

(HI,xnγ) 1996Lu09,2000Pa48

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

2006Ba75: ¹⁰⁰Mo(³²S,4nγ) E(³²S)=120 MeV; measured recoil-distance Doppler shift and DSAM; deduced T_{1/2}, B(E2).
 1996Lu09,1994Lu07: ¹⁰³Rh(²⁸Si,p2nγ) E(²⁸Si)=105 MeV; measured γ, γγ, γ(θ), DCO.
 2000Pa48: ¹⁰⁰Mo(³²S,4nγ) E(³²S)=155,160 MeV; measured γ, γγ, γ(θ) and DCO using Euroball spectrometer.
 1996Li41: ¹⁰⁰Ru(³²S,2p2n) E(³²S)=141 MeV; DSA, T_{1/2}.
 1991Ca19: ⁹⁴Mo(³⁷Cl,p2nγ) E(³⁷Cl)=158 MeV; γ, γγ, γ(θ).
 1985Ca12: ¹¹²Cd(²⁰Ne,4nγ) E(²⁰Ne)=103 MeV; γ, γγ, γ(θ).
 1984We17: ⁹²Zr(⁴⁰Ar,4nγ) E(⁴⁰Ar)=159 MeV; measured Doppler-shift recoil-distance; deduced T_{1/2}. Lifetimes in 1983Ki14 were preliminary results of 1984We17.
 1975Wa07: ¹¹⁶Sn(¹⁶O,4nγ) E(¹⁶O)=88 MeV; γ, γγ, γ(θ).
 Others: 1968Wa14, 1982CaZZ, 1982WeZZ.
 The level scheme is that proposed by 1996Lu09, except for some high-lying high-spin states from 1991Ca19 and 2000Pa48.
 α: Additional information 1.

¹²⁸Ce Levels

Quasiparticle labels used in band configuration assignments, with main components:

- a: ν_{7/2}[523], α=-1/2.
- b: ν_{7/2}[523], α=+1/2.
- e: ν_{5/2}[402], α=+1/2.
- f: ν_{5/2}[402], α=-1/2.
- A: π_{3/2}[541], α=-1/2.
- B: π_{3/2}[541], α=+1/2.
- C: π_{1/2}[550], α=-1/2.
- D: π_{1/2}[550], α=+1/2.
- E: π_{1/2}[420], α=+1/2.
- F: π_{1/2}[420], α=-1/2.
- G: π_{3/2}[422], α=+1/2.
- H: π_{3/2}[422], α=-1/2.

E(level) [†]	Jπ [‡]	T _{1/2} [#]	Comments
0.0 ^e	0 ⁺	3.93 min 2	
207.11 ^e 19	2 ⁺	0.30 ns 3	T _{1/2} : from 1984We17.
606.8 ^e 3	4 ⁺	8.0 ps +18-14	T _{1/2} : from 1984We17.
869.3 ^b 4	2 ⁺		
1138.4 ^a 4	3 ⁺		
1157.1 ^e 3	6 ⁺	1.49 ps 35	T _{1/2} : from 2006Ba75. Other: 2.0 ps +13-10 (1984We17).
1312.1 ^b 4	4 ⁺		
1663.4 ^a 4	5 ⁺		
1700.3 6			
1819.3 ^e 4	8 ⁺	0.46 ps 7	T _{1/2} : from 1996Li41. Other: 0.6 ps +4-6 (1984We17).
1847.0 ^b 4	6 ⁺		
1888.7 ^h 4	5 ⁻		
1979.5 ^k 5	4 ⁽⁻⁾		
2177.1 ^c 5	6 ⁺		
2240.5 4	(5 ⁻)		
2244.6 ^h 4	7 ⁻		
2285.9 ^m 5	5 ⁻		

Continued on next page (footnotes at end of table)

(HI,xn γ) 1996Lu09,2000Pa48 (continued) ^{128}Ce Levels (continued)

E(level) [†]	J π [‡]	T _{1/2} [#]	Comments
2298.3 ^a 7	7 ⁺		
2332.4 ^k 4	6 ⁽⁻⁾		
2369.6 6			
2384.6 ^l 4	6 ⁻		
2466.2 ^b 5	8 ⁺		
2519.6 ^j 4	7 ⁻		
2530.4 ^e 4	10 ⁺	0.31 ps 7	T _{1/2} : from 2006Ba75. Others: 0.8 ps 4 (1984We17), 2.4 ps 4 (1996Li41).
2586.0 ^m 5	7 ⁻		
2659.0 ^c 5	8 ⁺		
2700.4 ^k 4	8 ⁻		
2735.3 ^h 5	9 ⁻		
2812.0 ^l 5	8 ⁻		
2859.5 ^j 5	9 ⁻		
2869.9 6	10 ⁺		
2974.6 6			
3001.3 ^a 8	9 ⁺		
3086.5 ^m 6	9 ⁻		
3106.5 ^f 5	12 ⁺	1.7 ps 5	T _{1/2} : from 1996Li41. Other: 0.5 ps 4 (1984We17).
3130.0 ^k 6	10 ⁻		
3131.5 7	(10 ⁺)		
3143.6 ^b 6	10 ⁺		
3269.0 ^c 5	10 ⁺		
3323.9 ^h 7	11 ⁻		
3383.1 ^j 7	(11 ⁻)		
3397.6 ^l 6	10 ⁻		
3477.9 ^d 5	12 ⁺		
3584.9 8	(12 ⁺)		
3666.4 ^f 5	14 ⁺	1.5 ps 4	T _{1/2} : from 1996Li41. Other: 1.7 ps +5-16 (1984We17).
3722.8 ^m 6	11 ⁻		
3727.1 ^k 8	12 ⁻		
3809.4 ^b 7	(12 ⁺)		
3965.7 ^h 8	13 ⁻		
3996.3 ^c 6	12 ⁺		
4086.2 ^l 7	12 ⁻		
4102.3 ^j 9	(13 ⁻)		
4120.8 7			
4281.6 ^d 7	14 ⁺	0.90 ps 14	T _{1/2} : from 1996Li41.
4356.8 ^f 7	16 ⁺		
4404.5 ^m 7	13 ⁻		
4476.5 ^k 9	14 ⁻		
4543.9 ^b 9	(14 ⁺)		
4595.0 ^c 7	14 ⁺		
4688.1 ^h 9	15 ⁻		
4791.8 ^l 9	(14 ⁻)		
4846.8 7			
4935.5 ^j 10	(15 ⁻)		
5069.1 7			
5072.6 ^m 9	(15 ⁻)		
5126.8 ^d 9	16 ⁺		

Continued on next page (footnotes at end of table)

(HI,xn γ) 1996Lu09,2000Pa48 (continued) ^{128}Ce Levels (continued)

