^{111}Cd(^{3}He,3nγ),^{108}Cd(α,nγ) 1984Pr06

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jean Blachot	NDS 110, 1239 (2009)	1-Feb-2008

1984Pr06: E(^{3}He)=28-32 MeV; measured: γ, $\gamma\gamma$, ce, Ag(t).
1984Pr06: ^{108}Cd(α,nγ) E=20-27 MeV.
1984Pr06: ^{109}Ag(^{6}Li,4nγ) E=40.5 MeV.
1979Ha12: ^{110}Cd(α,3nγ) E=30-47 MeV; $\gamma\gamma$, $\gamma(\theta)$, ce.
1978Ho06: ^{110}Cd(^{3}He,nγ) E=22 MeV; measured γ(t).
1976Ma09: ^{108}Cd(α,nγ) E=15-18 MeV; measured: γ, $\gamma\gamma$, σ(Eγ,E,θ), γ(t), ce.
1972Br38: ^{108}Cd(α,nγ) E=22 MeV; measured γ(t).
Others: ^{110}Cd(α,3nγ) E=30-47 MeV; $\gamma\gamma$-coin, $\gamma(\theta)$, ce-spectra (1977HaYM,1978HaZP).

^{111}Sn Levels

1976Ma09 present empirical level syst of odd-tin isotopes.

E(level)	J$^{\pi}$ †	T$_{1/2}$	Comments
0	7/2^{+}		
154.4	5/2^{+}		
254.5	1/2^{+}	12.5 μs *10*	T$_{1/2}$: from 1978Ho06. Other: 18 μs *1* (1972Br38).
643.5	3/2^{+}		
755.4	5/2^{+}		
978.6	11/2^{-}	10.0 ns *5*	T$_{1/2}$: from 1984Pr06. Others: 9.2 ns *10* (1974Br29), 7.9 ns *8* (1972Br38). g-factor=− 0.23 *2* (1974Br29) 979γ(H,T).
1032.6	3/2		
1151.5	(3/2^{+},5/2^{+})		
1152 *1*			
1235.6	(9/2^{+})		
1276.7	(7/2^{+})	0.3 ns *2*	
1302.0	3/2^{+},5/2^{+}		
1347.8	11/2^{+}		
1478.0	9/2^{+}		
1693.2	(3/2^{+},5/2^{+})		
2062.2	15/2^{-}		
2065.2	15/2^{+}	0.52 ns *9*	
2100.3	(13/2^{+})		
2188.2	(11/2^{-},13/2^{-})		
2216.8	(11/2^{+},13/2^{+})		
2257.5	(17/2^{+})		
2363.0	$^{+}$		
2386.0	(13/2^{+})		
2523.6	(15/2^{+})		
2983.8	19/2^{-}	0.15 ns *10*	
3124.0	19/2^{-}		
3228.2			
3306.8	$^{-}$		
3323.1	21/2^{-}		
3459.4	23/2^{-}		
3621.1	(21/2^{-},23/2^{-})		
3789.4	(23/2^{-})		

† J assignments are consistent with slopes of γ-ray excit.

^{111}Cd(^{3}He,3nγ),^{108}Cd(α,nγ) 1984Pr06 (continued)

