Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Huang Xiaolong and Kang Mengxiao	NDS 133, 221 (2016)	1-Dec-2015

Q(β^-)=−390×10[1] *3*; S(n)=775×10[1] *3*; S(p)=191×10[1] *3*; Q(α)=514×10[1] *3* 2012Wa38
For systematic properties of odd-odd Bi isomers, see 1972Ha73.

^{198}Bi Levels

Cross Reference (XREF) Flags

A	^{198}Bi IT decay (7.7 s)	D	^{202}At α decay (0.46 s)
B	^{202}At α decay (184 s)	E	^{187}Re(^{16}O,5nγ)
C	^{202}At α decay (182 s)	F	^{184}W(^{19}F,5nγ)

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$	XREF	Comments
0.0	(2$^+$,3$^+$)	10.3[#] min *3*	ABCD	%ε+%β^+=100 %ε+%β^+: no α decay observed. configuration: $\pi(h^{+1}_{9/2})\otimes\nu(f^{-1}_{5/2})$ (2014Pa53). $T_{1/2}$: Other: 11.85 m *18* (1968Ha37).
0.0+x	7$^+$	11.6[#] min *3*	A CDEF	%ε+%β^+=100 (1992Hu04) Additional information 1. This level decays by ε+β^+ decay and no γ transition from this level is known. Thus the excitation energy of this state remains unknown. J$^\pi$: 248.5γ E3 from 10$^-$. configuration: $\pi(h^{+1}_{9/2})\otimes\nu(f^{-1}_{5/2})$ (2014Pa53).
164.0 *10*			B	
248.5+x *5*	10$^-$	7.7 s *5*	A DE	%IT=100 E(level): From ^{198}Bi IT decay (7.7 s). $T_{1/2}$: From γ(t) in ^{198}Bi IT decay (1972Ha73). configuration: $\pi(h^{+1}_{9/2})\otimes\nu(i^{-1}_{13/2})$ (2014Pa53).
303.0 *15*			B	
874.3+x *5*	11$^-$		E	
1224.1+x *6*	12$^-$		E	
1239.1+x *6*	11$^-$		E	
1547.0+x *6*	12$^-$		E	
1662.0+x *6*	13$^-$		E	
1707.4+x *6*	13$^-$		EF	
1768.5+x *6*	14$^-$		E	
1822.8+x *6*	14$^-$		E	
1877.7+x *6*	15$^+$	8.0 ns *36*	E	configuration: $\pi(h^{+1}_{9/2})\otimes\nu(i^{-2}_{13/2}p^{-1}_{3/2})$ (2014Pa53). $T_{1/2}$: From γ(t) in 1996Zh23.
2223.1+x *6*	16$^-$		EF	configuration: $\pi(h^{+1}_{9/2})\otimes\nu(i^{-1}_{13/2}f^{-2}_{5/2})$ (2014Pa53).
2289.1+x?[a] *12*	(16$^+$)		E	
2595.5+x[&] *7*	17$^-$		EF	
2723.9+x[a] *6*	17$^+$		EF	
2837.7+x[&] *7*	(18$^-$)		EF	
2853.7+x *6*	17$^+$		E	
3132.0+x[&] *7*	(19$^-$)		EF	
3203.6+x *8*	18$^+$		E	
3232.8+x *6*	18$^-$		E	
3300.6+x[a] *6*	18$^+$		EF	
3428.9+x[&] *7*	(20$^-$)		EF	
3451.9+x *8*			E	

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Adopted Levels, Gammas (continued)

^{198}Bi Levels (continued)

E(level)[†]	Jπ[‡]	XREF	E(level)[†]	Jπ[‡]	XREF	E(level)[†]	Jπ[‡]	XREF
3635.4+x[@] *8*	19^+	E	4192.2+x[@] *10*	(21^+)	EF	4845.4+x[@] *11*	(23^+)	E
3746.6+x[&] *8*	(21^-)	EF	4339.3+x[&] *8*	(23^-)	EF	4856.3+x[&] *9*	(25^-)	E
3763.1+x[a] *7*	19^+	E	4384.7+x[a] *8*	(21^+)	EF	5271.9+x[@] *11*	(24^+)	EF
3966.0+x[@] *8*	20^+	E	4482.5+x[@] *10*	(22^+)	EF	5767.4+x[@] *12*	(25^+)	EF
4064.9+x[a] *7*	(20^+)	EF	4627.1+x[&] *9*	(24^-)	EF	5970.9+x[@] *12*	(26^+)	EF
4126.4+x[&] *8*	(22^-)	E	4645.9+x[a] *9*	(22^+)	EF	6486.0+x[@] *13*	(27^+)	EF
4157.6+x *7*		E	4661.7+x *12*		E			

