

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jean Blachot	NDS 111,1471 (2010)	1-May-2009

Q(β⁻)=-6.07×10³ 4; S(n)=10889 25; S(p)=3050 18; Q(α)=-354 18 [2012Wa38](#)

Note: Current evaluation has used the following Q record -6070 3010890 253047 17 -356 18 [2003Au03,2009AuZZ](#).

Using DSAM, [1993Ja04](#) extracted an average quadrupole moment for the rotational sequence, consistent with a prolate deformation: β₂≈0.32.

¹¹³Sb Levels

Cross Reference (XREF) Flags

A	¹¹³ Te ε decay	D	¹¹² Sn(³ He,d)
B	(HI,xnγ)	E	¹¹⁴ Sn(p,2nγ)
C	¹¹² Sn(p,p) IAR		

E(level) @	J ^π ‡	T _{1/2} †	XREF	Comments
0.0 ^a	5/2 ⁺ #	6.67 min 7	AB DE	σ _ε +σ _β ⁺ =100 J ^π : ¹¹⁵ Sb to ¹²¹ Sb have J ^π =5/2 ⁺ . Allowed ε to 3/2 ⁺ , 5/2 ⁺ states in ¹¹⁵ Sn. T _{1/2} : from 1976Wi10 . Others: 1962Pa04 , 1969Ki16 , 1972Si28 .
644.78 20	1/2 ⁺	<1 ns	A DE	XREF: D(659). J ^π : L(³ He,d)=0.
814.17 ^a 22	7/2 ⁺ #	<1 ns	AB DE	XREF: D(829).
1018.6 3	5/2 ⁺	<1 ns	A DE	XREF: D(1045). J ^π : L(³ He,d)=2. log ft=5.7 from (7/2 ⁺).
1181.0 4		<1 ns	A E	
1257.1 3	(9/2 ⁺)	<1 ns	AB E	J ^π : γ(θ) in (⁶ Li,3nγ), D+Q γ to 7/2 ⁺ .
1347.9& 3	11/2 ⁻	<1 ns	B D	XREF: D(1390). J ^π : L(³ He,d)=(5). (E3) γ to 5/2 ⁺ .
1461.0 ^a 3	9/2 ⁺ #	<1 ns	AB E	J ^π : could be the bandhead based on a Nilsson orbital (404) 9/2 ⁺ M1 γ to 7/2 ⁺ , γ to 5/2 ⁺ .
1551.0 4	5/2 ⁺		A D	XREF: D(1590). J ^π : L(³ He,d)=2. log ft=6.0 from (7/2 ⁺).
1716.5 5			A	
1853.2 5		<1 ns	A E	
1910.1 ^a 4	(11/2 ⁺)#	<1 ns	B E	
1995.2 11		<1 ns	E	
2094.2 6			A	
2115.5 6			A	
2132.1 7			A	
2172.1 5			A	
2217.7 ^a 4	(13/2 ⁺)#	<1 ns	B E	J ^π : D+Q γ to 11/2 ⁺ , γ to (9/2 ⁺).
2307.6 4	(13/2 ⁺)		B	
2395.3 5			B	
2504.8 5	(15/2 ⁺)		B	
2534.9 3			A	
2626.3 5	(15/2 ⁻)		BC	
2659.1 ^a 4	(15/2 ⁺)#		B	
2815.5& 4	15/2 ⁻		B	
3009.7 11			B	
3044.7 ^b 5	19/2 ⁽⁻⁾	3.7 ns 3	B	T _{1/2} : from 1990Ko42 .
3083.8 ^a 5	(17/2 ⁺)#		B	

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Adopted Levels, Gammas (continued) ^{113}Sb Levels (continued)

<u>E(level)@</u>	<u>Jπ^{\ddagger}</u>	<u>XREF</u>
3173.4 ^b 5	21/2 ⁽⁻⁾	B
3212.9 ^{&} 5	19/2 ⁻	B
3344.8 5	(21/2)	B
3473.2 ^a 5	(19/2 ⁺) [#]	B
3552.9 ^b 5	(23/2)	B
3777.9 ^{&} 11	23/2 ⁻	B
3914.4 ^a 5	(21/2 ⁺) [#]	B
4166.8 ^b 5	(25/2)	B
4344.4 ^d 6	(23/2 ⁻)	B
4363.1 ^a 5	(23/2 ⁺) [#]	B
4459.7 ^{&} 12	27/2 ⁻	B
4506.4 5	(25/2 ⁻)	B
4525.2 5		B
4535.9 5		B
4642.7 ^d 6	(25/2 ⁻)	B
4744.8 ^c 5	25/2 ⁺	B
4783.9 ^b 6	(27/2)	B
5014.3 ^d 6	(27/2 ⁻)	B
5040.8 ^c 6	27/2 ⁺	B
5166.1 6	29/2	B
5177.7 ^a 8	(27/2 ⁺) [#]	B
5239.0 ^{&} 12	31/2 ⁻	B
5388.7 ^c 6	29/2 ⁺	B
5391.1 ^d 7	(29/2 ⁻)	B
5569.3 ^a 9	(29/2 ⁺) [#]	B
5612.0 6	(29/2 ⁻)	B
5716.4 ^b 6	(29/2)	B
5762.6 ^c 6	31/2 ⁺	B
5781.7 ^d 7	(31/2 ⁻)	B
5960.1 ^a 10	(31/2 ⁺) [#]	B
6052.6 7		B
6093.7 ^{&} 12	35/2 ⁻	B
6153.4 ^c 6	33/2 ⁺	B
6195.9 ^d 7	(33/2 ⁻)	B
6334.2 ^a 11	(33/2 ⁺) [#]	B
6424.1 ^b 7		B
6545.7 ^c 6	35/2 ⁺	B
6625.4 ^d 7	(35/2 ⁻)	B
6682.0 ^a 12	(35/2 ⁺) [#]	B
6976.6 ^c 6	37/2 ⁺	B
6977.6 ^a 13	(37/2 ⁺) [#]	B
7012.8 ^{&} 13	39/2 ⁻	B
7075.8 ^d 7	(37/2 ⁻)	B
7544.5 ^d 7	(39/2 ⁻)	B
7998.4 ^{&} 13	43/2 ⁻	B
8025.2 ^d 7	(41/2 ⁻)	B

