

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 93,33 (2001)	11-May-2001

$Q(\beta^-) = -8.25 \times 10^3$ 7; $S(n) = 1.121 \times 10^4$ 4; $S(p) = 5.39 \times 10^3$ 4; $Q(\alpha) = 8.2 \times 10^2$ 3 [2012Wa38](#)

Note: Current evaluation has used the following Q record -8091 syst 11234 syst 5401 syst 788 syst [1995Au04](#).

$\Delta(Q(\beta^-)) = 681$, $\Delta(S(n)) = 646$, $\Delta(S(p)) = 615$, $\Delta(Q(\alpha)) = 613$ ([1995Au04](#)).

[Additional information 1.](#)

 ^{130}Ce Levels

Quasiparticle nomenclature:

A: $\pi h_{11/2} 3/2[541]$, $\alpha = -1/2$.

B: $\pi h_{11/2} 3/2[541]$, $\alpha = +1/2$.

C: $\pi h_{11/2} 1/2[550]$, $\alpha = -1/2$.

D: $\pi h_{11/2} 1/2[550]$, $\alpha = +1/2$.

E: $\pi d_{3/2} 1/2[420]$, $\alpha = +1/2$.

F: $\pi d_{3/2} 1/2[420]$, $\alpha = -1/2$.

a: $\nu h_{11/2} 7/2[523]$, $\alpha = -1/2$.

b: $\nu h_{11/2} 7/2[523]$, $\alpha = +1/2$.

e: $\nu g_{7/2} 7/2[404]$, $\alpha = +1/2$.

f: $\nu g_{7/2} 7/2[404]$, $\alpha = -1/2$.

Cross Reference (XREF) Flags

- A** ^{130}Pr ε decay: high J + Low J
B ^{131}Nd εp decay (27 s)
C (HI, xn γ)
D $^{100}\text{Mo}(^{34}\text{S}, 4n\gamma)$: SD

E(level)	J^π	$T_{1/2}$	XREF	Comments
0.0 ^c	0 ⁺	22.9 min 5	ABC	$\% \varepsilon + \% \beta^+ = 100$ J^π : measurement by atomic-beam magnetic-resonance method (1973In04). $T_{1/2}$: from 1996Xu04 . Others: 25 min 2 (1964PeZY), 30 min 5 (1960Wa03), 30 min (1965Ge03), 25 min (1966No05).
253.85 ^c 16	2 ⁺	143 ps 6	ABC	J^π : E2 γ to 0 ⁺ .
710.37 ^c 21	4 ⁺	4.3 ps +5-3	A C	J^π : $\Delta J=2$, E2 γ to 2 ⁺ .
834.55 ^d 16	(2 ⁺)		A C	J^π : γ 's to 2 ⁺ and 0 ⁺ ; systematics.
1025.7 11	0 ⁺		A	J^π : $\gamma\gamma(\theta)$ in ^{130}Pr ε decay.
1177.37 21	(2 ⁺ , 3, 4 ⁺)		A	J^π : γ 's to 2 ⁺ and 4 ⁺ .
1322.83 ^d 22	(4 ⁺)		A C	
1324.1 ^c 3	6 ⁺	0.87 ps 7	A C	
1671.99 21	(2 ⁺ , 3, 4 ⁺)		A	J^π : γ 's to (2 ⁺) and 4 ⁺ .
1755.4 4			A	J^π : possible γ to 4 ⁺ .
1897.6 ^d 3	(6 ⁺)		A C	
1954.8 ^f 3	(5 ⁻)		A C	J^π : $\Delta J=1$ γ to 6 ⁺ ; γ to 4 ⁺ .
2053.0 ^c 3	8 ⁺	0.24 ps 7	C	
2115.8 3	(2 ⁺ , 3, 4 ⁺)		A	J^π : γ to 4 ⁺ ; possible γ to (2 ⁺).
2313.2 ^f 3	(7 ⁻)	23 ps 3	C	
2333.3 5			C	
2381.0 ^e 4	(6 ⁻)		C	J^π : (E1) γ to 6 ⁺ ; no γ to 4 ⁺ ; $\gamma(\theta)$.
2453.6 ^g 3	(7 ⁻)	100 ns 8	A C	$Q=1.77$ 21 (1999Io02)

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Adopted Levels, Gammas (continued) ^{130}Ce Levels (continued)

E(level)	J^{π}	$T_{1/2}$	XREF	Comments
Q: TDPAD method. J $^{\pi}$: γ 's to 8^+ and (5^-) , no γ to 4^+ .				
2560.6 ^d 5	(8 ⁺)		C	
2624.3 4			A	
2642.5 ^h 4	(8 ⁻)		C	J $^{\pi}$: M1+E2 γ to (7^-) .
2644.5 ^e 4	(8 ⁻)		C	
2760.9 ^f 4	(9 ⁻)	2.8 ps 14	C	
2809.0 ^c 4	10 ⁺	0.42 ps 10	C	
2958.6 ^g 5	(9 ⁻)		C	
3071.6 ^e 4	(10 ⁻)	5.2 ps 10	C	
3296.5 ^d 7	(10 ⁺)		C	
3311.9 ^c 4	12 ⁺	2.84 ps 17	C	
3317.0 ^h 5	(10 ⁻)		C	
3319.8 ^f 4	(11 ⁻)	<1.4 ps	C	
3681.3 ^e 5	(12 ⁻)	<1.0 ps	C	
3700.0 ^g 6	(11 ⁻)		C	
3860.5 ^c 5	14 ⁺	1.24 ps 7	C	
3985.3 ^d 8	(12 ⁺)		C	
4026.7 ^f 5	(13 ⁻)		C	
4120.2 ^h 6	(12 ⁻)		C	
4448.8 ^e 6	(14 ⁻)		C	
4536.0 ^g 6	(13 ⁻)		C	
4553.2 ^c 5	16 ⁺	0.28 ps 7	C	
4755.4 ^d 9	(14 ⁺)		C	
4862.4 ^f 6	(15 ⁻)		C	
4973.4 ^h 7	(14 ⁻)		C	
5305.3 ^g 7	(15 ⁻)		C	
5343.5 ^e 8	(16 ⁻)		C	
5384.2 ^c 6	18 ⁺	0.21 ps 5	C	
5585.8 ^h 7	(16 ⁻)		C	
5608 ^d 2	(16 ⁺)		C	
5757.9 ^f 7	(17 ⁻)		C	
5881.3 ^g 8	(17 ⁻)		C	
5884.5 8			C	
6211.9 ^h 8	(18 ⁻)		C	
6320.0 ^e 9	(18 ⁻)		C	
6341.6 ^c 7	20 ⁺	173 fs 35	C	
6396 1	(20 ⁺)		C	
6533 ^d 2	(18 ⁺)		C	
6576.3 ^g 8	(19 ⁻)		C	
6642.3 ^f 8	(19 ⁻)		C	
6978.3 ^h 9	(20 ⁻)		C	
7388 ^e 1	(20 ⁻)		C	
7408.6 ^c 8	22 ⁺	75 fs 14	C	
7412.3 ^g 10	(21 ⁻)		C	
7513 ^d 2	(20 ⁺)		C	
7583 ^f 1	(21 ⁻)		C	

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Adopted Levels, Gammas (continued) ^{130}Ce Levels (continued)