$\gamma(^{111}Sn)$

E_γ[†]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ	Comments
100.1 *3*	33[#] *4*	254.5	1/2$^+$	154.4	5/2$^+$	(E2)		Mult.: from adopted γ's.
154.4 *1*	268 *7*	154.4	5/2$^+$	0	7/2$^+$	M1+E2	−0.08 *6*	α(K)exp=0.175 *20* (1984Pr06)
161.5 *3*	17 *3*	3621.1	(21/2$^-$,23/2$^-$)	3459.4	23/2$^-$	D(+Q)	−0.08 *18*	
192.3 *1*	185 *4*	2257.5	(17/2$^+$)	2065.2	15/2$^+$	M1(+E2)	−0.03 *3*	α(K)exp=0.103 *6* (1984Pr06)
199.1 *1*	132 *3*	3323.1	21/2$^-$	3124.0	19/2$^-$	M1+E2	+0.16 *3*	α(K)exp=0.093 *27* (1984Pr06)
266.2 *1*	190 *4*	2523.6	(15/2$^+$)	2257.5	(17/2$^+$)	M1+E2	−0.05 *4*	α(K)exp=0.042 *7* (1984Pr06)
298.2 *3*	37 *2*	3621.1	(21/2$^-$,23/2$^-$)	3323.1	21/2$^-$	D+Q	+0.20 *5*	
339.3 *1*	140 *3*	3323.1	21/2$^-$	2983.8	19/2$^-$	M1(+E2)	+0.03 *3*	α(K)exp=0.021 *3* (1979Ha12); α(K)exp=0.015 *3* (1984Pr06)
389.4 *7*	3.4 *5*	643.5	3/2$^+$	254.5	1/2$^+$	M1,E2		α(K)exp=0.018 *4* (1976Ma09) Iγ: from Iγ/Iγ(489γ)= 0.085 *20* (1976Ma09).
458.4 *3*	46 *3*	2523.6	(15/2$^+$)	2065.2	15/2$^+$	M1+E2		α(K)exp=0.008 *2* (1984Pr06) δ: - 0.38 *30* or + 1.0 *4*.
466.3 *3*	3 *3*	3789.4	(23/2$^-$)	3323.1	21/2$^-$	M1+E2	+0.25 *2*	α(K)exp=0.0081 *16* (1979Ha12); α(K)exp=0.008 *2* (1984Pr06)
475.7 *3*	69[#] *3*	3459.4	23/2$^-$	2983.8	19/2$^-$	E2		α(K)exp=0.0099 *20* (1979Ha12); α(K)exp=0.0084 *60* (1984Pr06)
489.1 *3*	40 *7*	643.5	3/2$^+$	154.4	5/2$^+$	M1(+E2)	+0.15 *18*	α(K)exp=0.0072 (1984Pr06)
601.0 *3*	99[#] *8*	755.4	5/2$^+$	154.4	5/2$^+$	M1,E2		α(K)exp=0.0043 *8* (1976Ma09)
717.3 *3*	513[#] *11*	2065.2	15/2$^+$	1347.8	11/2$^+$	E2		α(K)exp=0.0025 *2* (1984Pr06)
752.5 *2*	61 *6*	2100.3	(13/2$^+$)	1347.8	11/2$^+$	M1+E2	+1.3 *10*	α(K)exp=0.0028 *8* (1984Pr06)
755.4 *2*	53 *6*	755.4	5/2$^+$	0	7/2$^+$	M1+E2	+0.50	α(K)exp=0.0019 *3* (1976Ma09), 0.0024 *2* (1984Pr06).
777.6[@]		1032.6	3/2	254.5	1/2$^+$			
[x]798.3[@] *4*								
864.9 *2*	53 *5*	2100.3	(13/2$^+$)	1235.6	(9/2$^+$)	Q		Mult.: from $\gamma(\theta)$.
866.5 *3*	25 *5*	3124.0	19/2$^-$	2257.5	(17/2$^+$)			
869.0 *1*	125 *6*	2216.8	(11/2$^+$,13/2$^+$)	1347.8	11/2$^+$	D+Q,Q		
877.6[@]		1032.6	3/2	154.4	5/2$^+$			Eγ: composite line.
897.2[@]		1151.5	(3/2$^+$,5/2$^+$)	254.5	1/2$^+$			
921.5 *1*	328 *8*	2983.8	19/2$^-$	2062.2	15/2$^-$	E2		α(K)exp=0.0013 *2* (1979Ha12); α(K)exp=0.0016 *2* (1984Pr06)
[x]946.9[@] *4*								
978.6 *3*	1230[#] *21*	978.6	11/2$^-$	0	7/2$^+$	M2		α(K)exp=0.0030 *5* (1976Ma09); α(K)exp=0.0031 *6* (1979Ha12) α(K)exp=0.0033 *2* (1984Pr06)
981.2 *5*	≈170	2216.8	(11/2$^+$,13/2$^+$)	1235.6	(9/2$^+$)			Iγ: Iγ=135 *+147−73* from Iγ/Iγ(869γ) at Eα= 20 MeV.
997.1 *1*	124 *8*	1151.5	(3/2$^+$,5/2$^+$)	154.4	5/2$^+$			
1015.2 *3*		2363.0	$^+$	1347.8	11/2$^+$	M1+E2	+0.48 *20*	α(K)exp=0.0013 *3* (1984Pr06)
1032.4[@] *7*		1032.6	3/2	0	7/2$^+$			
1038.2 *1*	119 *8*	2386.0	(13/2$^+$)	1347.8	11/2$^+$	D(+Q)		
1058.5 *5*	47 *8*	3124.0	19/2$^-$	2065.2	15/2$^+$			Iγ: from Iγ/Iγ(1061γ)= 0.23 *5* in (^{6}Li,4nγ).
1061.8 *1*	206 *13*	3124.0	19/2$^-$	2062.2	15/2$^-$	E2		α(K)exp=0.0010 *4* (1979Ha12); α(K)exp=0.00077 *20* (1984Pr06) Iγ: from Iγ(1058+1061)= 253 *10* and Iγ(1058)= 47 *8*.

