

Adopted Levels, Gammas

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

$Q(\beta^-) = -553.8$; $S(n) = 7763.8$; $S(p) = 4899.7$; $Q(\alpha) = -991.6$ [2012Wa38](#)
 $S(2n) = 17724.12$, $S(2p) = 12598.7$ ([2012Wa38](#)).
 α : [Additional information 1](#).

^{128}Cs Levels

Cross Reference (XREF) Flags

- A ^{128}Ba ϵ decay
- B (HL,xn γ)

E(level) [†]	J ^π [‡]	T _{1/2} [#]	XREF	Comments
0.0	1 ⁺	3.640 min 14	A	$\% \epsilon + \% \beta^+ = 100$ $Q = -0.5708$ (1989Ra17); $\mu = 0.9745$ μ, Q : from laser induced optical pumping of thermal atomic beam (1981Th06). Other: $+0.97710$ from atomic beam magnetic resonance (1977Ek02). $T_{1/2}$: from 2012Au07 . J^π : $J=1$ from atomic-beam magnetic resonance (1977Ek02), $\log ft = 4.8$ to 0^+ .
187.88 21			A	
215.44 4	0 ⁻ ,1		A	J^π : $\log ft = 8.26$ from 0^+ .
229.50 6	0 ⁻ ,1		A	J^π : $\log ft = 7.83$ from 0^+ .
273.440 10	1 ⁺		A	J^π : $\log ft = 5.57$ from 0^+ .
317.15 10	0 ⁻ ,1		A	J^π : $\log ft = 7.83$ from 0^+ .
359.11 4	0 ⁻ ,1		A	J^π : $\log ft = 7.33$ from 0^+ .
374.998 20	(1 ⁺)		A	J^π : $\log ft = 6.68$ from 0^+ .
0.0+x	(5)		B	J^π : D+Q γ from (6 ⁻). Additional information 2 .
x+18.6 4	(5)		B	J^π : D+Q γ from (6 ⁻).
x+114.6 3			B	
x+187.57 25	(6 ⁻)		B	J^π : M1+E2 γ from (7 ⁻).
x+301.7 3	(7 ⁻)		B	J^π : M1+E2 γ from (8 ⁻).
x+322.5 3	(6,7)		B	J^π : D+Q γ from (7 ⁻), D+Q γ to (6 ⁻).
x+335.3 3	(6,7,8)		B	J^π : D+Q γ from (7 ⁻).
x+430.1 ^b 3	(7 ⁻)		B	
x+453.4 ^c 3	(8 ⁻)		B	
x+510.8 ^a 3	(7 ⁻)		B	
x+551.8 ^b 3	(8 ⁻)		B	
x+596.7 ^a 4	(8 ⁻)		B	
x+612.1 ^{&} 4	(9 ⁺)	50 ns 8	B	J^π : from band systematics. $T_{1/2}$: from 1989Pa09 in ($^{11}\text{B}, 3n\gamma$).
x+754.9 ^{&} 6	(10 ⁺)		B	
x+772.7 ^b 3	(9 ⁻)		B	
x+907.7 ^a 4	(9 ⁻)		B	
x+1010.7 ^c 4	(10 ⁻)		B	
x+1103.6 ^{&} 6	(11 ⁺)		B	
x+1137.2 ^b 4	(10 ⁻)		B	
x+1162.4 ^a 5	(10 ⁻)		B	
x+1263.8 [@] 6	(11 ⁺)		B	
x+1348.9 ^b 4	(11 ⁻)		B	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) ^{128}Cs Levels (continued)

