(HI,xnγ) 1989Pa09,2003Ko23,2006Gr23

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Zoltan Elekes and Janos Timar	NDS 129, 191 (2015)	28-Feb-2015

1989Pa09: ^{120}Sn(^{11}B,3nγ) E(^{11}B)=50 MeV; measured Eγ, Iγ, γγ coincidence, γ(θ), γγ(θ), γ(t); deduced levels, rotational bands.

2003Ko23: ^{122}Sn(^{10}B,4nγ) E(^{10}B)=47 MeV; measured Eγ, Iγ, γγ coincidence, γγ(θ), γ(t); deduced high-spin levels, J, π, B(M1)/B(E2); 4 Compton-suppressed HPGe, 14-element BGO multiplicity filter, Pb-backed target, pulsed beam. See also 2001Ko30.

2006Gr23: ^{122}Sn(^{10}B,4nγ) E(^{10}B)=55 MeV, OSIRIS II array; measured Eγ, Iγ, γγ coincidence, DSA; deduced high-spin levels, J, π, $T_{1/2}$, B(M1), B(E2).

α: Additional information 1.

^{128}Cs Levels

The level scheme is based on the level schemes proposed by 1989Pa09 and by 2003Ko23, and also on unpublished results communicated with the first author of 2003Ko23, T. Koike.

E(level)	J^{π}[†]	$T_{1/2}$[‡]	Comments
0.0	1^+	3.66[#] min *2*	
0.0+x	(5)		Additional information 2.
x+18.6 *4*	(5)		
x+114.6 *3*			
x+187.57 *25*	(6^-)		
x+301.7 *3*	(7^-)		
x+322.5 *3*	(6,7)		
x+335.3 *3*	(6,7,8)		
x+430.1[d] *3*	(7^-)		
x+453.4[e] *3*	(8^-)		
x+510.8[c] *3*	(7^-)		
x+551.8[d] *3*	(8^-)		
x+596.7[&c] *4*	(8^-)		
x+612.1[b] *4*	(9^+)	50[@] ns *8*	
x+754.9[b] *6*	(10^+)		
x+772.7[d] *3*	(9^-)		
x+907.7[c] *4*	(9^-)		
x+1010.7[e] *4*	(10^-)		
x+1103.6[b] *6*	(11^+)		
x+1137.2[d] *4*	(10^-)		
x+1162.4[c] *5*	(10^-)		
x+1263.8[a] *6*	(11^+)		
x+1348.9[d] *4*	(11^-)		
x+1376.4[b] *7*	(12^+)		
x+1456.1[c] *5*	(11^-)		
x+1635.7[a] *7*	(12^+)	0.42 ps *+10−8*	
x+1737.6[e] *5*	(12^-)		
x+1784.6[b] *7*	(13^+)	0.52 ps *+20−10*	
x+1894.8[d] *4*	(12^-)		
x+1906.8[c] *8*	(12^-)		
x+1998.6[a] *6*	(13^+)	0.39 ps *+18−11*	
x+2086.4[d] *5*	(13^-)		

Continued on next page (footnotes at end of table)

(HI,xnγ) 1989Pa09,2003Ko23,2006Gr23 (continued)

^{128}Cs Levels (continued)

E(level)	J^{π}[†]	$T_{1/2}$[‡]	Comments
x+2155.6[b] 7	(14$^+$)	0.88 ps +16−14	
x+2190.0[b] 7	(13$^+$)		Seen only in 2003Ko23.
x+2205.6[c] 6	(13$^-$)		
x+2355.6[a] 7	(14$^+$)	0.53 ps +12−10	
x+2593.8[e] 6	(14$^-$)		
x+2620.1[b] 7	(15$^+$)	0.63 ps +13−11	
x+2714.8?[c] 13	(14$^-$)		
x+2794.8[d] 5	(14$^-$)		
x+2799.3[a] 7	(15$^+$)	0.50 ps +11−9	
x+2957.5[d] 6	(15$^-$)		
x+3025.5[c] 6	(15$^-$)		
x+3030.2[b] 8	(16$^+$)	0.84 ps +19−17	
x+3258.9[a] 7	(16$^+$)	0.58 ps +12−10	
x+3507.2[e] 7	(16$^-$)		
x+3523.5[b] 8	(17$^+$)	0.60 ps +17−12	
x+3711.5[a] 8	(17$^+$)	1.02 ps +24−20	
x+3807.8?[d] 11	(16$^-$)		
x+3882.6[c] 7	(17$^-$)		
x+3924.5[d] 6	(17$^-$)		
x+3960.6[b] 9	(18$^+$)	0.82 ps +20−14	
x+4453.4[e] 7	(18$^-$)		
x+4474.2[b] 9	(19$^+$)	0.86 ps +20−15	
x+4917.7[d] 7	(19$^-$)		
x+4947.4[b] 10	(20$^+$)	1.06 ps +23−20	

