Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 195,1 (2024)	19-Sep-2023

Q(β^-)=−5780 *60*; S(n)=9070 *70*; S(p)=750 *70*; Q(α)=5010 *60* 2021Wa16
S(2n)=20100 *80*, S(2p)=4090 *90*, Q(εp)=5490 *70* (2021Wa16).
^{162}Ta produced and identified by 1985Li14 in ^{175}Lu(^{3}He,xn), E=280 MeV reaction; measured half-life. In 1984Sc06, α decay of ^{166}Re was studied which indirectly implied the formation of daughter nuclide of ^{162}Ta.

^{162}Ta Levels

Cross Reference (XREF) Flags

A ^{166}Re α decay (2.25 s)
B ^{106}Cd(^{60}Ni,3pnγ)

E(level)†	J$^\pi$‡	$T_{1/2}$	XREF	Comments
0.0		3.57 s *12*		%ε+%β^+=99.926 *10*; %α=0.074 *10*; %εp=? %α: weighted average of 0.081 *13* (1992Ha10) and 0.065 *14* (1986Ru05). Both of these values were deduced assuming that the 284.5 γ (the $2^+\rightarrow0^+$ transition in ^{162}Hf, populated in the ^{162}Ta $\varepsilon+\beta^+$ decay) occurs in 100% of the $\varepsilon+\beta^+$ decays. If this transition occurs less frequently than this, the actual %α value will be smaller than the one adopted here. J$^\pi$: 3^- from systematics (2021Ko07). $T_{1/2}$: weighted average of: 3.60 s *15* (1992Ha10, γ-decay curve in $\varepsilon+\beta^+$ decay); and 3.5 s *2* (1985Li14, γ-decay curve in $\varepsilon+\beta^+$ decay). 1987HaZO list $T_{1/2}$=3.52 s *12*, but 1992Ha10 report that this value has been superseded by their subsequent publication. Others: 5 s *3* (1986Ru05, α-decay curve); and 5.1 s *11* (1987HaZO, α-decay curve).
0+x	(7^-)		B	E(level): this level may be the ground state of ^{162}Ta.
0+y			A	E(level): this level, populated in the α decay of ^{166}Re may be the ground state of ^{162}Ta.
275.4+x@ *1*	(9^-)		B	
359.4+x# *10*	(10^-)		B	
450.0+x@ *10*	(11^-)		B	
692.7+x# *11*	(12^-)		B	
877.2+x@ *11*	(13^-)		B	
1173.6+x# *11*	(14^-)		B	
1419.1+x@ *11*	(15^-)		B	
1731.1+x# *11*	(16^-)		B	
2020.5+x@ *11*	(17^-)		B	
2359.9+x# *11*	(18^-)		B	
2667.1+x@ *11*	(19^-)		B	
3036.9+x# *11*	(20^-)		B	
3347.1+x@ *11*	(21^-)		B	
3759.2+x# *11*	(22^-)		B	
4082.0+x@ *11*	(23^-)		B	
4560.8+x# *11*	(24^-)		B	
4886.5+x@ *11*	(25^-)		B	
5445.7+x# *11*	(26^-)		B	

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Adopted Levels, Gammas (continued)

^{162}Ta Levels (continued)

E(level)[†]	J^{π}[‡]	XREF
5750.7+x[@] *11*	(27^-)	B
6402.7+x[#] *11*	(28^-)	B
6668.7+x[@] *11*	(29^-)	B
7631.7+x[#] *15*	(30^-)	B

[†] From least-squares fit to Eγ data. Uncertainties for some of the gamma rays as indicated were doubled by the evaluator to get an acceptable fit.
[‡] Based on tentative assignment of 9^- for the bandhead, and comparison with high-spin structure of ^{164}Ta (2011Gh08). Thus all J^{π} assignments are considered here as tentative.
[#] Band(A): $\pi 9/2[514]\otimes\nu 1/2[660],\alpha=0$.
[@] Band(a): $\pi 9/2[514]\otimes\nu 1/2[660],\alpha=1$.

γ(^{162}Ta)

