

(HI,xn γ) [1997La17,1979Sh03](#)

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	D. M. Symochko, E. Browne, J. K. Tuli		NDS 110,2945 (2009)	1-Dec-2008

[1997La17](#): $^{116}\text{Cd}(^7\text{Li},4n\gamma)$, E=35 MeV; six Compton-suppressed semi, BGO detectors, measured γ , $\gamma\gamma$, DCO ratio, multiplicity.

[1979Sh03](#): $^{116}\text{Cd}(^6\text{Li},3n\gamma)$, E=24-35 MeV; semi γ , $\gamma\gamma$, $\gamma(\theta)$, $\gamma(t)$, excitation function.

[1987Lu06](#): $^{116}\text{Cd}(^7\text{Li},4n\gamma)$, E=26-40 MeV; semi; measured singles and off-beam γ -ray spectra, $\gamma(t)$.

The level scheme is that proposed by [1997La17](#), except for the isomeric levels at 2841.6+x keV. The isomeric state is assigned by [1979Sh03](#).

 ^{119}Sb Levels

E(level) [†]	J π [‡]	T _{1/2} [#]	Comments
0	5/2 ⁺		
270.43 13	7/2 ⁺		
970.78 15	9/2 ⁺		
1048.38 15	7/2 ⁺		
1212.55 13	9/2 ⁺		
1249.65 18	9/2 ⁺		
1340.63 20	11/2 ⁺		
1366.08 16	11/2 ⁻		
1407.12 16	11/2 ⁺		
1675.62 20	13/2 ⁺		
2037.51 21	15/2 ⁺		
2094.27 19			
2138.21 18	13/2 ⁺		
2202.12 18	13/2 ⁺		
2278.64 22	13/2 ⁻		
2313.90 21	(15/2) ⁻		
2419.24 21	17/2 ⁺		
2475.18 20	15/2 ⁻		
2505.0 3	15/2 ⁻		
2553.54 24	(19/2) ⁻	130 ns 3	$\mu=+3.14$ 6; Q=2.13 22 T _{1/2} : 134 ns 6 from (239.7 γ)(t) (1987Lu06). μ ,Q: TDPAD (1991Io02).
2707.5 3	17/2 ⁻		
2747.6 3			
2768.9 3	(17/2 ⁺)		
2841.6 3	(21/2) ⁻		
2841.6+x	(27/2 ⁺)	0.85 s 9	Additional information 1 . T _{1/2} : 0.85 s 6 from (288.2 γ)(t) (1979Sh03). J π : tentative assignment from syst of lifetime and isomerism in odd Sb nuclei.
2848.87 24	19/2 ⁺		
3002.3 4	19/2 ⁻		
3064.79 24	17/2 ⁻		
3068.59 22	17/2 ⁻		
3295.74 21	19/2 ⁻		
3310.26 25	21/2 ⁺		
3505.3 4	(21/2 ⁺)		
3581.8 3	21/2 ⁻		
3608.2 4	23/2 ⁻		
3784.5 3	23/2 ⁺		
3939.5 3	23/2 ⁻		
4211.4 4	25/2 ⁺		
4274.2 3	25/2 ⁺		
4297.9 5	27/2 ⁻		
4341.8 4	(25/2 ⁺)		

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(HI,xn γ) 1997La17,1979Sh03 (continued) ^{119}Sb Levels (continued)

<u>E(level)[†]</u>	<u>J$\pi^{\ddagger}$</u>	<u>E(level)[†]</u>	<u>J$\pi^{\ddagger}$</u>	<u>E(level)[†]</u>	<u>J$\pi^{\ddagger}$</u>
4346.4 3	25/2 ⁻	4776.1 3	27/2 ⁻	5232.0 3	(29/2 ⁻)
4352.4 5	27/2 ⁻	4785.1 4	(27/2 ⁺)	5243.3 5	(29/2 ⁺)
4444.5 5	29/2 ⁻	4940.2 5	(29/2 ⁺)	5353.9 5	(31/2 ⁺)
4542.5 4	(27/2 ⁺)	5190.2 5	(31/2 ⁻)	5711.9 4	(31/2 ⁻)
				6113.6 6	(35/2 ⁻)

[†] Deduced by evaluators from least-squares fit to γ -ray energies.