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Adopted Levels, Gammas (continued)

^{113}Sb Levels (continued)

E(level) [@]	J ^π ‡	XREF	Comments
9059.7 ^{& 14}	47/2 ⁻	B	
9280 40		C	IAS of ^{113}Sn g.s.
9720 40		C	IAS of ^{113}Sn 410 level.
9780 40		C	IAS of ^{113}Sn 498 level.
10215.4 ^{& 14}	51/2 ⁻	B	
11466.6 ^{& 14}	55/2 ⁻	B	
12800.9 ^{& 15}	59/2 ⁻	B	
14213.9 ^{& 18}	(63/2 ⁻)	B	
15717.9 ^{& 20}	(67/2 ⁻)	B	
17352.9 ^{& 23}	(71/2 ⁻)	B	
19143.9 ^{& 25}	(75/2 ⁻)	B	
21104 ^{& 3}	(79/2 ⁻)	B	

† From 1976Ka25 in $^{114}\text{Sn}(p,2n\gamma)$.

‡ Based on rotational band observed in (HI,xn γ) and Nilsson model consideration, unless given otherwise.

L($^3\text{He},d$)=2 and 4 for g.s. and 814 level, respectively. 814 γ is not Q from $\gamma(\theta)$ in $^{110}\text{Cd}(^6\text{Li},3n\gamma)$.

@ From least-squares fit to γ energies.

& Band(A): Suggested (1993Ja04) As members of a rotational band with the 1348-keV level as bandhead. Proton h11/2 orbital, 1/2 [550] Nilsson configuration.

^a Band(B): Suggested As members of a rotational band with the 1461-keV level as bandhead. Nilsson orbital [404]9/2⁺.

^b Band(C): Band based on 19/2⁻ at 3044.7 keV.

^c Band(D): Band based on 25/2⁺ at 4744.8 keV.

^d Band(E): Band based on (23/2⁻).

<u>$\gamma(^{113}\text{Sb})$</u>								
E _i (level)	J _i ^π	E _γ [†]	I _γ [†]	E _f	J _f ^π	Mult. [‡]	δ [‡]	Comments
644.78	1/2 ⁺	644.8 2	100	0.0	5/2 ⁺	[E2]		B(E2)(W.u.)>0.16 Mult.: from the level scheme.
814.17	7/2 ⁺	814.4 3	100	0.0	5/2 ⁺	D+Q	-0.22 12	B(M1)(W.u.)>3.7×10 ⁻⁵
1018.6	5/2 ⁺	1018.1 4	100	0.0	5/2 ⁺			
1181.0		1181.0 4	100	0.0	5/2 ⁺			
1257.1	(9/2 ⁺)	238.4 5	8 3	1018.6	5/2 ⁺			
		443.3 4	12 4	814.17	7/2 ⁺	D+Q	-0.02 9	B(M1)(W.u.)>2.5×10 ⁻⁵
		1256.7 5	100 12	0.0	5/2 ⁺			
1347.9	11/2 ⁻	90.9 2	100 1	1257.1	(9/2 ⁺)	(E1+M2)	0.01 5	B(E1)(W.u.)>0.00032 B(E3)(W.u.)>33
		1347.9 7	20 2	0.0	5/2 ⁺	(E3)		
1461.0	9/2 ⁺	646.6 3	29 3	814.17	7/2 ⁺	D+Q	+0.03 8	B(M1)(W.u.)>1.8×10 ⁻⁵
		1460.8 5	100 10	0.0	5/2 ⁺			
1551.0	5/2 ⁺	737.0 4	44 14	814.17	7/2 ⁺			
		1550.3 7	100 30	0.0	5/2 ⁺			
1716.5		1071.7 4	100	644.78	1/2 ⁺			
1853.2		391.8 5	100 50	1461.0	9/2 ⁺			
		1039.5 5	58 17	814.17	7/2 ⁺			
1910.1	(11/2 ⁺)	449.3 3	100	1461.0	9/2 ⁺	D+Q	+0.24 6	B(M1)(W.u.)>0.00022; B(E2)(W.u.)>0.027
1995.2		1181.0	100	814.17	7/2 ⁺			
2094.2		1449.7 7	62 16	644.78	1/2 ⁺			
		2093.7 10	100 23	0.0	5/2 ⁺			
2115.5		1301.3 7	90 30	814.17	7/2 ⁺			

