^{79}Kr ε decay (35.04 h) 1974Co05,1973Lu07,1970We01

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 135, 193 (2016)	31-May-2016

Parent: ^{79}Kr: E=0.0; J^{π}=1/2$^-$; $T_{1/2}$=35.04 h *10*; Q(ε)=1626 *3*; %ε+%β^+ decay=100.0
^{79}Kr-J^{π},$T_{1/2}$: From ^{79}Kr Adopted Levels.
^{79}Kr-Q(ε): From 2012Wa38.
Other main reference: 1967Ro03.
Others: 1972OhZX, 1970Be79, 1969Be82, 1966La06, 1965Wi13, 1964Bo25, 1963Po13, 1963Ra26.
ce measurements: 1954Th39, 1964Bo25.

^{79}Br Levels

E(level)†	J^{π}‡	$T_{1/2}$	Comments
0.0	3/2$^-$		
217.07 *6*	5/2$^-$	≤0.15 ns	$T_{1/2}$: from 1970Be79, 1969Be82.
261.32 *6*	3/2$^-$	0.13 ns *2*	$T_{1/2}$: from γ(ce)γ(t) (1972OhZX). Others: 0.91 ns *8* ($\gamma\gamma$(t),1970Be79). Value from 1970Be79 is inconsistent with B(E2) (from Coul. ex.) and δ(261γ).
306.52 *7*	1/2$^-$,3/2$^-$		
397.47 *6*	1/2$^-$,3/2$^-$		
523.22 *10*	5/2$^-$		
606.02 *6*	3/2$^-$		
831.94 *6*	1/2$^-$,3/2$^-$		
1112.48 *11*	1/2$^-$,3/2$^-$		
1131.67 *14*	1/2,3/2		
1332.31 *6*	3/2$^-$		
1501.6 *3*	1/2,3/2		
1573.7? *5*	(5/2)$^+$		

† From least-squares fit to Eγ values.
‡ From Adopted Levels.

ε,β^+ radiations

E(β^+) measured by 1966La06, 1964Bo25, 1955Th01, 1954Th39, 1952Be55.
ε(K)/β^+ measured by 1955Ra64, 1954Th39, 1952Be55.
ε(L)/ε(K) measured by 1965Wi13, 1963Dr04, 1955Ra32.
Iβ^+ deduced by 1966La06 from triple coincidences with γ rays and two annihilation quanta.

E(decay)	E(level)	Iβ^+ †	Iε†	Log *ft*	I(ε+β^+)†	Comments
(52‡ *3*)	1573.7?		<0.0005	>7.5	<0.0005	εK=0.814; εL=0.153; εM+=0.032
(124 *3*)	1501.6		0.023 *8*	6.7 *2*	0.023 *8*	εK=0.857; εL=0.119; εM+=0.024
(294 *3*)	1332.31		1.27 *7*	5.76 *4*	1.27 *7*	εK=0.871; εL=0.107; εM+=0.022
(494 *3*)	1131.67		0.069 *8*	7.48 *6*	0.069 *8*	εK=0.875; εL=0.104; εM+=0.021
(514 *3*)	1112.48		0.22 *4*	7.0 *1*	0.22 *4*	εK=0.875; εL=0.104; εM+=0.021
(794 *3*)	831.94		1.80 *12*	6.48 *3*	1.80 *12*	εK=0.877; εL=0.104; εM+=0.021
(1020 *3*)	606.02		12.1 *5*	5.88 *2*	12.1 *5*	εK=0.877; εL=0.102; εM+=0.020
(1103‡ *3*)	523.22		<0.18	>7.8	<0.18	εK=0.877; εL=0.102; εM+=0.020
(1229 *3*)	397.47	0.021 *4*	9.6 *5*	6.14 *3*	9.6 *5*	av Eβ=95 *3*; εK=0.876; εL=0.102; εM+=0.020 Iβ^+=0.015 per 100 decays (1966La06).
(1319 *3*)	306.52	0.005 *2*	0.52 *15*	7.5 *2*	0.52 *15*	av Eβ=134 *3*; εK=0.870; εL=0.101; εM+=0.020
(1365 *3*)	261.32	0.18 *2*	11.6 *5*	6.15 *2*	11.8 *5*	av Eβ=153 *3*; εK=0.865; εL=0.100; εM+=0.020