E(level) [†]	J π [‡]	T _{1/2} [#]	Comments
5184.5 ^f 8	18 ⁺	0.21 ps 3	T _{1/2} : from 1996Li41.
5192.4 ^{@c} 9	16 ⁺		
5301.7 ^k 11	(16 ⁻)		
5351.9 ^b 14	(16 ⁺)		
5478.9 ^h 10	17 ⁻		
5854.4 ^{@c} 14	18 ⁺		
6005.8 ^{@d} 13	18 ⁺		
6142.6 ^f 10	20 ⁺	0.12 ps 3	T _{1/2} : from 1996Li41.
6198.8 ^k 12	(18 ⁻)		
6224.9 ^b 17	(18 ⁺)		
6316.9 ^{&g} 11	19 ⁻		
6375.9 ^{@h} 15	19 ⁻		
6500.9 ^{@i} 15	(19 ⁻)		
6605.4 ^{@c} 17	20 ⁺		
6929.8 ^{@d} 17	20 ⁺		
7175.5 ^{&g} 13	21 ⁻		
7219.3 ^{&f} 11	22 ⁺	<0.28 ps	T _{1/2} : from 1996Li41, value is not corrected for feeding.
7295.9 ^{@h} 18	21 ⁻		
7379.9 ^{@i} 18	(21 ⁻)		
7462.4 ^{@c} 20	22 ⁺		
7911.8 ^{@d} 20	22 ⁺		
8139.5 ^{&g} 24	23 ⁻		
8360.9 ^{@i} 20	(23 ⁻)		
8405.3 ^{&f} 12	24 ⁺		
8432.4 ^{@c} 22	24 ⁺		
8956.8 ^{@d} 22	24 ⁺		
9218 ^{@g} 3	(25 ⁻)		
9471.9 ^{@i} 23	(25 ⁻)		
9514.4 ^{@c} 24	26 ⁺		
9695.3 ^{&f} 24	(26 ⁺)		
10076.8 ^{@d} 24	26 ⁺		
10402 ^{@g} 3	(27 ⁻)		
10698 ^{@c} 3	(28 ⁺)		
11078 ^{&f} 3	(28 ⁺)		
11271 ^{@d} 3	28 ⁺		
11975 ^{@c} 3	(30 ⁺)		
12541 ^{@d} 3	(30 ⁺)		
12547 ^{@f} 4	(30 ⁺)		
13333 ^{@c} 3	(32 ⁺)		
13875 ^{@d} 3	(32 ⁺)		
14762 ^{@c} 4	(34 ⁺)		
16265 ^{@c} 4	(36 ⁺)		
17838 ^{@c} 4	(38 ⁺)		

[†] From least-squares fit to E γ 's by the evaluators.

[‡] From Adopted Levels.

Continued on next page (footnotes at end of table)

(HI,xn γ) 1996Lu09,2000Pa48 (continued)

^{128}Ce Levels (continued)

- # From DSA (1996Li41) and Doppler-shift recoil-distance (1984We17), see comment.
- @ From 2000Pa48.
- & From 1991Ca19.
- ^a Band(A): γ band, $\alpha=1$.
- ^b Band(B): γ band, $\alpha=0$.
- ^c Band(C): possible β band with coupled AB configuration above spin 12.
- ^d Band(D): possible triaxial ab band.
- ^e Band(E): g.s. band.
- ^f Band(F): AB band.
- ^g Band(G): possible AFef band.
- ^h Band(H): possible AF band.
- ⁱ Band(I): possible AFBC band.
- ^j Band(J): possible AH band.
- ^k Band(K): possible AG band.
- ^l Band(L): possible ae band.
- ^m Band(M): possible af band.

(HI,xn γ) 1996Lu09,2000Pa48 (continued)

$\gamma(^{128}\text{Ce})$

E_γ †	I_γ	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. ‡	$\delta^{\#a}$	α	Comments
98.5 5	0.19 4	2384.6	6 ⁻	2285.9	5 ⁻	M1+E2	-0.18 10	1.27 5	$A_2=-0.45$ 6, $A_4=0.03$ 8 (1996Lu09).
144.0 5	0.27 4	2384.6	6 ⁻	2240.5	(5 ⁻)	M1+E2	-0.45 20	0.447 21	$A_2=-0.73$ 4, $A_4=0.02$ 6 (1996Lu09).
180.6 5	0.14 4	2700.4	8 ⁻	2519.6	7 ⁻				
201.6 5	5.9 2	2586.0	7 ⁻	2384.6	6 ⁻	M1+E2	-0.05 10	0.167 3	$A_2=-0.29$ 4, $A_4=0.11$ 5 (1996Lu09).
205 @		2735.3	9 ⁻	2530.4	10 ⁺				
207.1 2	100	207.11	2 ⁺	0.0	0 ⁺	E2		0.1635	$A_2=0.247$ 6, $A_4=-0.056$ 9; DCO=0.96 3 (1996Lu09).
226.0 5	4.05 15	2812.0	8 ⁻	2586.0	7 ⁻	M1+E2	-0.12 10	0.1225 19	$A_2=-0.41$ 9, $A_4=0.11$ 13 (1996Lu09).
270.4 5	1.02 8	3130.0	10 ⁻	2859.5	9 ⁻				
274.4 5	2.93 15	3086.5	9 ⁻	2812.0	8 ⁻	M1+E2	-0.09 6	0.0728	$A_2=-0.36$ 6, $A_4=-0.01$ 8 (1996Lu09).
275.0 5	0.22 7	2519.6	7 ⁻	2244.6	7 ⁻				
300.1 5	0.21 7	2586.0	7 ⁻	2285.9	5 ⁻				
311.1 5	1.90 12	3397.6	10 ⁻	3086.5	9 ⁻				
318.0 5	<0.5	4404.5	13 ⁻	4086.2	12 ⁻				
325.2 5	1.0 1	3722.8	11 ⁻	3397.6	10 ⁻				
339.3 ^c 5	1.12 11	2869.9	10 ⁺	2530.4	10 ⁺				E_γ : from authors' drawing (1996Lu09).
339.8 5	2.3 2	2859.5	9 ⁻	2519.6	7 ⁻				
351 ^c		1663.4	5 ⁺	1312.1	4 ⁺				E_γ : 321 quoted in Fig. 2 of 1996Lu09 is incorrect. Not reported in 2000Pa48.
351.8 5	0.63 13	2240.5	(5 ⁻)	1888.7	5 ⁻				
352.7 5	1.75 12	2332.4	6 ⁽⁻⁾	1979.5	4 ⁽⁻⁾				
355.9 5	8.2 3	2244.6	7 ⁻	1888.7	5 ⁻				
363.0 5	<0.5	4086.2	12 ⁻	3722.8	11 ⁻				
368.0 5	2.86 17	2700.4	8 ⁻	2332.4	6 ⁽⁻⁾	Q			$A_2=0.11$ 7, $A_4=-0.18$ 10 (1996Lu09).
371.5 5	0.38 6	3477.9	12 ⁺	3106.5	12 ⁺	D			DCO=0.6 2 (1996Lu09). Mult.: $\Delta J=0$, Q transition.
393.6 5	0.32 6	2240.5	(5 ⁻)	1847.0	6 ⁺				
399.6 2	96 2	606.8	4 ⁺	207.11	2 ⁺	E2		0.0203	I_γ : other: 58.3 12 (1996Li41). $A_2=0.256$ 4, $A_4=-0.095$ 7; DCO=1.01 3 (1996Lu09).
405.1 5	0.74 7	2384.6	6 ⁻	1979.5	4 ⁽⁻⁾	Q			$A_2=0.32$ 15, $A_4=0.14$ 20 (1996Lu09).
425.1 5	7.0 3	2244.6	7 ⁻	1819.3	8 ⁺	E1		0.00524	$A_2=-0.21$ 4, $A_4=-0.01$ 6; DCO=0.56 2 (1996Lu09), =0.50 12 (1991Ca19).
427.6 5	0.68 8	2812.0	8 ⁻	2384.6	6 ⁻				
429.6 5	4.2 2	3130.0	10 ⁻	2700.4	8 ⁻	E2		0.01649	DCO=0.99 12 (1996Lu09).
442.9 5	0.54 8	1312.1	4 ⁺	869.3	2 ⁺				
453.4 5	0.50 10	3584.9	(12 ⁺)	3131.5	(10 ⁺)				
455.7 5	1.37 14	2700.4	8 ⁻	2244.6	7 ⁻	M1+E2		0.0196	E_γ : other: 457 (1991Ca19). $A_2=-0.05$ 5, $A_4=0.02$ 7 (1996Lu09).
479.2 5	0.14 7	2812.0	8 ⁻	2332.4	6 ⁽⁻⁾				
481.7 5	0.92 9	2659.0	8 ⁺	2177.1	6 ⁺				
490.6 2	10.0 4	2735.3	9 ⁻	2244.6	7 ⁻				
495.8 5	0.72 10	2384.6	6 ⁻	1888.7	5 ⁻				
500.5 5	0.17 9	3086.5	9 ⁻	2586.0	7 ⁻				

