

<sup>169</sup>W  $\epsilon+\beta^+$  decay (75 s) 1990Me12

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia	NDS 209,1 (2026)	1-Oct-2025

Parent: <sup>169</sup>W: E=0.0; J<sup>π</sup>=(5/2<sup>-</sup>); T<sub>1/2</sub>=75 s 6; Q(ε)=5370 30; %ε+%β<sup>+</sup> decay=100

<sup>169</sup>W-J<sup>π</sup>,T<sub>1/2</sub>: from <sup>169</sup>W Adopted Levels.

<sup>169</sup>W-Q(ε+β<sup>+</sup>): from 2021Wa16.

Others: 1987Es08, 1992HeZV (sources from Gd(Ne,xn)).

1990Me12: <sup>169</sup>W sources from <sup>138</sup>Ba(<sup>36</sup>Ar,xn), E=191 MeV. Measured Eγ, Iγ, γγ coin, γ-K x ray coin.

The decay scheme is that of 1990Me12 with the addition of unplaced 107.5γ, 153.4γ and 169.5γ from 1990Me12; the latter were placed by the evaluator as in Adopted Levels, Gammas. The decay scheme cannot be normalized; several placed gammas of unknown multipolarity are low enough in energy for significant internal conversion to occur, and the unknown deexcitations of the 11 and 27 levels probably take place via transitions which are almost entirely converted. ε+β<sup>+</sup> feeding to the g.s. is unknown; it would be expected to be <5% were this feeding first forbidden (as might be expected given that many N=95 isotones have 5/2[523] g.s. configurations). However, allowed ε+β<sup>+</sup> feeding to the <sup>169</sup>Ta g.s. cannot be ruled out entirely given that the pairing selfconsistent cranking model calculations of 1985Re06 indicate that the 3/2[651] and 5/2[642] bandheads are only 15 and 30 keV above a 5/2[523] bandhead in W. The apparent ε feeding to (5/2<sup>+</sup>) 181, (9/2<sup>-</sup>) 220 and (7/2<sup>-</sup>) 469 levels seems inconsistent with a 5/2<sup>-</sup> parent but might simply result from a very incomplete decay scheme. Alternatively, placements suggested by analogy with Adopted Levels, Gammas may not be correct. The expected ν 5/2[523] to π 7/2[523] allowed unhindered decay has yet to be identified. More experimental work on <sup>169</sup>W ε decay is required.

<sup>169</sup>Ta Levels

E(level) <sup>†</sup>	J <sup>π</sup> <sup>‡</sup>	T <sub>1/2</sub> <sup>‡</sup>	Comments
0.0	(5/2 <sup>+</sup> )	4.9 min 5	
11.4 3	(1/2 <sup>+</sup> )		Additional information 1.
27.5 3	(3/2 <sup>+</sup> )		Additional information 2.
			E(level): from Adopted Levels; E held fixed for least-squares fit.
96.64 18	(7/2 <sup>+</sup> )		
135.96 23	(7/2 <sup>+</sup> )		
180.91 20	(5/2 <sup>+</sup> )	17 ns 4	Level not proposed in 1990Me12. Unplaced 153.4γ and 169.5γ in 1990Me12 are placed from this level as of the adopted dataset.
192.19 27	(5/2 <sup>-</sup> )		
220.18 28	(9/2 <sup>-</sup> )	28 ns 5	
245.2 4	(9/2 <sup>+</sup> )		
298.4 5	(9/2 <sup>+</sup> )		
299.76 35	(9/2 <sup>-</sup> )		Level not proposed in 1990Me12. Unplaced 107.5γ in 1990Me12 is placed from this level as of the adopted dataset.
349.23 34	(3/2 <sup>-</sup> )		
358.72 22	(5/2 <sup>-</sup> ,7/2,9/2 <sup>+</sup> )		
469.34 33	(7/2 <sup>-</sup> )		
556.03 31			
795.8 4			

<sup>†</sup> From least-squares fit to Eγ.

<sup>‡</sup> From Adopted Levels.