[†] From Adopted Levels, Gammas.
[‡] From DSA published in 2006Gr23 if not stated otherwise.
[#] From Adopted Levels, Gammas.
[@] From the decay curves of the 266γ in ^{129}Sn(^{11}B,3nγ) (1989Pa09).
[&] Based on communication with the first author of 2003Ko23, T. Koike.
[a] Band(A): configuration=$(\pi h_{11/2})(\nu h_{11/2})$ side.
[b] Band(B): configuration=$(\pi h_{11/2})(\nu h_{11/2})$ yrast.
[c] Band(C): configuration=$(\pi h_{11/2})(\nu g_{7/2})$.
[d] Band(D): configuration=$(\pi g_{7/2})(\nu h_{11/2})$.
[e] Band(E): configuration=$(\pi d_{5/2})(\nu h_{11/2})$.

(HI,xnγ) 1989Pa09,2003Ko23,2006Gr23 (continued)

γ(^{128}Cs)

E_γ [†]	I_γ [‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	δ[@a]	α	Comments
(18.6)		x+18.6	(5)	0.0+x	(5)				
107.5 *3*	>35	x+430.1	(7$^-$)	x+322.5	(6,7)	D+Q			A_2=−0.31 *4*, A_4=−0.16 *6*; R(DCO)=0.23 *5*.
114.3[bc] *3*	<30[b]	x+114.6		0.0+x	(5)				I_γ: from Iγ of the preceding G.
114.3[b] *3*	>300[b]	x+301.7	(7$^-$)	x+187.57	(6$^-$)	M1+E2		0.622 *12*	I_γ: given for doubly placed γ, and A_2, A_4 and DCO values are also given. A_2=−0.36 *6*, A_4=−0.15 *5*; R(DCO)=0.24 *3*. Mult.: from internal conversion coefficient based on intensity balance (1989Pa09).
121.7 *3*	>35	x+551.8	(8$^-$)	x+430.1	(7$^-$)	(M1+E2)		0.520 *10*	A_2=−0.36 *4*, A_4=−0.13 *6*; R(DCO)=0.30 *6*.
135.1 *3*	30 *3*	x+322.5	(6,7)	x+187.57	(6$^-$)	D+Q			A_2=+0.05 *4*, A_4=−0.08 *6*.
142.8 *5*	156 *8*	x+754.9	(10$^+$)	x+612.1	(9$^+$)	M1+E2	−0.05 *+6−7*	0.331 *7*	A_2=−0.33 *4*, A_4=−0.06 *5*; R(DCO)=0.49 *6* (2003Ko23). Mult.: from internal conversion coefficient based on intensity balance (1989Pa09).
143.2 *3*	>38	x+596.7	(8$^-$)	x+453.4	(8$^-$)				I_γ: estimated by the evaluators.
147.7 *3*	<5	x+335.3	(6,7,8)	x+187.57	(6$^-$)				
151.7 *3*	250 *25*	x+453.4	(8$^-$)	x+301.7	(7$^-$)	M1+E2		0.281 *5*	A_2=−0.33 *4*, A_4=−0.08 *5*; R(DCO)=0.34 *3*. Mult.: from internal conversion coefficient based on intensity balance (1989Pa09).
158.7 *3*	180 *18*	x+612.1	(9$^+$)	x+453.4	(8$^-$)	E1		0.0607	Mult.: from internal conversion coefficient based on intensity balance (1989Pa09). A2=−0.14 4, A4=−0.11 6.
169.0 *3*	>180	x+187.57	(6$^-$)	x+18.6	(5)	D+Q			A_2=+0.54 *5*, A_4=−0.14 *6*; R(DCO)=0.78 *4*.
175.4 *3*	5.0 *5*	x+510.8	(7$^-$)	x+335.3	(6,7,8)	D+Q			R(DCO)=0.4 *1*.
187.9 *3*	>300	x+187.57	(6$^-$)	0.0+x	(5)	D+Q			A_2=−0.18 *4*, A_4=−0.06 *5*; R(DCO)=0.73 *3*.
191 *1*	<1	x+2086.4	(13$^-$)	x+1894.8	(12$^-$)				
207.5[&] *3*	30 *3*	x+322.5	(6,7)	x+114.6					
209.3[&] *3*	108 *11*	x+510.8	(7$^-$)	x+301.7	(7$^-$)				R(DCO)=1.3 *1*. Value is that for a complex peak.
211.9 *3*	5.0 *5*	x+1348.9	(11$^-$)	x+1137.2	(10$^-$)				R(DCO)=0.4 *1*.
221.0 *3*	21 *2*	x+772.7	(9$^-$)	x+551.8	(8$^-$)	(M1+E2)		0.1001 *15*	A_2=−0.55 *4*, A_4=−0.04 *6*; R(DCO)=0.31 *1*.
229.3 *3*	20 *2*	x+551.8	(8$^-$)	x+322.5	(6,7)				
231 *1*	<5	x+3030.2	(16$^+$)	x+2799.3	(15$^+$)				Observed by 2006Gr23, Iγ$estimated by the evaluators.
242.7 *3*	10 *1*	x+430.1	(7$^-$)	x+187.57	(6$^-$)				
250.1 *3*	65 *7*	x+551.8	(8$^-$)	x+301.7	(7$^-$)	D+Q			R(DCO)=0.51 *5*.
265.8 *3*	60 *6*	x+453.4	(8$^-$)	x+187.57	(6$^-$)	(E2)		0.0643	A_2=−0.25 *4*, A_4=−0.07 *6*; R(DCO)=0.9 *2*; A_2 is in disagreement with assigned spins.
272.7 *5*	56 *6*	x+1376.4	(12$^+$)	x+1103.6	(11$^+$)	(M1+E2)	−0.09 *+5−7*	0.0571 *9*	R(DCO)=0.46 *6* (2003Ko23).
323.2 *3*	31 *3*	x+510.8	(7$^-$)	x+187.57	(6$^-$)	D+Q			R(DCO)=0.7 *1*.
342.4 *3*	14 *2*	x+772.7	(9$^-$)	x+430.1	(7$^-$)				
348.6 *5*	100	x+1103.6	(11$^+$)	x+754.9	(10$^+$)	(M1+E2)	−0.16 *+7−9*	0.0301	A_2=−0.54 *4*, A_4=+0.02 *5*; R(DCO)=0.40 *6* (2003Ko23).
357.0 *5*	4.4 *9*	x+2355.6	(14$^+$)	x+1998.6	(13$^+$)				
362.9 *5*	5.5 *9*	x+1998.6	(13$^+$)	x+1635.7	(12$^+$)				
364.6 *3*	9 *1*	x+1137.2	(10$^-$)	x+772.7	(9$^-$)	D+Q			R(DCO)=0.8 *2*.