E(level) [†]	J ^π [‡]	T _{1/2} [#]	XREF	E(level) [†]	J ^π [‡]	T _{1/2} [#]	XREF
x+1376.4 ^{&} 7	(12 ⁺)		B	x+2799.3 [@] 7	(15 ⁺)	0.50 ps +11-9	B
x+1456.1 ^a 5	(11 ⁻)		B	x+2957.5 ^b 6	(15 ⁻)		B
x+1635.7 [@] 7	(12 ⁺)	0.42 ps +10-8	B	x+3025.5 ^a 6	(15 ⁻)		B
x+1737.6 ^c 5	(12 ⁻)		B	x+3030.2 ^{&} 8	(16 ⁺)	0.84 ps +19-17	B
x+1784.6 ^{&} 7	(13 ⁺)	0.52 ps +20-10	B	x+3258.9 [@] 7	(16 ⁺)	0.58 ps +12-10	B
x+1894.8 ^b 4	(12 ⁻)		B	x+3507.2 ^c 7	(16 ⁻)		B
x+1906.8 ^a 8	(12 ⁻)		B	x+3523.5 ^{&} 8	(17 ⁺)	0.60 ps +17-12	B
x+1998.6 [@] 6	(13 ⁺)	0.39 ps +18-11	B	x+3711.5 [@] 8	(17 ⁺)	1.02 ps +24-20	B
x+2086.4 ^b 5	(13 ⁻)		B	x+3807.8 ^b 11	(16 ⁻)		B
x+2155.6 ^{&} 7	(14 ⁺)	0.88 ps +16-14	B	x+3882.6 ^a 7	(17 ⁻)		B
x+2190.0 7	(13 ⁺)		B	x+3924.5 ^b 6	(17 ⁻)		B
x+2205.6 ^a 6	(13 ⁻)		B	x+3960.6 ^{&} 9	(18 ⁺)	0.82 ps +20-14	B
x+2355.6 [@] 7	(14 ⁺)	0.53 ps +12-10	B	x+4453.4 ^c 7	(18 ⁻)		B
x+2593.8 ^c 6	(14 ⁻)		B	x+4474.2 ^{&} 9	(19 ⁺)	0.86 ps +20-15	B
x+2620.1 ^{&} 7	(15 ⁺)	0.63 ps +13-11	B	x+4917.7 ^b 7	(19 ⁻)		B
x+2714.8 ^a 13	(14 ⁻)		B	x+4947.4 ^{&} 10	(20 ⁺)	1.06 ps +23-20	B
x+2794.8 ^b 5	(14 ⁻)		B				

[†] The energy of the lowest state in $^{120}\text{Sn}(^{11}\text{B},3n\gamma)$ has not been determined. E(levels) are based on a least-squares fit to the E γ 's (evaluators).

[‡] J^π's of members of bands are based on the J^π of the bandhead and stretched E2 and M1 cascades in (HI,xn γ). J^π assignment of each bandhead is made in comparison with neighboring nuclides and theoretical consideration if not stated otherwise.

From DSAM in (HI,xn γ) if not stated otherwise.

@ Band(A): configuration=($\pi h_{11/2}$)($\nu h_{11/2}$) side.

& Band(B): configuration=($\pi h_{11/2}$)($\nu h_{11/2}$) yrast.

^a Band(C): configuration=($\pi h_{11/2}$)($\nu g_{7/2}$).

^b Band(D): configuration=($\pi g_{7/2}$)($\nu h_{11/2}$).

^c Band(E): configuration=($\pi d_{5/2}$)($\nu h_{11/2}$).

Adopted Levels, Gammas (continued)

