^{110}Cd(α,nγ) 1997Ka40,1976Ma09

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

1997Ka40: E=18 MeV. Measured: γ and ce singles, excit, $\gamma\gamma$ coin. Preliminary report was given in 1995KaZV.
1976Ma09: E=15-18 MeV. Measured: γ and ce singles, excit functions, $\gamma\gamma$.

^{113}Sn Levels

E(level)†	J$^\pi$‡	$T_{1/2}$	E(level)†	J$^\pi$‡	E(level)†	J$^\pi$‡
0.0	1/2$^+$		1781.5 *3*	9/2$^-$	2512.1 *4*	(3/2$^+$,5/2$^+$)
77.38 *1*	7/2$^+$		1831.0 *3*		2540.9 *5*	(15/2$^-$)
410.37 *18*	5/2$^+$		1867.5 *3*	5/2$^+$	2583.1 *5*	
498.16 *16*	3/2$^+$		1907.6 *5*	15/2$^-$	2591.1 *3*	
739.3 *4*	11/2$^-$	86# ns *2*	1909.9 *3*	(5/2$^+$,7/2$^+$)	2617.3 *4*	
1014.66 *24*	(1/2),3/2$^+$		1936.3 *5*	(11/2$^-$)	2620.1 *4*	
1018.36 *21*	5/2$^+$		1946.2 *5*	(9/2$^-$)	2624.7 *4*	
1284.22 *17*	5/2$^+$		1952.9 *5*	(13/2$^-$)	2649.9 *5*	
1314.0 *3*	3/2$^+$		2039.97 *25*	(7/2$^+$)	2662.9 *4*	(3/2$^+$,5/2$^+$)
1356.0 *3*	3/2$^+$		2045.9 *3*	(3/2$^+$,5/2$^+$)	2672.0 *5*	
1472.77 *23*	5/2$^+$		2176.9 *5*	7/2$^+$	2750.7 *6*	17/2$^-$
1539.4 *4*	5/2$^+$		2200.8 *4*	5/2$^+$	2778.8 *5*	
1540.8 *5*	(11/2$^-$)		2258.8 *4*	5/2$^+$	2807.7 *6*	19/2$^-$
1557.0 *3*	3/2$^+$		2337.6 *5*	11/2$^-$	2890.0 *5*	11/2$^-$
1645.2 *4*			2386.0 *4*	7/2$^+$	2956.6 *4*	
1652.1 *3*	5/2$^+$		2448.6 *3*	7/2$^+$	2976.0 *7*	(19/2$^-$)
1732.3 *4*	(3/2$^+$,5/2$^+$)		2457.4 *3*		3130.2 *6*	21/2$^-$
1745.29 *23*	5/2$^+$		2505.8 *4*			

† From least-squares fit to γ energies.
‡ From Adopted Levels. All the reactions works (α,xnγ) and (p,nγ) of 1997Ka40 are in the same paper and have the same J$^\pi$.
# From Adopted Levels. Measured in ^{111}Cd(α,2nγ).

$\gamma(^{113}$Sn)

E_γ†	I_γ†	E_i(level)	J_i^π	E_f	J_f^π	Mult.‡	Comments
77.38 *1*		77.38	7/2$^+$	0.0	1/2$^+$		E_γ: from Adopted Levels, gammas.
172.4 *3*	1.2 *1*	2039.97	(7/2$^+$)	1867.5	5/2$^+$		
225.3 *3*	0.5 *2*	2976.0	(19/2$^-$)	2750.7	17/2$^-$		
322.5 *3*	1.1 *1*	3130.2	21/2$^-$	2807.7	19/2$^-$		
332.6 *3*	44 *3*	410.37	5/2$^+$	77.38	7/2$^+$	M1,E2	Mult.: from α(K)exp=0.0192 *13*.
498.1 *2*	30 *2*	498.16	3/2$^+$	0.0	1/2$^+$	M1	Mult.: from $\gamma(\theta)$ and linear polarization.
567.2 *3*	1.2 *1*	2039.97	(7/2$^+$)	1472.77	5/2$^+$		
583.2 *3*	7.1 *4*	1867.5	5/2$^+$	1284.22	5/2$^+$	M1,E2	Mult.: from α(K)exp=0.0038 *7*.
608.0 *3*	2.5 *2*	1018.36	5/2$^+$	410.37	5/2$^+$	M1	Mult.: from $\gamma(\theta)$ and linear polarization.
633.3 *3*	1.2 *1*	2540.9	(15/2$^-$)	1907.6	15/2$^-$		
661.5 *3*	100 *4*	739.3	11/2$^-$	77.38	7/2$^+$	M2	B(M2)(W.u.)=0.122 *3* Mult.: from $\gamma(\theta)$ and linear polarization.
755.8 *3*	0.6 *1*	2039.97	(7/2$^+$)	1284.22	5/2$^+$		
786.0# *3*	4.4# *2*	2258.8	5/2$^+$	1472.77	5/2$^+$		
786.1# *3*	4.4# *2*	1284.22	5/2$^+$	498.16	3/2$^+$		
797.8 *3*	1.4 *1*	2750.7	17/2$^-$	1952.9	(13/2$^-$)		
801.5 *3*	3.6 *3*	1540.8	(11/2$^-$)	739.3	11/2$^-$		E_γ: the placement of this transition is questionable.