$^{128}_{55}Cs_{73}$-3

(HI,xnγ) 1989Pa09,2003Ko23,2006Gr23 (continued)

γ(^{128}Cs) (continued)

E_γ [†]	I_γ [‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	δ[@a]	α	Comments
370.8 *5*	7.2 *14*	x+2155.6	(14$^+$)	x+1784.6	(13$^+$)	(M1+E2)	−0.09 *+9−10*	0.0257	R(DCO)=0.6 *1*.
371.8 *5*	7.1 *15*	x+1635.7	(12$^+$)	x+1263.8	(11$^+$)	(M1+E2)		0.0255	R(DCO)=0.47 *9* (2003Ko23).
396.9 *3*	46 *5*	x+907.7	(9$^-$)	x+510.8	(7$^-$)	(E2)		0.0183	A_2=+0.08 *5*, A_4=−0.05 *7*; R(DCO)=1.1 *1*.
408.0 *5*	49 *5*	x+1784.6	(13$^+$)	x+1376.4	(12$^+$)	(M1+E2)	−0.17 *6*	0.0201	A_2=−0.49 *6*, A_4=+0.21 *9*; R(DCO)=0.40 *3*.
411 *1*	6.0 *6*	x+3030.2	(16$^+$)	x+2620.1	(15$^+$)				From 1989Pa09.
413.9[&] *3*	25 *3*	x+1010.7	(10$^-$)	x+596.7	(8$^-$)	(E2)		0.01616	R(DCO)=1.0 *1*. Value is that for a complex peak.
436 *1*	<5	x+3960.6	(18$^+$)	x+3523.5	(17$^+$)				From 1989Pa09.
443.5 *5*	11 *2*	x+2799.3	(15$^+$)	x+2355.6	(14$^+$)				
451 *1*	<5	x+1906.8	(12$^-$)	x+1456.1	(11$^-$)				
452.4 *5*	1.5 *4*	x+3711.5	(17$^+$)	x+3258.9	(16$^+$)				
454.4 *3*	9 *1*	x+907.7	(9$^-$)	x+453.4	(8$^-$)	D+Q			R(DCO)=0.4 *1*.
459	<5	x+3258.9	(16$^+$)	x+2799.3	(15$^+$)				Observed by 2006Gr23, Iγ$estimated by the evaluators.
464.5 *5*	13 *2*	x+2620.1	(15$^+$)	x+2155.6	(14$^+$)	(M1+E2)		0.01452	R(DCO)=0.61 *6*.
493.1 *5*	3.9 *8*	x+3523.5	(17$^+$)	x+3030.2	(16$^+$)	(M1+E2)		0.01251	R(DCO)=0.7 *2*.
508.9 *5*	42.6 *43*	x+1263.8	(11$^+$)	x+754.9	(10$^+$)	(M1+E2)		0.01157	R(DCO)=0.82 *9*; gate:142.8 keV (2003Ko23).
514 *1*	<5	x+4474.2	(19$^+$)	x+3960.6	(18$^+$)				From 1989Pa09.
532.0 *5*	20 *2*	x+1635.7	(12$^+$)	x+1103.6	(11$^+$)	(M1+E2)		0.01037	R(DCO)=0.87 *10*; gate:348.6 keV (2003Ko23).
546.0 *3*	<5	x+1894.8	(12$^-$)	x+1348.9	(11$^-$)				
548.4 *3*	29 *3*	x+1456.1	(11$^-$)	x+907.7	(9$^-$)	(E2)		0.00731	A_2=+0.09 *5*, A_4=−0.10 *7*; R(DCO)=1.2 *1*.
554.2 *5*	5.9	x+2190.0	(13$^+$)	x+1635.7	(12$^+$)				
