^{121}Cs ε decay (155 s) 1991Ge02

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	S. Ohya	NDS 111, 1619 (2010)	20-Jan-2009

Parent: ^{121}Cs: E=0; J$^\pi$=3/2$^{(+)}$; T$_{1/2}$=155 s *4*; Q(ε)=5372 *18*; %ε+%β^+ decay=100.0

1991Ge02: La(p,spall) E=600 MeV, on-line ms; measured γ, $\gamma\gamma$, $\gamma\gamma$(t). La(^{3}He,spall) E=280 MeV on-line ms; measured ce with Si detector with magnetic β^+ shield, β^+ with 4$\pi\beta$ plastic scin. Authors proposed level scheme in the mixed decays of ^{121}Cs (155 s) and ^{121}Cs (122 s) and also showed selected levels in the decay of ^{121}Cs (122 s).

1981So06: ^{124}Xe(p,4n) E=52 MeV, Eγ, Iγ, $\gamma\gamma$, Eβ^+, Iβ^+, x/γ ratio, deduced decay scheme.

1984PaZZ: measured Q(β^+)=5.21 MeV *22* from shape-fitting procedure (a different method from F-K analysis).

1975We23: La(p,3pxn) E=600 MeV ms; measured γ in coincidence with β^+.

Decay scheme is from evaluator based on that in 1991Ge02. Evaluator assumed no direct ε+β^+ feeding from ^{121}Cs ε decay (155 s) to the levels at 179.44 keV and 196.081 keV which are strongly fed from ^{121}Cs 9/2$^{(+)}$ state, and also assumed no direct ε+β^+ feeding from ^{121}Cs ε decay (122 s) to the levels at 153.95 keV, 239.74 keV, 264.5 keV, 427.12 keV and 449.85 keV which are strongly fed from ^{121}Cs 3/2$^{(+)}$ state. See ^{121}Cs ε decay (122 s). The decay scheme of ^{121}Cs g.s. ε+β^+ decay is still tentative due to similarity of half-lives of g.s. and the isomeric state.

^{121}Xe Levels

E(level)†	J$^\pi$‡	T$_{1/2}$#
0	5/2$^{(+)}$	40.1 min *20*
153.96 *11*	(1/2$^+$)	80 ns *15*
179.44 *13*	7/2$^{(+)}$	
196.08 *16*	7/2$^{(-)}$	8 ns *2*
239.77 *13*	(3/2$^+$)	
355.77 *15*	(5/2$^-$)	
427.12 *17*	(3/2$^+$,5/2$^+$)	
449.84 *12*	(5/2$^+$)	
497.2 *5*		
553.03 *16*		
619.91 *16*		
661.06 *15*		
682.41 *18*		
696.50 *14*		
737.44 *21*		
946.2 *4*		
1117.6 *4*		

† E(levels) are based on a least-squares fit to E(γ's).
‡ From Adopted Levels.
# From $\gamma\gamma$(t).

ε,β^+ radiations

E(decay)	E(level)	Iβ^+ †	Iε†	Log *ft*	I($\varepsilon+\beta^+$)†	Comments
(4254 *18*)	1117.6	0.5 *3*	0.1 *1*	7.0 *4*	0.6 *4*	av Eβ=1467.5 *85*; εK=0.1756 *24*; εL=0.0233 *4*; εM+=0.00633 *9*
(4426 *18*)	946.2	0.19 *12*	0.04 *3*	7.5 *4*	0.23 *15*	av Eβ=1547.8 *85*; εK=0.1551 *21*; εL=0.0206 *3*; εM+=0.00559 *8*
(4635 *18*)	737.44	1.1 *6*	0.20 *11*	6.8 *3*	1.3 *7*	av Eβ=1645.8 *85*; εK=0.1339 *17*; εL=0.01776 *23*; εM+=0.00482 *6*
(4676 *18*)	696.50	1.6 *8*	0.29 *14*	6.7 *3*	1.9 *9*	av Eβ=1665.1 *85*; εK=0.1302 *17*; εL=0.01727 *22*; εM+=0.00469 *6*
(4690 *18*)	682.41	0.9 *5*	0.17 *9*	6.9 *3*	1.1 *6*	av Eβ=1671.7 *85*; εK=0.1289 *16*; εL=0.01710 *22*; εM+=0.00464 *6*
(4711 *18*)	661.06	2.2 *10*	0.39 *18*	6.5 *3*	2.6 *12*	av Eβ=1681.7 *85*; εK=0.1270 *16*; εL=0.01685 *21*; εM+=0.00457 *6*
(4752 *18*)	619.91	1.5 *8*	0.26 *13*	6.7 *3*	1.8 *9*	av Eβ=1701.1 *85*; εK=0.1235 *16*; εL=0.01638 *21*; εM+=0.00445 *6*
(4819 *18*)	553.03	0.3 *3*	0.06 *6*	7.4 *5*	0.4 *4*	av Eβ=1732.7 *85*; εK=0.1181 *15*; εL=0.01565 *20*; εM+=0.00425 *6*

