^{181}Ta(^{14}N,6nγ) 1983Gu12

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	T. D. Johnson, Balraj Singh	NDS 142, 1 (2017)	15-Apr-2017

1983Gu12: ^{181}Ta(^{14}N,6nγ), E(^{14}N)=90-110 MeV. Measured Eγ, Iγ, $\gamma\gamma$, $\gamma(\theta)$, ce-ce coincidence. NaI, Ge detectors for γ-measurements; a spectrometer with a superconducting solenoid electron transporter and two Si(Li) detectors for electron measurements. A total of 28 γ rays were reported.

^{189}Hg Levels

There are some differences in the level scheme presented by 1983Gu12 and the adopted level scheme from ^{160}Gd(^{34}S,5nγ) (1994Be27). For example the 704.8-518.2 cascade is reversed in 1994Be27 and also there is another transition connecting this cascade to the band based on 21/2$^-$.

E(level)[†]	J$^\pi$[‡]	Comments
0.0+x[#]	13/2$^+$	Additional information 1. E(level): x=80 keV *30* (2001Sc41,2017Au03).
403.00+x[#] *19*	17/2$^+$	
473.8+x *3*	15/2$^+$	
1029.80+x[#] *25*	21/2$^+$	
1110.1+x *3*	19/2$^+$	
1690.8+x[&] *3*	21/2$^-$	
1762.8+x[#] *4*	25/2$^+$	
1916.7+x[&] *4*	25/2$^-$	
1976.1+x[a] *5*	23/2$^-$	
2220.4+x[a] *5*	27/2$^-$	
2252.6+x[&] *4*	29/2$^-$	
2434.9+x *6*	29/2$^-$	
2476.9+x[@] *4*	29/2$^+$	
2615.5+x[#] *5*	29/2$^+$	
2674.3+x[@] *4*	33/2$^+$	
2686.0+x[a] *5*	31/2$^-$	
2820.7+x[&] *5*	33/2$^-$	
3123.7+x *6*	33/2$^+$	
3139.7+x *7*	(33/2$^-$)	
3153.5+x[@] *5*	(37/2$^+$)	
3343.8+x[a] *7*	(35/2$^-$)	
3540.2+x[&] *6*	37/2$^-$	
3793.1+x *8*	(37/2$^+$)	
3875.2+x[@] *6*	41/2$^+$	
4713.3+x? *8*	(41/2$^-$)	J$^\pi$: 45/2$^+$ in Adopted Levels.
5579.6+x? *10*	(45/2$^+$)	J$^\pi$: 49/2$^+$ in Adopted Levels.

† From least-squares fit to Eγ values.
‡ As proposed by 1983Gu12 based on $\gamma(\theta)$ data and band assignments.
# Band(A): Band based on 13/2$^+$.
@ Band(B): Band based on 29/2$^+$.
& Band(C): Band based on 21/2$^-$.
a Band(D): Band based on 23/2$^-$.

$^{181}Ta(^{14}N,6n\gamma)$ 1983Gu12 (continued)

$\gamma(^{189}Hg)$

Experimental internal conversion electron data such as K/L ratios are from 1983Gu12 deduced from their (ce)(ce) coincidence experiment.