E_i(level)	J_i^{π}	E_γ	I_γ	E_f	J_f^{π}	Mult.[‡]	α[#]	Comments
275.4+x	(9^-)	275.4 *1*	100	0+x	(7^-)	(E2)	0.1064	α(K)=0.0703 *10*; α(L)=0.0275 *4*; α(M)=0.00670 *10* α(N)=0.001577 *23*; α(O)=0.000220 *4*; α(P)=5.46×10^{-6} *8*
359.4+x	(10^-)	84.0 *10*	100	275.4+x	(9^-)			
450.0+x	(11^-)	90.6 *1*	100	359.4+x	(10^-)			
692.7+x	(12^-)	242.7 *1*	100 *5*	450.0+x	(11^-)	D		
		332.6 *10*	4.9 *17*	359.4+x	(10^-)	(E2)	0.0605 *10*	α(K)=0.0426 *7*; α(L)=0.01370 *25*; α(M)=0.00330 *6* α(N)=0.000779 *14*; α(O)=0.0001107 *20*; α(P)=3.43×10^{-6} *6*
877.2+x	(13^-)	184.5 *1*	100 *4*	692.7+x	(12^-)	D		
		427.2 *2*	23.5 *24*	450.0+x	(11^-)			
1173.6+x	(14^-)	296.4 *1*	100 *4*	877.2+x	(13^-)	D		
		481.2 *2*	17.2 *18*	692.7+x	(12^-)			
1419.1+x	(15^-)	245.6 *1*	100 *4*	1173.6+x	(14^-)			
		541.8 *1*	60 *4*	877.2+x	(13^-)			
1731.1+x	(16^-)	312.4[†] *1*	100 *4*	1419.1+x	(15^-)			
		556.7[†] *2*	34 *4*	1173.6+x	(14^-)			
2020.5+x	(17^-)	289.4 *1*	100 *4*	1731.1+x	(16^-)			
		601.3 *1*	45 *4*	1419.1+x	(15^-)			
2359.9+x	(18^-)	339.4 *1*	100 *5*	2020.5+x	(17^-)			
		628.8 *2*	52 *6*	1731.1+x	(16^-)			
2667.1+x	(19^-)	307.3 *1*	100 *5*	2359.9+x	(18^-)			
		646.7 *1*	58 *6*	2020.5+x	(17^-)			
3036.9+x	(20^-)	369.8 *1*	100 *7*	2667.1+x	(19^-)			
		676.8 *2*	54 *7*	2359.9+x	(18^-)			
3347.1+x	(21^-)	310.3 *1*	100 *5*	3036.9+x	(20^-)			
		679.9 *3*	29 *5*	2667.1+x	(19^-)			
3759.2+x	(22^-)	412.0 *1*	100 *14*	3347.1+x	(21^-)			
		721.3[†] *3*	56 *15*	3036.9+x	(20^-)			
4082.0+x	(23^-)	322.8 *1*	100 *11*	3759.2+x	(22^-)			
		735.5 *3*	60 *11*	3347.1+x	(21^-)			
4560.8+x	(24^-)	478.8 *1*	100 *23*	4082.0+x	(23^-)			
		800.4[†] *4*	40 *17*	3759.2+x	(22^-)			

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Adopted Levels, Gammas (continued)

γ(^{162}Ta) (continued)

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π
4886.5+x	(25$^-$)	325.7 *1*	100 *11*	4560.8+x	(24$^-$)
		804.3 *4*	26 *9*	4082.0+x	(23$^-$)
5445.7+x	(26$^-$)	559.3 *1*	100 *10*	4886.5+x	(25$^-$)
		883.5 *6*	17 *7*	4560.8+x	(24$^-$)
5750.7+x	(27$^-$)	305.0 *1*	100 *8*	5445.7+x	(26$^-$)
		862.7 *10*	9 *7*	4886.5+x	(25$^-$)
6402.7+x	(28$^-$)	652.0 *2*	100 *47*	5750.7+x	(27$^-$)
		956.1 *16*	<29	5445.7+x	(26$^-$)
6668.7+x	(29$^-$)	266.0 *2*	100 *12*	6402.7+x	(28$^-$)
		918.0 *11*	33 *15*	5750.7+x	(27$^-$)
7631.7+x	(30$^-$)	963.0[@] *10*	100	6668.7+x	(29$^-$)

† Uncertainty doubled by the evaluator in the least-squares fit procedure.

‡ Assignment by the evaluator from DCO values; in addition, (E2) assigned for two low-energy ΔJ=2, quadrupole transitions from RUL, assuming level half-life less than 20 ns or so from coincidence resolving time. In other cases, where DCO values are given by 2011Gh08, it was not possible to make secure assignments since the values overlap for ΔJ=2, quadrupole and ΔJ=1, dipole transitions.

Additional information 1.

@ Placement of transition in the level scheme is uncertain.