$\gamma(^{128}\text{Cs})$									
$E_i(\text{level})$	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.†	$\delta^{\ddagger\#}$	α	Comments
187.88		187@ 1	100@	0.0	1+				
215.44	0 ⁻ ,1	215.47 4	100	0.0	1+				
229.50	0 ⁻ ,1	229.50 6	100	0.0	1+				
273.440	1+	273.44 1	100	0.0	1+	M1(+E2)		0.0567	Mult.: from $\alpha(\text{K})\text{exp}$ in ¹²⁸ Ba ϵ decay.
317.15	0 ⁻ ,1	129.24 20	50 14	187.88					
		317.16 10	100 18	0.0	1+				
359.11	0 ⁻ ,1	143.80 20	11 5	215.44	0 ⁻ ,1				
		359.10 4	100 9	0.0	1+				
374.998	(1 ⁺)	101.72 20	6.1 14	273.440	1+				
		159.71 10	4.2 14	215.44	0 ⁻ ,1				
		187@ 1	12@ 7	187.88					
		374.99 2	100 5	0.0	1+				
x+18.6	(5)	(18.6)	100	0.0+x	(5)				
x+114.6		114.3@ 3	100@	0.0+x	(5)				
x+187.57	(6 ⁻)	169.0 3		x+18.6	(5)	D+Q			
		187.9 3		0.0+x	(5)	D+Q			
x+301.7	(7 ⁻)	114.3@ 3	100@	x+187.57	(6 ⁻)	D+Q			
x+322.5	(6,7)	135.1 3	100 10	x+187.57	(6 ⁻)	D+Q			
		207.5 3	100 10	x+114.6					
x+335.3	(6,7,8)	147.7 3	100	x+187.57	(6 ⁻)				
x+430.1	(7 ⁻)	107.5 3		x+322.5	(6,7)	D+Q			
		242.7 3		x+187.57	(6 ⁻)				I _{γ} : 29 3 if I(107.5 γ)=100.
x+453.4	(8 ⁻)	151.7 3	100 10	x+301.7	(7 ⁻)	M1+E2		0.281 5	
		265.8 3	24.0 24	x+187.57	(6 ⁻)	(E2)		0.0643	
x+510.8	(7 ⁻)	175.4 3	4.6 5	x+335.3	(6,7,8)	D+Q			
		209.3 3	100 10	x+301.7	(7 ⁻)				
		323.2 3	29 3	x+187.57	(6 ⁻)	D+Q			
x+551.8	(8 ⁻)	121.7 3	>54	x+430.1	(7 ⁻)	(M1+E2)		0.520 10	
		229.3 3	31 3	x+322.5	(6,7)				
		250.1 3	100 11	x+301.7	(7 ⁻)	D+Q			
x+596.7	(8 ⁻)	143.2 3	100	x+453.4	(8 ⁻)	(M1+E2)		0.329 6	
x+612.1	(9 ⁺)	158.7 3	100	x+453.4	(8 ⁻)	E1		0.0607	
x+754.9	(10 ⁺)	142.8 5	100	x+612.1	(9 ⁺)	M1+E2	-0.05 +6-7	0.331 7	
x+772.7	(9 ⁻)	221.0 3	100 10	x+551.8	(8 ⁻)	(M1+E2)		0.1001 15	
		342.4 3	67 10	x+430.1	(7 ⁻)				
x+907.7	(9 ⁻)	396.9 3	100 11	x+510.8	(7 ⁻)	(E2)		0.0183	
		454.4 3	19.6 22	x+453.4	(8 ⁻)	D+Q			
x+1010.7	(10 ⁻)	413.9 3	64 8	x+596.7	(8 ⁻)	(E2)		0.01616	
		557.4 3	100 10	x+453.4	(8 ⁻)	(E2)		0.00700	
x+1103.6	(11 ⁺)	348.6 5	100	x+754.9	(10 ⁺)	(M1+E2)	-0.16 +7-9	0.0301	
x+1137.2	(10 ⁻)	364.6 3	69 8	x+772.7	(9 ⁻)	D+Q			
		585.5 3	100 15	x+551.8	(8 ⁻)	(E2)		0.00615	

Adopted Levels, Gammas (continued)

γ(¹²⁸Cs) (continued)

