(HI,xnγ) 1990Li22

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	A. Hashizume	NDS 112, 1647 (2011)	1-Oct-2009

1990Li22: ^{120}Sn(^{11}B,4nγ) E=50 MeV; γ, γγ coin, γ(θ), DCO ratio, pulsed beam γ(t), γ-multiplicity.
1980Dr07: ^{127}I(α,4nγ) E=51 MeV; γ, γγ coin, γ(θ), excitation function.
1979Ga01: ^{120}Sn(^{10}B,3nγ) E=41 MeV; γ, γγ coin, γ(θ), excitation function.
The level scheme is that proposed by 1990Li22.

^{127}Cs Levels

E(level)[†]	Jπ[g,h]	$T_{1/2}$[f]	E(level)[†]	Jπ[g,h]	E(level)[†]	Jπ[g,h]
0.0	1/2(+)	6.25 h *10*	2104.6[@] *7*	(17/2+)	3365.0[e] *7*	(27/2−)
65.8[a] *3*	5/2(+)	25.5 ns *15*	2116.6 *6*	(21/2−)	3369.7[‡] *9*	
138.6 *4*	3/2(+)		2166.6[#] *9*	(17/2+)	3562.2[b] *7*	(27/2+)
246.5[@] *7*	(5/2+)		2202.4[‡] *7*	(15/2−)	3645.0[a] *13*	
272.8[a] *4*	(7/2+)		2257.4[c] *7*	(23/2−)	3646.9[&] *14*	(27/2+)
452.1[c] *5*	(11/2−)	55 μs *3*	2440.2[‡] *8*	(17/2−)	3765.9[‡] *9*	
454.5[a] *4*	9/2(+)		2577.5[#] *10*	(19/2+)	3814.7[d] *7*	(29/2−)
685.9[@] *6*	(9/2+)		2638.3[e] *6*	(23/2−)	3912.3[b] *8*	(29/2+)
707.0[a] *5*	(11/2+)		2690.9[a] *9*	21/2(+)	3984.2?[a]	
853.8[#] *5*	(9/2+)		2696.7[‡] *8*	(19/2−)	4037.9[&] *17*	
866.0[c] *6*	(15/2−)		2747.0[&] *7*	(19/2+)	4100.4[d] *7*	(31/2−)
1043.3[a] *8*	13/2(+)		2896.9[&] *7*	(21/2+)	4174.5[e] *10*	
1130.9[#] *6*	(11/2+)		2934.8 *7*	(25/2−)	4303.9[b] *8*	(31/2+)
1316.0[@] *7*	(13/2+)		2959.6[@] *12*		4392.9[&] *20*	
1322.9[a] *6*	(15/2+)		2999.5[b] *7*	(23/2+)	4639.5[d] *9*	(33/2−)
1441.8[#] *6*	(13/2+)		3001.5[a] *7*	(23/2+)	4722.6[b] *10*	
1457.3[c] *6*	(19/2−)		3008.3[‡] *9*	(21/2−)	4953.5[d] *10*	(35/2−)
1491.5 *6*	(17/2−)		3017.5[#] *12*	(21/2+)	5177.8[b] *11*	
1787.4[#] *7*	(15/2+)		3060.5[&] *7*	(23/2+)	5186.5[e] *14*	
1802.0[a] *9*	17/2(+)		3062?		5534.5[d] *11*	
1955.6[e] *6*	(19/2−)		3155.9[c] *7*	(27/2−)	5864.5[d] *13*	
2094.1[‡] *7*	(13/2−)		3260.9[b] *7*	(25/2+)		
2096.0[a] *6*	(19/2+)		3353.0[&] *7*	(25/2+)		

[†] Energy values are based on a least-squares fit to relevant E_γ's.
[‡] Negative-parity band.
[#] 9/2[404] band.
[@] (π,α)=(+,+1/2) 1/2[420] band.
[&] Negative-parity band.
[a] 3/2[422] band.
[b] Positive-parity band.
[c] 11/2[550] band.
[d] Negative-parity band.
[e] (π,α)=(-,−1/2) band.
[f] No levels with $T_{1/2}$>8 ns are observed other than those listed.
[g] Spin and parity values are those proposed by 1990Li22 based on assumed spin and parity values for the base states: 273 keV (7/2+), 452 keV (11/2−).
[h] Systematics of Routhian plots are presented for the bands in ^{123,125,127,129,131}Cs (by 2009Si08).

