Adopted Levels, Gammas

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

Q(β^-)=2301.6 *22*; S(n)=6489.1 *24*; S(p)=7662.4 *25*; Q(α)=−1034.0 *29* 2021Wa16
S(2n)=14185.7 *23*, S(2p)=16964.0 *22* (2021Wa16).

^{162}Tb Levels

Cross Reference (XREF) Flags

A ^{162}Gd β^- decay (8.4 min)
B ^{252}Cf SF decay
C ^{163}Dy(t,α)

E(level)	J$^\pi$@	$T_{1/2}$	XREF	Comments
0.0[c]	1$^-$&	7.74 min *9*	ABC	%β^-=100 J$^\pi$: configuration based on pickup of a 3/2[411] proton from ^{163}Dy, whose g.s. has configuration=ν5/2[523]. The log *ft*=4.95 of the β^- transition to the 2$^-$ level at 1148 keV in ^{162}Dy indicates an allowed-unhindered β transition, which indicates a ν5/2[523]→π7/2[523] β transition. This uniquely establishes the g.s. configuration assignment and establishes the 1148-keV level in ^{162}Dy as having configuration= π7/2[523]-π3/2[411]. See the ^{162}Dy Adopted Levels and 1995Be02 for further discussion. $T_{1/2}$: weighted average of five values, 7.76 min *10* (1977Ka08), 8.0 min *5* (1966Fu08), 7.75 min *31* (1966Sc24), 7.5 min *10* (1967Gu03), and 7.6 min *2* (1968Ka10). Two other results from the same publication, 7.48 min *3* (1965Sc24) and 7.43 min *4* (1965Sc24) were excluded due to the fact that considering all seven reported half-lifes, the weight of the 1965Sc24 values is more than 80%. Excluding 1965Sc24 values, the remaining five measurements give the same consistent (LWM, NRM, RT) value of 7.74 min *9* as the adopted weighted average. Unweighted average of 7.43 min *4* (1965Sc24) and 7.76 min *10* (1977Ka08) is 7.60 min *15*. See also 1951Bu25, 1960Wi10, and 1962Ta12 for half-life measurements related to nuclide identification. Additional information 1.
39.10[c] *9*	2$^-$&		A C	J$^\pi$: transition to 1$^-$, g.s. is mainly M1; the (t,α) cross section and the rotational-band spacing.
97[c] *1*	3$^-$&		C	
176[c] *1*	4$^-$&		C	
216[b] *1*	4$^-$&		C	J$^\pi$: configuration is the Σ=0 coupling of the π3/2[411] and ν 5/2[523] Nilsson orbitals, the Σ=1 coupling of which is assigned to the g.s. The systematics of 1998Ja07 suggests a Gallagher-Moszkowski splitting of 82 keV, compared to the observed value of 216 keV.
268[c] *2*	5$^-$&		C	
285.5 *32*	(4$^-$)		B	E(level): deduced from measured mass excess using PI-ICR technique in ^{252}Cf SF Decay (2020Or03). J$^\pi$: proposed in ^{162}Tb IT Decay (2020Or03) based on assigned configuration π3/2[411]ν5/2[523] and Gallagher-Moszkowski rule.
310[b] *1*	5$^-$&		C	
341.41 *9*	(0$^-$,1)		A C	XREF: C(338). J$^\pi$: log *ft*=5.94 in β^- decay from the ^{162}Gd g.s. parent.
389 *1*			C	
434[d] *1*	(5)$^-$		c	E(level),J$^\pi$: $\sigma(\theta)$ consistent with L(t,α)=4+5, J=5, K^π=5$^-$ and J=1, K^π=1$^+$. Doublet or multiplet since the measured cross section is larger than predicted for band

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{162}Tb Levels (continued)

