^{123}Cs $\varepsilon+\beta^{+}$ decay 1981Ma01,1981So06

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 174,1 (2021)	15-Apr-2021

Parent: ^{123}Cs: E=0.0; J$^{\pi}$=1/2$^{(+)}$; $T_{1/2}$=5.86 min *10*; Q(ε)=4205 *15*; %ε+%β^{+} decay=100

^{123}Cs-J$^{\pi}$,$T_{1/2}$: From Adopted Levels of ^{123}Cs.

^{123}Cs-Q(ε): From 2021Wa16.

1981Ma01: ^{123}Cs source was produced via ^{139}La(p,3p14n) with E=600 MeV proton provided by the CERN synchro-cyclotron and separated by the ISOLDE separator. Separated ions were implanted into an aluminum-coated mylar tape. γ rays were detected with Ge(Li) detectors and conversion electrons were detected with a Si(Li) detector; positrons were detected with a 4$\pi\beta$ plastic scintillator. Measured Eγ, Iγ, $\gamma\gamma$-coin, γ(t), E(ce), I(ce), γ-ce-coin, Eβ^{+}, Iβ^{+}, γ-β^{+}-coin. Deduced levels, J, π, parent $T_{1/2}$, decay branching ratios, log *ft* values, conversion coefficients, γ-ray multipolarities. Systematics of odd-mass Xe nuclei. Comparisons with theoretical calculations.

1981So06: ^{123}Cs source was produced via ^{124}Xe(p,2n) with E=33 MeV proton beam provided by the McGill synchro-cyclotron on ^{124}Xe gas target. γ rays were detected with Ge(Li) (with a positron annihilator of Cu) and an x-ray detectors. Measured Eγ, Iγ, E(x ray), I(x ray), $\gamma\gamma$-coin, Eβ^{+}, Iβ^{+}. Deduced level, J, π, parent $T_{1/2}$, Q-value, log *ft*, conversion coefficients, γ-ray multipolarities.

1987Fr10: ^{123}Cs source was produced by irradiation of a cerium target by 270 MeV ^{3}He beam and separated by the ISOCELE separator at Orsay. γ rays were detected with a plastic scintillator and conversion electrons were detected with a magnetic spectrometer. Measured Eγ, Iγ, E(ce), I(ce), γ-ce-coin, γ-ce(t). Deduced $T_{1/2}$, conversion coefficients, γ-ray multipolarities, transition strengths. Comparisons with theoretical calculations.

1975We23: ^{123}Cs source was produced via La(p,spallation) with 600 MeV proton beam provided from the CERN Synchro-cyclotron. γ rays and positrons were detected with a combination of Ge(Li) and plastic scintillator, respectively, or a combination of NaI(Tl) and Si(Li) detectors. Measured Eγ, Iγ, Eβ^{+}, Iβ^{+}, β^{+}-γ-coin. Deduced decay energies, Q-value.

1966Da09: ^{123}Cs source was produced via In(^{14}N,xn) reaction with E=140 MeV ^{14}N beam provided by the Yale Heavy Ion Accelerator on a natural indium target. γ rays were detected with a Ge(Li) detector and a NaI crystal and positrons were detected with a plastic phosphor. Measured Eγ, Iγ, E(x ray), I(x ray), Eβ^{+}, Iβ^{+}, $\gamma\gamma$-coin, $\beta\gamma$-coin, $\beta\gamma$(t). Deduced levels, J, π, parent $T_{1/2}$, β^{+}-decay branchings, log *ft*, γ-ray conversion coefficients.

Others:

1996Os04, measured Q-value=4110 *30* 1975LyZY,

1980KaZB: measured I(ce). Deduced J, γ-ray multipolarity.

1977KoYL: La(p,spallation) E=635 MeV. Measured Eγ, Iγ, $\gamma\gamma$(t).

1975LyZY: measured I(ce). Deduced levels, J, π.

Additional information 1.

Decay scheme is that proposed by 1981Ma01 and 1981So06 on the basis of Eγ sums and $\gamma\gamma$-coin. There are major differences in the two level schemes. The level scheme is incomplete due to a large gap of about 3 MeV between Q-value and the highest populated level at 1453.