(HI,xnγ) 1990Li22 (continued)

γ(^{127}Cs)

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[a]	δ[b]	Comments
65.8 *3*	>100	65.8	5/2$^{(+)}$	0.0	1/2$^{(+)}$			
72.8 *3*	>50	138.6	3/2$^{(+)}$	65.8	5/2$^{(+)}$			
108.3 *3*	<2	2202.4	(15/2$^-$)	2094.1	(13/2$^-$)	D+Q		δ: −0.3<δ<0; A$_2$=−0.340 40, A$_4$=−0.1169 57.
134.2 *3*	40 *1*	272.8	(7/2$^+$)	138.6	3/2$^{(+)}$	Q		DCO=0.81 *2*.
150[@] *1*	<3	2896.9	(21/2$^+$)	2747.0	(19/2$^+$)			
163.6 *3*	6 *4*	3060.5	(23/2$^+$)	2896.9	(21/2$^+$)	D+Q		δ: −0.3<δ<0. A$_2$=−0.336 42, A$_4$=+0.025 58.
167 *1*	<2	853.8	(9/2$^+$)	685.9	(9/2$^+$)			
179.4 *3*	72 *7*	452.1	(11/2$^-$)	272.8	(7/2$^+$)			
180[@] *1*	7 *1*	246.5	(5/2$^+$)	65.8	5/2$^{(+)}$	(D+Q)		DCO=0.96 *3*.
181 *1*	<2	454.5	9/2$^{(+)}$	272.8	(7/2$^+$)			
201 *1*	3 *1*	3260.9	(25/2$^+$)	3060.5	(23/2$^+$)	D(+Q)	−0.14 *18*	A$_2$=−0.344 49, A$_4$=+0.046 67.
206.9 *3*	96 *1*	272.8	(7/2$^+$)	65.8	5/2$^{(+)}$	D+Q		DCO=0.73 *1*.
220.8 *3*	5 *1*	3155.9	(27/2$^-$)	2934.8	(25/2$^-$)	D+Q	+0.28 *3*	A$_2$=+0.130 63, A$_4$=+0.091 82.
231 *1*	<2	685.9	(9/2$^+$)	454.5	9/2$^{(+)}$			
237.8 *3*	<2	2440.2	(17/2$^-$)	2202.4	(15/2$^-$)	D+Q		δ: −1.8<δ<−0.4. A$_2$=−0.882 40, A$_4$=+0.103 63.
253 *1*	<2	707.0	(11/2$^+$)	454.5	9/2$^{(+)}$			
256.4 *3*	<2	2696.7	(19/2$^-$)	2440.2	(17/2$^-$)	D+Q		δ: −1.6<δ<−0.3, A$_2$=−0.629 53, A$_4$=+0.174 63.
259.5 *3*	3 *1*	3260.9	(25/2$^+$)	3001.5	(23/2$^+$)	D+Q		δ: −1.2<δ<−0.1. A$_2$=−0.458 48, A$_4$=+0.114 67.
261.4 *3*	3 *1*	3260.9	(25/2$^+$)	2999.5	(23/2$^+$)	D+Q		DCO=0.36 2; A$_2$=−0.611 51, A$_4$=+0.193 71. δ: −1.8<δ<−0.2.
277.1 *3*	8 *1*	1130.9	(11/2$^+$)	853.8	(9/2$^+$)	D+Q	+0.11 *6*	A$_2$=−0.055 44, A$_4$=−0.046 58.
287 *1*	<2	4100.4	(31/2$^-$)	3814.7	(29/2$^-$)	D+Q		DCO=0.59 *7*.
292 *1*	[&]	3645.0		3353.0	(25/2$^+$)			
292.5 *3*	5 *1*	3353.0	(25/2$^+$)	3060.5	(23/2$^+$)	D+Q	−0.23 *20*	A$_2$=−0.440 46, A$_4$=+0.054 64.
301.4 *3*	7 *1*	3562.2	(27/2$^+$)	3260.9	(25/2$^+$)	D+Q	−0.24 *17*	DCO=0.39 3; A$_2$=−0.551 38, A$_4$=+0.007 5.
311.0[@] *3*	5 *1*	1441.8	(13/2$^+$)	1130.9	(11/2$^+$)			
311.7 *3*	<2	3008.3	(21/2$^-$)	2696.7	(19/2$^-$)			
314 *1*	<2	4953.5	(35/2$^-$)	4639.5	(33/2$^-$)	D+Q		DCO=0.41 *8*.
330 *1*	<2	5864.5		5534.5				
336 *1*	<2	1043.3	13/2$^{(+)}$	707.0	(11/2$^+$)			
345.6 *3*	3 *1*	1787.4	(15/2$^+$)	1441.8	(13/2$^+$)	D+Q	+0.11 *1*	A$_2$=−0.048 56, A$_4$=−0.007 73.
346 *1*	<2	2440.2	(17/2$^-$)	2094.1	(13/2$^-$)			
350.2 *3*	4 *1*	3912.3	(29/2$^+$)	3562.2	(27/2$^+$)	D+Q		DCO=0.31 1; A$_2$=−0.473 39, A$_4$=+0.093 55. δ: −1.2<δ<−0.1.
354 *1*	<2	3353.0	(25/2$^+$)	2999.5	(23/2$^+$)			
355 *1*	<2	4392.9		4037.9				
361.6 *3*	<2	3369.7		3008.3	(21/2$^-$)			
379 *1*	<2	2166.6	(17/2$^+$)	1787.4	(15/2$^+$)			
388.8 *3*	14 *1*	454.5	9/2$^{(+)}$	65.8	5/2$^{(+)}$	Q		DCO=0.98 4; A$_2$=+0.108 46, A$_4$=−0.061 56.
391 *1*	<2	4037.9		3646.9	(27/2$^+$)			
391.6 *3*	<3	4303.9	(31/2$^+$)	3912.3	(29/2$^+$)	D+Q		DCO=0.45 50; A$_2$=−0.525 48, A$_4$=+0.075 68. δ: −0.9<δ<−0.3.
396.2 *3*	<2	3765.9		3369.7				
411 *1*	<2	2577.5	(19/2$^+$)	2166.6	(17/2$^+$)			
413 *1*	<2	685.9	(9/2$^+$)	272.8	(7/2$^+$)			
413.9 *3*	100	866.0	(15/2$^-$)	452.1	(11/2$^-$)	Q		DCO=1.03 2; A$_2$=+0.146 50, A$_4$=0.082 60.
419 *1*	<2	4722.6		4303.9	(31/2$^+$)			
434.2 *3*	30 *1*	707.0	(11/2$^+$)	272.8	(7/2$^+$)	Q		DCO=1.00 1; A$_2$=+0.141 46, A$_4$=−0.090 56.
439.3 *3*	7 *1*	685.9	(9/2$^+$)	246.5	(5/2$^+$)	Q		DCO=1.01 3; A$_2$=+0.113 48, A$_4$=−0.052 59.
440 *1*	<2	3017.5	(21/2$^+$)	2577.5	(19/2$^+$)			