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Adopted Levels, Gammas (continued)

$\gamma(^{113}\text{Sb})$ (continued)								
$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\dagger	E_f	J_f^π	Mult. [‡]	δ^\ddagger	Comments
2115.5		2115.5 10	100 22	0.0	5/2 ⁺			
2132.1		1317.9 6	100	814.17	7/2 ⁺			
2172.1		915.0 4	100 30	1257.1	(9/2 ⁺)			
		1358.0 8	84 22	814.17	7/2 ⁺			
2217.7	(13/2 ⁺)	306.7 5	100 10	1910.1	(11/2 ⁺)	D+Q	+0.16 6	B(M1)(W.u.)>0.00044; B(E2)(W.u.)>0.026
		756.1 5	64 8	1461.0	9/2 ⁺			
2307.6	(13/2 ⁺)	397.4 3	100	1910.1	(11/2 ⁺)			
2395.3		1047.2 5	100	1347.9	11/2 ⁻			
2504.8	(15/2 ⁺)	197.1 3	47 5	2307.6	(13/2 ⁺)	D+Q	+0.09 6	
		287.2 3	100 11	2217.7	(13/2 ⁺)	D+Q	+0.08 9	
2534.9		1515.1 7	58 17	1018.6	5/2 ⁺			
		1719.8 10	33 10	814.17	7/2 ⁺			
		2535.2 3	100 25	0.0	5/2 ⁺			
2626.3	(15/2 ⁻)	1278.9 6	100	1347.9	11/2 ⁻			
2659.1	(15/2 ⁺)	351.5 3		2307.6	(13/2 ⁺)			
		440.9 3		2217.7	(13/2 ⁺)			
		749.5 3		1910.1	(11/2 ⁺)			
2815.5	15/2 ⁻	1467.6 3	100	1347.9	11/2 ⁻	(E2)		
3009.7		504.9 10	100	2504.8	(15/2 ⁺)			
3044.7	19/2 ⁽⁻⁾	418.5 3	100	2626.3	(15/2 ⁻)			
3083.8	(17/2 ⁺)	424.8 3	100	2659.1	(15/2 ⁺)	D+Q	+0.07 8	
		865.7		2217.7	(13/2 ⁺)	Q		
3173.4	21/2 ⁽⁻⁾	128.7 2	100	3044.7	19/2 ⁽⁻⁾	D+Q	-0.10 4	
3212.9	19/2 ⁻	397.4 3		2815.5	15/2 ⁻	Q		
3344.8	(21/2)	171.5 3	100	3173.4	21/2 ⁽⁻⁾			
3473.2	(19/2 ⁺)	389.9 3	100	3083.8	(17/2 ⁺)	Q		
		813.8 3		2659.1	(15/2 ⁺)	D+Q	-0.22 12	
3552.9	(23/2)	379.6 4	100	3173.4	21/2 ⁽⁻⁾	D+Q	-0.25 5	
3777.9	23/2 ⁻	564.7 3	100	3212.9	19/2 ⁻	(E2)		
3914.4	(21/2 ⁺)	441.3 3		3473.2	(19/2 ⁺)			
		830.3 3		3083.8	(17/2 ⁺)			
4166.8	(25/2)	613.9 3	100	3552.9	(23/2)	D		
4344.4	(23/2 ⁻)	998.9 3		3344.8	(21/2)			
4363.1	(23/2 ⁺)	448.7 3		3914.4	(21/2 ⁺)			
		890.0 3		3473.2	(19/2 ⁺)			
4459.7	27/2 ⁻	681.8 3	100	3777.9	23/2 ⁻	(E2)		
4506.4	(25/2 ⁻)	339.5 3		4166.8	(25/2)			
		1161.7 3		3344.8	(21/2)	Q		
4525.2		358.4 3		4166.8	(25/2)			
		972.3 3		3552.9	(23/2)			
4535.9		369.1 3		4166.8	(25/2)			
4642.7	(25/2 ⁻)	298.3 3	100	4344.4	(23/2 ⁻)	D		
4744.8	25/2 ⁺	209.0 3		4535.9				
		219.7 3		4525.2				
		381.7 3		4363.1	(23/2 ⁺)			
		830.4 3		3914.4	(21/2 ⁺)			
4783.9	(27/2)	277.5 3		4506.4	(25/2 ⁻)			
		617.1 3		4166.8	(25/2)	D		
5014.3	(27/2 ⁻)	371.6 3		4642.7	(25/2 ⁻)			
		669.9 3		4344.4	(23/2 ⁻)			
5040.8	27/2 ⁺	295.8 3		4744.8	25/2 ⁺			
5166.1	29/2	999.3 3	100	4166.8	(25/2)	Q		
5177.7	(27/2 ⁺)	432		4744.8	25/2 ⁺	D		
		815		4363.1	(23/2 ⁺)	Q		
5239.0	31/2 ⁻	779.3 3	100	4459.7	27/2 ⁻	(E2)		

