Adopted Levels, Gammas

	Type	Author	History Citation	Literature Cutoff Date
	Full Evaluation	M. S. Basunia	NDS 195,368 (2024)	1-Dec-2023

$Q(\beta^-)=-8171$ *10*; $S(n)=10715$ *22*; $S(p)=112$ *15*; $Q(\alpha)=6780$ *3*   2021Wa16
$S(2n)=19317$ *22*, $S(2p)=3201$ *11*, $Q(\varepsilon p)=3838$ *10* (2021Wa16).
Identification: excitation functions ^{159}Tb(^{40}Ar,8n) (1972Ga27,1974Le02); ^{109}Ag(^{84}Kr,2n) (1972Ga27); ^{181}Ta(^{20}Ne,xn),
　　^{203}Tl(^{3}He,xn) (1974Le02).
Other references: 2004An07, 1998Kr23, 1988Hu03.
1991Wa21: Studied ^{191}Bi^{m,g} α decay to ^{187}Tl to ^{183}Au.
2000Sc46: Measured α emission anisotropy.
2003Va05: ^{191}Bi $9/2^-$ isomer production cross section was measured to be 6 μb in the reaction ^{142}Nd(^{52}Cr,4n), E=255 MeV.

^{191}Bi Levels

Level schemes and band structures have been reported in two studies 2015Ny02 and 2004Ni06, both from the same experimental
　　group in Jyvaskyla, but using two different reactions. Based on $\gamma\gamma$-coin data, structures are more extensive in 2015Ny02 than in
　　2004Ni06. In addition, placement of some of the γ rays has been revised in 2015Ny02. The evaluator has adopted all the
　　gamma-ray data and level scheme from 2015Ny02, except for a 400-ns isomer at an unknown energy, which is from 2004Ni06.
　　Some of the multipolarity assignments are also from 2004Ni06.

Cross Reference (XREF) Flags

A	^{195}At α decay (290 ms)
B	^{195}At α decay (143 ms)
C	^{109}Ag(^{86}Kr,4nγ)
D	^{142}Nd(^{52}Cr,p2nγ)

E(level)[†]	J$^{\pi}$ [@]	T$_{1/2}$	XREF	Comments
0.0[‡]	(9/2$^-$)	12.4 s *3*	BCD	%α=51 *10*; %ε+%β^+=49 *10* μ=3.724 *22* δ<r^2>^{191,209}=0.810 fm^2 *2* (stat) *40* (syst) (2021Ba45) assuming supersedes their 　earlier value in 2017Ba12 δ<r^2>^{191,209}=−0.772 fm^2 *9* (stat) *54* (syst). %α from 2003Ke04, %ε+%β^+ from difference to 100% (2003Ke04). Others: 　40≤%α≤77 (1985Co06); %α≈19 (1972Ga27). J$^{\pi}$: from systematics of heavier odd-A Bi nuclides. Supported by the hindrance factor 　(HF=0.75) of the 6308-keV α ray to the (9/2$^-$) 335-keV level in ^{187}Tl, indicating 　an unhindered transition. A spherical configuration is proposed for this level 　(1985Co06,2004Ni06), with the h$_{9/2-}$ proton coupled to the even-even Pb core. T$_{1/2}$: weighted average of: 12.4 s *4* (2003Ke04), 13.0 s +*21*−*15* (1999Ta20), 12 s *1* 　(1985Co06), 13 s *1* (1974Le02), and 12.0 s *7* (1972Ga27). Uncertainty is the lowest 　input value. μ: From 2021Ba45 (In Source Laser Spectroscopy), supersedes their 2017Ba12 value. 　Uncertainty of magnetic moment is combined one of 0.009 (stat) and 0.024 (syst). 　Other: 3.66 *5* (2019StZV based on 2017Ba12 − 3.680 *48* stat *70* syst). Q: Q$_s$=−1.41 *13* (2021Ba45).
148.7[a] *5*	(7/2$^-$)	<10 ns	ABCD	J$^{\pi}$: from (M1) multipolarity of deexciting 148.7-keV γ in ^{142}Nd(^{52}Cr,p2n). Also 　favored 7075 keV α transition from the (7/2$^-$), 32-keV level in 143-ms ^{195}At α 　decay. Configuration: 7/2$^-$[514] (2005Ke10). T$_{1/2}$: from prompt coincidences (resolving time <10 ns) of the deexciting 148.7-keV 　γ-ray with the 7075-keV α ray feeding this level from the (7/2$^-$) isomeric state in 　^{195}At (2003Ke04).
242[#b] *4*	(1/2$^+$)	125 ms *8*	A CD	%α=68 *5*; %IT=32 *5*; %ε+%β^+=?