Continued on next page (footnotes at end of table)

(HI,xnγ) 1990Li22 (continued)

$\gamma(^{127}Cs)$ (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[a]	δ[b]	Comments
455 *1*	<2	5177.8		4722.6				
464.4 *3*	8 *1*	1955.6	(19/2$^-$)	1491.5	(17/2$^-$)	D+Q	−0.8 *3*	A_2=−0.696 38, A_4=+0.139 54.
495 *1*	<2	2696.7	(19/2$^-$)	2202.4	(15/2$^-$)			
522.2 *3*	5 *1*	2638.3	(23/2$^-$)	2116.6	(21/2$^-$)	D+Q	−0.9 *3*	A_2=−0.706 44, A_4=+0.138 62.
539 *1*	<2	4639.5	(33/2$^-$)	4100.4	(31/2$^-$)	D+Q		DCO=0.38 *4*.
562[#] *1*	[&]	3562.2	(27/2$^+$)	2999.5	(23/2$^+$)			
568 *1*	<2	3008.3	(21/2$^-$)	2440.2	(17/2$^-$)			
581[#] *1*	[&]	5534.5		4953.5	(35/2$^-$)			
581.1 *3*	13 *1*	853.8	(9/2$^+$)	272.8	(7/2$^+$)	D+Q	+0.19 *2*	A_2=+0.033 46, A_4=+0.036 59.
588 *1*	2	1441.8	(13/2$^+$)	853.8	(9/2$^+$)			
589[@] *1*	13 *1*	1043.3	13/2$^{(+)}$	454.5	9/2$^{(+)}$	Q		DCO=0.99 *5*.
591.1 *3*	66 *1*	1457.3	(19/2$^-$)	866.0	(15/2$^-$)	Q		DCO=1.07 1; A_2=+0.241 50, A_4=−0.128 60.
615.9 *3*	25 *1*	1322.9	(15/2$^+$)	707.0	(11/2$^+$)	Q		DCO=1.06 2; A_2=+0.280 50, A_4=−0.132 58.
625.7[@] *3*	12 *1*	2116.6	(21/2$^-$)	1491.5	(17/2$^-$)			
626.3[@] *3*	15 *1*	1491.5	(17/2$^-$)	866.0	(15/2$^-$)			
630.1 *3*	6 *1*	1316.0	(13/2$^+$)	685.9	(9/2$^+$)	Q		DCO=0.98 4; A_2=+0.203 54, A_4=+0.039 67.
642[d] *1*	<2	2747.0	(19/2$^+$)	2104.6	(17/2$^+$)			
651 *1*	<2	3912.3	(29/2$^+$)	3260.9	(25/2$^+$)			
656 *1*	<2	1787.4	(15/2$^+$)	1130.9	(11/2$^+$)			
658 *1*	<2	3814.7	(29/2$^-$)	3155.9	(27/2$^-$)	D+Q		DCO=0.61 *6*.
659.2 *3*	12 *1*	2116.6	(21/2$^-$)	1457.3	(19/2$^-$)	D+Q	−0.70 *5*	DCO=0.25 3; A_2=−0.865 36, A_4=+0.144 50.
672 *1*	<2	3369.7		2696.7	(19/2$^-$)			
679 *1*	5 *1*	2934.8	(25/2$^-$)	2257.4	(23/2$^-$)	D+Q	−1.1 *8*	DCO=0.20 6; A_2=−0.661 45, A_4=+0.276 63.
682.4 *3*	11 *1*	2638.3	(23/2$^-$)	1955.6	(19/2$^-$)	Q		DCO=1.08 4; A_2=+0.256 50, A_4=−0.144 60.
725 *1*	2	2166.6	(17/2$^+$)	1441.8	(13/2$^+$)			
726.8 *3*	8 *1*	3365.0	(27/2$^-$)	2638.3	(23/2$^-$)	Q		DCO=0.96 8; A_2=+0.152 51, A_4=−0.041 63.
741 *1*	<2	4303.9	(31/2$^+$)	3562.2	(27/2$^+$)			
757 *1*	<2	3765.9		3008.3	(21/2$^-$)			
758.7 *3*	6 *1*	1802.0	17/2$^{(+)}$	1043.3	13/2$^{(+)}$	Q		DCO=1.05 6; A_2=+0.309 60, A_4=+0.003 73.
773.1 *3*	23 *1*	2096.0	(19/2$^+$)	1322.9	(15/2$^+$)	Q		DCO=1.05 2; A_2=+0.251 49, A_4=−0.129 57.
788.6 *3*	3 *1*	2104.6	(17/2$^+$)	1316.0	(13/2$^+$)	Q		DCO=0.88 3; A_2=+0.285 59, A_4=−0.154 73.
790 *1*	<2	2577.5	(19/2$^+$)	1787.4	(15/2$^+$)			
792 *1*	<2	2896.9	(21/2$^+$)	2104.6	(17/2$^+$)	Q		DCO=0.97 *10*.
800.2 *3*	31 *1*	2257.4	(23/2$^-$)	1457.3	(19/2$^-$)	Q		DCO=1.10 1; A_2=+0.214 50, A_4=−0.115 57.
810[c] *1*	[&]	4174.5		3365.0	(27/2$^-$)			
810[c] *1*	<2	4722.6		3912.3	(29/2$^+$)			
818.0 *3*	7 *1*	2934.8	(25/2$^-$)	2116.6	(21/2$^-$)	Q		A_2=+0.151 51, A_4=−0.048 63.
825 *1*	<2	4639.5	(33/2$^-$)	3814.7	(29/2$^-$)			
851 *1*	<2	3017.5	(21/2$^+$)	2166.6	(17/2$^+$)			
853 *1*	<2	4953.5	(35/2$^-$)	4100.4	(31/2$^-$)	Q		DCO=0.85 *5*.
855 *1*	<2	2959.6		2104.6	(17/2$^+$)			
874 *1*	<2	5177.8		4303.9	(31/2$^+$)			
880.1 *3*	3 *1*	3814.7	(29/2$^-$)	2934.8	(25/2$^-$)	Q		DCO=0.91 5; A_2=+0.139 94, A_4=+0.040 91.
888.9 *3*	3 *1*	2690.9	21/2$^{(+)}$	1802.0	17/2$^{(+)}$	Q		DCO=1.01 10; A_2=+0.306 75, A_4=−0.072 95.
895 *1*	<2	5534.5		4639.5	(33/2$^-$)			
898.5 *3*	12 *1*	3155.9	(27/2$^-$)	2257.4	(23/2$^-$)	Q		DCO=1.03 2; A_2=+0.205 49, A_4= −0.109 59.
903.4 *3*	8 *1*	2999.5	(23/2$^+$)	2096.0	(19/2$^+$)	Q		DCO=1.10 3; A_2=+0.141 49, A_4=−0.107 61.
905.5 *3*	5 *1*	3001.5	(23/2$^+$)	2096.0	(19/2$^+$)	Q		DCO=1.11 4; A_2=+0.211 53, A_4=−0.134 63.
911 *1*		5864.5		4953.5	(35/2$^-$)			
941 *1*	<2	2896.9	(21/2$^+$)	1955.6	(19/2$^-$)			
944.4 *3*	6 *1*	4100.4	(31/2$^-$)	3155.9	(27/2$^-$)	Q		DCO=1.03 5; A_2=+0.120 57, A_4=+0.030 72.
956[#d] *1*	<2[&]	3062?		2104.6	(17/2$^+$)			
956[#] *1*	[&]	3646.9	(27/2$^+$)	2690.9	21/2$^{(+)}$			

