^{122}Xe ε decay 1981Ng04,1973Lo10,1969Gf01

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	T. Tamura	NDS 108, 455 (2007)	30-Sep-2006

Parent: ^{122}Xe: E=0.0; $J^{\pi}=0^{+}$; $T_{1/2}$=20.1 h *1*; Q(ε)=725 *12*; %ε decay=100.0

The decay scheme is that proposed by 1981Ng04 on the basis of (ce)γ-coin, $\gamma\gamma$-coin and Eγ sums.

1981Ng04: Ce(p,spallation) E(p)=660 MeV, chem, mass; semi γ, $\gamma\gamma$-coin, magnetic spectrometer ce, magnetic spectrometer-semi ceγ-coin.

1973Lo10: Ce(p,spallation) E(p)=800 MeV, mass; semi γ, scin-semi $\gamma\gamma$(t), magnetic double-lens spectrometer, (ce)(Auger)(t), (ce)(ce)(t), scin-magnetic spectrometer (γ)ce(t), (K x ray)ce(t).

1969Gf01: ^{120}Te(α,2n); semi γ, semi-scin $\gamma\gamma$-coin.

Others: γ(1970LaZX,1965An05,1960Mo09,1954Ma75).

^{122}I Levels

E(level)†	J^{π}	$T_{1/2}$	Comments
0.0	1^{+}		
53.114 *15*	$0,1,2,3^{+}$		
61.626 *4*	$0^{+},1^{+}$	7.4 ns *3*	$T_{1/2}$: weighted average of 7.55 ns *40* from (61.8γ)(K x ray)(t) and 7.2 ns *7* from (61.8L+90.5K)(K x ray)(t) (1973Lo10).
90.596 *6*	$1^{+},2^{+}$	1.9 ns *3*	$T_{1/2}$: average value of (90.6γ)(K x ray)(t) and (61.8L+90.5K)(K x ray)(t) (1973Lo10).
148.612 *4*	1^{+}	≤80 ps	$T_{1/2}$: from (148.6K)(KLL Auger)(t) and (148.6K)(K x ray)(t).
163.066 *7*	$1^{+},2^{+}$		
175.574 *10*			
279.427 *9*	0,1		
350.053 *8*	1^{+}		
416.675 *19*	1^{+}		

† E(levels) are based on a least-squares fit to the E(γ's) of 1981Ng04 (evaluator).

ε radiations

E(decay)	E(level)	Iε†‡	Log *ft*	Comments
(308 *12*)	416.675	2.47 *11*	5.92 *5*	εK=0.8325 *12*; εL=0.1315 *10*; εM+=0.0360 *3*
(375 *12*)	350.053	9.25 *21*	5.54 *4*	εK=0.8376 *8*; εL=0.1276 *6*; εM+=0.03477 *19*
(446 *12*)	279.427	0.29 *4*	7.20 *7*	εK=0.8412 *6*; εL=0.1248 *4*; εM+=0.03391 *13*
(576 *12*)	148.612	3.75 *16*	6.33 *3*	εK=0.8454 *3*; εL=0.12166 *23*; εM+=0.03290 *8*
(663 *12*)	61.626	0.98 *7*	7.04 *4*	εK=0.8473 *3*; εL=0.12028 *17*; εM+=0.03246 *6*
(672# *12*)	53.114	≤0.48	≥7.4	εK=0.8474 *3*; εL=0.12016 *17*; εM+=0.03243 *6*
(725 *12*)	0.0	83.0 *4*	5.191 *16*	εK=0.8483 *2*; εL=0.11951 *14*; εM+=0.03222 *5*

† Iε=83.0 *4*(to g.s.) is calculated using Iγ(350.065γ)/I(564.119γ) in ^{122}Te)=0.444 observed with ^{122}Xe(20 h)+^{122}I(3.6 min) equilibrium source (1969Gf01) and Iγ(564.119γ)=0.176 *4* per ^{122}I β^{+} decay.

‡ Absolute intensity per 100 decays.

Existence of this branch is questionable.

γ(^{122}I)

Iγ normalization: from %ε(to g.s.)=83.0 *4* (see ε data from ^{122}Xe ε decay).