<sup>169</sup>W ε+β<sup>+</sup> decay (75 s) **1990Me12** (continued)

$\gamma(^{169}\text{Ta})$									
$E_\gamma^\dagger$	$I_\gamma^\dagger$	$E_i(\text{level})$	$J_i^\pi$	$E_f$	$J_f^\pi$	Mult. @	$\alpha^\&$	$I_{(\gamma+ce)}$	Comments
(11.2 4)		192.19	(5/2 <sup>-</sup> )	180.91	(5/2 <sup>+</sup> )	[E1]		1.5×10 <sup>2</sup> 12	$E_\gamma$ : from level energy difference; transition not observed. $I_{(\gamma+ce)}$ : at least 33 12 and no more than 267 30 to avoid negative ε feeding to 192 and 180 levels, respectively.
(11.4)		11.4	(1/2 <sup>+</sup> )	0.0	(5/2 <sup>+</sup> )	[E2]		≥308	$E_\gamma$ : from level energy difference; transition not observed. $I_{(\gamma+ce)}$ : lower limit required to avoid negative ε feeding to 11 level.
(16.1)		27.5	(3/2 <sup>+</sup> )	11.4	(1/2 <sup>+</sup> )	[M1]	159.2 22	≥184	ce(L)/(γ+ce)=0.769 7; ce(M)/(γ+ce)=0.1754 31 ce(N)/(γ+ce)=0.0419 8; ce(O)/(γ+ce)=0.00662 13; ce(P)/(γ+ce)=0.000457 9 α(L)=123.2 17; α(M)=28.1 4 α(N)=6.72 9; α(O)=1.061 15; α(P)=0.0732 10 $E_\gamma$ : from level energy difference; transition not observed. $I_{(\gamma+ce)}$ : lower limit required to avoid negative ε feeding to 27 level.
96.6 <sup>‡</sup> 2	40 4	96.64	(7/2 <sup>+</sup> )	0.0	(5/2 <sup>+</sup> )	(M1)	4.82 7		α(K)=4.00 6; α(L)=0.632 10; α(M)=0.1433 22 α(N)=0.0343 5; α(O)=0.00543 8; α(P)=0.000375 6 Mult.: M1,E2 from α(exp)=7 4 (1990Me12); (M1) from Adopted Gammas.
107.5 <sup>#</sup> 3	6 3	299.76	(9/2 <sup>-</sup> )	192.19	(5/2 <sup>-</sup> )	[E2]	2.79 5		α(K)=0.797 12; α(L)=1.516 29; α(M)=0.380 7 α(N)=0.0889 17; α(O)=0.01174 22; α(P)=5.53×10 <sup>-5</sup> 9 $E_\gamma$ : Gamma in coincidences with 170γ, 153γ and possibly 165γ.
<sup>x</sup> 109.0 3 120.1 3	9 3 8 3	469.34	(7/2 <sup>-</sup> )	349.23	(3/2 <sup>-</sup> )	[E2]	1.828 31		Coincident with 153γ, 165γ, 170γ. α(K)=0.626 9; α(L)=0.912 16; α(M)=0.229 4 α(N)=0.0535 10; α(O)=0.00709 13; α(P)=4.27×10 <sup>-5</sup> 6 Coincident with 153γ, 170γ.
123.4 4	167 28	220.18	(9/2 <sup>-</sup> )	96.64	(7/2 <sup>+</sup> )	E1	0.2123 35		α(K)=0.1748 29; α(L)=0.0291 5; α(M)=0.00660 11 α(N)=0.001551 26; α(O)=0.000230 4; α(P)=1.194×10 <sup>-5</sup> 19 Mult.: from α(exp)=0.5 2 (1990Me12).
136.0 <sup>‡</sup> 3	29 3	135.96	(7/2 <sup>+</sup> )	0.0	(5/2 <sup>+</sup> )	M1	1.812 28		α(K)=1.507 23; α(L)=0.237 4; α(M)=0.0537 8 α(N)=0.01284 20; α(O)=0.002032 31; α(P)=0.0001407 22 Mult.: from α(exp)=2.1 5 (1990Me12).
138.5 3 148.6 4	16 3 8 3	358.72 245.2	(5/2 <sup>-</sup> ,7/2,9/2 <sup>+</sup> ) (9/2 <sup>+</sup> )	220.18 96.64	(9/2 <sup>-</sup> ) (7/2 <sup>+</sup> )	[M1]	1.410 22		α(K)=1.172 19; α(L)=0.1839 29; α(M)=0.0417 7 α(N)=0.00998 16; α(O)=0.001580 25; α(P)=0.0001094 17 Coincident with 97γ.

<sup>169</sup>W ε+β<sup>+</sup> decay (75 s) [1990Me12](#) (continued)

γ(<sup>169</sup>Ta) (continued)