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Adopted Levels, Gammas (continued) $\gamma(^{113}\text{Sb})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\dagger	E_f	J_f^π	Mult. ‡
5388.7	29/2 ⁺	347.6 3		5040.8	27/2 ⁺	
		644.0 3		4744.8	25/2 ⁺	
5391.1	(29/2 ⁻)	376.7 3		5014.3	(27/2 ⁻)	
		748.3 3		4642.7	(25/2 ⁻)	
5569.3	(29/2 ⁺)	392		5177.7	(27/2 ⁺)	D
		824		4744.8	25/2 ⁺	Q
5612.0	(29/2 ⁻)	1105.6 3	100	4506.4	(25/2 ⁻)	
5716.4	(29/2)	932.5 3	100	4783.9	(27/2)	
5762.6	31/2 ⁺	373.8 3		5388.7	29/2 ⁺	
		722.0 3		5040.8	27/2 ⁺	
5781.7	(31/2 ⁻)	390.6 3		5391.1	(29/2 ⁻)	
		767.3 3		5014.3	(27/2 ⁻)	
5960.1	(31/2 ⁺)	391		5569.3	(29/2 ⁺)	D
		782		5177.7	(27/2 ⁺)	Q
6052.6		886.5 3	100	5166.1	29/2	
6093.7	35/2 ⁻	854.7 3	100	5239.0	31/2 ⁻	(E2)
6153.4	33/2 ⁺	390.8 3		5762.6	31/2 ⁺	
		764.6 3		5388.7	29/2 ⁺	
6195.9	(33/2 ⁻)	414.2 3		5781.7	(31/2 ⁻)	
		804.8 3		5391.1	(29/2 ⁻)	
6334.2	(33/2 ⁺)	374		5960.1	(31/2 ⁺)	D
		765		5569.3	(29/2 ⁺)	Q
6424.1		707.7 3	100	5716.4	(29/2)	
6545.7	35/2 ⁺	392.3 3		6153.4	33/2 ⁺	
		783.1 3		5762.6	31/2 ⁺	
6625.4	(35/2 ⁻)	429.5 3		6195.9	(33/2 ⁻)	
		843.7 3		5781.7	(31/2 ⁻)	
6682.0	(35/2 ⁺)	348		6334.2	(33/2 ⁺)	D
		722		5960.1	(31/2 ⁺)	Q
6976.6	37/2 ⁺	430.9 3		6545.7	35/2 ⁺	
		823.2 3		6153.4	33/2 ⁺	
6977.6	(37/2 ⁺)	296		6682.0	(35/2 ⁺)	D
		643		6334.2	(33/2 ⁺)	Q
7012.8	39/2 ⁻	919.0 3	100	6093.7	35/2 ⁻	(E2)
7075.8	(37/2 ⁻)	450.4 3		6625.4	(35/2 ⁻)	
		879.9 3		6195.9	(33/2 ⁻)	
7544.5	(39/2 ⁻)	468.7 3		7075.8	(37/2 ⁻)	
		919.1 3		6625.4	(35/2 ⁻)	
7998.4	43/2 ⁻	985.6 3	100	7012.8	39/2 ⁻	(E2)
8025.2	(41/2 ⁻)	480.7 3		7544.5	(39/2 ⁻)	
		949.4 3		7075.8	(37/2 ⁻)	
9059.7	47/2 ⁻	1061.3 3		7998.4	43/2 ⁻	(E2)
10215.4	51/2 ⁻	1155.7 3	100	9059.7	47/2 ⁻	(E2)
11466.6	55/2 ⁻	1251.2 3	100	10215.4	51/2 ⁻	(E2)
12800.9	59/2 ⁻	1334.3 3	100	11466.6	55/2 ⁻	(E2)
14213.9	(63/2 ⁻)	1413 1	100	12800.9	59/2 ⁻	Q
15717.9	(67/2 ⁻)	1504 1	100	14213.9	(63/2 ⁻)	Q
17352.9	(71/2 ⁻)	1635 1	100	15717.9	(67/2 ⁻)	Q
19143.9	(75/2 ⁻)	1791 1	100	17352.9	(71/2 ⁻)	Q
21104	(79/2 ⁻)	1960 1	100	19143.9	(75/2 ⁻)	Q

