

¹⁴⁸La β⁻ decay 1983Gi04

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 117, 1 (2014)	1-Oct-2013

Parent: ¹⁴⁸La: E=0.0; J^π=(2⁻); T_{1/2}=1.26 s 8; Q(β⁻)=7690 22; %β⁻ decay=100.0
 Measured: γ, ce, γγ, γγ(t), γγ(θ) (1983Gi04,1982PfZZ), γγ(θ,H), β, βγ (1982Br23).
 β⁻ feeding was determined assuming no β⁻ decay to g.s..
 Decay scheme is that of 1983Gi04 and is incomplete.

¹⁴⁸Ce Levels

E(level) [†]	J ^π [‡]	T _{1/2} [‡]	Comments
0.0	0 ⁺	56.8 s 3	
158.467 5	2 ⁺	1.01 ns 6	g=0.37 6 (1986Gi05) g: from γγ(θ,H).
453.45 5	4 ⁺	<1.2 ns	
760.32 4	(1 ⁻)		J ^π : 1 ⁻ preferred; 1 ⁺ ,2 ⁺ are possible.
770.43 6	0 ⁺		J ^π : from γ(θ) of the 612γ-158γ cascade.
841.39 5	(3 ⁻)		J ^π : 3 ⁻ preferred; 2 ⁺ ,3 ⁺ ,4 ⁺ are possible.
935.59 5	(2 ⁺)		J ^π : 2 ⁺ preferred; 3,4 ⁺ are possible.
989.90 4	(2 ⁺)		J ^π : 2 ⁺ .
1116.62 5	(3 ⁺)		J ^π : 3 ⁺ preferred; 2 ⁺ ,3 ⁻ ,4 ⁺ are possible.
1223.98 11	(4 ⁺)		J ^π : 4 ⁺ preferred; 2 ⁺ ,3 are possible.
1368.89 5			
1415.61 7			
1456.88? 25			
1486.07 9	(4 ⁻)		
1497.07 7	(2 ⁺ ,1)		
1554.76 9			
1558.51? 16			
1584.00? 12			
1589.91 6	(2 ⁺ ,1)		
1622.78? 12			
1625.98? 10			
1728.39 11			
1891.20 8	(2 ⁺ ,1)		
1927.69? 21			
2144.48 15			
2153.67 14	(2 ⁺ ,1)		
2192.37? 24			
2252.23 14			
2550.36 21	(2 ⁺ ,1)		

[†] From a least-squares fit to Ey data (normalized χ²=1.96>critical χ²=1.77).

[‡] ADOPTED values.

β⁻ radiations

E(decay)	E(level)	Iβ ^{-†‡}	Log ft	Comments
(5140 22)	2550.36	4.2	5.95	av Eβ=2224 11
(5438 22)	2252.23	7.45	5.80	av Eβ=2363 11
(5498 22)	2192.37?	0.67	6.87	av Eβ=2391 11
(5536 22)	2153.67	4.00	6.11	av Eβ=2409 11
(5546 22)	2144.48	2.56	6.30	av Eβ=2413 11
(5762 22)	1927.69?	0.89	6.84	av Eβ=2515 11

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¹⁴⁸La β⁻ decay **1983Gi04 (continued)**

β⁻ radiations (continued)

E(decay)	E(level)	Iβ ^{-†‡}	Log ft	Comments
(5799 22)	1891.20	2.95	6.33	av Eβ=2532 11
(5962 22)	1728.39	1.22	6.76	av Eβ=2608 11
(6064 22)	1625.98?	0.33	7.36	av Eβ=2656 11
(6067 22)	1622.78?	0.89	6.93	av Eβ=2657 11
(6100 22)	1589.91	4.3	6.26	av Eβ=2673 11
(6106 22)	1584.00?	0.89	6.95	av Eβ=2675 11
(6131 22)	1558.51?	0.33	7.38	av Eβ=2687 11
(6135 22)	1554.76	1.22	6.82	av Eβ=2689 11
(6193 22)	1497.07	2.39	6.54	av Eβ=2716 11
(6204 22)	1486.07	0.67	7.10	av Eβ=2721 11
(6233 22)	1456.88?	0.83	7.02	av Eβ=2735 11
(6274 22)	1415.61	2.34	6.58	av Eβ=2754 11
(6321 22)	1368.89	6.4	6.16	av Eβ=2776 11
(6466 22)	1223.98	0.50	7.31	av Eβ=2844 11
				log f ^{1u} _t =9.13 7.
(6573 22)	1116.62	2.39	6.66	av Eβ=2894 11
(6700 22)	989.90	10.6	6.05	av Eβ=2953 11
(6754 22)	935.59	5.3	6.36	av Eβ=2978 11
(6849 22)	841.39	6.8	6.28	av Eβ=3022 11
(6920 22)	770.43	1.6	6.93	av Eβ=3055 11
(6930 22)	760.32	14.0	5.99	av Eβ=3060 11
(7237 22)	453.45	1.84	9.06 ^{1u}	av Eβ=3187 11
(7532 22)	158.467	12.4	6.20	av Eβ=3340 11