E_γ[†]	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	α[‡]	Comments
58.8 *5*	0.080 *13*	2674.3+x	33/2⁺	2615.5+x	29/2⁺	E2	62 *3*	L12/L3=1.0 *5* α(L)=46.4 *21*; α(M)=12.1 *6* α(N)=2.99 *14*; α(O)=0.494 *22*; α(P)=0.000644 *24* I_γ: deduced by evaluators from B(E2)(58.8)/B(E2)(197.4)=1.84 *18* (1983Gu12).
197.4 *2*	14 *2*	2674.3+x	33/2⁺	2476.9+x	29/2⁺	E2	0.409	A_2=+0.23 *10*; A_4=+0.04 *10*; K/L=1.0 *1* α(K)=0.1749 *25*; α(L)=0.175 *3*; α(M)=0.0453 *7* α(N)=0.01126 *17*; α(O)=0.00190 *3*; α(P)=2.19×10^{-5} *4* Iγ(142°)/Iγ(90°)=1.04 *11*.
225.9 *2*	28 *1*	1916.7+x	25/2⁻	1690.8+x	21/2⁻	E2	0.259	A_2=+0.29 *6*; A_4=−0.11 *3*; K/L=1.1 *3* α(K)=0.1260 *18*; α(L)=0.1000 *15*; α(M)=0.0257 *4* α(N)=0.00639 *10*; α(O)=0.001086 *16*; α(P)=1.584×10^{-5} *23* Iγ(142°)/Iγ(90°)=1.23 *9*.
244.3 *4*	6 *2*	2220.4+x	27/2⁻	1976.1+x	23/2⁻			Iγ(142°)/Iγ(90°)=1.2 *7*.
335.9 *2*	16 *1*	2252.6+x	29/2⁻	1916.7+x	25/2⁻	(E2)	0.0766	A_2=+0.36 *2*; A_4=−0.10 *5* α(K)=0.0481 *7*; α(L)=0.0215 *3*; α(M)=0.00542 *8* α(N)=0.001349 *20*; α(O)=0.000234 *4*; α(P)=6.25×10^{-6} *9* Iγ(142°)/Iγ(90°)=1.30 *13*.
403.0 *2*	100 *2*	403.00+x	17/2⁺	0.0+x	13/2⁺	E2	0.0465	K/L=2.8 *3*; A_2=+0.40 *5*; A_4=0.00 *5* α(K)=0.0315 *5*; α(L)=0.01135 *16*; α(M)=0.00283 *4* α(N)=0.000705 *10*; α(O)=0.0001239 *18*; α(P)=4.14×10^{-6} *6* Iγ(142°)/Iγ(90°)=1.30 *4*.
457.5 *4*	8 *1*	2220.4+x	27/2⁻	1762.8+x	25/2⁺	D		A_2=−0.30 *10* Iγ(142°)/Iγ(90°)=0.82 *20*.
465.6 *2*	15 *2*	2686.0+x	31/2⁻	2220.4+x	27/2⁻	(E2)	0.0321	A_2=+0.33 *6* Iγ(142°)/Iγ(90°)=1.26 *16*.
473.8 *4*	9 *1*	473.8+x	15/2⁺	0.0+x	13/2⁺	D+Q		A_2=−0.75 *5*; A_4=+0.39 *20* Iγ(142°)/Iγ(90°)=0.47 *9*.
479.2 *2*	12 *2*	3153.5+x	(37/2⁺)	2674.3+x	33/2⁺	(E2)	0.0299	A_2=+0.40 *10*; A_4=0.00 *10* Iγ(142°)/Iγ(90°)=1.18 *19*.
518.2[@] *4*	6 *2*	2434.9+x	29/2⁻	1916.7+x	25/2⁻	(E2)	0.0247	A_2=+0.40 *20* Iγ(142°)/Iγ(90°)=1.14 *37*.
568.1 *2*	13 *3*	2820.7+x	33/2⁻	2252.6+x	29/2⁻	(E2)	0.0199	A_2=+0.12 *4* Iγ(142°)/Iγ(90°)=1.19 *15*.
580.7 *2*	11 *2*	1690.8+x	21/2⁻	1110.1+x	19/2⁺	D		A_2=−0.37 *5*; A_4=−0.04 *6* Iγ(142°)/Iγ(90°)=0.73 *9*.
626.8 *2*	77 *2*	1029.80+x	21/2⁺	403.00+x	17/2⁺	E2	0.01594	A_2=+0.20 *2*; A_4=−0.05 *4*; K/L=4.0 *5* Iγ(142°)/Iγ(90°)=1.37 *20*.
636.3 *2*	10 *1*	1110.1+x	19/2⁺	473.8+x	15/2⁺	Q		A_2=+0.20 *6*; A_4=+0.12 *8* Note that positive A_4 is inconsistent