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^{79}Kr ε decay (35.04 h) 1974Co05,1973Lu07,1970We01 (continued)

ϵ,β^+ radiations (continued)

E(decay)	E(level)	Iβ^+ †	Iε†	Log *ft*	I($\varepsilon+\beta^+$)†	Comments
						E(β^+)=325 *20* (1954Th39). Iβ^+=0.13 per 100 decays (1966La06); relative Iβ^+=9 (1955Th01), 7 (1954Th39).
(1626 *3*)	0.0	6.8 *3*	55.9 *12*	5.62 *12*	62.7 *13*	av Eβ=264 *3*; εK=0.783 *3*; εL=0.0905 *4*; εM+=0.0181 *1* E(β^+)=613 *5* (1964Bo25), 598 *5* (1954Th39), 590 *10* (1952Be55). Iβ^+=7.6 per 100 decays (1966La06). Relative Iβ^+=91 (1955Th01), 93 (1954Th39).

† Absolute intensity per 100 decays.

‡ Existence of this branch is questionable.

$\gamma(^{79}Br)$

Iγ normalization: from absolute γ-ray intensity measurement (1974Co05).

E_γ [†]	I_γ [‡b]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [#]	δ [@]	α [a]	Comments
44.2 *4*	1.7 *2*	261.32	3/2⁻	217.07	5/2⁻	M1		1.15 *4*	α(K)exp=0.85 *17* (1954Th39) α(K)=1.01 *3*; α(L)=0.114 *4*; α(M)=0.0182 *6* α(N)=0.00168 *5*
136.09 *10*	6.7 *9*	397.47	1/2⁻,3/2⁻	261.32	3/2⁻	M1+E2	+0.25 *2*	0.0633 *23*	α(K)exp=0.26 *7* (1954Th39) α(K)=0.0558 *20*; α(L)=0.0064 *3*; α(M)=0.00102 *5* α(N)=9.3×10^{-5} *4* δ: from A_2=+0.006 *6*, A_4=+0.003 *8* for $\gamma\gamma(\theta)$ of 136γ-261γ, assuming δ=−0.04 *5* for 261γ. K/(L+M)=8.6 (1954Th39). Mult.: α(K)exp and K/(L+M) imply almost pure E2 for 136γ, in disagreement with δ=0.25 from $\gamma\gamma(\theta)$.
180.25 *15*	0.8 *4*	397.47	1/2⁻,3/2⁻	217.07	5/2⁻	M1,E2		0.061 *38*	α(K)exp=0.02 *2* (1954Th39) α(K)=0.054 *33*; α(L)=0.0064 *42*; α(M)=1.02×10^{-3} *66* α(N)=9.1×10^{-5} *57*
208.48 *10*	6.1 *4*	606.02	3/2⁻	397.47	1/2⁻,3/2⁻	M1(+E2)	<0.2	0.0171 *9*	α(K)exp=0.014 *3* (1954Th39) α(K)=0.0152 *8*; α(L)=0.00166 *9*; α(M)=0.000263 *15* α(N)=2.45×10^{-5} *13* δ: from A_2=−0.064 *6*, A_4=0.000 *9* for 208γ-398γ (1973Lu07). K/(L+M)=6.9 (1954Th39).
217.07 *10*	18.7 *8*	217.07	5/2⁻	0.0	3/2⁻	M1+E2	+0.08 *3*	0.0149 *3*	α(K)=0.0132 *3*; α(L)=0.00144 *3*; α(M)=0.000229 *5* α(N)=2.13×10^{-5} *5* δ: from $\gamma(\theta)$ in Coul. ex. Ce(K)/Ce(L+M)=10.6 (1954Th39). α(K)=0.013 for this transition used as normalization for other γ-rays.
261.29 *10*	100	261.32	3/2⁻	0.0	3/2⁻	M1+E2	0.13 *2*	0.00948 *16*	α(K)exp=0.0074 *15* (1954Th39) α(K)=0.00841 *15*; α(L)=0.000910 *16*; α(M)=0.000145 *3* α(N)=1.347×10^{-5} *23* δ: from Adopted Gammas. Other: δ=−0.04 *5* from $\gamma\gamma(\theta)$ of 345γ-261γ (1973Lu07), assuming M1 for 345γ. δ must be nonzero since level is populated in Coul. ex. K/(L+M)=8.0 (1954Th39).
280.46 *25*	0.081 *11*	1112.48	1/2⁻,3/2⁻	831.94	1/2⁻,3/2⁻				
299.53 *10*	12.1 *6*	606.02	3/2⁻	306.52	1/2⁻,3/2⁻	M1+E2	0.45 *20*	0.0081 *13*	α(K)exp=0.0072 *15* (1954Th39) α(K)=0.0072 *11*; α(L)=0.00079 *13*; α(M)=0.000125 *20* α(N)=1.16×10^{-5} *18* A_2=+0.008 *11*, A_4=−0.009 *14* for 300γ-307γ (1973Lu07). δ: from α(K)exp (1954Th39). $\gamma\gamma(\theta)$ (1973Lu07) does not give a unique value. K/(L+M)=10.8 (1954Th39).

