^{136}I β^- decay (46.6 s) 1977We04,1991Ma07

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. A. Mccutchan	NDS 152, 331 (2018)	1-Apr-2018

Parent: ^{136}I: E=201 *26*; J$^\pi$=(6$^-$); $T_{1/2}$=46.6 s *11*; Q(β^-)=6884 *14*; %β^- decay=100.0

1995Ma75: ^{136}I activity from ^{235}U(n,F) with E=thermal followed by mass separation (OSIRIS). Measured Eγ, $\beta\gamma\gamma$(t) using small plastic scintillator for βs and BaF_2 and Ge detectors for γs; deduced $T_{1/2}$ from fast timing method. Results are indicated as preliminary.

1991Ma07: ^{136}I activity from ^{235}U(n,F) with E=thermal followed by mass separation (TRISTAN). Measured Eγ, Iγ, Ece, Ice using a Ge detector and a Si(Li) detector; deduced conversion coefficients.

1985Be04: ^{136}I activity from ^{235}U(n,F) with E=thermal followed by mass separation (TRISTAN). Measured $\gamma\gamma(\theta)$ and $\gamma\gamma(\theta$,H,t) using Ge detectors; deduced g factor of first 4$^+$ level.

1980Ka31: ^{136}I activity from ^{235}U(n,F) with E=thermal followed by mass separation. Measured Eγ, γ(t); deduced $T_{1/2}$ of 1694-keV level.

1980KeZQ: ^{136}I activity from ^{235}U(n,F) with E=thermal followed by mass separation (LOHENGRIN). Measured Eγ, Eβ, β-γ coincidences using plastic scintillator telescope amd Ge(Li) detector; deduced β end point energies.

1977We04: ^{136}I activity from ^{235}U(n,F) followed by mass separation at the TRISTAN on-line isotope separator facility at the Ames reserach reactor. Measured Eγ, Iγ, γ(t), $\gamma\gamma$ using two Ge(Li) detectors.

Others: 1972Ac02, 1971Lu02, 1971Er06, 1970Ca25.

A total energy release of 7550 keV *240* as calculated by the code RADLST, is somewhat larger than the total available energy of the decay of 7090 keV *30*, although with large uncertainty.

See 83.4-s + 46.6-s decay for transitions which could not be classified as belonging to a specific decay.

α: Additional information 1.

^{136}Xe Levels

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$	Comments
0.0	0$^+$		
1313.03 *10*	2$^+$	<0.15 ns	$T_{1/2}$: from $\gamma\gamma$(t) using 381γ and 1313γ (1980Ka31).
1694.39 *10*	4$^+$	1.293 ns *17*	g=0.80 *15* (1985Be04,1988WoZW) $T_{1/2}$: from $\beta\gamma\gamma$(t) (1995Ma75). Others: 1.32 ns *6* (1980Ka31 $\gamma\gamma$(t) using 197γ-381γ and 197γ-1313γ); <1.4 ns (1975Mo03). g: TPAD taking $T_{1/2}$=1.32 ns (1985Be04,1988WoZW).
1891.70 *10*	6$^+$	2.9 μs *2*	$T_{1/2}$: weighted average of 2.8 μs *2* and 3.0 μs *3* from $\gamma\gamma$(t) using 197γ and 1313γ, respectively (1970Ca25).
2125.68 *11*	3$^+$,4$^+$		
2261.52 *10*	6$^+$	≤50 ps	$T_{1/2}$: from $\beta\gamma\gamma$(t) (1995Ma75). Other: <1.4 ns (1975Mo03).
2444.39 *11*	5	≤50 ps	$T_{1/2}$: from $\beta\gamma\gamma$(t) (1995Ma75). Other: <2.0 ns (1975Mo03).
2465.03 *15*			
2608.43 *12*	4$^+$,5$^+$	≤50 ps	$T_{1/2}$: from $\beta\gamma\gamma$(t) (1995Ma75). Other: <2.1 ns from 164.5γ(t) and <1.6 ns from 347.2γ(t) (1975Mo03).
3830.04 *20*	(6$^+$,5)		
3872.80 *22*	(6$^+$,5)		
4057.60 *17*	(6$^+$,5)		
5861.6? *4*	(4$^+$,5,6$^+$)		
6090.8? *8*			

† From a least-squares fit to Eγ, by evaluator.

‡ From the Adopted Levels.