E_γ [†]	I_γ [‡@]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [#]	δ [#]	α [&]	Comments
53.080 *18*	0.37 *3*	53.114	0,1,2,3$^+$	0.0	1$^+$	[M1,E2]		11 *7*	α(K)=5.6 *16*; α(L)=4 *4*; α(M)=0.9 *9*; α(N+..)=0.21 *19*
58.015 *13*	1.16 *3*	148.612	1$^+$	90.596	1$^+$,2$^+$	M1+E2	≤0.52	4.6 *10*	α(K)=3.4 *3*; α(L)=0.9 *6*; α(M)=0.19 *12*; α(N+..)=0.05 *3* δ: from weighted average α(K)exp=3.2 *5* α(K)exp=2.9 *6* (1981Ng04), 3.7 *8* (1973Lo10).
61.626 *4*	5.22 *15*	61.626	0$^+$,1$^+$	0.0	1$^+$	M1		3.05	α(K)=2.62; α(L)=0.344; α(M)=0.0690; α(N+..)=0.01695 α(K)exp=2.0 *4* (1981Ng04), 2.2 *5* (1973Lo10).
66.63 *5*	0.34 *4*	416.675	1$^+$	350.053	1$^+$	[M1,E2]		5 *3*	α(K)=3.1 *10*; α(L)=1.5 *13*; α(M)=0.3 *3*; α(N+..)=0.07 *7*
72.470 *6*	2.38 *16*	163.066	1$^+$,2$^+$	90.596	1$^+$,2$^+$	M1(+E2)	≤0.46	2.2 *4*	α(K)=1.77 *14*; α(L)=0.36 *15*; α(M)=0.07 *4*; α(N+..)=0.018 *8* α(K)exp=1.8 *4* (1981Ng04), 1.7 *2* (1973Lo10). δ: from 1981Ng04.
90.596 *7*	7.22 *25*	90.596	1$^+$,2$^+$	0.0	1$^+$	M1+E2	0.49 *25*	1.30 *25*	α(K)=1.01 *13*; α(L)=0.22 *10*; α(M)=0.046 *20*; α(N+..)=0.011 *5* α(K)exp=1.1 *2* (1981Ng04), 0.97 *15* (1973Lo10). δ: from weighted average of α(K)exp=1.02 *12*.
103.857 *7*	0.63 *4*	279.427	0,1	175.574		[M1,E2]		1.1 *5*	α(K)=0.83 *25*; α(L)=0.23 *16*; α(M)=0.05 *4*; α(N+..)=0.011 *8*
109.897 *23*	0.53 *4*	163.066	1$^+$,2$^+$	53.114	0,1,2,3$^+$	[M1,E2]		0.9 *4*	α(K)=0.70 *20*; α(L)=0.18 *12*; α(M)=0.038 *25*; α(N+..)=0.009 *6*
116.355 *9*	1.30 *4*	279.427	0,1	163.066	1$^+$,2$^+$	[M1,E2]		0.8 *3*	α(K)=0.58 *16*; α(L)=0.14 *9*; α(M)=0.030 *19*; α(N+..)=0.007 *5*
148.612 *4*	33.6 *12*	148.612	1$^+$	0.0	1$^+$	M1		0.2485	α(K)=0.2139; α(L)=0.0277; α(M)=0.00556; α(N+..)=0.00316
163.052 *22*	1.71 *7*	163.066	1$^+$,2$^+$	0.0	1$^+$	M1,E2		0.25 *7*	α(K)=0.21 *4*; α(L)=0.039 *18*; α(M)=0.008 *4*; α(N+..)=0.0019 *9* α(K)exp=0.22 *5* (1981Ng04).
174.45 *3*	1.84 *7*	350.053	1$^+$	175.574		[M1,E2]		0.20 *5*	α(K)=0.17 *3*; α(L)=0.030 *13*; α(M)=0.006 *3*; α(N+..)=0.0015 *6*
175.582 *14*	3.34 *14*	175.574		0.0	1$^+$	[M1,E2]		0.20 *5*	α(K)=0.16 *3*; α(L)=0.030 *13*; α(M)=0.006 *3*; α(N+..)=0.0015 *6* α(K)exp=0.16 *3* (1973Lo10).
186.978 *10*	7.15 *23*	350.053	1$^+$	163.066	1$^+$,2$^+$	M1		0.1320	α(K)=0.1137; α(L)=0.01469; α(M)=0.00295; α(N+..)=0.00072 α(K)exp=0.114 *18* (1981Ng04).
201.43 *5*	1.49 *17*	350.053	1$^+$	148.612	1$^+$	M1,E2		0.130 *23*	α(K)=0.107 *15*; α(L)=0.018 *7*; α(M)=0.0037 *14*; α(N+..)=0.0009 *3* α(K)exp=0.16 *4* (1981Ng04).
253.69 *6*	1.52 *16*	416.675	1$^+$	163.066	1$^+$,2$^+$	M1,E2		0.064 *6*	α(K)=0.054 *4*; α(L)=0.0083 *19*; α(M)=0.0017 *4*; α(N+..)=0.00041 *9* α(K)exp=0.09 *5* (1981Ng04).

γ(^{122}I) (continued)

E_γ †	I_γ ‡@	E_i(level)	J^π_i	E_f	J^π_f	Mult. #	α &	Comments
259.4 *4*	0.7 *2*	350.053	1$^+$	90.596	1$^+$,2$^+$			
288.42 *3*	5.20 *16*	350.053	1$^+$	61.626	0$^+$,1$^+$	[M1,E2]	0.0437 *21*	α(K)=0.0369 *9*; α(L)=0.0055 *9*; α(M)=0.00111 *20*; α(N+..)=0.00027 *5*
326.3 *5*	≈0.5	416.675	1$^+$	90.596	1$^+$,2$^+$			
350.065 *10*	100.0 *19*	350.053	1$^+$	0.0	1$^+$	[M1,E2]	0.0250 *3*	α(K)=0.0212 *6*; α(L)=0.00300 *24*; α(M)=0.00061 *6*; α(N+..)=0.00015 α(K)exp=0.021 *5* (1981Ng04,1973Lo10); Δα(K)exp=15 is given by 1981Ng04.
355.11 *4*	3.1 *5*	416.675	1$^+$	61.626	0$^+$,1$^+$	[M1,E2]	0.0240 *4*	α(K)=0.0204 *7*; α(L)=0.00287 *22*; α(M)=0.00058 *5*; α(N+..)=0.00014
416.633 *25*	24.0 *5*	416.675	1$^+$	0.0	1$^+$	M1	0.01629	α(K)=0.01408; α(L)=0.00177; α(M)=0.00035 α(K)exp=0.0145 *22* (1981Ng04).

† From 1981Ng04; all γ′s, except for 259.35γ and 326.3γ are also observed by 1973Lo10.

‡ Relative to I(350.065γ)=100; I(326.3γ) is deduced from ceγ-coin spectrum.

\# Multipolarities and mixing ratios are deduced from α(exp) (1981Ng04,1973Lo10); values are normalized to α(K)exp(148 γ)=0.215 (M1 theory), for the transitions below 100 keV 1981Ng04 use Ice(K) of 1973Lo10.

@ For absolute intensity per 100 decays, multiply by 0.0780 *8*.

& 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.

^{122}Xe ε decay 1981Ng04,1973Lo10,1969Gf01