E(level)	$J^{\pi\ddagger}$	$T_{1/2}^{\dagger}$	XREF	E(level)	$J^{\pi\ddagger}$	XREF
7885.3 ^h 11	(22 ⁻)		C	23001+x ⁱ	J1+34	D
8380.3 ^g 12	(23 ⁻)		C	25065+x? ⁱ	J1+36	D
8511 ^e 2	(22 ⁻)		C	y ^{&j}	J2	D
8554 ^d 2	(22 ⁺)		C	841+y ^j	J2+2	D
8570.0 ^c 9	24 ⁺	52 fs 10	C	1755+y ^j	J2+4	D
8605 ^f 2	(23 ⁻)		C	2738+y ^j	J2+6	D
8606 1	(24 ⁺)		C	3790+y ^j	J2+8	D
8912.3 ^h 13	(24 ⁻)		C	4914+y ^j	J2+10	D
9465.3 ^g 14	(25 ⁻)		C	6110+y ^j	J2+12	D
9664 ^d 3	(24 ⁺)		C	7376+y ^j	J2+14	D
9702.5? 11	(26 ⁺)		C	8714+y ^j	J2+16	D
9703 ^f 2	(25 ⁻)		C	10126+y ^j	J2+18	D
9748 2	(26 ⁺)		C	11615+y ^j	J2+20	D
9816 ^c 2	(26 ⁺)	31 fs 9	C	13181+y ^j	J2+22	D
10050 ^h 2	(26 ⁻)		C	14827+y ^j	J2+24	D
10650 ^g 2	(27 ⁻)		C	16553+y ^j	J2+26	D
10849 ^d 3	(26 ⁺)		C	18359+y ^j	J2+28	D
10876 ^f 2	(27 ⁻)		C	20259+y ^j	J2+30	D
10997 2	(28 ⁺)		C	22255+y ^j	J2+32	D
11132 ^c 2	(28 ⁺)		C	z ^{ak}	J3	D
11138 2	(28 ⁺)		C	904+z ^k	J3+2	D
11283 ^h 2	(28 ⁻)		C	1880+z ^k	J3+4	D
11923 ^g 2	(29 ⁻)		C	2928+z ^k	J3+6	D
12097 ^f 3	(29 ⁻)		C	4050+z ^k	J3+8	D
12486 ^c 2	(30 ⁺)		C	5246+z ^k	J3+10	D
12607 ^h 2	(30 ⁻)		C	6517+z ^k	J3+12	D
13817 ^c 3	(32 ⁺)		C	7863+z ^k	J3+14	D
15178 ^c 3	(34 ⁺)		C	9288+z ^k	J3+16	D
x ^{@i}	J1≈(18) [#]		D	10800+z ^k	J3+18	D
865+x ⁱ	J1+2		D	12394+z ^k	J3+20	D
1764+x ⁱ	J1+4		D	14098+z ^k	J3+22	D
2720+x ⁱ	J1+6		D	15903+z ^k	J3+24	D
3752+x ⁱ	J1+8		D	17807+z ^k	J3+26	D
4859+x ⁱ	J1+10		D	19806+z ^k	J3+28	D
6007+x ⁱ	J1+12		D	u ^{bl}	J4	D
7124+x ⁱ	J1+14		D	1261+u ^l	J4+2	D
8339+x ⁱ	J1+16		D	2592+u ^l	J4+4	D
9627+x ⁱ	J1+18		D	3995+u ^l	J4+6	D
10994+x ⁱ	J1+20		D	5473+u ^l	J4+8	D
12442+x ⁱ	J1+22		D	7028+u ^l	J4+10	D
13974+x ⁱ	J1+24		D	8662+u ^l	J4+12	D
15595+x ⁱ	J1+26		D	10379+u ^l	J4+14	D
17304+x ⁱ	J1+28		D	12169+u ^l	J4+16	D
19109+x ⁱ	J1+30		D	14031+u ^l	J4+18	D
21009+x ⁱ	J1+32		D			

[†] From recoil-distance Doppler shift and Doppler-shift attenuation methods in (HI,xnγ).[‡] From γ(θ), γγ(θ) and associated band structures.

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Adopted Levels, Gammas (continued) ^{130}Ce Levels (continued)

- # 899 transition estimated as 22 to 20. Positive parity proposed by [1998Se10](#).
- @ This level may deexcite by an 866 γ followed by a 956 γ as indicated by the alignment plot in figure 3 of [1998Se10](#).
- & Possible feeding of 14 $^-$, 16 $^-$ and 17 $^-$ states of 2-quasiproton band ([2000PaZZ](#)).
- ^a [2000PaZZ](#) show a cascade of 832 γ -(757 γ -675 γ) deexciting this level, followed by possible feeding of 14 $^+$ level of g.s. band.
- ^b [2000PaZZ](#) show an 1175 γ deexciting this level, followed by possible feeding of 22 $^+$ level of g.s. band.
- ^c Band(A): g.s. (yrast) band, AB after 10 $^+$. second backbend at about 24 $^+$.
- ^d Band(B): γ band, γ AB after 10 $^+$.
- ^e Band(C): ae band.
- ^f Band(D): af band.
- ^g Band(E): $K^\pi=(7^-)$ af band, afAB after 15 $^-$.
- ^h Band(F): $K^\pi=(7^-)$ ae band, aeAB after 14 $^-$.
- ⁱ Band(G): SD-1 band ([1998Se10](#)). Percent population=0.6 ([1998Se10](#)). Configuration= $\nu 6^1 \otimes \nu 1/2[411]$, $\alpha=0$. This band may continue downward with four more transitions of 866, 956, 866 and 834 keV, but the ordering of these γ rays in the lowest part of the band is not yet established. [2000PaZZ](#) suggest the ordering as 864 γ -956 γ -834 γ followed by 864 γ feeding the 10 $^+$ level of g.s. band. These γ rays are unplaced in the present level scheme.
- ^j Band(H): SD-2 band ([1998Se10](#),[1997Wi02](#)). Percent population=1.0 ([1998Se10](#)), 0.5 ([1997Wi02](#)). Configuration= $\nu 6^1 \otimes \nu 7/2[523]$, $\alpha=0$.
- ^k Band(I): SD-3 band ([1998Se10](#)). Percent population=0.5 ([1998Se10](#)). Configuration= $\nu 6^1 \otimes \nu 1/2[411]$, $\alpha=1$, possibly signature partner of SD-1 band.
- ^l Band(J): SD-4 band ([1998Se10](#)). Percent population=0.4 ([1998Se10](#)). Configuration= $\nu 6^1 \otimes \nu 7/2[523]$, $\alpha=1$, possibly signature partner of SD-2 band.

Adopted Levels, Gammas (continued)

$\gamma(^{130}\text{Ce})$

The SD-1 band may continue downward with four more transitions of 866, 956, 866 and 834 keV, but the ordering of these γ rays in the lowest part of the band is not established. 2000PaZZ suggested the ordering as 864 γ -956 γ -834 γ followed by 864 γ feeding the 10⁺ level of g.s. band. These γ rays are unplaced in the present level scheme.