[†] From Eγ by using least-squares fit, except as noted.
[‡] From ε+β$^+$ decay and systematics (1992Hu04) and γ(θ) from ^{187}Re(^{16}O,5nγ) (2014Pa53), and magnetic-dipole band (2000Zw02).
[#] From ce(t) in ^{202}At α decay (182 s) (1992Hu04).
[@] Band(A): ΔJ=1 band 1, based on 19^+. Proposed configuration=$\pi(h^{+1}_{9/2})\otimes\nu(i^{-2}_{13/2}\ (p_{3/2}f_{5/2})^{-3})$ for lower members of the band and $\pi(h^{+1}_{9/2})\otimes\nu(i^{-4}_{13/2}(p_{3/2}f_{5/2})^{-3})$ after the back-bending (2014Pa53); interpreted as a magnetic-dipole rotational (δ) band.
[&] Band(B): ΔJ=1 band 2, based on 17^-. Proposed configuration=$\pi(h^{+1}_{9/2})\otimes\nu(i^{-3}_{13/2})$ for lower members of the band and $\pi(h^{+1}_{9/2})\otimes\nu(i^{-3}_{13/2}\ p^{-2}_{3/2})$ after the back-bending (2014Pa53); interpreted as a magnetic-dipole rotational (δ) band.
Evaluator's note: proposed configuration after the back-bend seems questionable since a pair of $p_{3/2}$ neutrons is unlikely to produce such an upbend with a gain in alignment; a back-bend is generally caused by an intruder (high-spin) orbital.
[a] Band(C): ΔJ=1 band 3, based on 16^+. Proposed tentative configuration=$\pi(h^{+2}_{9/2}i^{+1}_{13/2}\ s^{-2}_{1/2})\otimes\nu(i^{-1}_{13/2})$.

γ(^{198}Bi)

E_i(level)	J^π_i	E_γ[&]	I_γ[&][d]	E_f	J^π_f	Mult.[a]	α[e]	Comments
164.0		164[c] *1*	100	0.0	$(2^+,3^+)$			
248.5+x	10^-	248.5[b] *5*	100	0.0+x	7^+	E3[b]	1.54 *3*	B(E3)(W.u.)=0.00046 *3* B(E3)(W.u.)=(2.9-9.1)×10^{-4} for heavier Bi IT decays (1972Ha73).
303.0		139[c] *1*	100	164.0				
874.3+x	11^-	625.8 *1*	100	248.5+x	10^-	M1(+E2)	0.042 *24*	
1224.1+x	12^-	975.9 *2*	100	248.5+x	10^-	E2	0.00734	
1239.1+x	11^-	990.1 *2*	100	248.5+x	10^-	M1+E2	0.013 *7*	
1547.0+x	12^-	672.8 *1*	100 *4*	874.3+x	11^-	M1+E2	0.035 *19*	
		1298.7 *2*	25.8 *12*	248.5+x	10^-	E2	0.00427	
1662.0+x	13^-	115.8 *2*	62 *7*	1547.0+x	12^-	M1+E2	5.2 *16*	
		787.5 *1*	100 *7*	874.3+x	11^-	E2	0.01127	
1707.4+x	13^-	468.2 *1*	100 *5*	1239.1+x	11^-	E2	0.0360	
		483.4 *1*	66 *6*	1224.1+x	12^-	M1+E2	0.08 *5*	
1768.5+x	14^-	106.6 *2*	100	1662.0+x	13^-	M1+E2	6.8 *17*	
1822.8+x	14^-	(55.0[f†] *5*)		1768.5+x	14^-			
		115.2 *3*	100	1707.4+x	13^-	M1+E2	5.3 *16*	
1877.7+x	15^+	(55.0[f†] *5*)		1822.8+x	14^-	[E1][@]	0.472 *14*	
		110.8 *4*	100	1768.5+x	14^-	E1	0.345 *6*	B(E1)(W.u.)=1.4×10^{-5} *7*
2223.1+x	16^-	345.5 *1*	100 *3*	1877.7+x	15^+	E1	0.0221	
		453.7 *3*	11.4 *7*	1768.5+x	14^-	E2	0.0389	
2289.1+x?	(16^+)	(66)	100	2223.1+x	16^-	[E1][@]	0.289	
2595.5+x	17^-	372.4 *2*	100	2223.1+x	16^-	M1	0.258	
2723.9+x	17^+	434[g]	20 *3*	2289.1+x?	(16^+)	[M1][@]	0.1709	