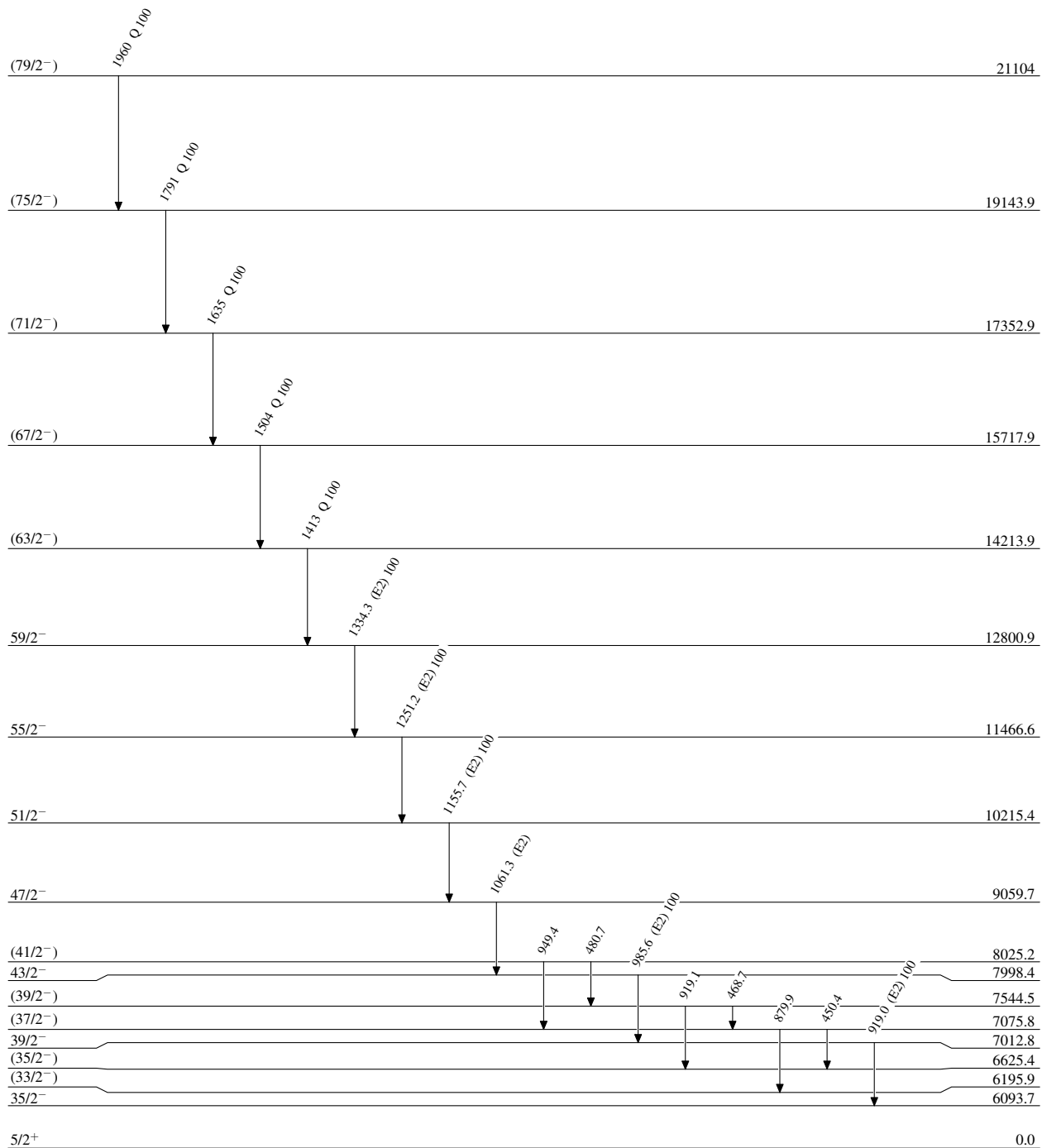
† From $^{110}\text{Cd}(^6\text{Li},3n\gamma)$ and ^{113}Te ε decay.

‡ Mult and δ from $\gamma(\theta)$ (1979Sh03) and DCO ratios (1993Ja04) in (HI,xny).

