Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia	NDS 121, 561 (2014)	31-Mar-2014

$Q(\beta^-)$=1161.2 *8*; S(n)=4604.63 *8*; S(p)=4466.3 *11*; $Q(\alpha)$=5036.0 *8* 2012Wa38

Other reactions.

^{208}Pb(t,n): 1998Be87, 1998Be81.

^{208}Pb(d,n): 1998Be81.

^{209}Bi(^{36}Ar,^{35}Ar): 1996Lh02, 1994Bo02.

^{209}Bi(^{20}Ne,^{19}Ne): 1994Bo02.

Be(^{238}U,xnγ): 1998Pf02.

^{9}Be(^{238}U,X): 2009Al32 – Measured production cross section. For ^{210}Bi $\sigma\approx$0.02 mb (estimated from Fig. 4.).

^{210}Bi Levels

Cross Reference (XREF) Flags

A	^{210}Pb β^- decay	F	^{208}Pb(α,d)	K	^{209}Bi(d,pγ) E=8-10 MeV
B	^{214}At α decay (558 ns)	G	^{209}Bi(n,γ) E=thermal	L	^{209}Bi(α,^{3}He) E=58 MeV
C	^{214}At α decay (760 ns)	H	^{209}Bi(n,γ):resonances	M	^{209}Bi(^{17}O,^{16}Oγ)
D	^{214}At α decay (265 ns)	I	^{209}Bi(d,p)	N	^{208}Pb(^{208}Pb,Xγ)
E	^{9}Be(^{238}U,xnγ)	J	^{209}Bi(pol d,p) E=12.0 MeV		

E(level)†	J^π‡	$T_{1/2}$	XREF	Comments
0.0@	1−	5.012 d *5*	AB D FG IJK N	$\%\beta^-$=100; $\%\alpha$=13.2×10^{-5} *10* μ=−0.04451 *6*; Q=+0.136 *1* $T_{1/2}$: Weighted average of 5.013 d *5* (1956Ro18,1959Ro51), 5.02 d *1* (1935Po01), 5.02 d *2* (1952Be22), and 4.989 d *13* (1953Lo09). J^π: J=1, atomic beam (1976Fu06). π=−, L=4 in (d,p). $\%\alpha$: from 1962Ka27. μ,Q: atomic beam (1962Al02,1989Ra17).
46.5390@ *10*	0−	<3 ns	A FG IJK	$T_{1/2}$: $\beta\gamma$(t) (1955Le29). J^π: 46.5γ M1 to 1−. Analogy with J^π=0− level in ^{212}Bi. E(level): from ^{210}Pb β^- decay.
271.31@ *11*	9−	3.04×10^{6} y *6*	C FG IJK N	$\%\alpha$=100 μ=2.728 *42*; Q=−0.471 *59* Additional information 1. μ,Q: Laser spectroscopy in resonance cells with fluorescence detection. Isotope shift (1997Ki15,2000Pe30). $T_{1/2}$: specific activity measurement (1976TuZY). Other values: 3.55×10^{6} y *12* specific activity measurement (1969La01), 2.6×10^{6} y *8* (1953Hu42). J^π: L=(9) in (α,d), J(max)=9. $\%\beta^-$<3×10^{-5}, %IT<3×10^{-5} (β^- or IT decay not observed) (1976TuZY).
319.73@ *4*	2−	5.2 ps *10*	B FG IJK M	$T_{1/2}$: recoil-distance Doppler measurement (1975Do12). J^π: L=4 and spectroscopic strength in (d,p).
347.95@ *4*	3−		B FG IJK	J^π: 28γ to 2−, 347γ to 1−. L=4 in (d,p).
433.48@ *12*	7−	57.5 ns *10*	C EFG iJK	μ=+2.114 *49* $T_{1/2}$: weighted average of 56.8 ns *10* (1972Ba65) and 59.0 ns *15* (1973Pr11). Other: 58 ns (1998Pf02). μ: differential perturbed angular correlations of γ rays (DPAD) (1972Ba65,1989Ra17).

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Adopted Levels, Gammas (continued)

^{210}Bi Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$	XREF	Comments
439.24[@] *4*	5^-	38 ns *1*	C G iJK	μ=+1.530 *45* $T_{1/2}$: From 1973Pr11. Others: 37.0 ns *14* (1972Ba65) and 38 ns *6* (1971El01). μ: differential perturbed angular correlations of γ rays (1972Ba65,1989Ra17).
502.84[@] *4*	4^-	<1.4 ns	FG IJK	$T_{1/2}$: from γ(t) in (d,pγ) (1971El01). J^{π}: L=4 in (d,p).
550.04[@] *4*	6^-	<1.4 ns	FG IJK	$T_{1/2}$: from γ(t) in (d,pγ) (1971El01). J^{π}: L=4 in (d,p).
563.16[&] *5*	(1^-)		B G K	
582.54[@] *12*	8^-	<1.7 ps	FG IJK M	$T_{1/2}$: recoil-distance Doppler measurement (1975Do12). J^{π}: L=4 in (d,p).
669.0[&] *5*	10^-	100 ps *18*	C FG I KLMN	E(level): from ^{209}Bi(d,pγ). J^{π}: L=6 in (d,p); L=11 in (α,d), J(max)=10. $T_{1/2}$: recoil-distance Doppler measurement (1975Do12).
916.11[a] *13*	8^-		FG IJK	J^{π}: L=4 in (d,p); L=7 in (α,d), J(max)=8.
971.92[&] *5*	(2^-)		G I K	J^{π}: L=(6) in (d,p).
993.72[b] *5*	(3^+)		FG I KL	J^{π}: L=(7) in (d,p).
1164.64[a] *6*	(1^-)		G	
1175.33[a] *5*	(2^-)		G I L	J^{π}: from spectroscopic strength in (d,p).
1184.15[&] *12*	(8^-)		FG K	J^{π}: from spectroscopic strength in (d,p).
1197.3 *5*			G I	
1208.41[a] *12*	(6^-)		FG K	
1248.04[&] *6*	(4^-)		FG I K	J^{π}: L=(4,2) in (d,p); L=(5) in (α,d).
1300.61[&] *12*	(7^-)		G i l	
1322.2 *8*	(11^+)		F I N	J^{π}: L=10 in (α,d), J(max)=11; 653γ to 10^-.
1335.71[&] *6*	(5^-)		G i l	J^{π}: L=6 in (d,p).
1339.33[&] *6*	(6^-)		G K	
1346.0 *6*			G	
1373.99[&] *6*	(3^-)		FG i Kl	
1382.34[a] *14*	(7^-)		G i Kl	
1390.00[a] *6*	(4^-)		G	
1462.83[a] *5*	(5^-)		G I KL	J^{π}: L=6 in (d,p).
1473.1 *11*	(12^+)		F I L N	J^{π}: L=(12) in (α,d); L=7 in (d,p); 151γ to (11^+).
1475.85[a] *6*	(3^-)		G	
1478.90[&] *15*	(9^-)		G K	
1523.30[b] *6*	(4^+)		FG I L	J^{π}: L=7 in (d,p).
1531.12[d] *16*	(2^+)		G	
1585.24[e] *9*	(2^-)		FG I K	J^{π}: L=2 in (d,p).
1706.54[b] *6*	(5^+)		FG I L	J^{π}: L=7 in (d,p).
1753.5[b] *5*	(10^+)		FG I L	J^{π}: L=7 in (d,p).
1776.38[b] *13*	(6^+)		G I L	J^{π}: L=7 in (d,p).
1793.41[b] *15*	(8^+)		G I l	
1801	(11^+)		F I l	J^{π}: L=7 in (d,p) and (α,^{3}He).
1812	(8^+)		I	J^{π}: L=7 in (d,p).
1837.06[b] *7*	(7^+)		FG I L	J^{π}: L=7 in (d,p).
1896.84[d] *15*	(3^+)		G	
1896.93[e] *14*	(9^-)		G	
1908 *4*			F	

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Adopted Levels, Gammas (continued)

^{210}Bi Levels (continued)

E(level)[†]	J^{π}[‡]	XREF	Comments
1924.40[c] *9*	(2^-)	G I K	J^{π}: L=2 in (d,p).
1980.33[c] *12*	(7^-)	G I K	J^{π}: L=2 in (d,p).
1984.71[e] *8*	(3^-)	fG K	
1987 *4*		F	$J^{\pi}=(11^+,12^+)$ from L=(12) in (α,d).
1990.18[c] *9*	(3^-)	fG K	
2005.99[e] *14*	(8^-)	G	
2006.25[d] *7*	(4^+)	G	
2015.55[d] *14*	(6^+)	G	
2026.69[h] *10*	(1^+)	G	
2034.27[c] *5*	(5^-)	FG I K	J^{π}: L=2 in (d,p).
2072.51[b] *16*	(9^+)	G L	
2079.18[c] *8*	(4^-)	G I K	J^{π}: L=2 in (d,p).
2099.30[e] *13*	(5^-)	G	
2099.4[b] *5*	(11^+)	FG L	XREF: L(2110). J^{π}: L=(12) in (α,d) probably corresponds to 2100.2 level. E(level): From (n,γ) E=thermal.
2108.33[c] *17*	(6^-)	G I K	J^{π}: L=2 in (d,p).
2135.14[e] *5*	(7^-)	FG	
2138 *3*	(5^-)	I	J^{π}: L=2 in (d,p).
2143 *4*		F	
2177.25[e] *6*	(4^-)	FG I K	J^{π}: L=2 in (d,p).
2237.81[e] *13*	(6^-)	FG I K	J^{π}: L=2 in (d,p).
2258.88[d] *13*	(7^+)	G	
2280 *5*		F I	
2314.14[i] *15*	(6^-)	G	
2464		F I	
2525.14[f] *7*	(4^-)	FG I K	J^{π}: L=0 in (d,p).
2543 *5*		F	
2578.75[f] *8*	(5^-)	FG I K	J^{π}: L=0 in (d,p); L=5 in (α,d), J(max)=5.
2610.10[i] *9*	(4^-)	FG I K	J^{π}: L=0 in (d,p).
2664 *5*		F	
2724.07[h] *14*	(8^+)	G	
2725.3 *11*	(14^-)	F N	J^{π}: L=(13) in (α,d), J(max)=14: Configuration=((π $i_{13/2}$) (ν $j_{15/2}$)) (2014Ci03).
2737.19[j] *13*	(8^-)	G I K	J^{π}: L=4 in (d,p).
2758.96[h] *7*	(6^+)	G	
2764.97[h] *14*	(3^+)	fG K	
2765.16[j] *9*	(3^-)	fG I	J^{π}: L=4 in (d,p).
2818.00[j] *15*	(1^-)	G I	J^{π}: L=4 in (d,p).
2819.05[g] *8*	(4^+)	G	
2840.46[j] *15*	(6^-)	FG I K	XREF: F(2833). J^{π}: L=2 in (d,p).
2868 *6*		F	
2910.15[h] *13*	(7^+)	G	
2921.15[i] *7*	(5^-)	FG I	J^{π}: L=2 in (d,p).
2966.46[j] *12*	(4^-)	G I K	J^{π}: L=4 in (d,p).
3004.53[j] *6*	(2^-)	G	
3010.86[i] *17*	(2^-)	G I	J^{π}: L=4 in (d,p).
3039.56[k] *10*	(3^-)	FG I K	J^{π}: L=2 in (d,p).
3069.54[k] *7*	(4^-)	G I	J^{π}: L=4 in (d,p).
3108.53[j] *14*	(5^-)	G I K	