Continued on next page (footnotes at end of table)

(HI,xnγ) 1990Li22 (continued)

$\gamma(^{127}Cs)$ (continued)

E_γ [†]	I_γ [‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[a]	δ[b]	Comments
963.2 *3*	2.5 *4*	2094.1	(13/2$^-$)	1130.9	(11/2$^+$)	D(+Q)	0.00 *3*	A_2=−0.200 58, A_4=−0.030 82.
983[d] *1*	<2	3984.2?		3001.5	(23/2$^+$)			
1012 *1*	<2	5186.5		4174.5				
1018 *1*	<2	4174.5		3155.9	(27/2$^-$)			
1088.9 *3*	4 *1*	1955.6	(19/2$^-$)	866.0	(15/2$^-$)	Q		DCO=0.90 4; A_2=+0.270 62, A_4=−0.026 76.
1107 *1*	&	3365.0	(27/2$^-$)	2257.4	(23/2$^-$)	Q		DCO=0.91 *3*.
1180 *1*	<3	2638.3	(23/2$^-$)	1457.3	(19/2$^-$)	Q		DCO=0.83 *9*.
1255.5 *3*	<3	2747.0	(19/2$^+$)	1491.5	(17/2$^-$)	D		A_2=−0.100 98, A_4=0.
1440 *1*	<2	2896.9	(21/2$^+$)	1457.3	(19/2$^-$)			

† From 1990Li22.
‡ From 1990Li22, relative to I(413.9 γ)=100.
# From the author's level scheme. Uncertainties are those proposed by the authors.
@ Unresolved doublet (1990Li22).
& No intensity is given by authors.
[a] From DCO ratio and/or A_2 and A_4 (1990Li22). DCO ratios observed are typically ≥1.0 for stretched quadrupole transitions, and ≤0.6 for stretched dipole transitions(1990Li22). Although DCO=0.96 *3* for the 180 keV γ from 246.5 level, its multipolarity is assigned as M1/E2 by 1990Li22 announcing that the the spectrum peak corresponding this γ is complex.
[b] The observed A_2/A_0 and A_4/A_0 for stretched E2 transitions were used to obtain alignment parameters A_2 and A_4 for each band. From these alignment parameters and from experimental angular distribution coefficients, using theoretical angular distribution table (1967Ya05), δ were obtained (1990Li22).
[c] Multiply placed.
[d] Placement of transition in the level scheme is uncertain.

