^{125}Xe ε decay 1980Bo32,1981Bo25

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	J. Katakura	NDS 112, 495 (2011)	1-Jan-2010

Parent: ^{125}Xe: E=0.0; $J^\pi=1/2^{(+)}$; $T_{1/2}$=16.9 h *2*; Q(ε)=1644.5 *22*; %ε+%β^+ decay=100.0
1980Bo32: ce(p,X) ms; semi γ; iron-free spectrometer Ice; Iγ-coin.
1981Bo25: Spectrometer Ice.
1967Ge10: ^{124}Xe(n,γ) ms; semi γ; air-core spectrometer Ice; $\gamma\gamma(\theta)$.
1969Lu09: semi γ, $\gamma\gamma$-coin, $\beta\gamma$-coin.
1970Lu13: semi γ, $\gamma\gamma$-coin, $\gamma\gamma(\theta)$.
Others: 1966Ge13, 1967Ho04.
The level scheme is that proposed by 1980Bo32.

^{125}I Levels

E(level)[†]	J^π[‡]	$T_{1/2}$	Comments
0.0	5/2$^+$	59.408 d *8*	$T_{1/2}$: See Adopted Levels.
113.544 *7*	7/2$^+$	0.610 ns *20*	$T_{1/2}$: From (K x ray)(ce(K) 114γ)(t) (1968Ko01); Other: 0.60 ns *4* (K x ray)(ce(K) 114γ)(t) (1966Ge13).
188.416 *4*	3/2$^+$	0.344 ns *9*	$T_{1/2}$: Weighted average of 0.354 ns *7* (K x ray)(ce(K) 188γ)(t) (1966Ge13), 0.34 ns *2* (ce(K) 55γ)(ce(K) 188γ)(t) (1967Ho04), 0.325 ns *10* (ce(K) 55γ)(ce(K) 188γ)(t) (1968Ko01).
243.382 *4*	1/2$^+$	0.230 ns *10*	$T_{1/2}$: From (Eγ≥600γ)(ce(L) 243γ)(t) (1968Ko01); Others: ≤0.19 ns (K x ray)(ce(K) 243γ)(t) (1966Ge13), 0.21 ns *2* (Auger E)(ce(K) 243γ)(t) (1967Ho04).
372.066 *14*	3/2$^+$		
453.792 *9*	3/2$^+$		
1007.450 *19*	3/2$^+$		
1082.8 *3*			
1089.904 *15*	(1/2)$^+$		
1180.872 *13*	3/2$^+$		
1263.95 *3*	(1/2,3/2)		
1381.635 *22*	1/2$^+$,3/2$^+$		
1442.79 *5*	3/2$^+$		
1562.43 *10*	1/2,3/2		

† E(levels) are based on a least-squares fit to Eγ's by evaluators.
‡ Spin and parity values are those given under Adopted Levels.

ε,β^+ radiations

$\Sigma I\beta^+$=0.3% *1* from I$\gamma\pm$ (1969Lu09).