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^{110}Cd(α,nγ) 1997Ka40,1976Ma09 (continued)

$\gamma(^{113}Sn)$ (continued)

E_γ[†]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	Comments
							1987Vi09 in (p,nγ) has found 801γ in coin with 662γ but not with 1018γ and 332γ.
838.4[#] *3*	2.3[#] *2*	2620.1		1781.5	9/2$^-$		
[x]838.9[#] *3*	2.3[#] *2*						
873.9 *3*	2.0 *2*	1284.22	5/2$^+$	410.37	5/2$^+$		
879.4 *3*	1.1 *1*	2624.7		1745.29	5/2$^+$		
892.6 *3*	2.8 *2*	2176.9	7/2$^+$	1284.22	5/2$^+$		
[x]899.7[#] *3*	3.9[#] *2*						
900.1[#] *3*	3.9[#] *2*	2807.7	19/2$^-$	1907.6	15/2$^-$		
913.2 *3*	1.8 *1*	2386.0	7/2$^+$	1472.77	5/2$^+$		
936.7 *3*	5.5 *3*	1014.66	(1/2),3/2$^+$	77.38	7/2$^+$		
940.6 *3*	12.0 *6*	1018.36	5/2$^+$	77.38	7/2$^+$		
975.8 *3*	1.1 *1*	2448.6	7/2$^+$	1472.77	5/2$^+$		
1014.4 *3*	3.6 *2*	1014.66	(1/2),3/2$^+$	0.0	1/2$^+$		
1018.3 *3*	2.5 *2*	1018.36	5/2$^+$	0.0	1/2$^+$		
1042.3 *3*	6.8 *3*	1781.5	9/2$^-$	739.3	11/2$^-$		
1068.3 *3*	1.2 *1*	2976.0	(19/2$^-$)	1907.6	15/2$^-$		
1129.0 *3*	4.4 *3*	1539.4	5/2$^+$	410.37	5/2$^+$		
1147.2 *3*	1.5 *1*	1645.2		498.16	3/2$^+$		
1164.3 *3*	1.2 *1*	2448.6	7/2$^+$	1284.22	5/2$^+$		
1168.3 *3*	22.1 *9*	1907.6	15/2$^-$	739.3	11/2$^-$		
1197.0 *3*	7.3 *4*	1936.3	(11/2$^-$)	739.3	11/2$^-$		
1206.9 *3*	3.8 *3*	1946.2	(9/2$^-$)	739.3	11/2$^-$		
1213.6 *3*	11.3 *6*	1952.9	(13/2$^-$)	739.3	11/2$^-$		
1221.6 *3*	0.9 *2*	2505.8		1284.22	5/2$^+$		
1234.1 *3*	3.8 *3*	1732.3	(3/2$^+$,5/2$^+$)	498.16	3/2$^+$		