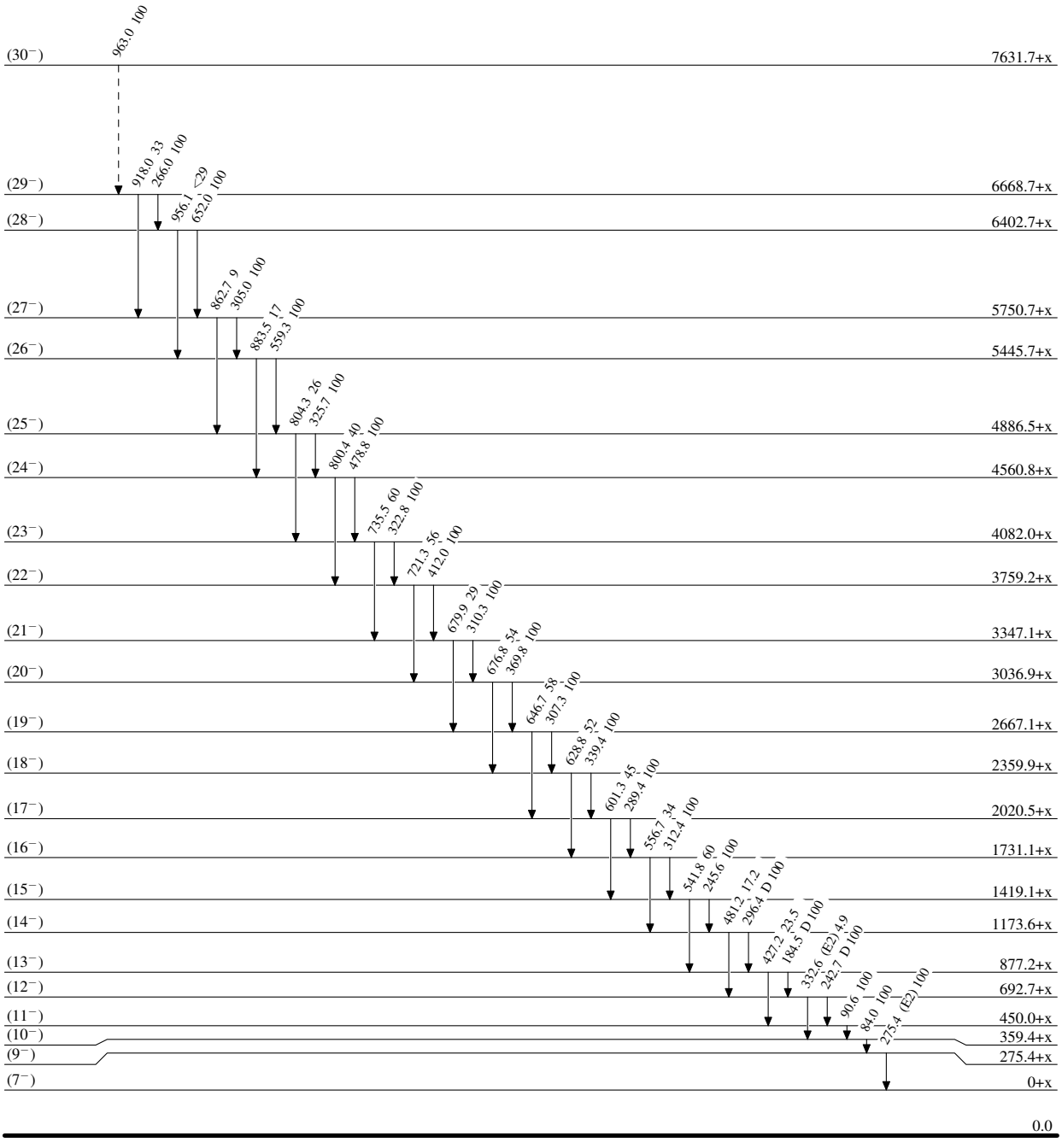
Adopted Levels, Gammas

Legend

Level Scheme

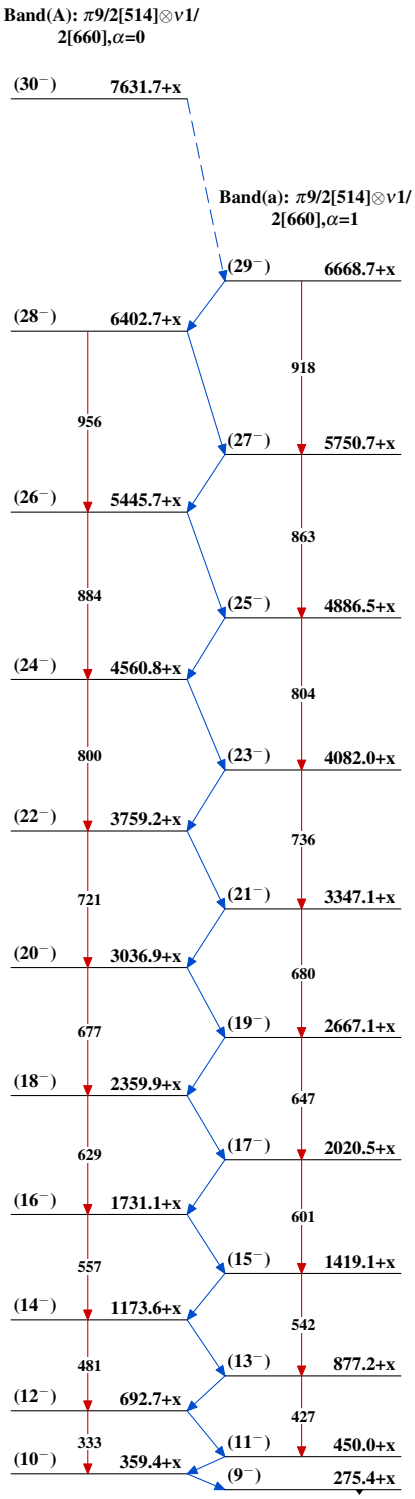
Intensities: Relative photon branching from each level

- - - - - - ► γ Decay (Uncertain)



$^{162}_{73}Ta_{89}$

Adopted Levels, Gammas



$^{162}_{73}Ta_{89}$