^{96}Tc $\varepsilon+\beta^+$ decay (4.28 d) 1971Ba59,1970An03

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	D. Abriola(a), A. A. Sonzogni	NDS 109,2501 (2008)	1-Apr-2008

Parent: ^{96}Tc: E=0; $J^\pi=7^+$; $T_{1/2}$=4.28 d *7*; Q(ε)=2973 *5*; %ε+%β^+ decay=100

The decay scheme is from 1971Ba59.

Measured γ, $\gamma\gamma(\theta)$ (1971Ba59,1971Ba52); ce (1970An03); see also 1974Ga14, 1969Ag05, 1968Ag02.

1999Ma54: measured $\gamma\gamma(\theta)$, δ for oriented ^{96}Tc nuclei.

α: Additional information 1.

^{96}Mo Levels

E(level)	J^π†	E(level)	J^π†	E(level)	J^π†	E(level)	J^π†
0	0^+	1625.82 *8*	2^+	1978.39 *7*	3^+	2440.64 *6*	6^+
778.21 *4*	2^+	1628.08 *6*	4^+	2219.25 *8*	4^+	2754.94 *6*	6^+
1497.72 *8*	2^+	1869.52 *5*	4^+	2438.43 *7*	5^+	2875.35 *8*	7^+

† Adopted values.

ε,β^+ radiations

E(decay)	E(level)	Iε‡	Log *ft*	I($\varepsilon+\beta^+$)†‡	Comments
(98 *5*)	2875.35	0.80 *5*	5.62 *7*	0.80 *5*	εK=0.819 *4*; εL=0.146 *3*; εM+=0.0352 *9*
(218 *5*)	2754.94	19.5 *12*	5.03 *4*	19.5 *12*	εK=0.8516 *6*; εL=0.1202 *5*; εM+=0.02820 *12*
(532 *5*)	2440.64	79 *4*	5.239 *25*	79 *4*	εK=0.8641; εL=0.11035 *6*; εM+=0.02556 *2*
(535# *5*)	2438.43	<0.22	>7.8	<0.22	εK=0.8641; εL=0.11032 *6*; εM+=0.02555 *2*

† Deduced from intensity balance.

‡ Absolute intensity per 100 decays.

Existence of this branch is questionable.

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$\gamma(^{96}Mo)$

Iγ normalization: Sum(Iγ to g.s.)=100. I($\varepsilon+\beta^+$)(g.s.) negligible since transition is highly forbidden.