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Adopted Levels, Gammas (continued)

^{191}Bi Levels (continued)

E(level)[†]	J$^{\pi}$[@]	T$_{1/2}$	XREF	Comments
				Additional information 1.
				%α, %ε+%β^+, %IT from 2003Ke04. Other: 50≤%α≤100 (1985Co06), %IT=22 6 (2013Ny01).
				E(level): Average of 238.4 *40* [from Eα=6871 *3* (^{191}Bi (1/2$^+$) to ^{187}Tl (1/2$^+$) in 2009Ba12 evaluation) and Qα=7680 *3* (2021Wa16)] and 245.0 *70* [from Eα=6953 *3* (^{195}At (1/2$^+$) to ^{191}Bi (1/2$^+$)) and Qα=7344 *6* (2021Wa16)]. Also 242 keV *4* (2021Ko07 − NUBASE).
				J$^{\pi}$: from unhindered character of α transitions, both for the one from ^{195}At g.s. decay, and for the one decaying to the ^{187}Tl g.s., both of which have been assigned J$^{\pi}$=(1/2$^+$). The J$^{\pi}$ for this level is interpreted as due to a (2p-1h) intruder state, with a s$_{1/2}$ proton promoted across the Z=82 shell gap.
				T$_{1/2}$: Weighted average of 121 ms +8−7 (2003Ke04), 156 ms +27−20 (1999Ta20), 115 ms *10* (1999An36), and 150 ms *15* (1985Co06,1981Le23). Other: 20 s *15* (1974Le02) (outlier).
343.8[a] *6*	(9/2$^-$)		CD	J$^{\pi}$: ΔJ=1, dipole γ to (7/2$^-$); band member.
422.7 *5*	(5/2$^+$)		CD	J$^{\pi}$: ΔJ=2, quadrupole (most likely E2) γ to (1/2$^+$).
429.7[&] *5*	(13/2$^+$)	562 ns *10*	CD	%IT=100
				J$^{\pi}$: from systematics of (13/2$^+$) levels in neighboring Bi nuclei.
				T$_{1/2}$: from recoil-γ(t) in ^{142}Nd(^{52}Cr,p2n) (2004Ni06). Earlier value from the same group was 533 ns *7* (2001Ni04).
481.2[c] *7*	(3/2$^+$)		C	J$^{\pi}$: γ to (1/2$^+$); possible bandhead.
485.7[a] *4*	(11/2$^-$)		CD	J$^{\pi}$: 486.0γ D to (9/2$^-$); band member.
609.9[b] *6*	(5/2$^+$)		C	J$^{\pi}$: γs to (1/2$^+$) and (5/2$^+$); band member.
692.4[a] *4*	(13/2$^-$)		CD	J$^{\pi}$: 692.3γ Q to (9/2$^-$); band member.
720.0 *8*	(7/2$^+$)		C	J$^{\pi}$: γ to (5/2$^+$); possible γ from (9/2$^+$).
747.4[&] *8*	(15/2$^+$)		CD	J$^{\pi}$: 317.7γ D to (13/2$^+$); band member.
824.9[c] *7*	(7/2$^+$)		C	J$^{\pi}$: γs to (3/2$^+$) and (5/2$^+$); band member.
881.0 *7*	(9/2$^+$)		C	J$^{\pi}$: γs to (7/2$^+$) and (5/2$^+$).
934.1[b] *7*	(9/2$^+$)		C	J$^{\pi}$: γs to (7/2$^+$) and (5/2$^+$).
1016.5[a] *6*	(15/2$^-$)		CD	J$^{\pi}$: 531.3γ (Q) to (11/2$^-$); band member.
1025.7[&] *8*	(17/2$^+$)		CD	J$^{\pi}$: 596.0γ (Q) to (13/2$^+$); band member.
1176.8[c] *8*	(11/2$^+$)		C	J$^{\pi}$: γs to (9/2$^+$) and (7/2$^+$); band member.
1247.3[a] *6*	(17/2$^-$)		C	J$^{\pi}$: 555.0γ (Q) to (13/2$^-$); band member.
1256.1 *13*			CD	
1332.4[b] *8*	(13/2$^+$)		C	J$^{\pi}$: γ to (9/2$^+$); band member.
1350.2[&] *9*	(19/2$^+$)		CD	J$^{\pi}$: 324.2γ (D) to (17/2$^+$) and γ to (15/2$^+$); band member.
1356.3? *12*	(13/2$^+$)		C	J$^{\pi}$: γ to (9/2$^+$).
1598.0[&] *9*	(21/2$^+$)		CD	J$^{\pi}$: 572.9γ (Q) to (17/2$^+$), 247.8γ D to (19/2$^+$); band member.
1616.6[a] *8*	(19/2$^-$)		CD	J$^{\pi}$: 369.0γ D to (17/2$^-$) and γ to (15/2$^-$); band member.
1623.2?[c] *9*	(15/2$^+$)		C	J$^{\pi}$: γs to (13/2$^+$) and (11/2$^+$); band member.
1815.2[b] *13*	(17/2$^+$)		C	J$^{\pi}$: γ to (13/2$^+$); band member.
1825.1[a] *9*	(21/2$^-$)		C	J$^{\pi}$: 577.9γ to (17/2$^-$); band member.
1825.1+x		400 ns *40*	D	%IT≈100
				Additional information 2.
				Decay mode of ≈100% by isomeric transitions is assumed by the evaluator.
				E(level): the existence of this level is inferred from the half-life of 400 ns observed (2004Ni06) for the 578-keV γ ray. This γ is placed from an 1825.1, (21/2$^-$) level in 2015Ny02, but from a 1271-keV level in 2004Ni06. There is no discussion about isomer decays in 2015Ny02.
				T$_{1/2}$: from recoil-578γ(t) (2004Ni06 − (^{52}Cr,p2nγ)).
1982.5[&] *10*	(23/2$^+$)		C	J$^{\pi}$: 632.0γ (Q) to (19/2$^+$), 384.8γ D to (21/2$^+$); band member.
2066.2 *11*			C	

