

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	C. D. Nesaraja	NDS 189,1 (2023)	14-Feb-2023

$Q(\beta^-)=1278$ 14; $S(n)=4699$ 13; $S(p)=7350$ syst; $Q(\alpha)=4560$ syst 2021Wa16
 $\Delta S(p)=100$, $\Delta Q(\alpha)=200$ (syst, 2021Wa16).
 $S(2n)=10719$ 14, $S(2p)=13880$ 300 (syst) (2021Wa16).

 ^{245}Pu LevelsCross Reference (XREF) Flags

A $^{244}\text{Pu}(d,p)$
 B $^{244}\text{Pu}(^{18}\text{O}, ^{17}\text{O}\gamma)$
 C $^{244}\text{Pu}(^{209}\text{Bi}, ^{208}\text{Bi}\gamma)$

E(level) [†]	J ^π #	T _{1/2}	XREF	Comments
0 [@]	(9/2 ⁻)	10.54 h 6	ABC	$\% \beta^- = 100$ T _{1/2} : From unweighted average of 10.59 h 2 (decay, 1967Bu09) and 10.48 h 5 (decay, 1968Da02). Value is recommended by 1986LoZT. Others: 10.1 h 5 (from successive separation of its daughter ^{245}Am , 1955Fi37), 10.6 h 4 (from chemically separated daughter, ^{245}Am , 1956Bu92), 10.4 h 2 (from daughter ^{245}Am , 1968Da02). J ^π : From systematics of nuclei with 151 neutrons (^{247}Cm , ^{249}Cf , ^{251}Fm) and from macroscopic-microscopic model calculation (2011As03). Only β^- decay was observed.
60.5 ^{&} 10	(11/2 ⁻)		C	Additional information 1.
137.5 [@] 10	(13/2 ⁻)		C	Additional information 2.
194.10 ^b 16	(7/2 ⁺)		BC	J ^π : E1 194.10γ to (9/2 ⁻) g.s. and from macroscopic-microscopic model calculation (2011As03).
224.4 ^{&} 18	(15/2 ⁻)		ABC	
251 ^{‡a} 4	(9/2 ⁺)		ABC	Additional information 3.
264.50 ^g 26	(5/2 ⁺)		B	J ^π : M1 70.4γ to (7/2 ⁺) 194-keV level and from macroscopic-microscopic model calculation (2011As03).
269.10 ^c 16	(7/2 ⁺)		B	J ^π : D 75.0γ to (7/2 ⁺) 194-keV level, D to (9/2 ⁻) g.s level and the energy spacing between the 331.2 and 269.1 keV level is consistent with that of the members of the 7/2[613] with energy difference of 57.61 keV in the ENSDF database for ^{249}Cf (2011Ab07).
311.5 ^e 11	(1/2 ⁺)	0.33 μs 2	AB	Additional information 4. J ^π : From systematics of neutron single levels for N=151 isotones (2007Ma82, 2011As03). T _{1/2} : From γ(t) in $^{244}\text{Pu}(^{18}\text{O}, ^{17}\text{O}\gamma)$ (2007Ma82).
322.5 [@] 10	(17/2 ⁻)		C	
323.1 ^b 11	(11/2 ⁺)		C	Additional information 5.
331.20 ^c 30	(9/2 ⁺)		AB	
360 ^{‡e}	(5/2 ⁺)		AB	Additional information 6.
405.0 ^a 10	(13/2 ⁺)		C	
428 ^{‡e}	(7/2 ⁺)		AB	
433.2 ^{&} 18	(19/2 ⁻)		C	
463.30 ^{‡e} 28	(9/2 ⁺)		AB	
502.4 ^b 5	(15/2 ⁺)		C	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) ^{245}Pu Levels (continued)