Continued on next page (footnotes at end of table)

^{111}Cd(^{3}He,3nγ),^{108}Cd(α,nγ) 1984Pr06 (continued)

$\gamma(^{111}Sn)$ (continued)

E_γ [†]	I_γ [†]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [‡]	δ	Comments
1083.6 *1*	1000 *17*	2062.2	15/2$^-$	978.6	11/2$^-$	E2		α(K)exp=0.00091 *20* (1979Ha12); α(K)exp=0.00086 *7* (1984Pr06)
1122.3 *3*	41 *5*	1276.7	(7/2$^+$)	154.4	5/2$^+$	M1(+E2)	−0.9 *8*	α(K)exp=0.00102 *20* (1984Pr06)
1147.6 *3*		1302.0	3/2$^+$,5/2$^+$	154.4	5/2$^+$			
1152[@] *1*	<236	1152		0	7/2$^+$			I_γ: from Iγ/Iγ(997γ)<1.6 *3* (1976Ma09).
1166.0 *3*	120[#] *8*	3228.2		2062.2	15/2$^-$			
1209.6 *3*	264[#] *11*	2188.2	(11/2$^-$,13/2$^-$)	978.6	11/2$^-$	D(+Q)	+1.2 *12*	
1235.6 *2*	160[#] *7*	1235.6	(9/2$^+$)	0	7/2$^+$	D+Q		α(K)exp=0.00052 *8* (1976Ma09)
1244.6 *3*	135[#] *8*	3306.8	$^-$	2062.2	15/2$^-$	Q		
1276.5[@] *4*	23 *4*	1276.7	(7/2$^+$)	0	7/2$^+$			I_γ: from Iγ/Iγ(1122.3)= 0.56 *8* (1976Ma09).
1323.6 *2*	66 *8*	1478.0	9/2$^+$	154.4	5/2$^+$	E2		α(K)exp=0.00083 *11* (1984Pr06)
1347.8 *1*	614 *20*	1347.8	11/2$^+$	0	7/2$^+$	E2		α(K)exp=0.00058 *3* (1984Pr06)
[x]1400.7[@] *7*								
[x]1423.6[@] *14*								
1478.2[@] *4*	23 *7*	1478.0	9/2$^+$	0	7/2$^+$			I_γ: from Iγ/Iγ(1323γ)= 0.35 *9* (1976Ma09).
1538.8 *3*	32 *5*	1693.2	(3/2$^+$,5/2$^+$)	154.4	5/2$^+$			
[x]1803[@] *1*								
[x]1881[@]								
[x]1977.9[@] *6*								

[†] From 1984Pr06 in (^{3}He,3nγ) E=32 MeV. Authors also give values for (^{3}He,3nγ) at E=20, 30 MeV, for (α,nγ) at E=20, 22, 24, and 27 MeV, and for (^{6}Li,4nγ) at E=41 MeV. These are all included when arriving at branchings in adopted γ's.

[‡] Based on α(K)exp normalized to α(K)(489γ)=0.0073 (M1 theory), $\gamma(\theta)$.

[#] Includes background line.

[@] From 1976Ma09.

[x] γ ray not placed in level scheme.