^{136}I β^- decay (46.6 s) 1977We04,1991Ma07 (continued)

β^- radiations

<Eβ>=2.11 MeV *12* from 1982Al01 (OSIRIS; Si(Li),Ge(Li)) compared with <Eβ>=2.34 MeV *15* from the decay scheme.

E(decay)	E(level)	Iβ^- [#]	Log *ft* [†]	Comments
(9.9×10^2 [@] *3*)	6090.8?	0.030 *9*	6.71 *14*	av Eβ=343 *12*
(1.22×10^3 [@] *3*)	5861.6?	0.151 *20*	6.34 *7*	av Eβ=438 *13*
(3.03×10^3 *3*)	4057.60	1.42 *10*	6.94 *4*	av Eβ=1249 *14*
(3.21×10^3 *3*)	3872.80	0.88 *6*	7.26 *4*	av Eβ=1335 *14*
(3.25×10^3 *3*)	3830.04	1.08 *7*	7.19 *4*	av Eβ=1355 *14*
(4.48×10^3 *3*)	2608.43	9.7 *3*	8.539[1u] *25*	av Eβ=1908 *14*
(4.62×10^3 *3*)	2465.03	1.29 *10*	7.77 *4*	av Eβ=1995 *14*
(4.64×10^3 *3*)	2444.39	7.3 *5*	7.02 *4*	av Eβ=2005 *14*
(4.82×10^3 [‡] *3*)	2261.52	13.4 *11*	6.83 *4*	av Eβ=2091 *14* E(decay): other: 5300 *240* from 1980KeZQ.
(5.19×10^3 *3*)	1891.70	71 *6*	6.25 *4*	av Eβ=2265 *14*
(5.39×10^3 [‡@] *3*)	1694.39	≤4	≥9.4[1u]	av Eβ=2337 *14* E(decay): other: 5890 *150* from 1980KeZQ.

† Significant differences from the values of 1977We04 due to the g.s. Q(β^-) which they used to calculate log *ft*.
‡ Eβ=5885 *150* from β-1313γ+1321γ; other: 5850 *240* from β-370γ+381γ.
# Absolute intensity per 100 decays.
@ Existence of this branch is questionable.

$\gamma(^{136}Xe)$

Iγ normalization: from ΣI(γ+ce)(to g.s.)=100.

E$_\gamma$ [‡]	I$_\gamma$ [†&]	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$	Mult. [#]	α	Comments
164.12 *16*	4.3 *9*	2608.43	4$^+$,5$^+$	2444.39	5			
182.7 *2*	7.4 *9*	2444.39	5	2261.52	6$^+$			
197.316 [@] *7*	783 *45*	1891.70	6$^+$	1694.39	4$^+$	E2	0.1684	α(K)exp=0.137 *25*; α(L)exp=0.035 *6*; α(M)exp=0.017 *3* (1991Ma07) α(K)=0.1330 *19*; α(L)=0.0282 *4*; α(M)=0.00591 *9*; α(N)=0.001187 *17*; α(O)=0.0001304 *19* E$_\gamma$: other: 197.33 *5* (1977We04). Mult.: from α(K)exp, α(L)exp, and α(M)exp. Also α(K)exp=0.158 *25*, K/L+=3.8 *8* (1972Ac02). Mult.: other: A$_2$=0.080 *20*, A$_4$=0.004 *20* for (197γ)(381γ)(θ) consistent with Q-Q cascade (1985Be04).
318.6 *2*	5.1 *4*	2444.39	5	2125.68	3$^+$,4$^+$			
339.4 *2*	2.6 *5*	2465.03		2125.68	3$^+$,4$^+$			
346.81 *10*	30.1 *18*	2608.43	4$^+$,5$^+$	2261.52	6$^+$			
369.813 [@] *23*	175 *10*	2261.52	6$^+$	1891.70	6$^+$	M1+E2	0.0227 *11*	α(K)exp=0.019 *4*; α(L)exp=0.0028 *5* (1991Ma07) α(K)=0.0193 *13*; α(L)=0.00274 *14*;

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^{136}I β^- decay (46.6 s) 1977We04,1991Ma07 (continued)

$\gamma(^{136}Xe)$ (continued)

E_γ[‡]	I_γ[†&]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	α	Comments
								α(M)=0.00056 *4*; α(N)=0.000115 *6*; α(O)=1.39×10^{-5} *3* Mult.: from α(K)exp, α(L)exp. E_γ: other: 370.13 *6* (1977We04).
381.359[@] *7*	998 *55*	1694.39	4^+	1313.03	2^+	E2	0.0198	α(K)exp=0.016 *3*; α(L)exp=0.0030 *6*; α(M)exp=0.0019 *4* (1991Ma07) α(K)=0.01652 *24*; α(L)=0.00259 *4*; α(M)=0.000532 *8*; α(N)=0.0001085 *16* α(O)=1.274×10^{-5} *18* Mult.: M1,E2 from α(K)exp; Q from $\gamma\gamma(\theta)$. Other: α(K)exp=0.018 *4* (1972Ac02). E_γ: other: 381.37 *6* (1977We04). Mult.: other: A_2=0.083 *15*, A_4=−0.02 *2* for (381γ)(1313γ)(θ) consistent with Q-Q cascade (1985Be04).
431.38 *12*	6.3 *19*	2125.68	$3^+,4^+$	1694.39	4^+			
482.80 *10*	17.5 *9*	2608.43	$4^+,5^+$	2125.68	$3^+,4^+$	M1	0.01215	α(K)exp=0.017 *6* (1991Ma07) α(K)=0.01049 *15*; α(L)=0.001326 *19*; α(M)=0.000268 *4*; α(N)=5.56×10^{-5} *8*; α(O)=6.98×10^{-6} *10* Mult.: from α(K)exp.
552.69 *14*	8.4 *6*	2444.39	5	1891.70	6^+			
716.7 *3*	9.8 *7*	2608.43	$4^+,5^+$	1891.70	6^+			
750.05 *7*	58 *4*	2444.39	5	1694.39	4^+	D		Mult.: A_2=−0.410 *10*, A_4=0.003 *30* for (750γ)(381γ)(θ) consistent with D-Q cascade (1985Be04).
770.75 *15*	12.8 *8*	2465.03		1694.39	4^+			
812.63 *8*	26 *9*	2125.68	$3^+,4^+$	1313.03	2^+			
914.1 *2*	35 *2*	2608.43	$4^+,5^+$	1694.39	4^+			
1313.02 *10*	1000	1313.03	2^+	0.0	0^+	E2	9.41×10^{-4}	α(K)exp=0.00078 *5* (1991Ma07) α(K)=0.000792 *11*; α(L)=9.89×10^{-5} *14*; α(M)=2.00×10^{-5} *3*; α(N)=4.13×10^{-6} *6*; α(O)=5.16×10^{-7} *8* Mult.: from α(K)exp. Mult.: other: A_2=0.083 *15*, A_4=−0.02 *2* for (381γ)(1313γ)(θ) consistent with Q-Q cascade (1985Be04).
1385.6 *4*	1.8 *3*	3830.04	$(6^+,5)$	2444.39	5			
1592.8 *2*	2.5 *3*	4057.60	$(6^+,5)$	2465.03				
1796.0 *2*	6.9 *5*	4057.60	$(6^+,5)$	2261.52	6^+			
1937.4 *5*	2.1 *4*	3830.04	$(6^+,5)$	1891.70	6^+			
2135.8 *2*	6.9 *5*	3830.04	$(6^+,5)$	1694.39	4^+			
2165.8 *15*	0.7 *6*	4057.60	$(6^+,5)$	1891.70	6^+			
2178.4 *2*	8.8 *6*	3872.80	$(6^+,5)$	1694.39	4^+			
2362.8 *3*	4.1 *4*	4057.60	$(6^+,5)$	1694.39	4^+			

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^{136}I β^- decay (46.6 s) 1977We04,1991Ma07 (continued)

$\gamma(^{136}Xe)$ (continued)

E_γ[‡]	I_γ[†&]	E_i(level)	J_i^π	E_f	J_f^π
3600.0[a] 6	0.62 13	5861.6?	$(4^+,5,6^+)$	2261.52	6^+
3735.9[a] 5	0.89 14	5861.6?	$(4^+,5,6^+)$	2125.68	$3^+,4^+$
4396.3[a] 8	0.30 9	6090.8?		1694.39	4^+

† Normalized to $I\gamma(381\gamma)$=998 so that $I\gamma(1313\gamma)$=1000 for both 46.6-s and 83.4-s decay.
‡ From 1977We04, except where noted.
# Adopted values based upon $\gamma\gamma(\theta)$ and α(K)exp as noted.
@ From 1979Bo26 (curved-crystal spect; ^{235}U,^{239}Pu(n,F)). Assignment based on agreement with $E\gamma$ given by 1977Bl12.
& For absolute intensity per 100 decays, multiply by 0.1.
a Placement of transition in the level scheme is uncertain.

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