<u>E_i(level)</u>	<u>J_i^π</u>	<u>E_γ</u>	<u>I_γ</u>	<u>E_f</u>	<u>J_f^π</u>	<u>Mult.[†]</u>	<u>δ[‡]#</u>	<u>α</u>	<u>I_(γ+ce)</u>
x+1162.4	(10 ⁻)	565.7 3	100	x+596.7	(8 ⁻)	(E2)		0.00673	
x+1263.8	(11 ⁺)	508.9 5 651.7 5	100 10 33 3	x+754.9	(10 ⁺)	(M1+E2)		0.0115 7	
x+1348.9	(11 ⁻)	211.9 3	21.7 22	x+1137.2	(10 ⁻)				
x+1376.4	(12 ⁺)	576.2 3 272.7 5 621.6 5	100 13 70 9 100 9	x+772.7	(9 ⁻)	(E2)		0.00641	
x+1456.1	(11 ⁻)	548.4 3	100	x+1103.6	(11 ⁺)	(M1+E2)	-0.09 +5-7	0.0571 9	
x+1635.7	(12 ⁺)	371.8 5 532.0 5	36 8 100 10	x+754.9	(10 ⁺)	(E2)		0.00526	
x+1737.6	(12 ⁻)	726.9 3	100	x+907.7	(9 ⁻)	(E2)		0.00731	
x+1784.6	(13 ⁺)	408.0 5 681.1 5	100 11 18.3 19	x+1263.8	(11 ⁺)	(M1+E2)		0.0255	
x+1894.8	(12 ⁻)	546.0 3 757.3 3	<100 100 10	x+1103.6	(11 ⁺)	(E2)		0.0103 7	
x+1906.8	(12 ⁻)	451 1 744 1	<83 100 10	x+1376.4	(12 ⁺)	(M1+E2)	-0.17 6	0.00356	
x+1998.6	(13 ⁺)	362.9 5 622.2 5 735.0 5 895 1	40 7 35 7 100 10 <36	x+1103.6	(11 ⁺)			0.00418	
x+2086.4	(13 ⁻)	191 1 737.6 3	<6.3 100 13	x+1456.1	(11 ⁻)	(E2)		0.00323	
x+2155.6	(14 ⁺)	370.8 5 779.2 5	19 4 100 11	x+1162.4	(10 ⁻)				
x+2190.0	(13 ⁺)	554.2 5	5.9	x+1635.7	(12 ⁺)	(M1+E2)		0.0070 71	1
x+2205.6	(13 ⁻)	749.5 3	100	x+1263.8	(11 ⁺)				
x+2355.6	(14 ⁺)	357.0 5 571.1 5 719.9 5	24 5 100 11 11 3	x+1103.6	(11 ⁺)				
x+2593.8	(14 ⁻)	856.2 3	100	x+1894.8	(12 ⁻)				
x+2620.1	(15 ⁺)	464.5 5 835.5 5	100 15 77 12	x+1894.8	(12 ⁻)	(E2)		0.00344	
x+2714.8?	(14 ⁻)	808 & 1	100	x+1784.6	(13 ⁺)	(M1+E2)	-0.09 +9-10	0.0257	
x+2794.8	(14 ⁻)	709 1	<100	x+1376.4	(12 ⁺)	(E2)		0.00302	
x+2799.3	(15 ⁺)	900.0 3 443.5 5 800.9 5	100 10 100 18 54 11	x+1635.7	(12 ⁺)				
x+2957.5	(15 ⁻)	871.1 3	100	x+1998.6	(13 ⁺)	(M1+E2)		0.0087 1	
x+3025.5	(15 ⁻)	819.9 3	100	x+1737.6	(12 ⁻)	(E2)		0.00242	
x+3030.2	(16 ⁺)	231 1 411 1 874.5 5	<29 35 4 100 12	x+2155.6	(14 ⁺)	(M1+E2)	-0.25 +7-9	0.0145 2	
				x+1784.6	(13 ⁺)	(E2)		0.00256	
				x+1906.8	(12 ⁻)				
				x+2086.4	(13 ⁻)				
				x+1894.8	(12 ⁻)				
				x+2355.6	(14 ⁺)				
				x+1998.6	(13 ⁺)				
				x+2086.4	(13 ⁻)	(E2)		0.00233	
				x+2205.6	(13 ⁻)	(E2)		0.00268	
				x+2799.3	(15 ⁺)				
				x+2620.1	(15 ⁺)				
				x+2155.6	(14 ⁺)	(E2)		0.00231	

Adopted Levels, Gammas (continued)

$\gamma(^{128}\text{Cs})$ (continued)

<u>E_i(level)</u>	<u>J_i^π</u>	<u>E_γ</u>	<u>I_γ</u>	<u>E_f</u>	<u>J_f^π</u>	<u>Mult. †</u>	<u>α</u>	<u>Comments</u>
x+3258.9	(16 ⁺)	459	<78	x+2799.3	(15 ⁺)			
		638.6 5	100 20	x+2620.1	(15 ⁺)			
		903.3 5	81 17	x+2355.6	(14 ⁺)			
x+3507.2	(16 ⁻)	913.4 3	100	x+2593.8	(14 ⁻)	(E2)	0.00209	
x+3523.5	(17 ⁺)	493.1 5	75 15	x+3030.2	(16 ⁺)	(M1+E2)	0.0125 1	
		903.2 5	100 21	x+2620.1	(15 ⁺)	(E2)	0.00215	
x+3711.5	(17 ⁺)	452.4 5	44 12	x+3258.9	(16 ⁺)			
		912.4 5	100 24	x+2799.3	(15 ⁺)			
x+3807.8?	(16 ⁻)	1013 1	100	x+2794.8	(14 ⁻)			
x+3882.6	(17 ⁻)	857.1 3	100	x+3025.5	(15 ⁻)	(E2)	0.00242	
x+3924.5	(17 ⁻)	967.0 3	100	x+2957.5	(15 ⁻)	(E2)	0.00184	
x+3960.6	(18 ⁺)	436 1	<72	x+3523.5	(17 ⁺)			
		930.7 5	100 14	x+3030.2	(16 ⁺)	(E2)	0.00201	
x+4453.4	(18 ⁻)	946.2 3	100	x+3507.2	(16 ⁻)			
x+4474.2	(19 ⁺)	514 1	<100	x+3960.6	(18 ⁺)			
		950.6 5	26 10	x+3523.5	(17 ⁺)			
x+4917.7	(19 ⁻)	993.2 3	100	x+3924.5	(17 ⁻)			
x+4947.4	(20 ⁺)	986.8 5	100	x+3960.6	(18 ⁺)	(E2)	0.001764 25 α=0.001764 25	