$E_\gamma^\dagger$	$I_\gamma^\dagger$	$E_i(\text{level})$	$J_i^\pi$	$E_f$	$J_f^\pi$	Mult. @	$\alpha^\&$	Comments
153.4 <sup>#</sup> 3	79 8	180.91	(5/2 <sup>+</sup> )	27.5	(3/2 <sup>+</sup> )	[M1+E2]	1.02 27	$\alpha(\text{K})=0.7$ 4; $\alpha(\text{L})=0.24$ 7; $\alpha(\text{M})=0.057$ 19 $\alpha(\text{N})=0.013$ 4; $\alpha(\text{O})=0.0019$ 5; $\alpha(\text{P})=6$
162.4 4	9 3	298.4	(9/2 <sup>+</sup> )	135.96	(7/2 <sup>+</sup> )	(M1)	1.097 17	$\alpha(\text{K})=0.913$ 14; $\alpha(\text{L})=0.1430$ 22; $\alpha(\text{M})=0.0324$ 5 $\alpha(\text{N})=0.00776$ 12; $\alpha(\text{O})=0.001228$ 19; $\alpha(\text{P})=8.51 \times 10^{-5}$ 13
164.7 3	24 3	192.19	(5/2 <sup>-</sup> )	27.5	(3/2 <sup>+</sup> )	[E1]	0.1002 15	$\alpha(\text{K})=0.0830$ 12; $\alpha(\text{L})=0.01332$ 20; $\alpha(\text{M})=0.00302$ 4 $\alpha(\text{N})=0.000711$ 11; $\alpha(\text{O})=0.0001070$ 16; $\alpha(\text{P})=5.91 \times 10^{-6}$ 9 Coincidences with 109γ, 168γ, 277γ and possibly 108γ.
168.3 4	12 2	349.23	(3/2 <sup>-</sup> )	180.91	(5/2 <sup>+</sup> )	[E1]	0.0947 14	$\alpha(\text{K})=0.0785$ 12; $\alpha(\text{L})=0.01257$ 19; $\alpha(\text{M})=0.00285$ 4 $\alpha(\text{N})=0.000671$ 10; $\alpha(\text{O})=0.0001011$ 16; $\alpha(\text{P})=5.61 \times 10^{-6}$ 8 Coincident with 109γ, 153γ, 165γ, 170γ.
169.5 <sup>a#‡</sup> 3	≈81 <sup>a</sup>	180.91	(5/2 <sup>+</sup> )	11.4	(1/2 <sup>+</sup> )	[E2]	0.524 8	$\alpha(\text{K})=0.263$ 4; $\alpha(\text{L})=0.1984$ 32; $\alpha(\text{M})=0.0493$ 8 $\alpha(\text{N})=0.01155$ 18; $\alpha(\text{O})=0.001558$ 25; $\alpha(\text{P})=1.847 \times 10^{-5}$ 27 $I_\gamma$ : 100 for doubly-placed γ; intensity divided based on adopted branching from 180.1 level.
169.5 <sup>a</sup> 3	19 <sup>a</sup>	469.34	(7/2 <sup>-</sup> )	299.76	(9/2 <sup>-</sup> )	[M1]	0.973 14	$\alpha(\text{K})=0.810$ 12; $\alpha(\text{L})=0.1267$ 19; $\alpha(\text{M})=0.0287$ 4 $\alpha(\text{N})=0.00687$ 10; $\alpha(\text{O})=0.001088$ 16; $\alpha(\text{P})=7.55 \times 10^{-5}$ 11 $I_\gamma$ : 100 for doubly-placed γ; intensity divided based on adopted branching from 180.1 level. Coincident with 109γ, 153γ, 165γ, 170γ.
197.3 3	8 3	556.03		358.72	(5/2 <sup>-</sup> , 7/2, 9/2 <sup>+</sup> )			
222.8 3	6 2	358.72	(5/2 <sup>-</sup> , 7/2, 9/2 <sup>+</sup> )	135.96	(7/2 <sup>+</sup> )			
262.0 4	40 16	358.72	(5/2 <sup>-</sup> , 7/2, 9/2 <sup>+</sup> )	96.64	(7/2 <sup>+</sup> )			
277.3 4	29 3	469.34	(7/2 <sup>-</sup> )	192.19	(5/2 <sup>-</sup> )	[M1]	0.250 4	$\alpha(\text{K})=0.2081$ 30; $\alpha(\text{L})=0.0322$ 5; $\alpha(\text{M})=0.00730$ 11 $\alpha(\text{N})=0.001748$ 25; $\alpha(\text{O})=0.000277$ 4; $\alpha(\text{P})=1.927 \times 10^{-5}$ 28 Coincident with 153γ, 165γ, 170γ.
358.8 4	6 3	358.72	(5/2 <sup>-</sup> , 7/2, 9/2 <sup>+</sup> )	0.0	(5/2 <sup>+</sup> )			
420.1 4	3 2	556.03		135.96	(7/2 <sup>+</sup> )			
575.6 4	26 6	795.8		220.18	(9/2 <sup>-</sup> )			
699.3 5	<4	795.8		96.64	(7/2 <sup>+</sup> )			

† From [1990Me12](#).

‡ Also reported in [1987Es08](#).