[‡] The assignments of high spin ($\geq 13/2$) states are from A_2, A_4 and DCO ratios and level systematics from 1997La17.

From Adopted Levels.

 $\gamma(^{119}\text{Sb})$

<u>Eγ[†]</u>	<u>Iγ[@]</u>	<u>E$_i$(level)</u>	<u>Jπ_i</u>	<u>E$_f$</u>	<u>Jπ_f</u>	<u>Mult.[‡]</u>	<u>δ[#]</u>	<u>Comments</u>
40.8 2	<2	1407.12	11/2 ⁺	1366.08	11/2 ⁻			I γ : from $\gamma\gamma$.
134.2 2	56 2	2553.54	(19/2 ⁻)	2419.24	17/2 ⁺	(E1+M2)	0.11 3	E γ : other: 135.1 5 (1979Sh03). Mult.: $\Delta J=1$ from $A_4=0$ in $\gamma(\theta)$ (1979Sh05). δ : 0.11 3 (1979Sh05).
146.6 2	<2	4444.5	29/2 ⁻	4297.9	27/2 ⁻			
153.3 2	43 1	1366.08	11/2 ⁻	1212.55	9/2 ⁺	E1		δ : 0.02 5 (1979Sh05).
157.4 2	<2	1407.12	11/2 ⁺	1249.65	9/2 ⁺			
164.0 2	<2	1212.55	9/2 ⁺	1048.38	7/2 ⁺			
196.5 2	<2	2475.18	15/2 ⁻	2278.64	13/2 ⁻			
227.1 2	7 1	3295.74	19/2 ⁻	3068.59	17/2 ⁻	(M1+E2)		
230.9 2	2 1	3295.74	19/2 ⁻	3064.79	17/2 ⁻	(M1+E2)		
232.3 2	2 1	2707.5	17/2 ⁻	2475.18	15/2 ⁻	(M1+E2)		
239.7 2	11 2	2553.54	(19/2 ⁻)	2313.90	(15/2 ⁻)	(E2)		E γ : other: 237.4 3 (1979Sh03). δ : -0.06 9 (1979Sh03).
270.4 2	105 1	270.43	7/2 ⁺	0	5/2 ⁺	M1+E2	-0.04 4	
273.1 2	<2	2475.18	15/2 ⁻	2202.12	13/2 ⁺			
286.1 2	7 1	3581.8	21/2 ⁻	3295.74	19/2 ⁻	(M1+E2)		
288.1 2	100	2841.6	(21/2 ⁻)	2553.54	(19/2 ⁻)	M1+E2	0.51 5	
331.1 2	<2	4542.5	(27/2 ⁺)	4211.4	25/2 ⁺			
334.9 2	83 1	1675.62	13/2 ⁺	1340.63	11/2 ⁺	M1+E2	0.20 4	
357.5 2	5 1	3939.5	23/2 ⁻	3581.8	21/2 ⁻	M1,E2		
361.8 2	69 1	2037.51	15/2 ⁺	1675.62	13/2 ⁺	M1+E2	0.19 8	
369.8 2	100 10	1340.63	11/2 ⁺	970.78	9/2 ⁺	M1+E2	0.30 5	
381.7 2	66 1	2419.24	17/2 ⁺	2037.51	15/2 ⁺	M1+E2	0.15 5	
397.7 2	<2	4940.2	(29/2 ⁺)	4542.5	(27/2 ⁺)			
407.0 2	3 1	4346.4	25/2 ⁻	3939.5	23/2 ⁻	M1,E2		
413.7 2	<2	5353.9	(31/2 ⁺)	4940.2	(29/2 ⁺)			
426.9 2	2 1	4211.4	25/2 ⁺	3784.5	23/2 ⁺	(M1+E2)		
429.6 2	10 1	2848.87	19/2 ⁺	2419.24	17/2 ⁺	(M1+E2)		
429.9 2	2 1	4776.1	27/2 ⁻	4346.4	25/2 ⁻	M1,E2		
455.8 2	<2	5232.0	(29/2 ⁻)	4776.1	27/2 ⁻			
461.3 2	7 1	3310.26	21/2 ⁺	2848.87	19/2 ⁺	(M1+E2)		
474.2 2	4 1	3784.5	23/2 ⁺	3310.26	21/2 ⁺	(M1+E2)		
479.9 2	<2	5711.9	(31/2 ⁻)	5232.0	(29/2 ⁻)			
489.8 2	2 1	4274.2	25/2 ⁺	3784.5	23/2 ⁺	M1,E2		
497.3 2	9 1	3002.3	19/2 ⁻	2505.0	15/2 ⁻	E2		
510.9 2	2 1	4785.1	(27/2 ⁺)	4274.2	25/2 ⁺			
605.9 2	8 1	3608.2	23/2 ⁻	3002.3	19/2 ⁻	E2		
630.7 2	3 1	2768.9	(17/2 ⁺)	2138.21	13/2 ⁺			