† From (HI,xnγ), unless otherwise noted.

‡ From DCO ratio in (HI,xnγ) (2003Ko23).

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.

@ Multiply placed with undivided intensity.

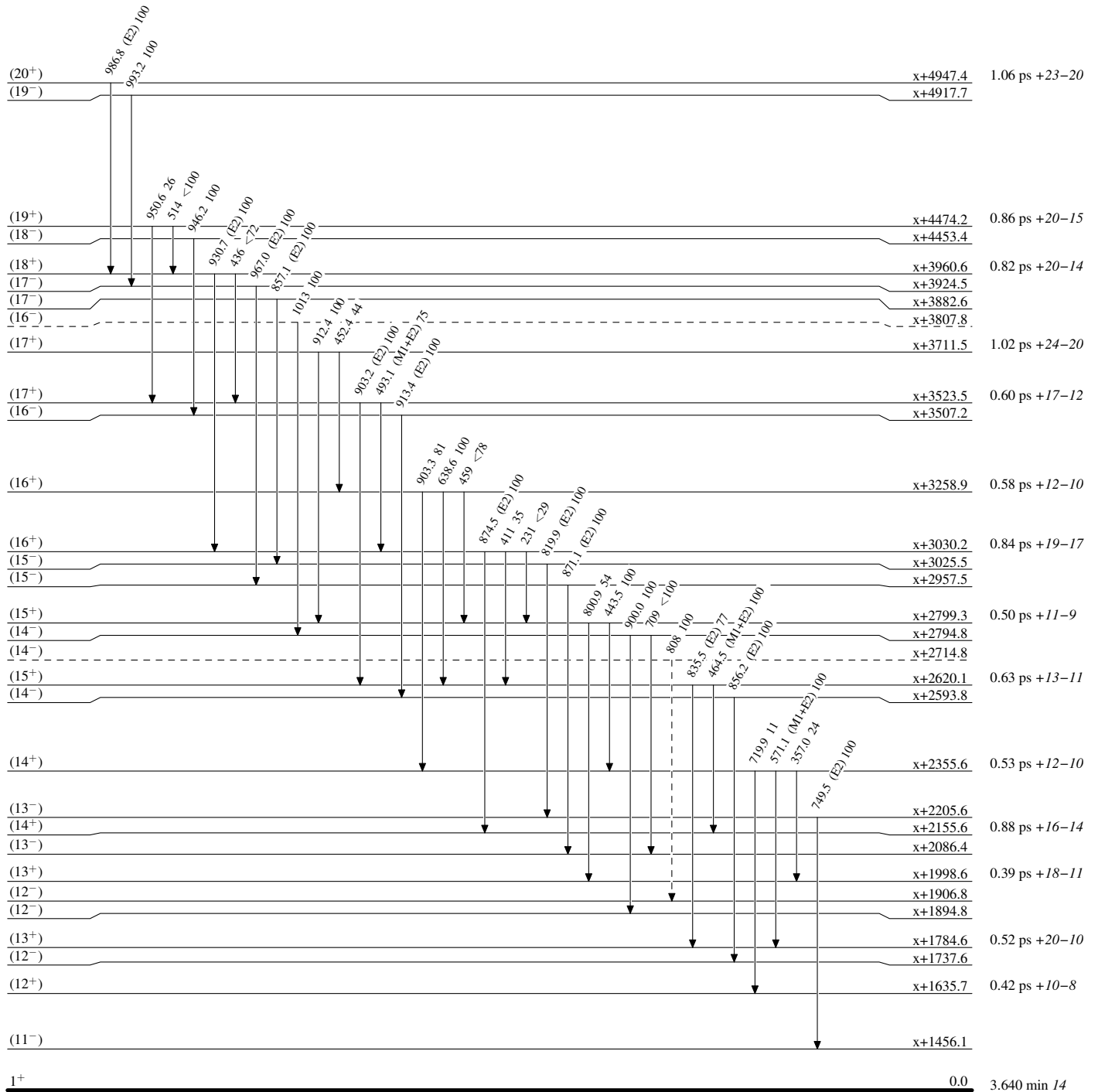
& Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Legend

