^{106}In ε decay (6.2 min)

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	D. De Frenne and A. Negret	NDS 109, 943 (2008)	1-May-2007

Parent: ^{106}In: E=0.0; J$^{\pi}$=7^{+}; T$_{1/2}$=6.2 min *1*; Q(ε)=6526 *11*; %ε+%β^{+} decay=100.0

Experimental results are considered as incomplete by the evaluators as the beta decay energy is very high (6526 keV 11) A number of inconsistencies in the ε feeding of some levels are observed. See also decay of other ^{106}In isomer.

1992Ku01: source: ^{106}Cd(p,n) E not given. Measured: Eγ, Iγ, ce(K) deduced: ^{106}Cd levels, J^{π}, α(K)exp, mult.

1978Hu06: source: ^{106}Cd(p,n) E=11,15 MeV. Measured: γ singles, $\gamma\gamma$ and $\beta\gamma$ β singles. Deduced: ^{106}Cd levels, J, π, log *ft*.

1984Ro10: source ^{106}In from Sn(p,2pxn), on-line mass separation. Measured Eγ, Iγ, Ice, $\gamma\gamma$ and γ(ce). Deduced: log *ft*, ^{106}Cd levels, J, π, α, mult.

Others: 1972Me02, 1976Fl14, 1980Wi20.

Q(ε)=6531 *16* keV calculated from 1984Fi05.

^{106}Cd Levels

E(level)	J$^{\pi}$&	E(level)	J$^{\pi}$&	E(level)	J$^{\pi}$&	E(level)	J$^{\pi}$&
0.0†	0^{+}	2485.58# *17*	4^{+}	3084.03 *23*	7^{+}	3641.93 *17*	(8^{+})
632.60† *10*	2^{+}	2491.72† *14*	6^{+}	3126.03 *18*	7^{+}	3787.33‡ *20*	
1493.71† *13*	4^{+}	2502.92 *15*	6^{+}	3283.93?‡ *20*	+	4243.51?‡ *20*	+
2104.52 *13*	4^{+}	2629.02 *19*	5^{-}	3357.7?‡ *3*		4282.59?# *20*	
2305.15 *21*	4^{+}	2920.22‡ *24*	5	3366.97‡ *20*	8^{+}	4398.6?‡@ *3*	
2330.26 *16*	5^{+}	2924.67 *20*	6^{+}	3472.71‡ *18*		5130.67‡ *19*	
2468.3 *5*	4^{+}	3043.91 *17*	8^{+}	3547.44‡ *18*	+		

† Band(A): ΔJ=2 g.s. band.
‡ Observed only by 1984Ro10.
# Observed only by 1980Wi20.
@ Only one deexciting γ observed by 1984Ro10.
& From Adopted Levels.

ε,β^{+} radiations

E(decay)	E(level)	Iβ^{+} †	Iε†	Log *ft*	I($\varepsilon+\beta^{+}$)†	Comments
(2243 *11*)	4282.59?	1.89 *20*	0.00111 *12*	4.88 *5*	1.89 *20*	av Eβ=544.1 *49*; εK=0.000590 *18*
(2884 *11*)	3641.93	2.7 *7*		5.53 *12*	2.7 *7*	av Eβ=832.3 *50*
(3400 *11*)	3126.03	2.80 *23*		5.99 *4*	2.80 *23*	av Eβ=1069.0 *51*
(3442 *11*)	3084.03	6.2 *4*		5.68 *3*	6.2 *4*	av Eβ=1088.4 *51*
(3482 *11*)	3043.91	39.8 *11*	0.00256 *8*	4.901 *17*	39.8 *11*	av Eβ=1106.9 *51*; εK=6.42×10^{-5} *9*
(3601 *11*)	2924.67	3.5 *4*		6.05 *5*	3.5 *4*	av Eβ=1162.2 *51*
(3897 *11*)	2629.02	2.50 *23*		7.75^{1u} *5*	2.50 *23*	av Eβ=1309.5 *51*
(4023 *11*)	2502.92	8.3 *14*		5.97 *8*	8.3 *14*	av Eβ=1358.9 *52* E(β^{+})=2.59 MeV *20* (1978Hu06) β(1009γ).
(4034 *11*)	2491.72	10.6 *20*		5.87 *9*	10.6 *20*	av Eβ=1364.1 *52* E(β^{+})=2.56 MeV *20* (1978Hu06) β(998γ). Other: 2.7 MeV *1* (1966Ca09) β(860γ,990γ).
(4040 *11*)	2485.58	<0.5		>7.2	<0.5	av Eβ=1367.0 *52* Direct feeding of this level in ε decay highly improbable because J^{π}(^{106}In)=7^{+}. Probably an important fraction of the ε decay to higher lying levels is missed.
(4196‡ *11*)	2330.26	7.0 *5*		6.15 *4*	7.0 *5*	av Eβ=1439.9 *52*