557.4 *3*	39 *4*	x+1010.7	(10$^-$)	x+453.4	(8$^-$)	(E2)		0.00700	A_2=+0.17 *5*, A_4=−0.14 *6*; R(DCO)=1.0 *1*.
565.7 *3*	13 *2*	x+1162.4	(10$^-$)	x+596.7	(8$^-$)	(E2)		0.00673	R(DCO)=1.5 *4*.
571.1 *5*	18 *2*	x+2355.6	(14$^+$)	x+1784.6	(13$^+$)	(M1+E2)		0.00871	R(DCO)=0.86 13; gate:408.0 keV (2003Ko23).
576.2[&] *3*	23 *3*	x+1348.9	(11$^-$)	x+772.7	(9$^-$)	(E2)		0.00641	R(DCO)=0.9 *1*. Value is that for a complex peak.
585.5 *3*	13 *2*	x+1137.2	(10$^-$)	x+551.8	(8$^-$)	(E2)		0.00615	R(DCO)=1.3 *1*.
621.6 *5*	56 *6*	x+1376.4	(12$^+$)	x+754.9	(10$^+$)	(E2)		0.00526	A_2=+0.19 *5*, A_4=−0.06 *7*; R(DCO)=1.2 *1*.
622.2 *5*	4.8 *9*	x+1998.6	(13$^+$)	x+1376.4	(12$^+$)	(M1+E2)		0.00707 *11*	R(DCO)=0.65 *14*; gate: 272.7 keV (2003Ko23).
638.6 *5*	6.4 *13*	x+3258.9	(16$^+$)	x+2620.1	(15$^+$)				
651.7 *5*	14.2 *14*	x+1263.8	(11$^+$)	x+612.1	(9$^+$)				
681.1 *5*	8.6 *9*	x+1784.6	(13$^+$)	x+1103.6	(11$^+$)	(E2)		0.00418	R(DCO)=1.6 *5*.
709 *1*	<5	x+2794.8	(14$^-$)	x+2086.4	(13$^-$)				
719.9 *5*	1.9 *6*	x+2355.6	(14$^+$)	x+1635.7	(12$^+$)				
726.9 *3*	25 *3*	x+1737.6	(12$^-$)	x+1010.7	(10$^-$)	(E2)		0.00356	A_2=+0.15 *5*, A_4=−0.07 *6*; R(DCO)=1.1 *1*.
735.0 *5*	13.7 *14*	x+1998.6	(13$^+$)	x+1263.8	(11$^+$)				
737.6 *3*	16 *2*	x+2086.4	(13$^-$)	x+1348.9	(11$^-$)	(E2)		0.00344	R(DCO)=1.0 *1*.
744 *1*	6.0 *6*	x+1906.8	(12$^-$)	x+1162.4	(10$^-$)				
749.5 *3*	17 *2*	x+2205.6	(13$^-$)	x+1456.1	(11$^-$)	(E2)		0.00331	R(DCO)=1.1 *1*.
757.3 *3*	5.0 *5*	x+1894.8	(12$^-$)	x+1137.2	(10$^-$)	(E2)		0.00323	R(DCO)=1.0 *2*.
779.2 *5*	34 *4*	x+2155.6	(14$^+$)	x+1376.4	(12$^+$)	(E2)		0.00302	A_2=+0.15 *5*, A_4=−0.18 *6*; R(DCO)=1.1 *1*.
800.9 *5*	5.9 *12*	x+2799.3	(15$^+$)	x+1998.6	(13$^+$)				
808[c] *1*	<5	x+2714.8?	(14$^-$)	x+1906.8	(12$^-$)				
819.9 *3*	9 *1*	x+3025.5	(15$^-$)	x+2205.6	(13$^-$)	(E2)		0.00268	R(DCO)=1.0 *1*.
835.5 *5*	10.0 *15*	x+2620.1	(15$^+$)	x+1784.6	(13$^+$)	(E2)		0.00256	R(DCO)=1.0 *3*.