$^{79}_{35}Br_{44}$-3

γ(^{79}Br) (continued)

E_γ[†]	I_γ[‡b]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	δ[@]	α[a]	Comments
306.47 *10*	20.5 *8*	306.52	1/2⁻,3/2⁻	0.0	3/2⁻	M1+E2[&]	0.11[&] *2*	0.00630 *10*	α(K)exp=0.0064 *12*(1954Th39) α(K)=0.00559 *9*; α(L)=0.000601 *10*; α(M)=9.56×10^{-5} *15* α(N)=8.92×10^{-6} *14* K/(L+M)=9.4 (1954Th39). Mult.: from α(K)exp and Ce(K)/Ce(L+M).
344.71 *10*	1.86 *15*	606.02	3/2⁻	261.32	3/2⁻	(M1)		0.00465	α(K)exp=0.16 *16* (1954Th39) α(K)=0.00413 *6*; α(L)=0.000442 *7*; α(M)=7.03×10^{-5} *10* α(N)=6.57×10^{-6} *10* Mult.: α(K)exp agrees with M1 or E1. But J^π change favors M1. γγ(θ) agrees with pure dipole mult. A_2=+0.135 *28*, A_4=−0.036 *38* for 345γ-261γ (1973Lu07).
388.97 *10*	11.9 *6*	606.02	3/2⁻	217.07	5/2⁻	M1+E2	−0.19 *2*	0.00359 *6*	α(K)exp=0.0037 *7* (1954Th39) α(K)=0.00319 *5*; α(L)=0.000341 *6*; α(M)=5.42×10^{-5} *9* α(N)=5.06×10^{-6} *8* δ: from A_2=−0.001 *21*, A_4=+0.035 *29* for 389γ-217γ(1973Lu07).
397.54 *10*	73.5 *25*	397.47	1/2⁻,3/2⁻	0.0	3/2⁻	M1+E2	−0.35 *4*	0.00361 *9*	α(K)exp=0.0029 *6* (1954Th39) α(K)=0.00321 *8*; α(L)=0.000345 *9*; α(M)=5.48×10^{-5} *13* α(N)=5.10×10^{-6} *12* δ: from γγ(θ) of 209γ-397γ (1973Lu07). K/(L+M)=10.1 (1954Th39).
434.50 *10*	0.31 *4*	831.94	1/2⁻,3/2⁻	397.47	1/2⁻,3/2⁻				
500.7 *7*	0.13 *4*	1332.31	3/2⁻	831.94	1/2⁻,3/2⁻				
506.6 *10*	0.70	1112.48	1/2⁻,3/2⁻	606.02	3/2⁻				
523.2 *2*	1.8 *5*	523.22	5/2⁻	0.0	3/2⁻	M1+E2[&]	+0.26[&] *3*	0.00179	α(K)=0.001593 *25*; α(L)=0.000169 *3*; α(M)=2.69×10^{-5} *5* α(N)=2.52×10^{-6} *4*
525.35 *15*	3.1 *6*	831.94	1/2⁻,3/2⁻	306.52	1/2⁻,3/2⁻				
^{x}538.5 *5*	0.052 *15*								Reported by 1973Lu07 only.
571.1 *6*	0.043 *6*	831.94	1/2⁻,3/2⁻	261.32	3/2⁻				
606.09 *10*	63.9 *16*	606.02	3/2⁻	0.0	3/2⁻	M1+E2[&]	0.30[&] *3*	1.28×10^{-3} *2*	α(K)exp=0.0020 *4* (1954Th39) α(K)=0.001139 *17*; α(L)=0.0001206 *19*; α(M)=1.92×10^{-5} *3* α(N)=1.79×10^{-6} *3* δ: from Coul. ex. and (γ,γ′). K/(L+M)=7.8 (1954Th39).