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^{106}In ε decay (6.2 min) (continued)

ε,$β^+$ radiations (continued)

E(decay)	E(level)	Iβ$^+$ †	Log *ft*	I(ε+β$^+$)†	Comments
					If for ^{106}In g.s. $J^π=7^+$, then $β^-$ transition to 2330-keV level is second forbidden and log *ft*=6.21 is too small. However, because several of the transitions feeding this level have no intensity given they easily could account for the feeding of the 2330-keV level. Also a number of γ's deexciting unobserved levels fed in ε decay could have been missed.
(4221 *11*)	2305.15	0.87 *14*	7.07 *7*	0.87 *14*	av Eβ=1451.7 *52* Very improbable that this level is directly fed in ε decay because $J^π(^{106}In)=7^+$.
(4421‡ *11*)	2104.52	1.1 *7*	7.1 *3*	1.1 *7*	av Eβ=1546.1 *52* Very improbable that this level is directly fed in ε decay because $J^π(^{106}In)=7^+$.
(5032‡ *11*)	1493.71	10 *6*	6.5 *3*	10 *6*	av Eβ=1835.5 *53* Very improbable that this level is directly fed in ε decay because $J^π(^{106}In)=7^+$.
(5893 *11*)	632.60	<7	>7.0	<7	av Eβ=2247.1 *53*

† Absolute intensity per 100 decays.
‡ Existence of this branch is questionable.

γ(^{106}Cd)

Eγ†	Iγ†@	E$_i$(level)	$J^π_i$	E$_f$	$J^π_f$	Mult.#	α&	Comments
161.0‡ *2*	0.5‡ *1*	2491.72	6$^+$	2330.26	5$^+$			
186.6 *2*	0.6 *1*	2491.72	6$^+$	2305.15	4$^+$			
225.7 *2*	6.9 *3*	2330.26	5$^+$	2104.52	4$^+$	M1+E2	0.051 *7*	α(K)exp=0.055 *6* (1992Ku01) Iγ: weighted average of 7.0 *4* (1978Hu06) and 6.7 *5* (1976Fl14).
282.7 *2*		3366.97	8$^+$	3084.03	7$^+$			
^{x}308.9 *2*								
^{x}314.6 *2*								
^{x}390.7 *2*								
^{x}395.5 *2*								
421.3 *2*		3547.44	$^+$	3126.03	7$^+$	E2	0.015	
433.1‡ *2*	2.3‡ *3*	2924.67	6$^+$	2491.72	6$^+$	E2	0.0093	
^{x}438.6 *2*								
524.6‡ *2*	1.9‡ *2*	2629.02	5$^-$	2104.52	4$^+$	E1	0.0018	
541.0 *3*	12.5 *5*	3043.91	8$^+$	2502.92	6$^+$			Iγ: weighted average of 12.7 *7* (1978Hu06) and 12.4 *6* (1976Fl14).
552.4 *2*	25.2 *9*	3043.91	8$^+$	2491.72	6$^+$			Iγ: weighted average of 25.8 *13* (1978Hu06) and 24.7 *13* (1976Fl14).
558.6‡ *2*	2.2‡ *2*	3043.91	8$^+$	2485.58	4$^+$			
580.7 *5*	0.7 *1*	3084.03	7$^+$	2502.92	6$^+$			
592.1 *4*	3.0 *3*	3084.03	7$^+$	2491.72	6$^+$			
601.4 *2*		4243.51?	$^+$	3641.93	(8$^+$)	M1	0.0043	
610.7 *2*	3.6 *3*	2104.52	4$^+$	1493.71	4$^+$	E2	0.0035	Iγ: from 1976Fl14.
623.2‡ *2*	1.8‡ *2*	3126.03	7$^+$	2502.92	6$^+$	M1+E2	0.0039	
632.6 *1*	100	632.60	2$^+$	0.0	0$^+$	E2	0.0030	
634.1‡ *2*	1.0‡ *1*	3126.03	7$^+$	2491.72	6$^+$			
^{x}636.2 *2*								

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^{106}In ε decay (6.2 min) (continued)