E(level)	J$^{\pi}$[@]	XREF	Comments
			members. The other member with L=5 corresponds to 442.11, 1^+ level with configuration=ν5/2[523]-π7/2[523],$K^{\pi}=1^+$.
442.11[f] *8*	1^+	A C	J$^{\pi}$: allowed-unhindered (log *ft*=4.46) β^- transition from the 0^+ ^{162}Gd g.s. parent. This also uniquely establishes that this level has configuration=ν5/2[523]-π7/2[523], $K^{\pi}=1^+$.
475 *1*		C	
521 *1*		C	
550[†d] *1*	$(6)^{-}$[†]	C	
570[†e] *2*	$(6)^{+}$[†]	C	
616 *1*		C	
657[e] *1*	$(7)^+$	C	J$^{\pi}$: L(t,α)=5.
727 *1*	+[a]	C	
777[e] *1*	$(8)^+$	C	J$^{\pi}$: L(t,α)=5.
829[‡] *2*	+[a]	C	
894[#] *1*	+[a]	C	
925[#] *1*	+[a]	C	
967 *2*	+[a]	C	
995 *2*	+[a]	C	
1033 *2*	+[a]	C	
1069 *2*		C	
1108 *2*	+[a]	C	
1128 *2*		C	
1167 *2*		C	
1186 *2*		C	
1222 *2*		C	
1264[‡] *2*		C	
1292 *2*		C	
1337 *2*		C	
1358 *2*		C	
1387 *2*		C	
1424 *2*		C	
1444 *2*		C	
1479 *2*		C	
1515 *2*		C	

[†] The shape of the angular distribution for 550+570 group is consistent with L=4+5, J=6, $K^{\pi}=5^-$ and 6^+, but the total measured cross section is larger than the predicted value. Probably there are additional levels in this energy region.

[‡] Multiplet structure.

[#] Combined L(t,α)=5 for 894 and 925 levels.

[@] For levels populated in (t,α), the assignments are from $\sigma(\theta)$ distributions, DWBA and Nilsson-model calculations which give predicted cross sections for members in a band: "fingerprint" method.

[&] L(t,α)=2 from $5/2^-$ target.

[a] L(t,α)=5 from $5/2^-$ target gives positive parity and J=2 to 8.

[b] Band(A): $K^{\pi}=4^-$,ν5/2[523]+π3/2[411].

[c] Band(a): $K^{\pi}=1^-$,ν5/2[523]-π3/2[411].

[d] Band(B): $K^{\pi}=5^-$. Tentative configuration=ν5/2[523]+π5/2[413] + others.

[e] Band(C): $K^{\pi}=(6^+)$. Strongly Coriolis-mixed band of configurations=ν5/2[523]+π7/2[523] and ν5/2[523]+π5/2[532].

[f] Band(D): π7/2[523]-ν5/2[523],$K^{\pi}=1^+$. Bandhead.

Adopted Levels, Gammas (continued)

γ(^{162}Tb)

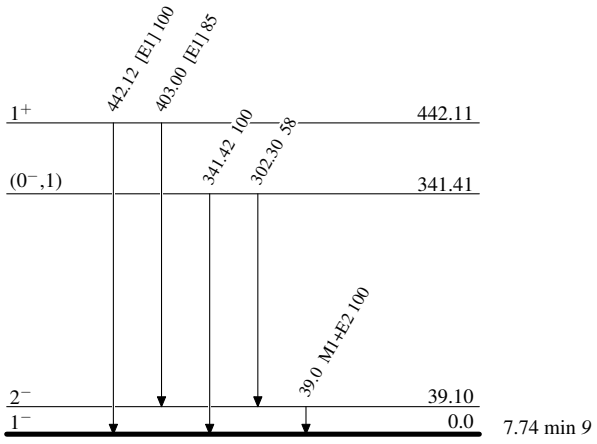
E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.	δ	α†	Comments
39.10	2⁻	39.0 *2*	100	0.0	1⁻	M1+E2	0.14 *+5−7*	7.9 *18*	α(L)=6.1 *15*; α(M)=1.4 *4* α(N)=0.31 *8*; α(O)=0.045 *10*; α(P)=0.00211 *5* Mult.,δ: from β⁻ decay dataset.
341.41	(0⁻,1)	302.30 *15*	58 *9*	39.10	2⁻				
		341.42 *10*	100 *9*	0.0	1⁻				
442.11	1⁺	403.00 *8*	85 *4*	39.10	2⁻	[E1]		0.00808 *11*	α(K)=0.00687 *10*; α(L)=0.000946 *13*; α(M)=0.0002052 *29* α(N)=4.72×10⁻⁵ *7*; α(O)=7.15×10⁻⁶ *10*; α(P)=4.44×10⁻⁷ *6*
		442.12 *8*	100	0.0	1⁻	[E1]		0.00651 *9*	α(K)=0.00554 *8*; α(L)=0.000759 *11*; α(M)=0.0001645 *23* α(N)=3.78×10⁻⁵ *5*; α(O)=5.75×10⁻⁶ *8*; α(P)=3.60×10⁻⁷ *5*

† Additional information 2.

