^{167}Tm ε decay 1968Fu09,1979ArZU

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 90, 431 (2000)	5-Jul-2000

Parent: ^{167}Tm: E=0.0; $J^\pi=1/2^+$; $T_{1/2}$=9.25 d *2*; Q(ε)=748.4 *15*; %ε decay=100.0

Others: 1955Ne01, 1957Go78, 1957Gr74, 1957Mi01, 1958Be72, 1959Ha09, 1960Na14, 1962Dz03, 1962Gr23, 1962Ko09, 1963Al32, 1965Fu04, 1966Ja16, 1982Ar22, 1982BeYN, 1987BaZB, 1990Mu05, 1991Be15, 1991Mu15, 1996BeZY.

1968Fu09: sources from ^{165}Ho(α,2n); measured Eγ, Iγ (Ge(Li)), delayed (x ray)(ce) coin.

1979ArZU: measured ce data (mag spect).

The decay scheme and most data are from 1968Fu09.

^{167}Er Levels

E(level)	J^π†	$T_{1/2}$	Comments
0.0	$7/2^+$	stable	
207.801 *5*	$1/2^-$	2.269 s *6*	$T_{1/2}$: adopted value.
264.873 *6*	$3/2^-$	1.47 ns *5*	$T_{1/2}$: (x ray)(ce)(t) (1968Fu09); other values: 2.0 ns *5* (1958Be72), 1.46 ns *8* (1966Ja16).
281.3 *7*	$5/2^-$		
346.5 *3*	$5/2^-$		
531.54 *4*	$3/2^+$		

† Adopted values.

ε radiations

ε feedings are from intensity imbalance at each level; no feeding to g.s. is expected, because ΔJ=3.

E(decay)	E(level)	Iε†	Log *ft*	Comments
(216.9 *15*)	531.54	1.64 *23*	7.23 *7*	εK=0.7508 *9*; εL=0.1892 *7*; εM+=0.06005 *24* K-capture probability measurement: 0.755 *28* (1991Be15). εL(exp)/εK(exp)=0.243 *17* (1991Be15), implying Q(ε)=750 *+30−20* (1991Be15 is presumed to supersede 1982BeYN).
(401.9 *15*)	346.5	0.025 *5*	9.39[1u] *9*	εK=0.7259; εL=0.2067 *5*; εM+=0.06736 *18*
(483.5 *15*)	264.873	29 *7*	6.80 *11*	εK=0.8059; εL=0.1487; εM+=0.04536 K-capture probability measurements: 0.813 *30* (1996BeZY), 0.835 *29* (1990Mu05). εL(exp)/εK(exp)=0.180 *16* (1996BeZY).
(540.6 *15*)	207.801	69 *18*	6.53 *12*	εK=0.8098; εL=0.1459; εM+=0.04435

† Absolute intensity per 100 decays.

γ(^{167}Er)

Iγ normalization: From total I(γ+ce) to g.s.=100%; no feeding to g.s. is expected because ΔJ=3.

See 1982Ar22 for L-Auger spectrum.

I(Er Kα x ray)=310, relative to Iγ=10.0 for 531.5γ (1960Na14) (after correction for absorption and assuming ω_K=0.949), compared with I(Er Kα x ray)=466 from decay scheme.

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^{167}Tm ε decay 1968Fu09,1979ArZU (continued)

γ(^{167}Er) (continued)

E_γ †	I_γ †&	E_i(level)	J_i^π	E_f	J_f^π	Mult.	δ	α[a]	Comments
(16.7‡)	#	281.3	5/2−	264.873	3/2−				
57.0723 *12*	29 *5*	264.873	3/2−	207.801	1/2−	M1+E2	0.360 *11*	5.22 *12*	α(L)=4.02 *12*; α(M)=0.94 *3*; α(N+..)=0.261 *8* E_γ: from adopted gammas. I_γ: deduced from Iγ(207.8γ) and Ice(L)(57.1γ): Ice(K)(207.8γ)=18.7 *9*:19.76 *24* (1979ArZU). Mult.,δ: from evaluator's analysis of L1:L2:L3:M1:M2:M3:(M5+M5):N:O=7.3 *6*:5.6 *4*:5.8 *5*:1.5 *2*:1.4 *2*:1.5 *2*:0.04 *2*:1.1 *1*:0.14 *3* (1979ArZU). Consistent with L1:L2:L3=1.00:0.70 *2*:0.855 *22* (1987BaZB). However, α(L)exp=18.3 *7* (1991Mu15) implies δ=2.7 *+6−4*.
(73.8‡)	#	281.3	5/2−	207.801	1/2−	E2		9.8	α(K)=1.94; α(L)=5.99; α(M)=1.45; α(N+..)=0.396 Mult.: from adopted gammas.
207.801 *5*	258 *35*	207.801	1/2−	0.0	7/2+	E3		1.36	α(K)=0.469; α(L)=0.679; α(M)=0.169; α(N+..)=0.0466 E_γ: from adopted gammas. I_γ: 41.6% 7 based on adopted decay scheme normalization. Mult.: from K:L1:L2:L3:M:N:O=19.76 *24*:2.0 *2*:16.7 *17*:10.0 *10*:7.5 *8*:2.0 *3*:0.3 *1* (1979ArZU), L1:L2:L3=1.00:6.3 *4*:4.00 *16* (1987BaZB), and α(K)exp=0.50 *5* (1963Al32, scin), 0.47 *2* (1991Mu15, HPGe).
250.2 *5*	0.014 *3*	531.54	3/2+	281.3	5/2−	[E1]		0.0293	α(K)=0.0247; α(L)=0.00361; α(M)=0.00079; α(N+..)=0.00022
264.9	≤0.46	264.873	3/2−	0.0	7/2+	[M2]		0.85	α(K)=0.677; α(L)=0.133; α(M)=0.0306; α(N+..)=0.0087 E_γ: from 1979ArZU. I_γ: upper limit of 0.46 *6* deduced from Iγ(207.8γ) and Ice(L)(264.9γ)/Ice(K)(207.8γ)≤ 5.1×10^{-4} (1979ArZU).
266.5 *5*	0.014 *3*	531.54	3/2+	264.873	3/2−	E1@		0.0250	α(K)=0.0211; α(L)=0.00306; α(M)=0.00067; α(N+..)=0.00019 α(K)exp≤0.02 (1965Fu04).
323.7 *5*	0.013 *3*	531.54	3/2+	207.801	1/2−	E1@		0.0154	α(K)=0.0130; α(L)=0.00187; α(M)=0.00041; α(N+..)=0.00011 α(K)exp≤0.01 (1965Fu04).
346.5 *3*	0.155 *20*	346.5	5/2−	0.0	7/2+	E1		0.0130	α(K)=0.0110; α(L)=0.00158; α(M)=0.00035 Mult.: from adopted gammas.

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^{167}Tm ε decay 1968Fu09,1979ArZU (continued)

γ(^{167}Er) (continued)

E_γ †	I_γ †&	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α[a]	Comments
531.54 *4*	10.0	531.54	3/2$^+$	0.0	7/2$^+$	E2@	0.0142	α(K)=0.0113; α(L)=0.00218 α(K)exp=0.013 (1965Fu04). E_γ: from adopted gammas.

† From 1968Fu09, except as noted.
‡ Rounded-off value from adopted gammas; transition is expected, but has not been observed, in ^{167}Tm ε decay.
# Negligible; if it is assumed that there is no ε branch, the only feeding into the 281.6 level is from 250.2γ (Iγ=0.014).
@ From Xγ and ceγ coin (1965Fu04).
& For absolute intensity per 100 decays, multiply by 0.161 *22*.
a Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

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Decay Scheme

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