E(level) [†]	J ^π #	T _{1/2}	XREF	Comments
555.2 [@] 11	(21/2 ⁻)		C	
579.8 ^d 4	(3/2 ⁺)		AB	J ^π : (D) 315.3γ to (5/2 ⁺) 264.5-keV level and from systematics of neutron single levels for N=151 isotones (2007Ma82).
610.9 ^a 11	(17/2 ⁺)		C	
619.2 ^d 4	(5/2 ⁺)		AB	
642.90 ^f 30	(3/2 ⁻)		AB	J ^π : (D) 282.9γ to 360-keV level (5/2 ⁺).
665 ^{‡d}	(7/2 ⁺)		AB	
680.80 ^f 20	(7/2 ⁻)		AB	
689.2 ^{&} 15	23/2 ⁻		C	
728 ^{‡d}	(9/2 ⁺)		AB	
732.4 ^b 11	(19/2 ⁺)		C	
743			A	
763			A	
764.80 ^f 35	(11/2 ⁻)		B	
807 2	(11/2 ⁺)		A	
834.3 [@] 12	(25/2 ⁻)		C	
865.7 ^a 12	(21/2 ⁺)		C	
991.2 ^{&} 14	(27/2 ⁻)		C	
1011.0 ^b 12	(23/2 ⁺)		C	
1076 3			A	
1133 3			A	
1159.0 [@] 13	(29/2 ⁻)		C	
1167.6 ^a 13	(25/2 ⁺)		C	
1284 3			A	
1335.6 ^b 13	(27/2 ⁺)		C	
1337.4 ^{&} 14	(31/2 ⁻)		C	
1394 4			A	
1514.1 ^a 14	(29/2 ⁺)		C	
1526.7 [@] 14	(33/2 ⁻)		C	
1702.4 ^b 14	(31/2 ⁺)		C	
1725.0 ^{&} 15	(35/2 ⁻)		C	
1900.7 ^a 15	(33/2 ⁺)		C	
1934.5 [@] 15	(37/2 ⁻)		C	
2.0×10 ³ 4		90 ns 30		%SF≤100 Only SF decay was observed. T _{1/2} (γ)/T _{1/2} (SF)=1.08 was calculated by 1972We09. See also compilation by 2002Si26 and 2015Ja04. E(level): Systematics of SF isomers in lighter odd-A Pu E(level)=1.8 MeV; 2.3 MeV was deduced by 1972We09 from ²⁴⁴ Pu(n,F) data of 1971Au06. Level energy=1.87 MeV calculated by 1972We09, 2.43 MeV by 1990Bh02. T _{1/2} : Experimental value recommended in 1990Bh02 (reference not given). See 1972We09, 1980Ku14, and 1990Bh02 for calculated T _{1/2} (SF).
2106.9 ^b 15	(35/2 ⁺)		C	
2151.5 ^{&} 16	(39/2 ⁻)		C	
2321.6 ^a 16	(37/2 ⁺)		C	
2378.4 [@] 16	(41/2 ⁻)		C	
2542.7 ^b 16	(39/2 ⁺)		C	
2609.0 ^{&} 16	(43/2 ⁻)		C	
2769.3 ^a 17	(41/2 ⁺)		C	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) ^{245}Pu Levels (continued)

E(level) [†]	J ^π #	XREF	E(level) [†]	J ^π #	XREF
2850.1 [@] 16	(45/2 ⁻)	C	3314.1 [@] 19	(49/2 ⁻)	C
2999.4 ^b 17	(43/2 ⁺)	C	3461.4 ^b 19	(47/2 ⁺)	C
3229.4 ^a 17	(45/2 ⁺)	C	3686.4 ^a 20	(49/2 ⁺)	C
			3769.1 [@] 22	(53/2 ⁻)	C

[†] Deduced by the evaluator from least-squares fit to γ -ray energies, with E=60.5-keV, 137.5-keV, 251-keV, 311.5-keV, 323.1-keV, and 360-keV held fixed during least-squares fit to avoid singular matrix.

[‡] From $^{244}\text{Pu}(^{18}\text{O}, ^{17}\text{O}\gamma)$.

Based on the rotational band structure, as given by the assigned bandhead configurations, except as noted.

@ Band(A): $\nu 9/2[734]$, $\alpha=+1/2$.