E_γ	I_γ[&]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	δ[‡]	α	Comments
120.3 *5*	0.04 *1*	2875.35	7^+	2754.94	6^+	(M1)		0.151 *3*	α(K)=0.1317 *24*; α(L)=0.0156 *3*; α(M)=0.00279 *5*; α(N)=0.000423 *8*; α(O)=2.34×10^{-5} *5* α(N+..)=0.000447 *9* Mult.: α(K)exp=0.136 *35*.
219.4 *4*	0.04 *1*	2438.43	5^+	2219.25	4^+	M1,E2		0.051 *21*	α(K)=0.044 *18*; α(L)=0.006 *3*; α(M)=0.0010 *5*; α(N)=0.00015 *7*; α(O)=7.2×10^{-6} *25* α(N+..)=0.00016 *8* Mult.: α(K)exp=0.040 *16*.
241.6 *2*	≤0.08	1869.52	4^+	1628.08	4^+	M1+E2	+0.024 *5*	0.0234	α(K)=0.0206 *3*; α(L)=0.00238 *4*; α(M)=0.000426 *6*; α(N)=6.48×10^{-5} *10*; α(O)=3.64×10^{-6} *6* α(N+..)=6.84×10^{-5} *10* Mult.,δ: from Adopted Gammas.
314.27 *5*	2.44 *24*	2754.94	6^+	2440.64	6^+	M1+E2	−0.11 *1*	0.01210	α(K)=0.01063 *15*; α(L)=0.001224 *18*; α(M)=0.000219 *3*; α(N)=3.33×10^{-5} *5*; α(O)=1.87×10^{-6} *3* α(N+..)=3.68×10^{-5} *9* Mult.: α(K)exp=0.0131 *16*, α(L1)exp/α(L2)exp=20.9 *30*, α(L1)exp/α(L3)exp=39 *6*, α(L2)exp/α(L3)exp=1.9 *5*, α(L1)exp/(α(L2)exp+α(L3)exp)=13.7 *20*. Mult.,δ: from 1999Ma54. Ratios of the α(L)exp values were measured by 1969Ag05.
316.50 *6*	1.40 *20*	2754.94	6^+	2438.43	5^+	M1+E2	−0.060 *5*	0.01182	α(K)=0.01038 *15*; α(L)=0.001193 *17*; α(M)=0.000213 *3*; α(N)=3.25×10^{-5} *5*; α(O)=1.83×10^{-6} *3* α(N+..)=3.44×10^{-5} *6* α(K)exp=0.0129 *20*, α(L1)exp/α(L2)exp=25 *4*, α(L1)exp/α(L3)exp>62, α(L2)exp/α(L3)exp>2, α(L1)exp/(α(L2)exp+α(L3)exp)=22 *7*. Mult.,δ: from 1999Ma54. Ratios of the α(L)exp values were measured by 1969Ag05.
349.9 *2*	0.07 *2*	2219.25	4^+	1869.52	4^+				
350.1 *5*	0.02 *1*	1978.39	3^+	1628.08	4^+	M1+E2			α(K)=0.0103 *23*; α(L)=0.0012 *4*; α(M)=0.00022 *6*; α(N)=3.4×10^{-5} *9*; α(O)=1.7×10^{-6} *4* α(N+..)=3.5×10^{-5} *9*
352.5 *3*	0.02 *1*	1978.39	3^+	1625.82	2^+	M1+E2			α(K)=0.0103 *23*; α(L)=0.0012 *4*; α(M)=0.00022 *6*; α(N)=3.4×10^{-5} *9*; α(O)=1.7×10^{-6} *4* α(N+..)=3.5×10^{-5} *9*
371.8 *2*	0.07 *2*	1869.52	4^+	1497.72	2^+	E2		0.01189	α(K)=0.01034 *15*; α(L)=0.001286 *19*; α(M)=0.000230 *4*; α(N)=3.44×10^{-5} *5*

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^{96}Tc $\varepsilon+\beta^+$ decay (4.28 d) 1971Ba59,1970An03 (continued)

$\gamma(^{96}Mo)$ (continued)