$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult. [‡]	$\delta^\ddagger$	α^a	Comments
253.85	2 ⁺	253.8 2	100	0.0	0 ⁺	E2		0.084	$\alpha(K)=0.0659$; $\alpha(L)=0.01399$; $\alpha(M)=0.00300$; $\alpha(N+..)=0.00079$
710.37	4 ⁺	456.5 2	100	253.85	2 ⁺	E2		0.0139	B(E2)(W.u.)=89 4
834.55	(2 ⁺)	580.6 2	100 10	253.85	2 ⁺				B(E2)(W.u.)=167 20
		834.6 2	80 9	0.0	0 ⁺				
1025.7	0 ⁺	771.8		253.85	2 ⁺				
		1025.5 ^b		0.0	0 ⁺	(E0)			Mult.: from ε decay.
1177.37	(2 ⁺ ,3,4 ⁺)	342.7 6	7 2	834.55	(2 ⁺)				
		467.2 6	9 3	710.37	4 ⁺				
		923.6 2	100 7	253.85	2 ⁺				
1322.83	(4 ⁺)	488.3 2	100 20	834.55	(2 ⁺)				
		612.5 3	144 33	710.37	4 ⁺				
		1068.8 5	32 8	253.85	2 ⁺				
1324.1	6 ⁺	613.8 2	100	710.37	4 ⁺	E2			B(E2)(W.u.)=191 16
1671.99	(2 ⁺ ,3,4 ⁺)	494.7 2	26 8	1177.37	(2 ⁺ ,3,4 ⁺)				
		837.4 2	100 5	834.55	(2 ⁺)				
		961.5 4	22 8	710.37	4 ⁺				
1755.4		578.0 3	100	1177.37	(2 ⁺ ,3,4 ⁺)				
		1045.0		710.37	4 ⁺				
1897.6	(6 ⁺)	573.6 4	100 20	1324.1	6 ⁺				
		574.8 4	83 17	1322.83	(4 ⁺)				
		1187		710.37	4 ⁺				
1954.8	(5 ⁻)	283 ^b		1671.99	(2 ⁺ ,3,4 ⁺)				
		630.7 2	100 10	1324.1	6 ⁺	D(+Q)	+0.04 4		
		631.9 5	2.0 7	1322.83	(4 ⁺)				
		1244.3 5	2.0 7	710.37	4 ⁺				
2053.0	8 ⁺	728.7 2	100	1324.1	6 ⁺	E2			B(E2)(W.u.)=2.9×10 ² 9
2115.8	(2 ⁺ ,3,4 ⁺)	792 ^b		1322.83	(4 ⁺)				
		938.5 2	100 21	1177.37	(2 ⁺ ,3,4 ⁺)				
		1282		834.55	(2 ⁺)				
		1404.9 10	85 26	710.37	4 ⁺				
2313.2	(7 ⁻)	260.4 4	20 4	2053.0	8 ⁺	[E1]		0.0180	B(E1)(W.u.)=9.2×10 ⁻⁵ 24
		358.4 2	100 10	1954.8	(5 ⁻)	E2		0.028	$\delta(Q/D)=+0.05$ 5.
		415.5 4	12 3	1897.6	(6 ⁺)	[E1]			B(E2)(W.u.)=75 14
									B(E1)(W.u.)=1.4×10 ⁻⁵ 4

Adopted Levels, Gammas (continued)

$\gamma(^{130}\text{Ce})$ (continued)										
$E_i(\text{level})$	J_i^π	E_γ [†]	I_γ [†]	E_f	J_f^π	Mult. [‡]	δ [‡]	α^a	$I_{(\gamma+ce)}$	Comments
2313.2	(7 ⁻)	989.0 5	5.9 13	1324.1	6 ⁺	[E1]				B(E1)(W.u.)=5.0×10 ⁻⁷ 14
2333.3		1009.2 4	100	1324.1	6 ⁺					
2381.0	(6 ⁻)	426.2 5	15 3	1954.8	(5 ⁻)					
		483.3 5	13 3	1897.6	(6 ⁺)					
		1056.9 4	100 20	1324.1	6 ⁺	(E1)				
2453.6	(7 ⁻)	72.8	#	2381.0	(6 ⁻)				≈35	
		120.5	#	2333.3					≈85	
		401.0 5	11 3	2053.0	8 ⁺	[E1]				B(E1)(W.u.)=4.5×10 ⁻⁹ 14
		499.0 4	37 8	1954.8	(5 ⁻)	[E2]		0.0109		B(E2)(W.u.)=0.0017 5
		556.1 3	100 20	1897.6	(6 ⁺)	[E1]				B(E1)(W.u.)=1.6×10 ⁻⁸ 4
		1129.7 3	100 20	1324.1	6 ⁺	[E1]				B(E1)(W.u.)=1.8×10 ⁻⁹ 4
2560.6	(8 ⁺)	505		2053.0	8 ⁺					
		663.4 4	100	1897.6	(6 ⁺)					
2624.3		952.3 3	100	1671.99	(2 ⁺ ,3,4 ⁺)					
2642.5	(8 ⁻)	189.3 3	100	2453.6	(7 ⁻)	(M1+E2)	-1.3 4	0.215		
		587		2053.0	8 ⁺					
2644.5	(8 ⁻)	263.4 4	100 20	2381.0	(6 ⁻)					
		331.2 4	69 14	2313.2	(7 ⁻)					
		591.6 5	28 6	2053.0	8 ⁺					
2760.9	(9 ⁻)	116.4 5	3.7 7	2644.5	(8 ⁻)	[M1,E2]		0.99 21		B(M1)(W.u.)=0.07 4; B(E2)(W.u.)=3.2×10 ³ 19
		447.6 2	100 10	2313.2	(7 ⁻)	E2		0.0147		B(E2)(W.u.)=2.1×10 ² 11
		708.0 4	29 6	2053.0	8 ⁺	[E1]				B(E1)(W.u.)=6.E-5 3
2809.0	10 ⁺	756.0 2	100	2053.0	8 ⁺	E2				B(E2)(W.u.)=1.4×10 ² 4
2958.6	(9 ⁻)	316.3 4	100	2642.5	(8 ⁻)					
		903		2053.0	8 ⁺					
3071.6	(10 ⁻)	310.7 4	21 4	2760.9	(9 ⁻)					
		427.1 3	100 20	2644.5	(8 ⁻)	E2		0.0168		B(E2)(W.u.)=1.6×10 ² 6
3296.5	(10 ⁺)	735.9 4	100	2560.6	(8 ⁺)					
3311.9	12 ⁺	502.9 2	100	2809.0	10 ⁺	E2				B(E2)(W.u.)=158 10
3317.0	(10 ⁻)	358.4 5	28 6	2958.6	(9 ⁻)					
		674.7 4	100 20	2642.5	(8 ⁻)					
3319.8	(11 ⁻)	248.2 5	5.5 11	3071.6	(10 ⁻)					
		558.9 3	100 20	2760.9	(9 ⁻)	E2				B(E2)(W.u.)>1.8×10 ²
3681.3	(12 ⁻)	361.5 4	26 6	3319.8	(11 ⁻)					
		609.7 4	100 20	3071.6	(10 ⁻)	E2				B(E2)(W.u.)>1.4×10 ²
3700.0	(11 ⁻)	383.0 5	36 9	3317.0	(10 ⁻)					
		741.3 4	100 20	2958.6	(9 ⁻)					
3860.5	14 ⁺	548.6 2	100	3311.9	12 ⁺	E2				B(E2)(W.u.)=235 14
3985.3	(12 ⁺)	688.8 4	100	3296.5	(10 ⁺)					
4026.7	(13 ⁻)	345.4 5	7.7 15	3681.3	(12 ⁻)					

Adopted Levels, Gammas (continued) $\gamma(^{130}\text{Ce})$ (continued)