& Band(a): $\nu 9/2[734]$, $\alpha=-1/2$.

^a Band(B): $\nu 7/2[624]$, $\alpha=+1/2$.

^b Band(b): $\nu 7/2[624]$, $\alpha=-1/2$.

^c Band(C): $\nu 7/2[613]$.

^d Band(D): $\nu 3/2[622]$.

^e Seq.(G): $\nu 1/2[620]$. (3/2⁺) member has not been reported.

^f Band(E): $\nu 1/2[750]$.

^g Band(F): 5/2[622] Rotational Bandhead.

 $\gamma(^{245}\text{Pu})$

Additional information 7.

$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	I_γ	E_f	J_f^π	Mult. [#]	$\alpha^\text{@}$	Comments
60.5	(11/2 ⁻)	(60 1)		0	(9/2 ⁻)			
137.5	(13/2 ⁻)	(138 1)		0	(9/2 ⁻)			
194.10	(7/2 ⁺)	194.10 [‡] 20	100 [‡]	0	(9/2 ⁻)	E1	0.1100 16	$\alpha(\text{K})=0.0856$ 12; $\alpha(\text{L})=0.01840$ 26; $\alpha(\text{M})=0.00449$ 6 $\alpha(\text{N})=0.001210$ 17; $\alpha(\text{O})=0.000293$ 4; $\alpha(\text{P})=5.16\times 10^{-5}$ 7; $\alpha(\text{Q})=2.429\times 10^{-6}$ 34
224.4	(15/2 ⁻)	(162 1)		60.5	(11/2 ⁻)			
264.50	(5/2 ⁺)	70.4 [‡] 2	100 [‡]	194.10	(7/2 ⁺)	M1	15.67 26	$\text{B}(\text{M1})(\text{W.u.})=1.15\times 10^{-5}$ 7 $\alpha(\text{L})=11.79$ 19; $\alpha(\text{M})=2.87$ 5 $\alpha(\text{N})=0.781$ 13; $\alpha(\text{O})=0.1945$ 32; $\alpha(\text{P})=0.0370$ 6; $\alpha(\text{Q})=0.00243$ 4
269.10	(7/2 ⁺)	75.0 [‡] 2	100.0 [‡] 74	194.10	(7/2 ⁺)	D		
		269.1 [‡] 2	51.9 [‡] 37	0	(9/2 ⁻)	(D)		
311.5	(1/2 ⁺)	(47 [‡])	100 [‡]	264.50	(5/2 ⁺)	[E2]	576 8	$\alpha(\text{L})=419$ 6; $\alpha(\text{M})=116.8$ 16 $\alpha(\text{N})=32.1$ 4; $\alpha(\text{O})=7.54$ 11; $\alpha(\text{P})=1.181$ 17; $\alpha(\text{Q})=0.00260$ 4 $\text{B}(\text{E2})(\text{W.u.})=0.142$ +19-16
322.5	(17/2 ⁻)	185 1		137.5	(13/2 ⁻)			
323.1	(11/2 ⁺)	(129 1)		194.10	(7/2 ⁺)			
331.20	(9/2 ⁺)	331.2 [‡] 3	100 [‡]	0	(9/2 ⁻)	(D)		
405.0	(13/2 ⁺)	154 1		251	(9/2 ⁺)			
433.2	(19/2 ⁻)	208.8 5		224.4	(15/2 ⁻)			
502.4	(15/2 ⁺)	179.3		323.1	(11/2 ⁺)			

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) $\gamma(^{245}\text{Pu})$ (continued)