Continued on next page (footnotes at end of table)

^{181}Ta(^{14}N,6nγ) 1983Gu12 (continued)

γ(^{189}Hg) (continued)

E_γ [†]	I_γ	E_i(level)	J^π_i	E_f	J^π_f	Mult. [#]	α [‡]	Comments
								with stretched quadrupole. Iγ(142°)/Iγ(90°)=1.44 *25*.
646.8 *4*	8 *1*	3123.7+x	33/2+	2476.9+x	29/2+	(Q)		Iγ(142°)/Iγ(90°)=1.17 *22*.
657.8 *4*	9 *1*	3343.8+x	(35/2−)	2686.0+x	31/2−	Q		A_2=+0.41 *6*; A_4=−0.16 *8* Iγ(142°)/Iγ(90°)=1.5 *5*.
661.0 *2*	13 *2*	1690.8+x	21/2−	1029.80+x	21/2+	D		A_2=+0.12 *4* Iγ(142°)/Iγ(90°)=1.04 *19*; ΔJ=0 transition.
669.4 *6*	4 *2*	3793.1+x	(37/2+)	3123.7+x	33/2+			
704.8 [@] *4*	5 *2*	3139.7+x	(33/2−)	2434.9+x	29/2−			Iγ(142°)/Iγ(90°)=1.7 *9*.
707.1 *4*	7 *2*	1110.1+x	19/2+	403.00+x	17/2+	D+Q		A_2=−0.70 *10*; A_4=+0.45 *10* Iγ(142°)/Iγ(90°)=0.43 *12*.
714.1 *2*	23 *2*	2476.9+x	29/2+	1762.8+x	25/2+	(E2)	0.01200	A_2=+0.13 *3*; K/L=4 *1* Iγ(142°)/Iγ(90°)=1.07 *10*.
719.5 *4*	7 *2*	3540.2+x	37/2−	2820.7+x	33/2−	(Q)		Iγ(142°)/Iγ(90°)=1.12 *30*.
721.7 *4*	7 *2*	3875.2+x	41/2+	3153.5+x	(37/2+)	(Q)		Iγ(142°)/Iγ(90°)=1.12 *30*.
[x]731.5								E_γ: from the single spectra shown in Fig. 1 in 1983Gu12, however, not listed in authors′ Table 1.
733.0 *2*	50 *2*	1762.8+x	25/2+	1029.80+x	21/2+	(E2)	0.01135	A_2=+0.25 *2*; A_4=+0.01 *2*; K/L=4 *1* Iγ(142°)/Iγ(90°)=1.63 *14*.
838.1 [&] *4*	6 *2*	4713.3+x?	(41/2−)	3875.2+x	41/2+			
852.7 *4*	6 *2*	2615.5+x	29/2+	1762.8+x	25/2+	(E2)	0.00830	K(853)/K(733)=0.7 *1*, deduced from ce-ce coincidence intensities in the ce(L)(59 keV) gate. Iγ(142°)/Iγ(90°)=1.05 *29*.
866.3 [&] *6*	3 *2*	5579.6+x?	(45/2+)	4713.3+x?	(41/2−)			E_γ: 870.0 in Adopted dataset.
946.4 *4*	5 *2*	1976.1+x	23/2−	1029.80+x	21/2+	D		A_2=−0.46 *4* Iγ(142°)/Iγ(90°)=0.54 *20*.

† 1983Gu12 state an uncertainty of 0.2 keV for most γ rays, rising to 0.6 keV for the weakest ones. Evaluators assign 0.2 keV for Iγ≥10, 0.4 keV for Iγ=5-9 and 0.6 keV for Iγ<5.