$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult. ‡	Comments
4026.7	(13 ⁻)	706.9 3	100 20	3319.8	(11 ⁻)	[E2]	
4120.2	(12 ⁻)	420.3 5	11 4	3700.0	(11 ⁻)		
		803.3 4	100 20	3317.0	(10 ⁻)		
4448.8	(14 ⁻)	767.5 4	100	3681.3	(12 ⁻)	E2	
4536.0	(13 ⁻)	415.5 5	32 7	4120.2	(12 ⁻)		
		835.8 4	100 20	3700.0	(11 ⁻)		
4553.2	16 ⁺	692.7 2	100	3860.5	14 ⁺	E2	B(E2)(W.u.)=3.2×10 ² 8
4755.4	(14 ⁺)	770.1 5	100	3985.3	(12 ⁺)		
4862.4	(15 ⁻)	835.7 3	100	4026.7	(13 ⁻)	E2	
4973.4	(14 ⁻)	437.1 5	24 5	4536.0	(13 ⁻)		
		853.6 4	100 20	4120.2	(12 ⁻)		
5305.3	(15 ⁻)	332.0 4	100 20	4973.4	(14 ⁻)		
		769.1 4	93 20	4536.0	(13 ⁻)		
5343.5	(16 ⁻)	894.7 4	100	4448.8	(14 ⁻)		
5384.2	18 ⁺	831.0 2	100	4553.2	16 ⁺	[E2]	B(E2)(W.u.)=1.7×10 ² 5
5585.8	(16 ⁻)	280.5 4	100 20	5305.3	(15 ⁻)		
		612.5 4	87 20	4973.4	(14 ⁻)		
5608	(16 ⁺)	853		4755.4	(14 ⁺)		
5757.9	(17 ⁻)	895.5 4	100	4862.4	(15 ⁻)	E2	
5881.3	(17 ⁻)	295.5 4	100 20	5585.8	(16 ⁻)		
		576.0 5	13 7	5305.3	(15 ⁻)		
5884.5		1022.1 5	100	4862.4	(15 ⁻)		
6211.9	(18 ⁻)	330.6 5	100 20	5881.3	(17 ⁻)		
		626.1 5	40 10	5585.8	(16 ⁻)		
6320.0	(18 ⁻)	976.5 4	100	5343.5	(16 ⁻)		
6341.6	20 ⁺	957.4 3	100	5384.2	18 ⁺	[E2]	B(E2)(W.u.)=104 21
6396	(20 ⁺)	1012		5384.2	18 ⁺		
6533	(18 ⁺)	925		5608	(16 ⁺)		
6576.3	(19 ⁻)	364.4 5	100 20	6211.9	(18 ⁻)		
		695.0 5	44 9	5881.3	(17 ⁻)		
6642.3	(19 ⁻)	884.4 4	100	5757.9	(17 ⁻)		
6978.3	(20 ⁻)	402.0 5	100 20	6576.3	(19 ⁻)		
		766.4 5	57 12	6211.9	(18 ⁻)		
7388	(20 ⁻)	1068		6320.0	(18 ⁻)		
7408.6	22 ⁺	1067.0 4	100	6341.6	20 ⁺	[E2]	B(E2)(W.u.)=1.4×10 ² 3
7412.3	(21 ⁻)	434		6978.3	(20 ⁻)		
		836		6576.3	(19 ⁻)		
7513	(20 ⁺)	980		6533	(18 ⁺)		
7583	(21 ⁻)	941		6642.3	(19 ⁻)		
7885.3	(22 ⁻)	473		7412.3	(21 ⁻)		
		907		6978.3	(20 ⁻)		

Adopted Levels, Gammas (continued)

<u>$\gamma(^{130}\text{Ce})$ (continued)</u>							Comments
$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult. [‡]	
8380.3	(23 ⁻)	495		7885.3	(22 ⁻)		
		968		7412.3	(21 ⁻)		
8511	(22 ⁻)	1123		7388	(20 ⁻)		
8554	(22 ⁺)	1041		7513	(20 ⁺)		
8570.0	24 ⁺	1161.4	5	7408.6	22 ⁺	[E2]	B(E2)(W.u.)=1.3×10 ² 3
8605	(23 ⁻)	1022		7583	(21 ⁻)		
8606	(24 ⁺)	1197		7408.6	22 ⁺		
8912.3	(24 ⁻)	532		8380.3	(23 ⁻)		
		1027		7885.3	(22 ⁻)		
9465.3	(25 ⁻)	553		8912.3	(24 ⁻)		
		1085		8380.3	(23 ⁻)		
9664	(24 ⁺)	1110		8554	(22 ⁺)		
9702.5?	(26 ⁺)	1132.5	5	8570.0	24 ⁺		
9703	(25 ⁻)	1098		8605	(23 ⁻)		
9748	(26 ⁺)	1142		8606	(24 ⁺)		
9816	(26 ⁺)	1246		8570.0	24 ⁺	[E2]	B(E2)(W.u.)=1.6×10 ² 5
10050	(26 ⁻)	1138		8912.3	(24 ⁻)		
10650	(27 ⁻)	1185		9465.3	(25 ⁻)		
10849	(26 ⁺)	1185		9664	(24 ⁺)		
10876	(27 ⁻)	1173		9703	(25 ⁻)		
10997	(28 ⁺)	1249		9748	(26 ⁺)		
11132	(28 ⁺)	1316		9816	(26 ⁺)		
11138	(28 ⁺)	1390		9748	(26 ⁺)		
11283	(28 ⁻)	1233		10050	(26 ⁻)		
11923	(29 ⁻)	1273		10650	(27 ⁻)		
12097	(29 ⁻)	1221		10876	(27 ⁻)		
12486	(30 ⁺)	1354		11132	(28 ⁺)		
12607	(30 ⁻)	1324		11283	(28 ⁻)		
13817	(32 ⁺)	1331		12486	(30 ⁺)		
15178	(34 ⁺)	1361		13817	(32 ⁺)		
865+x	J1+2	865		x	J1≈(18)		
1764+x	J1+4	899		865+x	J1+2		
2720+x	J1+6	956		1764+x	J1+4		
3752+x	J1+8	1032		2720+x	J1+6		
4859+x	J1+10	1107		3752+x	J1+8		
6007+x	J1+12	1148		4859+x	J1+10		
7124+x	J1+14	1117		6007+x	J1+12		
8339+x	J1+16	1215		7124+x	J1+14		
9627+x	J1+18	1288		8339+x	J1+16		
10994+x	J1+20	1367		9627+x	J1+18		
12442+x	J1+22	1448		10994+x	J1+20		
13974+x	J1+24	1532		12442+x	J1+22		

Adopted Levels, Gammas (continued)

$\gamma(^{130}\text{Ce})$ (continued)