E_γ	I_γ[&]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	δ[‡]	α	Comments
									α(O)=1.708×10^{-6} *24*; α(N+..)=3.61×10^{-5} *5* Mult.,δ: from Adopted Gammas.
434.71 *5*	0.75 *5*	2875.35	7$^+$	2440.64	6$^+$	M1+E2[@]	+0.31 *4*	0.00556 *9*	α(K)=0.00489 *8*; α(L)=0.000561 *10*; α(M)=0.0001002 *17*; α(N)=1.522×10^{-5} *25* α(O)=8.54×10^{-7} *13*; α(N+..)=1.61×10^{-5} *3* Mult.: α(K)exp=0.0053 *4*. δ: other: +0.40 *1* or +3.68 *4* (1999Ma54).
460.04 *7*	0.43 *4*	2438.43	5$^+$	1978.39	3$^+$	E2		0.00609 *9*	α(K)=0.00532 *8*; α(L)=0.000643 *9*; α(M)=0.0001151 *17*; α(N)=1.726×10^{-5} *25* α(O)=8.90×10^{-7} *13*; α(N+..)=1.82×10^{-5} *3* Mult.: α(K)exp=0.0054 *17*, E2 taken from spin difference.
481.0 *5*	0.08 *3*	1978.39	3$^+$	1497.72	2$^+$	M1+E2	+0.12 *4*	4.25×10^{-3} *7*	α(K)=0.00374 *6*; α(L)=0.000425 *7*; α(M)=7.59×10^{-5} *12*; α(N)=1.156×10^{-5} *17*; α(O)=6.56×10^{-7} *10* α(N+..)=1.223×10^{-5} *18* Mult.,δ: from Adopted Gammas. δ: other: δ=+0.18 *2* or −15.5 *20* (1999Ma54).
535.78 *8*	0.41 *4*	2754.94	6$^+$	2219.25	4$^+$	E2+M3	−0.10 *3*	0.00412 *18*	α(K)=0.00360 *16*; α(L)=0.000432 *21*; α(M)=7.7×10^{-5} *4*; α(N)=1.16×10^{-5} *6*; α(O)=6.1×10^{-7} *3* α(N+..)=1.04×10^{-5} *11* Mult.,δ: from 1999Ma54.
568.88 *7*	0.92 *6*	2438.43	5$^+$	1869.52	4$^+$	M1+E2	−0.24 *3*	0.00287 *4*	α(K)=0.00253 *4*; α(L)=0.000286 *4*; α(M)=5.12×10^{-5} *8*; α(N)=7.79×10^{-6} *11*; α(O)=4.42×10^{-7} *7* α(N+..)=8.23×10^{-6} *12* Mult.: α(K)exp=0.0024 *5*.
591.3 *6*	0.11 *6*	2219.25	4$^+$	1628.08	4$^+$				
719.5 *2*	0.20 *5*	1497.72	2$^+$	778.21	2$^+$	M1+E2	+0.44 *+3−4*	1.67×10^{-3} *2*	α(K)=0.001472 *21*; α(L)=0.0001661 *24*; α(M)=2.97×10^{-5} *5*; α(N)=4.52×10^{-6} *7*; α(O)=2.56×10^{-7} *4* α(N+..)=4.77×10^{-6} *8* Mult.: α(K)exp=0.0013 *4*. δ: Adopted value, other: δ=+0.13 *3* or δ=+1.6 *1* (1999Ma54).
721.5 *3*	0.12 *5*	2219.25	4$^+$	1497.72	2$^+$	E2		1.71×10^{-3} *2*	α(K)=0.001501 *21*; α(L)=0.0001740 *25*; α(M)=3.11×10^{-5} *5*; α(N)=4.70×10^{-6} *7*; α(O)=2.56×10^{-7} *4* α(N+..)=4.95×10^{-6} *7* Mult.: from Adopted Gammas. if M=E2+M3, δ=−0.03 *3* (1999Ma54).
778.22 *4*	100	778.21	2$^+$	0	0$^+$	E2[@]		1.41×10^{-3} *2*	α(K)=0.001238 *18*; α(L)=0.0001426 *20*; α(M)=2.55×10^{-5} *4*; α(N)=3.86×10^{-6} *6*; α(O)=2.11×10^{-7} *3* α(N+..)=4.07×10^{-6} *6*
812.54 *4*	82.2 *35*	2440.64	6$^+$	1628.08	4$^+$	E2+M3[@]	−0.036 *8*	1.27×10^{-3} *2*	α(K)=0.001119 *16*; α(L)=0.0001286 *19*; α(M)=2.30×10^{-5} *4*;

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^{96}Tc $\varepsilon+\beta^+$ decay (4.28 d) 1971Ba59,1970An03 (continued)

$\gamma(^{96}Mo)$ (continued)