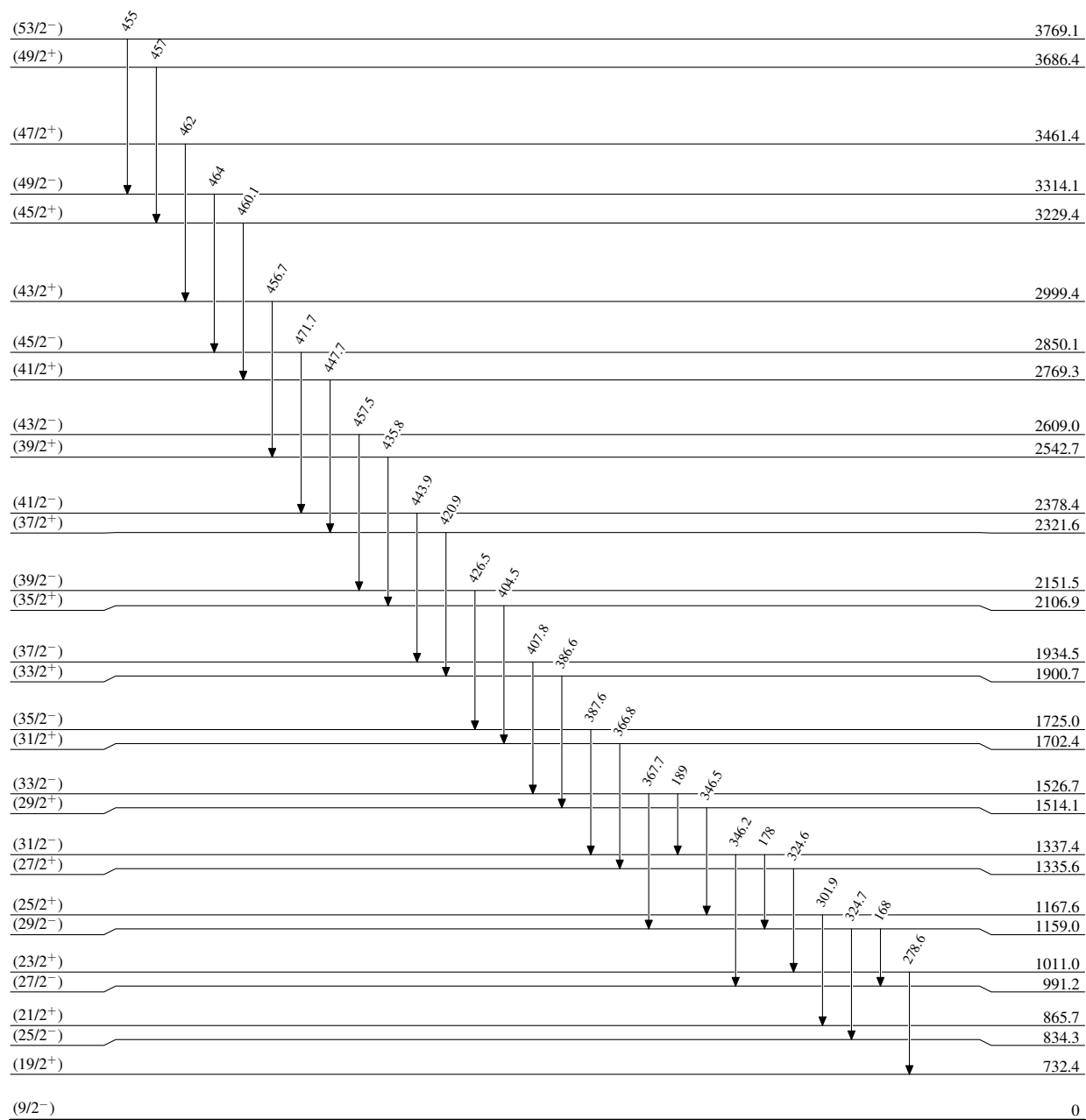
$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	I_γ	E_f	J_f^π	Mult. [#]
555.2	(21/2 ⁻)	232.7 5		322.5	(17/2 ⁻)	
579.8	(3/2 ⁺)	315.3 [‡] 3	100 [‡]	264.50	(5/2 ⁺)	(D)
610.9	(17/2 ⁺)	205.9 5		405.0	(13/2 ⁺)	
619.2	(5/2 ⁺)	354.7 [‡] 3	100 [‡]	264.50	(5/2 ⁺)	Q
642.90	(3/2 ⁻)	282.9 [‡] 3	100 [‡]	360	(5/2 ⁺)	(D)
680.80	(7/2 ⁻)	217.5 [‡] 2	57 [‡] 4	463.30	(9/2 ⁺)	(D)
		320.8 [‡] 2	100 [‡] 6	360	(5/2 ⁺)	D
689.2	23/2 ⁻	256 1		433.2	(19/2 ⁻)	
732.4	(19/2 ⁺)	230 1		502.4	(15/2 ⁺)	
764.80	(11/2 ⁻)	301.5 [‡] 2	100 [‡]	463.30	(9/2 ⁺)	D
834.3	(25/2 ⁻)	145 1		689.2	23/2 ⁻	
		279.1 5		555.2	(21/2 ⁻)	
865.7	(21/2 ⁺)	254.8 5		610.9	(17/2 ⁺)	
991.2	(27/2 ⁻)	157 1		834.3	(25/2 ⁻)	
		302 1		689.2	23/2 ⁻	
1011.0	(23/2 ⁺)	278.6 5		732.4	(19/2 ⁺)	
1159.0	(29/2 ⁻)	168 1		991.2	(27/2 ⁻)	
		324.7 5		834.3	(25/2 ⁻)	
1167.6	(25/2 ⁺)	301.9 5		865.7	(21/2 ⁺)	
1335.6	(27/2 ⁺)	324.6 5		1011.0	(23/2 ⁺)	