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level

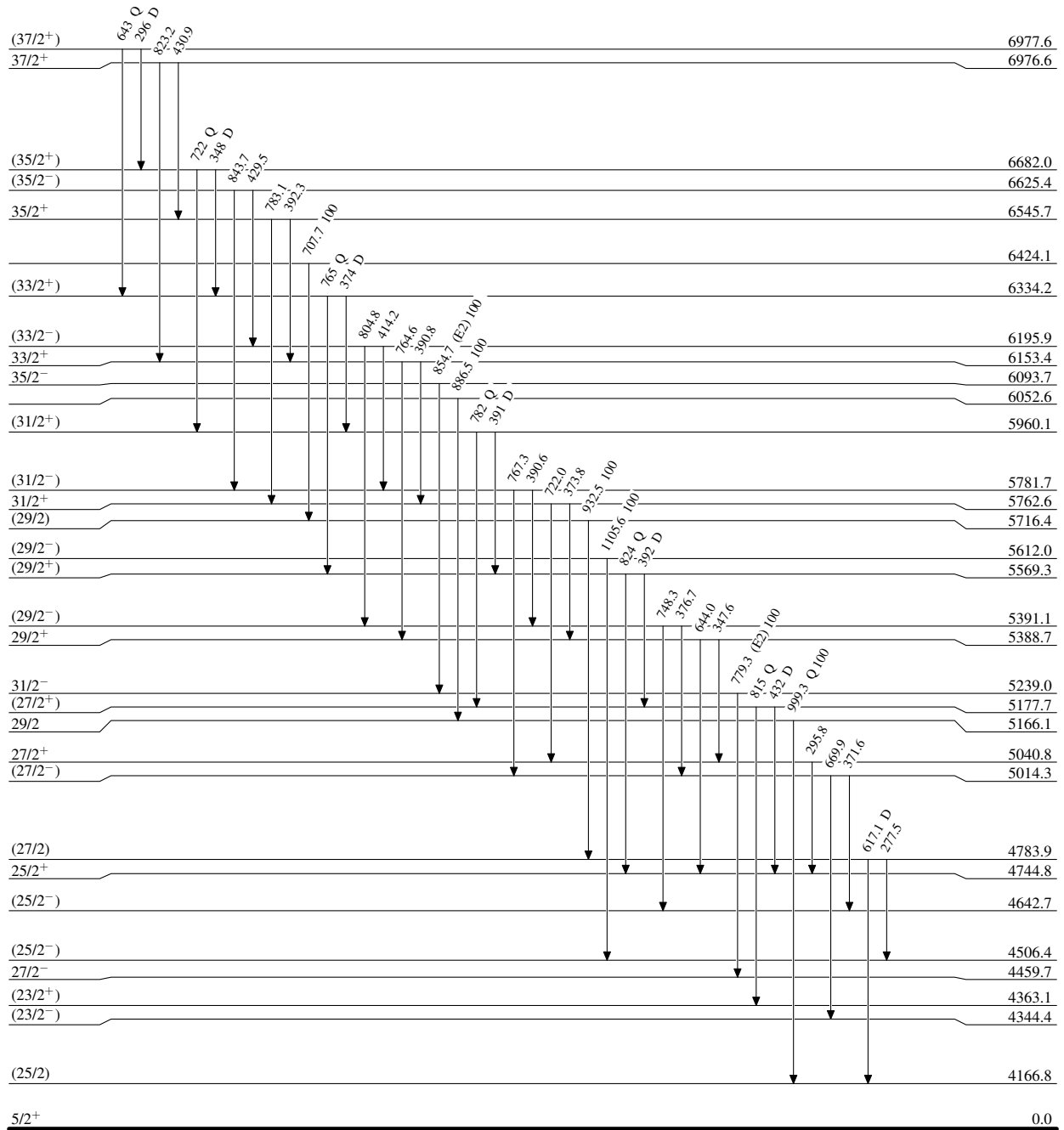


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Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