$^{128}_{55}Cs_{73}$-4

(HI,xnγ) 1989Pa09,2003Ko23,2006Gr23 (continued)

γ(^{128}Cs) (continued)

E_γ [†]	I_γ [‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	α	Comments
856.2 *3*	13 *2*	x+2593.8	(14$^-$)	x+1737.6	(12$^-$)	(E2)	0.00242	R(DCO)=1.0 *1*.
857.1 *3*	<5	x+3882.6	(17$^-$)	x+3025.5	(15$^-$)	(E2)	0.00242	R(DCO)=0.9 *2*.
871.1 *3*	9 *1*	x+2957.5	(15$^-$)	x+2086.4	(13$^-$)	(E2)	0.00233	R(DCO)=1.3 *2*.
874.5 *5*	17 *2*	x+3030.2	(16$^+$)	x+2155.6	(14$^+$)	(E2)	0.00231	R(DCO)=1.2 *1*.
895 *1*	<5	x+1998.6	(13$^+$)	x+1103.6	(11$^+$)			Observed by 2006Gr23, Iγ$estimated by the evaluators.
900.0 *3*	5.0 *5*	x+2794.8	(14$^-$)	x+1894.8	(12$^-$)			
903.2 *5*	5.2 *11*	x+3523.5	(17$^+$)	x+2620.1	(15$^+$)	(E2)	0.00215	R(DCO)=1.3 *3*.
903.3 *5*	5.2 *11*	x+3258.9	(16$^+$)	x+2355.6	(14$^+$)			
912.4 *5*	3.4 *8*	x+3711.5	(17$^+$)	x+2799.3	(15$^+$)			
913.4 *3*	6.0 *6*	x+3507.2	(16$^-$)	x+2593.8	(14$^-$)	(E2)	0.00209	R(DCO)=1.0 *2*.
930.7 *5*	6.9 *10*	x+3960.6	(18$^+$)	x+3030.2	(16$^+$)	(E2)	0.00201	R(DCO)=1.1 *3*.
946.2 *3*	<5	x+4453.4	(18$^-$)	x+3507.2	(16$^-$)			
950.6 *5*	1.3 *5*	x+4474.2	(19$^+$)	x+3523.5	(17$^+$)			
967.0 *3*	<5	x+3924.5	(17$^-$)	x+2957.5	(15$^-$)	(E2)	0.00184	R(DCO)=1.5 *4*.
986.8 *5*	2.0 *6*	x+4947.4	(20$^+$)	x+3960.6	(18$^+$)	(E2)	0.001765 *25*	α=0.001765 *25* R(DCO)=1.1 *4*.
993.2 *3*	<5	x+4917.7	(19$^-$)	x+3924.5	(17$^-$)			
1013 *1*	<5	x+3807.8?	(16$^-$)	x+2794.8	(14$^-$)			