1241.6 *3*	4.0 *3*	1652.1	5/2$^+$	410.37	5/2$^+$		
1247.1 *3*	1.4 *1*	1745.29	5/2$^+$	498.16	3/2$^+$		
1284.2 *3*	28 *2*	1284.22	5/2$^+$	0.0	1/2$^+$	E2	Mult.: M1,E2 from α(K)exp=0.0006 *1*, E2 from $\gamma(\theta)$ and linear polarization.
1314.0 *3*	5.0 *3*	1314.0	3/2$^+$	0.0	1/2$^+$	M1	Mult.: from $\gamma(\theta)$ and linear polarization.
1334.9 *3*	7.3 *4*	1745.29	5/2$^+$	410.37	5/2$^+$		
1356.0 *3*	8.8 *4*	1356.0	3/2$^+$	0.0	1/2$^+$		
1411.7 *3*	3.7 *3*	1909.9	(5/2$^+$,7/2$^+$)	498.16	3/2$^+$		
1472.8 *3*	23.3 *2*	1472.77	5/2$^+$	0.0	1/2$^+$	E2	Mult.: from $\gamma(\theta)$ and linear polarization.
1499.5 *3*	2.9 *2*	1909.9	(5/2$^+$,7/2$^+$)	410.37	5/2$^+$		
[x]1546.8 *3*	2.0 *2*						
1547.7[#] *3*	2.0[#] *2*	2045.9	(3/2$^+$,5/2$^+$)	498.16	3/2$^+$		
1557.0 *3*	1.4 *1*	1557.0	3/2$^+$	0.0	1/2$^+$		
1574.5 *3*	2.4 *2*	1652.1	5/2$^+$	77.38	7/2$^+$		
1598.3 *3*	4.0 *3*	2337.6	11/2$^-$	739.3	11/2$^-$		
1667.5 *3*	3.5 *3*	1745.29	5/2$^+$	77.38	7/2$^+$		
1672.4 *3*	0.6 *2*	2956.6		1284.22	5/2$^+$		
1702.6 *3*	3.9 *3*	2200.8	5/2$^+$	498.16	3/2$^+$		
1801.6 *3*	0.7 *2*	2540.9	(15/2$^-$)	739.3	11/2$^-$		
1831.0 *3*	1.4 *1*	1831.0		0.0	1/2$^+$		
1843.8 *3*	2.4 *2*	2583.1		739.3	11/2$^-$		
1910.6 *3*	0.4 *1*	2649.9		739.3	11/2$^-$		
1932.7 *3*	0.6 *2*	2672.0		739.3	11/2$^-$		
1959.1 *3*	1.1 *1*	2457.4		498.16	3/2$^+$		
2013.9 *3*	1.4 *1*	2512.1	(3/2$^+$,5/2$^+$)	498.16	3/2$^+$		
2039.5 *3*	1.4 *1*	2778.8		739.3	11/2$^-$		
2092.9 *3*	0.1 *1*	2591.1		498.16	3/2$^+$		
2099.3 *3*	1.2 *1*	2176.9	7/2$^+$	77.38	7/2$^+$		

