512 *29*	α(exp)=0.15 *5* (2011As05) α(N)=0.0607 *13*; α(O)=0.01159 *24*; α(P)=0.001061 *22* α(K)=0.313 *5*; α(L)=0.889 *19*; α(M)=0.237 *5* Mult.: From α(exp) (^{18}O,xγ).
1619.1	(23/2$^+$)	261.7[‡] *5*	100	1357.4	21/2$^+$			
1779.6		711.2[‡] *3*	100	1068.4	17/2$^+$			
2017.2		398.1[‡] *5*	100	1619.1	(23/2$^+$)			

[†] From ^{213}Bi β^- decay, except where otherwise noted.
[‡] From (^{18}O,Xγ).
[#] From (^{18}O,Xγ) based on the the angular anisotropy ratio R_{ADO} measurements. Evaluator assign as E2 based on the assigned configuration, systematics, and measurement timescale (γγ coin).
[@] Additional information 1.
[&] Placement of transition in the level scheme is uncertain.

From ENSDF

$^{213}_{84}Po_{129}$-4

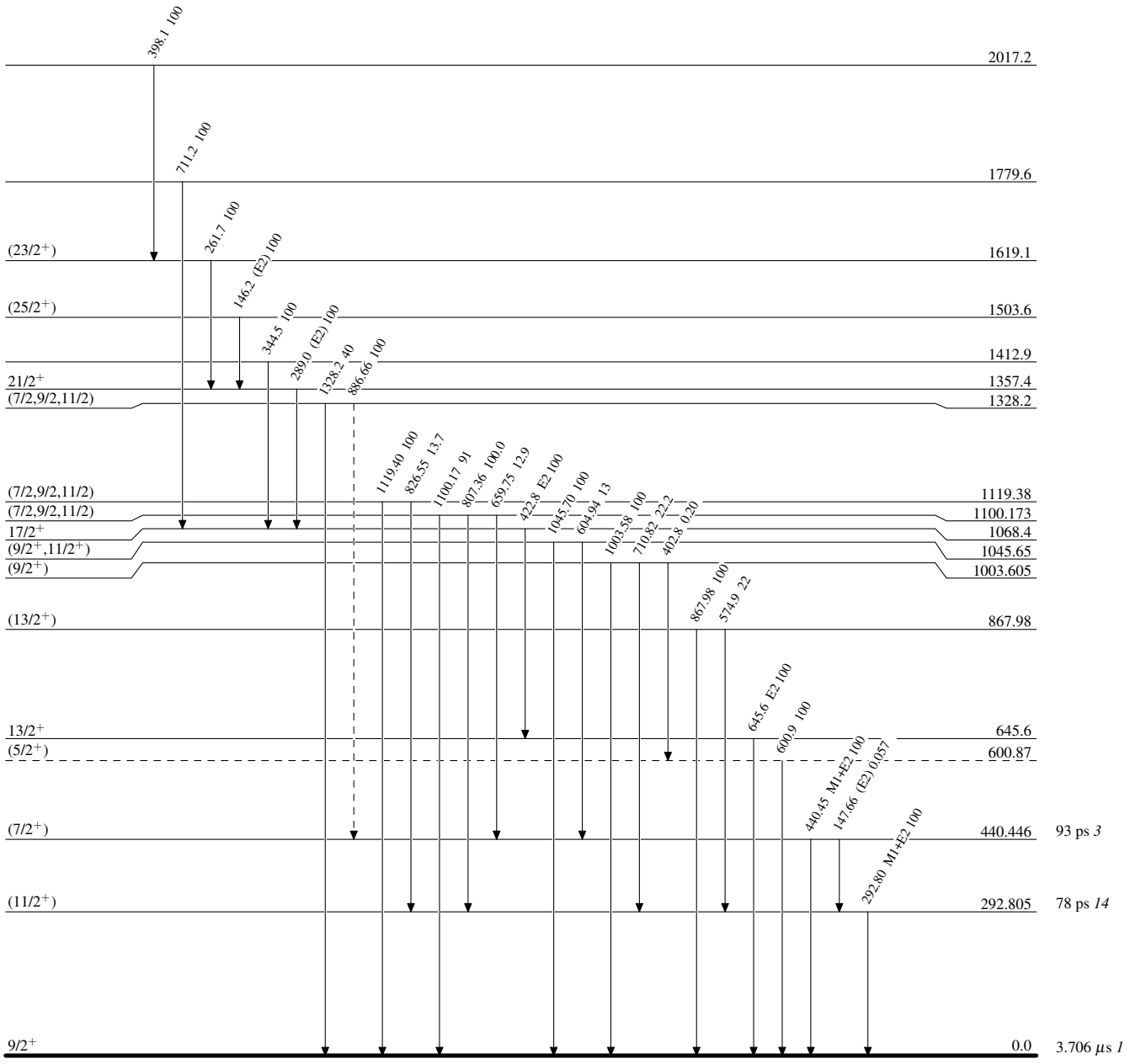
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{213}_{84}Po_{129}$