$\gamma(^{106}Cd)$ (continued)

E_γ[†]	I_γ[†@]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	α[&]	Comments
[x]690.9 2								
753.3 4	2.5 2	3084.03	7^+	2330.26	5^+			
780.7 2		3283.93?	$^+$	2502.92	6^+	E2	0.0016	
792.5 2		3283.93?	$^+$	2491.72	6^+			
[x]802.1 2								
[x]808.3 2								
811.1 4	1.28 9	2305.15	4^+	1493.71	4^+	M1,E2		I_γ: weighted average of 1.2 2 (1978Hu06) and 1.3 1 (1976Fl14).
820.3[a] 2		2924.67	6^+	2104.52	4^+			E_γ: observed only by 1984Ro10.
836.7 4	2.8 2	2330.26	5^+	1493.71	4^+	M1,E2		α(K)exp=0.0026 4 (1992Ku01)
861.1 1	90 5	1493.71	4^+	632.60	2^+	E2	0.0014	I_γ: from 1976Fl14.
875.2 2		3366.97	8^+	2491.72	6^+	E2	0.0015	
887.1 2		5130.67		4243.51?	$^+$			
974.6[a] 4	1.6 1	2468.3	4^+	1493.71	4^+			Observed only by 1978Hu06.
980.8 2		3472.71		2491.72	6^+			E_γ: different placement given by 1978Hu06.
992.1[‡] 2	1.50[‡] 15	2485.58	4^+	1493.71	4^+			
997.8 1	41.5 17	2491.72	6^+	1493.71	4^+			I_γ: weighted average of 48 3 (1978Hu06) and 38.6 20 (1976Fl14).
1009.3 1	27.5 10	2502.92	6^+	1493.71	4^+			I_γ: weighted average of 30.4 15 (1978Hu06) and 25.3 13 (1976Fl14).
1027.4 2		3357.7?		2330.26	5^+			
1031.6 2		4398.6?		3366.97	8^+			
[x]1063.7 2								
[x]1076.9 2								
1135.2 2	0.6 1	2629.02	5^-	1493.71	4^+			E_γ,I_γ: from 1980Wi20.
1139.0[‡] 2	2.7[‡] 7	3641.93	(8^+)	2502.92	6^+	(M1)	0.0008	E_γ,I_γ: from 1978Hu06. Mult.: From level scheme Mult=Q.
1142.7 2		3472.71		2330.26	5^+			
[x]1145 1	3.9 10							
1149.4 2		3641.93	(8^+)	2491.72	6^+			
[x]1173.7 2								
1199.7 2		4243.51?	$^+$	3043.91	8^+			
1217.5 2		3547.44	$^+$	2330.26	5^+			
[x]1243.3 2								
1284.6 2		3787.33		2502.92	6^+			
1295.4 2		3787.33		2491.72	6^+			
[x]1298.8 2								
[x]1373.6 2								
1426.5 2		2920.22	5	1493.71	4^+			
1430.8[‡] 2	1.2[‡] 2	2924.67	6^+	1493.71	4^+			
1442.7 2		3547.44	$^+$	2104.52	4^+			
1471.9 1	6.6 5	2104.52	4^+	632.60	2^+			I_γ: weighted average of 3.0 12 (1978Hu06) and 7.2 5 (1976Fl14).
1488.7 2		5130.67		3641.93	(8^+)			
[x]1505.9 2								
[x]1518.6 2								
[x]1524.9 2								
[x]1550.5 2								
[x]1622.1 2								
[x]1633.2 2								
1672.6 3	0.19 3	2305.15	4^+	632.60	2^+	E2		
[x]1757.1 2								
1763.4 2		5130.67		3366.97	8^+			
1780.1[‡] 2	1.5[‡] 2	4282.59?		2502.92	6^+			
1790.4[‡] 2	0.40[‡] 4	4282.59?		2491.72	6^+			

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^{106}In ε decay (6.2 min) (continued)

γ(^{106}Cd) (continued)

E_γ[†]	I_γ[†@]	E_i(level)	J^π_i	E_f	J^π_f	E_γ[†]	E_i(level)
1853.0[‡] 2	0.9[‡] 1	2485.58	4^+	632.60	2^+	[x]2225.7 2	
[x]1896.4 2						[x]2390.3 2	
1978.9 2		3472.71		1493.71	4^+	[x]2414.1 2	
[x]2005.3 2						[x]2449.0 2	
[x]2046.2 2						[x]2494.3 2	
2087.1 2		5130.67		3043.91	8^+	[x]2551.4 2	
2148.8 2		3641.93	(8^+)	1493.71	4^+	[x]2586.2 2	

[†] Eγ with Iγ values are from 1978Hu06, unless otherwise noted. Eγ values for transitions with no Iγ are from 1984Ro10. For Iγ see 1984Ro10, they are not given for ^{106}In(5.2 min) and ^{106}In(6.2 min) ε decay separately. Unassigned γ′s of 1984Ro10 given in both decays.