[†] From 1989Pa09, except for Band(A) and Band(B), where it is taken from 2003Ko23.
[‡] Relative to I(348.6γ)=100. From 1989Pa09, except for Band(A) and Band(B), where it is taken from 2003Ko23. Uncertainties of those intensities are about 5% for the strong and about 30% for the weaker transitions..
[#] From γ(θ), γγ(θ), DCO ratio, and decay scheme. A_2 and A_4 data and R(DCO) are from 1989Pa09 if not noted.
[@] From R(DCO) (2003Ko23).
[&] Included γ from the decay of ^{127}Cs.
[a] If No value given it was assumed δ=0.10 for E2/M1, δ=1.00 for E3/M2 and δ=0.10 for the other multipolarities.
[b] Multiply placed with intensity suitably divided.
[c] Placement of transition in the level scheme is uncertain.

$^{128}_{55}Cs_{73}$-5

(HI,xnγ) 1989Pa09,2003Ko23,2006Gr23

Level Scheme

Intensities: Relative I_γ

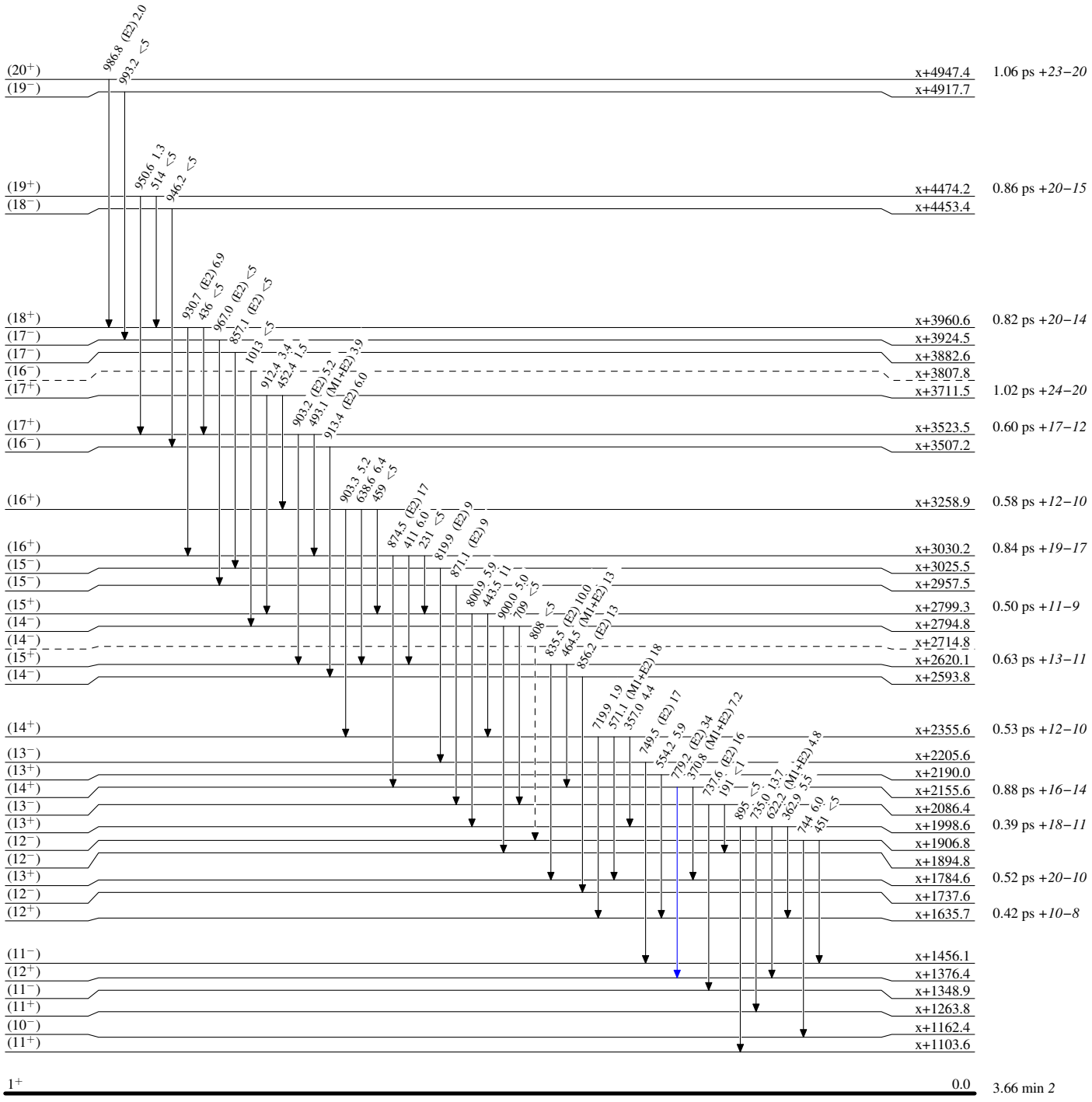
Legend

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

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

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

γ Decay (Uncertain)



