Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Huang Xiaolong, Zhou Chunmei	NDS 104,283 (2005)	1-Jan-2002

Q(β^-)=-6.33×10^3 *5*; S(n)=9.75×10^3 *3*; S(p)=1615 *17*; Q(α)=5365 *11*   2012Wa38
Note: Current evaluation has used the following Q record -6330 *51* 9750 *26* 1616 17 5.21E3 11   2003Au03.

^{197}Bi Levels

For the comparison of the experimental results and theoretical calculations of quasiparticle cluster-interaction, see 1986Ch01.

Cross Reference (XREF) Flags

A	^{201}At α decay
B	^{192}Pt(^{10}B,5nγ)
C	^{183}W(^{19}F,5nγ):SD
D	^{187}Re(^{16}O,6nγ)

E(level)[†]	J$^{\pi}$[‡]	T$_{1/2}$[#]	XREF	Comments
0	(9/2$^-$)	9.33 min *50*	AB D	%ε+%β^+=100; %α=1×10^{-4} syst (1980Sc26)
				Configuration=(π h$_{9/2}$)
				No α decay observed.
				J$^{\pi}$: HF=1.4 from (9/2$^-$) in ^{201}At α decay (89 s) and systematics of odd Bi isotopes.
				T$_{1/2}$: from γ(t) (1991Va09). Other: $\approx$1 min (systematics, 1980Sc26,1973Ta30).
500 *syst*	(1/2$^+$)	5.04 min *16*		%ε+%β^+=45 *40*; %α=55 *40*; %IT<0.3
				Configuration=(π s$_{1/2}$)
				%α: From 1985Co06. Others: %$\alpha\approx$0.05 (1950Ne77); see also 1984Co13, 1974Le02, 1972Ga27.
				E(level),J$^{\pi}$: from systematics. Low-lying 1/2$^+$ isomers are populated in ^{199}Bi, ^{201}Bi, ^{203}Bi at $\approx$667, 846, 1098 keV, respectively.
				T$_{1/2}$: from unweighted average of 4.88 min *75* (1991Va09) and 5.2 min *6* (1985Co06). Others: 9.0 min *2* (1984Co13), 9.5 min *10* (1970Ta14), 8.0 min *5* (1966SiZZ), $\approx$10 min (1972Ga27,1974Le02).
				%IT,%ε+%β^+: undetermined. L-forbidden M4 transition to g.s. unobserved; compatible with large HF(M4). %IT$\leq$6.8 for ^{201}Bi, %IT$\approx$0.3 for ^{199}Bi, %IT$\approx$0 for ^{195}Bi.
				Isomeric decays of 1/2$^+$ states in ^{199}Bi, ^{201}Bi (3s1/2 to 1h9/2) studied by 1980Br23.
				α decay of 1/2$^+$ isomers in odd-Bi isotopes (A=191-201) compared with theory (1978Va21).
1000.73 *16*	(13/2$^-$)		B D	
1009.23 *16*	(11/2$^-$)		B D	Configuration=(π h$_{9/2}$)(ν 2$^+$) (1986LoZW)
1196.25 *15*	(13/2$^+$)		B D	Configuration=(π i$_{13/2}$) (1986LoZW)
1600.95 *25*	(17/2$^+$)	15.3 ns *30*	B D	
1967.5 *8*	21/2$^+$		B D	
1968+x		18.0 ns *31*	D	Additional information 1.
				E(level): this level decays to 1968 through a low energy γ of Eγ=x.
2064.7 *10*		36.7 ns *70*	B D	
2088.6 *10*	(25/2$^+$)	19.3 ns *49*	D	J$^{\pi}$: ΔJ=2 (E2) 121.1γ to (21/2$^+$).
2127.9+x *5*			D	
2129.3 *4*	(23/2$^-$)	204 ns *18*	B D	
2357.4 *11*	(27/2$^+$)	53 ns *21*	B D	
2360.4+x *5*	(29/2$^-$)	263 ns *13*	B	Additional information 2.