[‡] Taken from 1980Wi20. No ΔIγ given by the authors. Estimated by the evaluators to be 10%.

[#] From 1984Ro10; based on conversion electron data.

[@] For absolute intensity per 100 decays, multiply by 0.997.

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

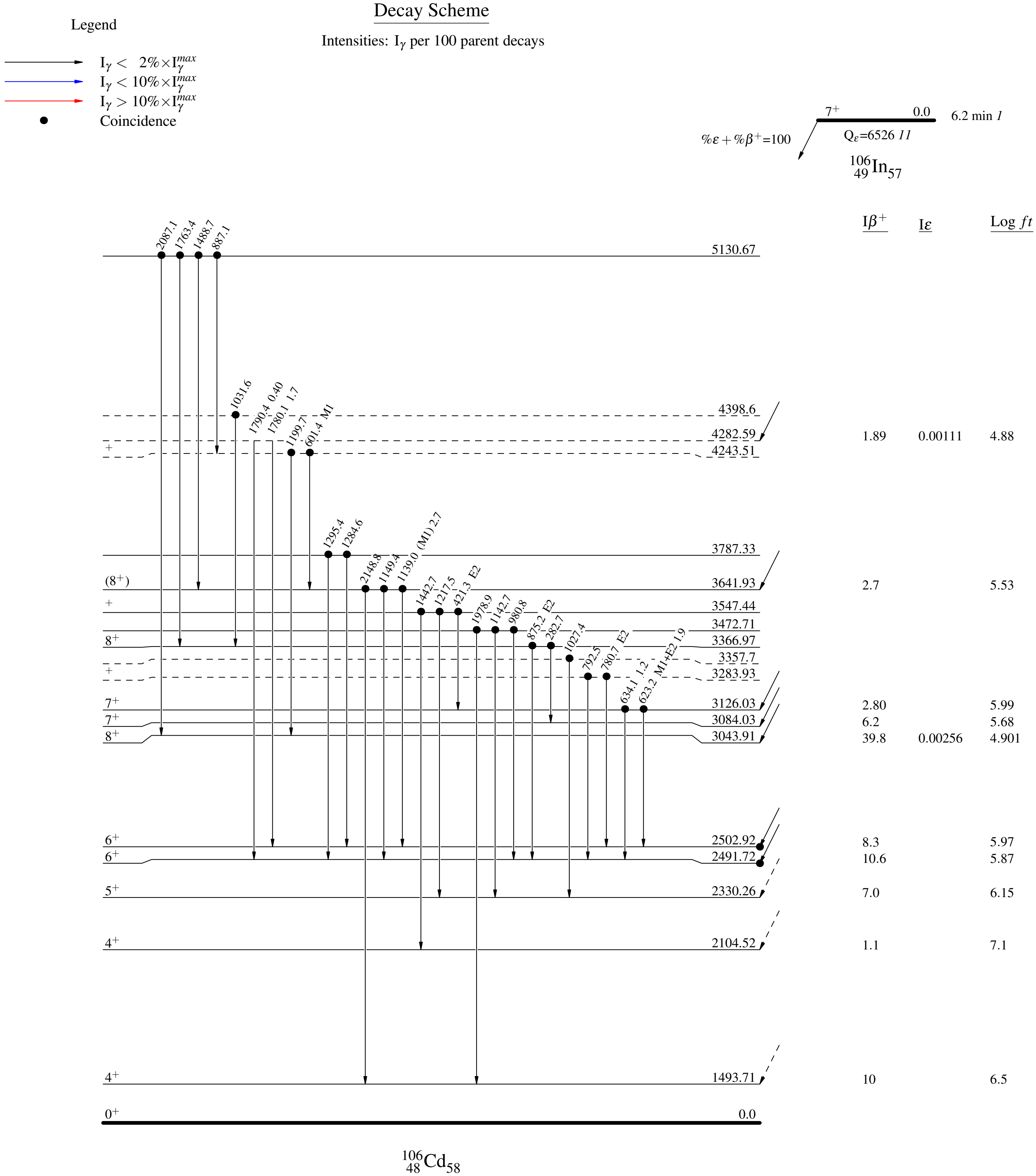
[a] Placement of transition in the level scheme is uncertain.