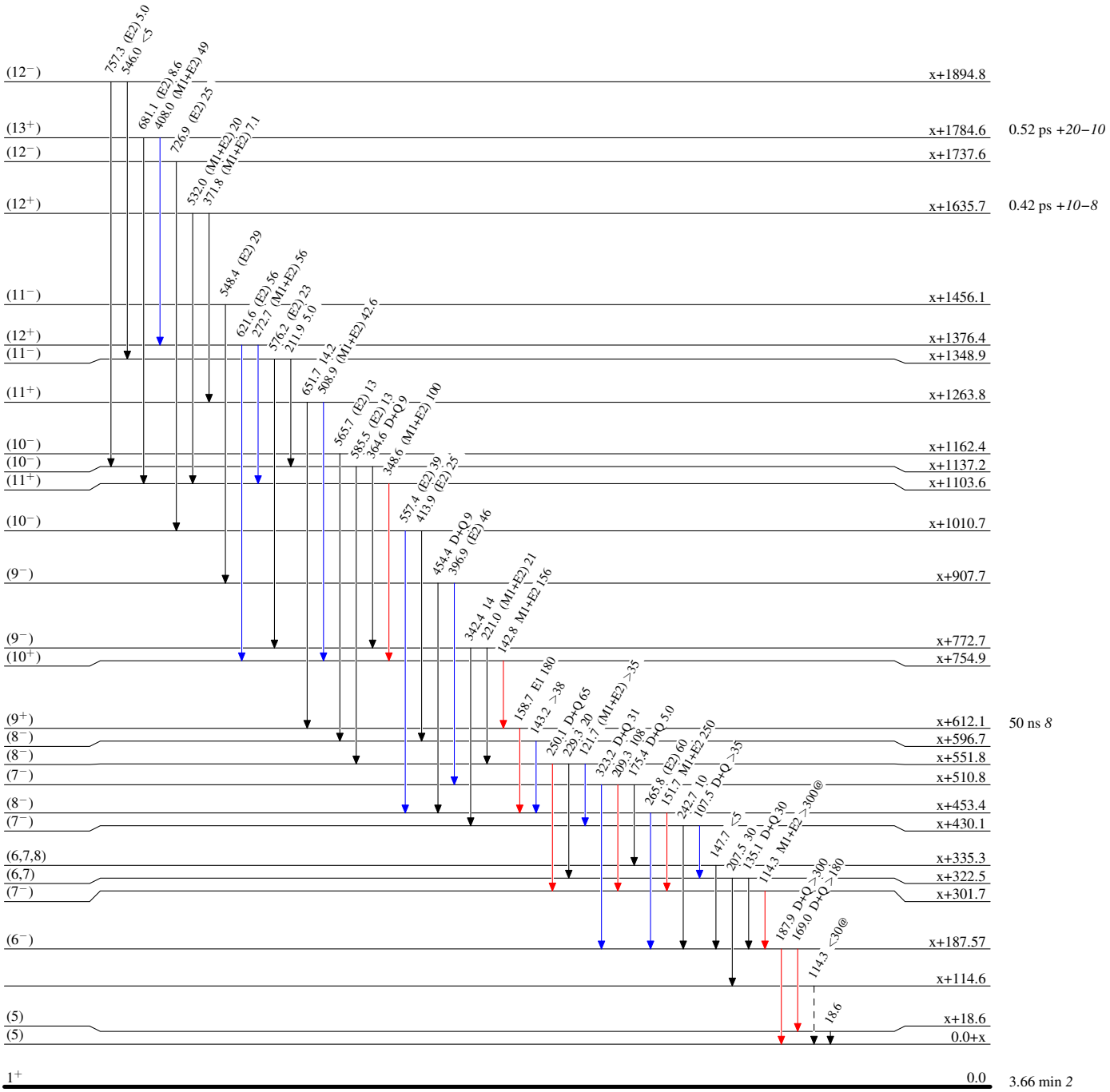
$^{128}_{55}Cs_{73}$

(HI,xnγ) 1989Pa09,2003Ko23,2006Gr23

Level Scheme (continued)