^{123}Xe Levels

E(level)†	J$^{\pi}$‡	$T_{1/2}$‡	Comments
0.0	1/2$^{(+)}$	2.050 h *14*	
97.38 *3*	3/2$^{(+)}$	380 ps *30*	$T_{1/2}$: adopted value from ce-γ-coin in 1987Fr10. Other: <9 ns (1966Da09).
180.75 *4*	5/2$^{(+)}$#	2.5 ns *2*	$T_{1/2}$: adopted value from ce-γ-coin in 1987Fr10.
252.01 *5*	(7/2^{+})#		
307.11 *7*	5/2$^{(+)}$#		
437.48 *21*	7/2$^{(+)}$#		
442.58 *9*	(1/2^{+},3/2^{+})		
585.75 *12*	(3/2^{+})		
596.60 *9*	(1/2^{+},3/2^{+})		
611.09 *8*	(1/2^{+},3/2^{+})		
693.74 *17*	(1/2,3/2)		

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^{123}Cs $\varepsilon+\beta^+$ decay 1981Ma01,1981So06 (continued)

^{123}Xe Levels (continued)

E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡
741.47 *6*	(1/2+,3/2+)	917.42 *21*	(3/2+)	1125.73 *19*	(1/2+,3/2)
848.42 *11*	(1/2+,3/2)	1032.37 *24*	(1/2+,3/2)	1273.28 *18*	(1/2,3/2)
				1452.84 *14*	(1/2,3/2)

† From a least-squares fit to γ-ray energies.
‡ From Adopted Levels. Values from this study are adopted in Adopted Levels where noted, or given in comments if different.
\# (1/2,3/2) proposed in 1981Ma01 and/or 1981So06 based on log *ft* values, which however should be considered as approximate due to incomplete decay scheme.

ε,β^+ radiations

I($\varepsilon+\beta^+$) and log *ft* values should be considered as approximate since the decay scheme is incomplete.

E(decay)	E(level)	Iβ+ ‡	Iε‡	Log *ft*	I(ε+β+)†‡	Comments
(2752 *15*)	1452.84	0.65 *15*	1.1 *3*	6.0 *1*	1.8 *4*	av Eβ=776.2 *68*; εK=0.545 *6*; εL=0.0730 *8*; εM+=0.01983 *20*
(2932 *15*)	1273.28	2.1 *5*	2.6 *6*	5.7 *1*	4.7 *11*	av Eβ=857.5 *68*; εK=0.482 *6*; εL=0.0644 *7*; εM+=0.01749 *19*
(3079 *15*)	1125.73	0.79 *15*	0.81 *15*	6.2 *1*	1.6 *3*	av Eβ=924.5 *69*; εK=0.432 *5*; εL=0.0577 *7*; εM+=0.01568 *18*
(3173 *15*)	1032.37	0.29 *6*	0.26 *6*	6.7 *1*	0.55 *12*	av Eβ=967.1 *69*; εK=0.403 *5*; εL=0.0538 *7*; εM+=0.01460 *17*
(3288 *15*)	917.42	0.15 *5*	0.12 *4*	7.1 *2*	0.27 *9*	av Eβ=1019.7 *69*; εK=0.369 *5*; εL=0.0492 *6*; εM+=0.01336 *16*
(3357 *15*)	848.42	1.8 *4*	1.2 *2*	6.1 *1*	3.0 *6*	av Eβ=1051.4 *69*; εK=0.350 *4*; εL=0.0466 *6*; εM+=0.01266 *15*
(3464 *15*)	741.47	3.8 *6*	2.3 *4*	5.9 *1*	6.1 *10*	av Eβ=1100.5 *69*; εK=0.322 *4*; εL=0.0429 *5*; εM+=0.01164 *14* E(decay): Eβ+=2.5×10³ *10* (1975We23), in coincidence with 742γ .
(3511 *15*)	693.74	0.73 *13*	0.42 *8*	6.6 *1*	1.15 *21*	av Eβ=1122.5 *70*; εK=0.310 *4*; εL=0.0413 *5*; εM+=0.01121 *14*
(3594 *15*)	611.09	3.0 *5*	1.6 *2*	6.1 *1*	4.6 *7*	av Eβ=1160.6 *70*; εK=0.291 *4*; εL=0.0387 *5*; εM+=0.01051 *13* E(decay): Eβ+=2.79×10³ *41* (1975We23), in coincidence with 611γ .
(3608 *15*)	596.60	8.3 *11*	4.2 *6*	5.6 *1*	12.5 *17*	av Eβ=1167.3 *70*; εK=0.287 *4*; εL=0.0383 *5*; εM+=0.01039 *13* E(decay): Eβ+=2.37×10³ *14* (1981So06), 2.54×10³ *26* (1975We23), in coincidence with 597γ .
(3619 *15*)	585.75	0.56 *9*	0.28 *5*	6.8 *1*	0.84 *14*	av Eβ=1172.3 *70*; εK=0.285 *4*; εL=0.0379 *5*; εM+=0.01030 *13*
(3762 *15*)	442.58	2.3 *4*	0.98 *18*	6.3 *1*	3.3 *6*	av Eβ=1238.6 *70*; εK=0.255 *3*; εL=0.0339 *4*; εM+=0.00921 *11*
(3768 *15*)	437.48	0.21 *8*	0.09 *3*	7.3 *2*	0.30 *11*	av Eβ=1240.9 *70*; εK=0.254 *3*; εL=0.0338 *4*; εM+=0.00917 *11*
(3898 *15*)	307.11	1.1 *4*	0.40 *16*	6.7 *2*	1.5 *6*	av Eβ=1301.4 *70*; εK=0.230 *3*; εL=0.0305 *4*; εM+=0.00829 *10*
(3953 *15*)	252.01	0.7 *3*	0.2 *1*	7.0 *2*	0.9 *4*	av Eβ=1327.0 *70*; εK=0.220 *3*; εL=0.0293 *4*; εM+=0.00795 *10*
(4024 *15*)	180.75	3.8 *8*	1.2 *2*	6.3 *1*	5.0 *10*	av Eβ=1360.1 *70*; εK=0.2086 *24*; εL=0.0277 *4*; εM+=0.00753 *9*