E_γ	I_γ[&]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	δ[‡]	α	Comments
									α(N)=3.48×10^{-6} *5*; α(O)=1.91×10^{-7} *3* α(N+..)=3.65×10^{-6} *6* Mult.,δ: from 1999Ma54.
(847.7 *1*)	0.019[#]	1625.82	2$^+$	778.21	2$^+$				
849.86 *4*	97.8 *38*	1628.08	4$^+$	778.21	2$^+$	E2[@]		1.13×10^{-3} *2*	α(K)=0.000996 *14*; α(L)=0.0001141 *16*; α(M)=2.04×10^{-5} *3*; α(N)=3.09×10^{-6} *5* α(O)=1.706×10^{-7} *24*; α(N+..)=3.26×10^{-6} *5* Mult.: α(K)exp=0.00102 *8*. δ: from Adopted Gammas, other: δ(Q+D)=−0.05 *4* (1999Ma54).
885.40 *20*	0.10 *4*	2754.94	6$^+$	1869.52	4$^+$	E2+M3	−0.10 *3*	0.00107 *4*	α(K)=0.00094 *3*; α(L)=0.000108 *4*; α(M)=1.93×10^{-5} *7*; α(N)=2.93×10^{-6} *11*; α(O)=1.62×10^{-7} *6* α(N+..)=3.09×10^{-6} *11* Mult.,δ: from 1999Ma54.
1091.30 *4*	1.10 *8*	1869.52	4$^+$	778.21	2$^+$	E2+M3	−0.05 *5*	6.41×10^{-4} *21*	α(K)=0.000564 *18*; α(L)=6.37×10^{-5} *22*; α(M)=1.14×10^{-5} *4*; α(N)=1.73×10^{-6} *6*; α(O)=9.7×10^{-8} *4* α(N+..)=1.81×10^{-6} *4* Mult.: α(K)exp=0.00047 *6*. δ: from 1999Ma54.
1126.85 *6*	15.2 *12*	2754.94	6$^+$	1628.08	4$^+$	E2+M3[@]	−0.037 *5*	5.96×10^{-4} *9*	α(K)=0.000523 *8*; α(L)=5.90×10^{-5} *9*; α(M)=1.052×10^{-5} *15*; α(N)=1.599×10^{-6} *23* α(O)=8.99×10^{-8} *13*; α(N+..)=3.10×10^{-6} *10* Mult.,δ: from 1999Ma54.
1200.17 *8*	0.37 *3*	1978.39	3$^+$	778.21	2$^+$	(M1+E2)	+0.89 *10*	5.39×10^{-4} *8*	α(K)=0.000469 *7*; α(L)=5.23×10^{-5} *8*; α(M)=9.33×10^{-6} *14*; α(N)=1.422×10^{-6} *21*; α(O)=8.11×10^{-8} *12* α(N+..)=7.90×10^{-6} *18* Mult.: α(K)exp≈0.0005. δ: from adopted gammas. Other: δ=+0.81 *2* or δ=+2.12 *8* (1999Ma54).
1441.14 *10*	0.054 *6*	2219.25	4$^+$	778.21	2$^+$	E2		4.16×10^{-4} *6*	α(K)=0.000311 *5*; α(L)=3.47×10^{-5} *5*; α(M)=6.18×10^{-6} *9*; α(N)=9.41×10^{-7} *14*; α(O)=5.35×10^{-8} *8* α(N+..)=6.41×10^{-5} *9* Mult.: from Adopted Gammas. if M=E2+M3, δ=−0.08 *7* (1999Ma54).
1497.72 *10*	0.093 *7*	1497.72	2$^+$	0	0$^+$				
(1625.7 *1*)	0.001[#]	1625.82	2$^+$	0	0$^+$	E2		4.12×10^{-4} *6*	α(K)=0.000245 *4*; α(L)=2.72×10^{-5} *4*; α(M)=4.85×10^{-6} *7*; α(N)=7.39×10^{-7} *11*; α(O)=4.22×10^{-8} *6* α(N+..)=0.0001349 *19* Mult.: from Adopted Gammas.

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^{96}Tc $\varepsilon+\beta^+$ decay (4.28 d) 1971Ba59,1970An03 (continued)

$\gamma(^{96}Mo)$ (continued)

† α(K)exp were normalized to α(K)(E2) for 778γ.
‡ From $\gamma\gamma(\theta)$ (1971Ba59) if the 778.2 and 849.9 transitions are E2; δ(849.9) from $\gamma\gamma(\theta)$ in 1974Be03.
# Deduced from intensity balance and γ-branching if Iε=0.
@ From angular distribution of γ from oriented nuclei (1975Sa18).
& For absolute intensity per 100 decays, multiply by 0.9976 *1*.

$^{96}_{42}Mo_{54}$-5

^{96}Tc ε decay (4.28 d) 1971Ba59,1970An03

Decay Scheme

Intensities: Relative I_γ