^{95}Tc ε decay (61 d) 1977Me12,1974An05

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	S. K. Basu, G. Mukherjee, A. A. Sonzogni	NDS 111, 2555 (2010)	30-Jun-2009

Parent: ^{95}Tc: E=38.91 *4*; J$^{\pi}$=1/2$^-$; $T_{1/2}$=61 d *2*; Q(ε)=1691 *5*; %ε+%β^+ decay=96.12 *32*

^{95}Tc-%ε+%β^+ decay: See comment on Iγ normalization.

1970Bo28 measured γ's and $\gamma^{\pm}$'s (Ge(Li)), γ(θ) (NaI,Ge(Li)), γγ-coincidences (NaI,Ge(Li)), γγ(θ,H,t) (NaI), and γγ(t) (scin).

1973Be34 measured γγ(θ) and linear polarization; Ge(Li).

1974An05 measured γ's and γγ-coincidences (Ge(Li)) and β^+'s and ce's; β spectrometer.

1977Me12: see ^{95}Tc ε decay (20.0 h) for experimental details.

1978He21 reevaluated their earlier measurements (1971He20. Ge(Li)) to be consistent with an energy scale based on Eγ(^{198}Au)=411.80441 *108* (1978Ke02) and the fundamental constants of 1973CoTA.

The level scheme is from 1977Me12. It is in good agreement with the results of 1974An05. See 1983Lu03 for other references.

α: Additional information 2.

Additional information 1.

Iγ normalization: Additional information 3.

Iγ normalization,Branching: Additional information 4.

^{95}Mo Levels

E(level)	J$^{\pi}$†	$T_{1/2}$	Comments
0.0	5/2$^+$	stable	
204.1177 *18*	3/2$^+$	751 ps *9*	g=−0.26 *2* (1970Bo28) $T_{1/2}$: weighted av of 742 ps *14* (1958Qu01. γγ(t); NaI), 755 ps *15* (1965Me08. γγ(t); scin) and 756 ps *14* (1970Bo28). g: Niobium-foil source; −0.30 *4* for liquid source.
786.2017 *25*	1/2$^+$		J$^{\pi}$: 1/2$^+$ from γγ(θ) and linear polarization (1973Be34) assuming J(786)=1/2,3/2, J(821)=1/2,3/2,5/2, and J(1039)=1/2,3/2.
820.627 *5*	3/2$^+$		J$^{\pi}$: 3/2$^+$ from γγ(θ) and linear polarization (1973Be34) assuming J(786)=1/2,3/2, J(821)=1/2,3/2,5/2, and J(1039)=1/2,3/2.
1039.270 *4*	1/2$^+$		J$^{\pi}$: 1/2$^+$ from γγ(θ) and linear polarization (1973Be34) assuming J(786)=1/2,3/2, J(821)=1/2,3/2,5/2, and J(1039)=1/2,3/2.
1056.753 *14*	5/2$^+$		
1302.31 *7*	1/2$^+$		
1369.76 *15*	(3/2)		
1426.13 *3*	(5/2)$^+$		
1620.25 *3*	3/2$^+$		
1660.29? *25*	(≤5/2)		

† From the Adopted Levels.

ε,β^+ radiations

E(decay)	E(level)	Iε&	Log *ft*	I(ε+β^+)&	Comments
(70[a] *5*)	1660.29?	0.000005 *4*	11.6† *4*	5.×10^{-6} *4*	εK=0.788 *10*; εL=0.170 *8*; εM+=0.042 *3*
(110 *5*)	1620.25	0.0511 *25*	8.09 *6*	0.0511 *25*	εK=0.826 *3*; εL=0.140 *3*; εM+=0.0336 *6*
(304 *5*)	1426.13	0.00837 *22*	9.36[1u] *4*	0.00837 *22*	εK=0.825 *2*; εL=0.141 *1*; εM+=0.0339 *3*
(360 *5*)	1369.76	0.00018 *6*	11.7† *2*	1.8×10^{-4} *6*	εK=0.860; εL=0.1135 *2*; εM+=0.02639 *5*
(428[a] *5*)	1302.31	0.0013 *7*	11.0† *3*	0.0013 *7*	εK=0.862; εL=0.11193 *12*; εM+=0.02598 *4*
(673 *5*)	1056.753	0.0185 *16*	10.45[1u]† *5*	0.0185 *16*	εK=0.856; εL=0.1165 *2*; εM+=0.0272
(691 *5*)	1039.270	30.1 *5*	7.04 *2*	30.1 *5*	εK=0.866; εL=0.109; εM+=0.0252
(909 *5*)	820.627	5.95 *8*	7.99† *2*	5.95 *8*	εK=0.867; εL=0.108; εM+=0.0249

Continued on next page (footnotes at end of table)

^{95}Tc ε decay (61 d) 1977Me12,1974An05 (continued)

ϵ,β^+ radiations (continued)

E(decay)	E(level)	Iβ^+ [&]	Iε[&]	Log *ft*	I(ε+β^+)[&]	Comments
(944 *5*)	786.2017		38.0 *5*	7.22 *2*	38.0 *5*	εK=0.868; εL=0.1076; εM+=0.0248
1528[‡] *6*	204.1177	0.201[#] *21*	7.48[@] *10*	8.35[†] *2*	7.68 *10*	av Eβ=225.8 *22*; εK=0.8465 *10*; εL=0.10353 *13*; εM+=0.02384 *3*
1732[‡] *6*	0.0	0.242[#] *17*	13.32[@] *9*	9.26[1u] *2*	13.56 *9*	av Eβ=336.8 *23*; εK=0.851; εL=0.106; εM+=0.0246 First-forbidden unique spectrum shape (1974An05).