Adopted Levels, Gammas (continued)

^{197}Bi Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	T$_{1/2}$[#]	XREF	Comments
				An E1 transition would be expected from the systematics of 29/2 isomers observed in the heavier odd Bi isotopes. A search for low energy delayed γ rays with the planar HPGe detector produced no candidates for this transition, suggesting that X≤40 keV.
2383.1+x *7*	(29/2$^-$)	253 ns *39*	D	J$^{\pi}$: Assigned by authors. Detail arguments not given.
2383.3 *11*	(27/2$^+$)		D	J$^{\pi}$: From ΔJ=1 *294.7*γ to (25/2$^+$) with different multipolarities.
2384.5 *5*	(25/2)		B	
2497.8 *11*			D	
2635.1 *12*			D	
2688.7 *5*	(27/2)		B	
2868.2+x *12*	(31/2$^-$)		B D	J$^{\pi}$: Assigned by authors. Detail arguments not given.
2928.3 *12*			D	
2929.5 *5*	(31/2$^-$)	209 ns *30*	B	
3070.6 *11*			D	
3078.3 *12*			D	
3306.6+x *9*	(33/2$^-$)		D	J$^{\pi}$: Assigned by authors. Detail arguments not given.
3555.6 *13*			D	
3684.0+x *10*			D	
3866.2 *14*			D	
4024.8 *13*			D	
y[@]	J≈(15/2)		C	Additional information 3.
186.7+y[@] *5*	J+2		C	
415.8+y[@] *7*	J+4		C	
685.4+y[@] *9*	J+6		C	
995.4+y[@] *10*	J+8		C	
1346.5+y[@] *12*	J+10		C	
1737.2+y[@] *13*	J+12		C	
2168.0+y[@] *14*	J+14		C	
2636.5+y[@] *15*	J+16		C	
3143.6+y[@] *15*	J+18		C	
3688.6+y?[@]	J+20		C	

[†] For the states connecting γ's, E(levels) are from level scheme and adopted γ radiations using least-squares fit to data.

[‡] From $\gamma(\theta)$ of ^{192}Pt(^{10}B,5nγ) and systematics for the heavier odd-mass Bi isotopes (1986Ch01), the assignments of states to the bands with the fitting spin of 15/2 using the I(I+1) relationship of ^{187}Re(^{16}O,5nγ) except as noted.

[#] From $\gamma\gamma$(t) or γ(t) measurements in ^{192}Pt(^{10}B,5nγ), except as noted.

[@] Band(A): SD band (?) (1996Cl01,1997BoZK). the isotopic assignment is considered tentative by 1996Cl01. Percent population <0.6 (1996Cl01), ≈2 (1995Cl01).

Adopted Levels, Gammas (continued)

$\gamma(^{197}\text{Bi})$

All data are from ^{192}Pt(^{10}B,5nγ), ^{187}Re(^{16}O,5nγ).