(HI,xnγ) **1996Lu09,2000Pa48** (continued)

γ(¹²⁸Ce) (continued)

E_{γ}^{\dagger}	I_{γ}	$E_i(\text{level})$	J_i^{π}	E_f	J_f^{π}	Mult. [‡]	α	Comments
517@		3996.3	12 ⁺	3477.9	12 ⁺			
523.6 5	2.27 16	3383.1	(11 ⁻)	2859.5	9 ⁻			
525.2 5	1.27 12	1663.4	5 ⁺	1138.4	3 ⁺			
531.5 5	0.17 5	1138.4	3 ⁺	606.8	4 ⁺			
534.9 5	3.9 2	1847.0	6 ⁺	1312.1	4 ⁺			
537.5 5	0.27 6	2384.6	6 ⁻	1847.0	6 ⁺			
550.3 2	72.7 18	1157.1	6 ⁺	606.8	4 ⁺	E2	0.00834	I_{γ} : other: 39.2 9 (1996Li41). $A_2=0.273$ 6, $A_4=-0.101$ 10; DCO=1 (1996Lu09).
559.9 2	13.0 5	3666.4	14 ⁺	3106.5	12 ⁺	E2	0.00797	$A_2=0.254$ 16, $A_4=-0.079$ 24; DCO=1.02 3 (1996Lu09).
576.0 2	19.0 6	3106.5	12 ⁺	2530.4	10 ⁺	E2	0.00740	$A_2=0.292$ 14, $A_4=-0.120$ 21; DCO=0.97 3 (1996Lu09).
576.9 5	0.21 7	2240.5	(5 ⁻)	1663.4	5 ⁺			
585.7 5	1.2 3	3397.6	10 ⁻	2812.0	8 ⁻			
588.7 5	4.8 2	3323.9	11 ⁻	2735.3	9 ⁻	E2	0.00700	$A_2=0.14$ 5, $A_4=-0.05$ 7; DCO=1.19 10 (1996Lu09).
597.1 5	4.0 3	3727.1	12 ⁻	3130.0	10 ⁻	Q		DCO=0.84 16 (1996Lu09).
598@		5192.4	16 ⁺	4595.0	14 ⁺			
598.4 5	1.25 20	4595.0	14 ⁺	3996.3	12 ⁺	Q		DCO=0.72 9 (1996Lu09).
601.1 5	0.79 10	3131.5	(10 ⁺)	2530.4	10 ⁺			
610.0 5	2.07 15	3269.0	10 ⁺	2659.0	8 ⁺			
615@		4281.6	14 ⁺	3666.4	14 ⁺			
619.2 5	2.80 18	2466.2	8 ⁺	1847.0	6 ⁺			
634.9 5	1.49 15	2298.3	7 ⁺	1663.4	5 ⁺			
636.4 5	1.24 15	3722.8	11 ⁻	3086.5	9 ⁻			
641.9 5	3.7 2	3965.7	13 ⁻	3323.9	11 ⁻	E2	0.00562	$A_2=0.28$ 11, $A_4=-0.14$ 17; DCO=1.00 12 (1996Lu09).
647.4 5	1.90 14	2466.2	8 ⁺	1819.3	8 ⁺	D+Q		DCO=0.77 8 (1996Lu09). E_{γ} : other: 645 (2000Pa48).
^x 649								
662@		5854.4	18 ⁺	5192.4	16 ⁺			
662.2 5	0.45 8	869.3	2 ⁺	207.11	2 ⁺			
662.2 2	41 3	1819.3	8 ⁺	1157.1	6 ⁺	E2	0.00520	DCO=0.99 5 (1996Lu09).
666.2 5	1.55 13	3809.4	(12 ⁺)	3143.6	10 ⁺			
668.1 5	1.38 13	5072.6	(15 ⁻)	4404.5	13 ⁻			
677.8 5	1.11 9	3143.6	10 ⁺	2466.2	8 ⁺			
682.0 5	0.84 13	4404.5	13 ⁻	3722.8	11 ⁻			
688.6 5	0.75 15	4086.2	12 ⁻	3397.6	10 ⁻			
690.1 5	0.97 13	1847.0	6 ⁺	1157.1	6 ⁺			
690.2 5	6.1 3	4356.8	16 ⁺	3666.4	14 ⁺	E2	0.00470	I_{γ} : other: 11.4 3 (1996Li41). DCO=0.92 9 (1996Lu09).
700.3 5	0.42 12	2519.6	7 ⁻	1819.3	8 ⁺		6.00×10 ⁻⁴	
703.0 5	0.51 10	3001.3	9 ⁺	2298.3	7 ⁺			
705.3 5	2.7 2	1312.1	4 ⁺	606.8	4 ⁺	M1+E2	0.00664	$A_2=-0.13$ 2, $A_4=-0.16$ 17; DCO=0.64 9 (1996Lu09). $\delta=-0.8$ +3-5 or 4.5 +∞-2.0.
705.6 5	<0.2	4791.8	(14 ⁻)	4086.2	12 ⁻			

(HI,xn γ) **1996Lu09,2000Pa48** (continued) $\gamma(^{128}\text{Ce})$ (continued)