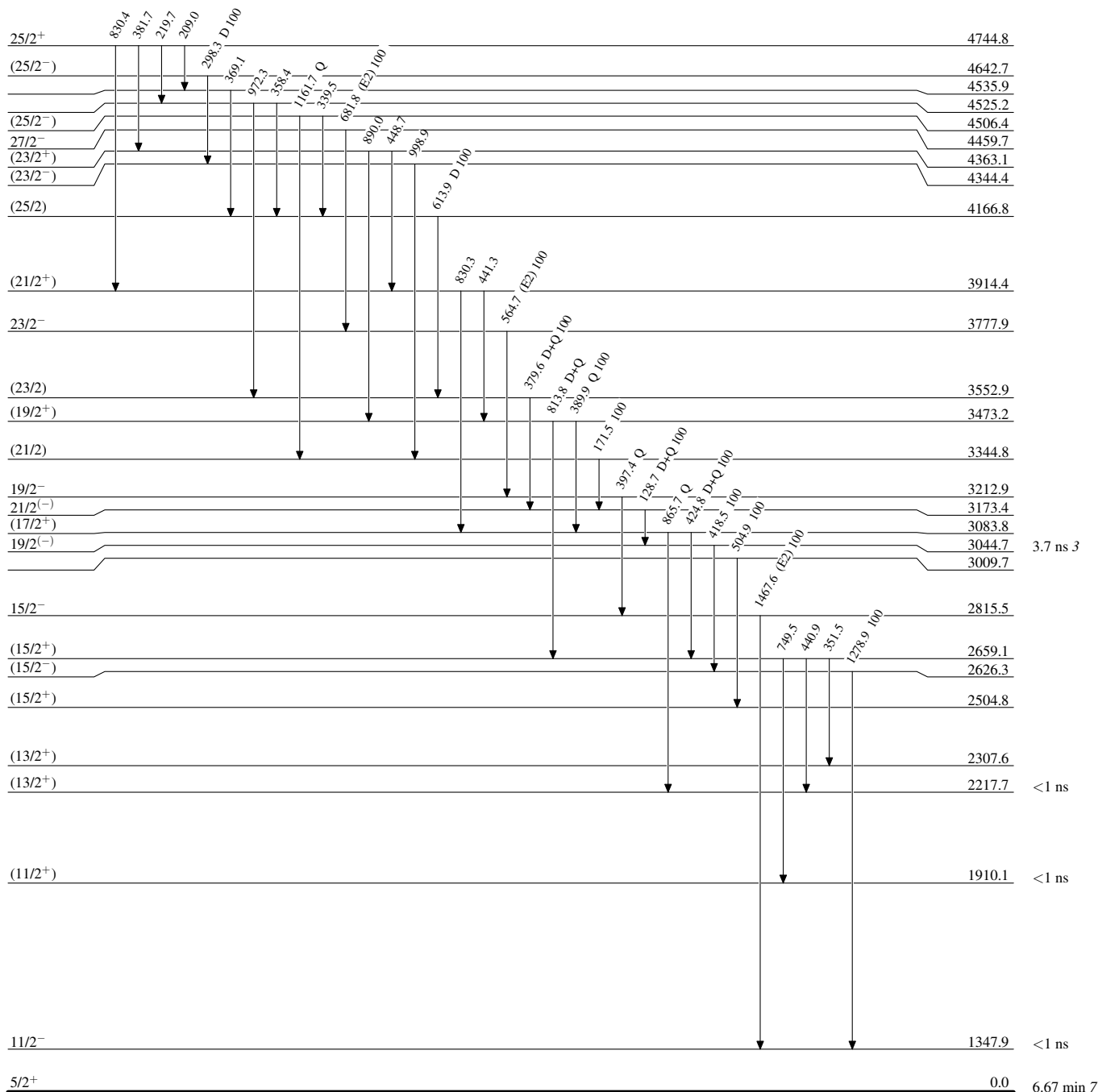


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Adopted Levels, Gammas

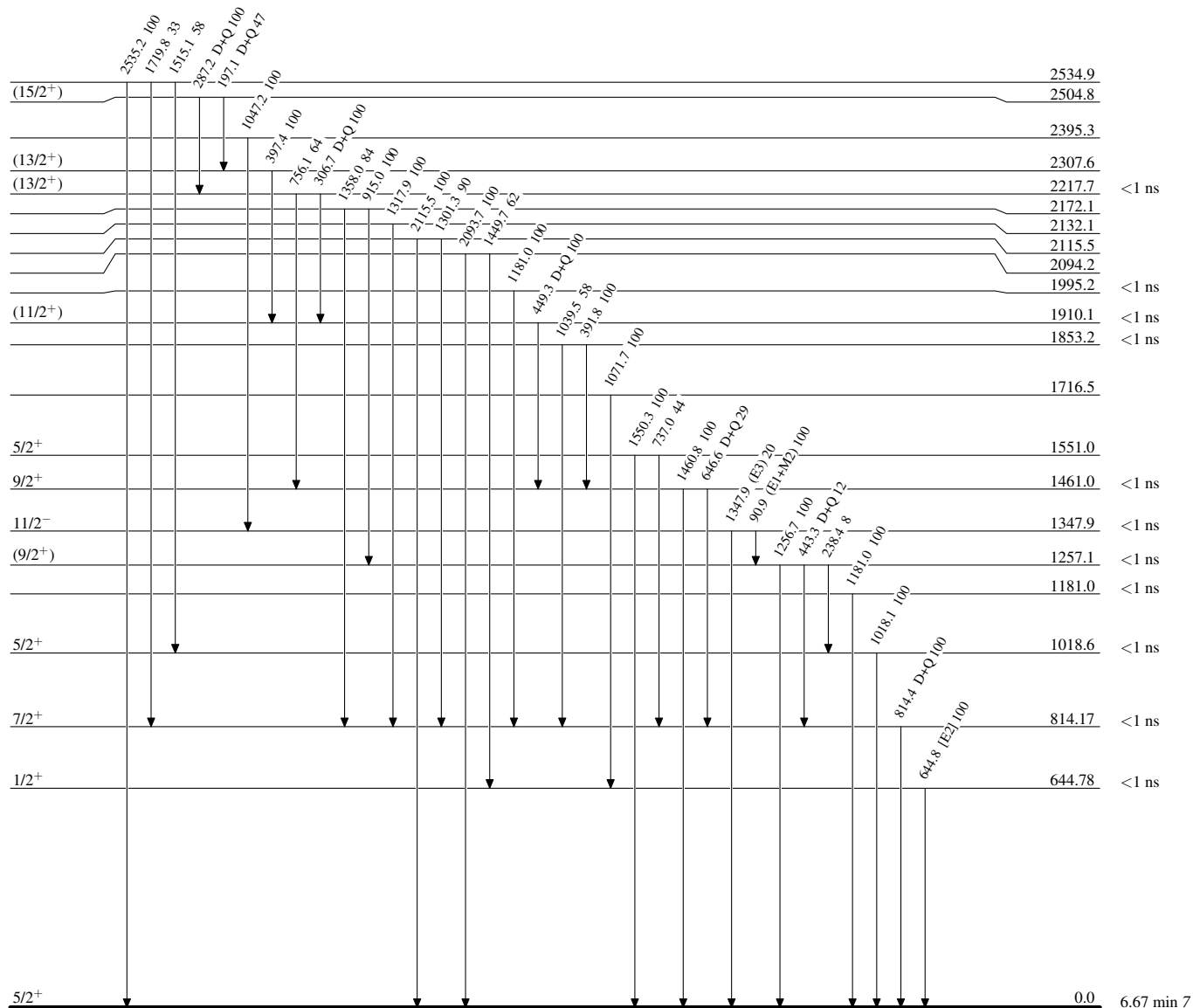
Level Scheme (continued)