Adopted Levels, Gammas

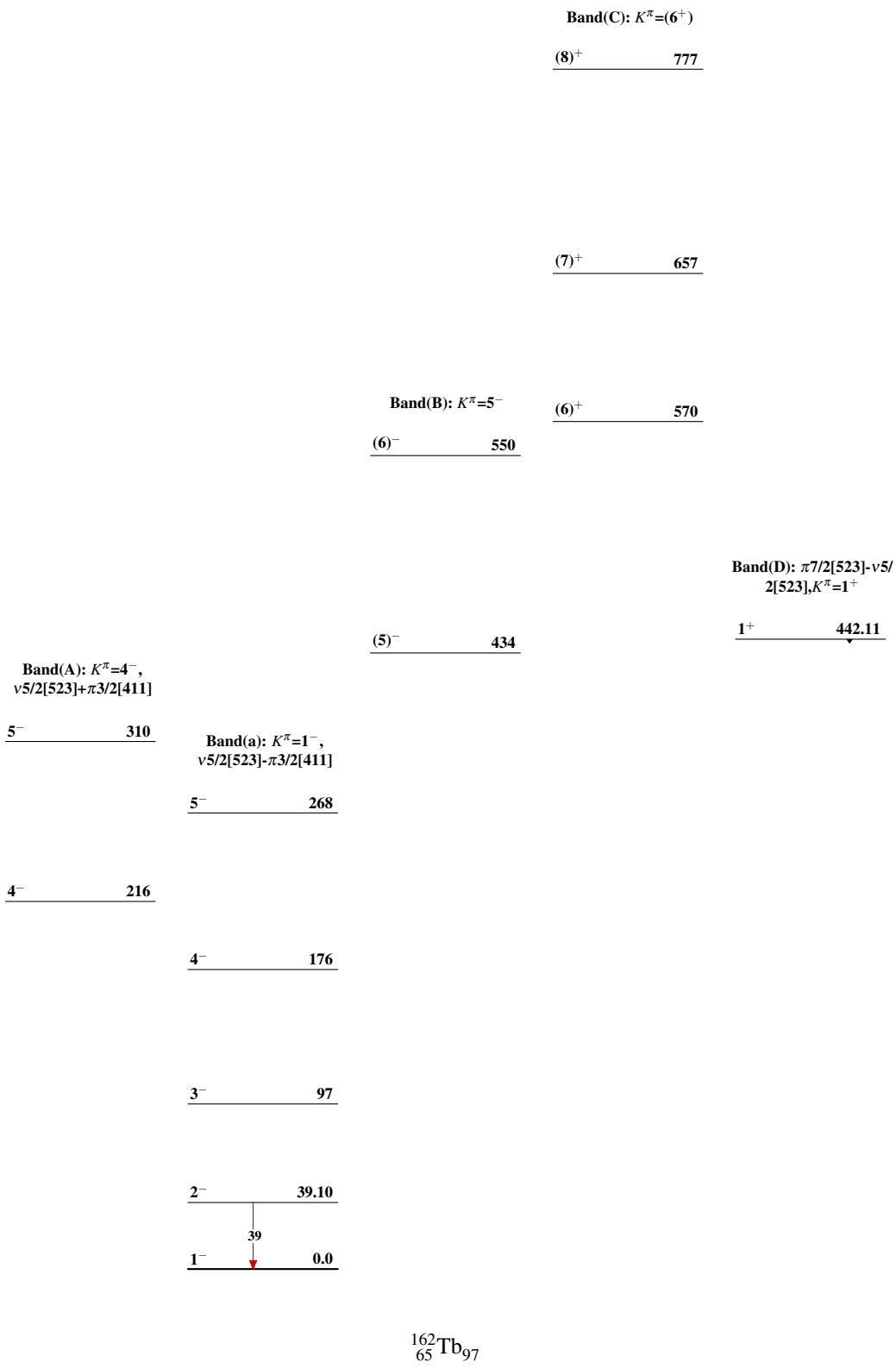
Level Scheme

Intensities: Relative photon branching from each level



$^{162}_{65}Tb_{97}$

Adopted Levels, Gammas



$^{162}_{65}Tb_{97}$