E_γ †	I_γ	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. ‡	$\delta^{\#a}$	α	Comments
711.1 2	25.3 7	2530.4	10 ⁺	1819.3	8 ⁺	E2		0.00437	$A_2=0.275$ 15, $A_4=-0.136$ 23; DCO=1.00 3 (1996Lu09).
719.2 5	0.86 14	4102.3	(13 ⁻)	3383.1	(11 ⁻)				
721.5 5	0.11 5	2384.6	6 ⁻	1663.4	5 ⁺				
722.4 5	2.39 18	4688.1	15 ⁻	3965.7	13 ⁻	E2		0.00421	E_γ : other: 721.3 5 (1985Ca12). DCO=0.96 16 (1996Lu09).
727.2 5	1.43 14	3996.3	12 ⁺	3269.0	10 ⁺	Q			$A_2=0.14$ 5, $A_4=0.11$ 8 (1996Lu09).
731.6 5	7.2 3	1888.7	5 ⁻	1157.1	6 ⁺	D			$A_2=-0.02$ 4, $A_4=0.12$ 6; DCO=0.76 5 (1996Lu09).
734.5 5	0.63 9	4543.9	(14 ⁺)	3809.4	(12 ⁺)				
749.4 5	2.7 2	4476.5	14 ⁻	3727.1	12 ⁻	E2		0.00386	$A_2=0.27$ 13, $A_4=-0.18$ 18 (1996Lu09).
751 @		6605.4	20 ⁺	5854.4	18 ⁺				
787 @		4595.0	14 ⁺	3809.4	(12 ⁺)				
790.9 5	0.98 15	5478.9	17 ⁻	4688.1	15 ⁻				E_γ : other: 791.9 5 (1985Ca12).
802.8 5	0.75 11	3269.0	10 ⁺	2466.2	8 ⁺				E_γ : other: 804 in 2000Pa48.
803.7 5	≈ 1	4281.6	14 ⁺	3477.9	12 ⁺				E_γ : other: 805 (2000Pa48).
808		5351.9	(16 ⁺)	4543.9	(14 ⁺)				
825.2 5	0.83 15	5301.7	(16 ⁻)	4476.5	14 ⁻				
827.6 5	1.5 2	5184.5	18 ⁺	4356.8	16 ⁺	Q			I_γ : other: 4.8 3 (1996Li41). DCO=0.83 8 (1996Lu09).
833.2 5	0.36 8	4935.5	(15 ⁻)	4102.3	(13 ⁻)				
835 @		5192.4	16 ⁺	4356.8	16 ⁺				
839 @		2659.0	8 ⁺	1819.3	8 ⁺				
839 & 2		6316.9	19 ⁻	5478.9	17 ⁻				
845.2 5	<0.5	5126.8	16 ⁺	4281.6	14 ⁺				E_γ : other: 843 (2000Pa48).
853 @		3996.3	12 ⁺	3143.6	10 ⁺				
857 @		7462.4	22 ⁺	6605.4	20 ⁺				
858 & 2		7175.5	21 ⁻	6316.9	19 ⁻				E_γ : other: 856 (2000Pa48).
869.4 5	0.25 5	869.3	2 ⁺	0.0	0 ⁺				
873		6224.9	(18 ⁺)	5351.9	(16 ⁺)				
879 b @		6005.8	18 ⁺	5126.8	16 ⁺				
879 b @		7379.9	(21 ⁻)	6500.9	(19 ⁻)				
881.3 5	2.3 2	2700.4	8 ⁻	1819.3	8 ⁺	D			DCO=1.02 10 (1996Lu09).
897 @		6375.9	19 ⁻	5478.9	17 ⁻				
897.1 5	1.38 16	6198.8	(18 ⁻)	5301.7	(16 ⁻)				
917 @		2735.3	9 ⁻	1819.3	8 ⁺				E_γ : 922 quoted in Fig. 2 of 2000Pa48 is incorrect.
920 @		7295.9	21 ⁻	6375.9	19 ⁻				
924 @		6929.8	20 ⁺	6005.8	18 ⁺				
928.4 5	0.56 10	2240.5	(5 ⁻)	1312.1	4 ⁺				
929 @		4595.0	14 ⁺	3666.4	14 ⁺				
931.7 5	2.4 2	1138.4	3 ⁺	207.11	2 ⁺	M1+E2	4.2 +24-15	0.00241 8	$A_2=0.41$ 7, $A_4=0.25$ 9; DCO=1.22 10 (1996Lu09).
947.2 5	1.79 15	3477.9	12 ⁺	2530.4	10 ⁺	E2		0.00227	DCO=1.0 1 (1996Lu09).

(HI,xnγ) **1996Lu09,2000Pa48** (continued)

γ(¹²⁸Ce) (continued)

E_γ †	I_γ	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. ‡	α	Comments
958.2 5	0.2 1	6142.6	20 ⁺	5184.5	18 ⁺			E_γ : from 1985Ca12. Other: 957 (2000Pa48). I_γ : other: 4.7 3 (1996Li41). E_γ : other: 962 (2000Pa48).
964 & 2		8139.5	23 ⁻	7175.5	21 ⁻			
970 @		8432.4	24 ⁺	7462.4	22 ⁺			
981 @		8360.9	(23 ⁻)	7379.9	(21 ⁻)			
982 @		7911.8	22 ⁺	6929.8	20 ⁺			
1014.3 5	1.1 1	4120.8		3106.5	12 ⁺			
1020.2 5	0.86 8	2177.1	6 ⁺	1157.1	6 ⁺	D+Q		$A_2=0.39$ 7, $A_4=0.17$ 9; DCO=0.8 3 (1996Lu09).
1022 @		6500.9	(19 ⁻)	5478.9	17 ⁻			
^x 1026 & 2								
1033 @		7175.5	21 ⁻	6142.6	20 ⁺			
1040.3 5	2.39 16	2859.5	9 ⁻	1819.3	8 ⁺	E1	7.85×10^{-4}	DCO=0.71 9 (1996Lu09).
1045 @		8956.8	24 ⁺	7911.8	22 ⁺			
1050.6 5	1.79 14	2869.9	10 ⁺	1819.3	8 ⁺	E2	0.00182	DCO=1.08 9 (1996Lu09).
1056.4 5	1.45 13	1663.4	5 ⁺	606.8	4 ⁺	D+Q		$A_2=-0.21$ 5, $A_4=0.32$ 7; DCO=2.5 3 (1996Lu09). E_γ : from 1985Ca12. I_γ : from 1996Li41.
1076.7 5	2.3 4	7219.3	22 ⁺	6142.6	20 ⁺			
1079 @		9218	(25 ⁻)	8139.5	23 ⁻			
1082 @		9514.4	26 ⁺	8432.4	24 ⁺			
1083.4 5	0.43 7	2240.5	(5 ⁻)	1157.1	6 ⁺			
1087.5 5	1.05 11	2244.6	7 ⁻	1157.1	6 ⁺	E1	7.23×10^{-4}	DCO=0.78 13 (1996Lu09). E_γ : other: 1091 (2000Pa48).
1093.5 5	0.56 9	1700.3		606.8	4 ⁺			
1105.0 5	0.49 8	1312.1	4 ⁺	207.11	2 ⁺			
1111 @		9471.9	(25 ⁻)	8360.9	(23 ⁻)			
1120 @		10076.8	26 ⁺	8956.8	24 ⁺			
1128.7 5	0.62 12	2285.9	5 ⁻	1157.1	6 ⁺			
1132 @		6316.9	19 ⁻	5184.5	18 ⁺			
1155.3 5	<0.5	2974.6		1819.3	8 ⁺			
1175.3 5	3.45 17	2332.4	6 ⁽⁻⁾	1157.1	6 ⁺	D		$A_2=-0.198$ 18, $A_4=0.12$ 3; DCO=1.02 5 (1996Lu09).
1180.4 5	0.33 10	4846.8		3666.4	14 ⁺			
1184 ^b @		10402	(27 ⁻)	9218	(25 ⁻)			
1184 ^b @		10698	(28 ⁺)	9514.4	26 ⁺			
1186.0 5		8405.3	24 ⁺	7219.3	22 ⁺			E_γ : from 1985Ca12.
1194 @		11271	28 ⁺	10076.8	26 ⁺			
1212.5 5	0.23 5	2369.6		1157.1	6 ⁺			
1227.7 5	0.49 6	2384.6	6 ⁻	1157.1	6 ⁺	D		DCO=1.3 4 (1996Lu09).
1270 @		12541	(30 ⁺)	11271	28 ⁺			
1277 @		11975	(30 ⁺)	10698	(28 ⁺)			

(HI,xn γ) 1996Lu09,2000Pa48 (continued)

