^{179}W ε decay (6.40 min) 1969Ko18,1969Bi10

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 110, 265 (2009)	15-Nov-2008

Parent: ^{179}W: E=221.91 *3*; J^π=1/2$^-$; $T_{1/2}$=6.40 min *7*; Q(ε)=1063 *16*; %ε+%β^+ decay=0.29 *4*

^{179}W-%ε+%β^+ decay: from decay scheme assuming Ti(120.1γ[^{179}W]+221.5γ[^{179}W]+238.7γ[^{179}Ta])=100% and I(239γ):I(222γ)=100 *5*:3870 *300* (1969Ko18). ε+β^+ feeding to the g.s. is not expected (ΔJ=3, $\Delta\pi$=yes transition).

1969Ko18: measured Eγ, Iγ, $\gamma\gamma$ coin, Ice. Detectors: Ge(Li), Si(Li).

1969Bi10: measured Eγ, Iγ, γ(t). Detector: Ge(Li).

The level scheme is that of 1969Ko18 after the elimination of an unobserved 8.7γ (I(γ+ce) ≤34 *14*) connecting the 750 and 742 levels. 1969Ko18 proposed this γ to achieve intensity balance At the 742 level because they believed that level to Be the 5/2 member of the 1/2[541] band to which there should Be At most a negligible ε branch from the 1/2$^-$ parent.

^{179}Ta Levels

E(level)	J^π†	$T_{1/2}$	Comments
0.0‡	7/2$^+$	1.82 y *3*	$T_{1/2}$: from Adopted Levels.
238.7# *3*	5/2$^+$		
520.3@ *4*	(1/2)$^+$		
527.7@ *4*	(3/2)$^+$		
741.6 *7*	1/2,3/2		J^π: 5/2$^-$ 1/2[541] suggested by 1969Ko18; assignment not adopted because the 628-keV level bears that assignment in Adopted Levels.
750.3 *5*	(1/2,3/2)		J^π: 1/2$^-$ 1/2[541] suggested by 1969Ko18; this E(level) is compatible with a 5/2 band member At 628 keV, As In Adopted Levels. However, the 680 level is assigned 1/2$^-$ 1/2[541] In Adopted Levels.

† From Adopted Levels.
‡ Band(A): 7/2[404] g.s. band.
# Band(B): 5/2[402] band.
@ Band(C): 1/2[411] band.

ε,β^+ radiations

E(decay)	E(level)	Iε†	Log *ft*	Comments
(535 *16*)	750.3	0.10 *4*	6.20 *18*	εK=0.7943 *13*; εL=0.1563 *10*; εM+=0.0494 *4*
(543 *16*)	741.6	0.08 *4*	6.31 *22*	εK=0.7950 *13*; εL=0.1558 *9*; εM+=0.0493 *4*
(757 *16*)	527.7	≤0.12	≥6.5	εK=0.8059 *6*; εL=0.1478 *5*; εM+=0.04630 *16*
(765 *16*)	520.3	≤0.12	≥6.5	εK=0.8061 *6*; εL=0.1476 *5*; εM+=0.04623 *16*
(1046‡ *16*)	238.7	<0.008	>8.5^{1u}	εK=0.7914 *8*; εL=0.1582 *6*; εM+=0.05031 *20* I($\varepsilon+\beta^+$): from log $f^{1u}t$>8.5 for 1U transition.

† Absolute intensity per 100 decays.
‡ Existence of this branch is questionable.

^{179}W ε decay (6.40 min) 1969Ko18,1969Bi10 (continued)

$\gamma(^{179}Ta)$

Iγ normalization: from decay scheme assuming Ti(120.1γ[^{179}W]+221.5γ[^{179}W]+238.7γ[^{179}Ta])=100% and I(239γ):I(222γ)=100 *5*:3870 *300* (1969Ko18). $\varepsilon+\beta^+$ feeding to the g.s. is not expected (ΔJ=3, $\Delta\pi$=yes transition).

