

<sup>149</sup>Tm ε decay (0.9 s) 1987To12

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen		NDS 185, 2 (2022)	23-Aug-2022

Parent: <sup>149</sup>Tm: E=0.0; J<sup>π</sup>=(11/2<sup>-</sup>); T<sub>1/2</sub>=0.9 s 2; Q(ε)=9800 SY; %ε+%β<sup>+</sup> decay=100.0

<sup>149</sup>Tm-Q(ε): 9800 200 (syst,2021Wa16).

<sup>149</sup>Tm-T<sub>1/2</sub>: From γ(t) in 1987To12.

1987To12: <sup>149</sup>Tm ions were produced from <sup>94</sup>Mo(<sup>58</sup>Ni,p2n) with E=259 MeV <sup>58</sup>Ni beam from the Lawrence Berkeley Laboratory SuperHILAC, and mass separated with the OASIS facility online, and collected with a tape system to the counting station. Charged particles were detected with a Si ΔE-E telescope and a plastic scintillator; γ rays were detected with Ge detectors. Measured E<sub>γ</sub>, I<sub>γ</sub>, E(x-ray), I(x-ray), γγ-coin, (x-ray)γ-coin, β-delayed proton spectra, βγ(t). Deduced levels, J<sup>π</sup>, parent T<sub>1/2</sub>.

The decay scheme is incomplete.

<sup>149</sup>Er Levels

E(level)	J <sup>π</sup> †	T <sub>1/2</sub> ‡	Comments
0.0	(1/2 <sup>+</sup> )	4 s 2	
111.3 1	(3/2 <sup>+</sup> )		
741.5	(11/2 <sup>-</sup> )	9.6 s 6	%ε+%β <sup>+</sup> =96.5 7; %IT=3.5 7; %εp=0.18 7 1987To12 estimate that total feeding to this level (direct and indirect) is ≈70%.
907.4 2	(5/2 <sup>+</sup> )		
1066.2 2	(7/2 <sup>-</sup> )		
1482.9 4	(9/2 <sup>-</sup> ,11/2 <sup>-</sup> )		

† Tentative assignments from 1987To12; same in the Adopted Levels.

‡ From the Adopted Levels.

γ(<sup>149</sup>Er)

The decay scheme has not been normalized due to insufficient information about the existence and placement of all the γ rays.

Assumption of ≈70% decay to the 741 level (1987To12) would lead to a normalization factor (i.e. multiplication factor to obtain I<sub>γ</sub>/100 decays) of 0.07. %εp=0.2 +2-1 (1987To12).

E <sub>γ</sub> †	I <sub>γ</sub> †	E <sub>i</sub> (level)	J <sub>i</sub> <sup>π</sup>	E <sub>f</sub>	J <sub>f</sub> <sup>π</sup>	Mult.#	α <sup>@</sup>	Comments
111.3 1	100	111.3	(3/2 <sup>+</sup> )	0.0	(1/2 <sup>+</sup> )	M1	2.094 30	α(K)=1.757 25; α(L)=0.263 4; α(M)=0.0584 8
158.8 1	175 35	1066.2	(7/2 <sup>-</sup> )	907.4	(5/2 <sup>+</sup> )	[E1]	0.0953 13	α(K)=0.01361 19; α(O)=0.001968 28; α(P)=0.0001083 15
416.7 3	150 50	1482.9	(9/2 <sup>-</sup> ,11/2 <sup>-</sup> )	1066.2	(7/2 <sup>-</sup> )			α(K)=0.0798 11; α(L)=0.01207 17; α(M)=0.00267 4
<sup>x</sup> 437.4 2	≈100	741.5	(11/2 <sup>-</sup> )	111.3	(3/2 <sup>+</sup> )	M4	0.320 4	α(N)=0.000614 9; α(O)=8.42×10 <sup>-5</sup> 12; α(P)=3.84×10 <sup>-6</sup> 5
630.2								α(K)=0.2436 34; α(L)=0.0591 8; α(M)=0.01398 20
								α(N)=0.00327 5; α(O)=0.000452 6; α(P)=2.057×10 <sup>-5</sup> 29
								I <sub>γ</sub> : assuming 70% feeding to this level and %IT=3.5, I <sub>γ</sub> (630γ)(absolute)≈1.8.
796.2 2	≈250‡	907.4	(5/2 <sup>+</sup> )	111.3	(3/2 <sup>+</sup> )			
907.3 3	≈120‡	907.4	(5/2 <sup>+</sup> )	0.0	(1/2 <sup>+</sup> )			

Continued on next page (footnotes at end of table)

$^{149}\text{Tm}$   $\varepsilon$  decay (0.9 s) [1987To12](#) (continued) $\gamma(^{149}\text{Er})$  (continued)

$E_\gamma^\dagger$	$I_\gamma^\dagger$	$E_i(\text{level})$	Comments
<sup>x</sup> 955.2 3	$\approx 120^\ddagger$		$\gamma$ seen in (x ray) $\gamma$ -coin only, not in coin with 111 $\gamma$ .

<sup>†</sup> From [1987To02](#).

<sup>‡</sup> From  $\gamma\gamma$ -coin or (x-ray) $\gamma$ -coin ([1987To12](#)).

<sup>#</sup> From the Adopted Gammas.

<sup>@</sup> Total theoretical internal conversion coefficients, calculated using the BrIcc code ([2008Ki07](#)) with Frozen orbital approximation based on  $\gamma$ -ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

<sup>x</sup>  $\gamma$  ray not placed in level scheme.

$^{149}\text{Tm}$   $\epsilon$  decay (0.9 s) 1987To12

## Decay Scheme

Intensities: Relative  $I_\gamma$ 