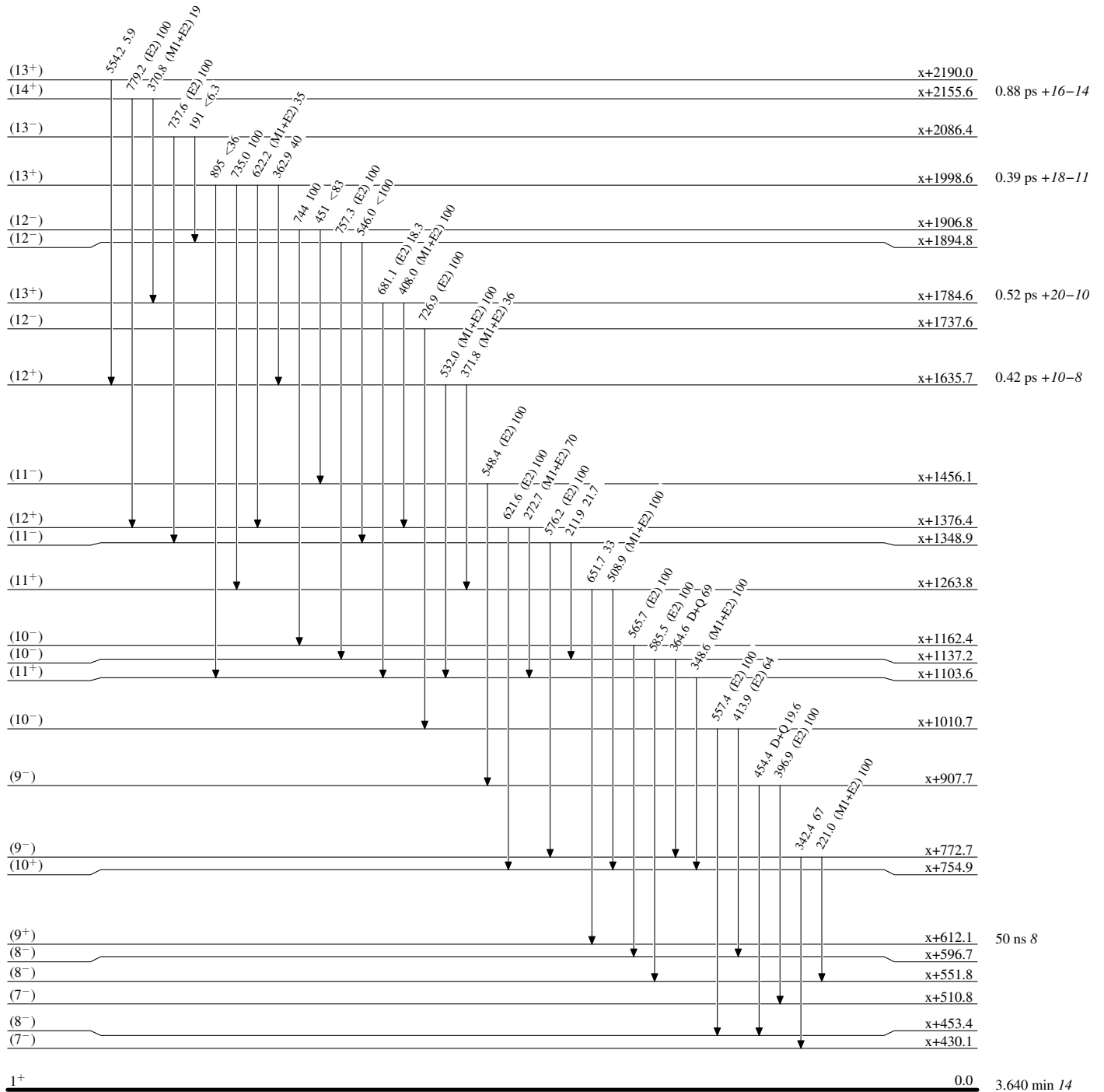
Level Scheme

Intensities: Relative photon branching from each level

-----► γ Decay (Uncertain)