$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	E_f	J_f^π	$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	E_f	J_f^π	$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	E_f	J_f^π
15595+x	J1+26	1621	13974+x	J1+24	11615+y	J2+20	1489	10126+y	J2+18	10800+z	J3+18	1512	9288+z	J3+16
17304+x	J1+28	1709	15595+x	J1+26	13181+y	J2+22	1566	11615+y	J2+20	12394+z	J3+20	1594	10800+z	J3+18
19109+x	J1+30	1805	17304+x	J1+28	14827+y	J2+24	1646	13181+y	J2+22	14098+z	J3+22	1704@	12394+z	J3+20
21009+x	J1+32	1900	19109+x	J1+30	16553+y	J2+26	1726	14827+y	J2+24	15903+z	J3+24	1805&	14098+z	J3+22
23001+x	J1+34	1992	21009+x	J1+32	18359+y	J2+28	1806	16553+y	J2+26	17807+z	J3+26	1904 ^b	15903+z	J3+24
25065+x?	J1+36	2064 ^b	23001+x	J1+34	20259+y	J2+30	1900	18359+y	J2+28	19806+z	J3+28	1999 ^b	17807+z	J3+26
841+y	J2+2	841	y	J2	22255+y	J2+32	1996	20259+y	J2+30	1261+u	J4+2	1261	u	J4
1755+y	J2+4	914	841+y	J2+2	904+z	J3+2	904	z	J3	2592+u	J4+4	1331	1261+u	J4+2
2738+y	J2+6	983	1755+y	J2+4	1880+z	J3+4	976	904+z	J3+2	3995+u	J4+6	1403	2592+u	J4+4
3790+y	J2+8	1052	2738+y	J2+6	2928+z	J3+6	1048	1880+z	J3+4	5473+u	J4+8	1478	3995+u	J4+6
4914+y	J2+10	1124	3790+y	J2+8	4050+z	J3+8	1122	2928+z	J3+6	7028+u	J4+10	1555	5473+u	J4+8
6110+y	J2+12	1196	4914+y	J2+10	5246+z	J3+10	1196	4050+z	J3+8	8662+u	J4+12	1634	7028+u	J4+10
7376+y	J2+14	1266	6110+y	J2+12	6517+z	J3+12	1271	5246+z	J3+10	10379+u	J4+14	1717	8662+u	J4+12
8714+y	J2+16	1338	7376+y	J2+14	7863+z	J3+14	1346	6517+z	J3+12	12169+u	J4+16	1790	10379+u	J4+14
10126+y	J2+18	1412	8714+y	J2+16	9288+z	J3+16	1425	7863+z	J3+14	14031+u	J4+18	1862	12169+u	J4+16

[†] Weighted averages taken for γ rays from levels that are commonly populated in ε decay and (HI,xn γ).

[‡] From (HI,xn γ).

Deduced from subsequent γ rays in coincidence spectra.

@ [2000PaZZ](#) show a cascade of 1664 γ -1761 γ above 1594 γ .

& See comment for 1704 γ .

^a Total theoretical internal conversion coefficients, calculated using the BrIcc code ([2008Ki07](#)) with Frozen orbital approximation based on γ -ray energies, assigned multiplicities, and mixing ratios, unless otherwise specified.

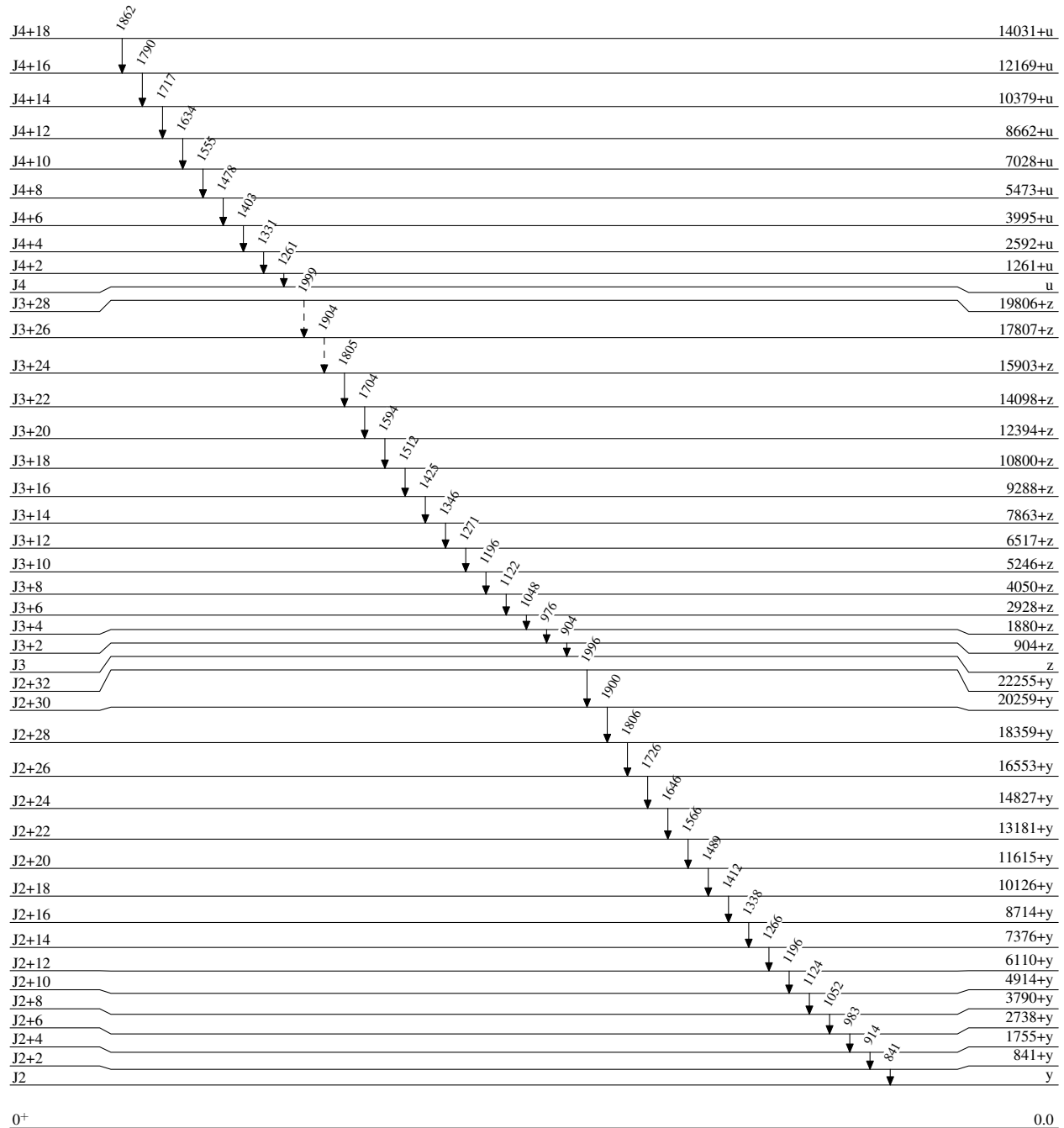
^b Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

