^{141}Tb ε decay (3.5 s) 1989Gi06

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 187,1 (2023)	12-Oct-2022

Parent: ^{141}Tb: E=0.0; J^π=(5/2$^-$); $T_{1/2}$=3.5 s *2*; Q(ε)=8.68×10^3 *11*; %ε+%β$^+$ decay=100

^{141}Tb-Q(ε): From 2021Wa16.

Measured: γ, γγ, Xγ (1989Gi06,1988TuZY,2001BeZY).

1989Gi06 placed all observed γ′s in the proposed decay scheme.

1988TuZY arranged similar but much fewer experimental data in a very different decay scheme.

2001BeZY confirmed the level scheme of 1989Gi06.

^{141}Gd Levels

E(level)†	J^π‡	$T_{1/2}$‡	E(level)†	J^π‡
0.0	1/2$^+$	14 s *4*	661.43 *10*	(3/2$^-$,5/2$^-$)
113.16 *7*	(3/2$^+$)		752.64 *9*	(3/2$^-$,5/2$^-$)
198.32 *7*	(3/2$^+$)		758.37 *12*	(3/2$^-$,5/2$^-$,7/2$^-$)
258.17 *6*	5/2$^+$		895.14 *8*	(7/2$^-$)
377.76 *9*	11/2$^-$	24.5 s *5*	940.52 *11*	(7/2$^-$)
492.35 *7*	(5/2$^+$,3/2$^-$)		989.71 *11*	(7/2$^-$)
514.46 *10*	(9/2,11/2$^-$)		1100.06 *14*	(7/2$^-$)
551.58 *8*	(7/2$^-$)		1131.86 *14*	(7/2$^-$)
646.16 *10*	(7/2$^-$)			

† From least-squares fit to Eγ data (χ^2 norm=2.83 greater than χ^2 critical=1.93).

‡ Adopted values.

ε,β$^+$ radiations

β$^+$/I(293γ)=4.25 *100*; ε/I(293γ)≈2.5 (1989Gi06).

γ′s included in the decay scheme (after correction for internal conversion for assumed multipolarities) account for ≈85% of the total β strength (1989Gi06).

E(decay)	E(level)	Iβ$^+$ #	Iε#	Log *ft*	I(ε+β$^+$)†‡#	Comments
(7.55×10^3 *11*)	1131.86	4.4	0.34	5.7	4.7	av Eβ=3020 *53*; εK=0.062 *3*; εL=0.0090 *5*; εM+=0.00260 *12*
(7.58×10^3 *11*)	1100.06	3.2	0.25	5.8	3.5	av Eβ=3035 *53*; εK=0.061 *3*; εL=0.0089 *5*; εM+=0.00256 *12*
(7.69×10^3 *11*)	989.71	9.31	0.69	5.4	10.0	av Eβ=3088 *53*; εK=0.058 *3*; εL=0.0085 *4*; εM+=0.00245 *12*
(7.74×10^3 *11*)	940.52	2.9	0.21	5.9	3.1	av Eβ=3112 *53*; εK=0.057 *3*; εL=0.0083 *4*; εM+=0.00240 *11*
(7.79×10^3 *11*)	895.14	27.6	1.97	5.0	29.6	av Eβ=3133 *53*; εK=0.056 *3*; εL=0.0082 *4*; εM+=0.00236 *11*
(7.92×10^3 *11*)	758.37	9.37	0.63	5.5	10.0	av Eβ=3199 *53*; εK=0.0532 *24*; εL=0.0077 *4*; εM+=0.00224 *10*
(7.93×10^3 *11*)	752.64	10.7	0.72	5.4	11.4	av Eβ=3202 *53*; εK=0.0531 *24*; εL=0.0077 *4*; εM+=0.00223 *10*
(8.02×10^3 *11*)	661.43	2.3	0.15	6.1	2.5	av Eβ=3246 *53*; εK=0.0512 *23*; εL=0.0075 *4*; εM+=0.00215 *10*
(8.03×10^3 *11*)	646.16	13.0	0.83	5.4	13.8	av Eβ=3253 *53*; εK=0.0509 *23*; εL=0.0074 *4*; εM+=0.00214 *10*
(8.13×10^3 *11*)	551.58	7	0.4	5.7	7	av Eβ=3299 *53*; εK=0.0491 *22*; εL=0.0072 *3*; εM+=0.00206 *9*