Adopted Levels, Gammas**Level Scheme (continued)**

Intensities: Relative photon branching from each level



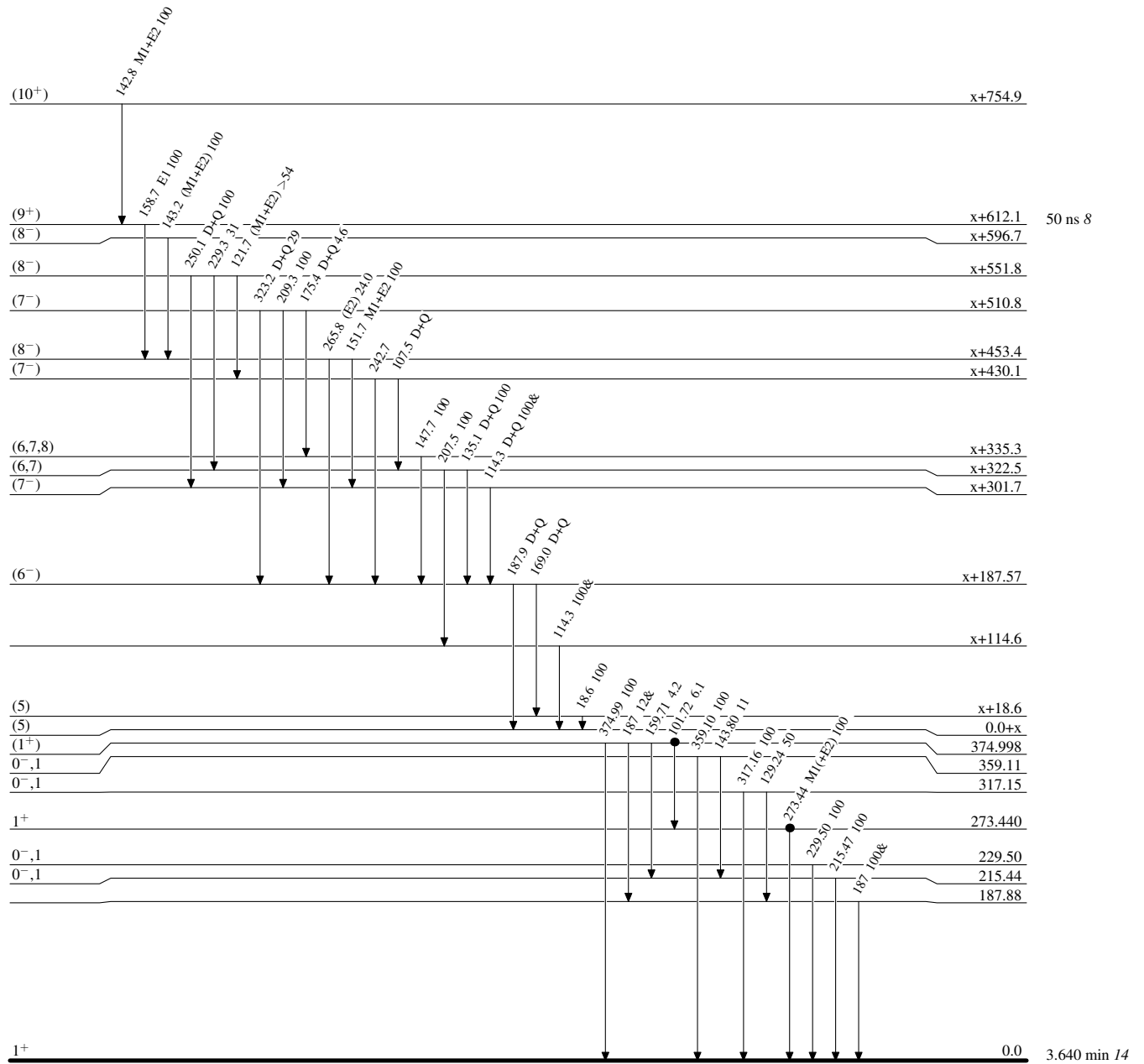
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

-----▶ γ Decay (Uncertain)
● Coincidence



Adopted Levels, Gammas