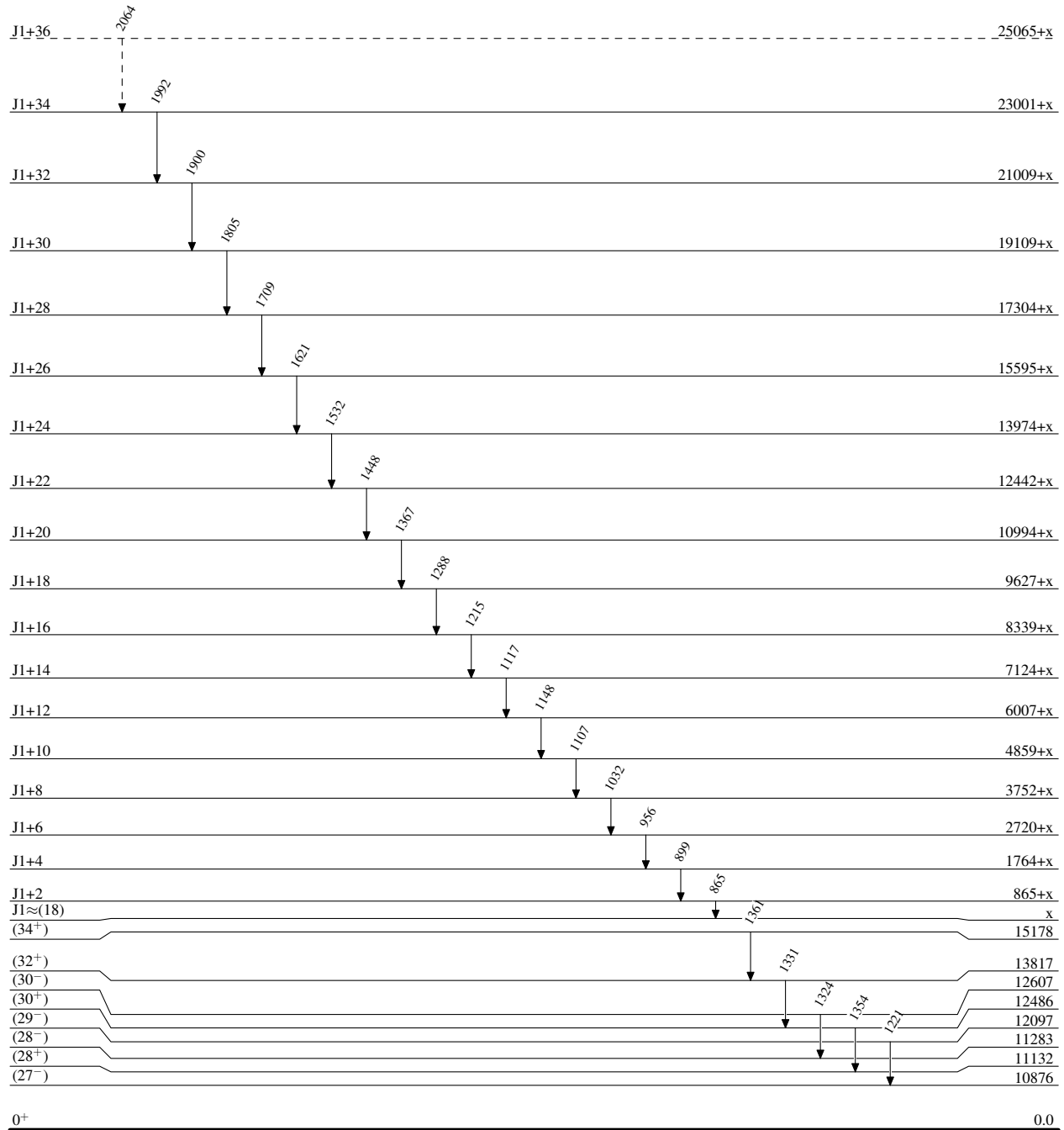
-----► γ Decay (Uncertain)

Adopted Levels, Gammas

Legend

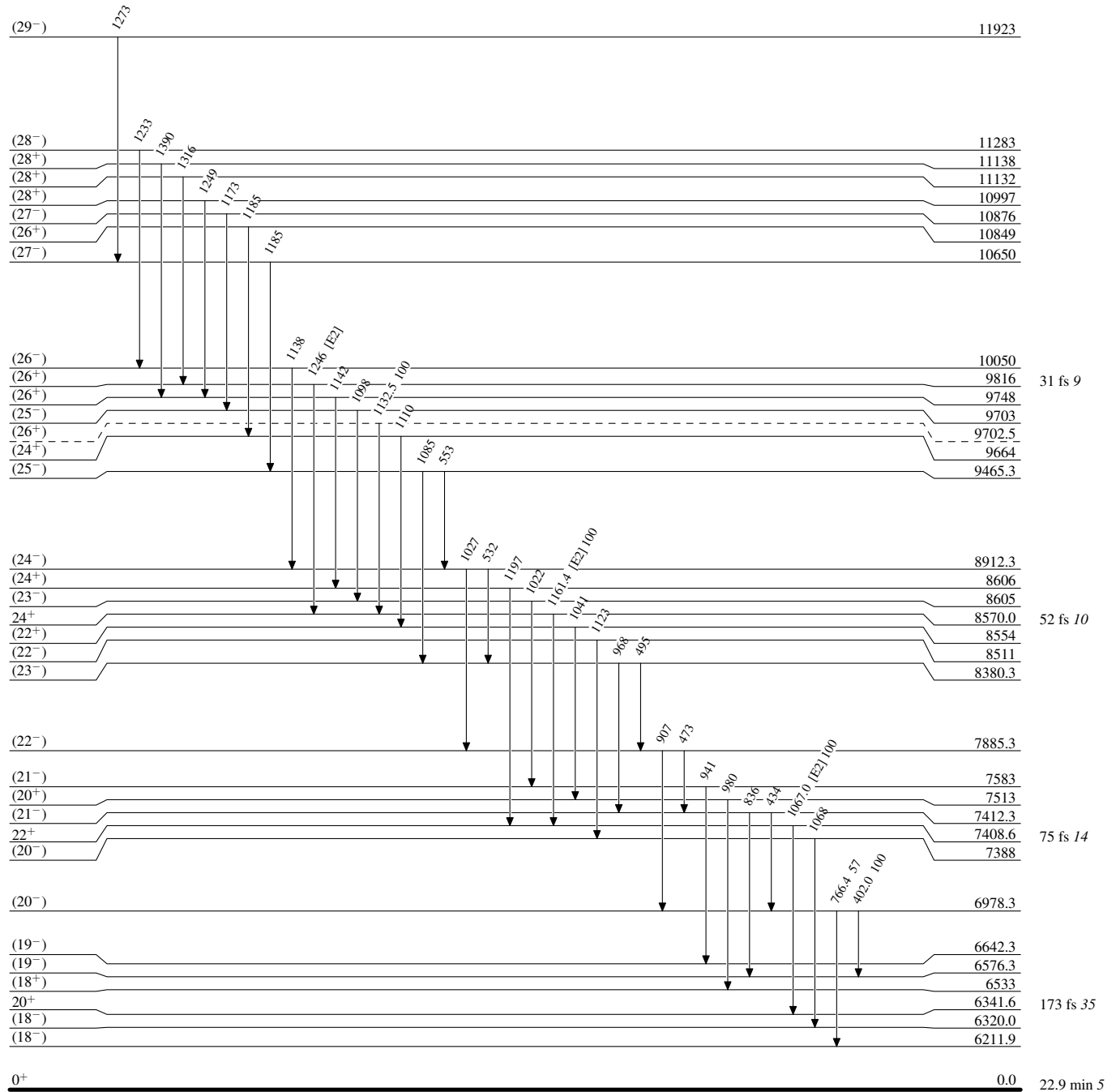
Level Scheme (continued)

Intensities: Relative photon branching from each level

-----► γ Decay (Uncertain)

