^{166}W $\varepsilon+\beta^+$ decay (19.2 s) 1989Hi04

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia	NDS 213,1 (2026)	1-Jul-2026

Parent: ^{166}W: E=0.0; $J^\pi=0^+$; $T_{1/2}$=19.2 s *7*; Q(ε)=4210 *30*; %ε+%β^+ decay=99.965 *12*

^{166}W-$T_{1/2}$: from ^{166}W Adopted Levels.

^{166}W-Q($\varepsilon+\beta^+$): from 2021Wa16.

1989Hi04: ^{166}W produced by bombarding 93% enriched $^{136}BaF_2$ with beams of ^{36}Ar, E=160 MeV; Fusion-evaporation residues recoiling from target were stopped in helium gas, loaded with NaCl aerosols. The products were thereby transported through a 10 m Teflon capillary to a shielded measuring site, sprayed on a transport tape, and periodically moved in front of γ-ray detector; 9% Ge(Li) γX-detector and a Ge X-ray detector in a close 180° geometry, and a 20% Ge(Li) in 90° position, one surface-barrier α-detector; measured Eγ, Iγ, $\gamma\gamma$ coin, γ-K x-ray coin, Eα, parent half-life and alpha decay branching; deduced decay scheme.

^{166}Ta Levels

E(level)[†]	J^π[‡]	$T_{1/2}$	Comments
0	(2^+)	34.4 s *5*	
125.79 *18*	(1^+)		
298.3 *3*			J^π: 1^+ in the ^{166}W decay scheme of 1989Hi04 (Fig. 3).
350.34 *25*			E(level): relative order of the 45.8 and 224.6 transitions is not established. The reverse order would define a level at 171.6.
395.93 *20*			J^π: (1^+) in the ^{166}W decay scheme of 1989Hi04 (Fig. 3).

† From least-squares fit to the Eγ.

‡ From Adopted Levels.

$\gamma(^{166}Ta)$

Iγ normalization: the decay scheme appears to be incomplete, not normalized. Although authors (1989Hi04) presented the normalization of the decay scheme.

$\gamma\gamma$ coin (Ta K x ray) (125.8γ, 395.9γ).

Eγ[†]	Iγ[†]	E_i(level)	E_f	Mult.	α[#]	Comments
45.8 *4*	1.4 *4*	395.93	350.34	[M1]	7.21 *21*	α(L)=5.59 *17*; α(M)=1.27 *4* α(N)=0.303 *9*; α(O)=0.0480 *14*; α(P)=0.00331 *10* Additional information 5. Mult.: if placement of 46γ is correct, E2 is ruled out because it would imply negative $\varepsilon+\beta^+$ feeding of the 350 level; M1 would imply no $\varepsilon+\beta^+$ branch to 350 level.
97.7 *4*	1.9 *2*	395.93	298.3	[M1,E2][‡]	4.36 *31*	α(K)=2.4 *15*; α(L)=1.5 *9*; α(M)=0.37 *23* α(N)=0.09 *5*; α(O)=0.012 *6*; α(P)=2.2×10^{-4} *15* Additional information 6. Eγ: 97.7 from fig. 3 of 1989Hi04, consistent with E(level) difference. Eγ=97.1 from table 4 appears to be a misprint.

Continued on next page (footnotes at end of table)

^{166}W $\varepsilon+\beta^+$ decay (19.2 s) 1989Hi04 (continued)

$\gamma(^{166}Ta)$ (continued)

E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π	Mult.	δ	α #	Comments
125.8 *2*	100	125.79	(1^+)	0	(2^+)	M1+E2	0.8 *+8−5*	1.98 *24*	α(K)=1.4 *4*; α(L)=0.47 *15*; α(M)=0.11 *4* α(N)=0.027 *9*; α(O)=0.0038 *11*; α(P)=1.2×10^{-4} *5* Mult.,δ: from α(K)exp=1.37 *+44−40*.
172.5 *3*	5.8 *7*	298.3		125.79	(1^+)	[M1,E2] ‡		0.71 *22*	α(K)=0.51 *26*; α(L)=0.152 *32*; α(M)=0.037 *9* α(N)=0.0086 *21*; α(O)=0.00124 *21*; α(P)=4.5×10^{-5} *27* Additional information 3.
224.6 *2*	7.8 *5*	350.34		125.79	(1^+)	[M1,E2]		0.32 *12*	α(K)=0.25 *12*; α(L)=0.0595 *20*; α(M)=0.0141 *10* α(N)=0.00333 *21*; α(O)=0.000491 *8*; α(P)=2.2×10^{-5} *13* Additional information 4.
270.1 *2*	2.3 *2*	395.93		125.79	(1^+)	[M1,E2]		0.19 *8*	α(K)=0.15 *7*; α(L)=0.0321 *26*; α(M)=0.00754 *33* α(N)=0.00179 *9*; α(O)=0.000267 *30*; α(P)=1.3×10^{-5} *7*
395.9 *3*	5.4 *14*	395.93		0	(2^+)	[M1,E2]		0.067 *30*	α(K)=0.054 *26*; α(L)=0.0099 *24*; α(M)=0.0023 *5* α(N)=0.00054 *12*; α(O)=8.3×10^{-5} *22*; α(P)=4.8×10^{-6} *26* Coincident with K x ray(Ta) only.

† From 1989Hi04. Authors also provided the %Iγ intensity. However, those are very different compared to those presented in this dataset. Please see the normalization comments (above this γ table).

‡ From intensity balance assuming no $\varepsilon+\beta^+$ feeding to 298.3 level.

Additional information 7.

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Decay Scheme

Intensities: Relative I_γ