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^{123}Cs ε+β^+ decay 1981Ma01,1981So06 (continued)

ϵ,β^+ radiations (continued)

E(decay)	E(level)	$I\beta^+$ ‡	$I\varepsilon$‡	Log *ft*	$I(\varepsilon+\beta^+)$†‡	Comments
(4108 *15*)	97.38	14.5 *19*	4.3 *6*	5.7 *1*	18.8 *24*	av Eβ=1399.0 *70*; εK=0.1959 *23*; εL=0.0260 *3*; εM+=0.00707 *8* E(decay): Eβ+=2.99×10^3 *31* (in coincidence with 100γ) (1975We23). I(ε+β$^+$): others: 26 *3* from 1966Da09, determined by correlating, through the radioactive decay parent-grand-daughter relationships, the yield of the 97-keV transition and the total yield of the well-studied isobaric grand-daughter ^{123}I with appropriate corrections for known fluorescence yields and theoretical K/L ratio; 1966Da09 then tentatively assign the rest 74% *3* to the g.s. feeding, without considering possible feedings to higher-energy excited states which are proposed in later studies but not in 1966Da09. A value of 12.5 *6* is reported in 1981So06, based on their measured total positron intensity of 650 *100* relative to Iγ=100 for 97.4γ and γ+ce feedings to 97.4 level, with their measured α(K)exp=0.9 *1* for 97.4γ; based on this branching to 97.4 level and total γ+ce feedings to ground state, 1981So06 deduce 62% *14* branching to g.s. Measured K-capture to positron ratio=0.505 *40* (1966Da09).
(4205 *15*)	0.0	26 *6*	7.0 *15*	5.5 *1*	33 *7*	av Eβ=1444.5 *70*; εK=0.1822 *21*; εL=0.0242 *3*; εM+=0.00657 *8* I(ε+β$^+$): from 1981Ma01, deduced from total γ+ce feedings to ground state and total number of positrons with tabulated data of capture to β$^+$ ratios of allowed decays (1971Go40). This value should be considered as approximate because of incomplete decay scheme and also because of assumptions of capture to β$^+$ ratios. Others: 62 *14* (1981So06), ≈74 *3* (1966Da09); see comments for the feeding to 97.4 level.

† From γ+ce intensity balance at each level, unless otherwise noted. The quoted values should be considered as approximate due to incomplete decay scheme. Large discrepancies exist between values from 1981Ma01 and 1981So06. See detailed comments at branches.

‡ Absolute intensity per 100 decays.

γ(^{123}Xe)

Iγ normalization: From ΣI(γ+ce to g.s.)=100−%I(ε+β^+)(g.s.), with the latter=33% *7* from 1981Ma01. This normalization should be considered as approximate due to incomplete decay scheme.

I(K x rays)/Iγ(97γ)=1.6 *3* (1981Ma01).

α(K)exp values given under comments are from 1981Ma01, normalized to α(K)(theory) for the 322.4 E2 transition in ^{120}Cs decay.