E_i(level)	J^π_i	E_γ	I_γ [†]	E_f	J^π_f	Mult.	δ	α [#]	Comments
1000.73	(13/2⁻)	1000.8 2	100	0	(9/2⁻)	(E2)		0.007	
1009.23	(11/2⁻)	1009.2 2	100	0	(9/2⁻)	(M1+E2)	−0.38 14	0.0182 12	
1196.25	(13/2⁺)	187.0 2	≈100	1009.23	(11/2⁻)	(E1)		0.0951	
		195.6 2	83 17	1000.73	(13/2⁻)	(E1)		0.0852	
		1196.2 2	53 6	0	(9/2⁻)	(M2)		0.0300	
1600.95	(17/2⁺)	404.7 2	100	1196.25	(13/2⁺)	(E2)		0.0527	
1967.5	21/2⁺	367.6 2	100	1600.95	(17/2⁺)	(E2)		0.0682	
2064.7		96.9 2	100	1967.5	21/2⁺	(E2)		7.90	B(E2)(W.u.)=1.8 7
2088.6	(25/2⁺)	121.1 5	100	1967.5	21/2⁺	(E2)			$\gamma(\theta)$ favors ΔJ=2; but Iγ rules out M2.
2127.9+x		159.9 5	100	1968+x					$\gamma(\theta)$: A₂=−0.08 3, A₄=−0.01 3, favors ΔJ=1; but Iγ suggest α(255γ)>α(160γ) rules out some multipolarity for both.
2129.3	(23/2⁻)	160.7 2	100	1967.5	21/2⁺	(E1)		0.139	B(E1)(W.u.)=2.07×10⁻⁷ 19
2357.4	(27/2⁺)	292.7 5	100	2064.7		(E2)		0.129	
2383.1+x	(29/2⁻)	255.2 5	100	2127.9+x					$\gamma(\theta)$: A₂=−0.10 3, A₄=−0.02 4, favors ΔJ=1; but Iγ suggest α(255γ)>α(160γ) rules out some multipolarity for both.
2383.3	(27/2⁺)	294.7 5	100	2088.6	(25/2⁺)				
2384.5	(25/2)	255.2 2	100	2129.3	(23/2⁻)	D			α=0.756 if mult=M1; α=0.0447 if mult=E1.
2497.8		433.1 5	100	2064.7					
2635.1		277.7 5	100	2357.4	(27/2⁺)				
2688.7	(27/2)	623.2 2	100	2064.7		D			α=0.0688 if mult=M1; α=0.00638 if mult=E1.
2868.2+x	(31/2⁻)	485.6 2	100	2383.1+x	(29/2⁻)	(M1+E2)	−0.33 18	0.123 11	
2928.3		240.7 5	100	2688.7	(27/2)				
2929.5	(31/2⁻)	864.0 2	100	2064.7		(E3)		0.0234	B(E3)(W.u.)=6.9 10
3070.6		1005.9 5	100	2064.7					Iγ estimated from coincidence data.
3078.3		580.5 5	100	2497.8					
3306.6+x	(33/2⁻)	438.9 2	57 7	2868.2+x	(31/2⁻)	(M1+E2)	−0.37 21	0.158 18	
		923.5 5	100 7	2383.1+x	(29/2⁻)				
3555.6		627.3 5	100	2928.3					
3684.0+x		377.4 5	100	3306.6+x	(33/2⁻)				Iγ estimated from coincidence data.
3866.2		310.6 5	100	3555.6					
4024.8		946.5 5	100	3078.3					Iγ estimated from coincidence data.
186.7+y	J+2	186.7 5	0.66 [‡] 7	y	J≈(15/2)				
415.8+y	J+4	229.1 5	1.09 [‡] 10	186.7+y	J+2				

Adopted Levels, Gammas (continued)

$\gamma(^{197}\text{Bi})$ (continued)

E_i(level)	J^π_i	E_γ	$I_\gamma^\dagger$	E_f	J^π_f	E_i(level)	J^π_i	E_γ	$I_\gamma^\dagger$	E_f	J^π_f
685.4+y	J+6	269.6 5	1.03‡ 10	415.8+y	J+4	2168.0+y	J+14	430.8 5	0.87‡ 8	1737.2+y	J+12
995.4+y	J+8	310.0 5	0.94‡ 10	685.4+y	J+6	2636.5+y	J+16	468.5 5	0.46‡ 8	2168.0+y	J+14
1346.5+y	J+10	351.1 5	0.98‡ 10	995.4+y	J+8	3143.6+y	J+18	507.1 5	0.56‡ 8	2636.5+y	J+16
1737.2+y	J+12	390.7 5	0.97‡ 10	1346.5+y	J+10	3688.6+y?	J+20	545@ 1		3143.6+y	J+18

† Relative photon branching from each level.

‡ Relative transition intensity within the SD band.

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.