E_γ[†]	I_γ[†@]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	α[&]	$I_{(\gamma+ce)}$[@]	Comments
(7.4 *6*)		527.7	(3/2)$^+$	520.3	(1/2)$^+$			63 *30*	Eγ: from level energy difference; γ not observed, but existence is implied by $\gamma\gamma$ coin data. I(γ+ce)>52 *18*,<82 *11* from intensity balance at 528, 520 levels, respectively.
213.9 *5*	26[#] *9*	741.6	1/2,3/2	527.7	(3/2)$^+$	[D,E2]	0.28 *23*		
222.5 *5*	26[#] *8*	750.3	(1/2,3/2)	527.7	(3/2)$^+$	[D,E2]	0.25 *21*		
230.1 *5*	9[#] *5*	750.3	(1/2,3/2)	520.3	(1/2)$^+$	[D,E2]	0.23 *19*		
238.7 *3*	100 *5*	238.7	5/2$^+$	0.0	7/2$^+$	M1+E2	0.27 *11*		α(K)=0.21 *11*; α(L)=0.0484 *8*; α(M)=0.0114 *4*; α(N+..)=0.00312 *6* α(N)=0.00270 *8*; α(O)=0.000400 *19*; α(P)=1.8×10^{-5} *11* %Iγ=0.228 *22* based on adopted normalization. Mult.: from Adopted Gammas. M1,E2 from α(L)exp=0.11 *5* (1969Ko18).
281.7 *3*	85 *8*	520.3	(1/2)$^+$	238.7	5/2$^+$	(E2)	0.0992		α(K)=0.0662 *10*; α(L)=0.0253 *4*; α(M)=0.00614 *9*; α(N+..)=0.001653 *25* α(N)=0.001446 *21*; α(O)=0.000202 *3*; α(P)=5.16×10^{-6} *8* Mult.: M1,E2 from α(L)exp=0.054 *20*(1969Ko18); level scheme favors E2.
288.9 *3*	13 *3*	527.7	(3/2)$^+$	238.7	5/2$^+$	[M1,E2]	0.16 *7*		α(K)=0.12 *7*; α(L)=0.026 *3*; α(M)=0.0061 *5*; α(N+..)=0.00166 *17* α(N)=0.00144 *13*; α(O)=0.00022 *4*; α(P)=1.1×10^{-5} *7*

[†] From 1969Ko18. Iγ from singles spectrum, except as noted.

[‡] From Adopted Gammas, except As noted. α(L)exp values quoted from 1969Ko18 were normalized assuming α(K)(M3)=6.45 for the 221.5γ In ^{179}W.

[#] Deduced by evaluator by scaling Iγ from spectrum gated by 282γ in 1969Ko18 by 0.85 (based on I(239γ):I(282γ)=100:85 In singles spectrum).

[@] For absolute intensity per 100 decays, multiply by 0.0023 *3*.

[&] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

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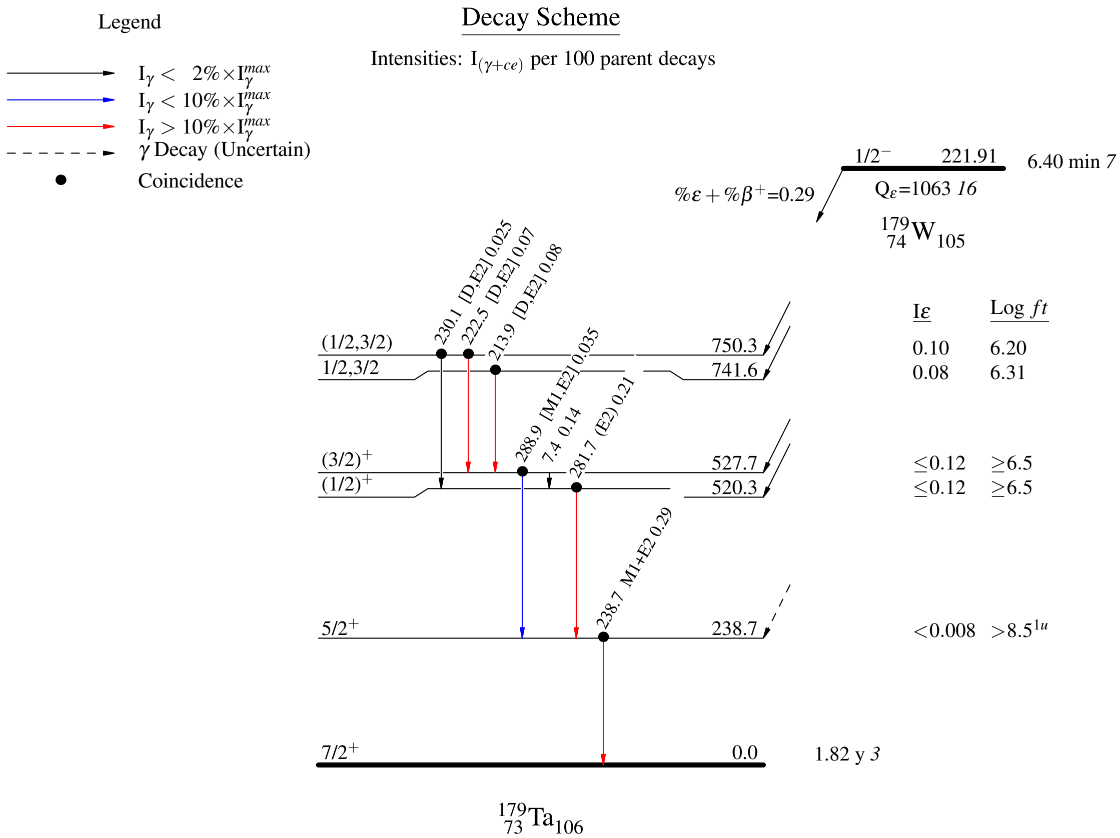