E_γ ‡	I_γ ‡&	E_i(level)	J^π_i	E_f	J^π_f	Mult. @	δ @	α †	Comments
71.26 *3*	1.7 *5*	252.01	(7/2$^+$)	180.75	5/2$^{(+)}$	(M1+E2)	−0.02 *5*	2.17 *4*	%Iγ=0.35 *11* α(K)=1.86 *3*; α(L)=0.248 *10*; α(M)=0.0504 *21* α(N)=0.0104 *4*; α(O)=0.00130 *4* E_γ: weighted average of 71.5 *3* from 1981Ma01 and 71.26 *3* from 1981So06. I_γ: unweighted average of 2.2 *4* from 1981Ma01 and 1.2 *1* from 1981So06.
83.38 *2*	20.4 *12*	180.75	5/2$^{(+)}$	97.38	3/2$^{(+)}$	M1		1.380	%Iγ=4.2 *5* α(K)=1.184 *17*; α(L)=0.1567 *22*; α(M)=0.0319 *5* α(N)=0.00659 *10*; α(O)=0.000821 *12* E_γ: weighted average of 83.3 *1* from 1981Ma01 and 83.38 *2* from 1981So06. I_γ: weighted average of 18.0 *20* from 1981Ma01 and 21 *1* from 1981So06. Mult.: supported by ce(K)/ce(L+M+N)=7.2 *8* (1987Fr10), α(K)exp=1.30 *6* (1981So06), α(K)exp=1.3 *3*, α(L)exp=0.22 *6*, α(M)=0.033 *8* (1981Ma01). δ(E2/M1)<0.17 calculated using BrIccMixing based on all ce data above.
97.38 *3*	100	97.38	3/2$^{(+)}$	0.0	1/2$^{(+)}$	M1		0.885	%Iγ=20.5 *22* α(K)=0.760 *11*; α(L)=0.1003 *14*; α(M)=0.0204 *3* α(N)=0.00422 *6*; α(O)=0.000526 *8* E_γ: weighted average of 97.3 *1* from 1981Ma01 and 97.39 *3* from 1981So06. Other: 100 *1* (1975We23). Mult.: supported by ce(K)/ce(L+M+N)=6.8 *7* (1987Fr10), α(K)exp=0.9 *1* (1981So06), α(K)exp=0.74 *15*, α(L)exp=0.13 *4*, α(M)exp=0.029 *10* (1981Ma01), α(K)exp=0.80 *2* (1966Da09). δ(E2/M1)<0.2 calculated using BrIccMixing based on all ce data above.
130.3 *2*	0.40 *6*	741.47	(1/2$^+$,3/2$^+$)	611.09	(1/2$^+$,3/2$^+$)	[M1,E2]		0.55 *17*	%Iγ=0.081 *15* α(K)=0.43 *10*; α(L)=0.10 *6*; α(M)=0.021 *12* α(N)=0.0042 *24*; α(O)=0.00045 *23*
154.8 *3*	0.3 *1*	848.42	(1/2$^+$,3/2)	693.74	(1/2,3/2)	[M1,E2]		0.31 *8*	%Iγ=0.061 *22* α(K)=0.25 *5*; α(L)=0.051 *24*; α(M)=0.011 *6* α(N)=0.0021 *10*; α(O)=0.00024 *10*

$^{123}_{54}Xe_{69}$-4

γ(^{123}Xe) (continued)

