

$^{159}\text{Tb}(^{16}\text{O},6\text{n}\gamma)$ **2005Ku40,1998Zh17,1998Zh03**

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 109, 2033 (2008)	15-Jun-2008

2005Ku40: E=104 MeV; pulsed beam; one HPGE and two NaI detectors; measured $T_{1/2}$, Q (using time differential perturbed angular distribution method, $\theta=0^\circ$ and 90°).

1998Zh17,1998Zh03: E=105 MeV; prompt (± 36 ns), delayed (12 to 600 ns) and preprompt (-600 to -12 ns) spectra obtained in conjunction with the authors' study of ^{170}Ta (reported, along with additional experimental detail, in **1999Zh27**); 4 HPGE detectors with BGO Compton shields, $\theta=\pm 90^\circ$, 30° and 145° ; measured $E\gamma$, $\gamma\gamma$ coin, γ -(Ta K x ray) coin, $\gamma\gamma(t)$; deduced $T_{1/2}$ from delayed $\gamma\gamma$ coin.

The level scheme is the partial scheme proposed by **1998Zh17**. It omits several known $\Delta J=2$ transitions (in the $5/2[402]$ and $9/2[514]$ bands) which must be present in this reaction also.

 ^{169}Ta Levels

E(level) [†]	J^π [‡]	$T_{1/2}$ [#]	Comments
0.0 ^b 0.0+x	5/2 ⁺		E(level): x=11.3 4 from Adopted Levels. adopted $J^\pi=(1/2^+)$.
16.0+x 96.5 ^d	7/2 ⁺		adopted $J^\pi=(3/2^+)$. 1998Zh17 assign the 97 and 136 levels, respectively, to the $7/2[404]$ and $5/2[402]$ bands. In Adopted Levels, the reverse is the case, supported by coincidence information from a subsequent extensive study of the ($^{51}\text{V},6\text{n}\gamma$) reaction (2006Ha46). band assignment not adopted; see comment on 97 level.
136.3 ^c 169.5+x [@]	7/2 ⁺ 5/2 ⁻	17 ns 4	Q=2.23 13 (2005Ku40) Q: from time differential perturbed angular distribution (TDPAD). J^π : TDPAD pattern depends on level spin and indicates $J=5/2$ for this level. this result is At variance with $J^\pi=1/2^-$ in ($^{51}\text{V},6\text{n}\gamma$) (2006Ha46) based on extensive interconnected band structures. Note that In Adopted Levels, Gammas the 170γ feeds a $(1/2^+)$ level so $J^\pi=5/2^-$ would imply M2 multipolarity for the 170γ and this would violate RUL. The $5/2^-$ $1/2[541]$ level is associated with a different level In Adopted Levels, so the present band assignment is not ADOPTED. $T_{1/2}$: 17 ns 4 from $\gamma\gamma$ delayed $\gamma\gamma$ coin (1998Zh17 , 1998Zh03) using $1/2[541]$ intraband γ 's As 'start' and $(154\gamma+170\gamma)$ As 'stop'. Other: 44 ns 5 from fit to time spectrum gated by $(154\gamma+170\gamma)$ (2005Ku40). Reason for discrepancy unknown.
220.0 ^{&}	9/2 ⁻	28 ns 5	Q=2.28 13 (2005Ku40) Q: from time differential perturbed angular distribution (TDPAD). J^π : TDPAD pattern depends on level spin and indicates $J=9/2$ for this level. $T_{1/2}$: 28 ns 5 from $\gamma\gamma$ delayed $\gamma\gamma$ coin (1998Zh17 , 1998Zh03) using $9/2[514]$ intraband γ 's As 'start' and 124γ As 'stop'. Other: 54 ns 6 from fit to time spectrum gated by 124γ (2005Ku40). Reason for discrepancy unknown.
276.6+x [@]	9/2 ⁻		In Adopted Levels, E=299.5.
285.0 ^b	9/2 ⁺		In Adopted Levels, E=244.8.
337.8 ^a	11/2 ⁻		
460.3 ^c	11/2 ⁺		In Adopted Levels, E=420.1.
499.3+x [@]	13/2 ⁻		In Adopted Levels, E=522.3.
508 ^{&}	13/2 ⁻		
693 ^a	15/2 ⁻		
836.0+x [@]	17/2 ⁻		In Adopted Levels, E=858.7.

[†] From least-squares fit to $E\gamma$, assigning equal weight to all $E\gamma$ data.

[‡] From **1998Zh17**, based on earlier decay and (HI,xn γ) studies, except as noted. Major discrepancies with adopted values are noted. additionally, all adopted values are given In parentheses.

$^{159}\text{Tb}(^{16}\text{O},6\text{n}\gamma)$ **2005Ku40,1998Zh17,1998Zh03 (continued)** ^{169}Ta Levels (continued)

From $\gamma\gamma(t)$ (centroid method) ([1998Zh17,1998Zh03](#)).

@ Band(A): $1/2[541]$, $\alpha=+1/2$ band. In Adopted Levels, the $J=5/2$ band member lies ≈ 12 keV above the 17 ns level deexcited by the 153.53γ and 169.5γ .