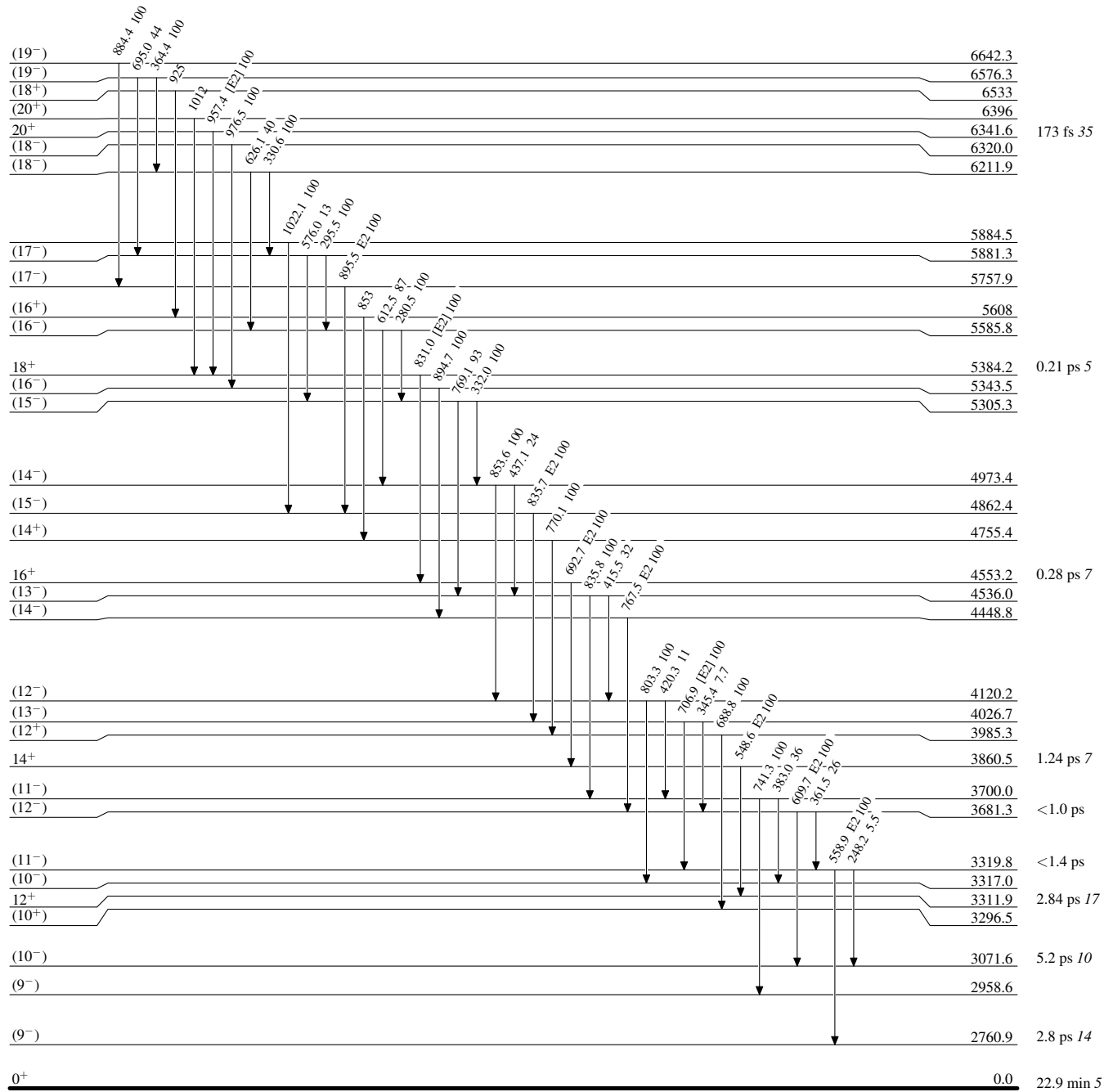
Adopted Levels, GammasLevel Scheme (continued)