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

E_γ [†]	I_γ	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. [‡]	Comments
1282.0 5	0.68 10	1888.7	5 ⁻	606.8	4 ⁺		
1290& 2		9695.3	(26 ⁺)	8405.3	24 ⁺		E_γ : other: 1288 (2000Pa48).
1334@		13875	(32 ⁺)	12541	(30 ⁺)		
1358@		13333	(32 ⁺)	11975	(30 ⁺)		
1362.5 5	2.02 12	2519.6	7 ⁻	1157.1	6 ⁺	E1	$A_2=-0.64$ 9, $A_4=0.14$ 12; DCO=0.62 9 (1996Lu09).
1372.6 5	2.03 12	1979.5	4 ⁽⁻⁾	606.8	4 ⁺	D	DCO=1.14 14 (1996Lu09).
1383& 2		11078	(28 ⁺)	9695.3	(26 ⁺)		E_γ : other: 1381 (2000Pa48).
1402.7 5	0.51 9	5069.1		3666.4	14 ⁺		
1429@		14762	(34 ⁺)	13333	(32 ⁺)		
1469@		12547	(30 ⁺)	11078	(28 ⁺)		
1502.2 5	0.92 8	2659.0	8 ⁺	1157.1	6 ⁺		
1503@		16265	(36 ⁺)	14762	(34 ⁺)		
1570.0 5	0.45 6	2177.1	6 ⁺	606.8	4 ⁺		
1573@		17838	(38 ⁺)	16265	(36 ⁺)		
1633.7 5	1.11 8	2240.5	(5 ⁻)	606.8	4 ⁺		

[†] From 1996Lu09, unless otherwise noted.

[‡] From $\gamma(\theta)$ and DCO ratios.

From 1996Lu09.

@ From 2000Pa48.

& From 1991Ca19. Uncertainty is assigned by evaluators.

^a If No value given it was assumed $\delta=0.10$ for E2/M1, $\delta=1.00$ for E3/M2 and $\delta=0.10$ for the other multipolarities.

^b Multiply placed.

^c Placement of transition in the level scheme is uncertain.

^x γ ray not placed in level scheme.