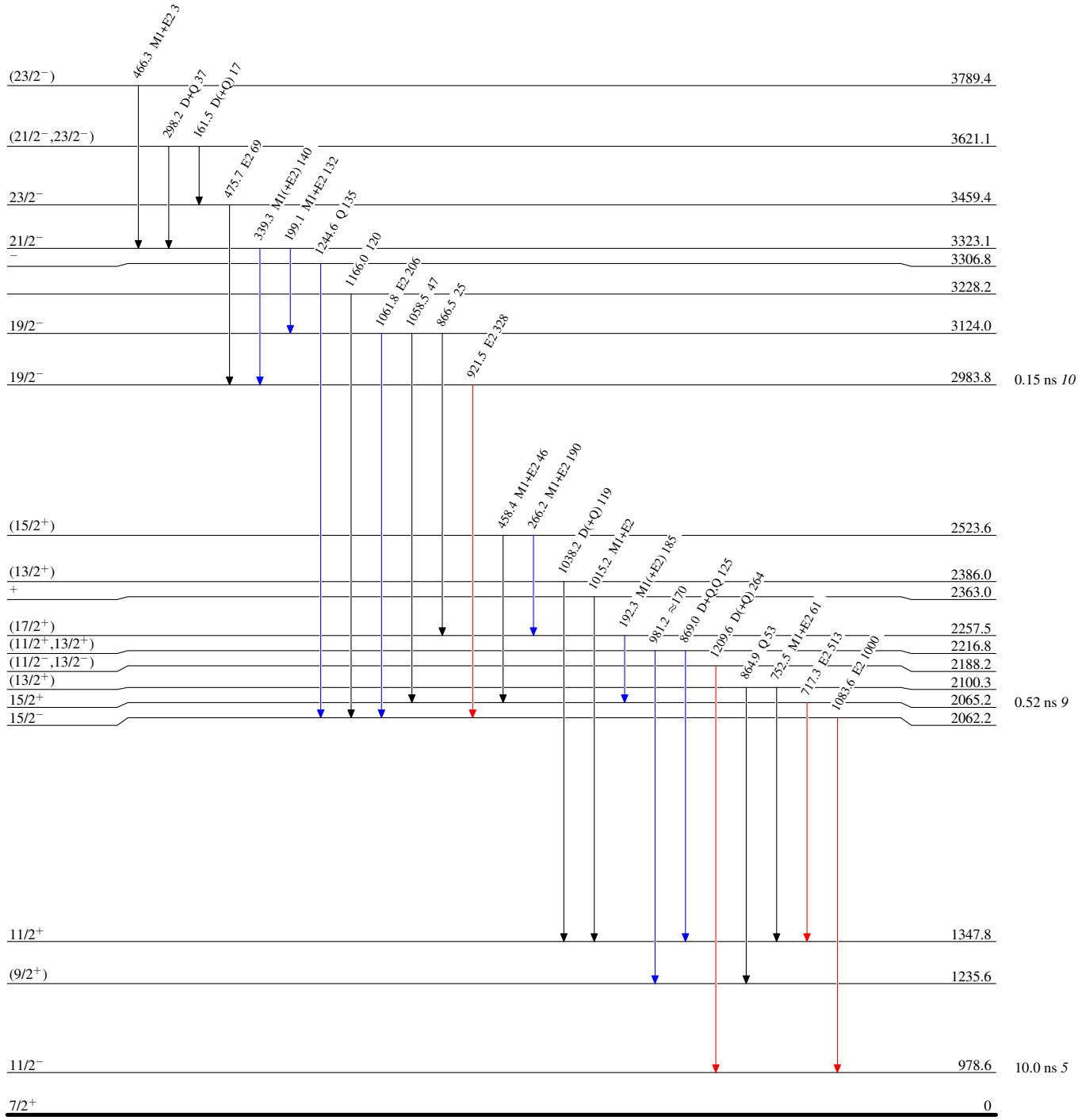
^{111}Cd(^{3}He,3nγ),^{108}Cd(α,nγ) **1984Pr06**