E_γ[‡]	I_γ[‡&]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[@]	α[†]	Comments
180.64 *14*	3.0 *3*	180.75	5/2$^{(+)}$	0.0	1/2$^{(+)}$	E2	0.228	%Iγ=0.61 *9* α(K)=0.178 *3*; α(L)=0.0400 *6*; α(M)=0.00840 *12* α(N)=0.001684 *25*; α(O)=0.000183 *3* E_γ: unweighted average of 180.5 *1* from 1981Ma01 and 180.77 *3* from 1981So06. Other: 177 *1* (1975We23). I_γ: weighted average of 2.8 *5* from 1981Ma01 and 3.1 *3* from 1981So06. Mult.: α(K)exp=0.17 *4* (1981Ma01) and ce(K)(97.4γ)/ce(K)(180.6γ)=30 *10* (1987Fr10) give M1,E2 (1981Ma01).
[x]191.5 *2*	0.6 *1*							%Iγ=0.122 *25*
209.6 *2*	0.9 *1*	307.11	5/2$^{(+)}$	97.38	3/2$^{(+)}$	E2,M1	0.121 *16*	%Iγ=0.18 *3* α(K)=0.100 *10*; α(L)=0.017 *6*; α(M)=0.0035 *12* α(N)=0.00072 *23*; α(O)=8.3$\times10^{-5}$ *21* E_γ: weighted average of 209.5 *2* from 1981Ma01 and 209.7 *2* from 1981So06. I_γ: weighted average of 0.9 *1* from 1981Ma01 and 0.7 *2* from 1981So06. Mult.: from α(K)exp=0.14 *6* (1981Ma01).
[x]234.2 *3*	0.45 *5*							%Iγ=0.092 *14*
237.6 *3*	1.3 *9*	848.42	(1/2$^+$,3/2)	611.09	(1/2$^+$,3/2$^+$)	[M1,E2]	0.083 *8*	%Iγ=0.26 *19* α(K)=0.069 *4*; α(L)=0.011 *3*; α(M)=0.0023 *6* α(N)=0.00047 *12*; α(O)=5.5$\times10^{-5}$ *11* E_γ: weighted average of 237.4 *3* from 1981Ma01 and 238.0 *5* from 1981So06. I_γ: unweighted average of 0.45 *5* from 1981Ma01 and 2.2 *6* from 1981So06.
251.8 *2*	0.38 *4*	848.42	(1/2$^+$,3/2)	596.60	(1/2$^+$,3/2$^+$)	[M1,E2]	0.069 *5*	%Iγ=0.077 *12* α(K)=0.0578 *25*; α(L)=0.0092 *20*; α(M)=0.0019 *5* α(N)=0.00038 *9*; α(O)=4.5$\times10^{-5}$ *8*
252.0[#a] *5*	2.2[#] *6*	252.01	(7/2$^+$)	0.0	1/2$^{(+)}$			%Iγ=0.44 *13* E_γ,I_γ: this quoted intensity from Table IV of 1981So06 is inconsistent I(252γ)/I(71γ)=0.23/0.41 in Fig.11. Also, this γ is seen neither by 1981Ma01 and in other studies. So the placement of this γ is considered as questionable by the evaluator and is not included in Adopted Gammas.
261.8 *1*	11.3 *18*	442.58	(1/2$^+$,3/2$^+$)	180.75	5/2$^{(+)}$	M1,E2	0.062 *4*	%Iγ=2.3 *5* α(K)=0.0516 *17*; α(L)=0.0081 *16*; α(M)=0.0017 *4* α(N)=0.00034 *7*; α(O)=4.0$\times10^{-5}$ *6* E_γ: weighted average of 261.7 *1* from 1981Ma01 and 261.9 *1* from

$\gamma(^{123}Xe)$ (continued)

E_γ[‡]	I_γ[‡&]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[@]	α[†]	Comments
								1981So06. I_γ: unweighted average of 9.5 *10* from 1981Ma01 and 13 *1* from 1981So06. Mult.: from α(K)exp=0.050 *8*, α(L)exp=0.006 *2* (1981Ma01).
278.0[#] *5*	1.1[#] *4*	1125.73	(1/2$^+$,3/2)	848.42	(1/2$^+$,3/2)			%Iγ=0.22 *9* E_γ,I_γ: other: a 278.3 *3* with Iγ=0.25 *5* not placed in 1981Ma01.
^{x}286.1 *2*	0.8 *1*							%Iγ=0.16 *3*
^{x}294.5 *2*	1.0 *6*							%Iγ=0.20 *13* E_γ: other: 294.5 *5* (1981So06). I_γ: unweighted average of 0.4 *1* from 1981Ma01 and 1.6 *4* from 1981So06.
304.0 *1*	3.4 *8*	611.09	(1/2$^+$,3/2$^+$)	307.11	5/2$^{(+)}$	M1,E2	0.0397 *7*	%Iγ=0.69 *18* α(K)=0.0335 *7*; α(L)=0.0050 *7*; α(M)=0.00102 *14* α(N)=0.00021 *3*; α(O)=2.50$\times10^{-5}$ *22* E_γ: from 1981So06. Other: 304.0 *2* (1981Ma01). I_γ: weighted average of 3.0 *5* from 1981Ma01 and 5 *1* from 1981So06. Mult.: from α(K)exp=0.033 *10* (1981Ma01).
307.1 *1*	20.2 *16*	307.11	5/2$^{(+)}$	0.0	1/2$^{(+)}$	E2	0.0388	%Iγ=4.1 *6* α(K)=0.0320 *5*; α(L)=0.00542 *8*; α(M)=0.001121 *16* α(N)=0.000228 *4*; α(O)=2.62$\times10^{-5}$ *4* E_γ: weighted average of 307.0 *1* from 1981Ma01 and 307.1 *1* from 1981So06. Other: 306 *1* (1975We23). I_γ: weighted average of 17.0 *20* from 1981Ma01 and 21 *1* from 1981So06. Mult.: α(K)exp=0.037 *6*, α(L)exp=0.005 *2* (1981Ma01) give M1,E2.
333.7 *2*	1.0 *2*	585.75	(3/2$^+$)	252.01	(7/2$^+$)			%Iγ=0.20 *5*
340.1 *2*	1.4 *2*	437.48	7/2$^{(+)}$	97.38	3/2$^{(+)}$	E2	0.0281	%Iγ=0.29 *5* α(K)=0.0233 *4*; α(L)=0.00380 *6*; α(M)=0.000785 *11* α(N)=0.0001595 *23*; α(O)=1.85$\times10^{-5}$ *3*
344.5[#a] *5*	3.4[#] *9*	596.60	(1/2$^+$,3/2$^+$)	252.01	(7/2$^+$)			%Iγ=0.69 *20* E_γ: could be the same as 345.3γ, placed from 442 level in 1981Ma01 and other studies. This placement by 1981So06 is considered as questionable by the evaluator and is not included in Adopted Gammas.
345.3 *2*	1.1 *2*	442.58	(1/2$^+$,3/2$^+$)	97.38	3/2$^{(+)}$			%Iγ=0.22 *5*
^{x}353.5 *2*	0.5 *1*							%Iγ=0.102 *23*
^{x}361.4 *2*	1.1 *2*							%Iγ=0.22 *5*
405.0 *2*	1.6 *3*	585.75	(3/2$^+$)	180.75	5/2$^{(+)}$			%Iγ=0.33 *7* 1981So06 place a γ of E=405.0 *5* from the 848 level, with Iγ=1.1 *2*. See comments for that γ.
405.0[#a] *5*	1.1[#] *2*	848.42	(1/2$^+$,3/2)	442.58	(1/2$^+$,3/2$^+$)			%Iγ=0.22 *5*