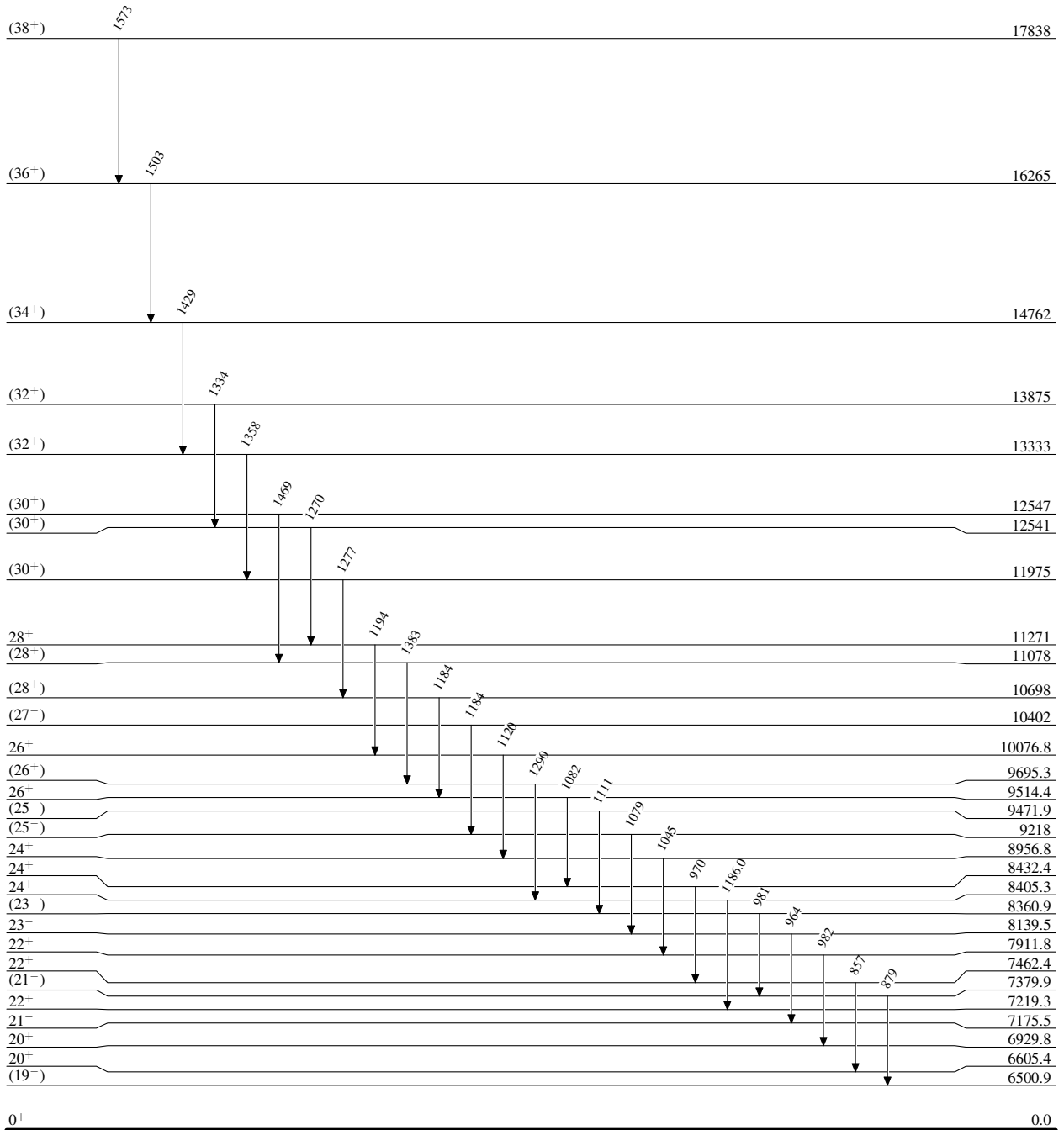
(HI,xn γ) 1996Lu09,2000Pa48

Level Scheme

Intensities: Relative I_γ

Legend

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



<0.28 ps

3.93 min 2

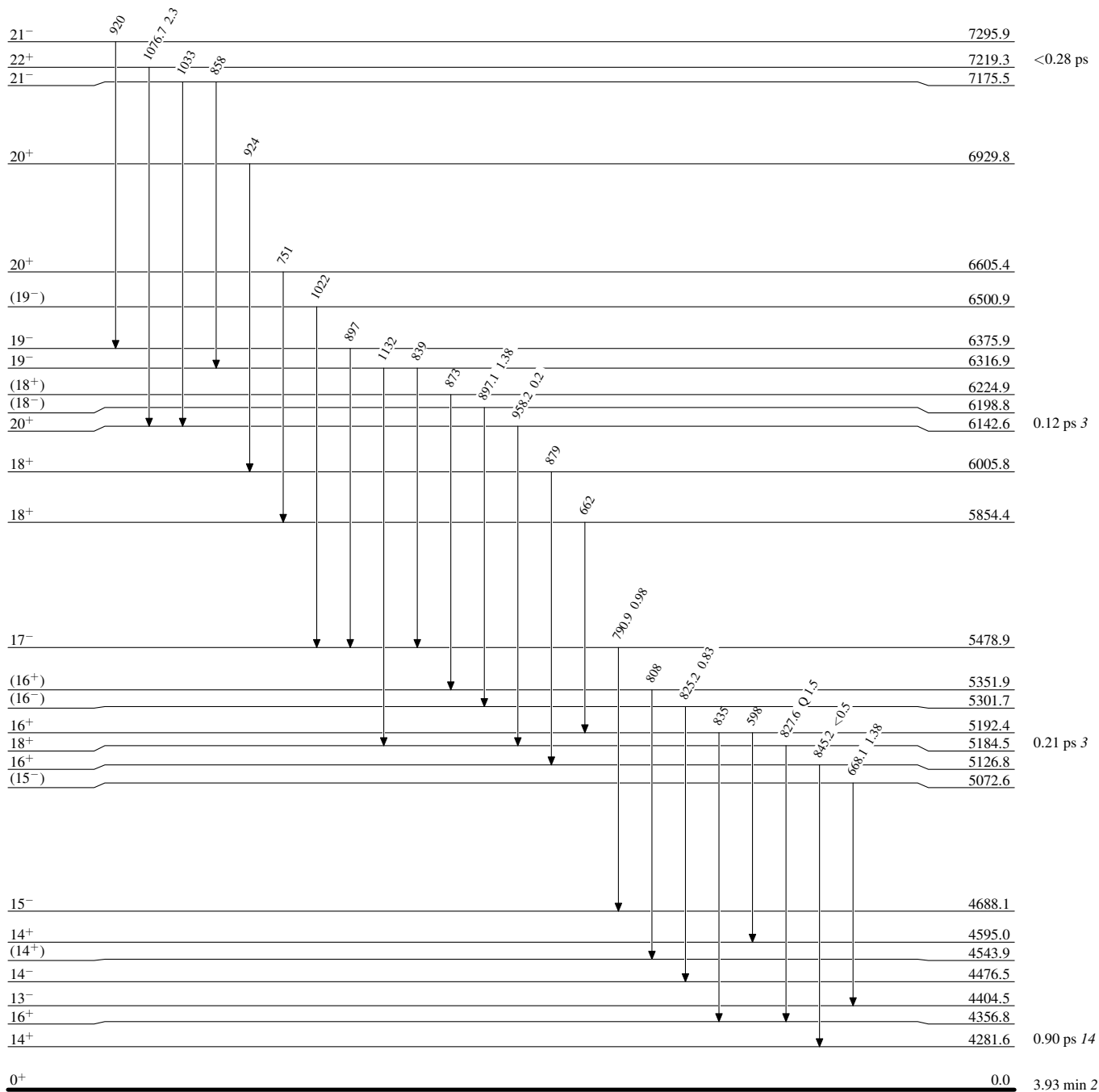
(HI,xn γ) 1996Lu09,2000Pa48

Level Scheme (continued)

Intensities: Relative I_γ

Legend

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



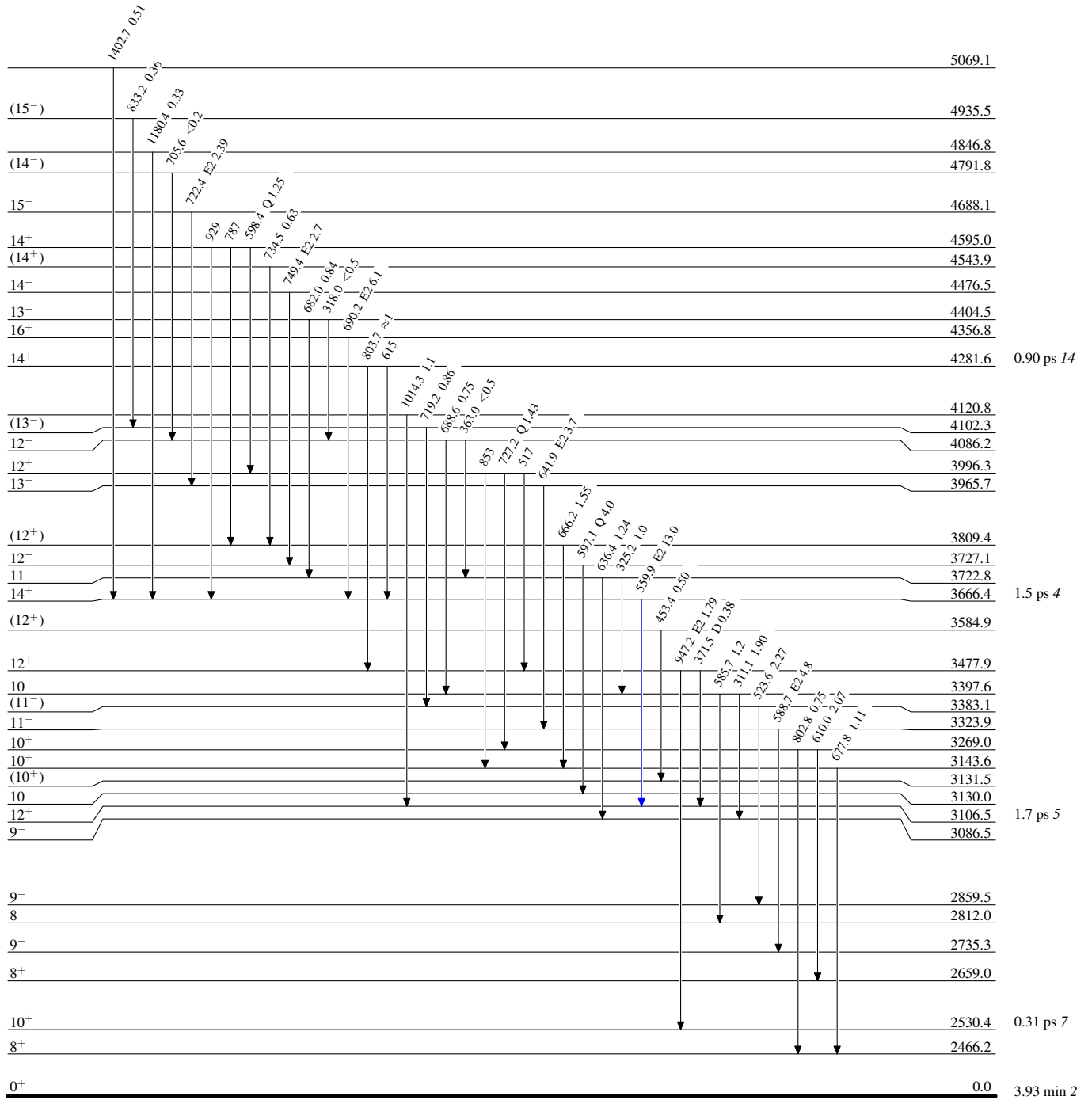
(HI,xn γ) 1996Lu09,2000Pa48

Level Scheme (continued)