E(decay)	E(level)	Iε[†]	Log *ft*	I($\varepsilon+\beta^+$)[†]	Comments
(82.1 22)	1562.43	0.0048 *7*	7.13 *8*	0.0048 *7*	εK=0.706 *8*; εL=0.227 *6*; εM+=0.0672 *19*
(201.7 22)	1442.79	0.0305 *14*	7.341 *24*	0.0305 *14*	εK=0.8156 *6*; εL=0.1443 *5*; εM+=0.04010 *15*
(262.9 22)	1381.635	0.368 *9*	6.522 *15*	0.368 *9*	εK=0.8272 *3*; εL=0.13549 *24*; εM+=0.03728 *8*
(380.6 22)	1263.95	0.0853 *18*	7.511 *12*	0.0853 *18*	εK=0.8380 *2*; εL=0.1273 *1*; εM+=0.03469 *4*
(463.6 22)	1180.872	1.000 *16*	6.626 *10*	1.000 *16*	εK=0.84198 *9*; εL=0.12429 *7*; εM+=0.03373 *2*
(554.6 22)	1089.904	1.89 *5*	6.514 *14*	1.89 *5*	εK=0.8449; εL=0.12208 *5*; εM+=0.03303 *2*
(561.7 22)	1082.8	0.016 *6*	8.60 *17*	0.016 *6*	εK=0.8451; εL=0.12194 *5*; εM+=0.03299 *2*
(637.0 22)	1007.450	0.343 *5*	7.382 *9*	0.343 *5*	εK=0.8468; εL=0.12065 *4*; εM+=0.03258 *1*
(1190.7 22)	453.792	4.65 *11*	6.812 *12*	4.65 *11*	εK=0.8523; εL=0.1164; εM+=0.03123
(1272.4 22)	372.066	0.031 *5*	9.05 *7*	0.031 *5*	εK=0.8524; εL=0.1160; εM+=0.03112

Continued on next page (footnotes at end of table)

^{125}Xe ε decay 1980Bo32,1981Bo25 (continued)

ϵ,β^+ radiations (continued)

E(decay)	E(level)	Iβ^+ †	Iε†	Log *ft*	I($\varepsilon+\beta^+$)†	Comments
(1401.1 *22*)	243.382	0.181 *6*	66.4 *12*	5.802 *10*	66.6 *12*	av Eβ=178.75 *97*; εK=0.8510; εL=0.11533 *2*; εM+=0.030926 *4* Eβ+=470 keV *40* to 243-keV level (1969Lu09).
(1456.1 *22*)	188.416	0.119 *5*	25.3 *10*	6.256 *18*	25.4 *10*	av Eβ=202.79 *96*; εK=0.8496; εL=0.11495 *2*; εM+=0.030818 *5*

† Absolute intensity per 100 decays.

$\gamma(^{125}I)$

Iγ normalization: Deduced from intensity balance in the level scheme, with no I(ε+β^+) to g.s. and 113.57-keV level assumed.
I(ce) measured α normalized to α(243γ)(K,E2)=0.0653 (1981Bo25), and α(74.857γ)(K,E2)=2.99 (1980Bo32).