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Adopted Levels, Gammas (continued)

γ(^{198}Bi) (continued)

E_i(level)	J_i^π	E_γ[&]	I_γ[&][d]	E_f	J_f^π	Mult.[a]	α[e]
2723.9+x	17^+	500.8 *1*	100 *5*	2223.1+x	16^-	E1	0.00988
2837.7+x	(18^-)	242.2 *2*	100	2595.5+x	17^-	(M1)[#]	0.836
2853.7+x	17^+	630.5 *1*	100 *4*	2223.1+x	16^-	E1	0.00620
		976.4 *3*	11.6 *10*	1877.7+x	15^+	E2	0.00733
3132.0+x	(19^-)	294.1 *3*	100	2837.7+x	(18^-)	(M1)[#]	0.490
3203.6+x	18^+	349.9 *4*	100	2853.7+x	17^+	M1+E2	0.19 *12*
3232.8+x	18^-	379.1 *1*	100	2853.7+x	17^+	E1	0.0179
3300.6+x	18^+	576.7 *1*	100	2723.9+x	17^+	M1	0.0804
3428.9+x	(20^-)	296.6 *3*	100 *13*	3132.0+x	(19^-)	(M1)[#]	0.479
		591.3 *3*	21 *4*	2837.7+x	(18^-)	[E2][@]	0.0208
3451.9+x		248.3[‡] *3*	100	3203.6+x	18^+		
3635.4+x	19^+	402.6 *4*	100	3232.8+x	18^-	E1	0.01572
3746.6+x	(21^-)	317.5 *3*	100 *14*	3428.9+x	(20^-)	(M1)[#]	0.397
		615.2 *5*	29 *5*	3132.0+x	(19^-)	[E2][@]	0.0190
3763.1+x	19^+	462.5[‡] *2*	100	3300.6+x	18^+	M1	0.1442
3966.0+x	20^+	330.6 *2*	100	3635.4+x	19^+	M1	0.356
4064.9+x	(20^+)	301.8 *3*	100	3763.1+x	19^+	(M1)[#]	0.456
4126.4+x	(22^-)	379.8[‡] *1*	100	3746.6+x	(21^-)	[M1][@]	0.245
4157.6+x		924.8[‡] *2*	100	3232.8+x	18^-		
4192.2+x	(21^+)	226.2 *6*	100	3966.0+x	20^+	(M1)	1.011 *16*
4339.3+x	(23^-)	212.9 *2*	100	4126.4+x	(22^-)	(M1)[#]	1.197
4384.7+x	(21^+)	319.8 *4*	100	4064.9+x	(20^+)	(M1)[#]	0.390
4482.5+x	(22^+)	290.3 *2*	100	4192.2+x	(21^+)	(M1)	0.508
4627.1+x	(24^-)	287.8 *3*	100	4339.3+x	(23^-)	(M1)[#]	0.520
4645.9+x	(22^+)	261.2 *4*	100	4384.7+x	(21^+)	(M1)[#]	0.679
4661.7+x		504[‡][g]	100	4157.6+x			
4845.4+x	(23^+)	362.9 *3*	100	4482.5+x	(22^+)	(M1)[#]	0.277
4856.3+x	(25^-)	229.2 *1*	100	4627.1+x	(24^-)	[M1][@]	0.975
5271.9+x	(24^+)	426.5 *3*	100	4845.4+x	(23^+)	(M1)[#]	0.179
5767.4+x	(25^+)	495.5 *4*	100	5271.9+x	(24^+)	(M1)[#]	0.1201
5970.9+x	(26^+)	203.5 *3*	100	5767.4+x	(25^+)	(M1)	1.358
6486.0+x	(27^+)	515.1 *5*	100	5970.9+x	(26^+)	(M1)[#]	0.1083

[†] Based on a doubly-placed 55.0γ proposed in 1996Zh23. This doublet could not be confirmed by 2014Pa53 since the energy threshold was somewhat higher than 55 keV in their experiment. Evaluator's note: proposed 55.0-keV transition from 1822.5+x, 14^- to 1768.6+x, 14^-, requiring mult=M1 or M1+E2 seems questionable since no conclusive evidence is provided in 1996Zh23.