& Band(B): $9/2[514]$, $\alpha=+1/2$ band.

^a Band(b): $9/2[514]$, $\alpha=-1/2$ band.

^b Band(C): $5/2[402]$, $\alpha=+1/2$ band. See comment on signature partner band.

^c Band(c): $5/2[402]$, $\alpha=-1/2$ band. for $J>5/2$, level energies are 40 keV higher than those In Adopted Levels because [1998Zh17](#) assign the 137 level As the $J=7/2$ member of this configuration instead of the 97 level.

^d Band(D): $7/2[404]$, $\alpha=-1/2$ band. Band assignment In Adopted Levels differs; see comment on $5/2[402]$ bands.

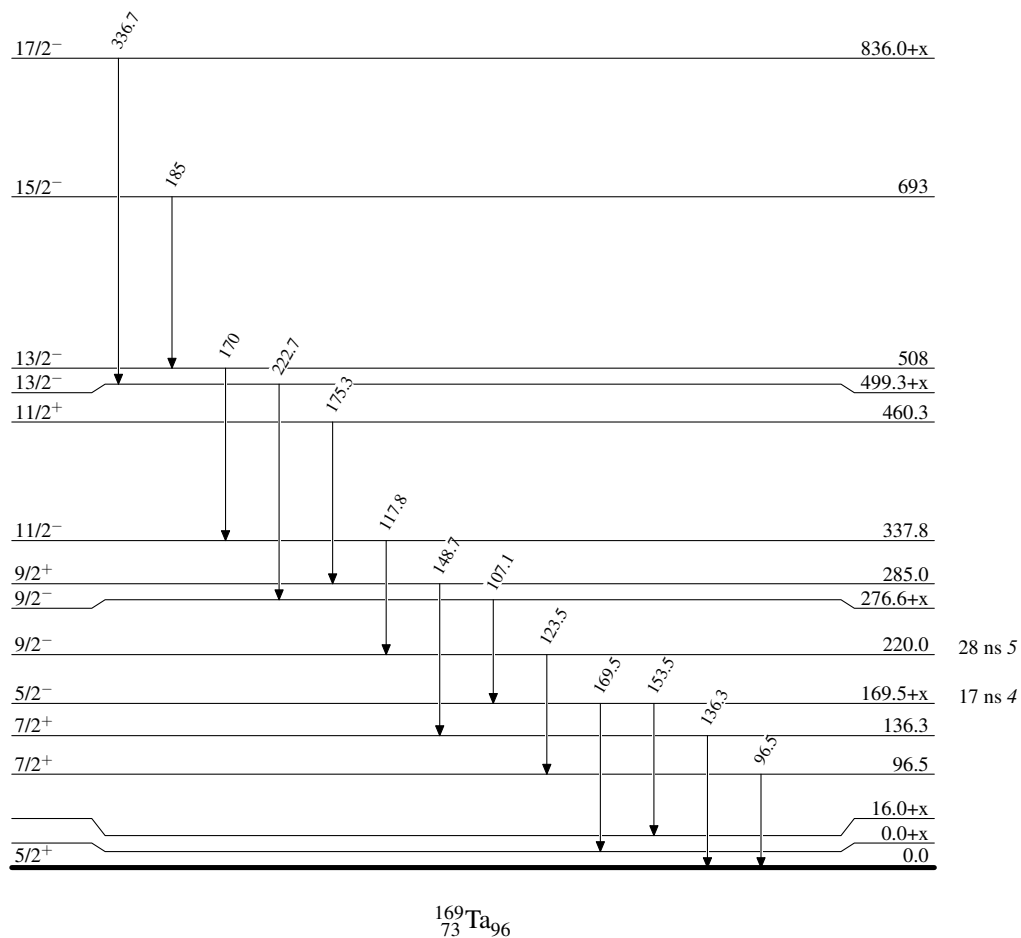
 $\gamma(^{169}\text{Ta})$

E_γ^\dagger	$E_i(\text{level})$	J_i^π	E_f	J_f^π	E_γ^\dagger	$E_i(\text{level})$	J_i^π	E_f	J_f^π
96.5	96.5	$7/2^+$	0.0	$5/2^+$	169.5	$169.5+x$	$5/2^-$	$0.0+x$	
107.1	$276.6+x$	$9/2^-$	$169.5+x$	$5/2^-$	170	508	$13/2^-$	337.8	$11/2^-$
117.8	337.8	$11/2^-$	220.0	$9/2^-$	175.3	460.3	$11/2^+$	285.0	$9/2^+$
123.5	220.0	$9/2^-$	96.5	$7/2^+$	185	693	$15/2^-$	508	$13/2^-$
136.3	136.3	$7/2^+$	0.0	$5/2^+$	222.7	$499.3+x$	$13/2^-$	$276.6+x$	$9/2^-$
148.7	285.0	$9/2^+$	136.3	$7/2^+$	336.7	$836.0+x$	$17/2^-$	$499.3+x$	$13/2^-$
153.5	$169.5+x$	$5/2^-$	$16.0+x$						

[†] From [1998Zh17](#); authors do not state uncertainty in E_γ .

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Level Scheme



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