γ(^{79}Br) (continued)

E_γ[†]	I_γ[‡b]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	δ[@]	α[a]	Comments
614.89 *10*	0.75 *25*	831.94	1/2$^-$,3/2$^-$	217.07	5/2$^-$				
[x]650.89 *15*	0.09 *2*								
715.04 *20*	0.048 *9*	1112.48	1/2$^-$,3/2$^-$	397.47	1/2$^-$,3/2$^-$				
726.56 *20*	0.15 *3*	1332.31	3/2$^-$	606.02	3/2$^-$				
734.12 *20*	0.10 *3*	1131.67	1/2,3/2	397.47	1/2$^-$,3/2$^-$				
809.17 *10*	0.76 *5*	1332.31	3/2$^-$	523.22	5/2$^-$				
831.97 *10*	9.9 *5*	831.94	1/2$^-$,3/2$^-$	0.0	3/2$^-$	M1(+E2)[&]	<0.12[&]	6.21×10^{-4}	α(K)exp=0.00059 *12* (1954Th39) α(K)=0.000553 *8*; α(L)=5.81×10^{-5} *9*; α(M)=9.22×10^{-6} *13* α(N)=8.66×10^{-7} *13*
851.13 *15*	0.30 *3*	1112.48	1/2$^-$,3/2$^-$	261.32	3/2$^-$				
871.2 *5*	0.06 *2*	1131.67	1/2,3/2	261.32	3/2$^-$				
895.5 *4*	0.088 *16*	1112.48	1/2$^-$,3/2$^-$	217.07	5/2$^-$				
914.8 *5*	0.057 *24*	1131.67	1/2,3/2	217.07	5/2$^-$				
934.84 *15*	0.95 *6*	1332.31	3/2$^-$	397.47	1/2$^-$,3/2$^-$	M1,E2		0.00051 *3*	α(K)exp=0.00038 *13* (1964Bo25) α(K)=0.000454 *24*; α(L)=4.8×10^{-5} *3*; α(M)=7.6×10^{-6} *5* α(N)=7.1×10^{-7} *4*
1025.73 *10*	1.19 *8*	1332.31	3/2$^-$	306.52	1/2$^-$,3/2$^-$	M1,E2		4.15×10^{-4} *17*	α(K)exp=0.00036 *12* (1964Bo25) α(K)=0.000369 *15*; α(L)=3.88×10^{-5} *18*; α(M)=6.2×10^{-6} *3* α(N)=5.77×10^{-7} *25*
1070.97 *15*	0.48 *8*	1332.31	3/2$^-$	261.32	3/2$^-$	M1,E2		3.77×10^{-4} *14*	α(K)exp=0.00061 *20* α(K)=0.000336 *12*; α(L)=3.53×10^{-5} *14*; α(M)=5.60×10^{-6} *23* α(N)=5.25×10^{-7} *20*
[x]1076.1 *4*	0.052 *20*								
1104.0 *5*	0.10 *5*	1501.6	1/2,3/2	397.47	1/2$^-$,3/2$^-$				
1112.8 *5*	0.52 *25*	1112.48	1/2$^-$,3/2$^-$	0.0	3/2$^-$				
1115.1 *3*	2.93 *30*	1332.31	3/2$^-$	217.07	5/2$^-$	M1(+E2)	+0.8 *+13−6*	3.45×10^{-4} *10*	α(K)exp=0.00035 *12* (1964Bo25) α(K)=0.000306 *9*; α(L)=3.21×10^{-5} *10*; α(M)=5.10×10^{-6} *16* α(N)=4.78×10^{-7} *14*; α(IPF)=9.7×10^{-7} *14* δ: from A_2=+0.332 *25*, A_4=+0.06 *2* for 1115γ-217γ (1970Be79,1969Be82). In deducing δ evaluators consider A_2 only. A_4=+0.06 does not agree with the required spin sequence.
1131.56 *20*	0.33 *4*	1131.67	1/2,3/2	0.0	3/2$^-$				
1195.3 *4*	0.02 *1*	1501.6	1/2,3/2	306.52	1/2$^-$,3/2$^-$				
1239.2 *10*	0.06 *3*	1501.6	1/2,3/2	261.32	3/2$^-$				
1332.21 *10*	3.39 *24*	1332.31	3/2$^-$	0.0	3/2$^-$	M1,E2		2.70×10^{-4} *9*	α(K)exp=0.00026 *10* (1964Bo25)