Adopted Levels, Gammas (continued)

^{191}Bi Levels (continued)

E(level)[†]	J$^\pi$ [@]	XREF	Comments
2194.6[&] 12	(25/2$^+$)	C	J$^\pi$: γs to (21/2$^+$) and (23/2$^+$); band member.
2342.2 15		C	
2358.9?[&] 15	(27/2)	C	J$^\pi$: γ to (25/2$^+$).
2368.4[b] 15	(21/2$^+$)	C	J$^\pi$: γ to (17/2$^+$); band member.
2508.7?[&] 17	(29/2)	C	J$^\pi$: γ to (27/2).
2560.2 14		C	
2670.8?[&] 22	(31/2)	C	J$^\pi$: γ to (29/2).
2914.6?[&] 25	(33/2)	C	J$^\pi$: γ to (31/2).
2943.3 16		C	
2983.9[b] 16	(25/2$^+$)	C	J$^\pi$: γ to (21/2$^+$); band member.
y[d]	(11/2$^+$)	C	Additional information 3.
126.6+y[d] 4	(15/2$^+$)	C	
294.3+y[d] 6	(19/2$^+$)	C	
503.0+y[d] 7	(23/2$^+$)	C	
752.5+y[d] 8	(27/2$^+$)	C	
1042.5+y[d] 9	(31/2$^+$)	C	
1373.2+y[d] 10	(35/2$^+$)	C	
1743.6+y[d] 13	(39/2$^+$)	C	
2154.4+y[d] 14	(43/2$^+$)	C	
2602.7+y[d] 15	(47/2$^+$)	C	
z[e]	(9/2$^+$)	C	Additional information 4.
140.3+z[e] 6	(13/2$^+$)	C	
320.9+z[e] 11	(17/2$^+$)	C	
541.4+z[e] 13	(21/2$^+$)	C	
801.5+z[e] 14	(25/2$^+$)	C	
1100.6+z[e] 15	(29/2$^+$)	C	
1439.3+z[e] 16	(33/2$^+$)	C	
1816.9+z[e] 17	(37/2$^+$)	C	
2230.5+z[e] 19	(41/2$^+$)	C	

[†] From least-squares fit to the γ-ray energies. The uncertainties in the level energies above the 242-keV 1/2$^+$ bandhead do not include the 4 keV uncertainty in that energy.

[‡] The ground state decays with an 51 10 % α branching ratio (2003Ke04) to levels in ^{187}Tl. This intensity is distributed among the following reported α rays (2003Ke04,1999An36,1985Co06): 1) E(α)=6308 keV 3, I(α)=97.0 3 %, and HF=1.5 4, which links to the 335 keV (9/2$^-$) level in ^{187}Tl; 2) E(α)=6639 keV 5, I(α)=3.0 3 %, and HF=68 28, which decays to the ^{187}Tl (1/2$^+$) g.s.; 3) E(α)=6342 keV 15, I(α)≈0.78%, seen in the fine structure of the decay of the ^{191}Bi ground state, and observed in the α-γ coincidence matrix to be associated with the 299 keV γ ray deexciting the (3/2$^+$) level in ^{187}Tl (1999An36). Using the value r$_0$(^{187}Tl)=1.486 17, obtained by interpolation between the r$_0$ values for the neighboring even-Z, N=106 isotones, one obtains for these α rays the values HF(6308)=0.75 16, HF(6342)=130 30, and HF(6639)=460 110.

[#] The (1/2$^+$) isomer decays by a 68% 5 α branch, with hindrance factor HF=1.5 2 and E(α)=6870 keV 3 (2003Ke04), to the ^{187}Tl (1/2$^+$) ground state. A further, very weak, α ray, with I(α)=0.24%, E(α)=6582 keV 15 (1999An36), connects this level with the 299 keV (3/2$^+$) level in ^{187}Tl. For these α transitions, using the value r$_0$(^{187}Tl)=1.486 17, one can calculate the hindrance factors HF(6870)=0.76 11 and HF(6582)=27 12. The remaining (non-α decay) intensity is assumed by 2003Ke04 to be taken up by an unobserved ≈92 keV (E3) isomeric transition to the (7/2$^-$) 149-keV level in ^{191}Bi (see ^{195}At α decay (328 ms) dataset).

[@] From ^{109}Ag(^{86}Kr,4nγ) (2015Ny02) based on angular distribution ratios for selected transitions and band structures built on the basis of heavy-ion reaction experiments using intensity arguments, $\gamma\gamma$ and $\alpha\gamma$ coincidences, and systematic trends from

Adopted Levels, Gammas (continued)

^{191}Bi Levels (continued)

neighboring nuclides. For extensive discussions regarding the probable nuclear configurations invoked to explain the suggested J^π assignments, as well as corresponding level energy systematics, see 2015Ny02, 2004Ni06 and 2003Ke04.