1337.4	(31/2 ⁻)	178 1		1159.0	(29/2 ⁻)	
		346.2 5		991.2	(27/2 ⁻)	
1514.1	(29/2 ⁺)	346.5 5		1167.6	(25/2 ⁺)	
1526.7	(33/2 ⁻)	189 1		1337.4	(31/2 ⁻)	
		367.7 5		1159.0	(29/2 ⁻)	
1702.4	(31/2 ⁺)	366.8 5		1335.6	(27/2 ⁺)	
1725.0	(35/2 ⁻)	387.6 5		1337.4	(31/2 ⁻)	
1900.7	(33/2 ⁺)	386.6 5		1514.1	(29/2 ⁺)	
1934.5	(37/2 ⁻)	407.8 5		1526.7	(33/2 ⁻)	
2106.9	(35/2 ⁺)	404.5 5		1702.4	(31/2 ⁺)	
2151.5	(39/2 ⁻)	426.5 5		1725.0	(35/2 ⁻)	
2321.6	(37/2 ⁺)	420.9 5		1900.7	(33/2 ⁺)	
2378.4	(41/2 ⁻)	443.9 5		1934.5	(37/2 ⁻)	
2542.7	(39/2 ⁺)	435.8 5		2106.9	(35/2 ⁺)	
2609.0	(43/2 ⁻)	457.5 5		2151.5	(39/2 ⁻)	
2769.3	(41/2 ⁺)	447.7 5		2321.6	(37/2 ⁺)	
2850.1	(45/2 ⁻)	471.7 5		2378.4	(41/2 ⁻)	
2999.4	(43/2 ⁺)	456.7 5		2542.7	(39/2 ⁺)	
3229.4	(45/2 ⁺)	460.1 5		2769.3	(41/2 ⁺)	
3314.1	(49/2 ⁻)	464 1		2850.1	(45/2 ⁻)	
3461.4	(47/2 ⁺)	462 1		2999.4	(43/2 ⁺)	
3686.4	(49/2 ⁺)	457 1		3229.4	(45/2 ⁺)	
3769.1	(53/2 ⁻)	455 1		3314.1	(49/2 ⁻)	