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(HI,xn γ) [1997La17,1979Sh03](#) (continued) $\gamma(^{119}\text{Sb})$ (continued)

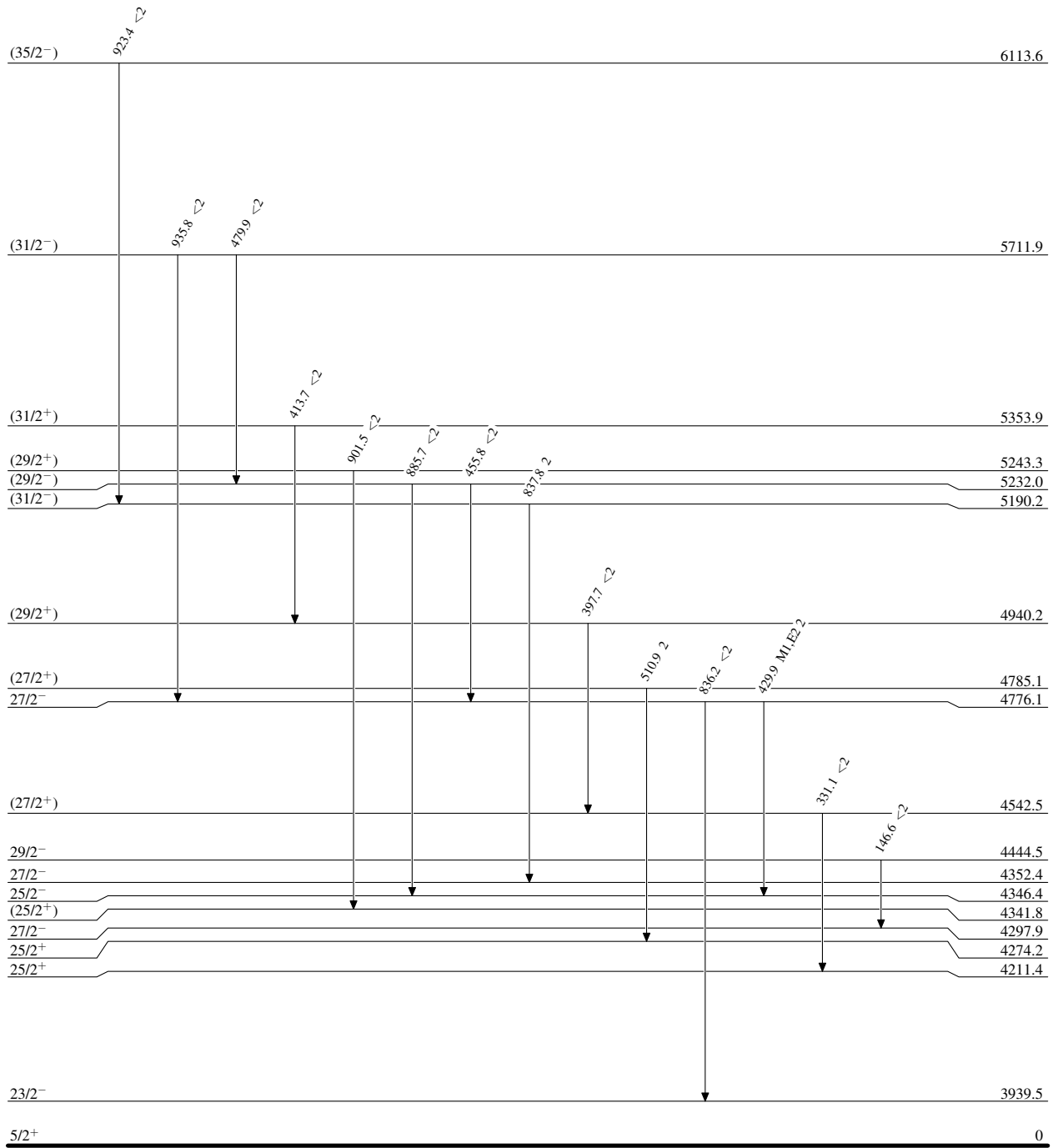
E_γ [†]	I_γ [@]	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. [‡]	δ [#]	Comments
643.7 2	<2	3939.5	23/2 ⁻	3295.74	19/2 ⁻			
653.3 2	<2	2747.6		2094.27				
689.7 2	3 1	4297.9	27/2 ⁻	3608.2	23/2 ⁻	E2		
696.9 2	15 1	2037.51	15/2 ⁺	1340.63	11/2 ⁺	E2		δ : -0.03 9 (1979Sh05).
700.3 2	82 1	970.78	9/2 ⁺	270.43	7/2 ⁺	M1+E2	-0.09 7	
704.9 2	15 1	1675.62	13/2 ⁺	970.78	9/2 ⁺	E2		δ : -0.12 14 (1979Sh05).
730.3 & 2	<2	2094.27		1366.08	11/2 ⁻			
731.0 2	<2	2138.21	13/2 ⁺	1407.12	11/2 ⁺	(M1+E2)		
736.4 2	2 1	3505.3	(21/2 ⁺)	2768.9	(17/2 ⁺)			
743.7 2	19 1	2419.24	17/2 ⁺	1675.62	13/2 ⁺	E2		
744.2 2	3 1	4352.4	27/2 ⁻	3608.2	23/2 ⁻	E2		
750.8 2	2 1	3064.79	17/2 ⁻	2313.90	(15/2 ⁻)	(M1+E2)		
754.7 2	2 1	3068.59	17/2 ⁻	2313.90	(15/2 ⁻)	(M1+E2)		
764.8 2	<2	4346.4	25/2 ⁻	3581.8	21/2 ⁻			
794.8 2	<2	2202.12	13/2 ⁺	1407.12	11/2 ⁺			
811.4 2	4 1	2848.87	19/2 ⁺	2037.51	15/2 ⁺			
836.2 2	<2	4776.1	27/2 ⁻	3939.5	23/2 ⁻			
836.5 2	<2	4341.8	(25/2 ⁺)	3505.3	(21/2 ⁺)			