  $^\&$ Band(A): Band built on $\pi i_{13/2}$.
  ^{a} Band(B): Band built on $\pi f_{7/2}$.
  ^{b} Band(C): Band built on intruder $s_{1/2}$.
  ^{c} Band(D): Band based on $(3/2^+)$.
  ^{d} Band(E): SD-1 band, built on $\pi 1/2[651],\alpha=-1/2$. Assignment by 2015Ny02.
  ^{e} Band(e): SD-2 band, built on $\pi 1/2[651],\alpha=+1/2$. Assignment by 2015Ny02.

$\gamma(^{191}\text{Bi})$

E_i(level)	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult.$^\#$	$\alpha^@$	Comments
148.7	$(7/2^-)$	148.6 5	100	0.0	$(9/2^-)$	(M1)	3.29 6	α(K)=2.68 5; α(L)=0.469 8; α(M)=0.1102 19 α(N)=0.0282 5; α(O)=0.00576 10; α(P)=0.000686 12 E_γ: weighted average of 148.7 5 from ^{195}At α decay (143 ms) and 148.5 5 from (^{86}Kr,4nγ). Mult.: from experimental α_K=3.3 3 in 143-ms ^{195}At α decay (2003Ke04), and ΔJ=1, dipole from angular distribution ratios in both the high-spin reactions (2015Ny02,2004Ni06).
242	$(1/2^+)$	93$^\&$ 4		148.7	$(7/2^-)$	[E3]	2.6×10^2 7	B(E3)(W.u.)=0.09 +6−3 α(L)=1.9×10^2 5; α(M)=55 16 α(N)=14 4; α(O)=2.6 8; α(P)=0.20 6 E_γ: from level-energy difference.
343.8	$(9/2^-)$	194.6 9	100	148.7	$(7/2^-)$	D		
422.7	$(5/2^+)$	180.6 5	100	242	$(1/2^+)$	(E2)	0.645 11	α(K)=0.2101 32; α(L)=0.324 6; α(M)=0.0854 16 α(N)=0.0217 4; α(O)=0.00404 7; α(P)=0.000327 6 Mult.: stretched quadrupole from angular distribution, RUL assuming level half-life <10 ns.
429.7	$(13/2^+)$	429.7 5	100	0.0	$(9/2^-)$	M2	0.542 8	B(M2)(W.u.)=0.0737 14 α(K)=0.418 6; α(L)=0.0938 14; α(M)=0.02288 33 α(N)=0.00589 9; α(O)=0.001197 17; α(P)=0.0001391 20 Mult.: from α(K)(exp) of α_K=0.61 10 in (^{52}Cr,p2n) (2004Ni06) and analogy with heavier Bi isotopes.
481.2	$(3/2^+)$	239.2 13	100	242	$(1/2^+)$			
485.7	$(11/2^-)$	142.0 9	11 4	343.8	$(9/2^-)$			
		486.0 5	100 20	0.0	$(9/2^-)$	D		
609.9	$(5/2^+)$	128.3 7	17 8	481.2	$(3/2^+)$			
		187.0 4	100 10	422.7	$(5/2^+)$			
		368.5 14	63 8	242	$(1/2^+)$			
692.4	$(13/2^-)$	206.6 9	74 22	485.7	$(11/2^-)$	(D)		
		348.0 9	30 19	343.8	$(9/2^-)$	(Q)		
		692.3 5	100 22	0.0	$(9/2^-)$	Q		
720.0	$(7/2^+)$	296.9 11	100	422.7	$(5/2^+)$			
747.4	$(15/2^+)$	317.7 6	100	429.7	$(13/2^+)$	D		

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Adopted Levels, Gammas (continued)