Intensities: Relative I γ

Legend

- I γ < 2% × I γ ^{max}
- I γ < 10% × I γ ^{max}
- I γ > 10% × I γ ^{max}



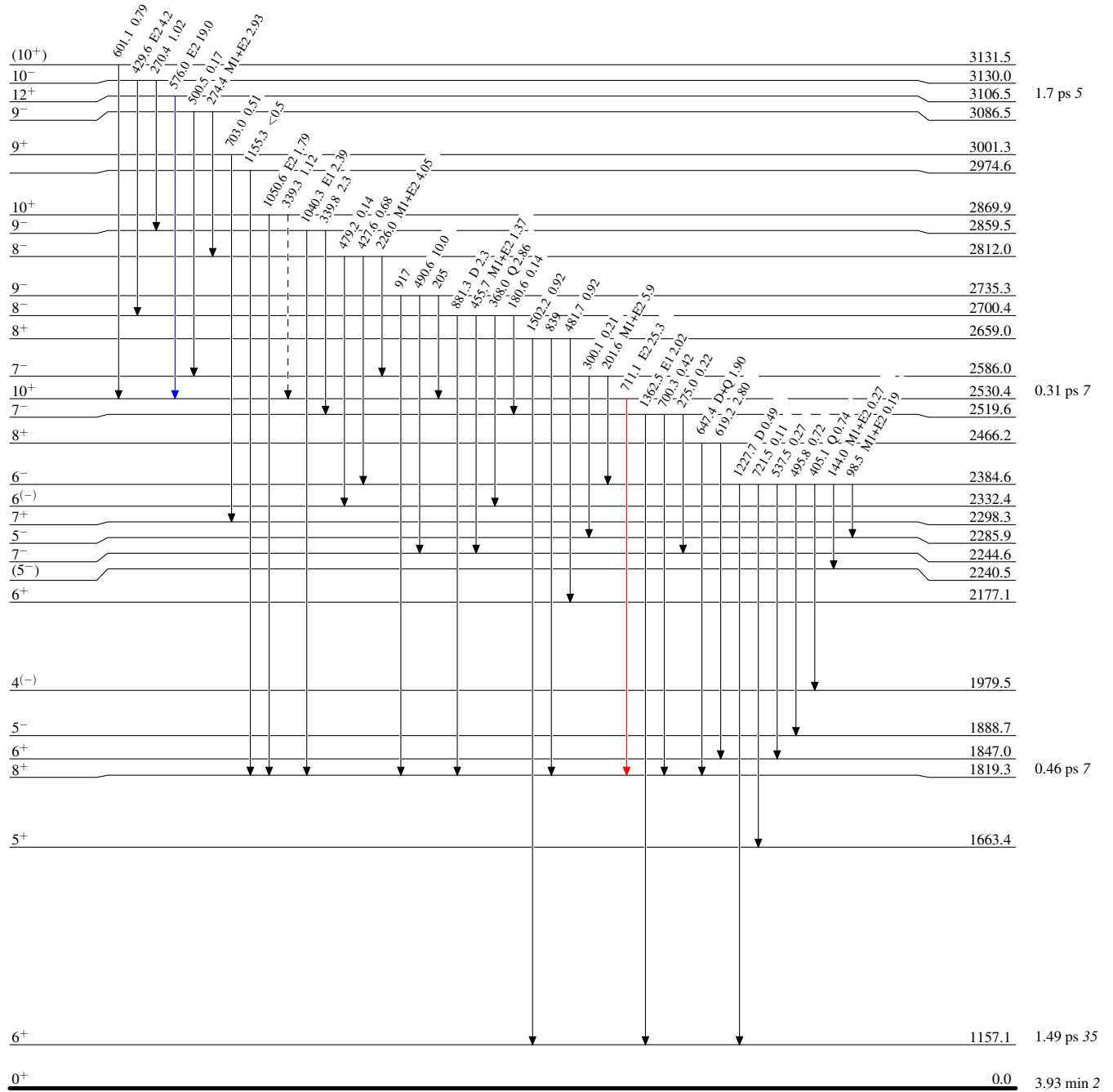
(HI,xn γ) 1996Lu09,2000Pa48

Legend

Level Scheme (continued)

Intensities: Relative I γ

- I γ < 2% × I γ^{max}
- I γ < 10% × I γ^{max}
- I γ > 10% × I γ^{max}
- - - - - γ Decay (Uncertain)



¹²⁸₅₈Ce₇₀

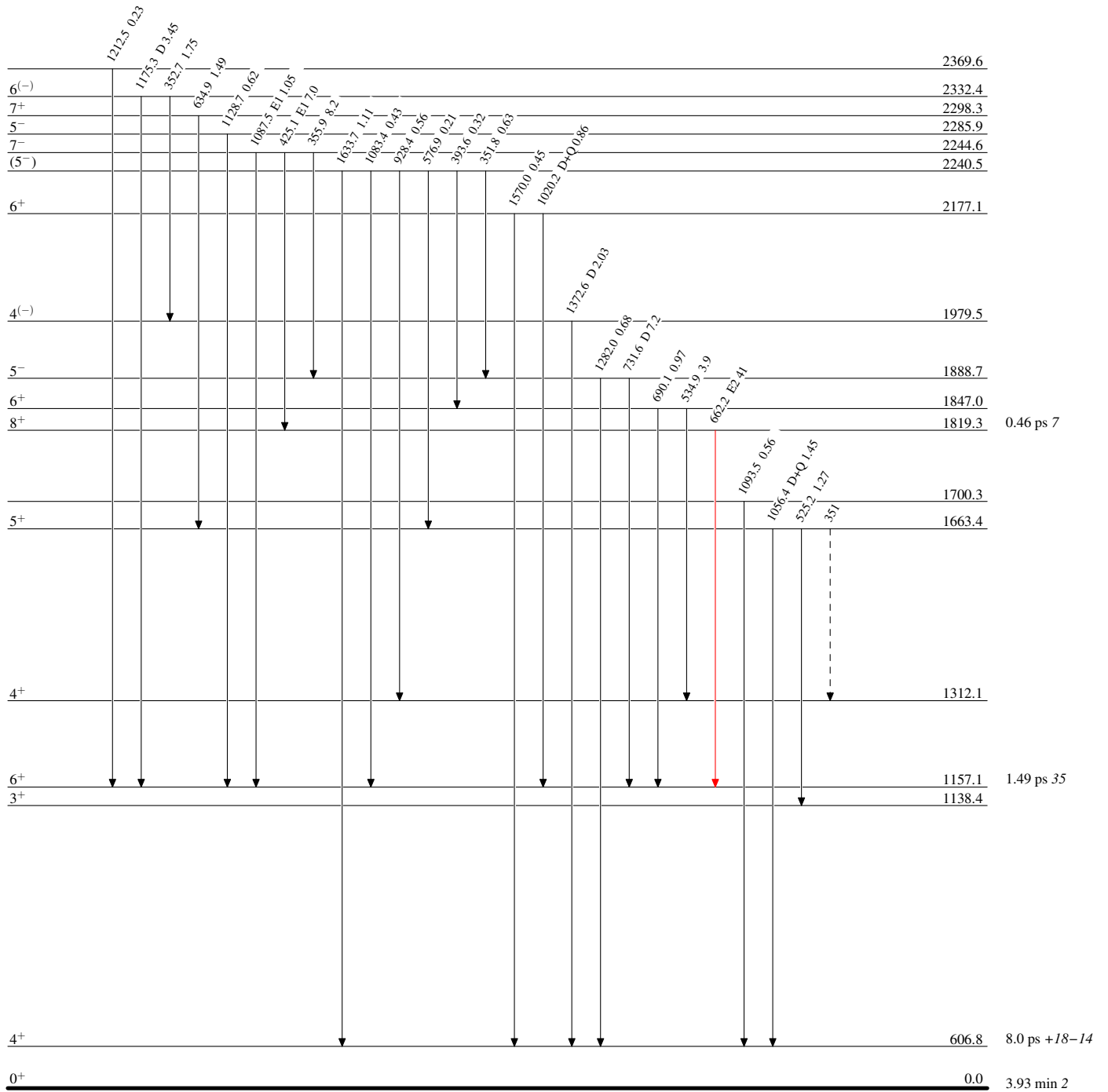
(HI,xn γ) 1996Lu09,2000Pa48

Legend

Level Scheme (continued)