† From imbalance of I(γ+ce). According to 1989Gi06, intensity balance through the first six excited levels indicates that the intensity of transitions not included in the scheme to these levels is low, which leave little room for significant direct β feeding on either of them.

‡ ≈4.4% of ε+β$^+$ is unaccounted for (1989Gi06).

Absolute intensity per 100 decays.

^{141}Tb ε decay (3.5 s) 1989Gi06 (continued)

γ(^{141}Gd)

Iγ normalization: Listed by 1989Gi06 (arguments not given).

E_γ [†]	I_γ [†#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α [‡]	Comments
59.3 *1*	18 *4*	551.58	(7/2$^-$)	492.35	(5/2$^+$,3/2$^-$)			
59.8 *1*	10 *2*	258.17	5/2$^+$	198.32	(3/2$^+$)	M1	8.88	α(K)=7.48 *11*; α(L)=1.094 *17*; α(M)=0.238 *4* α(N)=0.0547 *9*; α(O)=0.00847 *13*; α(P)=0.000563 *9*
85.2 *1*	11 *2*	198.32	(3/2$^+$)	113.16	(3/2$^+$)	M1	3.19	α(K)=2.69 *4*; α(L)=0.390 *6*; α(M)=0.0847 *13* α(N)=0.0195 *3*; α(O)=0.00302 *5*; α(P)=0.000201 *3*
91.5 *1*	2 *1*	752.64	(3/2$^-$,5/2$^-$)	661.43	(3/2$^-$,5/2$^-$)			
94.5 *1*	1 *1*	646.16	(7/2$^-$)	551.58	(7/2$^-$)			
113.2 *1*	47 *5*	113.16	(3/2$^+$)	0.0	1/2$^+$	M1	1.412	α(K)=1.193 *17*; α(L)=0.1720 *25*; α(M)=0.0374 *6* α(N)=0.00860 *13*; α(O)=0.001334 *19*; α(P)=8.89×10^{-5} *13*
119.6 *1*		377.76	11/2$^-$	258.17	5/2$^+$	E3	15.93	α(K)=2.74 *4*; α(L)=10.08 *15*; α(M)=2.49 *4* α(N)=0.557 *9*; α(O)=0.0718 *11*; α(P)=0.0001662 *24* Iγ: because of large $T_{1/2}$=24.5 s measured Iγ belongs to ^{141}Gd IT decay, not to ^{141}Tb ε decay with $T_{1/2}$=3.5 s.
131.6 *1*	47 *5*	646.16	(7/2$^-$)	514.46	(9/2,11/2$^-$)			
136.7 *1*	85 *9*	514.46	(9/2,11/2$^-$)	377.76	11/2$^-$			
145.0 *1*	22 *3*	258.17	5/2$^+$	113.16	(3/2$^+$)	M1	0.700	α(K)=0.592 *9*; α(L)=0.0850 *12*; α(M)=0.0185 *3* α(N)=0.00425 *6*; α(O)=0.000660 *10*; α(P)=4.41×10^{-5} *7*
173.9 *1*	15 *2*	551.58	(7/2$^-$)	377.76	11/2$^-$	[E2]	0.356	α(K)=0.236 *4*; α(L)=0.0928 *14*; α(M)=0.0215 *3* α(N)=0.00482 *7*; α(O)=0.000655 *10*; α(P)=1.312×10^{-5} *19*
198.4 *1*	88 *9*	198.32	(3/2$^+$)	0.0	1/2$^+$	M1	0.293	α(K)=0.248 *4*; α(L)=0.0354 *5*; α(M)=0.00768 *11* α(N)=0.001767 *25*; α(O)=0.000274 *4*; α(P)=1.84×10^{-5} *3*
206.7[@] *2*	4 *3*	758.37	(3/2$^-$,5/2$^-$,7/2$^-$)	551.58	(7/2$^-$)			
234.5 *1*	5 *2*	492.35	(5/2$^+$,3/2$^-$)	258.17	5/2$^+$			
248.8 *1*	5 *2*	895.14	(7/2$^-$)	646.16	(7/2$^-$)			
258.2 *1*	70 *7*	258.17	5/2$^+$	0.0	1/2$^+$	E2	0.0964	α(K)=0.0717 *10*; α(L)=0.0192 *3*; α(M)=0.00439 *7* α(N)=0.000989 *14*; α(O)=0.0001388 *20*; α(P)=4.35×10^{-6} *7*
268.3 *2*	29 *3*	646.16	(7/2$^-$)	377.76	11/2$^-$			
293.3 *1*	100 *10*	551.58	(7/2$^-$)	258.17	5/2$^+$			
343.6 *1*	97 *10*	895.14	(7/2$^-$)	551.58	(7/2$^-$)			
379.2 *1*	29 *3*	492.35	(5/2$^+$,3/2$^-$)	113.16	(3/2$^+$)			
389.0 *1*	11 *2*	940.52	(7/2$^-$)	551.58	(7/2$^-$)			
402.9 *1*	28 *7*	895.14	(7/2$^-$)	492.35	(5/2$^+$,3/2$^-$)			
[x]406.8 *1*	8 *2*							