[†] From $^{244}\text{Pu}(^{209}\text{Bi}, ^{208}\text{Bi}\gamma)$, except as noted.[‡] From $^{244}\text{Pu}(^{18}\text{O}, ^{17}\text{O}\gamma)$.[#] From $^{244}\text{Pu}(^{18}\text{O}, ^{17}\text{O}\gamma)$ (2007Ma82).

@ Additional information 8.

Adopted Levels, GammasLevel Scheme

Intensities: Relative photon branching from each level



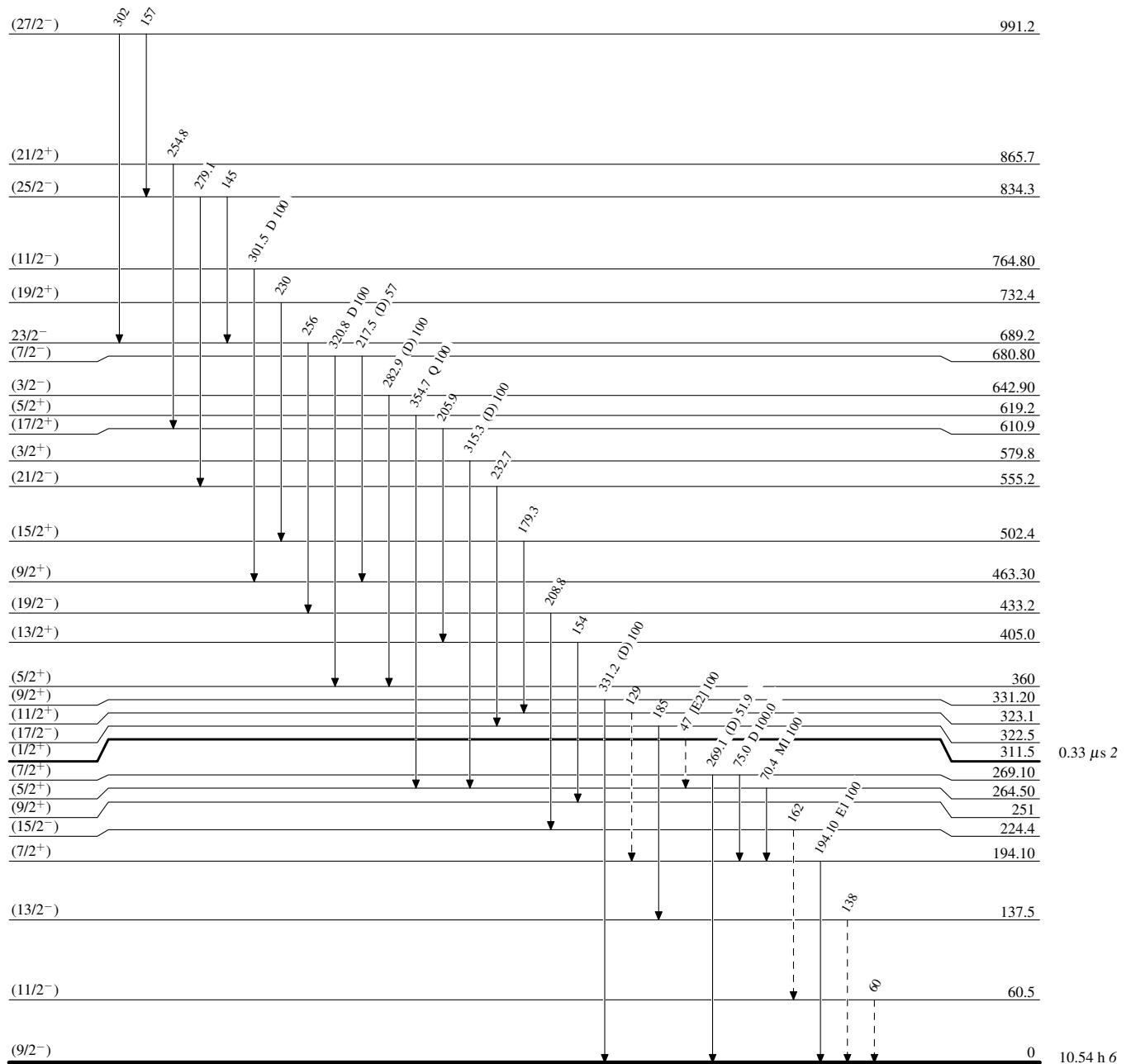
10.54 h 6

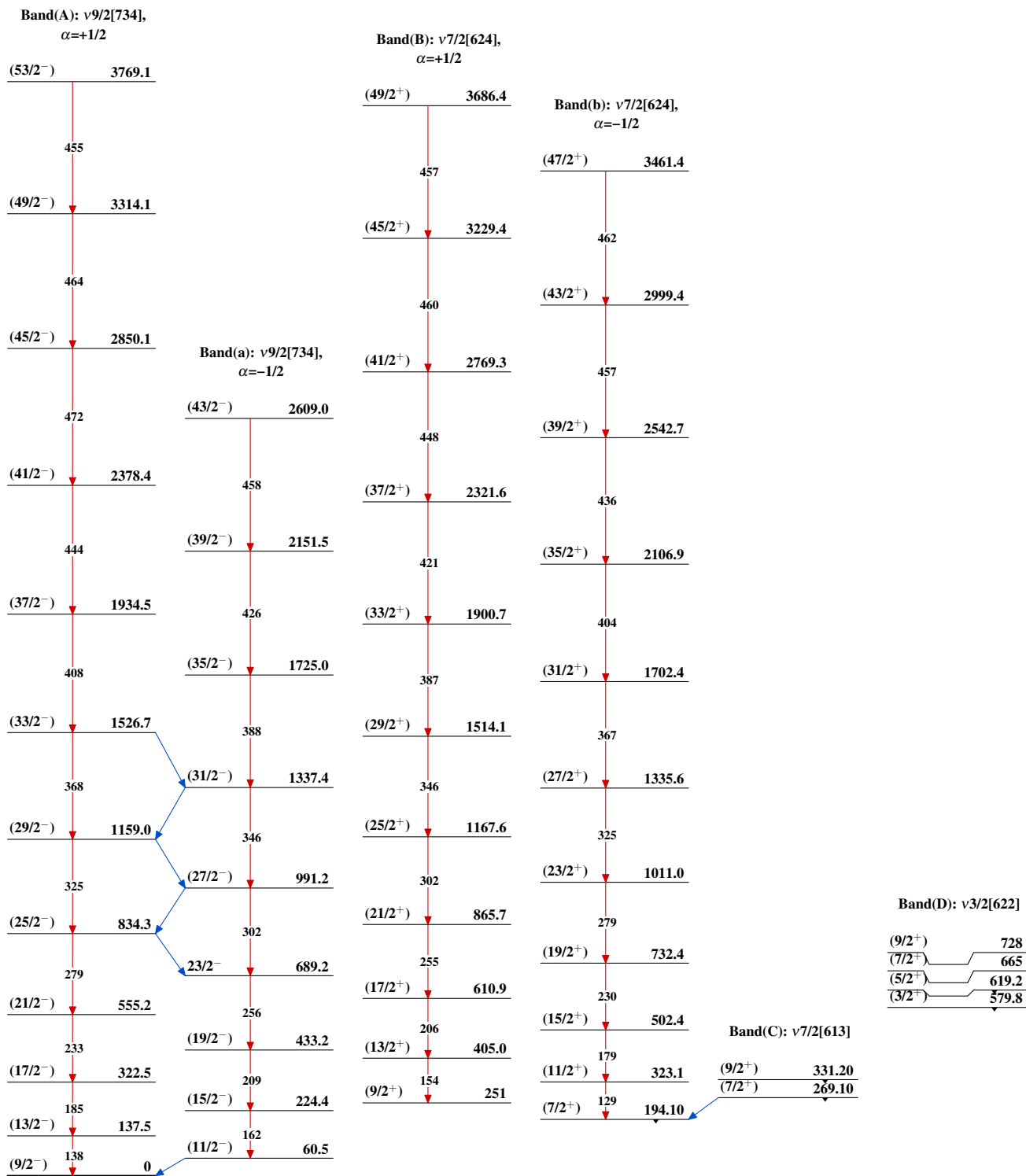
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

-----► γ Decay (Uncertain) $^{245}_{94}\text{Pu}_{151}$

Adopted Levels, Gammas

Adopted Levels, Gammas (continued)