$\gamma(^{123}$Xe) (continued)

E_γ [‡]	I_γ [‡&]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [@]	α [†]	Comments
								Placed by 1981So06, listed as seen in coincidence with 261.8γ in Table V. But a peak at this energy is barely seen in the coincidence spectrum of 261.8γ in Fig.8 of 1981So06. 1981Ma01 place a γ of E=405.0 *2* from the 586 level with Iγ=1.6, and this γ is listed as seen in coincidence with 83.4γ and 97.4γ, but not with 261.8γ. 2001Ga25 in ^{123}Te(^{3}He,3nγ) also place a 405.1γ from the 586 level but not from the 848 level. So the placement by 1981So06 is considered as questionable (by the evaluator) and this γ could be the same γ seen from 586 level in 1981Ma01 and 2001Ga25.
422.0[#] *5*	0.7[#] *3*	1032.37	(1/2$^+$,3/2)	611.09	(1/2$^+$,3/2$^+$)			%Iγ=0.14 *7*
430.5 *2*	1.0 *2*	611.09	(1/2$^+$,3/2$^+$)	180.75	5/2$^{(+)}$			%Iγ=0.20 *5* E$_\gamma$: weighted average of 430.6 *2* from 1981Ma01 and 430.0 *5* from 1981So06. I$_\gamma$: weighted average of 1.1 *2* from 1981Ma01 and 0.8 *2* from 1981So06.
434.3 *1*	4.7 *6*	741.47	(1/2$^+$,3/2$^+$)	307.11	5/2$^{(+)}$	M1,E2	0.0146 *13*	%Iγ=0.96 *16* α(K)=0.0125 *12*; α(L)=0.00172 *3*; α(M)=0.000350 *5* α(N)=7.20$\times10^{-5}$ *13*; α(O)=8.8$\times10^{-6}$ *4* E$_\gamma$: other: 434.3 *2* (1981So06). I$_\gamma$: other: 4.7 *7* (1981So06). Mult.: from α(K)exp=0.014 *5* (1981Ma01).
437.2[a] *2*	1.7 *3*	437.48	7/2$^{(+)}$	0.0	1/2$^{(+)}$			%Iγ=0.35 *8* E$_\gamma$: seen and placed only by 1981Ma01, with J(437)=(1/2,3/2). But the adopted J^π(437)=7/2$^{(+)}$ would require Mult=M3 for this transition to 1/2$^{(+)}$ ground state, which is very unlikely since it would require an isomeric T$_{1/2}$>2 ms for the 437 level in order for B(M3)(W.u.) not to exceed RUL=10. So this placement is considered as questionable by the evaluator and this γ is not included in Adopted Gammas.
442.6 *2*	2.9 *4*	442.58	(1/2$^+$,3/2$^+$)	0.0	1/2$^{(+)}$			%Iγ=0.59 *11*
^{x}447.1 *3*	0.5 *1*							%Iγ=0.102 *23*
^{x}484.7 *2*	2.9 *4*							%Iγ=0.59 *11*
488.4 *2*	1.5 *3*	585.75	(3/2$^+$)	97.38	3/2$^{(+)}$			%Iγ=0.31 *7*
499.2 *2*	6.2 *8*	596.60	(1/2$^+$,3/2$^+$)	97.38	3/2$^{(+)}$	E2,M1	0.0101 *11*	%Iγ=1.26 *21* α(K)=0.0086 *11*; α(L)=0.00116 *6*; α(M)=0.000237 *11* α(N)=4.88$\times10^{-5}$ *25*; α(O)=6.0$\times10^{-6}$ *5* E$_\gamma$: weighted average of 499.3 *1* from 1981Ma01 and 498.9 *2* from 1981So06. I$_\gamma$: weighted average of 6.2 *8* from 1981Ma01 and 6 *2* from 1981So06. Mult.: from α(K)exp=0.007 *3* (1981Ma01).
513.6 *4*	≈7.0	611.09	(1/2$^+$,3/2$^+$)	97.38	3/2$^{(+)}$			%Iγ=1.4 *8*