Continued on next page (footnotes at end of table)

^{121}Cs ε decay (155 s) 1991Ge02 (continued)

ε,$β^+$ radiations (continued)

E(decay)	E(level)	$Iβ^+$ †	Iε†	Log *ft*	I(ε+$β^+$)†	Comments
(4875 *18*)	497.2	0.26 *13*	0.040 *20*	7.6 *3*	0.30 *15*	av Eβ=1759.0 *85*; εK=0.1137 *14*; εL=0.01508 *19*; εM+=0.00409 *5*
(4922 *18*)	449.84	3.8 *17*	0.6 *3*	6.4 *3*	4.4 *20*	av Eβ=1781.4 *85*; εK=0.1102 *14*; εL=0.01461 *18*; εM+=0.00396 *5*
(4945 *18*)	427.12	3.3 *16*	0.48 *23*	6.5 *3*	3.8 *18*	av Eβ=1792.1 *85*; εK=0.1086 *13*; εL=0.01439 *18*; εM+=0.00391 *5*
(5016 *18*)	355.77	3.5 *17*	0.48 *23*	6.5 *3*	4.0 *19*	av Eβ=1825.8 *86*; εK=0.1036 *13*; εL=0.01374 *17*; εM+=0.00373 *5*
(5132 *18*)	239.77	9 *4*	1.1 *6*	6.2 *3*	10 *5*	av Eβ=1880.7 *86*; εK=0.0962 *12*; εL=0.01275 *15*; εM+=0.00346 *4*
(5218 *18*)	153.96	12 *5*	1.4 *6*	6.1 *3*	13 *6*	av Eβ=1921.4 *86*; εK=0.0911 *11*; εL=0.01207 *14*; εM+=0.00328 *4*
(5372 *18*)	0	49 *22*	5.2 *23*	5.5 *3*	54 *24*	av Eβ=1994.4 *86*; εK=0.0828 *10*; εL=0.01097 *13*; εM+=0.00298 *4*

† For absolute intensity per 100 decays, multiply by 1.00 *45*.

γ(^{121}Xe)

Iγ normalization: from ΣI(γ+ce) to g.s. + I(ε+$β^+$ to g.s.)=100. I(ε+$β^+$ to g.s.)=54% *24* measured value from $γ^±$, I($β^+$) (1991Ge02).
Unplaced γ's are not assigned to g.s. or isomeric state.