[‡] Observed only and placed by 2014Pa53.

[#] 2014Pa53 quote multipolarity from 2000Zw02, where the assignments are based on measurements of DCO ratios and γ transition intensity balances.

[@] Assumed assignment from ΔJ^π value.

[&] From ^{187}Re(^{16}O,5nγ), except as noted.

[a] From DCO in ^{187}Re(^{16}O,5nγ) or ^{184}W(^{19}F,5nγ), except as noted.

[b] From ^{198}Bi IT decay (7.7 s).

[c] From ^{202}At α decay (184 s).

[d] Relative photon branching from each level.

[e] Additional information 2.

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Adopted Levels, Gammas (continued)

$\gamma(^{198}Bi)$ (continued)

[f] Multiply placed.
[g] Placement of transition in the level scheme is uncertain.

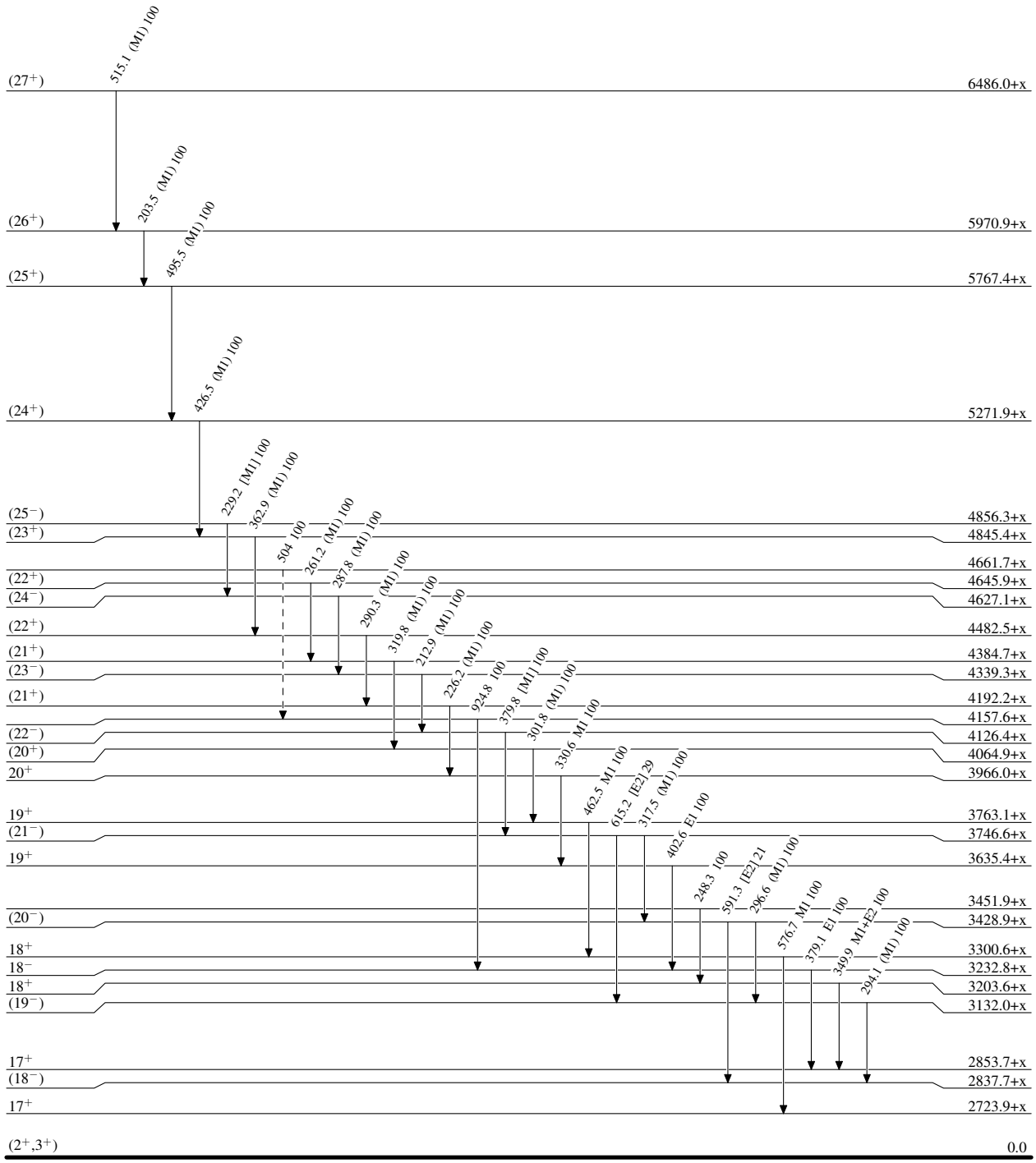
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{198}_{83}Bi_{115}$