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Adopted Levels, Gammas (continued)

^{210}Bi Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$	XREF	Comments
3123 *6*			F	
3141.32[k] *15*	(6^-)		G I K	Jπ: L=2 in (d,p).
3182.5 *4*	(4^-)		I K	E(level): from ^{209}Bi(d,pγ). Jπ: L=2 in (d,p). E(level): from ^{209}Bi(d,pγ).
3209.75[k] *6*	(5^-)		FG I K	Jπ: L=4 in (d,p).
3244.63[j] *16*	(7^-)		FG I K	Jπ: L=4 in (d,p).
3294.1 *14*	(13^+)		I N	XREF: I(3299). Jπ: 1821γ to (12^+).
3330			F I	
3399			I	
3412 *7*			F	
3443 *7*			F	
3469.2 *13*	(15^+)	11.1 ns *7*	N	Jπ,$T_{1/2}$: From (^{208}Pb,Xγ). 175γ (E2) to (13^+).
3502 *7*			F	
3538 *7*			F	
4030.2 *15*	(16^+)		F N	XREF: F(4025). Jπ: 561γ to (15^+).
4085.8 *12*	(14^-)		N	Jπ: 153γ feeding this level from (15^-) state.
4188			F	
4239.1 *13*	(15^-)		N	Jπ: 1514γ to (14^-).
4463.1 *15*	(16^-)		N	Jπ: 224γ to (15^-).
4594.1 *16*	(17^-)		N	Jπ: γ ray transitions to (16^-) and (16^+) states.
4605.43 *8*	(5)[#]		H	
4606.95 *8*	(4)[#]		H	
4607.98 *8*	(5)[#]		H	
4609.09 *8*	(5)[#]		H	Jπ: Other: (4) (2006MuZX).
4609.74 *8*	(5)[#]		H	
4610.92 *8*	(4)[#]		H	
4611.16 *8*	(3)[#]		H	Jπ: Other: (5) (2006MuZX).
4613.65 *8*	(6)[#]		H	Jπ: Other: (5) (2006MuZX).
4613.79 *8*	(5)[#]		H	
4614.35 *8*	(4)[#]		H	Jπ: Other: (6) (2006MuZX).
4614.40 *8*	(3)[#]		H	Jπ: Other: (5) (2006MuZX).
4616.73 *8*			H	
4620.28 *8*	(5)[#]		H	
4622.07 *8*	(6)[#]		H	Jπ: Other: (4) (2006MuZX).
4622.47 *8*	(5)[#]		H	
4625.50 *8*	(5)[#]		H	Jπ: Other: (3) (2006MuZX).
4625.68 *8*	(4)[#]		H	
4626.92 *8*	(5)[#]		H	
4627.78 *8*	(6)[#]		H	
4965.1 *19*	(19^-)		N	Jπ: 371γ to (17^-).
5182.1 *21*			N	
5478.1 *24*			N	
5748.1 *21*			N	
5845.1 *24*			N	
5996 *3*			N	
x+5996		0.1 ns	N	E(level),$T_{1/2}$: Exact location of this isomer could not be determined. One possibility, as mentioned in 2014Ci03, was missing the low-energy transitions in the deexcitation cascades due to high

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Adopted Levels, Gammas (continued)

^{210}Bi Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$	XREF	Comments
				internal conversion and low detection efficiency. However, 2014Ci03 note the location of this isomer to be above 6000 keV.

† Deduced by evaluator from least-squares fit to γ rays, except otherwise noted. ΔE=1 keV uncertainty is assumed for γ rays without uncertainty. 887.19γ (multiply placed) from 2072.49 keV level, 1733.3γ and 1761.5γ from 2079 keV level, and 903.13γ (multiply placed) from 2910.06 keV level were ignored in the least-square fit − deviated by more than 4σ from fitted values. χ^2=2.1, critical χ^2=1.2.

‡ Spin and parity assignments are based on γ-ray decay patterns in (n,γ) and (d,pγ) reactions; on L-values and transition strengths from (d,p), (^{3}He,p), and (α,d) reactions; and on a comparison of experimental level energies with calculated values for the various proton-neutron shell-model configurations (1972He03,1981LoZZ). Most of the L-values from (d,p) and (^{3}He,p) reactions are uncertain because of the difficulty to determine the relative contributions from transitions with different L-values. Spin and parity assignments deduced from these reactions are also based on the assumption that transition strengths are proportional to (2J+1). Assignments from (α,d) reactions assume preferential excitations to J(max)=J(p)+J(n) for the dominant proton-neutron configuration. Additional specific arguments are given with individual levels.

From ^{209}Bi(n,γ):resonances − 2006Do20 quoted spin and parity assignments from literature.

@ Main Configuration=((π 1$h_{9/2}$) (ν 2$g_{9/2}$)) (All coνfigurationsfrom(n Γ) − 1989Sh20).

& Main Configuration=((π 1$h_{9/2}$) (ν 1$i_{11/2}$)).

a Main Configuration=((π 2$f_{7/2}$) (ν 2$g_{9/2}$)).

b Main Configuration=((π 1$h_{9/2}$) (ν 1$j_{15/2}$)).

c Main Configuration=((π 1$h_{9/2}$) (ν 3$d_{5/2}$)).

d Main Configuration=((π 1$i_{13/2}$) (ν 2$g_{9/2}$)).

e Main Configuration=((π 2$f_{7/2}$) (ν 1$i_{11/2}$)).

f Main Configuration=((π 1$h_{9/2}$) (ν 4$s_{1/2}$)).

g Main Configuration=((π 2$f_{7/2}$) (ν 1$j_{15/2}$)).

h Main Configuration=((π 1$i_{13/2}$) (ν 1$i_{11/2}$)).

i Main Configuration=((π 2$f_{7/2}$) (ν 3$d_{5/2}$)).

j Main Configuration=((π 1$h_{9/2}$) (ν 2$g_{7/2}$)).

k Main Configuration=((π 1$h_{9/2}$) (ν 3$d_{3/2}$)).

γ(^{210}Bi)

E_i(level)	J_i^π	E_γ†	I_γ†	E_f	J_f^π	Mult.	α@	Comments
46.5390	0⁻	46.539 *1*	100	0.0	1⁻	M1	18.7	E_γ,I_γ,Mult.: from ^{210}Pb β^- decay.
319.73	2⁻	319.73 *5*	100	0.0	1⁻			
347.95	3⁻	(28.2 *CA*)	1.3	319.73	2⁻			From ^{209}Bi(d,pγ). γ ray not observed, but inferred from transition-intensity balance.
		347.91& *6*	100	0.0	1⁻			
433.48	7⁻	162.19& *5*	100	271.31	9⁻			
439.24	5⁻	(5.8 *CA*)		433.48	7⁻			γ ray not observed. Existence inferred from $\gamma\gamma$ coin in ^{209}Bi(d,pγ).
		91.32& *8*	100	347.95	3⁻			
502.84	4⁻	63.67 *8*	8 *4*	439.24	5⁻			
		154.85& *7*	100 *3*	347.95	3⁻			
		182.94 *10*	12.5 *8*	319.73	2⁻			
550.04	6⁻	110.79 *7*	85 *19*	439.24	5⁻			
		116.50& *6*	100 *9*	433.48	7⁻			
563.16	(1⁻)	516.6 *5*	44 *22*	46.5390	0⁻			

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Adopted Levels, Gammas (continued)