Intensities: Relative photon branching from each level



Adopted Levels, Gammas**Level Scheme (continued)**

Intensities: Relative photon branching from each level

 $^{113}_{51}\text{Sb}_{62}$

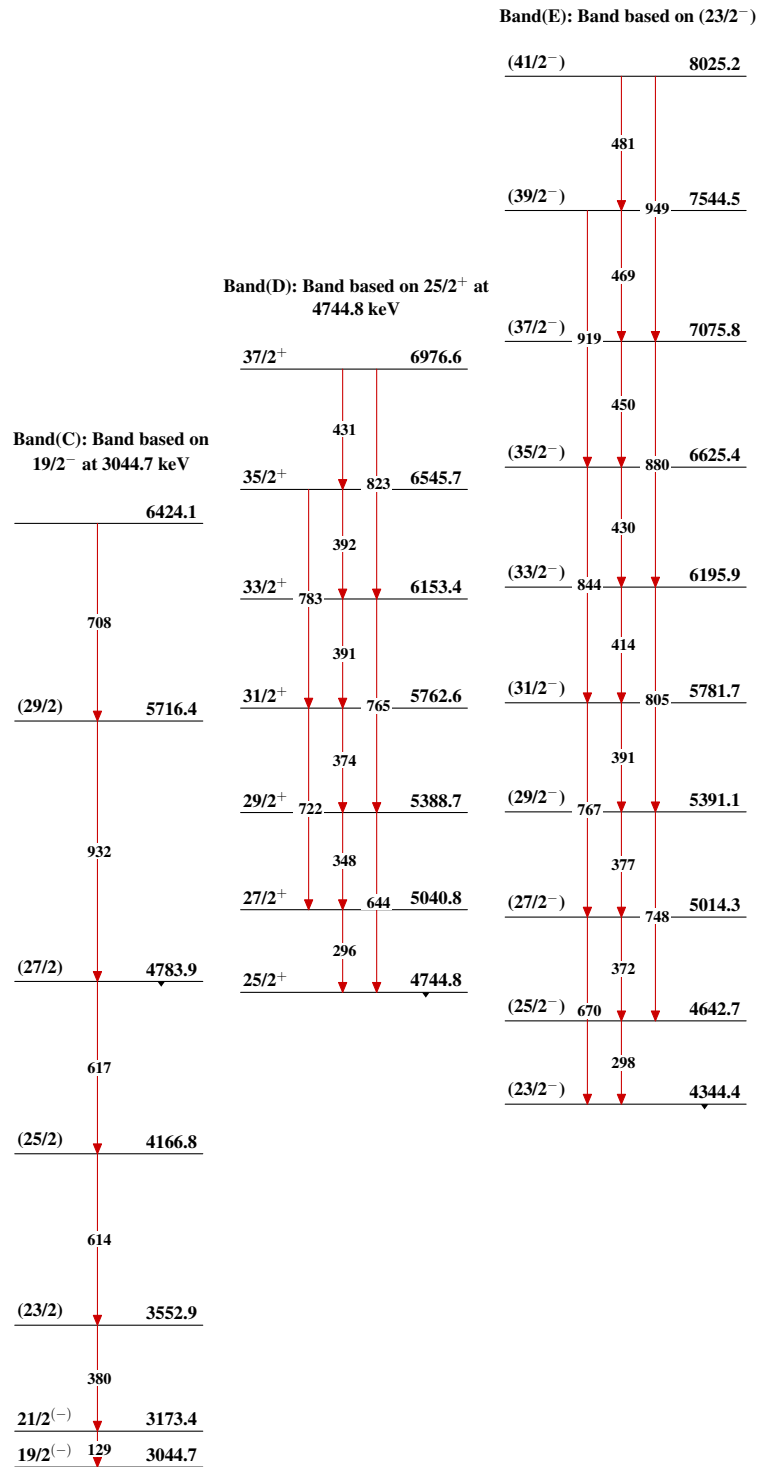
Adopted Levels, Gammas

Band(A): Suggested
(1993Ja04) As members of
a rotational band with
the 1348-keV level as
bandhead

(79/2 ⁻)	21104
1960	
(75/2 ⁻)	19143.9
1791	
(71/2 ⁻)	17352.9
1635	
(67/2 ⁻)	15717.9
1504	
(63/2 ⁻)	14213.9
1413	
59/2 ⁻	12800.9
1334	
55/2 ⁻	11466.6
1251	
51/2 ⁻	10215.4
1156	
47/2 ⁻	9059.7
1061	
43/2 ⁻	7998.4
986	
39/2 ⁻	7012.8
919	
35/2 ⁻	6093.7
855	
31/2 ⁻	5239.0
779	
27/2 ⁻	4459.7
682	
23/2 ⁻	3777.9
565	
19/2 ⁻	3212.9
397	
15/2 ⁻	2815.5
1468	
11/2 ⁻	1347.9

Band(B): Suggested As members of a
rotational band with the 1461-keV
level as bandhead

(37/2 ⁺)	6977.6
(35/2 ⁺)	6682.0
(33/2 ⁺)	6334.2
(31/2 ⁺)	5960.1
(29/2 ⁺)	5569.3
(27/2 ⁺)	5177.7
(23/2 ⁺)	4363.1
(21/2 ⁺)	3914.4
(19/2 ⁺)	3473.2
(17/2 ⁺)	3083.8
(15/2 ⁺)	2659.1
(13/2 ⁺)	2217.7
(11/2 ⁺)	1910.1
9/2 ⁺	1461.0
7/2 ⁺	814.17
5/2 ⁺	0.0

Adopted Levels, Gammas (continued) $^{113}_{51}\text{Sb}_{62}$