[x] γ ray not placed in level scheme.

^{106}In ε decay (6.2 min)

Decay Scheme

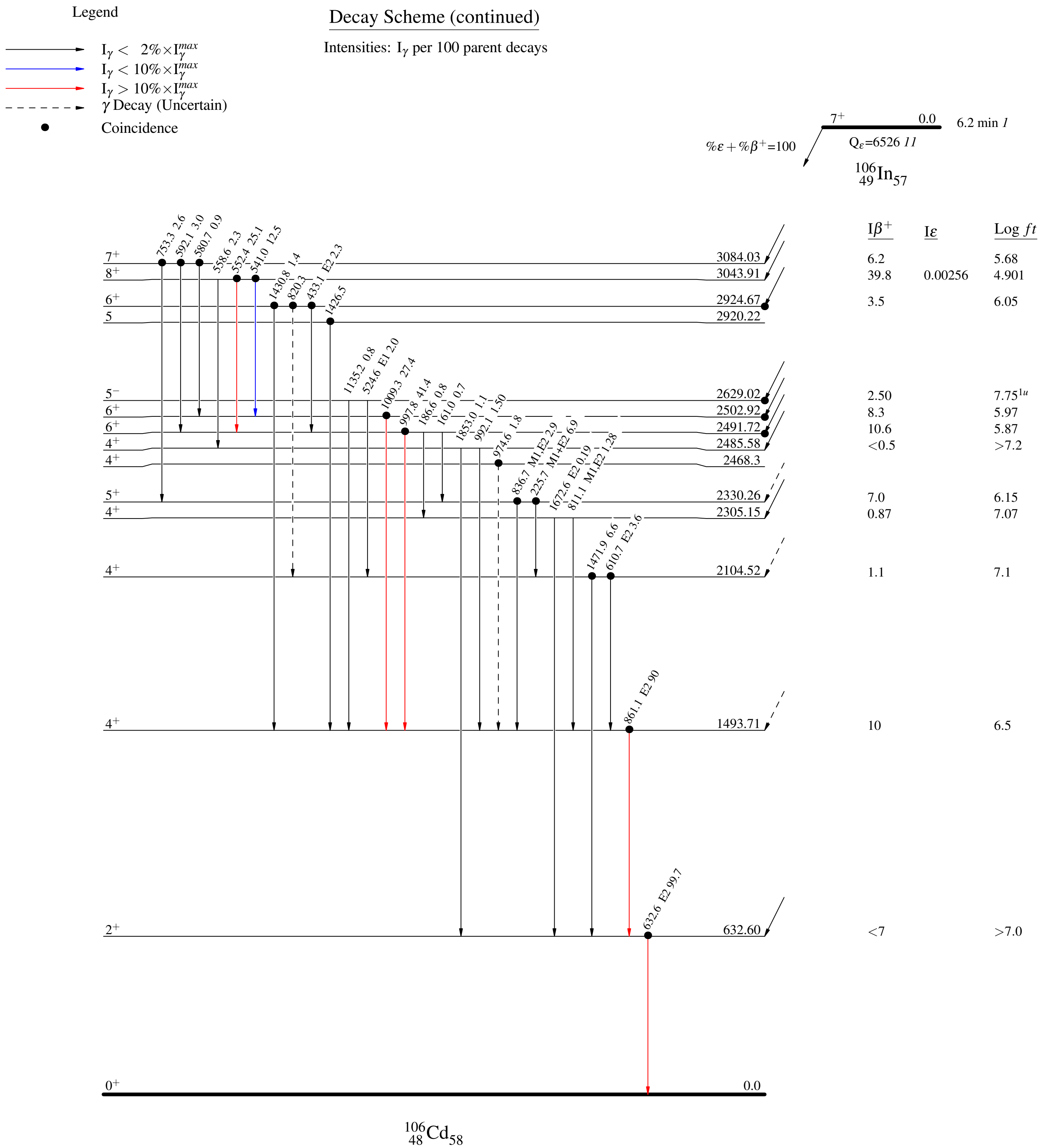
Intensities: I_γ per 100 parent decays



^{106}In ε decay (6.2 min)

Decay Scheme (continued)

Intensities: I_γ per 100 parent decays



^{106}In ε decay (6.2 min)