$\gamma(^{191}$Bi) (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.#	Comments
824.9	(7/2$^+$)	214.5 *8*	22 *13*	609.9	(5/2$^+$)		
		344.1 *7*	100 *13*	481.2	(3/2$^+$)		
		402.0$^\&$ *11*	<13	422.7	(5/2$^+$)		
881.0	(9/2$^+$)	160.5$^\&$ *9*	7 *4*	720.0	(7/2$^+$)		
		270.9 *6*	43 *14*	609.9	(5/2$^+$)		
		459.0 *7*	100 *14*	422.7	(5/2$^+$)		
934.1	(9/2$^+$)	214.3 *10*	6 *3*	720.0	(7/2$^+$)		
		324.2 *4*	100 *8*	609.9	(5/2$^+$)		
1016.5	(15/2$^-$)	323.4 *6*	100 *31*	692.4	(13/2$^-$)		
		531.3 *6*	83 *17*	485.7	(11/2$^-$)	(Q)	
1025.7	(17/2$^+$)	278.3 *5*	100 *17*	747.4	(15/2$^+$)	D	
		596.0 *9*	63 *6*	429.7	(13/2$^+$)	(Q)	
1176.8	(11/2$^+$)	243.2 *10*	55 *14*	934.1	(9/2$^+$)		
		351.9 *5*	100 *18*	824.9	(7/2$^+$)		
1247.3	(17/2$^-$)	230.7 *6*	28 *16*	1016.5	(15/2$^-$)		
		555.0 *7*	100 *20*	692.4	(13/2$^-$)	(Q)	
1256.1		508.7 *10*	100	747.4	(15/2$^+$)		
1332.4	(13/2$^+$)	398.3 *5*	100	934.1	(9/2$^+$)		
1350.2	(19/2$^+$)	324.2 *5*	100 *21*	1025.7	(17/2$^+$)	(D)	
		602.8 *10*	61 *9*	747.4	(15/2$^+$)		
1356.3?	(13/2$^+$)	475.3$^\&$ *10*	100	881.0	(9/2$^+$)		
1598.0	(21/2$^+$)	247.8 *5*	73 *18*	1350.2	(19/2$^+$)	D	
		572.9 *8*	100 *18*	1025.7	(17/2$^+$)	(Q)	
1616.6	(19/2$^-$)	369.0 *7*	93 *29*	1247.3	(17/2$^-$)	D	
		600.4 *11*	100 *43*	1016.5	(15/2$^-$)		
1623.2?	(15/2$^+$)	290.2$^\&$ *14*	57 *21*	1332.4	(13/2$^+$)		
		446.4$^\&$ *5*	100 *21*	1176.8	(11/2$^+$)		
1815.2	(17/2$^+$)	482.8 *10*	100	1332.4	(13/2$^+$)		
1825.1	(21/2$^-$)	208.4 *9*	32 *16*	1616.6	(19/2$^-$)		
		577.9 *9*	100 *37*	1247.3	(17/2$^-$)	(Q)	This γ ray allows one to deduce the existence of an unknown precursor level, from the half-life of 400 ns *40* which can be extracted form the observed time differences between recoil implantation and the detection of the 578-keV γ ray. No more precise information regarding the precursor state could be obtained in the experiments by 2004Ni06, whereas isomer decays were not discussed by 2015Ny02.
1982.5	(23/2$^+$)	384.8 *7*	100 *25*	1598.0	(21/2$^+$)	D	
		632.0 *7*	58 *25*	1350.2	(19/2$^+$)	(Q)	
2066.2		468.2 *6*	100	1598.0	(21/2$^+$)		
2194.6	(25/2$^+$)	212.2 *9*	100 *71*	1982.5	(23/2$^+$)		
		596.4 *15*	71 *29*	1598.0	(21/2$^+$)		
2342.2		527.0 *7*	100	1815.2	(17/2$^+$)		
2358.9?	(27/2)	164.3$^\&$ *8*	100	2194.6	(25/2$^+$)		
2368.4	(21/2$^+$)	553.2 *7*	100	1815.2	(17/2$^+$)		
2508.7?	(29/2)	149.8$^\&$ *8*	100	2358.9?	(27/2)		
2560.2		494.0 *8*	100	2066.2			
2670.8?	(31/2)	162.1$^\&$ *14*	100	2508.7?	(29/2)		
2914.6?	(33/2)	243.8$^\&$ *11*	100	2670.8?	(31/2)		
2943.3		601.1 *6*	100	2342.2			
2983.9	(25/2$^+$)	615.5 *6*	100	2368.4	(21/2$^+$)		
126.6+y	(15/2$^+$)	126.6‡ *4*	0.26‡ *8*	y	(11/2$^+$)		

Adopted Levels, Gammas (continued)

$\gamma(^{191}$Bi$)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π
294.3+y	(19/2$^+$)	167.7[‡] 4	0.46[‡] 9	126.6+y	(15/2$^+$)
503.0+y	(23/2$^+$)	208.7[‡] 3	0.59[‡] 11	294.3+y	(19/2$^+$)
752.5+y	(27/2$^+$)	249.5[‡] 4	0.70[‡] 13	503.0+y	(23/2$^+$)
1042.5+y	(31/2$^+$)	290.0[‡] 4	0.6[‡] 2	752.5+y	(27/2$^+$)
1373.2+y	(35/2$^+$)	330.7[‡] 4	0.52[‡] 15	1042.5+y	(31/2$^+$)
1743.6+y	(39/2$^+$)	370.4[‡] 9	0.49[‡] 15	1373.2+y	(35/2$^+$)
2154.4+y	(43/2$^+$)	410.8[‡] 5	0.18[‡] 10	1743.6+y	(39/2$^+$)
2602.7+y	(47/2$^+$)	448.3[‡] 5	0.09[‡] 7	2154.4+y	(43/2$^+$)
140.3+z	(13/2$^+$)	140.3[‡] 6	0.19[‡] 5	z	(9/2$^+$)
320.9+z	(17/2$^+$)	180.6[‡] 9	0.35[‡] 12	140.3+z	(13/2$^+$)
541.4+z	(21/2$^+$)	220.5[‡] 7	0.41[‡] 9	320.9+z	(17/2$^+$)
801.5+z	(25/2$^+$)	260.1[‡] 5	0.39[‡] 8	541.4+z	(21/2$^+$)
1100.6+z	(29/2$^+$)	299.1[‡] 6	0.15[‡] 12	801.5+z	(25/2$^+$)
1439.3+z	(33/2$^+$)	338.7[‡] 5	0.23[‡] 13	1100.6+z	(29/2$^+$)
1816.9+z	(37/2$^+$)	377.6[‡] 5	0.16[‡] 13	1439.3+z	(33/2$^+$)
2230.5+z	(41/2$^+$)	413.6[‡] 9	0.17[‡] 13	1816.9+z	(37/2$^+$)

[†] From ^{109}Ag(^{86}Kr,4nγ) unless otherwise stated. When weighted average taken, lower/lowest input uncertainty has been quoted.