Continued on next page (footnotes at end of table)

^{141}Tb ε decay (3.5 s) 1989Gi06 (continued)

$\gamma(^{141}Gd)$ (continued)

E_γ [†]	I_γ [†#]	E_i(level)	J_i^π	E_f	J_f^π
426.0 *1*	7 *2*	940.52	$(7/2^-)$	514.46	$(9/2,11/2^-)$
463.4 *1*	22 *3*	661.43	$(3/2^-,5/2^-)$	198.32	$(3/2^+)$
475.4 *1*	51 *5*	989.71	$(7/2^-)$	514.46	$(9/2,11/2^-)$
[x]480.3 *1*	32 *3*				
492.2 *1*	41 *4*	492.35	$(5/2^+,3/2^-)$	0.0	$1/2^+$
494.3 *1*	40 *4*	752.64	$(3/2^-,5/2^-)$	258.17	$5/2^+$
500.2 *1*	54 *5*	758.37	$(3/2^-,5/2^-,7/2^-)$	258.17	$5/2^+$
517.5 *1*	27 *3*	895.14	$(7/2^-)$	377.76	$11/2^-$
[x]530.9 *2*	15 *2*				
554.2 *1*	20 *2*	752.64	$(3/2^-,5/2^-)$	198.32	$(3/2^+)$
585.6 *1*	21 *2*	1100.06	$(7/2^-)$	514.46	$(9/2,11/2^-)$
611.8 *1*	8 *2*	989.71	$(7/2^-)$	377.76	$11/2^-$
617.4 *1*	28 *3*	1131.86	$(7/2^-)$	514.46	$(9/2,11/2^-)$
636.9 *1*	11 *2*	895.14	$(7/2^-)$	258.17	$5/2^+$

† From 1989Gi06. Values for transitions following decay of the 378 level have been corrected to include only the 3.5-s component.
‡ Additional information 1.
# For absolute intensity per 100 decays, multiply by 0.168.
@ Placement of transition in the level scheme is uncertain.
x γ ray not placed in level scheme.