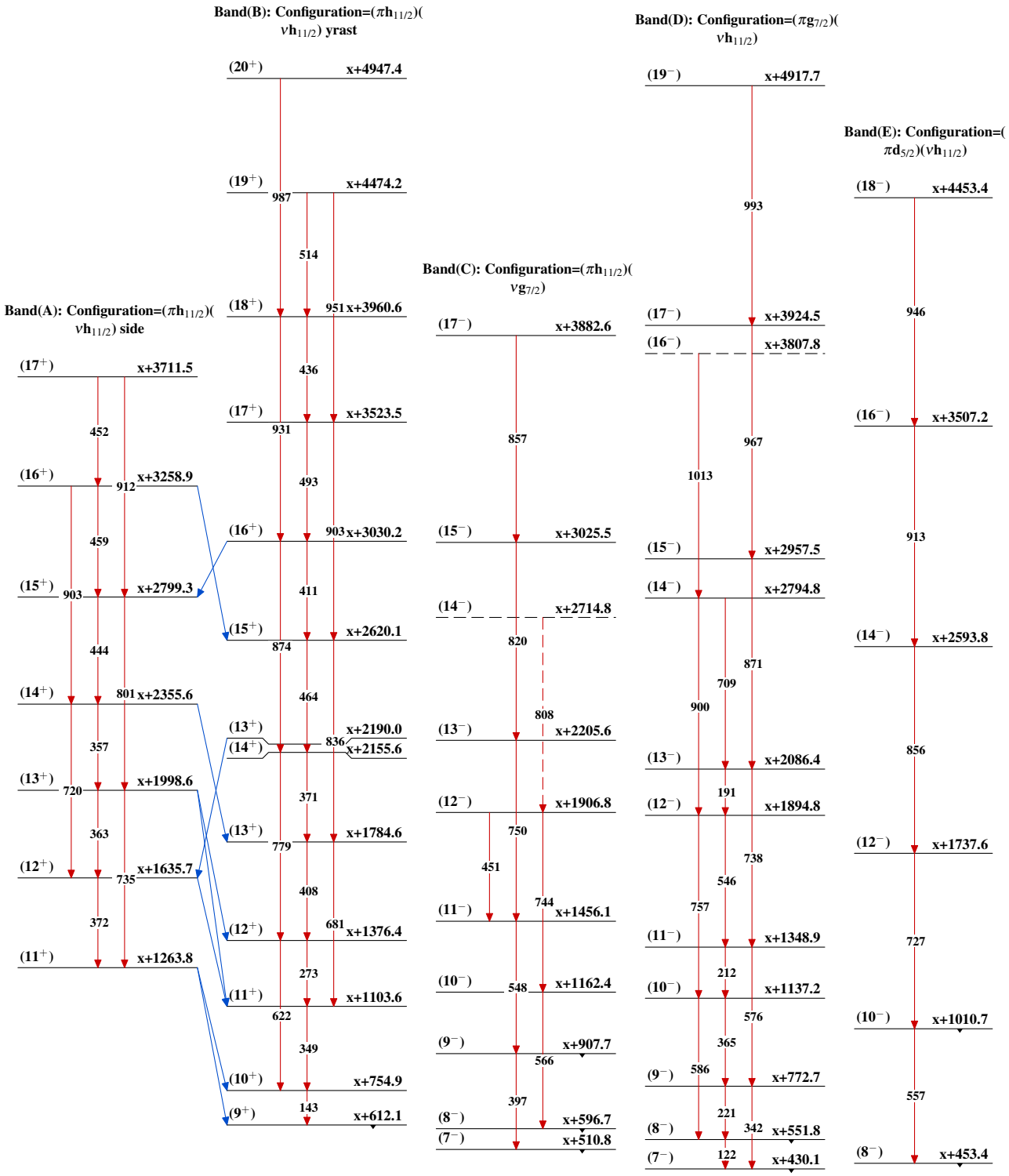
Intensities: Relative I_γ
@ Multiply placed: intensity suitably divided

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



$^{128}_{55}Cs_{73}$

(HI,xnγ) 1989Pa09,2003Ko23,2006Gr23



$^{128}_{55}Cs_{73}$