[‡] Observed in the 1/2$^+$ isomer α-tagged spectrum, but no connection with the normal-deformed band is established. Relative intensity within the SD band is given.
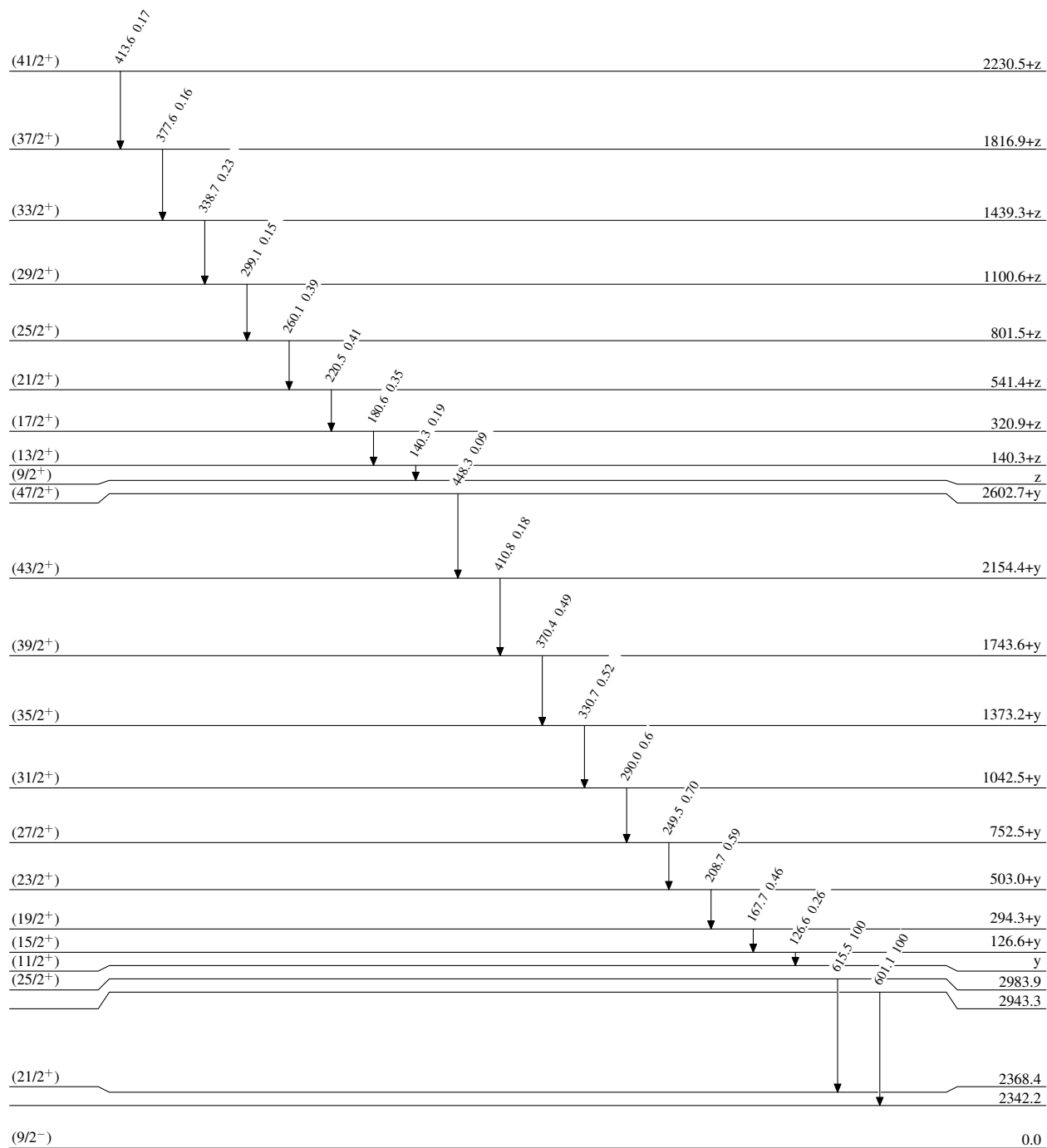
[#] From ^{109}Ag(^{86}Kr,4nγ) (2015Ny02) and ^{142}Nd(^{52}Cr,p2nγ) (2004Ni06) based on angular distribution ratios, unless otherwise stated.

[@] Additional information 5.