(HI,xnγ) 1990Li22

Level Scheme

Intensities: Relative I_γ

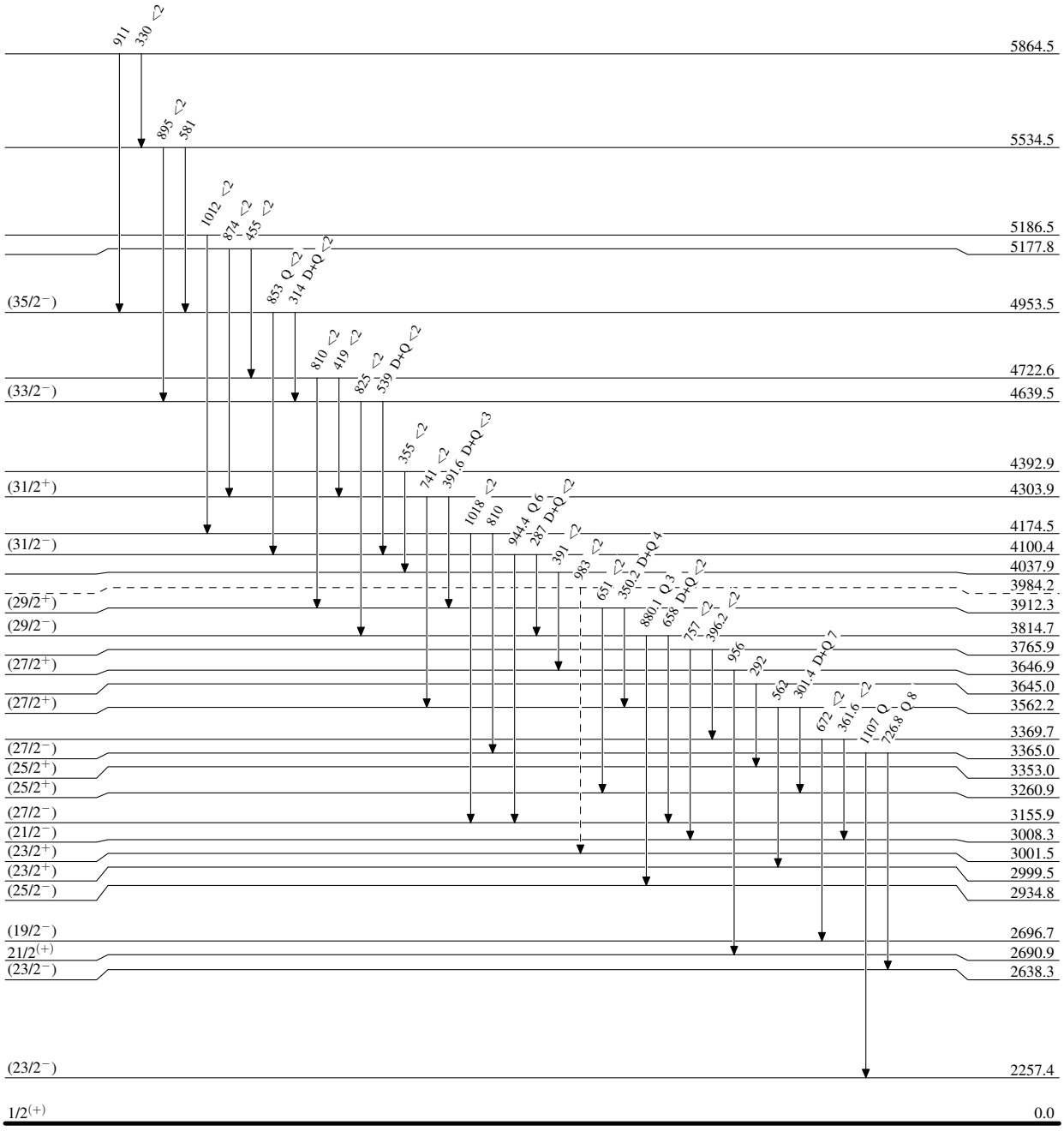
Legend

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

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

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

γ Decay (Uncertain)