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^{110}Cd(α,nγ) 1997Ka40,1976Ma09 (continued)

$\gamma(^{113}Sn)$ (continued)

E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π
2150.5 *3*	0.6 *2*	2890.0	$11/2^-$	739.3	$11/2^-$
2164.7 *3*	1.3 *1*	2662.9	$(3/2^+,5/2^+)$	498.16	$3/2^+$
2206.9 *3*	0.3 *1*	2617.3		410.37	$5/2^+$

† From 1997Ka40, $\Delta E\gamma$=0.3 keV estimated by evaluator, average of $\Delta E\gamma$=0.1-0.4 keV (1997Ka40).

‡ α(K)exp normalized by 498γ and 662γ to M1 and M2 theory, respectively. 498γ is M1,E2 from decay scheme, and 662γ is M2(+E3) from ^{113}Sn IT decay (86 ns). The other multipolarity assignments are not affected by this uncertainty.

Multiply placed with undivided intensity.

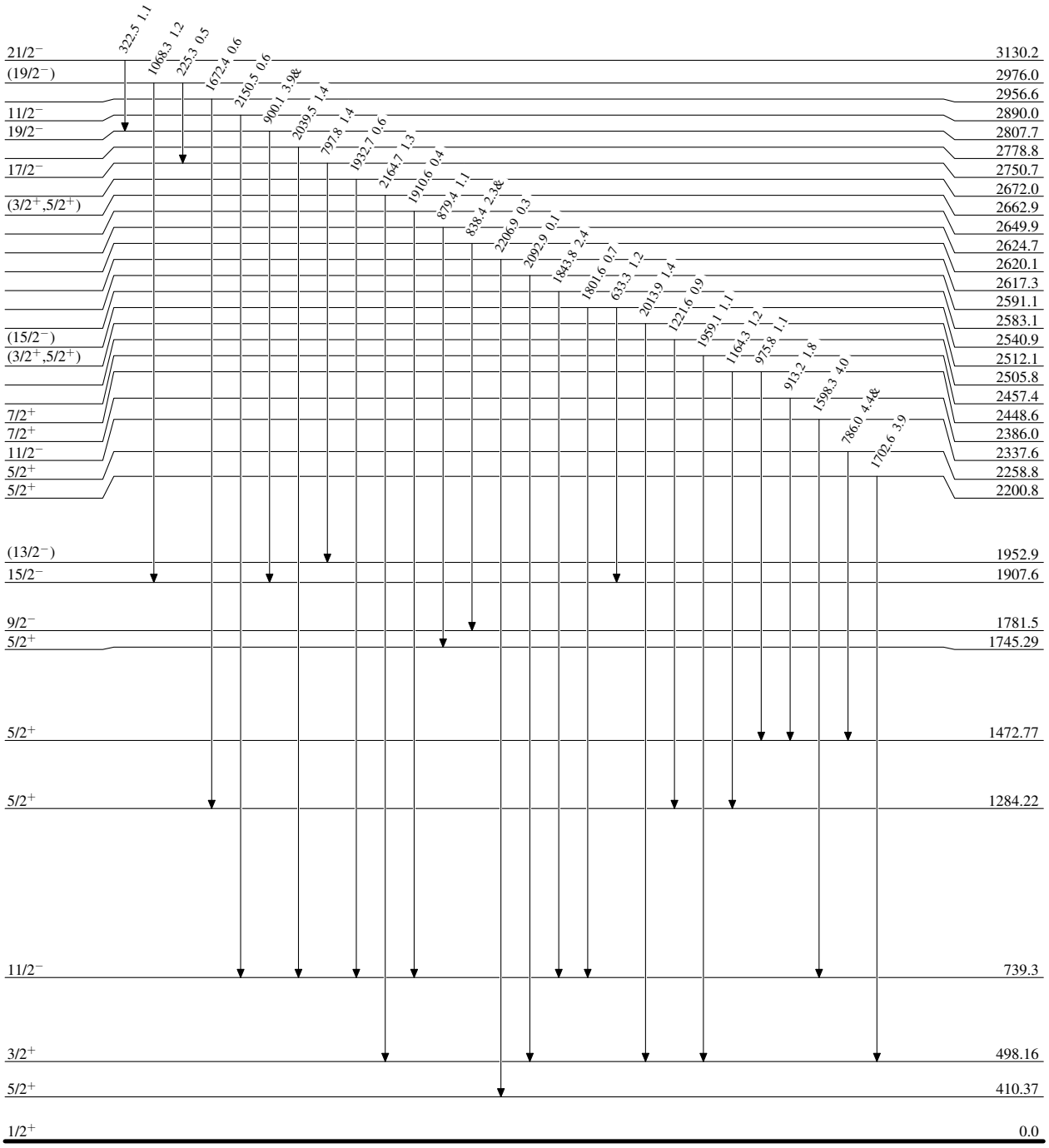
x γ ray not placed in level scheme.