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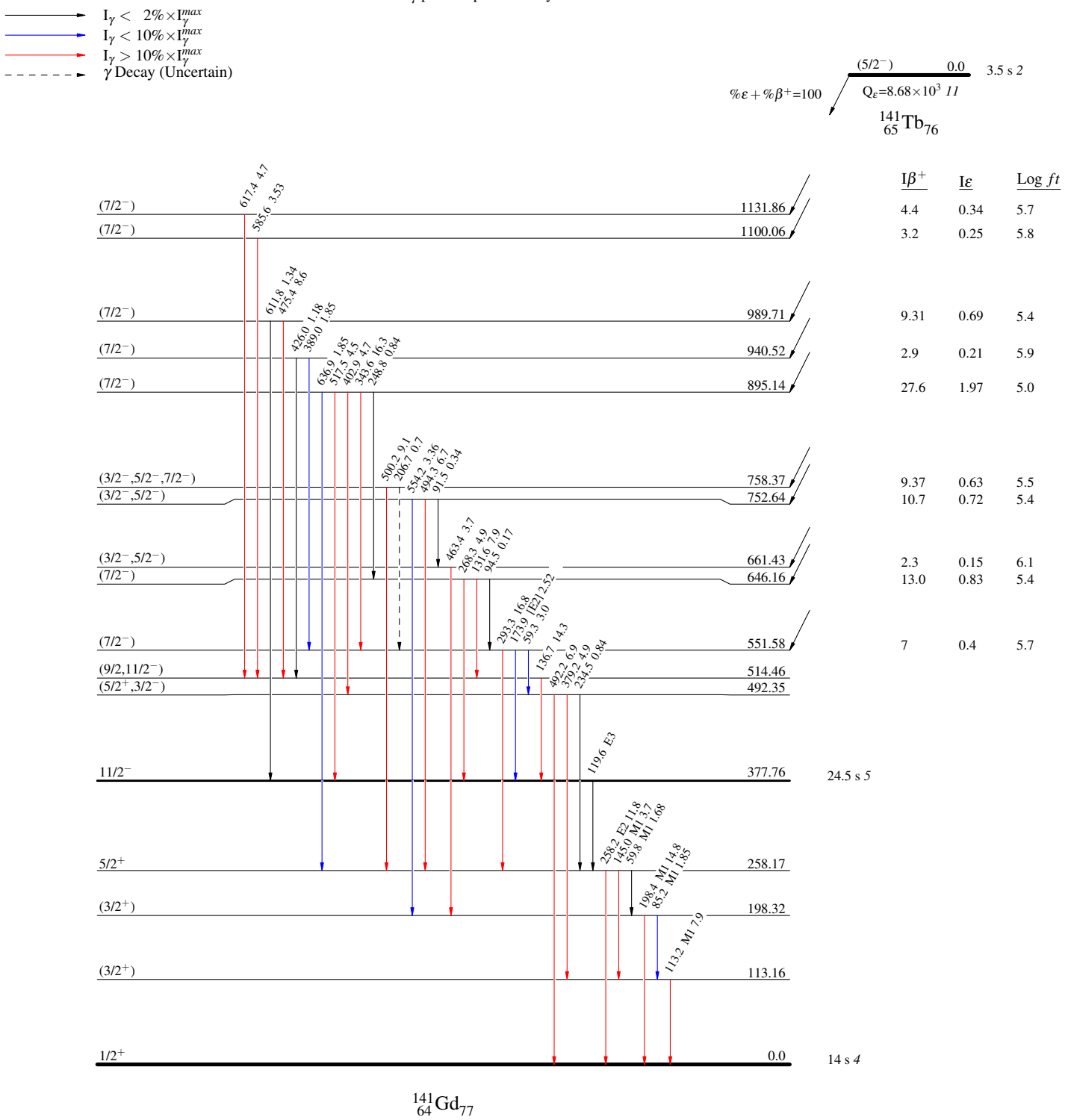
Decay Scheme

Intensities: I_γ per 100 parent decays



$^{141}_{64}Gd_{77}$