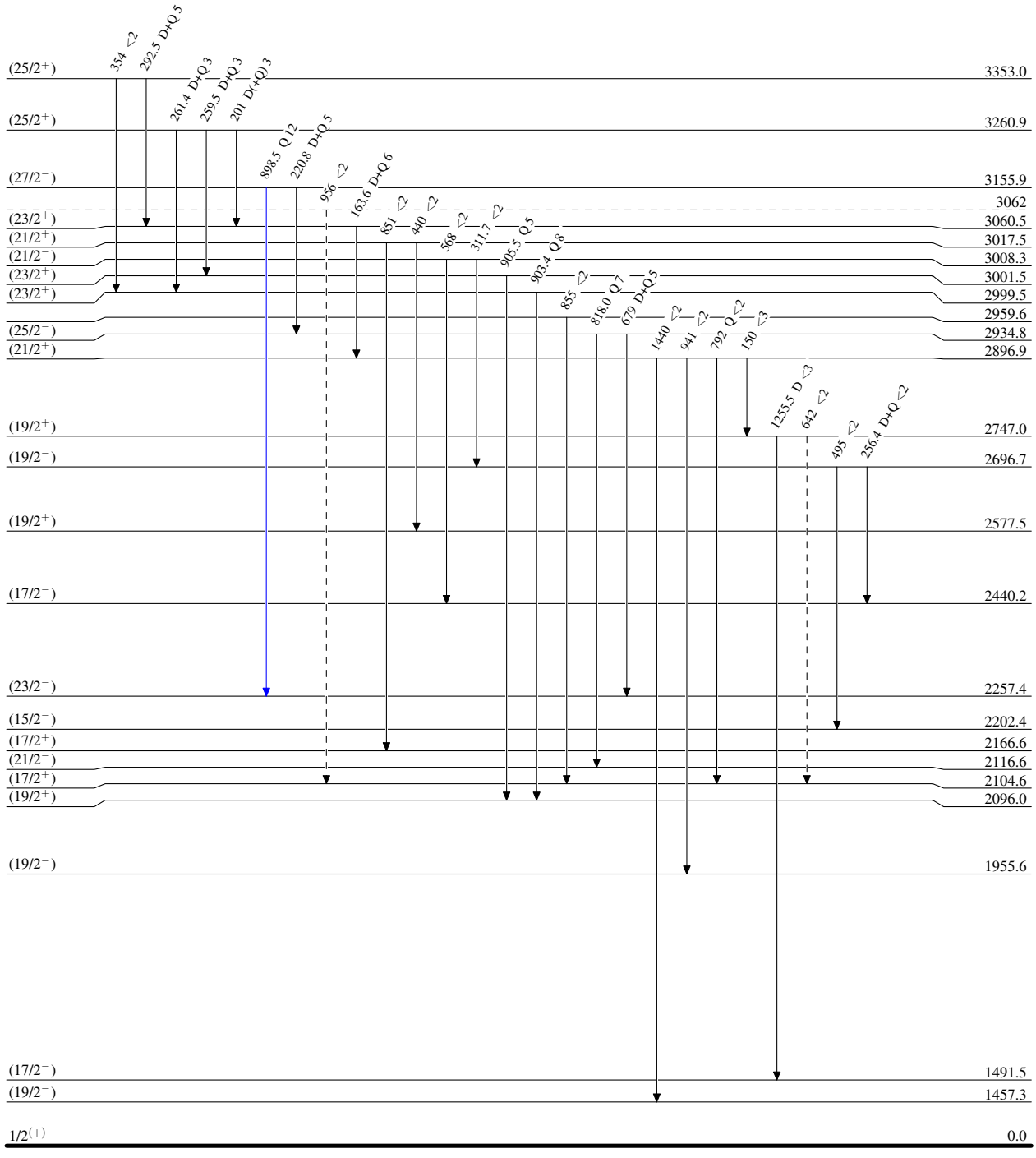
$^{127}_{55}Cs_{72}$

(HI,xnγ) 1990Li22

Level Scheme (continued)

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