$E_γ$	$I_γ$‡#	E_i(level)	$J^π_i$	E_f	$J^π_f$	Mult.	α†	Comments
ˣ59.3 *5*	4 *1*							
85.9 *3*	62 *4*	239.77	(3/2$^+$)	153.96	(1/2$^+$)	M1	1.267 *22*	α(K)=1.087 *19*; α(L)=0.1438 *25*; α(M)=0.0292 *5*; α(N+..)=0.00680 *12* α(N)=0.00605 *11*; α(O)=0.000754 *13* Mult.: from α(K)exp=1.2 *2*, K/L=7 *1*.
108.0 *2*	20 *3*	661.06		553.03		M1	0.660	α(K)=0.566 *9*; α(L)=0.0747 *12*; α(M)=0.01517 *23*; α(N+..)=0.00353 *6* α(N)=0.00314 *5*; α(O)=0.000392 *6* Mult.: from α(K)exp=0.4 *1*, K/L=12 *6*.
153.9 *2*	455 *15*	153.96	(1/2$^+$)	0	5/2$^{(+)}$	E2	0.397	α(K)=0.301 *5*; α(L)=0.0766 *12*; α(M)=0.01615 *25*; α(N+..)=0.00357 *6* α(N)=0.00323 *5*; α(O)=0.000344 *6* Mult.: from K/L=3.9 *4*. α(K)(E2)=0.303 is used as normalization.
159.7 *2*	50 *3*	355.77	(5/2$^-$)	196.08	7/2$^{(-)}$	M1	0.221	α(K)=0.190 *3*; α(L)=0.0249 *4*; α(M)=0.00505 *8*; α(N+..)=0.001175 *17* α(N)=0.001044 *15*; α(O)=0.0001305 *19* Mult.: from α(K)exp=0.20 *2*, K/L≈8.
179.4 *2*	81 *8*	179.44	7/2$^{(+)}$	0	5/2$^{(+)}$	M1	0.1606	α(K)=0.1381 *20*; α(L)=0.0180 *3*; α(M)=0.00366 *6*; α(N+..)=0.000852 *13* α(N)=0.000757 *11*; α(O)=9.47×10^{-5} *14* Mult.: from α(K)exp=0.15 *2*, K/L=7.4 *4*.
196.0 *2*	74 *7*	196.08	7/2$^{(-)}$	0	5/2$^{(+)}$	E1	0.0325	α(K)=0.0281 *4*; α(L)=0.00358 *6*; α(M)=0.000723 *11*; α(N+..)=0.0001662 *24* α(N)=0.0001482 *22*; α(O)=1.80×10^{-5} *3* From α(K)exp=0.030 *3*, K/L=8.2 *9*.
210.1 *2*	22 *2*	449.84	(5/2$^+$)	239.77	(3/2$^+$)	[E2]	0.1360	α(K)=0.1082 *16*; α(L)=0.0221 *4*; α(M)=0.00462

Continued on next page (footnotes at end of table)

^{121}Cs ε decay (155 s) 1991Ge02 (continued)

γ(^{121}Xe) (continued)

E_γ	I_γ [‡#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α [†]	Comments
								7; α(N+..)=0.001032 15 α(N)=0.000929 14; α(O)=0.0001028 15 Mult.: assumed E2 to deduce α.
239.6 2	232 14	239.77	(3/2$^+$)	0	5/2$^{(+)}$	M1	0.0736	α(K)=0.0634 9; α(L)=0.00820 12; α(M)=0.001664 24; α(N+..)=0.000388 6 α(N)=0.000344 5; α(O)=4.31×10^{-5} 7 Mult.: from α(K)exp=0.075 15, K/L=7.5 8.
270.2 2	50 4	449.84	(5/2$^+$)	179.44	7/2$^{(+)}$	M1	0.0536	α(K)=0.0461 7; α(L)=0.00595 9; α(M)=0.001206 17; α(N+..)=0.000281 4 α(N)=0.000250 4; α(O)=3.13×10^{-5} 5 Mult.: from α(K)exp=0.06 2, K/L=9.
273.2 3	5 1	427.12	(3/2$^+$,5/2$^+$)	153.96	(1/2$^+$)			
295.8 2	43 3	449.84	(5/2$^+$)	153.96	(1/2$^+$)	(E2)	0.0438	α(K)=0.0360 5; α(L)=0.00619 9; α(M)=0.001282 19; α(N+..)=0.000290 5 α(N)=0.000260 4; α(O)=2.98×10^{-5} 5 Mult.: from α(K)exp=0.04 1, K/L=5 1.
326.8 2	11 3	682.41		355.77	(5/2$^-$)			
^{x}337.2 3	7 3							
343.2 4	9 2	497.2		153.96	(1/2$^+$)			
355.9 2	70 4	355.77	(5/2$^-$)	0	5/2$^{(+)}$	E1	0.00672 10	α=0.00672 10; α(K)=0.00581 9; α(L)=0.000726 11; α(M)=0.0001464 21; α(N+..)=3.39×10^{-5} 5 α(N)=3.02×10^{-5} 5; α(O)=3.72×10^{-6} 6 Mult.: from α(K)exp=0.007 3.
^{x}361.7 3	6 2							
373.8 3	11 2	553.03		179.44	7/2$^{(+)}$			
380.1 3	8 2	619.91		239.77	(3/2$^+$)			
393.2 3	7 3	946.2		553.03				This γ is placed from 657.6 level in ^{121}Cs ε+β$^+$ decay (122 s).
398.8 3	14 2	553.03		153.96	(1/2$^+$)			
427.1 2	109 7	427.12	(3/2$^+$,5/2$^+$)	0	5/2$^{(+)}$	(M1,E2)	0.0153 13	α(K)=0.0130 12; α(L)=0.00180 3; α(M)=0.000367 6; α(N+..)=8.47×10^{-5} 14 α(N)=7.55×10^{-5} 12; α(O)=9.2×10^{-6} 4 Mult.: (M1,E2)+E0? from α(K)exp=0.023 4, K/L=6 2.
^{x}445.4 3	4 1							
450.1 2	10 3	449.84	(5/2$^+$)	0	5/2$^{(+)}$			This γ is placed from 449.85 and 646.1 levels in ^{121}Cs ε+β$^+$ decay (122 s).
456.6[@] 3	21[@] 3	696.50		239.77	(3/2$^+$)			
456.6[@] 5	10[@] 4	1117.6		661.06				
466.0 3	12 3	619.91		153.96	(1/2$^+$)			
481.6 3	20 4	661.06		179.44	7/2$^{(+)}$			
486.1 3	15 6	682.41		196.08	7/2$^{(-)}$			
497.6 2	29 5	737.44		239.77	(3/2$^+$)			
542.6 2	18 3	696.50		153.96	(1/2$^+$)			
553.0 3	36 5	553.03		0	5/2$^{(+)}$			
558.3 4	10 6	737.44		179.44	7/2$^{(+)}$			
564.5 5	8 3	1117.6		553.03				