Intensities: Relative photon branching from each level



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

Intensities: Relative photon branching from each level

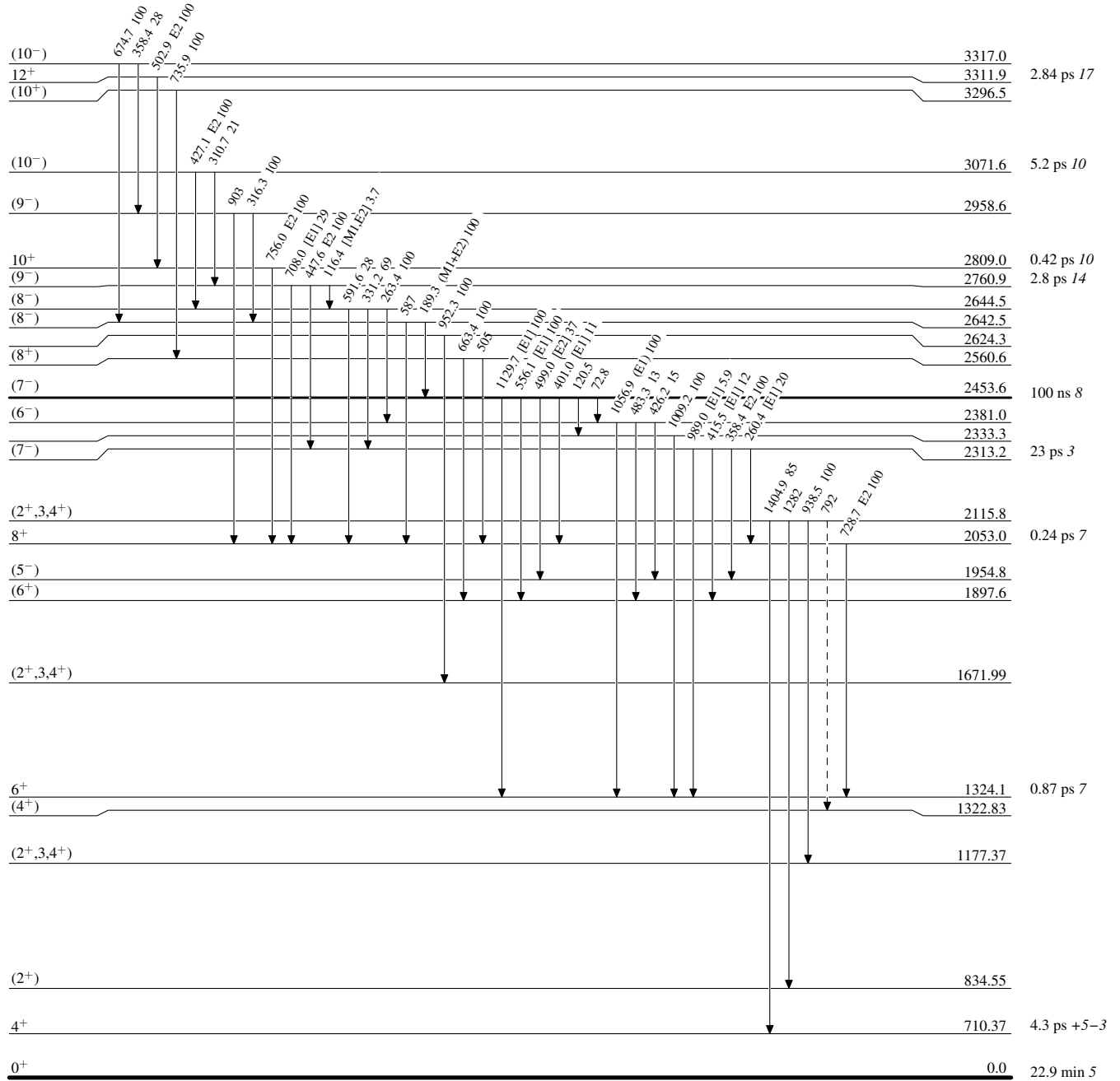


Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

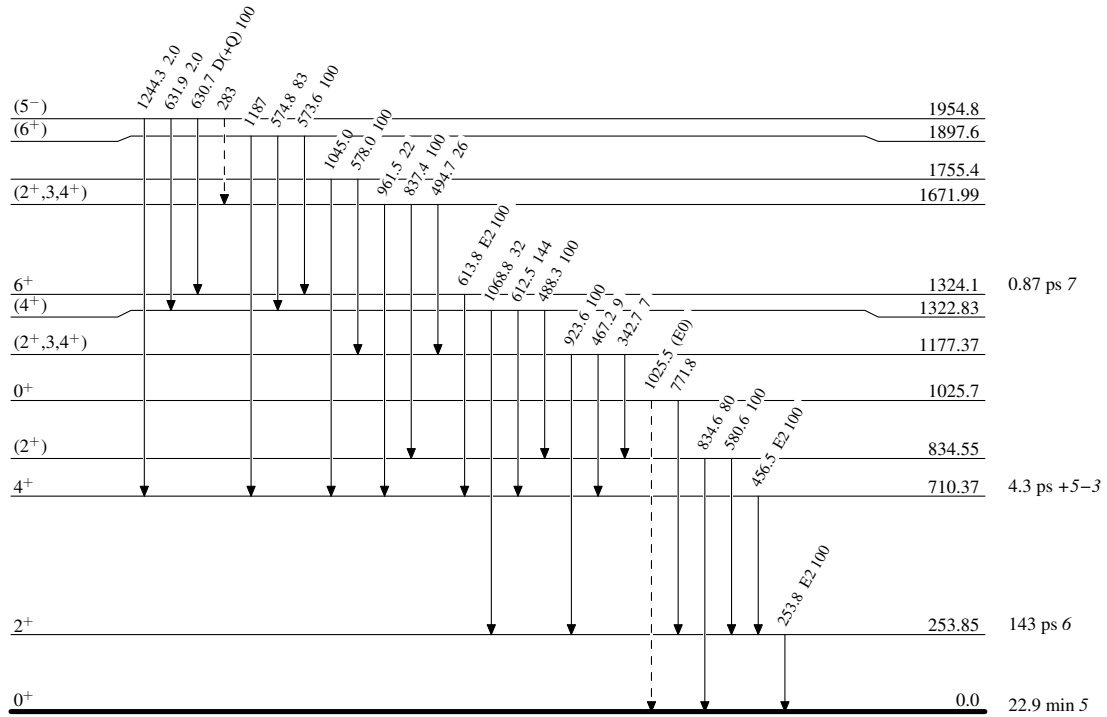
-----► γ Decay (Uncertain)

Adopted Levels, Gammas

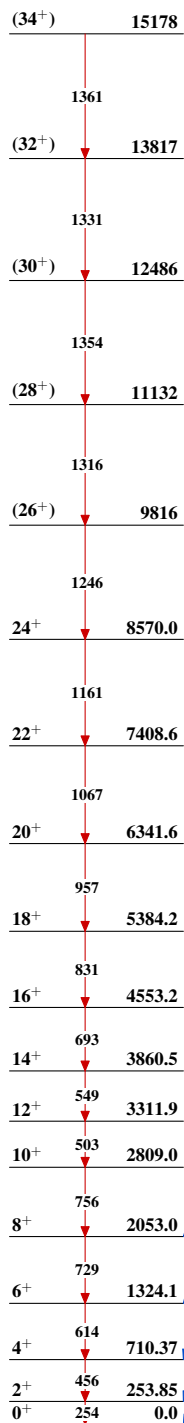
Legend

Level Scheme (continued)

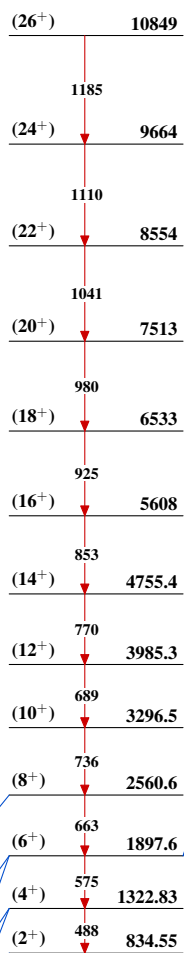
Intensities: Relative photon branching from each level

-----► γ Decay (Uncertain) $^{130}_{58}\text{Ce}_{72}$

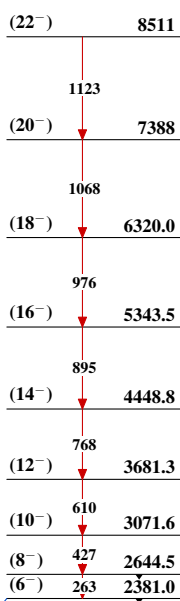
**Band(A): g.s. (yrast)
band, AB after 10^+**



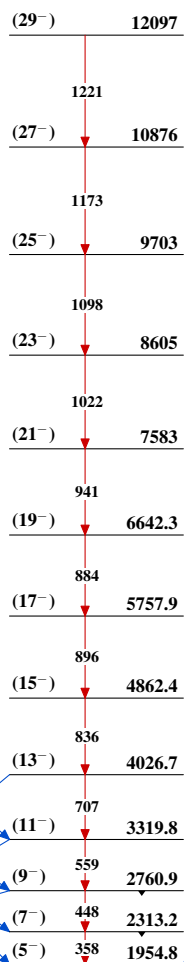
Band(B): γ band, γ_{AB}
after 10^+



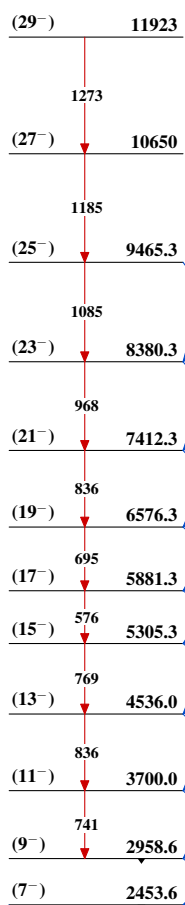
Band(C): Ae band



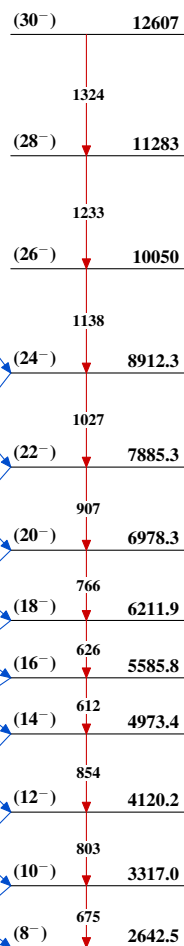
Band(D): Af band



**Band(E): $K^\pi=(7^-)$ af
band, afAB after 15^-**



**Band(F): $K^\pi=(7^-)$ ae
band, aeAB after 14^-**



Adopted Levels, Gammas (continued)

Band(G): SD-1 band (1998Se10)		Band(H): SD-2 band (1998Se10,1997Wi02)		Band(I): SD-3 band (1998Se10)		Band(J): SD-4 band (1998Se10)	
J1+36	25065+x	J2+32	22255+y	J3+28	19806+z	J4+18	14031+u
J1+34	2064	J2+30	20259+y	J3+26	1999	J4+16	1862
J1+32	1992	J2+28	1996	J3+24	1904	J4+14	1790
J1+30	19109+x	J2+26	1900	J3+22	1805	J4+12	1717
J1+28	1900	J2+24	1806	J3+20	1704	J4+10	1634
J1+26	1805	J2+22	1726	J3+18	1594	J4+8	1555
J1+24	1709	J2+20	1646	J3+16	1512	J4+6	1478
J1+22	1621	J2+18	1566	J3+14	1425	J4+4	1403
J1+18	1532	J2+16	1489	J3+12	1346	J4+2	1331
J1+16	1448	J2+14	1412	J3+10	1271	J4	1261
J1+14	1367	J2+12	1338	J3+8	1196		u
J1+12	1288	J2+10	1266	J3+6	1122		
J1+10	1215	J2+8	1196	J3+4	1048		
J1+8	1117	J2+6	1124	J3+2	904		
J1+6	1148	J2+4	1052	J3	904		
J1+4	1107	J2+2	983				
J1+2	956	J2	841				
J1+(18)	865		y				