E_γ [‡]	I_γ [@b]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [&]	δ [a]	α [†]	Comments
54.968 4	12.6 3	243.382	1/2+	188.416	3/2+	M1+E2	−0.022 8	4.20	α(K)=3.60 5; α(L)=0.479 8; α(M)=0.0965 15; α(N+..)=0.0218 4 α(N)=0.0195 3; α(O)=0.00227 4 α(K)exp=3.97 30 (1980Bo32); K/L=7.0 6, L1:L2:L3=100:8.1 3:2.2 2 (1967Ge10).
74.875 7	0.22 3	188.416	3/2+	113.544	7/2+	E2		4.92	α(K)=2.88 4; α(L)=1.627 23; α(M)=0.346 5; α(N+..)=0.0724 11 α(N)=0.0664 10; α(O)=0.00600 9 K/L=1.7 2, L1:L2:L3=100:244 18:308 19(1967Ge10).
113.551 15	0.890 22	113.544	7/2+	0.0	5/2+	M1+E2	−0.12 2	0.530	α(K)=0.454 7; α(L)=0.0614 14; α(M)=0.0124 3; α(N+..)=0.00279 6 α(N)=0.00250 6; α(O)=0.000290 6 α(K)exp=0.48 4 (1980Bo32); K/L=7.1 7, L1:L2:L3=100:8.8 9:4.6 8 (1967Ge10). δ: Negative sign is from A_2 and A_4 values in ^{123}Sb(α,2nγ),^{122}Sn(^{6}Li,3nγ).
^{x}178.485 23	0.132 10								
188.418 4	100	188.416	3/2+	0.0	5/2+	M1+E2	+0.357 9	0.1354 20	α(K)=0.1152 17; α(L)=0.01625 25; α(M)=0.00329 5; α(N+..)=0.000737 11 α(N)=0.000662 10; α(O)=7.53×10^{-5} 11 α(K)exp=0.12 1, K:L:M=100 8:14.2 11:33.6 28 (1981Bo25); α(K)exp=0.125 8 (1980Bo32); K/L=6.9 2, L1:L2:L3=100:12.3 4:8.2 2 (1967Ge10).
210.418 21	0.139 9	453.792	3/2+	243.382	1/2+	M1,E2		0.113 18	α(K)=0.093 12; α(L)=0.016 5; α(M)=0.0032 11; α(N+..)=0.00070 22 α(N)=0.00063 21; α(O)=6.8×10^{-5} 18 α(K)exp=0.099 13 (1980Bo32); α(K)exp=0.08 4 (1967Ge10).
243.378 5	55.7 11	243.382	1/2+	0.0	5/2+	E2		0.0799	α(K)=0.0651 10; α(L)=0.01185 17; α(M)=0.00244 4; α(N+..)=0.000532 8 α(N)=0.000481 7; α(O)=5.04×10^{-5} 7 K:L:M=100:18.4 15:4.6 4 (1981Bo25); K/L=5.3 3, L1:L2:L3=100:39.3 12:36.0 12 (1967Ge10).
258.36 8	0.025 3	372.066	3/2+	113.544	7/2+				
340.22 10	0.037 4	453.792	3/2+	113.544	7/2+	E2		0.0269	α(K)=0.0225 4; α(L)=0.00357 5; α(M)=0.000729 11; α(N+..)=0.0001606 23 α(N)=0.0001449 21; α(O)=1.574×10^{-5} 22 α(K)exp=0.022 7 (1981Bo25); α(K)exp<0.135 (1980Bo32). Mult.: From adopted gammas.
372.081 14	0.317 7	372.066	3/2+	0.0	5/2+	M1,E2		0.0209 6	α(K)=0.0178 8; α(L)=0.00249 16; α(M)=0.00050 4; α(N+..)=0.000113 7

$\gamma(^{125}$I) (continued)