^{110}Cd(α,nγ) **1997Ka40,1976Ma09**

Level Scheme

Intensities: Relative I_γ
& Multiply placed: undivided intensity given

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



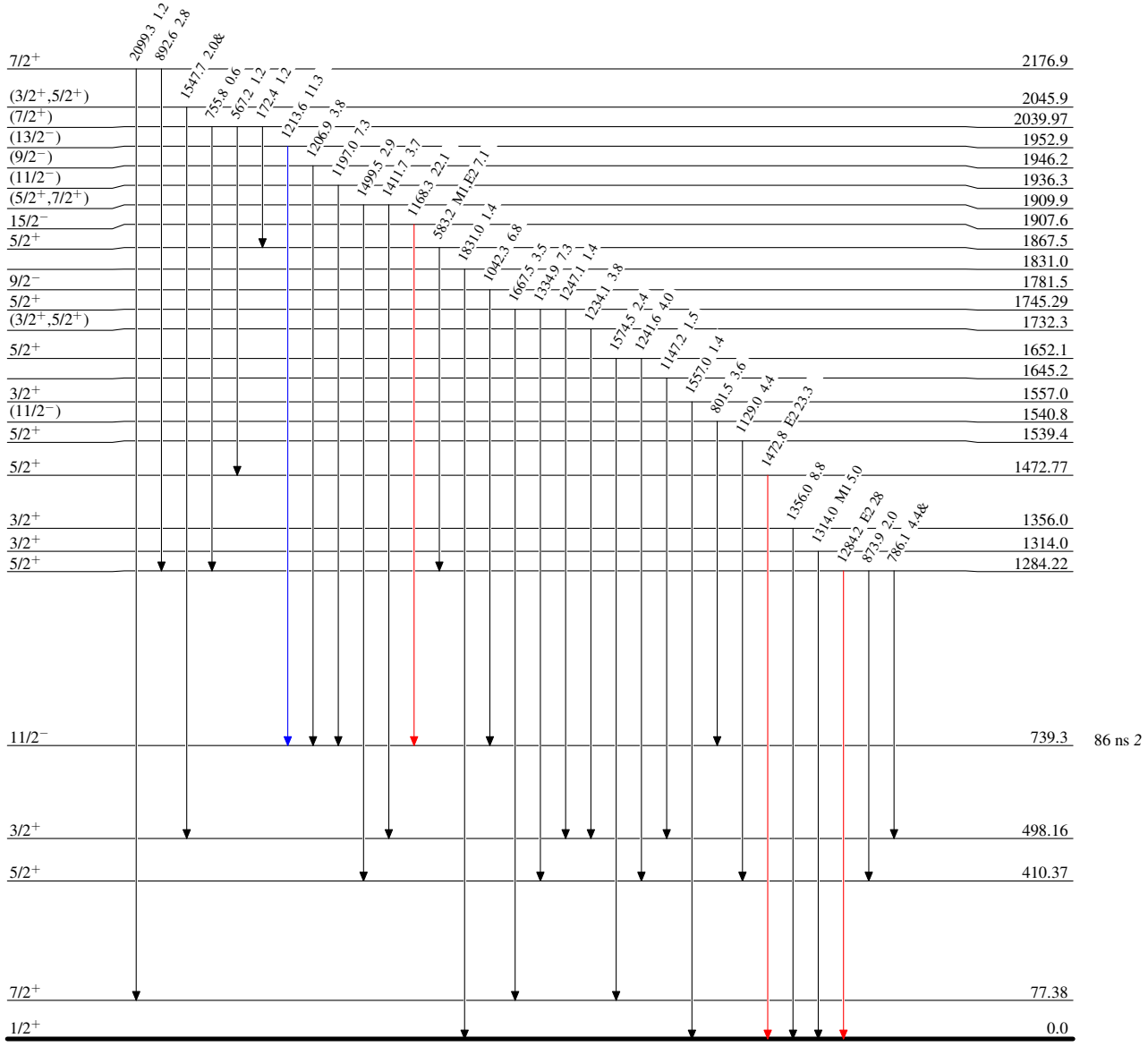
$^{113}_{50}Sn_{63}$

^{110}Cd(α,nγ) **1997Ka40,1976Ma09**

Level Scheme (continued)

Intensities: Relative I_γ
& Multiply placed: undivided intensity given

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

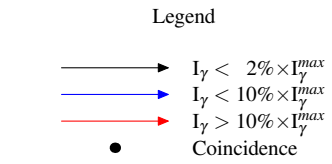


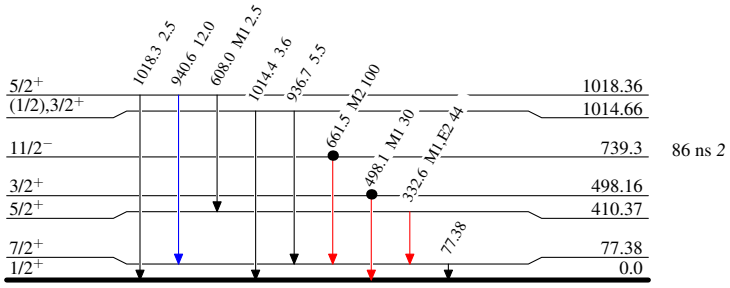
$^{113}_{50}Sn_{63}$

^{110}Cd(α,nγ) 1997Ka40,1976Ma09

Level Scheme (continued)

Intensities: Relative I_γ
& Multiply placed: undivided intensity given





$^{113}_{50}Sn_{63}$