837.8 2	2 1	5190.2	(31/2 ⁻)	4352.4	27/2 ⁻			
876.50 2	2 1	3295.74	19/2 ⁻	2419.24	17/2 ⁺	E1		
881.6 2	<2	2094.27		1212.55	9/2 ⁺			
885.7 2	<2	5232.0	(29/2 ⁻)	4346.4	25/2 ⁻			
888.6 2	<2	2138.21	13/2 ⁺	1249.65	9/2 ⁺			
891.0 2	2 1	3310.26	21/2 ⁺	2419.24	17/2 ⁺			
901.5 2	<2	5243.3	(29/2 ⁺)	4341.8	(25/2 ⁺)			
912.5 2	4 1	2278.64	13/2 ⁻	1366.08	11/2 ⁻	(M1+E2)		
923.4 2	<2	6113.6	(35/2 ⁻)	5190.2	(31/2 ⁻)			
925.7 2	2 1	2138.21	13/2 ⁺	1212.55	9/2 ⁺	E2		
935.7 2	2 1	3784.5	23/2 ⁺	2848.87	19/2 ⁺			
935.8 2	<2	5711.9	(31/2 ⁻)	4776.1	27/2 ⁻			
942.2 2	3 1	1212.55	9/2 ⁺	270.43	7/2 ⁺	(M1+E2)		
947.8 2	22 1	2313.90	(15/2 ⁻)	1366.08	11/2 ⁻	E2		δ : -0.03 20 (1979Sh05).
963.8 2	<2	4274.2	25/2 ⁺	3310.26	21/2 ⁺			
970.8 2	36 1	970.78	9/2 ⁺	0	5/2 ⁺	E2		
979.2 2	5 1	1249.65	9/2 ⁺	270.43	7/2 ⁺			
989.8 2	2 1	2202.12	13/2 ⁺	1212.55	9/2 ⁺	E2		
1031.0 2	4 1	3068.59	17/2 ⁻	2037.51	15/2 ⁺	E1		
1046.0 2	<2	2094.27		1048.38	7/2 ⁺			
1048.3 2	2 1	1048.38	7/2 ⁺	0	5/2 ⁺			
1095.6 2	<2	1366.08	11/2 ⁻	270.43	7/2 ⁺			
1109.1 2	5 1	2475.18	15/2 ⁻	1366.08	11/2 ⁻	E2		
1136.7 2	11 1	1407.12	11/2 ⁺	270.43	7/2 ⁺	E2		
1138.9 2	9 1	2505.0	15/2 ⁻	1366.08	11/2 ⁻	E2		
1212.6 2	33 1	1212.55	9/2 ⁺	0	5/2 ⁺	E2		