[&] Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Level Scheme

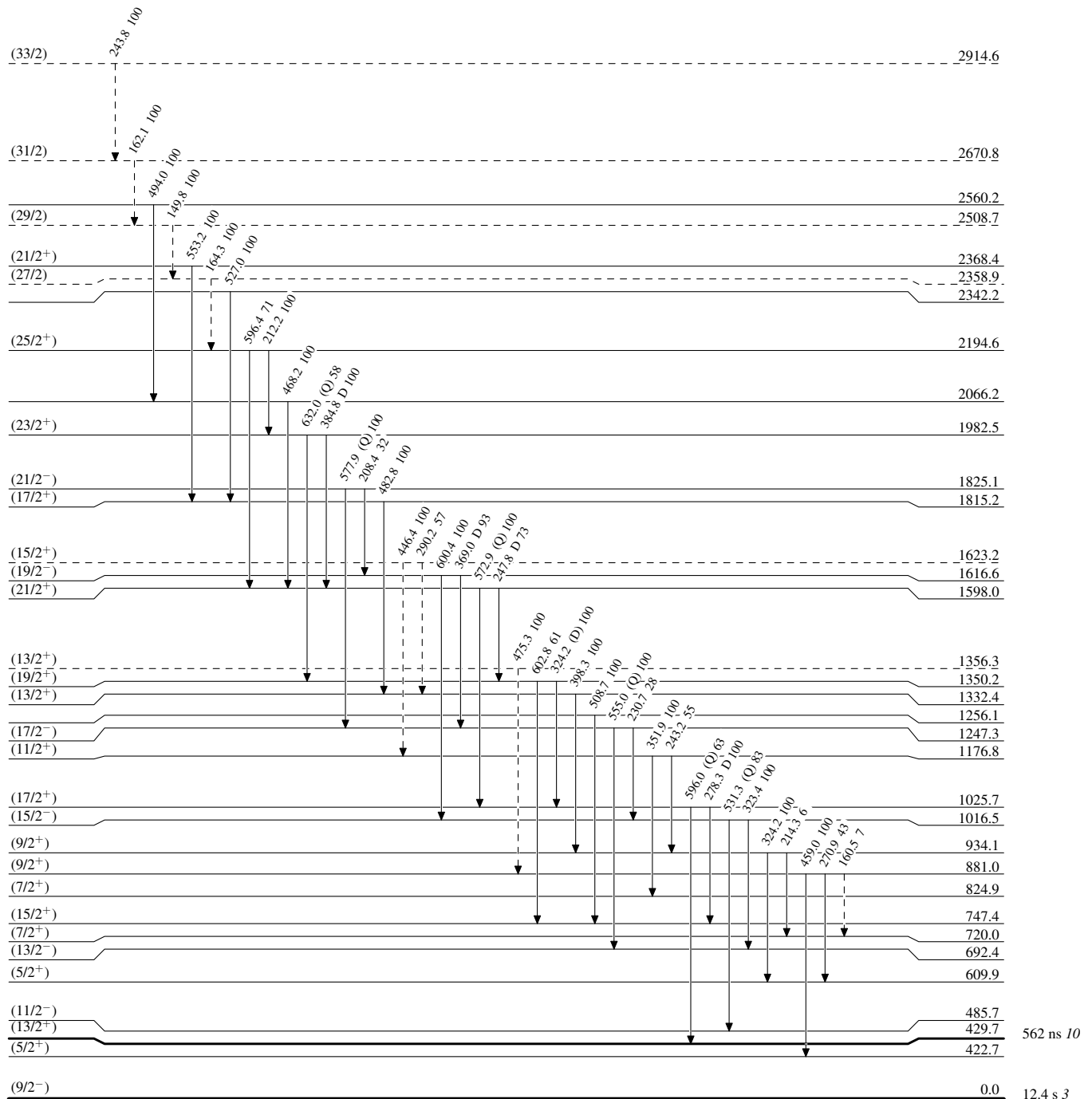Intensities: Relative photon branching from each level

$^{191}_{83}Bi_{108}$

Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level
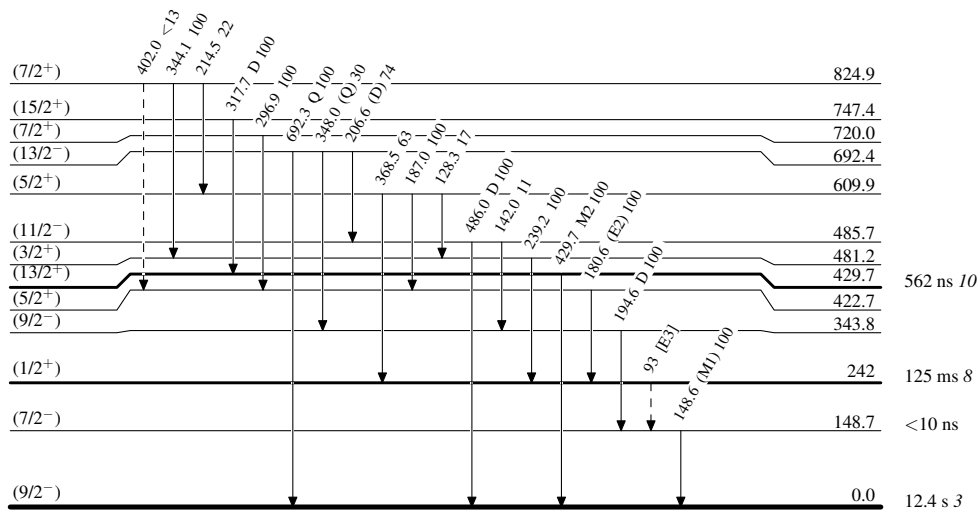
- - - - - - ▶   γ Decay (Uncertain)