# Placed as of the Adopted Levels, unplaced in [1990Me12](#).

@ From Adopted Gammas.

& [Additional information 3](#).

<sup>a</sup> Multiply placed with intensity suitably divided.

<sup>x</sup> γ ray not placed in level scheme.

$^{169}\text{W } \epsilon + \beta^+ \text{ decay (75 s) } 1990\text{Me12}$

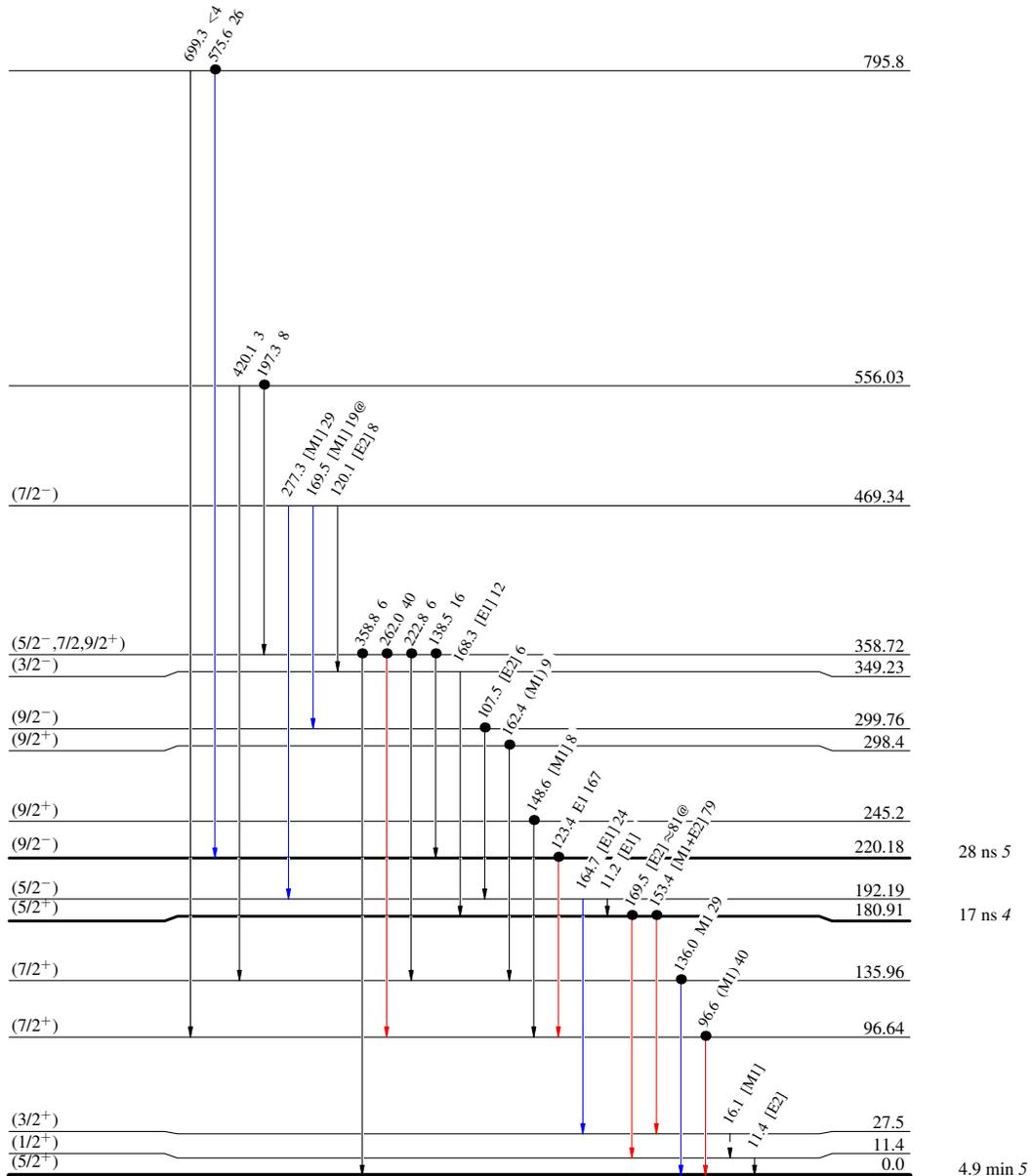
Decay Scheme

Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- - - -  $\gamma$  Decay (Uncertain)
- Coincidence

Intensities: Relative  $I_\gamma$   
@ Multiply placed: intensity suitably divided

$(5/2^-)$  0.0 75 s 6  
 $Q_\epsilon = 5370.30$   
 $^{169}_{74}\text{W}_{95}$   
 $\% \epsilon + \% \beta^+ = 100$



$^{169}_{73}\text{Ta}_{96}$