$^{123}_{54}$Xe$_{69}$-7

γ(^{123}Xe) (continued)

E_γ[‡]	I_γ[‡&]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[@]	α[†]	Comments
								I_γ: Masked by the strong 511-keV line. Iγ estimated from ce spectrum by assuming mult=M1,E2 (1981Ma01).
541.0 *5*	2.9 *11*	848.42	(1/2$^+$,3/2)	307.11	5/2$^{(+)}$			%Iγ=0.59 *23* E_γ: unweighted average of 541.5 *2* from 1981Ma01 and 540.5 *5* from 1981So06. I_γ: unweighted average of 1.8 *3* from 1981Ma01 and 4 *1* from 1981So06.
^{x}553.1 *3*	0.3 *1*							%Iγ=0.061 *22*
^{x}573.6 *4*	1.0 *3*							%Iγ=0.20 *7*
596.6 *1*	55 *5*	596.60	(1/2$^+$,3/2$^+$)	0.0	1/2$^{(+)}$	M1,E2	0.0064 *9*	%Iγ=11.2 *15* α(K)=0.0055 *8*; α(L)=0.00072 *7*; α(M)=0.000147 *13* α(N)=3.0×10^{-5} *3*; α(O)=3.7×10^{-6} *4* E_γ: weighted average of 596.7 *1* from 1981Ma01 and 596.4 *2* from 1981So06. Other: 598 *1* (1975We23). I_γ: weighted average of 45 *6* from 1981Ma01 and 57 *3* from 1981So06. Mult.: from α(K)exp=0.006 *2* (1981Ma01).
610.3[#] *2*	1.3[#] *4*	917.42	(3/2$^+$)	307.11	5/2$^{(+)}$			%Iγ=0.26 *9*
611.1 *2*	15.4 *19*	611.09	(1/2$^+$,3/2$^+$)	0.0	1/2$^{(+)}$			%Iγ=3.1 *5* E_γ: weighted average of 611.2 *2* from 1981Ma01 and 610.9 *2* from 1981So06. Other: 612 *1* (1975We23). I_γ: weighted average of 14.0 *20* from 1981Ma01 and 16.7 *19* from 1981So06.
^{x}626.7 *3*	0.5 *1*							%Iγ=0.102 *23*
^{x}635.8 *3*	0.3 *1*							%Iγ=0.061 *22*
644.1 *1*	12.5 *25*	741.47	(1/2$^+$,3/2$^+$)	97.38	3/2$^{(+)}$			%Iγ=2.5 *6* E_γ: weighted average of 644.2 *2* from 1981Ma01 and 644.1 *1* from 1981So06. Other: 645 *1* (1975We23). I_γ: unweighted average of 10.0 *15* from 1981Ma01 and 15 *2* from 1981So06.
667.8 *2*	5.8 *13*	848.42	(1/2$^+$,3/2)	180.75	5/2$^{(+)}$			%Iγ=1.2 *3* E_γ: weighted average of 667.9 *2* from 1981Ma01 and 667.6 *4* from 1981So06. I_γ: unweighted average of 4.5 *7* from 1981Ma01 and 7 *1* from 1981So06.
693.8 *2*	6.0 *8*	693.74	(1/2,3/2)	0.0	1/2$^{(+)}$			%Iγ=1.22 *21* E_γ: weighted average of 693.8 *2* from 1981Ma01 and 693.6 *4* from 1981So06. I_γ: weighted average of 5.7 *8* from 1981Ma01 and 8 *2* from 1981So06.
711.2 *2*	3.0 *10*	1452.84	(1/2,3/2)	741.47	(1/2$^+$,3/2$^+$)			%Iγ=0.61 *22* E_γ: weighted average of 711.4 *2* from 1981Ma01 and 711.0 *2* from 1981So06. I_γ: unweighted average of 2.0 *3* from 1981Ma01 and 4 *1* from 1981So06.
^{x}723.1 *3*	0.5 *1*							%Iγ=0.102 *23*