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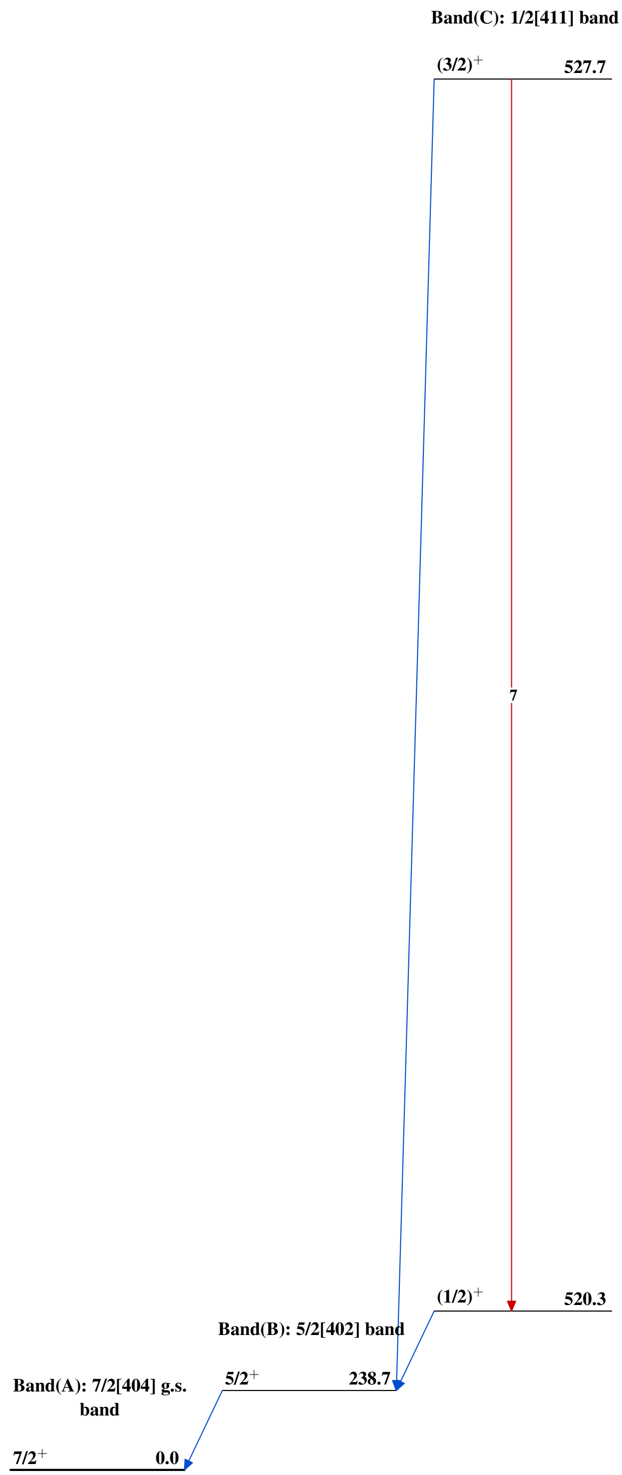

$^{179}_{73}Ta_{106}$