)



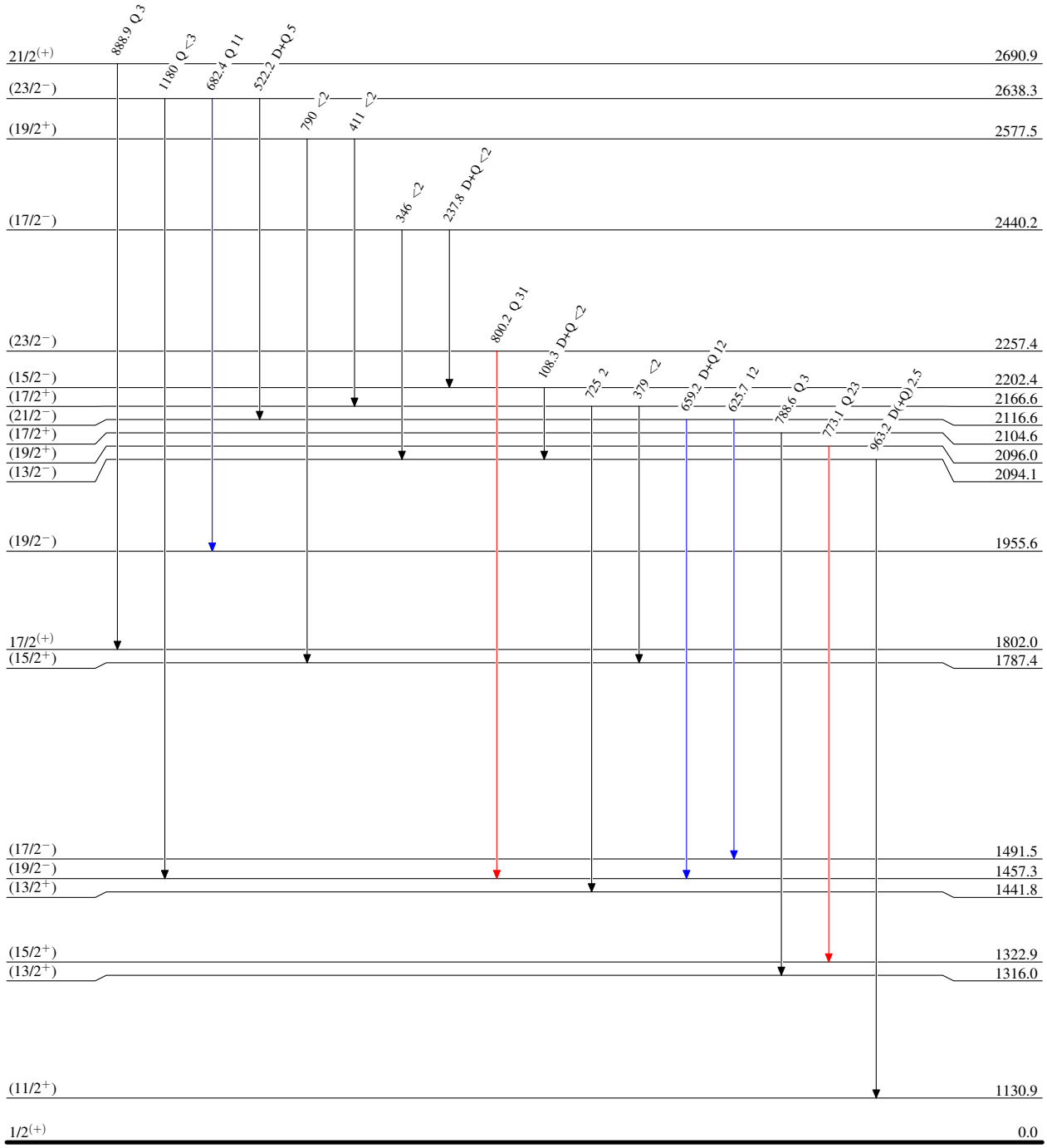
$^{127}_{55}Cs_{72}$

(HI,xnγ) 1990Li22

Level Scheme (continued)