[†] log $f^{1u}t$≥8.5.
[‡] From Eβ=710 *6* and 506 *6* (1974An05).
[#] From Iβ(to g.s.)/Iβ(to 204)=1.2 *2* and the adopted decay scheme; see the comment on Iγ normalization. Others for Iβ(to g.s.+204): 0.47% *6* (1970Bo28), 0.31% *4* (1974An05), and 0.24% *3* (1977Me12). From $\gamma^{\pm}$ and decay scheme.
[@] From Iβ and theoretical ε/β^+ ratios.
[&] Absolute intensity per 100 decays.
[a] Existence of this branch is questionable.

γ(^{95}Mo)

Iγ normalization: TVI$_\beta$(to g.s), I$_\beta$(to 204), %IT, %ε+%β^+, and the I$_\gamma$-normalization were derived by three TVsomewhat independent methods:
Coincidences shown on the drawing are from 1974An05.
α(K)exp: from 1974An05, except as noted. Values were normalized by assuming α(K)(204γ)=0.046.
α(L)exp,α(M)exp,K/L,K:L:M: from 1977Me12. See also 20-h ^{95}Tc ε decay.

E$_\gamma$[†]	I$_\gamma$[†a]	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$	Mult.	δ[‡]	α[#]	Comments
204.117[@] *2*	1000 *2*	204.1177	3/2$^+$	0.0	5/2$^+$	M1+E2	−0.62[#] *7*	0.052 *3*	α(K)=0.0449 *23*; α(L)=0.0058 *4*; α(M)=0.00103 *7*; α(N)=0.000154 *9*; α(O)=7.5×10^{-6} *4* α(N+..)=0.000161 *10* Mult.: from L1/L23.
218.66 *8*	0.68[&] *3*	1039.270	1/2$^+$	820.627	3/2$^+$	M1+E2[#]	0.73 *5*	0.0449 *15*	α(K)exp=0.040 *1* α(K)=0.0389 *13*; α(L)=0.00499 *19*; α(M)=0.00089 *4*; α(N)=0.000133 *5*; α(O)=6.47×10^{-6} *19* α(N+..)=0.000140 *5* δ: from α(K)exp.
245.83 *9*	0.028 *7*	1302.31	1/2$^+$	1056.753	5/2$^+$				
253.068[@] *4*	9.66 *7*	1039.270	1/2$^+$	786.2017	1/2$^+$	M1		0.0208	α(K)exp=0.0150 *30* α(K)=0.0182 *3*; α(L)=0.00211 *3*; α(M)=0.000378 *6*; α(N)=5.74×10^{-5} *8*; α(O)=3.22×10^{-6} *5* α(N+..)=6.06×10^{-5} *9* δ: 29% E2 admixture (1977Me12) would require α(K)=0.023 in disagreement with α(K)exp=0.0120 *4* (1977Me12). α(K)exp: Unweighted av of 0.0179 *10* (1974An05) and 0.0120 *4* (1977Me12).
263[b]	≤0.002	1302.31	1/2$^+$	1039.270	1/2$^+$				
^{x}291.67 *4*	0.088 *8*								
318.27[b] *10*	0.016 *6*	1620.25	3/2$^+$	1302.31	1/2$^+$				
515.6[b] *4*	0.005 *5*	1302.31	1/2$^+$	786.2017	1/2$^+$				
563.48 *6*	0.15 *2*	1620.25	3/2$^+$	1056.753	5/2$^+$				
582.082[@] *3*	473.7 *8*	786.2017	1/2$^+$	204.1177	3/2$^+$	M1+E2[‡]	+0.266 *+52−40*	0.00273 *4*	α(K)exp=0.00234 *7*; α(L)exp=0.00026 *1* α(K)=0.00240 *4*; α(L)=0.000272 *4*; α(M)=4.85×10^{-5} *8*; α(N)=7.39×10^{-6} *11*; α(O)=4.19×10^{-7} *6* α(N+..)=7.81×10^{-6} *12* α(K)exp: Unweighted av of 0.00241 *10* (1974An05) and 0.00228 *8* (1977Me12).
^{x}589.29 *25*	0.016 *4*								
616.49 *2*	20.3 *2*	820.627	3/2$^+$	204.1177	3/2$^+$	M1+E2[‡]	−2.00 *22*	0.00256 *4*	α(K)exp=0.00234 *9*; α(L)exp=0.00019 *1* α(K)=0.00224 *4*; α(L)=0.000261 *4*; α(M)=4.67×10^{-5}