† From 1983Gi04 (who assumed no g.s. β⁻ feeding) slightly adjusted by evaluator because of slightly different conversion coefficients (the intensities of uncertain gammas were included in the intensity balances). However because of large Q(β⁻), β⁻ decay may populate many >2550 levels of ¹⁴⁸Ce. Possible γ's from these levels (unobserved yet) may change the adopted balance of intensity for observed levels. Therefore, the adopted Iβ should be considered as an upper limit of real Iβ, and log ft as a lower limit of real values of log ft.

‡ Absolute intensity per 100 decays.

γ(¹⁴⁸Ce)

I_γ normalization: from Σ Ti(g.s.)=100 and assuming no β⁻ feeding to g.s..

E _γ	I _γ [‡]	E _i (level)	J _i ^π	E _f	J _f ^π	Mult.	α [†]	I _(γ+ce) [#]	Comments
(54.24)		989.90	(2 ⁺)	935.59	(2 ⁺)			0.50 17	I _γ : if E2 (α≈18) I _γ ≈0.5, if M1 (α≈7) I _γ ≈1.3.
158.468 5	1000 20	158.467	2 ⁺	0.0	0 ⁺	E2	0.407		I _(γ+ce) : from γγ coin data. α(K)=0.293 5; α(L)=0.0896 13; α(M)=0.0197 3; α(N+..)=0.00489 7 α(N)=0.00425 6; α(O)=0.000618 9; α(P)=1.713×10 ⁻⁵ 24
252.45 7	30 2	1368.89		1116.62	(3 ⁺)				Mult.: from adopted γ's.
257.09 9	6 1	1625.98?		1368.89					E _γ : from 1979Bo26.
295.07 9	120 2	453.45	4 ⁺	158.467	2 ⁺	[E2]	0.0513		α(K)=0.0412 6; α(L)=0.00802 12; α(M)=0.001726 25; α(N+..)=0.000436

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$^{148}\text{La} \beta^-$ decay **1983Gi04** (continued) $\gamma(^{148}\text{Ce})$ (continued)

E_γ	I_γ^\ddagger	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult.	α^\dagger	Comments
								7 $\alpha(\text{N})=0.000376$ 6; $\alpha(\text{O})=5.71 \times 10^{-5}$ 8; $\alpha(\text{P})=2.71 \times 10^{-6}$ 4
298.81 14	13 1	1415.61		1116.62	(3 ⁺)			
369.45 8	12 1	1486.07	(4 ⁻)	1116.62	(3 ⁺)			
378.93 4	71 7	1368.89		989.90	(2 ⁺)			E_γ : from 1979Bo26 .
387.92 10	25 1	841.39	(3 ⁻)	453.45	4 ⁺			
425.68 8	18 1	1415.61		989.90	(2 ⁺)			
433.32 8	20 1	1368.89		935.59	(2 ⁺)			
482.19 7	17 1	935.59	(2 ⁺)	453.45	4 ⁺			
536.38 16	9 1	989.90	(2 ⁺)	453.45	4 ⁺			
601.88 6	137 2	760.32	(1 ⁻)	158.467	2 ⁺			
611.81 7	52 1	770.43	0 ⁺	158.467	2 ⁺	E2	0.00634 9	$\alpha=0.00634$ 9; $\alpha(\text{K})=0.00534$ 8; $\alpha(\text{L})=0.000790$ 11; $\alpha(\text{M})=0.0001665$ 24; $\alpha(\text{N}+..)=4.29 \times 10^{-5}$ 6 $\alpha(\text{N})=3.67 \times 10^{-5}$ 6; $\alpha(\text{O})=5.80 \times 10^{-6}$ 9; $\alpha(\text{P})=3.81 \times 10^{-7}$ 6 Mult.: from $\gamma\gamma(\theta)$ and syst for β -vibrational levels in $A \approx 150$ deformed nuclei.
654.53 11	14 4	1589.91	(2 ⁺ ,1)	935.59	(2 ⁺)			
663.20 7	27 1	1116.62	(3 ⁺)	453.45	4 ⁺			
682.97 6	116 9	841.39	(3 ⁻)	158.467	2 ⁺			
713.37 12	9 1	1554.76		841.39	(3 ⁻)			
760.30 6	154 7	760.32	(1 ⁻)	0.0	0 ⁺			
770.53 10	9 1	1223.98	(4 ⁺)	453.45	4 ⁺			
777.16 6	129 2	935.59	(2 ⁺)	158.467	2 ⁺			
794.44 11	13 1	1554.76		760.32	(1 ⁻)			
819.28 8	24 6	1589.91	(2 ⁺ ,1)	770.43	0 ⁺			
831.33 6	93 5	989.90	(2 ⁺)	158.467	2 ⁺			
887.12 12	8 1	1728.39		841.39	(3 ⁻)			
^x 921.31 13	10 2							
958.23 6	71 1	1116.62	(3 ⁺)	158.467	2 ⁺			
967.4 4	7 2	1728.39		760.32	(1 ⁻)			
989.85 6	168 5	989.90	(2 ⁺)	0.0	0 ⁺			
1105.06 15	6 1	1558.51?		453.45	4 ⁺			
1130.95 10	19 2	1891.20	(2 ⁺ ,1)	760.32	(1 ⁻)			
1257.42 14	11 1	1415.61		158.467	2 ⁺			
1298.46 @ 25	15 1	1456.88?		158.467	2 ⁺			
1303.30 30	2 2	2144.48		841.39	(3 ⁻)			
1316.69 18	8 1	2252.23		935.59	(2 ⁺)			
1338.64 8	32 2	1497.07	(2 ⁺ ,1)	158.467	2 ⁺			
1425.58 @ 11	16 1	1584.00?		158.467	2 ⁺			
1431.56 10	24 1	1589.91	(2 ⁺ ,1)	158.467	2 ⁺			
1464.36 @ 11	16 1	1622.78?		158.467	2 ⁺			
1496.97 12	11 1	1497.07	(2 ⁺ ,1)	0.0	0 ⁺			
1569.65 25	7 2	1728.39		158.467	2 ⁺			
1589.93 13	15 1	1589.91	(2 ⁺ ,1)	0.0	0 ⁺			
1732.67 16	12 1	1891.20	(2 ⁺ ,1)	158.467	2 ⁺			
1769.27 @ 21	16 2	1927.69?		158.467	2 ⁺			
1891.02 17	22 1	1891.20	(2 ⁺ ,1)	0.0	0 ⁺			
1985.93 17	44 1	2144.48		158.467	2 ⁺			
1995.23 16	59 2	2153.67	(2 ⁺ ,1)	158.467	2 ⁺			
^x 2031.17 20	21 2							
2033.95 @ 24	12 2	2192.37?		158.467	2 ⁺			
2093.66 21	126 2	2252.23		158.467	2 ⁺			

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^{148}La β^- decay 1983Gi04 (continued) $\gamma(^{148}\text{Ce})$ (continued)

E_γ	I_γ^\ddagger	$E_i(\text{level})$	J_i^π	E_f	J_f^π
2153.56 23	13 2	2153.67	(2 ⁺ ,1)	0.0	0 ⁺
^x 2219.89 25	27 2				
2391.94 22	70 5	2550.36	(2 ⁺ ,1)	158.467	2 ⁺
2549.8 6	6 4	2550.36	(2 ⁺ ,1)	0.0	0 ⁺

[†] Additional information 1.