Intensities: Relative I_γ

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

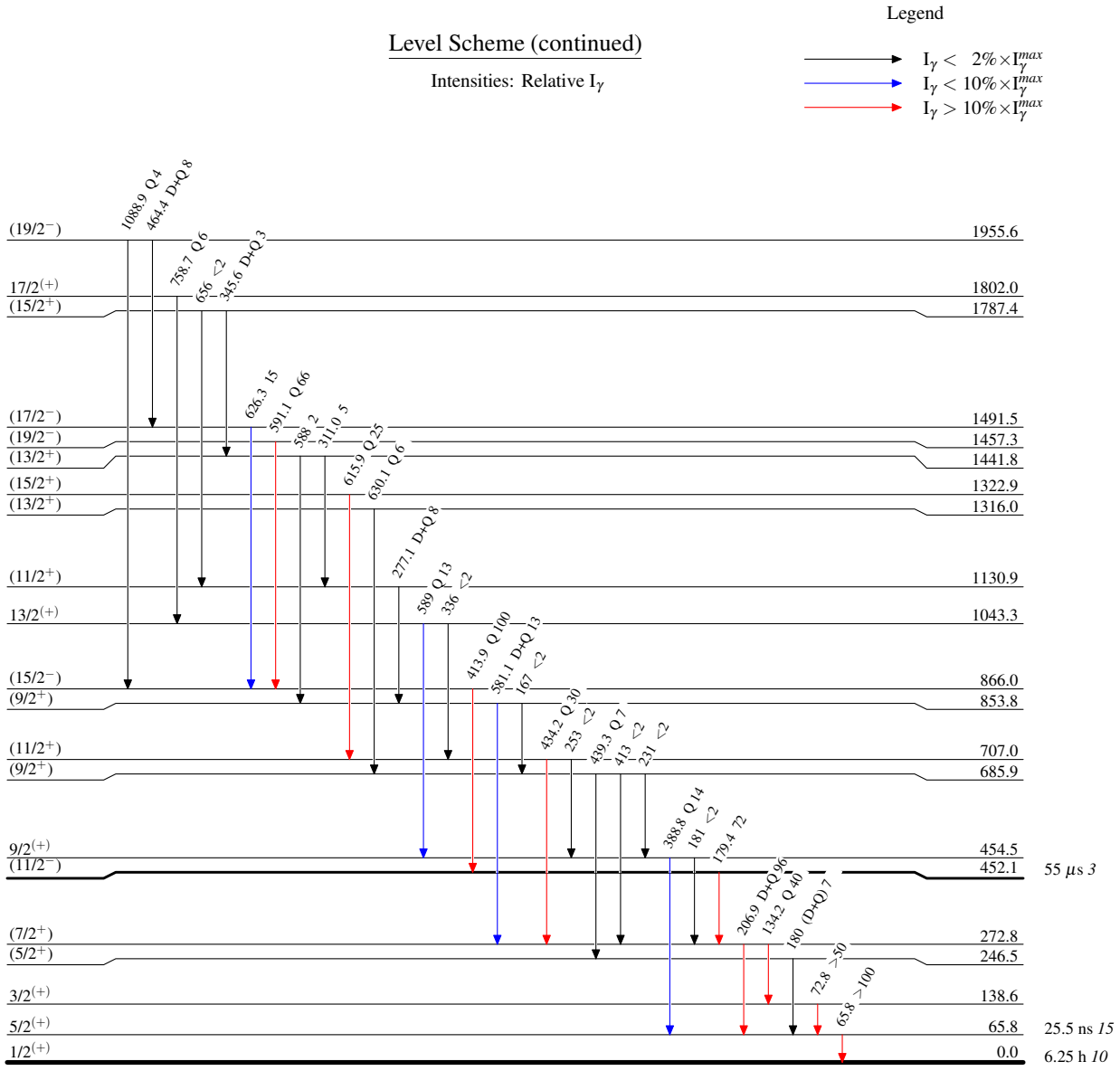


$^{127}_{55}Cs_{72}$

(HI,xnγ) 1990Li22

Level Scheme (continued)

Intensities: Relative I_γ



$^{127}_{55}Cs_{72}$