E_γ[‡]	I_γ[@b]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	α[†]	Comments
								α(N)=0.000101 *6*; α(O)=1.15×10^{-5} *3* α(K)exp=0.0188 *17* (1981Bo25); α(K)exp=0.019 *2* (1980Bo32).
[x]376.13 *10*	0.029 *5*							
[x]431.02 *6*	0.037 *4*							
453.796 *11*	8.68 *18*	453.792	3/2$^+$	0.0	5/2$^+$	M1	0.01302	α(K)=0.01126 *16*; α(L)=0.001414 *20*; α(M)=0.000284 *4*; α(N+..)=6.43×10^{-5} *9* α(N)=5.75×10^{-5} *8*; α(O)=6.78×10^{-6} *10* K:L:M=100 *8*:12.2 *11*:2.6 *4* (1981Bo25); α(K)exp=0.012 *1* (1980Bo32), α(K)exp=0.0121 *8* (1967Ge10).
553.69 *4*	0.057 *2*	1007.450	3/2$^+$	453.792	3/2$^+$			
635.382[c#] *23*	≈0.220[c#]	1007.450	3/2$^+$	372.066	3/2$^+$	(M1,E2)	0.0051 *7*	α=0.0051 *7*; α(K)=0.0044 *6*; α(L)=0.00057 *5*; α(M)=0.000114 *10*; α(N+..)=2.57×10^{-5} *23* α(N)=2.30×10^{-5} *20*; α(O)=2.7×10^{-6} *3* E_γ: From GTOL. 1980Bo32 report 635.824 *18* as a doublet. K:L=100:23 *9* (1981Bo25); α(K)exp<0.020 (1980Bo32); α(K)exp=0.0047 *7* (1981Bo25).
636.110[c#d] *17*	≈0.21[c#]	1089.904	(1/2)$^+$	453.792	3/2$^+$	(M1,E2)	0.0051 *7*	α=0.0051 *7*; α(K)=0.0044 *6*; α(L)=0.00057 *5*; α(M)=0.000114 *10*; α(N+..)=2.57×10^{-5} *23* α(N)=2.30×10^{-5} *20*; α(O)=2.7×10^{-6} *3* E_γ: From GTOL. 1980Bo32 report 635.824 *18* as a doublet. K:L:M=100:23 *9* (1981Bo25); α(K)exp<0.020 (1980Bo32); α(K)exp=0.0047 *7* (1981Bo25).
717.90 *6*	0.025 *2*	1089.904	(1/2)$^+$	372.066	3/2$^+$			
727.096 *23*	0.102 *3*	1180.872	3/2$^+$	453.792	3/2$^+$	M1,E2	0.0037 *5*	α=0.0037 *5*; α(K)=0.0032 *5*; α(L)=0.00040 *4*; α(M)=8.1×10^{-5} *8*; α(N+..)=1.83×10^{-5} *19* α(N)=1.64×10^{-5} *17*; α(O)=1.91×10^{-6} *22* α(K)exp=0.0033 *11* (1981Bo25).
764.17 *10*	0.014 *3*	1007.450	3/2$^+$	243.382	1/2$^+$			
809.18 *13*	0.013 *2*	1180.872	3/2$^+$	372.066	3/2$^+$			
819.02 *4*	0.045 *2*	1007.450	3/2$^+$	188.416	3/2$^+$			
846.511 *18*	2.06 *7*	1089.904	(1/2)$^+$	243.382	1/2$^+$	M1	0.00290 *4*	α=0.00290 *4*; α(K)=0.00252 *4*; α(L)=0.000310 *5*; α(M)=6.21×10^{-5} *9*; α(N+..)=1.408×10^{-5} *20* α(N)=1.259×10^{-5} *18*; α(O)=1.488×10^{-6} *21* α(K)exp=0.00248 *24*, α(L)exp=0.00028 *8* (1981Bo25).
894.42 *25*	0.030 *10*	1082.8		188.416	3/2$^+$			
901.51 *3*	1.074 *24*	1089.904	(1/2)$^+$	188.416	3/2$^+$	M1,E2	0.0022 *3*	α=0.0022 *3*; α(K)=0.0019 *3*; α(L)=0.00024 *3*; α(M)=4.8×10^{-5} *6*; α(N+..)=1.09×10^{-5} *13* α(N)=9.8×10^{-6} *12*; α(O)=1.14×10^{-6} *15* α(K)exp=0.0020 *4*, α(L)exp=0.00045 *15* (1981Bo25).
937.494 *23*	0.280 *6*	1180.872	3/2$^+$	243.382	1/2$^+$	E2(+M1)	0.0020 *3*	α=0.0020 *3*; α(K)=0.00176 *24*; α(L)=0.000219 *25*; α(M)=4.4×10^{-5} *5*; α(N+..)=1.00×10^{-5} *12*

γ(^{125}I) (continued)

E_γ ‡	I_γ @b	E_i(level)	J^π_i	E_f	J^π_f	Mult.&	α †	Comments
								α(N)=8.9×10^{-6} *11*; α(O)=1.04×10^{-6} *13* α(K)exp=0.0013 *4* (1981Bo25).
992.43 *3*	0.189 *4*	1180.872	3/2$^+$	188.416	3/2$^+$			
1007.431 *25*	0.299 *6*	1007.450	3/2$^+$	0.0	5/2$^+$	M1,E2	0.00173 *22*	α=0.00173 *22*; α(K)=0.00150 *20*; α(L)=0.000186 *21*; α(M)=3.7×10^{-5} *5*; α(N+..)=8.4×10^{-6} *10* α(N)=7.5×10^{-6} *9*; α(O)=8.9×10^{-7} *11* α(K)exp=0.0016 *5* (1981Bo25).
1020.55 *5*	0.044 *1*	1263.95	(1/2,3/2)	243.382	1/2$^+$			
1070.85 *10*	0.033 *2*	1442.79	3/2$^+$	372.066	3/2$^+$			
1075.54 *3*	0.114 *3*	1263.95	(1/2,3/2)	188.416	3/2$^+$			
1089.86 *4*	0.121 *4*	1089.904	(1/2)$^+$	0.0	5/2$^+$			
1108.71 *12*	0.0048 *10*	1562.43	1/2,3/2	453.792	3/2$^+$			
1138.23 *3*	0.556 *15*	1381.635	1/2$^+$,3/2$^+$	243.382	1/2$^+$	M1,E2	0.00132 *16*	α=0.00132 *16*; α(K)=0.00114 *14*; α(L)=0.000141 *16*; α(M)=2.8×10^{-5} *3*; α(N+..)=7.9×10^{-6} *7* α(N)=5.7×10^{-6} *7*; α(O)=6.7×10^{-7} *8*; α(IPF)=1.47×10^{-6} *8* α(K)exp=0.0011 *4* (1981Bo25).
1180.838 *25*	1.27 *3*	1180.872	3/2$^+$	0.0	5/2$^+$	M1,E2	0.00122 *15*	α=0.00122 *15*; α(K)=0.00106 *13*; α(L)=0.000130 *15*; α(M)=2.6×10^{-5} *3*; α(N+..)=1.02×10^{-5} *5* α(N)=5.3×10^{-6} *6*; α(O)=6.2×10^{-7} *8*; α(IPF)=4.34×10^{-6} *21* α(K)exp=0.0009 *3* (1981Bo25).
1193.23 *3*	0.123 *3*	1381.635	1/2$^+$,3/2$^+$	188.416	3/2$^+$			
1199.67 *17*	0.0074 *8*	1442.79	3/2$^+$	243.382	1/2$^+$			
1254.35 *12*	0.0030 *9*	1442.79	3/2$^+$	188.416	3/2$^+$			
1318.91 *16*	0.0021 *5*	1562.43	1/2,3/2	243.382	1/2$^+$			
[x]1326.0 *3*	0.0011 *4*							
1381.0 *8*	0.0028 *4*	1381.635	1/2$^+$,3/2$^+$	0.0	5/2$^+$			
[x]1385.15 *12*	0.0055 *5*							
1442.70 *6*	0.013 *1*	1442.79	3/2$^+$	0.0	5/2$^+$			
1562.4 *3*	0.0020 *3*	1562.43	1/2,3/2	0.0	5/2$^+$			

† Additional information 1.

‡ From 1980Bo32. Reported uncertainties seem to be too low.

1980Bo32 report Eγ=635.824 *18* with Iγ=0.430 *9* doubly placed from the 1007 and 1089 levels. The intensity was divided by the evaluators using $\gamma\gamma$ data of 1969Lu09.

@ Iγ's are relative to I(188.43γ)=100 from 1980Bo32, unless noted otherwise.

& From α(K)exp with normalization of α(K)(243γ)=0.0653 (E2 theory) (1981Bo25), L-subshell ratios and $\gamma\gamma(\theta)$ (1967Ge10).

[a] From L-subshell ratios and $\gamma\gamma(\theta)$ (1967Ge10), unless otherwise indicated.

[b] For absolute intensity per 100 decays, multiply by 0.538.

[c] Multiply placed with intensity suitably divided.

γ(^{125}I) (continued)

[d] Placement of transition in the level scheme is uncertain.
[x] γ ray not placed in level scheme.

$^{125}_{53}I_{72}$-6

^{125}Xe ε decay 1980Bo32,1981Bo25

Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
@ Multiply placed: intensity suitably divided