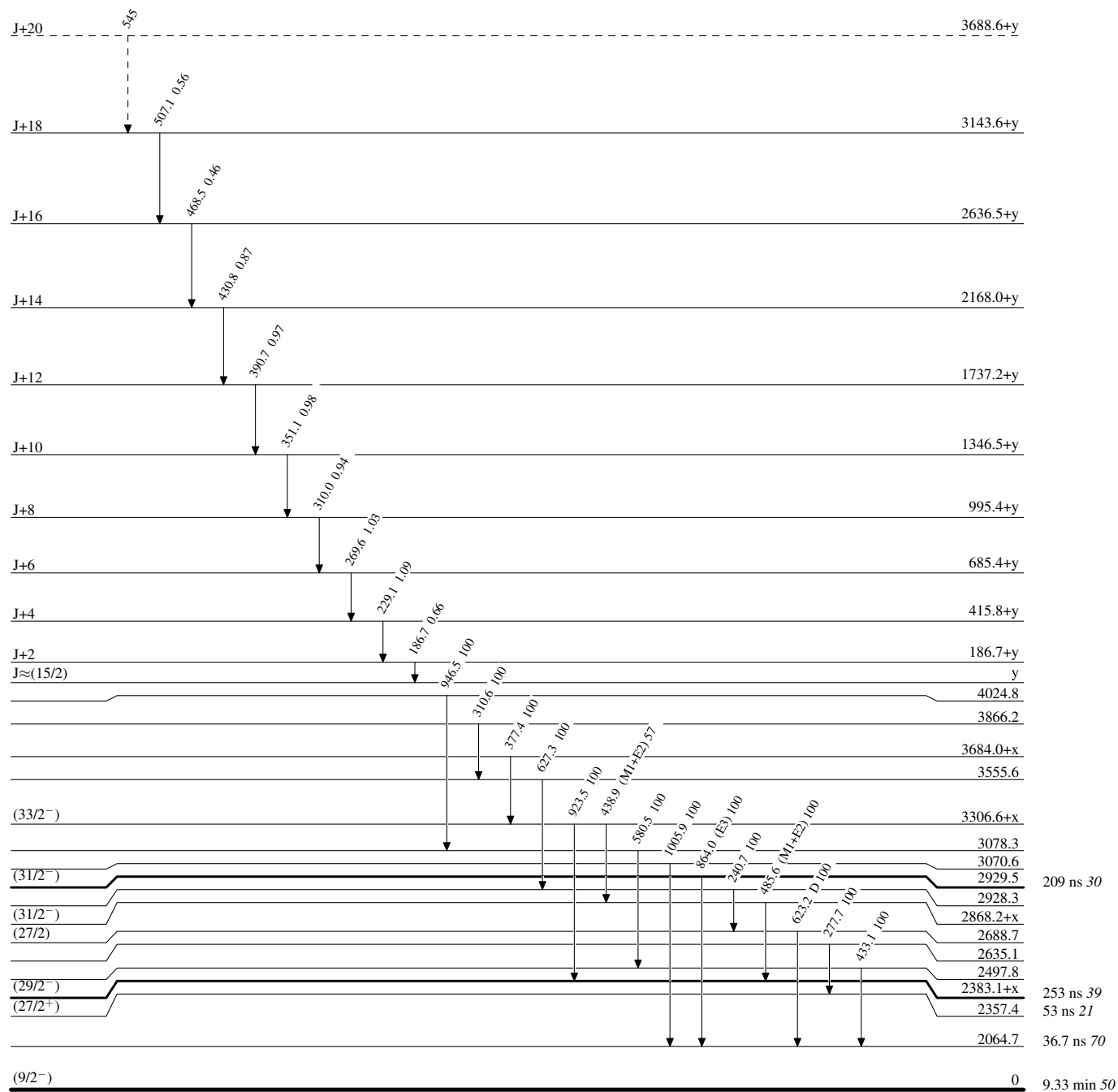@ Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Legend