$^{79}_{35}$Br$_{44}$-5

^{79}Kr ε decay (35.04 h) 1974Co05,1973Lu07,1970We01 (continued)

γ(^{79}Br) (continued)

E_γ [†]	I_γ [‡b]	E_i(level)	J^π_i	E_f	J^π_f	Comments
						α(K)=0.000212 *5*; α(L)=2.22×10^{-5} *5*; α(M)=3.52×10^{-6} *8* α(N)=3.31×10^{-7} *7*; α(IPF)=3.1×10^{-5} *4*
1501.6 *5*	<0.008	1501.6	1/2,3/2	0.0	$3/2^-$	
1573.7 *5*	<0.004	1573.7?	$(5/2)^+$	0.0	$3/2^-$	

[†] Weighted average of 1974Co05, 1973Lu07, 1970We01, 1967Ro03.
[‡] Weighted average of 1974Co05, 1973Lu07, 1967Ro03.
[#] From ce data (1954Th39,1964Bo25).
[@] Unless otherwise stated, from $\gamma\gamma(\theta)$ (1973Lu07). Data reanalyzed by evaluators. In most cases a double value solution is obtained. The second δ value, however, gives almost pure E2 multipolarity which in the present case is in disagreement with $T_{1/2}$ value obtained from (γ,γ') (1970We01) and Coul. ex. (1967Ro03). Thus, only the lower δ value is adopted.
[&] From (γ,γ') and Coul. ex.
[a] From BrIcc v2.3b (16-Dec-2014) 2008Ki07, “Frozen Orbitals” appr. If No δ(E2/M1) value given, α overlaps values for E2 and M1.
[b] For absolute intensity per 100 decays, multiply by 0.127 *4*.
[x] γ ray not placed in level scheme.

$^{79}_{35}\mathrm{Br}_{44}$-6

^{79}Kr ε decay (35.04 h) 1974Co05,1973Lu07,1970We01

Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays