^{131}I β^- decay

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Yu. Khazov, I. Mitropolsky, A. Rodionov	NDS 107, 2715 (2006)	17-Jul-2006

Parent: ^{131}I: E=0.0; J$^\pi$=7/2$^+$; T$_{1/2}$=8.0252 d *6*; Q(β^-)=970.8 *6*; %β^- decay=100.0
1974Me21, 1989Ch45: ^{131}I(β-) (T$_{1/2}$=8 d); measured E(γ), I(γ), $\gamma\gamma$. Ge(Li) anti-Compton, HPGe and Si(Li) detectors.
1960Jo11, 1972Kr07, 1974Ko02, 1975Ko15: ^{131}I(β-) decay (T$_{1/2}$=8 d); measured $\gamma(\theta)$. Nuclear orientation study.
1971Gf01, 1972Be90, 1976Ba42: ^{131}I(β-) decay (T$_{1/2}$=8 d); measured $\gamma\gamma(\theta)$.
The level scheme is as given by 1974Me21.

^{131}Xe Levels

E(level)†	J$^\pi$	T$_{1/2}$	Comments
0.0	3/2$^+$	stable	
80.1853 *19*	1/2$^+$	0.454 ns *40*	T$_{1/2}$: weighted average of 0.496 ns *21* (1962We14) and 0.416 ns *20* (1981Pa21).
163.930 *8*	11/2$^-$	11.86 d *4*	T$_{1/2}$: from γ(t) (IT decay).
341.144 *9*	9/2$^-$	1.6 ns *4*	T$_{1/2}$: weighted average of 2.15 ns *7* (1973En03) and 1.34 ns *4* (1981Pa21).
364.490 *4*	5/2$^+$	67.5 ps *14*	T$_{1/2}$: from 1981Pa21. Other: 47 ps *5* (1966Go20).
404.816 *4*	3/2$^+$	<75 ps	T$_{1/2}$: from 1981Pa21. Other: <500 ps (1973En02).
636.991 *4*	7/2$^+$		
666.934 *9*	7/2$^-$	<0.5 ns	T$_{1/2}$: from 1973En02.
722.909 *4*	5/2$^+$		

† From least-squares fit to Eγ's.

β^- radiations

E(decay)	E(level)	Iβ^-†‡	Log *ft*	Comments
(247.9 *6*)	722.909	2.08 *3*	6.987 *8*	av Eβ=69.36 *25*
(303.9 *6*)	666.934	0.645 *23*	7.781 *16*	av Eβ=86.94 *26*
(333.8 *6*)	636.991	7.23 *10*	6.864 *7*	av Eβ=96.62 *26*
(606.3 *6*)	364.490	89.6 *8*	6.643 *5*	av Eβ=191.58 *30*
(629.7 *6*)	341.144	0.050 *23*	9.95 *20*	av Eβ=200.22 *30*
(806.9 *6*)	163.930	0.39 *9*	9.83^{1u} *10*	av Eβ=283.24 *31*

† From net γ feeding of each level.
‡ Absolute intensity per 100 decays.

γ(^{131}Xe)

Iγ normalization: from ΣI(γ+ce)=100 to g.s. and total feeding of isomeric state 1.086% *7*.
α(K)exp: from I(ce) measurements of 1962Wo09 normalized to α(K)(284.3, E2)=0.0408.

E_γ†	I_γ‡@	E_i(level)	J^π_i	E_f	J^π_f	Mult.	δ#	α&	Comments
80.185 *2*	3.21 *4*	80.1853	1/2$^+$	0.0	3/2$^+$	M1+E2	<0.1	1.544	α(K)exp=1.20 *13*; α(L)exp=0.17 *2* (1964Da19) α(K)=1.324 *19*; α(L)=0.1757 *25*; α(M)=0.0357 *5*; α(N+..)=0.00831 *12* α(N)=0.00739 *11*; α(O)=0.000920 *13* δ: from from α(K)exp and α(L)exp. Mult.: D from comparison to RUL.
85.9 *2*	0.00011 *6*	722.909	5/2$^+$	636.991	7/2$^+$	[M1,E2]		2.2 *10*	α(K)=1.5 *5*; α(L)=0.5 *4*; α(M)=0.12 *9*; α(N+..)=0.025 *19* α(N)=0.023 *17*; α(O)=0.0024 *17*
163.930 *8*	0.0259 *5*	163.930	11/2$^-$	0.0	3/2$^+$	M4		50.5	α(K)=31.6 *5*; α(L)=14.75 *21*; α(M)=3.38 *5*; α(N+..)=0.767 *11* α(N)=0.691 *10*; α(O)=0.0755 *11* Isomeric transition. I(γ+ce)=1.086% *7* (1974Me21). I_γ: calculated by evaluators.
177.214 *2*	0.330 *4*	341.144	9/2$^-$	163.930	11/2$^-$	M1+E2	−4.3 *4*	0.240	α(K)exp=0.180 *12*; K/L=5.1 *5*; L1/L2=1.8 *7*; L1/L3=2.7 *13* α(K)=0.187 *3*; α(L)=0.0419 *7*; α(M)=0.00880 *14*; α(N+..)=0.00196 *3* α(N)=0.00177 *3*; α(O)=0.000192 *3*
232.18 *15*	0.0039 *5*	636.991	7/2$^+$	404.816	3/2$^+$	[E2]		0.0971	α(K)=0.0781 *11*; α(L)=0.01508 *22*; α(M)=0.00314 *5*; α(N+..)=0.000705 *10* α(N)=0.000634 *9*; α(O)=7.09×10^{-5} *10*
272.498 *17*	0.0707 *13*	636.991	7/2$^+$	364.490	5/2$^+$	M1+E2	−0.38 *17*	0.0530 *9*	α(K)=0.0453 *7*; α(L)=0.0061 *3*; α(M)=0.00125 *6*; α(N+..)=0.000289 *13* α(N)=0.000257 *12*; α(O)=3.17×10^{-5} *11*
284.305 *5*	7.51 *6*	364.490	5/2$^+$	80.1853	1/2$^+$	E2		0.0497	K/L=5.5 *5*; L1/L2=2.9 *4*; L1/L3=3.4 *5* (1962Wo09) α(K)=0.0408 *6*; α(L)=0.00714 *10*; α(M)=0.001479 *21*; α(N+..)=0.000334 *5* α(N)=0.000300 *5*; α(O)=3.42×10^{-5} *5*
295.8 *2*	0.0022 *10*	636.991	7/2$^+$	341.144	9/2$^-$	[E1]		0.01079	α(K)=0.00933 *14*; α(L)=0.001173 *17*; α(M)=0.000237 *4*; α(N+..)=5.47×10^{-5} *8* α(N)=4.87×10^{-5} *7*; α(O)=5.98×10^{-6} *9* I_γ: from 1989Ch45.
302.4 *2*	0.0058 *7*	666.934	7/2$^-$	364.490	5/2$^+$	[E1]		0.01019	α(K)=0.00881 *13*; α(L)=0.001107 *16*; α(M)=0.000223 *4*; α(N+..)=5.16×10^{-5} *8* α(N)=4.59×10^{-5} *7*; α(O)=5.65×10^{-6} *8*
318.088 *16*	0.095 *2*	722.909	5/2$^+$	404.816	3/2$^+$	M1+E2	−0.11 *8*	0.0350	α(K)=0.0301 *5*; α(L)=0.00388 *6*; α(M)=0.000786 *12*; α(N+..)=0.000183 *3* α(N)=0.0001628 *25*; α(O)=2.04×10^{-5} *3*
324.651 *25*	0.026 *3*	404.816	3/2$^+$	80.1853	1/2$^+$	M1+E2	−0.8 *7*	0.0329 *6*	α(K)=0.0280 *8*; α(L)=0.0040 *3*; α(M)=0.00081 *7*;

^{131}I β^- decay (continued)

γ(^{131}Xe) (continued)

E$_\gamma$[†]	I$_\gamma$[‡@]	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$	Mult.	δ[#]	α[&]	Comments
									α(N+..)=0.000187 *14* α(N)=0.000167 *13*; α(O)=2.02×10^{-5} *10*
325.789 *4*	0.335 *26*	666.934	7/2$^-$	341.144	9/2$^-$	M1+E2	−0.23 *4*	0.0329	α(K)exp=0.034 *4* α(K)=0.0283 *4*; α(L)=0.00367 *6*; α(M)=0.000745 *11*; α(N+..)=0.000173 *3* α(N)=0.0001541 *23*; α(O)=1.92×10^{-5} *3*
358.4 *2*	0.020 *7*	722.909	5/2$^+$	364.490	5/2$^+$	[M1,E2]		0.0248 *10*	α(K)=0.0210 *12*; α(L)=0.00301 *18*; α(M)=0.00062 *5*; α(N+..)=0.000141 *8* α(N)=0.000126 *8*; α(O)=1.53×10^{-5} *4*
364.489 *5*	100.0 *7*	364.490	5/2$^+$	0.0	3/2$^+$	M1+E2	−4.53 *12*	0.0228	α(K)exp=0.0192 *11* α(K)=0.0191 *3*; α(L)=0.00299 *5*; α(M)=0.000615 *9*; α(N+..)=0.0001401 *20* α(N)=0.0001254 *18*; α(O)=1.473×10^{-5} *21* δ: $\gamma(\theta)$ from oriented ^{131}I (1974Ko02). Others: δ=−6.7 *5* (1971Kr07), δ=−4.7 *3* (1964Da19).
404.814 *4*	0.067 *2*	404.816	3/2$^+$	0.0	3/2$^+$	M1+E2	+1.0 *9*	0.0177 *12*	α(K)=0.0151 *13*; α(L)=0.00210 *4*; α(M)=0.000429 *11*; α(N+..)=9.88×10^{-5} *17* α(N)=8.81×10^{-5} *17*; α(O)=1.072×10^{-5} *24*
^{x}449.6 *2*	0.009 *3*								
503.004 *4*	0.441 *4*	666.934	7/2$^-$	163.930	11/2$^-$	E2		0.00883	α(K)exp=0.0074 *9* α(K)=0.00748 *11*; α(L)=0.001083 *16*; α(M)=0.000221 *3*; α(N+..)=5.08×10^{-5} *8* α(N)=4.53×10^{-5} *7*; α(O)=5.44×10^{-6} *8*
636.989 *4*	8.78 *11*	636.991	7/2$^+$	0.0	3/2$^+$	E2		0.00470	α(K)exp=0.0042 *3* α(K)=0.00401 *6*; α(L)=0.000551 *8*; α(M)=0.0001123 *16*; α(N+..)=2.59×10^{-5} *4* α(N)=2.31×10^{-5} *4*; α(O)=2.81×10^{-6} *4*
642.719 *5*	0.266 *5*	722.909	5/2$^+$	80.1853	1/2$^+$	[E2]		0.00459	α(K)=0.00392 *6*; α(L)=0.000538 *8*; α(M)=0.0001096 *16*; α(N+..)=2.53×10^{-5} *4* α(N)=2.25×10^{-5} *4*; α(O)=2.74×10^{-6} *4*
722.911 *5*	2.17 *3*	722.909	5/2$^+$	0.0	3/2$^+$	M1+E2	+0.207 *5*	0.00459	α(K)exp=0.0038 *3* α=0.00459; α(K)=0.00394; α(L)=0.00049

† From 1990Me15.
‡ Weighted average of 1990Me15, 1989Ch45, 1980VyZZ.
# From $\gamma\gamma(\theta)$ and $\gamma(\theta)$ as adopted by 1977Kr13. Phase convention changed to the standard for Nuclear Data Sheets by the evaluators.
@ For absolute intensity per 100 decays, multiply by 0.815 *5*.
& 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.
^{x} γ ray not placed in level scheme.

$^{131}I\ \beta^-$ decay