Level Scheme

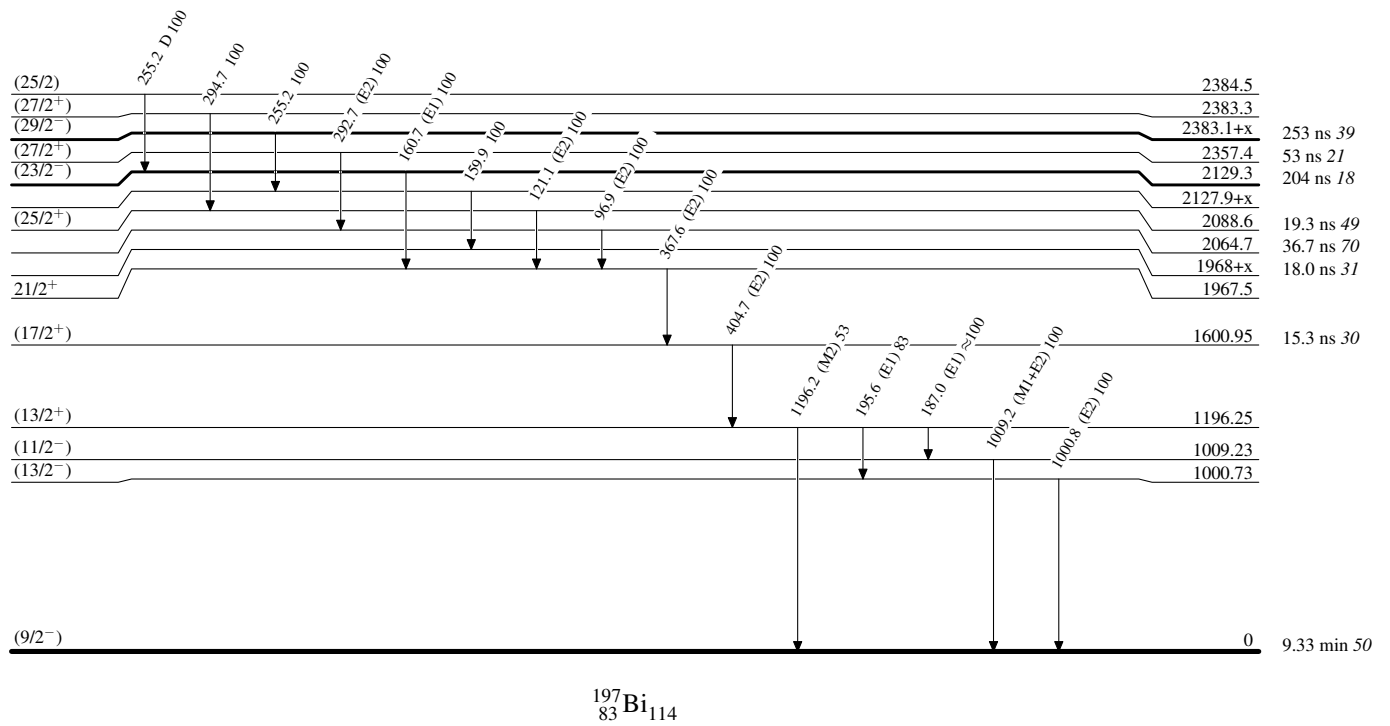Intensities: Relative photon branching from each level
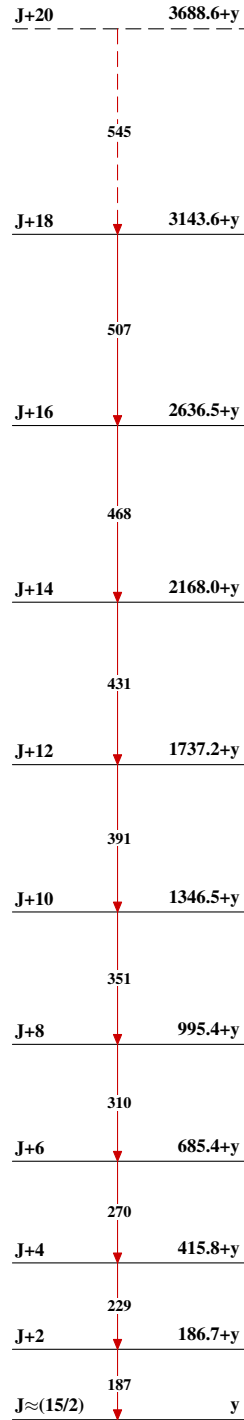
- - - - - - ► γ Decay (Uncertain)

$^{197}_{83}\text{Bi}_{114}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

$^{197}_{83}Bi_{114}$

Adopted Levels, Gammas

Band(A): SD band (?) (1996Cl01, 1997BoZK)

J+20	– – – – – – – –	3688.6+y
	545	
J+18		3143.6+y
	507	
J+16		2636.5+y
	468	
J+14		2168.0+y
	431	
J+12		1737.2+y
	391	
J+10		1346.5+y
	351	
J+8		995.4+y
	310	
J+6		685.4+y
	270	
J+4		415.8+y
	229	
J+2		186.7+y
	187	
J≈(15/2)		y

$^{197}_{83}\text{Bi}_{114}$