[‡] For absolute intensity per 100 decays, multiply by 0.0556 9.

Absolute intensity per 100 decays.

@ Placement of transition in the level scheme is uncertain.

^x γ ray not placed in level scheme.

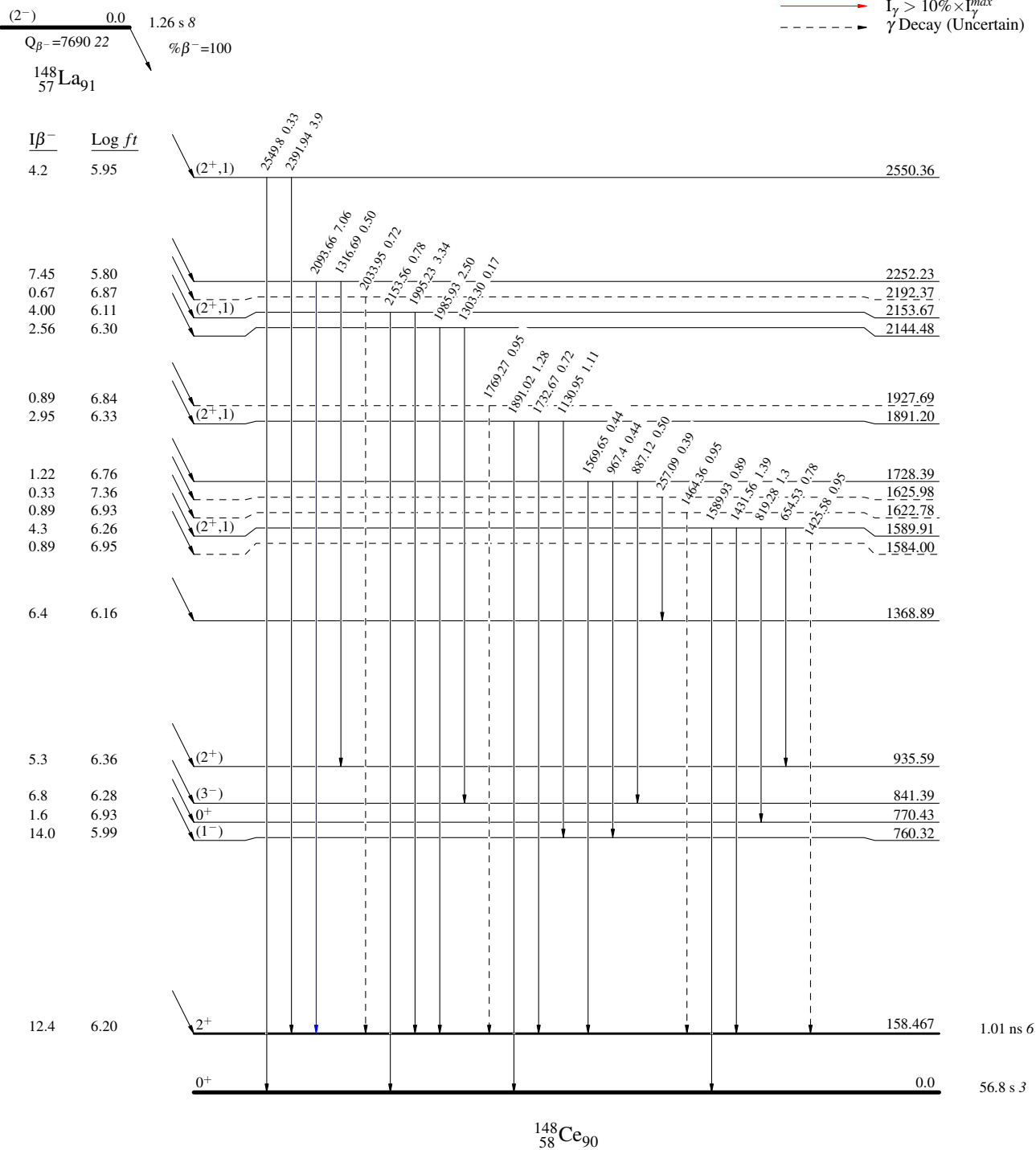
$^{148}\text{La} \beta^- \text{ decay } 1983\text{Gi04}$

Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays

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)



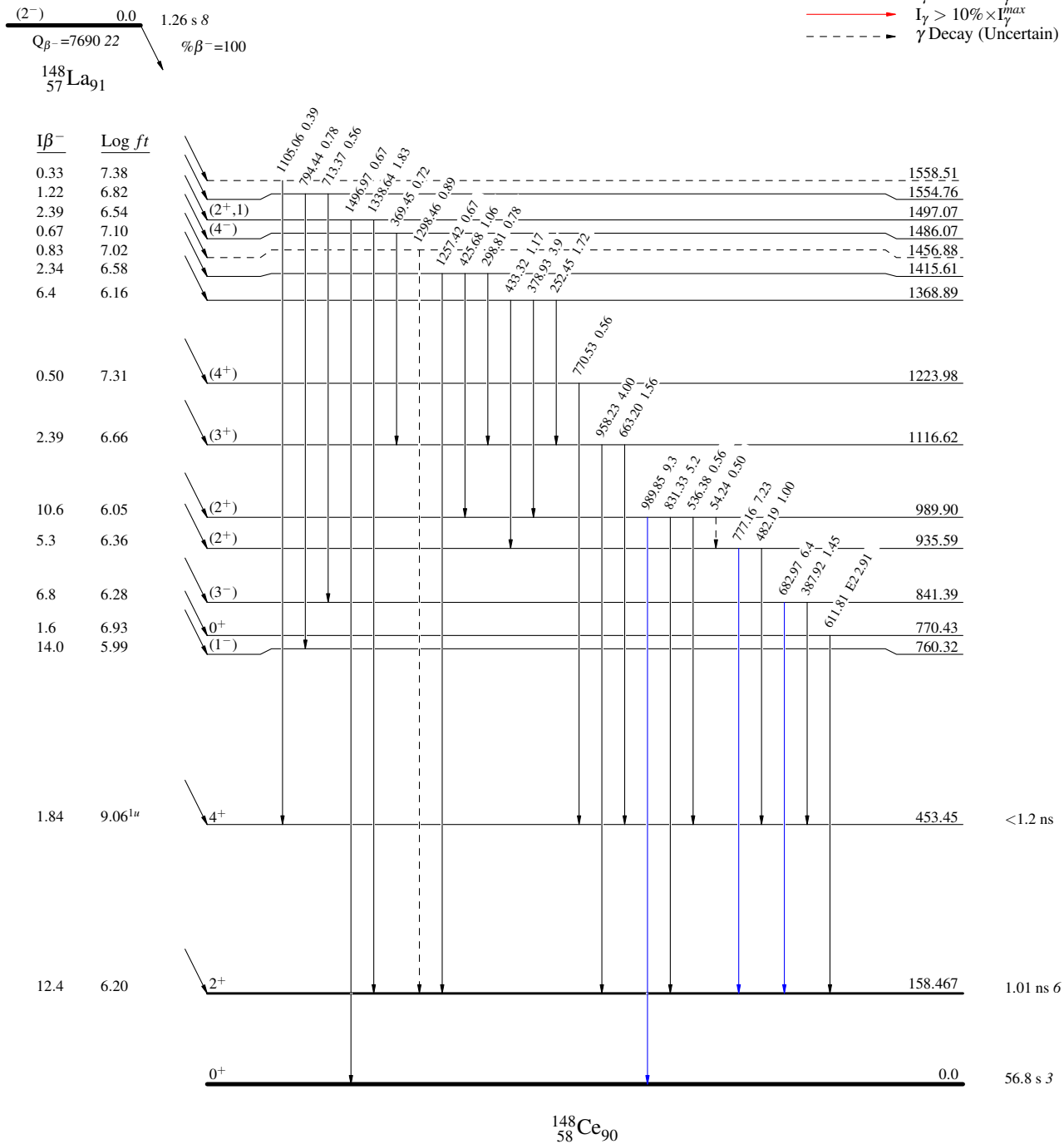
$^{148}\text{La} \beta^-$ decay 1983Gi04

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays

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)



$^{148}\text{La} \beta^-$ decay 1983Gi04

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays

Legend