Continued on next page (footnotes at end of table)

^{121}Cs ε decay (155 s) 1991Ge02 (continued)

$\gamma(^{121}Xe)$ (continued)

E_γ	I_γ ‡#	E_i(level)	J_i^π	E_f	J_f^π
619.9 *2*	34 *5*	619.91		0	$5/2^{(+)}$
^{x}646.8 *3*	12 *3*				
661.1 *2*	35 *4*	661.06		0	$5/2^{(+)}$
^{x}674.8 *2*	7 *2*				
682.3 *3*	7 *3*	682.41		0	$5/2^{(+)}$
^{x}690.5 *2*	8 *4*				
696.5 *2*	18 *4*	696.50		0	$5/2^{(+)}$
^{x}797.9 *4*	8 *2*				
^{x}841.9 *7*	7 *2*				
^{x}850.5 *3*	10 *3*				
^{x}867.2 *4*	6 *2*				
^{x}881.2 *3*	5 *2*				
^{x}891.6 *3*	7 *2*				
^{x}900.2 *3*	8 *2*				
^{x}905.4 *4*	4 *2*				
^{x}914.3 *3*	10 *2*				
^{x}922.6 *3*	7 *4*				
^{x}936.6 *3*	12 *2*				
^{x}949.2 *3*	8 *3*				
^{x}986.3 *4*	6 *3*				
^{x}1060.3 *4*	8 *3*				
^{x}1076.7 *4*	8 *3*				
^{x}1115.0 *8*	7 *4*				
^{x}1140.3 *4*	30 *5*				
^{x}1179.8 *5*	5 *2*				
^{x}1255.2 *5*	6 *3*				
^{x}1276.4 *6*	10 *3*				
^{x}1396.2 *5*	7 *3*				
^{x}1416.5 *5*	10 *3*				
^{x}1432.7 *5*	40 *6*				
^{x}1458.0 *6*	8 *3*				
^{x}1497.7 *6*	8 *3*				
^{x}1511.1 *6*	8 *3*				

† Normalized to α(K)exp=0.303 for 153.9γ (E2 theory).

‡ Evaluator has removed the contribution from ^{121}Cs ε decay (122 s). Evaluator assumed no direct $\varepsilon+\beta^+$ feeding from ^{121}Cs ε decay (155 s) to the levels at 179.44 keV and 196.081 keV which are strongly fed from ^{121}Cs $9/2^{(+)}$ state, and also assumed no direct $\varepsilon+\beta^+$ feeding from ^{121}Cs ε decay (122 s) to the levels at 153.95 keV, 239.74 keV, 264.5 keV, 427.12 keV and 449.85 keV which are strongly fed from ^{121}Cs $3/2^{(+)}$ state. See ^{121}Cs ε decay (122 s).

For absolute intensity per 100 decays, multiply by 0.033 *15*.

@ Multiply placed with intensity suitably divided.

^{x} γ ray not placed in level scheme.

^{121}Cs ε decay (155 s) 1991Ge02

Decay Scheme

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