$^{123}_{54}$Xe$_{69}$-8

γ(^{123}Xe) (continued)

E_γ[‡]	I_γ[‡&]	E_i(level)	J^π_i	E_f	J^π_f	Comments
725.1 3	1.0 2	1032.37	(1/2$^+$,3/2)	307.11	5/2$^{(+)}$	%Iγ=0.20 5 E_γ: weighted average of 725.1 3 from 1981Ma01 and 725.0 5 from 1981So06. I_γ: weighted average of 0.9 2 from 1981Ma01 and 1.3 3 from 1981So06.
741.5 1	15.0 20	741.47	(1/2$^+$,3/2$^+$)	0.0	1/2$^{(+)}$	%Iγ=3.1 5 E_γ: from 1981So06. Other: 741.5 2 (1981Ma01), 743 1 (1975We23). I_γ: weighted average of 13.0 20 from 1981Ma01 and 17 2 from 1981So06.
750.8 2	3.9 3	848.42	(1/2$^+$,3/2)	97.38	3/2$^{(+)}$	%Iγ=0.79 11 E_γ: weighted average of 750.9 3 from 1981Ma01 and 750.7 2 from 1981So06. I_γ: weighted average of 3.5 5 from 1981Ma01 and 4.8 7 from 1981So06.
819.0[#] 5	1.2[#] 6	1125.73	(1/2$^+$,3/2)	307.11	5/2$^{(+)}$	%Iγ=0.24 13
841.8 2	1.6 3	1452.84	(1/2,3/2)	611.09	(1/2$^+$,3/2$^+$)	%Iγ=0.33 7 E_γ: weighted average of 841.9 4 from 1981Ma01 and 841.8 2 from 1981So06. I_γ: weighted average of 1.5 3 from 1981Ma01 and 1.8 5 from 1981So06.
849.0 5	0.8 2	848.42	(1/2$^+$,3/2)	0.0	1/2$^{(+)}$	%Iγ=0.16 5 E_γ: weighted average of 848.9 5 from 1981Ma01 and 849.0 5 from 1981So06. I_γ: weighted average of 0.8 2 from 1981Ma01 and 0.7 4 from 1981So06.
934.7 5	1.0 3	1032.37	(1/2$^+$,3/2)	97.38	3/2$^{(+)}$	%Iγ=0.20 7
945.0[#] 3	1.9[#] 5	1125.73	(1/2$^+$,3/2)	180.75	5/2$^{(+)}$	%Iγ=0.39 11
1125.3[#] 3	3.7[#] 3	1125.73	(1/2$^+$,3/2)	0.0	1/2$^{(+)}$	%Iγ=0.75 10
1176.2[#] 4	9[#] 4	1273.28	(1/2,3/2)	97.38	3/2$^{(+)}$	%Iγ=1.8 9
[x]1189.0 5	1.6 4					%Iγ=0.33 9
[x]1255.8[#] 4	1.6[#] 5					%Iγ=0.33 11
1273.2[#] 2	14[#] 2	1273.28	(1/2,3/2)	0.0	1/2$^{(+)}$	%Iγ=2.9 5
1355.9 5	3.3 8	1452.84	(1/2,3/2)	97.38	3/2$^{(+)}$	%Iγ=0.67 18 E_γ: weighted average of 1356.2 5 from 1981Ma01 and 1355.6 5 from 1981So06. I_γ: weighted average of 3.0 8 from 1981Ma01 and 5 2 from 1981So06.
1453.0[#] 5	1.1[#] 5	1452.84	(1/2,3/2)	0.0	1/2$^{(+)}$	%Iγ=0.22 11

[†] Additional information 2.

[‡] From 1981Ma01, unless otherwise noted. Iγ values from 1981Ma01 relative to Iγ=1000 for 97.3γ have been re-normalized by the evaluator relative to Iγ=100 for 97.3γ. Weighted average is taken where comparable values are also available in 1981So06. The intensity values for weak γ rays are quite different between 1981Ma01 and 1981So06.

[#] From 1981So06.

[@] From Adopted Gammas. Values from this study are deduced based on ce data given under comments and they are also given under comments if different from adopted values.

[&] For absolute intensity per 100 decays, multiply by 0.205 22.

[a] Placement of transition in the level scheme is uncertain.

[x] γ ray not placed in level scheme.

$^{123}_{54}Xe_{69}$-9

^{123}Cs ε decay 1981Ma01,1981So06