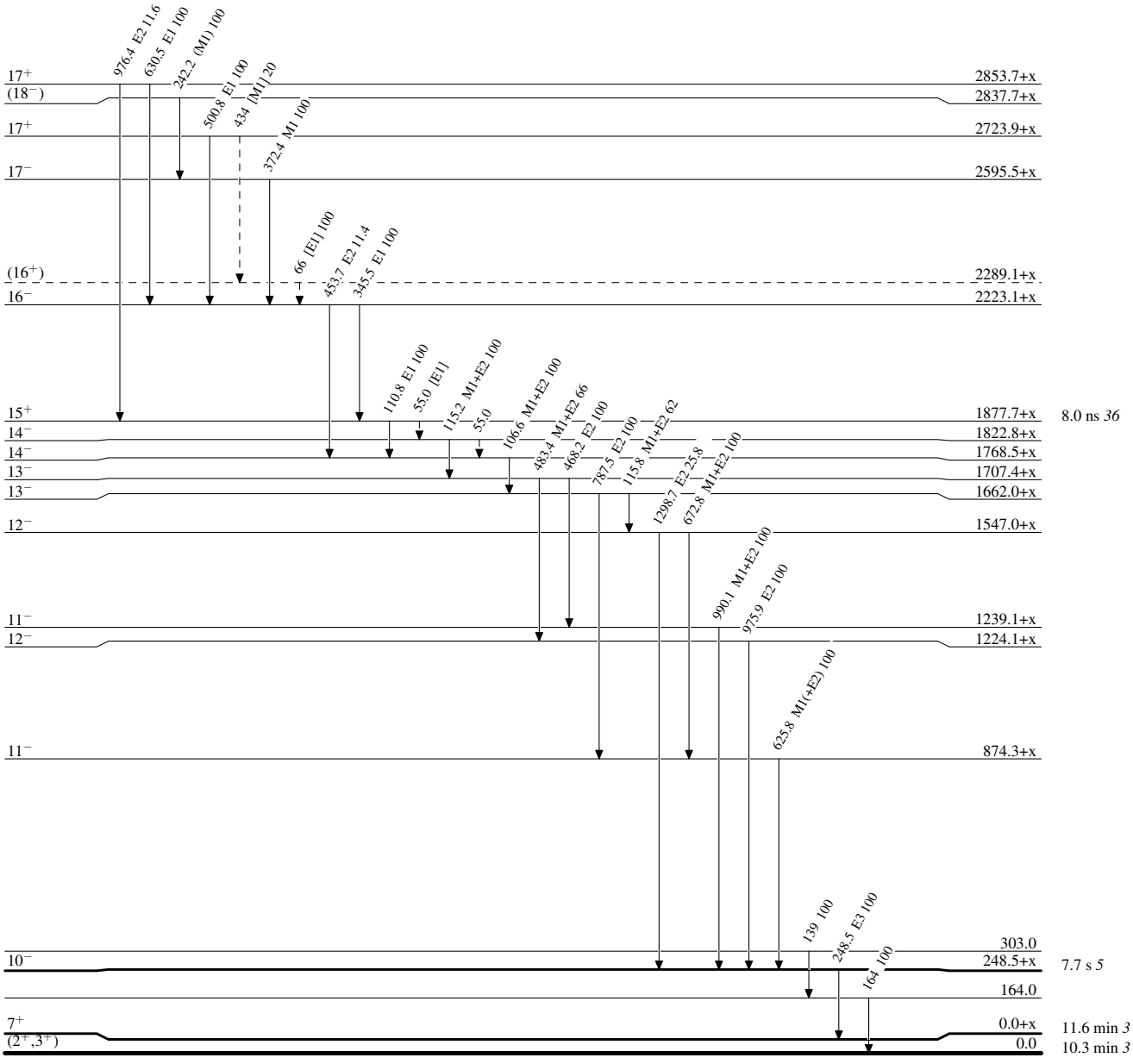
Adopted Levels, Gammas

Legend

Level Scheme (continued)

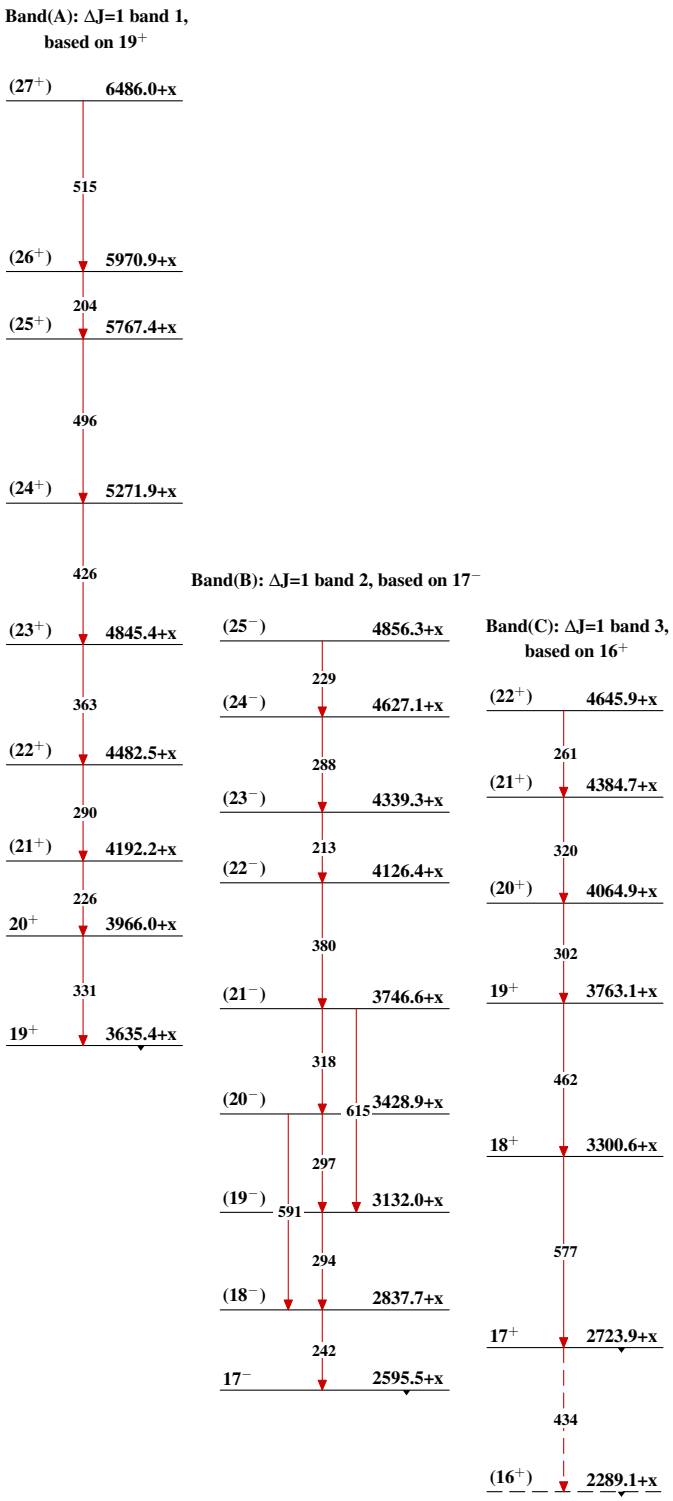
Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{198}_{83}Bi_{115}$

Adopted Levels, Gammas



$^{198}_{83}Bi_{115}$