Intensities: Relative I_{γ}

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

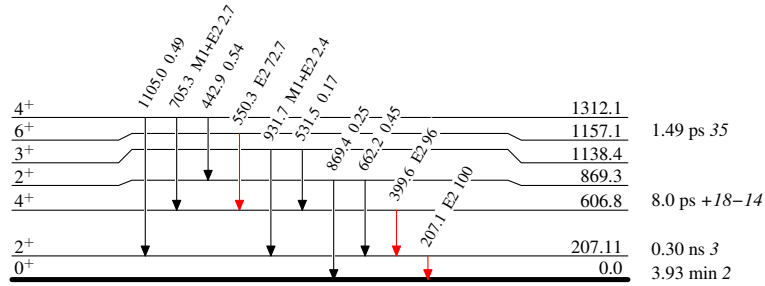


$^{128}_{58}\text{Ce}_{70}$

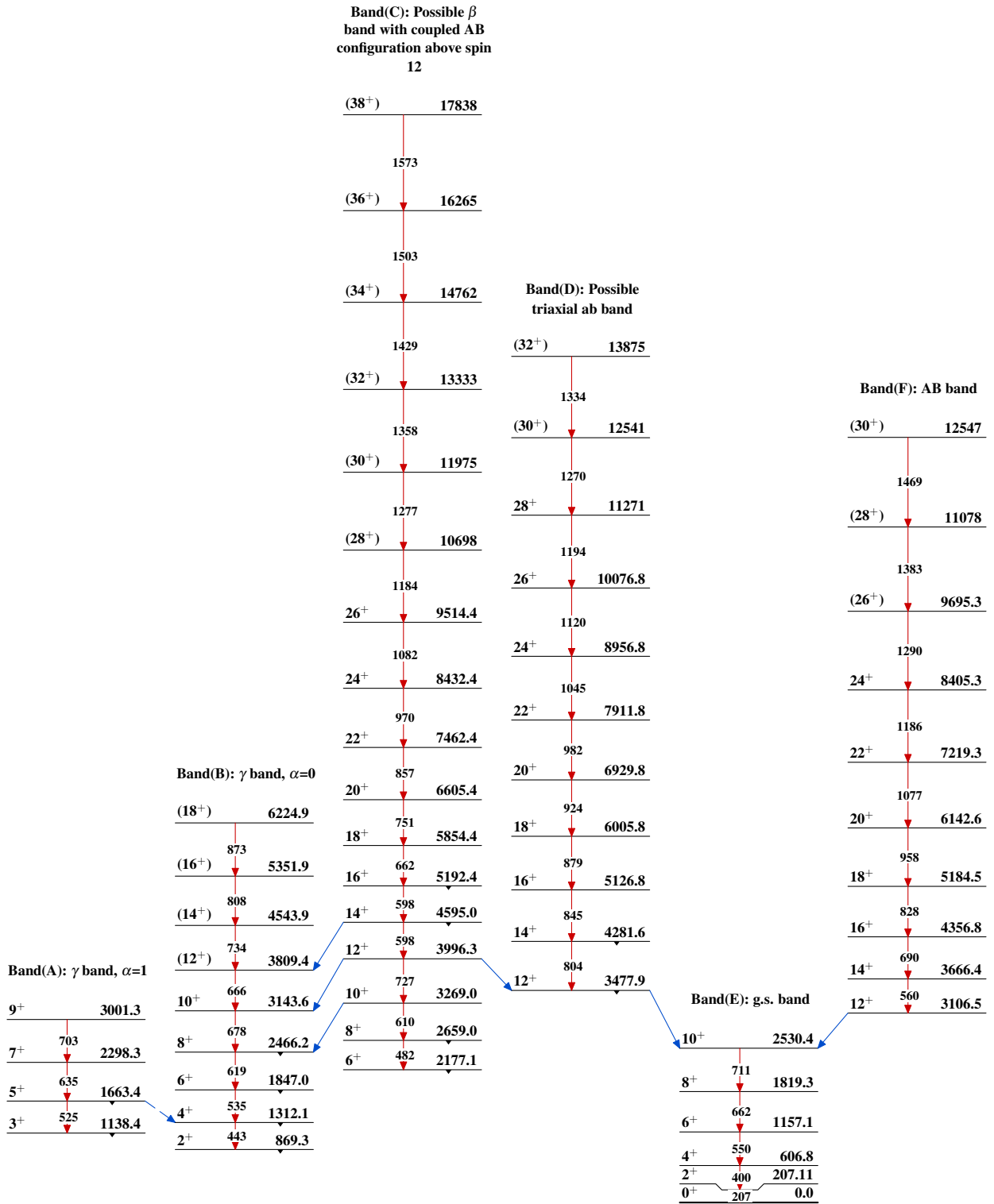
(HI,xn γ) 1996Lu09,2000Pa48**Level Scheme (continued)**Intensities: Relative I_γ

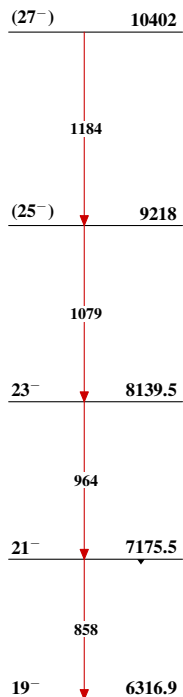
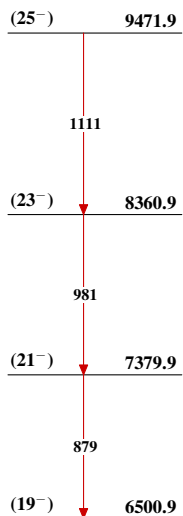
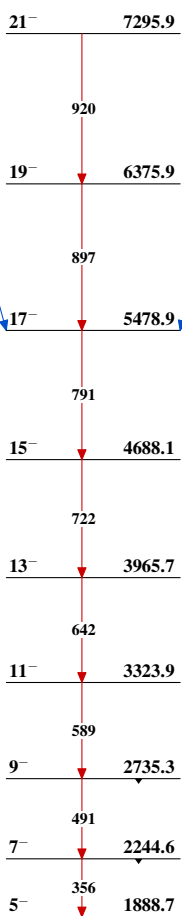
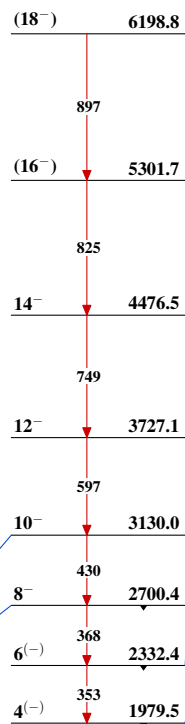
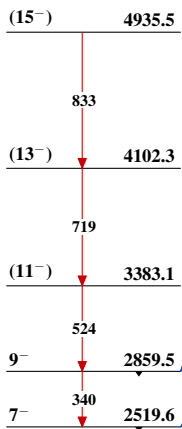
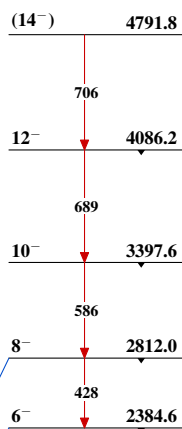
Legend

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

 $^{128}_{58}\text{Ce}_{70}$

(HI,xn γ) 1996Lu09,2000Pa48



(HI,xn γ) 1996Lu09,2000Pa48 (continued)**Band(G): Possible AFef band****Band(I): Possible AFBC band****Band(H): Possible AF band****Band(K): Possible AG band****Band(J): Possible AH band****Band(L): Possible ae band**

(HI,xn γ) 1996Lu09,2000Pa48 (continued)Band(M): Possible af
band(15⁻) 5072.6

668

13⁻ 4404.5

682

11⁻ 3722.8

636

9⁻ 3086.5

500

7⁻ 2586.0

300

5⁻ 2285.9 $^{128}_{58}\text{Ce}_{70}$