Legend

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

Level Scheme

Intensities: Type not specified

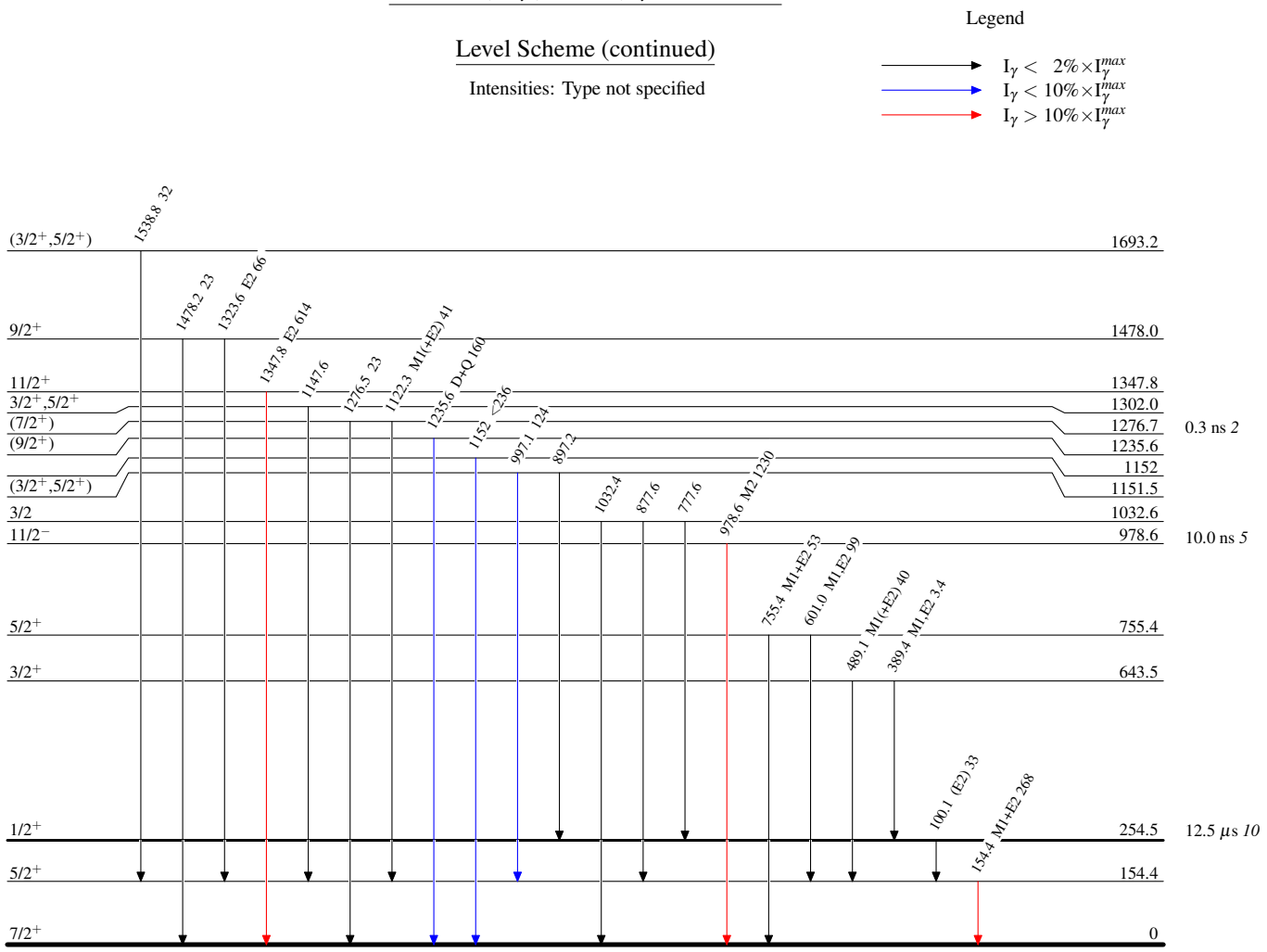


$^{111}_{50}Sn_{61}$

^{111}Cd(^{3}He,3nγ),^{108}Cd(α,nγ) 1984Pr06

Level Scheme (continued)

Intensities: Type not specified



$^{111}_{50}Sn_{61}$