$\gamma(^{210}Bi)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.	Comments
563.16	(1⁻)	563.24[&] 6	100 22	0.0	1⁻		
582.54	8⁻	148.99[&] 12		433.48	7⁻		
		311.25[&] 7		271.31	9⁻		
669.0	10⁻	397.7[‡] 5	100	271.31	9⁻		
916.11	8⁻	482.46[&] 16		433.48	7⁻		
		644.51[&] 9		271.31	9⁻		
971.92	(2⁻)	408.78 6	100 25	563.16	(1⁻)		
		623.84[&] 10	<25	347.95	3⁻		
		971.89[&] 8	80 16	0.0	1⁻		I_γ: Branching: $I\gamma(972\gamma)/I\gamma(408\gamma)$=0.35 14 ((d,p$\gamma$) – 1973Ca11).
993.72	(3⁺)	490.89[&] 7	<5.1	502.84	4⁻		
		645.81 7	18.4 16	347.95	3⁻		
		673.98 5	100 5	319.73	2⁻		
1164.64	(1⁻)	601.5[&] 3		563.16	(1⁻)		
		1118.08[&] 14		46.5390	0⁻		
1175.33	(2⁻)	827.24[&] 7		347.95	3⁻		
		855.49[&] 16		319.73	2⁻		
		1175.47[&] 8		0.0	1⁻		
1184.15	(8⁻)	601.5[&] 3	<36	582.54	8⁻		
		634.02 12	100 16	550.04	6⁻		
		750.44[&] 20	<39	433.48	7⁻		
		912.74[&] 9	<150	271.31	9⁻		
1208.41	(6⁻)	705.25[&] 13	<16	502.84	4⁻		
		769.27 6	100 5	439.24	5⁻		
		775.01[&] 5	<172	433.48	7⁻		
1248.04	(4⁻)	808.85[&a] 5	<186	439.24	5⁻		
		900.11[&] 8	100 20	347.95	3⁻		
1300.61	(7⁻)	116.47[&] 5		1184.15	(8⁻)		
		384.18 9	100 7	916.11	8⁻		
		718.2[&] 3	<18	582.54	8⁻		
		750.44[&] 20	<55	550.04	6⁻		
1322.2	(11⁺)	653[#]		669.0	10⁻	(E1)[#]	
		1051[#]		271.31	9⁻		
1335.71	(5⁻)	785.75[&] 24		550.04	6⁻		
		832.70[&] 17		502.84	4⁻		
		896.36[&] 8		439.24	5⁻		
1339.33	(6⁻)	91.32[&] 8		1248.04	(4⁻)		
		788.79[&] 24		550.04	6⁻		
		900.11[&] 8		439.24	5⁻		
1373.99	(3⁻)	402.03 7	100 7	971.92	(2⁻)		
		871.03[&] 15	<32	502.84	4⁻		
1382.34	(7⁻)	466.8[&] 3		916.11	8⁻		
		799.4[&] 5		582.54	8⁻		
		832.70[&] 17		550.04	6⁻		
1390.00	(4⁻)	214.78[&] 8		1175.33	(2⁻)		
		887.19[&] 15		502.84	4⁻		

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Adopted Levels, Gammas (continued)

$\gamma(^{210}Bi)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f
1390.00	(4⁻)	950.82[&] *11*		439.24	5⁻
1462.83	(5⁻)	162.19[&] *5*		1300.61	(7⁻)
		214.78[&] *8*	<188	1248.04	(4⁻)
		254.74 *14*	100 *22*	1208.41	(6⁻)
		912.74[&] *9*	≤172	550.04	6⁻
		960.6[&] *2*	<28.2	502.84	4⁻
1473.1	(12⁺)	151[#]	100	1322.2	(11⁺)
1475.85	(3⁻)	311.25[&] *7*		1164.64	(1⁻)
		912.74[&] *9*		563.16	(1⁻)
		1156.39[&] *11*		319.73	2⁻
1478.90	(9⁻)	808.85[&a] *5*		669.0	10⁻
		896.36[&] *8*		582.54	8⁻
1523.30	(4⁺)	148.99[&] *12*		1373.99	(3⁻)
		1020.4[&] *3*		502.84	4⁻
		1175.47[&] *8*		347.95	3⁻
1531.12	(2⁺)	968.5[&] *4*		563.16	(1⁻)
		1211.3[&] *2*		319.73	2⁻
		1531.0[&] *3*		0.0	1⁻
1585.24	(2⁻)	1237.7[‡] *3*	93[‡] *5*	347.95	3⁻
		1585.22[&] *10*	100	0.0	1⁻
1706.54	(5⁺)	1156.39[&] *11*		550.04	6⁻
		1203.54[&] *18*		502.84	4⁻
		1267.1 *12*		439.24	5⁻
1753.5	(10⁺)	1482.2[&] *4*	100	271.31	9⁻
1776.38	(6⁺)	1226.25 *18*	33 *7*	550.04	6⁻
		1337.16 *7*	100 *21*	439.24	5⁻
		1342.5[&] *6*	<1.5	433.48	7⁻
1793.41	(8⁺)	1211.3[&] *3*	<186	582.54	8⁻
		1360.4 *3*	100 *24*	433.48	7⁻
1837.06	(7⁺)	629.0 *5*	57 *29*	1208.41	(6⁻)
		1286.72 *20*	100 *29*	550.04	6⁻
		1397.84[&] *7*	<786	439.24	5⁻
1896.84	(3⁺)	903.13[&] *18*		993.72	(3⁺)
		1576.6[&] *7*		319.73	2⁻
1896.93	(9⁻)	596.3 *3*	40 *12*	1300.61	(7⁻)
		1625.85 *11*	100 *20*	271.31	9⁻
1924.40	(2⁻)	339.4[‡] *3*	54[‡] *8*	1585.24	(2⁻)
		1362.2[&] *5*	64 *6*	563.16	(1⁻)
		1576.6[&] *7*	54 *21*	347.95	3⁻
		1604.8[‡] *3*	100[‡] *21*	319.73	2⁻
		1924.9[‡] *5*	48[‡] *7*	0.0	1⁻
1980.33	(7⁻)	186.3[&] *3*	<400	1793.41	(8⁺)
		644.51[&] *9*	<500	1335.71	(5⁻)
		772.34 *13*	100 *33*	1208.41	(6⁻)
		1064.10[&] *14*	<154	916.11	8⁻
		1397.84[&] *7*	<300	582.54	8⁻
		1430.32[&] *7*	<367	550.04	6⁻

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Adopted Levels, Gammas (continued)

$\gamma(^{210}Bi)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f
1980.33	(7−)	1546.59& 24	<107	433.48	7−
		1708.99& 8	<760	271.31	9−
1984.71	(3−)	610.94 15	100 20	1373.99	(3−)
		1012.68& 10	<309	971.92	(2−)
		1482.2& 4	<49	502.84	4−
		1665.27& 25	<55	319.73	2−
1990.18	(3−)	466.8& 3	<222	1523.30	(4+)
		1018.2 4	100 33	971.92	(2−)
		1550.8‡ 3	<364‡	439.24	5−
		1642.10& 20	<211	347.95	3−
		1990.0 11	67 22	0.0	1−
2005.99	(8−)	623.84& 10		1382.34	(7−)
		705.25& 13		1300.61	(7−)
		1423.33& 11		582.54	8−
2006.25	(4+)	299.10 23	61 6	1706.54	(5+)
		632.4 4	20 6	1373.99	(3−)
		758.37& 24	<26	1248.04	(4−)
		1012.68& 10	<235	993.72	(3+)
		1503.1& 4	<26	502.84	4−
		1567.1 5	11 4	439.24	5−
		1658.22 11	100 22	347.95	3−
2015.55	(6+)	1465.44 10	100 24	550.04	6−
		1576.6& 7	<31	439.24	5−
		1582.9 3	41 7	433.48	7−
2026.69	(1+)	1032.76& 13	<48	993.72	(3+)
		1054.96& 13	<87	971.92	(2−)
		1980.5 3	32 10	46.5390	0−
		2025.9 5	100 26	0.0	1−
2034.27	(5−)	644.51& 9	<188	1390.00	(4−)
		1483.97 9	100 20	550.04	6−
		1531.0& 3	<35	502.84	4−
		1594.9‡ 2	40‡ 2	439.24	5−
		1601.0& 12	<35	433.48	7−
		1686.5‡ 3	21‡ 2	347.95	3−
2072.51	(9+)	887.19& 15	<750	1184.15	(8−)
		1156.39& 11	<1650	916.11	8−
		1800.2 14	100 50	271.31	9−
2079.18	(4−)	154.85& 7		1924.40	(2−)
		705.21& 13	<472	1373.99	(3−)
		871.03& 15	<186	1208.41	(6−)
		903.13& 18	<214	1175.33	(2−)
		1085.6& 6	<86	993.72	(3+)
		1576.6& 7	<129	502.84	4−
		1640.0 6	100 45	439.24	5−
		1733.3‡ 2		347.95	3−
		1761.5‡ 2		319.73	2−
2099.30	(5−)	64.92& 6	<89	2034.27	(5−)
		392.82 6	87 20	1706.54	(5+)

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

$\gamma(^{210}Bi)$ (continued)

E_i(level)	J^π_i	E_γ †	I_γ †	E_f	J^π_f
2099.30	(5⁻)	575.91& *11*	<78	1523.30	(4⁺)
		623.84& *10*	<38	1475.85	(3⁻)
		890.72 *18*	12 *4*	1208.41	(6⁻)
		1596.37 *23*	100 *20*	502.84	4⁻
		1665.27& *25*	<19	433.48	7⁻
2099.4	(11⁺)	1430.32& *7*	100	669.0	10⁻
2108.33	(6⁻)	1557.7 *3*	100 *31*	550.04	6⁻
		1668.82 *16*	94 *25*	439.24	5⁻
		1675.5‡ *2*	47‡ *5*	433.48	7⁻
2135.14	(7⁻)	154.85& *7*		1980.33	(7⁻)
		799.4& *5*		1335.71	(5⁻)
		950.82& *11*		1184.15	(8⁻)
		1585.22& *19*		550.04	6⁻
		1695.55& *15*		439.24	5⁻
		1701.7& *8*		433.48	7⁻
2177.25	(4⁻)	968.5& *4*		1208.41	(6⁻)
		1675.2‡ *8*	37‡ *20*	502.84	4⁻
		1738.3‡ *2*	100‡ *8*	439.24	5⁻
		1829.3& *4*		347.95	3⁻
2237.81	(6⁻)	775.01& *5*	<1487	1462.83	(5⁻)
		855.49& *16*	<178	1382.34	(7⁻)
		1321.74 *14*	100 *13*	916.11	8⁻
		1798.25 *13*	43 *13*	439.24	5⁻
		1804.2 *8*	17 *9*	433.48	7⁻
2258.88	(7⁺)	186.3& *3*		2072.51	(9⁺)
		482.46& *16*		1776.38	(6⁺)
		1074.29& *18*		1184.15	(8⁻)
		1342.5& *6*		916.11	8⁻
		1708.99& *8*		550.04	6⁻
		1825.35& *7*		433.48	7⁻
2314.14	(6⁻)	1764.89 *22*	50 *17*	550.04	6⁻
		1874.91& *16*	<133	439.24	5⁻
		1880.55 *16*	100 *25*	433.48	7⁻
2525.14	(4⁻)	347.91& *6*		2177.25	(4⁻)
		490.89& *7*		2034.27	(5⁻)
		1531.0& *3*		993.72	(3⁺)
		2022.2‡ *3*		502.84	4⁻
		2085.7‡ *3*		439.24	5⁻
		2177.0‡ *3*		347.95	3⁻
2578.75	(5⁻)	563.22& *8*		2015.55	(6⁺)
		1116.9 *6*		1462.83	(5⁻)
		2029.1‡ *3*		550.04	6⁻
		2076.4‡ *3*		502.84	4⁻
		2140.3‡ *5*		439.24	5⁻
2610.10	(4⁻)	575.91& *11*	<988	2034.27	(5⁻)
		713.21 *25*	100 *25*	1896.84	(3⁺)
		903.13& *18*	<188	1706.54	(5⁺)

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

$\gamma(^{210}Bi)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.
2610.10	(4⁻)	1362.2[&] 5	<175	1248.04	(4⁻)	
		2171.4[‡] 4		439.24	5⁻	
		2262.29[&] 17	<463	347.95	3⁻	
		2290.1[&] 3	<175	319.73	2⁻	
2724.07	(8⁺)	718.2[&] 3	<117	2005.99	(8⁻)	
		827.24[&] 7	<667	1896.93	(9⁻)	
		1423.33[&] 11	<417	1300.61	(7⁻)	
		1806.9 7	100 33	916.11	8⁻	
		2290.1[&] 3	<233	433.48	7⁻	
2725.3	(14⁻)	1252[#]		1473.1	(12⁺)	
		1403[#]		1322.2	(11⁺)	[E3]
2737.19	(8⁻)	601.5[&] 3	<35	2135.14	(7⁻)	
		900.11[&] 8		1837.06	(7⁺)	
		943.91 9	100 23	1793.41	(8⁺)	
		1397.84[&] 7	<145	1339.33	(6⁻)	
		2154.8[‡] 10		582.54	8⁻	
		2465.3[‡] 3		271.31	9⁻	
2758.96	(6⁺)	623.84[&] 10	<380	2135.14	(7⁻)	
		1376.5 4	100 60	1382.34	(7⁻)	
		1423.16[&] 25	<220	1335.71	(5⁻)	
		2325.9[&] 10	<210	433.48	7⁻	
2764.97	(3⁺)	758.37[&] 24		2006.25	(4⁺)	
		868.3[&] 8		1896.84	(3⁺)	
		2262.29[&] 17		502.84	4⁻	
		2416.9[&‡] 7		347.95	3⁻	
2765.16	(3⁻)	186.3[&] 3		2578.75	(5⁻)	
		758.37[&] 24		2006.25	(4⁺)	
		775.01[&] 5		1990.18	(3⁻)	
		868.3[&] 8		1896.84	(3⁺)	
		1601.0[&] 12		1164.64	(1⁻)	
		2262.29[&] 17		502.84	4⁻	
		2325.9[&] 10		439.24	5⁻	
		2416.9[&‡] 7		347.95	3⁻	
2818.00	(1⁻)	828.8[&a] 9	<250	1990.18	(3⁻)	
		1342.5[&] 6	<125	1475.85	(3⁻)	
		1642.10[&] 20	<475	1175.33	(2⁻)	
		2470.9[&] 3	<1250	347.95	3⁻	
		2771.9 8	100 50	46.5390	0⁻	
2819.05	(4⁺)	828.8[&a] 9	<111	1990.18	(3⁻)	
		1342.5[&] 6	<56	1475.85	(3⁻)	
		1825.35[&] 7	<845	993.72	(3⁺)	
		2315.9 8	100 33	502.84	4⁻	
		2379.4 4	<89	439.24	5⁻	
		2470.9[&] 3	<556	347.95	3⁻	
2840.46	(6⁻)	705.25[&] 13		2135.14	(7⁻)	
		1064.10[&] 14		1776.38	(6⁺)	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

$\gamma(^{210}Bi)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Comments
2840.46	(6⁻)	2290.1& 3		550.04	6⁻	E_γ: Other value: 2291.1 keV 5 (d,pγ).
		2402.0‡ 5		439.24	5⁻	
		2407.7‡ 5		433.48	7⁻	
2910.15	(7⁺)	186.3& 3	<400	2724.07	(8⁺)	
		775.01& 5	<2280	2135.14	(7⁻)	
		903.13& 18	<100	2005.99	(8⁻)	
		1116.9 6	<120	1793.41	(8⁺)	
		1203.54& 18	<717	1706.54	(5⁺)	
		1608.7 5	67 20	1300.61	(7⁻)	
		1701.7& 8	<53	1208.41	(6⁻)	
		1993.6 5	100 27	916.11	8⁻	
		2360.3 6	53 20	550.04	6⁻	
2921.15	(5⁻)	162.19& 5		2758.96	(6⁺)	
		785.75& 24		2135.14	(7⁻)	
		887.19& 15		2034.27	(5⁻)	
		1397.84& 7		1523.30	(4⁺)	
		1531.0& 3		1390.00	(4⁻)	
		1585.22& 19		1335.71	(5⁻)	
2966.46	(4⁻)	788.79& 24		2177.25	(4⁻)	
		887.19& 15		2079.18	(4⁻)	
		960.7& 2		2006.25	(4⁺)	
		1503.1& 4		1462.83	(5⁻)	
		1576.6& 7		1390.00	(4⁻)	
		2528.5‡ 9		439.24	5⁻	
3004.53	(2⁻)	186.3& 3	<105	2818.00	(1⁻)	
		827.24& 7	<70	2177.25	(4⁻)	
		1613.8 6	19 5	1390.00	(4⁻)	
		1756.3 5	23 7	1248.04	(4⁻)	
		1829.3& 4	<13	1175.33	(2⁻)	
		1839.81 8	100 21	1164.64	(1⁻)	
		2032.4 3	16 5	971.92	(2⁻)	
3010.86	(2⁻)	1020.4& 3		1990.18	(3⁻)	
		1085.6& 6		1924.40	(2⁻)	
		1835.76& 21		1175.33	(2⁻)	
3039.56	(3⁻)	960.7& 2		2079.18	(4⁻)	
		1054.96& 13		1984.71	(3⁻)	
		1576.6& 7		1462.83	(5⁻)	
		1665.27& 25		1373.99	(3⁻)	
		1874.91& 16		1164.64	(1⁻)	
		2535.6‡ 5		502.84	4⁻	
		2599.3‡ 5		439.24	5⁻	
		2691.1‡ 5		347.95	3⁻	
3069.54	(4⁻)	64.92& 6		3004.53	(2⁻)	
		490.89& 7		2578.75	(5⁻)	
		1362.2& 5		1706.54	(5⁺)	
		1546.59& 24		1523.30	(4⁺)	

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Adopted Levels, Gammas (continued)

$\gamma(^{210}Bi)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.
3069.54	(4⁻)	1695.55[&] *15*		1373.99	(3⁻)	
3108.53	(5⁻)	871.03[&] *15*	<217	2237.81	(6⁻)	
		1009.9 *4*	100 *33*	2099.30	(5⁻)	
		1074.29[&] *18*	<233	2034.27	(5⁻)	
		1118.08[&] *14*	<317	1990.18	(3⁻)	
		1332.5 *4*	67 *33*	1776.38	(6⁺)	
		1585.22[&] *19*	<333	1523.30	(4⁺)	
		2674.2[‡] *5*		433.48	7⁻	
3141.32	(6⁻)	827.24[&] *7*	<286	2314.14	(6⁻)	
		903.13[&] *18*	<107	2237.81	(6⁻)	
		1160.6 *3*	100 *36*	1980.33	(7⁻)	
		2591.3[‡] *4*		550.04	6⁻	
		2702.1[‡] *10*		439.24	5⁻	
		2708.2[‡] *4*		433.48	7⁻	
3182.5	(4⁻)	2679.7[‡] *5*	100[‡] *35*	502.84	4⁻	
		2743.3[‡]	93[‡]	439.24	5⁻	
		2834.5[‡] *10*	33[‡] *6*	347.95	3⁻	
3209.75	(5⁻)	971.89[&] *8*		2237.81	(6⁻)	
		1032.76[&] *13*		2177.25	(4⁻)	
		1074.29[&] *18*		2135.14	(7⁻)	
		1175.47[&] *8*		2034.27	(5⁻)	
		1203.54[&] *18*		2006.25	(4⁺)	
		1503.1[&] *4*		1706.54	(5⁺)	
		1835.76[&] *21*		1373.99	(3⁻)	
		1909.02[&] *23*		1300.61	(7⁻)	
		2862.3[‡] *8*		347.95	3⁻	
3244.63	(7⁻)	1209.7 *3*	100 *33*	2034.27	(5⁻)	
		1264.2 *7*	44 *17*	1980.33	(7⁻)	
		1909.02[&] *23*	<106	1335.71	(5⁻)	
		2695.9[‡] *5*		550.04	6⁻	
		2805.8[‡] *6*		439.24	5⁻	
		2810.9 *5*	67 *22*	433.48	7⁻	
3294.1	(13⁺)	1821[#]	100	1473.1	(12⁺)	
3469.2	(15⁺)	175[#]		3294.1	(13⁺)	(E2)[#]
		744[#]		2725.3	(14⁻)	(E1)[#]
4030.2	(16⁺)	561[#]	100	3469.2	(15⁺)	
4085.8	(14⁻)	1360[#]		2725.3	(14⁻)	
		2613[#]		1473.1	(12⁺)	
4239.1	(15⁻)	153[#]		4085.8	(14⁻)	
		1514[#]		2725.3	(14⁻)	
4463.1	(16⁻)	224[#]	100	4239.1	(15⁻)	
4594.1	(17⁻)	131[#]		4463.1	(16⁻)	
		564[#]		4030.2	(16⁺)	
4965.1	(19⁻)	371[#]	100	4594.1	(17⁻)	
5182.1		217[#]	100	4965.1	(19⁻)	
5478.1		296[#]	100	5182.1		

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

$\gamma(^{210}Bi)$ (continued)

E_i(level)	J^π_i	E_γ [†]	I_γ [†]	E_f	J^π_f
5748.1		783 [#]	100	4965.1	(19^-)
5845.1		663 [#]	100	5182.1	
5996		518 [#]	100	5478.1	

† From ^{209}Bi(n,γ) E=thermal, unless otherwise specified. Upper limits are given for photon branchings affected by multiple placement.

‡ From ^{209}Bi(d,pγ) (1973Pr11).

\# From (^{208}Pb,Xγ).

@ 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.

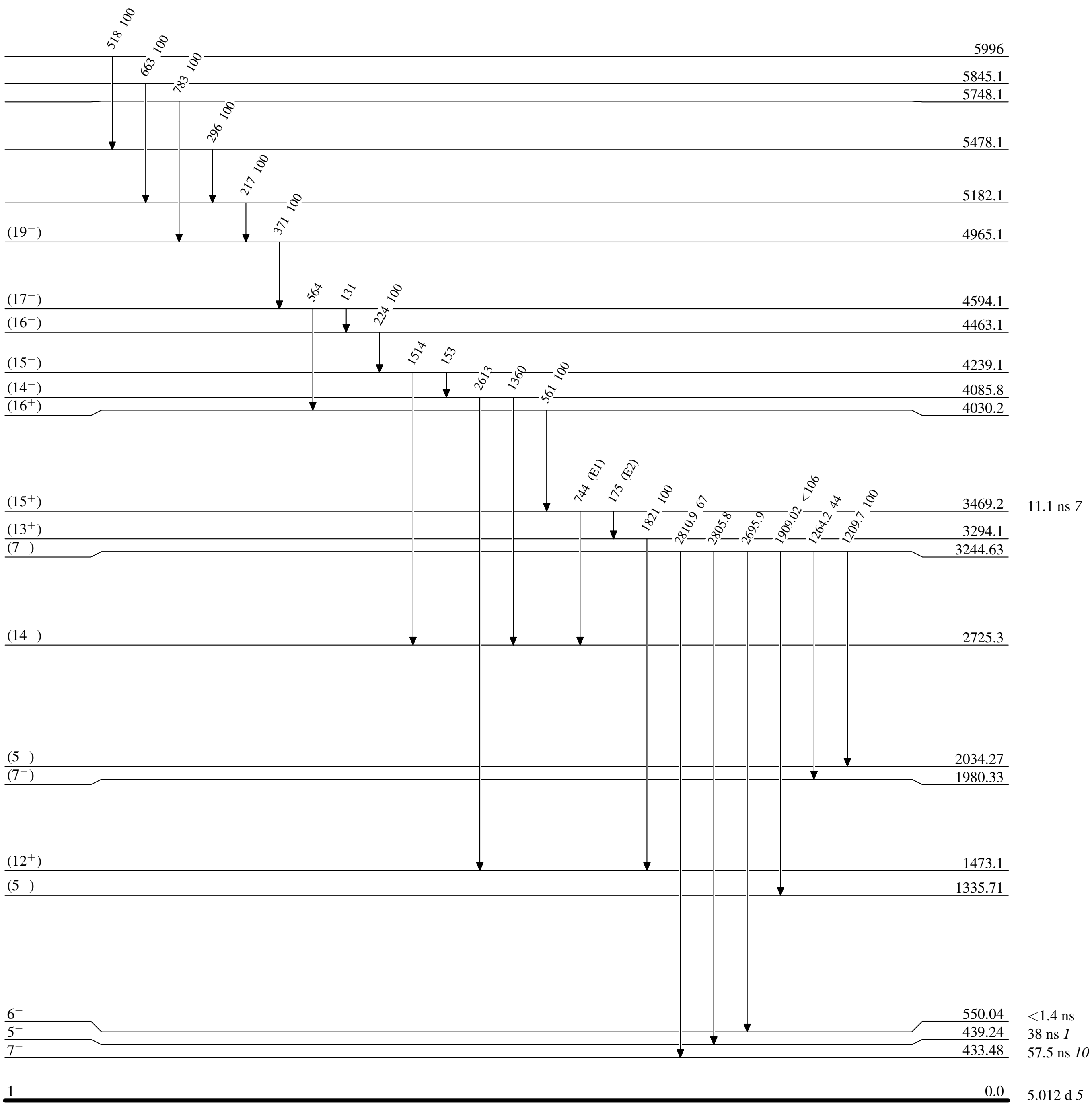
& Multiply placed.

a Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level

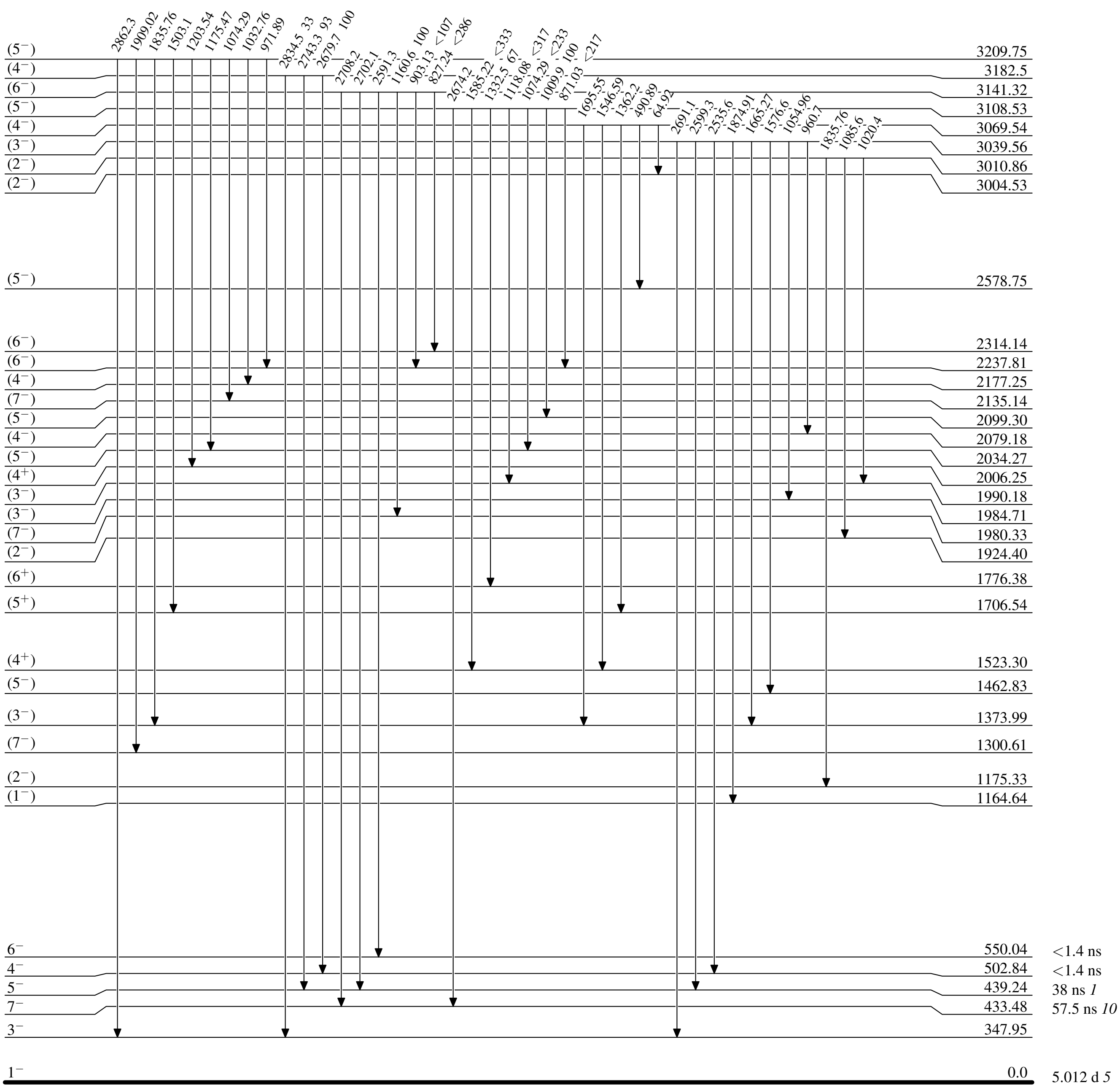


$^{210}_{83}Bi_{127}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{210}_{83}Bi_{127}$

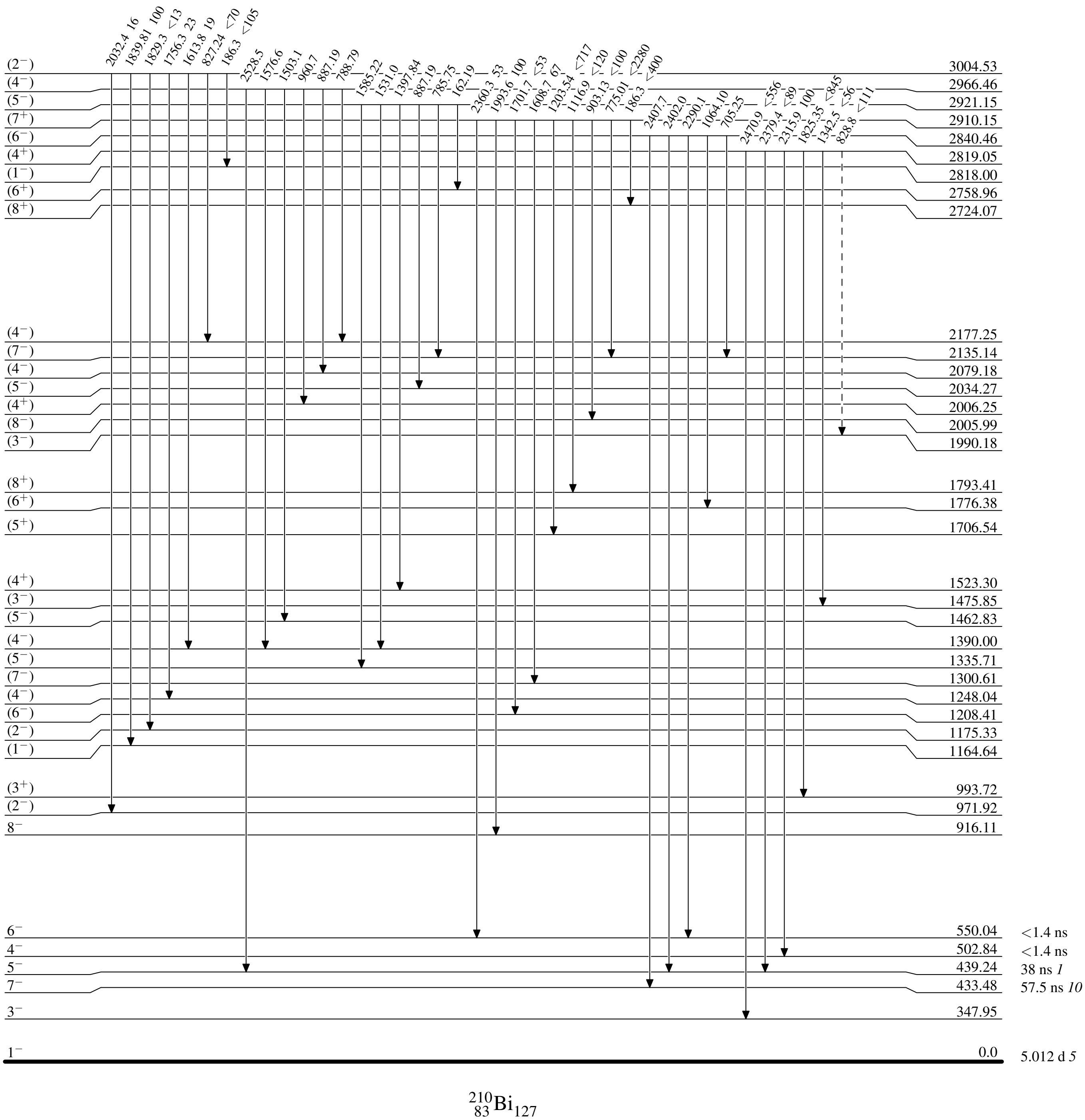
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

Legend

γ Decay (Uncertain)

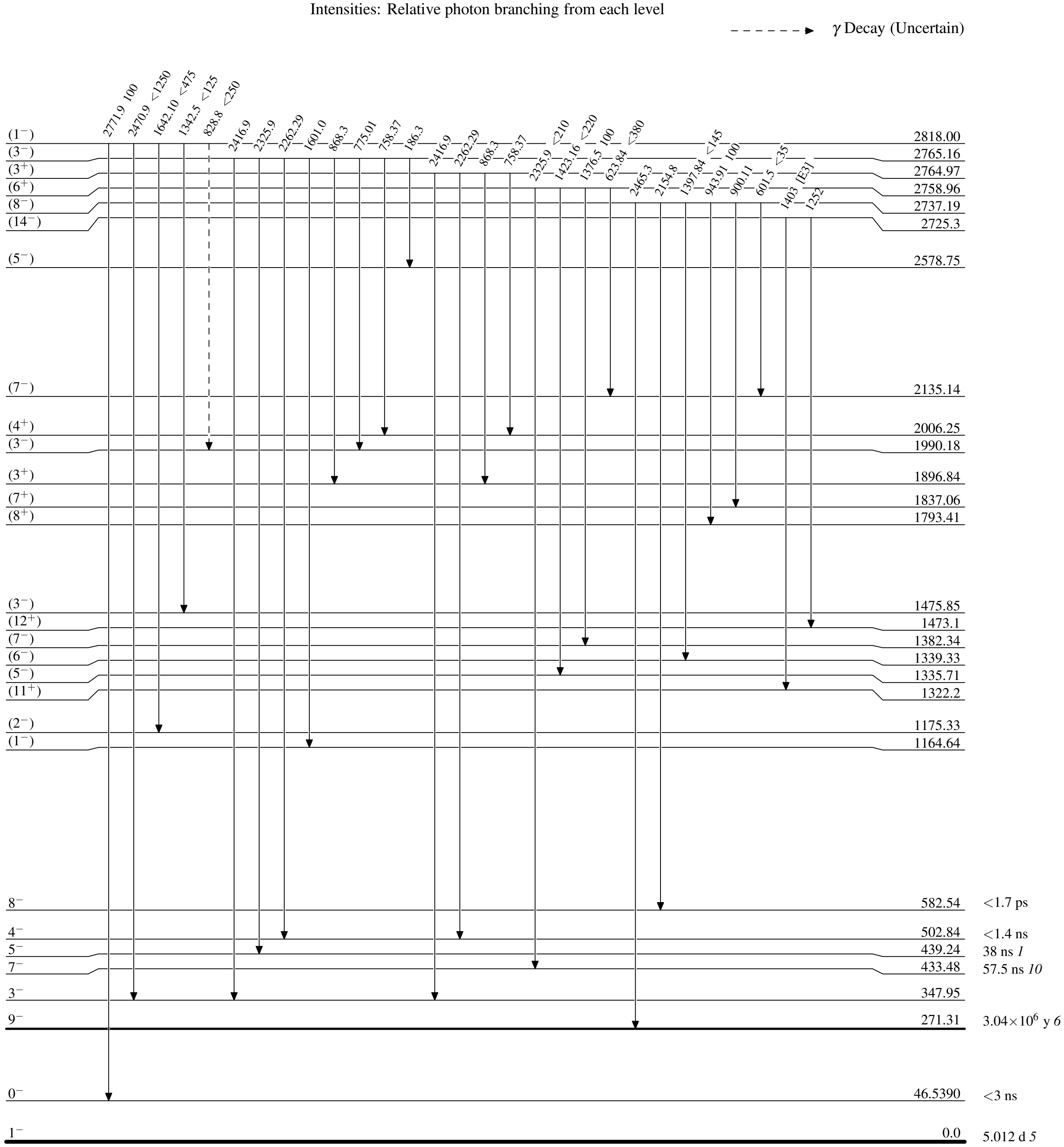


Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

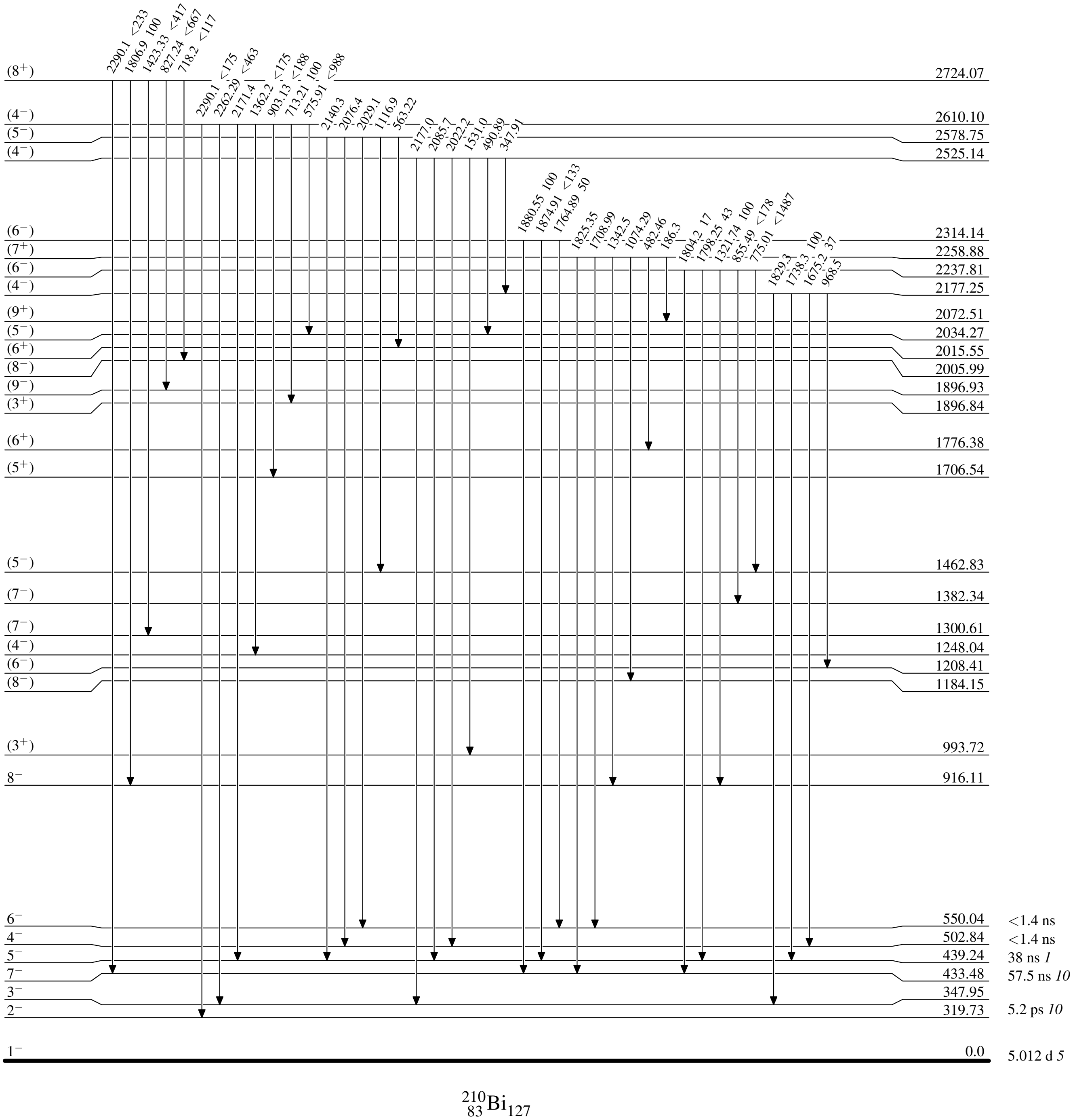


$^{210}_{83}Bi_{127}$

Adopted Levels, Gammas

Level Scheme (continued)

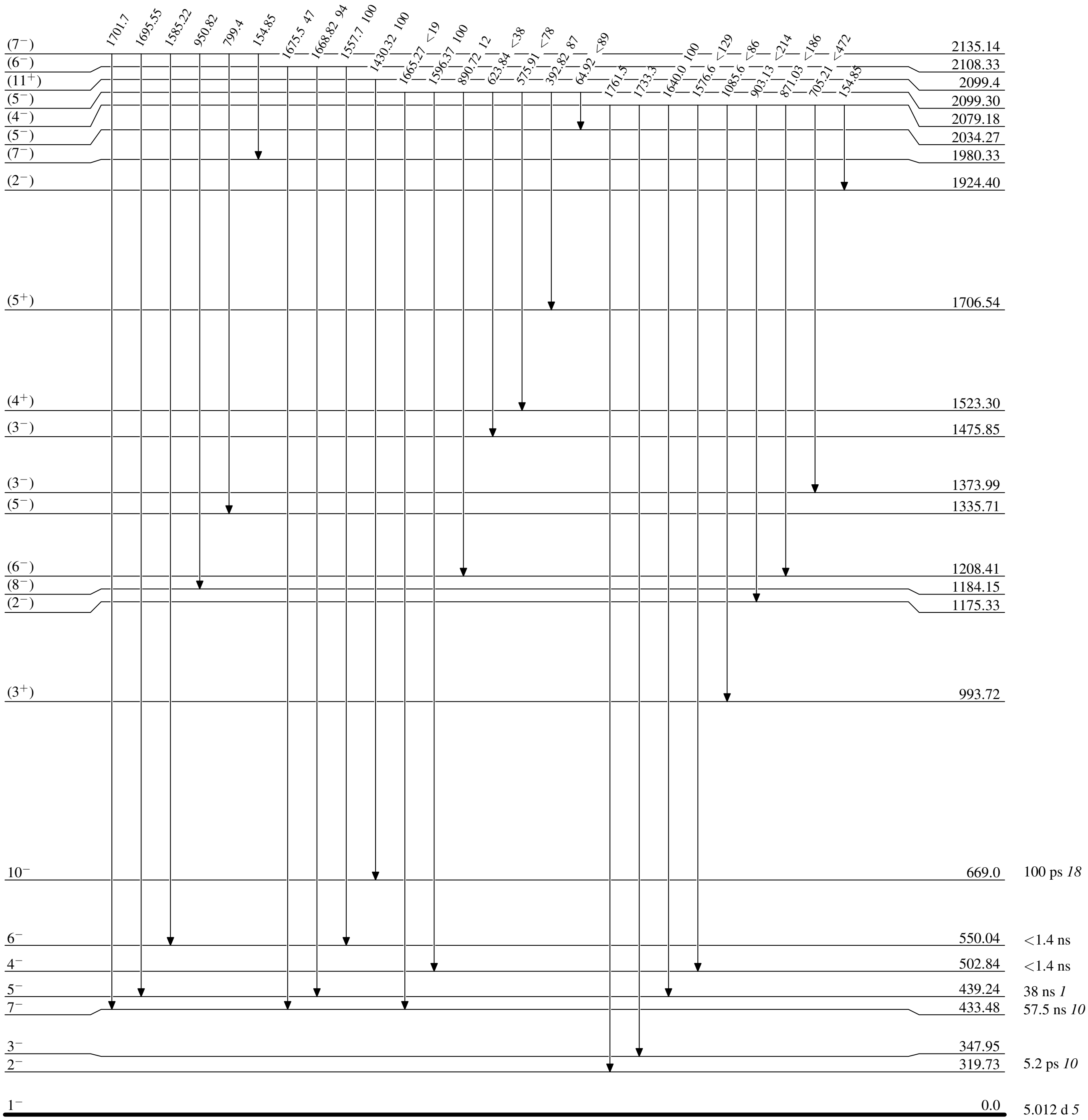
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

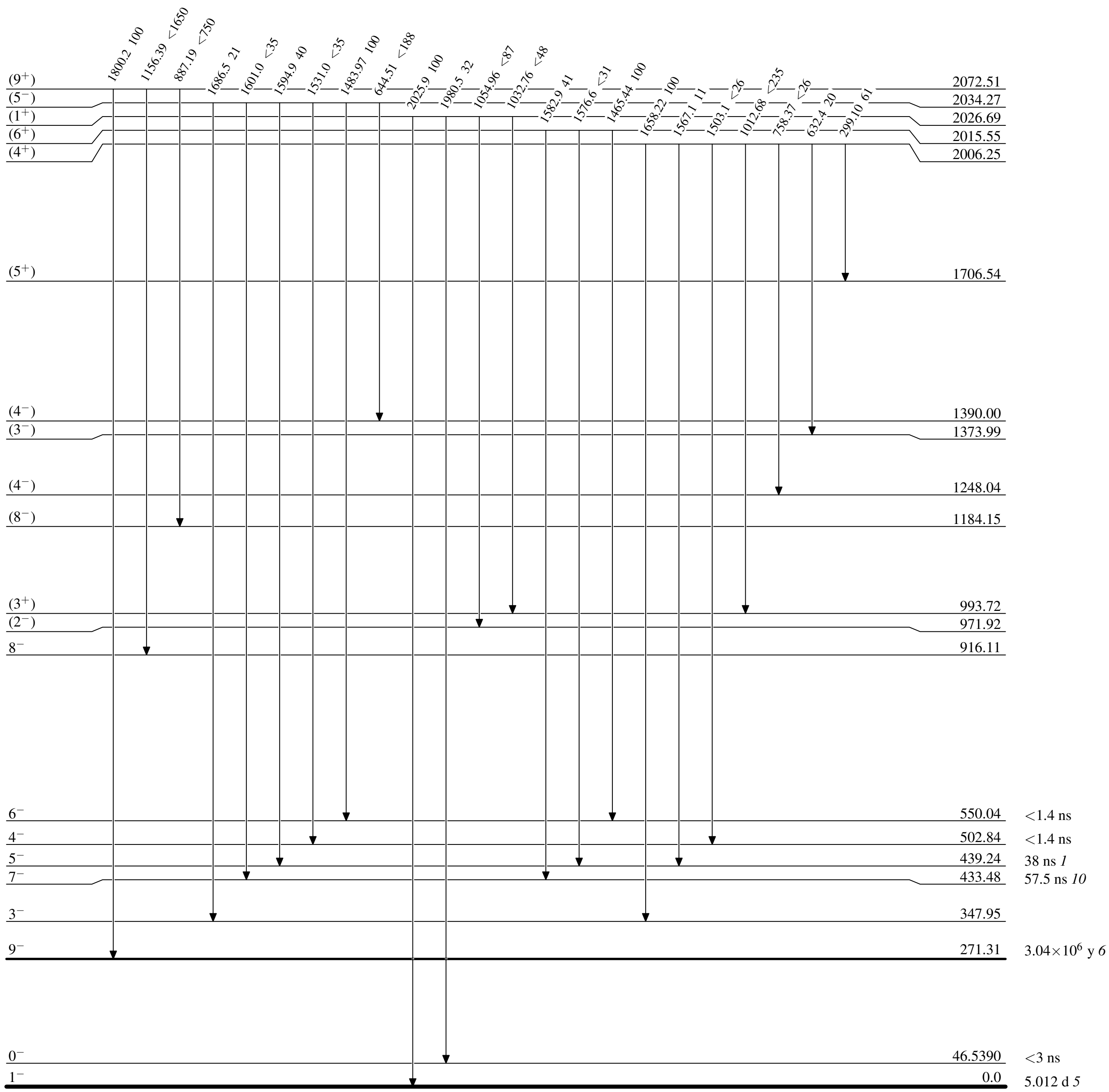


$^{210}_{83}Bi_{127}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

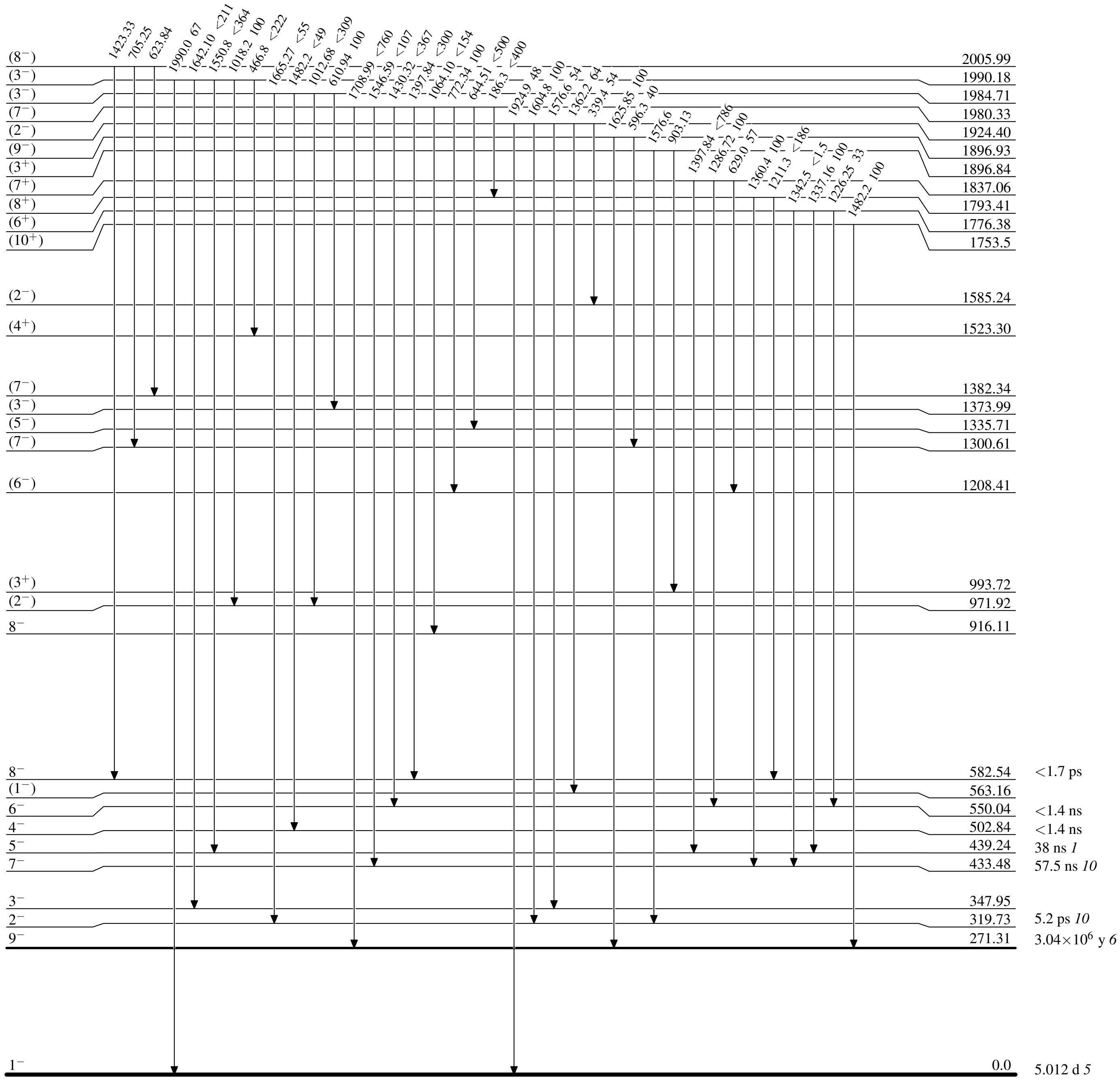


$^{210}_{83}Bi_{127}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{210}_{83}Bi_{127}$

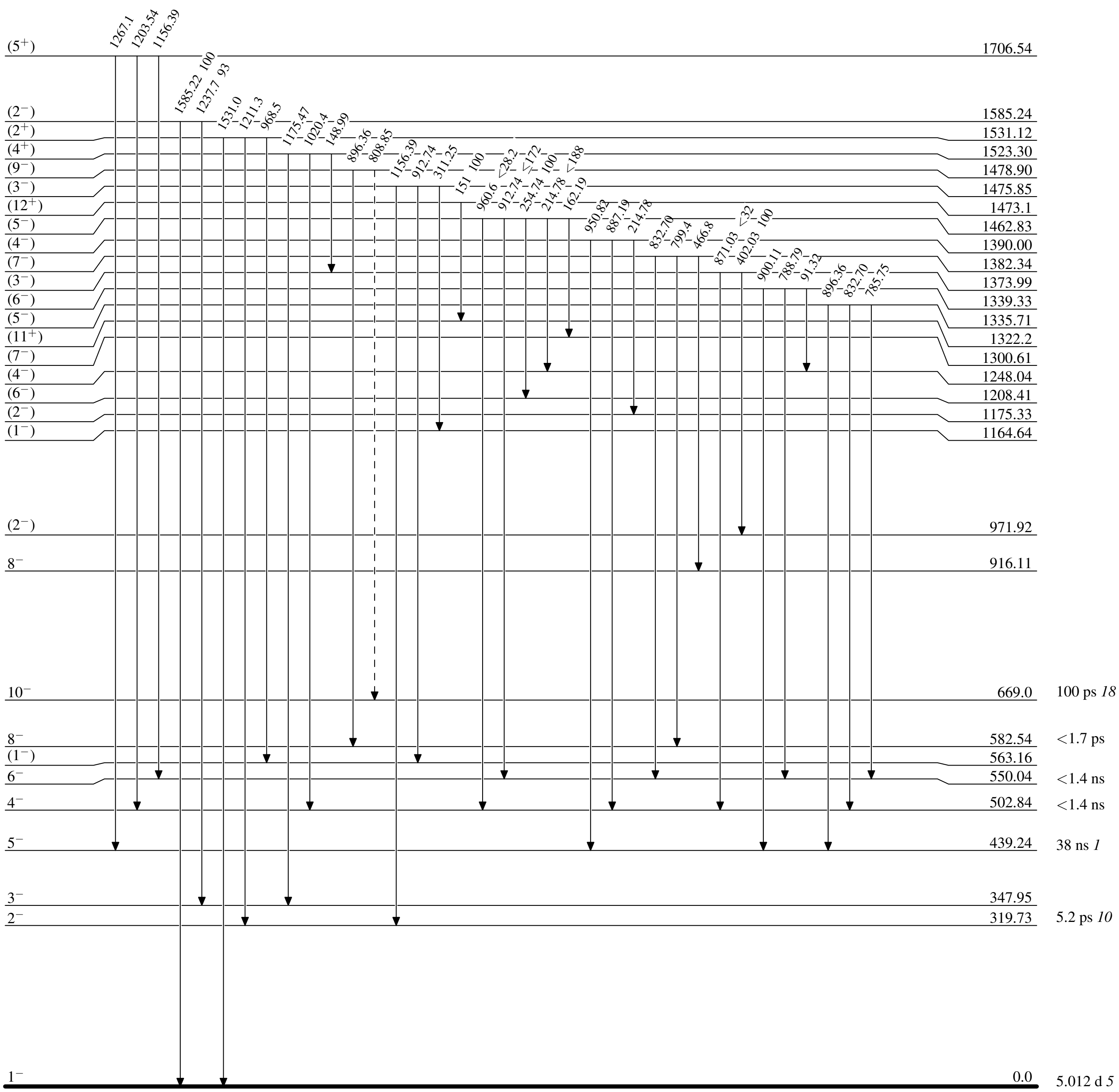
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

Legend

γ Decay (Uncertain)



$^{210}_{83}Bi_{127}$

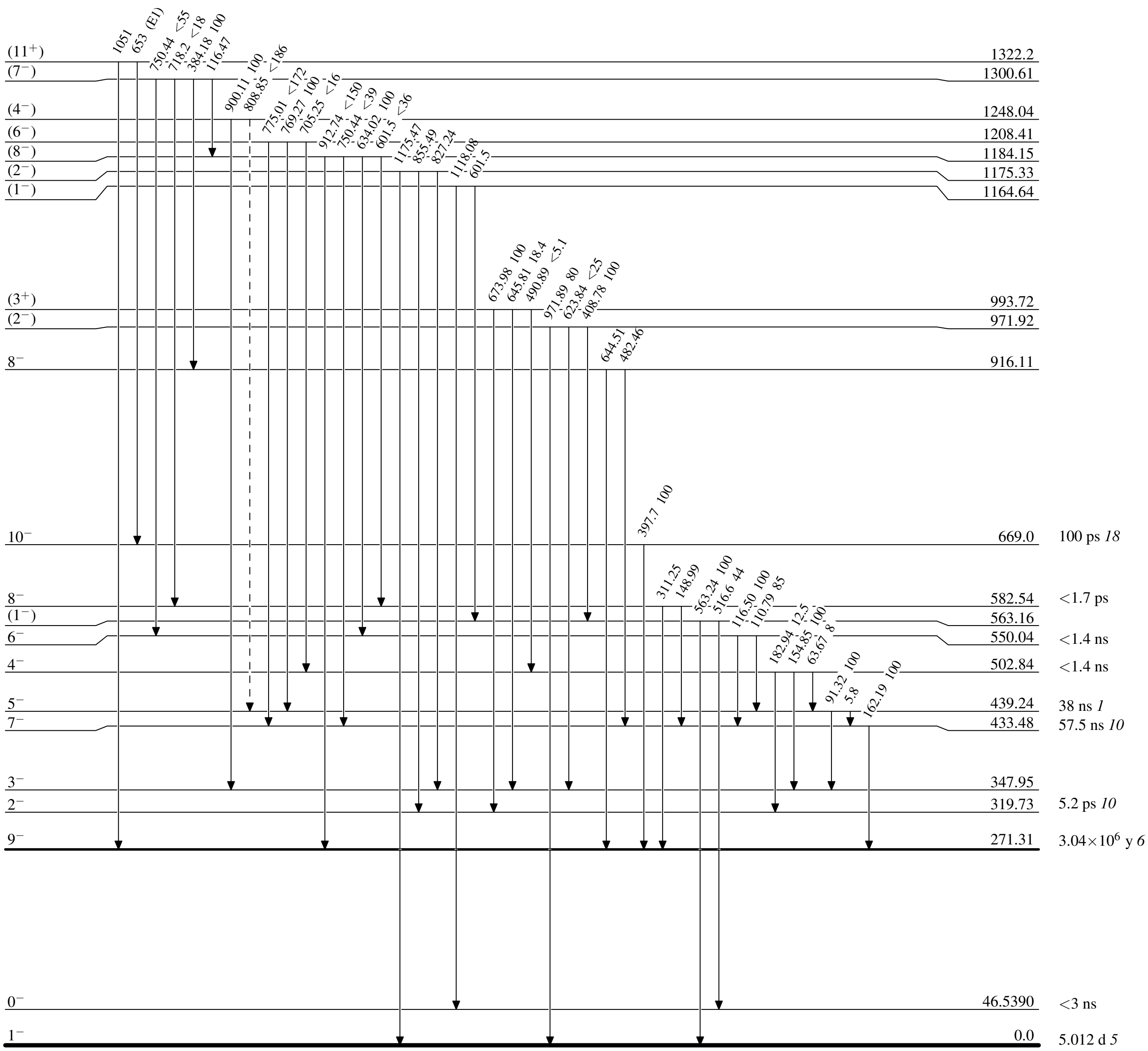
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)

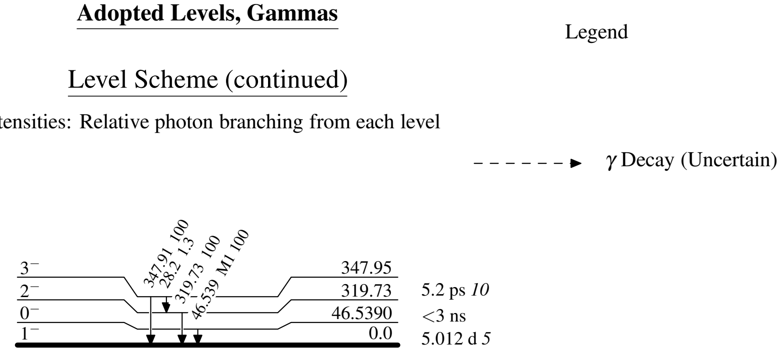


$^{210}_{83}Bi_{127}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{210}_{83}Bi_{127}$