$^{191}_{83}$Bi$_{108}$

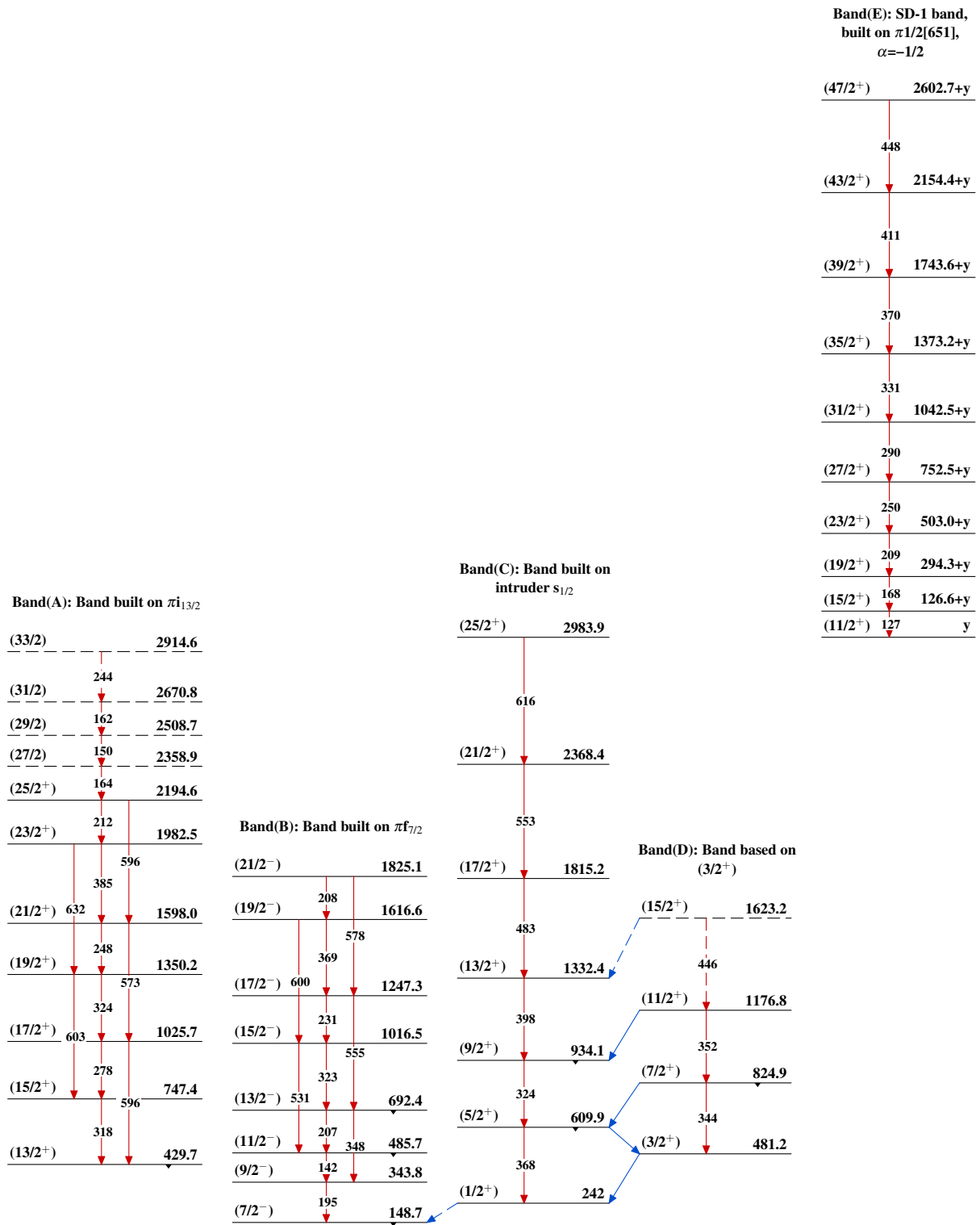**Adopted Levels, Gammas**   Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

- - - - - - ▶ γ Decay (Uncertain)

Level (keV)	J^π	Half-life
824.9	$(7/2^+)$	
747.4	$(15/2^+)$	
720.0	$(7/2^+)$	
692.4	$(13/2^-)$	
609.9	$(5/2^+)$	
485.7	$(11/2^-)$	
481.2	$(3/2^+)$	
429.7	$(13/2^+)$	562 ns *10*
422.7	$(5/2^+)$	
343.8	$(9/2^-)$	
242	$(1/2^+)$	125 ms *8*
148.7	$(7/2^-)$	<10 ns
0.0	$(9/2^-)$	12.4 s *3*

Gamma labels:
402.0 <13
344.1 D 100
214.5 22
317.7 D 100
206.9 100
692.3 Q 100
348.0 (Q) 30
206.6 (D) 74
368.5 63
187.0 100
128.3 17
486.0 D 100
142.0 11
239.2 100
429.7 M2 100
180.6 (E2) 100
194.6 D 100
93 [E3]
148.6 (M1) 100

$^{191}_{83}Bi_{108}$

Adopted Levels, Gammas

$^{191}_{83}$Bi$_{108}$

Adopted Levels, Gammas (continued)

Band(e): SD-2 band,
built on $\pi 1/2[651]$,
$\alpha = +1/2$

$(41/2^+)$		2230.5+z
	414	
$(37/2^+)$		1816.9+z
	378	
$(33/2^+)$		1439.3+z
	339	
$(29/2^+)$		1100.6+z
	299	
$(25/2^+)$		801.5+z
	260	
$(21/2^+)$		541.4+z
	220	
$(17/2^+)$		320.9+z
	181	
$(13/2^+)$		140.3+z
	140	
$(9/2^+)$		z

$${}^{191}_{83}\text{Bi}_{108}$$