[†] From [1997La17](#).[‡] From DCO ratio ([1997La17](#)) and/or A₂ and A₄ ([1979Sh03](#)). Parities assigned by the evaluators from constructed band structures.[#] Based on A₂ and A₄ from $\gamma(\theta)$ ([1979Sh03](#)).[@] Relative to I(369.8 γ)=100 at E(⁷Li)=35 MeV ([1997La17](#)).

& Placement of transition in the level scheme is uncertain.

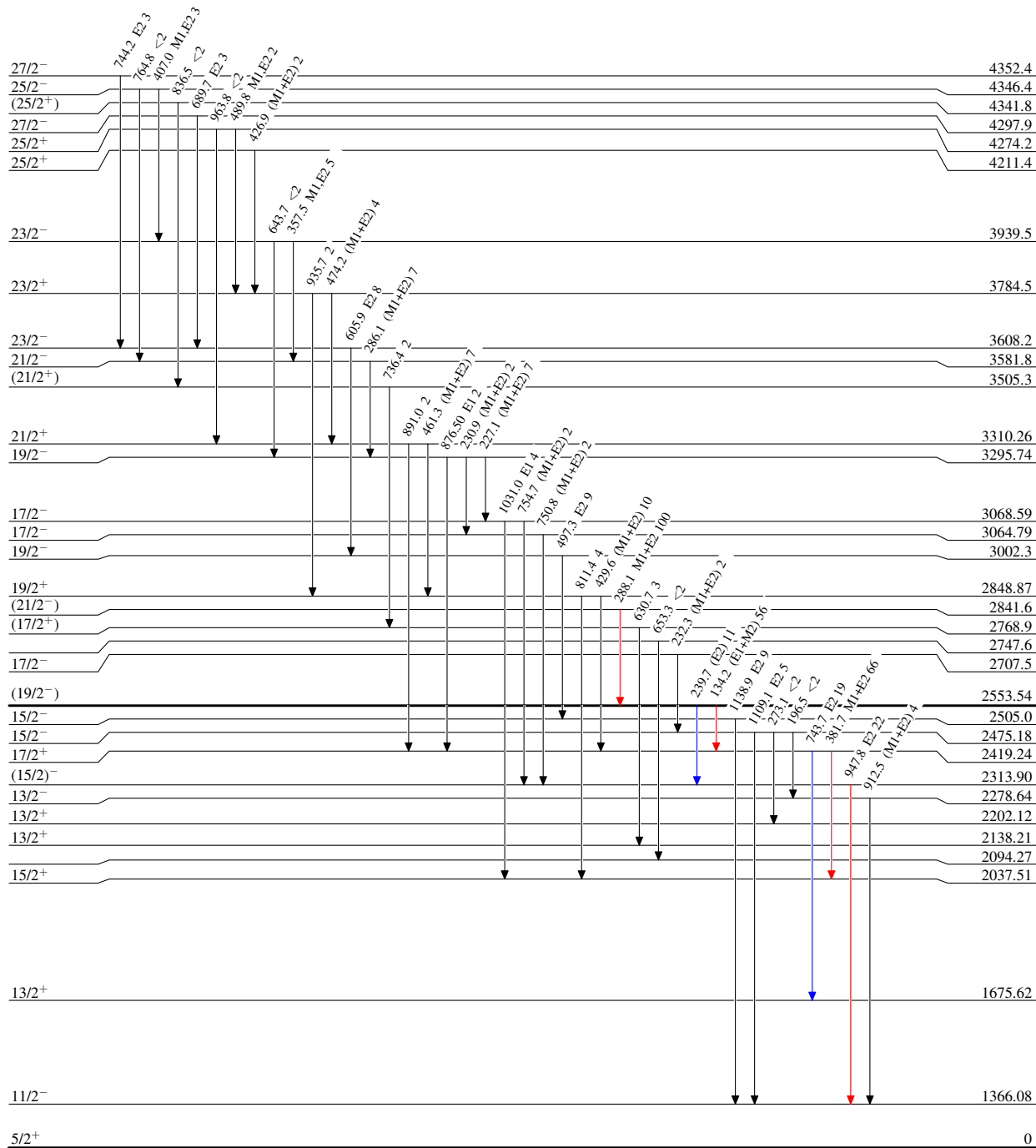
(HI,xn γ) 1997La17,1979Sh03**Level Scheme**Intensities: Relative I_γ **Legend**

- $\longrightarrow$ $I_\gamma < 2\% \times I_\gamma^{\max}$
 $\longrightarrow$ $I_\gamma < 10\% \times I_\gamma^{\max}$
 $\longrightarrow$ $I_\gamma > 10\% \times I_\gamma^{\max}$

 $^{119}_{51}\text{Sb}_{68}$

(HL,xn γ) 1997La17,1979Sh03**Level Scheme (continued)**Intensities: Relative I_γ **Legend**

- $\longrightarrow$ $I_\gamma < 2\% \times I_\gamma^{\max}$
 $\longrightarrow$ $I_\gamma < 10\% \times I_\gamma^{\max}$
 $\longrightarrow$ $I_\gamma > 10\% \times I_\gamma^{\max}$



(HI,xn γ) 1997La17,1979Sh03

Legend

Level Scheme (continued)

Intensities: Relative I_γ

- $\longrightarrow$ $I_\gamma < 2\% \times I_\gamma^{\max}$
 $\longrightarrow$ $I_\gamma < 10\% \times I_\gamma^{\max}$
 $\longrightarrow$ $I_\gamma > 10\% \times I_\gamma^{\max}$
 $\longrightarrow$ γ Decay (Uncertain)