$\gamma(^{95}Mo)$ (continued)

E_γ[†]	I_γ[†a]	E_i(level)	J^π_i	E_f	J^π_f	Mult.	δ[‡]	α[#]	Comments
									7; α(N)=7.06×10^{-6} *11*; α(O)=3.83×10^{-7} *6* α(N+..)=7.44×10^{-6} *11* E_γ: other: 616.45 *5* (1974An05). α(K)exp: Weighted av of 0.00236 *11* (1974An05) and 0.00231 *12* (1977Me12).
[x]623.29 *15*	0.09 *3*								
786.198[@] *4*	136.9 *7*	786.2017	1/2$^+$	0.0	5/2$^+$				α(K)exp=0.00122 *6*; α(L)exp=0.00014 *1*; α(M)exp=0.007×10^{-3} *1* α(K)exp: Unweighted av of 0.00127 *5* (1974An05) and 0.00116 *4* (1977Me12).
799.60 *15*	0.023 *8*	1620.25	3/2$^+$	820.627	3/2$^+$				
820.624[@] *5*	74.5 *1*	820.627	3/2$^+$	0.0	5/2$^+$				α(K)exp=0.00110 *6*; α(L)exp=0.00014 *2* α(K)exp: Other: 0.00106 (1977Me12).
835.149[@] *5*	421 *3*	1039.270	1/2$^+$	204.1177	3/2$^+$	M1+E2[‡]	+0.038 *19*	0.001191 *17*	α(K)exp=0.00105 *3*; α(L)exp=0.0000152 *8*; α(M)exp=0.046×10^{-3} *2* α=0.001191 *17*; α(K)=0.001049 *15*; α(L)=0.0001174 *17*; α(M)=2.09×10^{-5} *3* α(O)=1.83×10^{-7} *3*; α(N+..)=3.38×10^{-6} α(K)exp: Weighted av of 0.00105 *4* (1974An05) and 0.00105 *4* (1977Me12).
[x]844.1 *7*	0.18 *5*								
852.60 *2*	0.33 *1*	1056.753	5/2$^+$	204.1177	3/2$^+$				
1039.264[@] *6*	43.9 *4*	1039.270	1/2$^+$	0.0	5/2$^+$				α(K)exp=0.00063 *3* α(K)exp: Other: 0.0006 *1* (1977Me12).
1056.79 *2*	0.140 *5*	1056.753	5/2$^+$	0.0	5/2$^+$				
1098[b]	≤0.0003	1302.31	1/2$^+$	204.1177	3/2$^+$				
1165.5[b]	≤0.0015	1369.76	(3/2)	204.1177	3/2$^+$				
1222.00 *3*	0.132 *3*	1426.13	(5/2)$^+$	204.1177	3/2$^+$				α(K)exp=0.00050 *25*
1302[b]	≤0.0003	1302.31	1/2$^+$	0.0	5/2$^+$				
1369.75 *15*	0.0021 *5*	1369.76	(3/2)	0.0	5/2$^+$				
1416.09 *8*	0.029[&] *1*	1620.25	3/2$^+$	204.1177	3/2$^+$				
1426.11 *15*	0.0004 *3*	1426.13	(5/2)$^+$	0.0	5/2$^+$				
1620.20 *4*	0.603 *26*	1620.25	3/2$^+$	0.0	5/2$^+$				α(K)exp=0.00038 *8* I_γ: weighted av of 0.59 *3* (1977Me12) and 0.64 *5* (1974An05).
1660.27[b] *25*	0.00008 *5*	1660.29?	(≤5/2)	0.0	5/2$^+$				

[†] From 1977Me12, except as noted.

[‡] From $\gamma\gamma(\theta)$ and linear polarization (1973Be34) assuming J(786)=1/2,3/2, J(821)=1/2,3/2,5/2, and J(1039)=1/2,3/2, except as noted.

$^{95}_{42}Mo_{53}$-4

γ(^{95}Mo) (continued)

[#] From the adopted gammas.

[@] From 1978He21. Other relatively precise energies are 204.12 *1* (1977Me12) and 204.12 *2* (1974An05), 252.95 *1* (1977Me12) and 253.00 *3* (1974An05), 582.07 *1* (1977Me12), 786.18 *2* (1977Me12) and 786.18 *5* (1974An05), 820.61 *1* (1977Me12), 835.13 *1* (1977Me12), and 1039.25 *2* (1977Me12), respectively.

[&] Iγ(219γ)=1.00 *15* and Iγ(1416γ)=0.07 *2* (1974An05) are discrepant.

[a] For absolute intensity per 100 decays, multiply by 0.0632 *8*.

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

[x] γ ray not placed in level scheme.

$^{95}_{42}Mo_{53}$-5

^{95}Tc ε decay (61 d) 1977Me12,1974An05