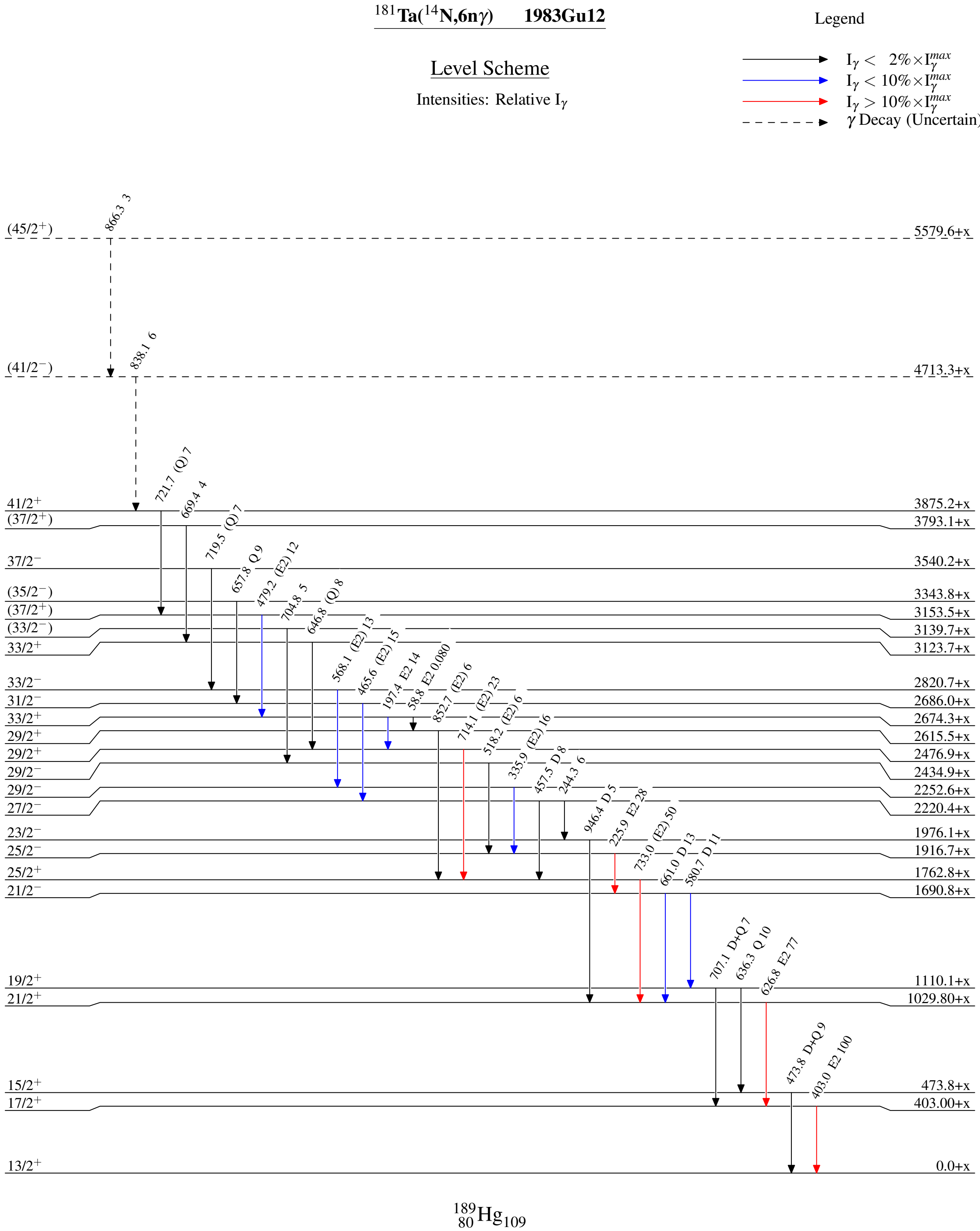
‡ From BrIcc code (2008Ki07), "Frozen Orbitals" appr.

\# For stretched quadrupole transitions, (E2) is assigned here for Eγ<600 keV based on assumed level half-life <20 ns (typical coincidence resolving time) and RUL for E2 and M2.

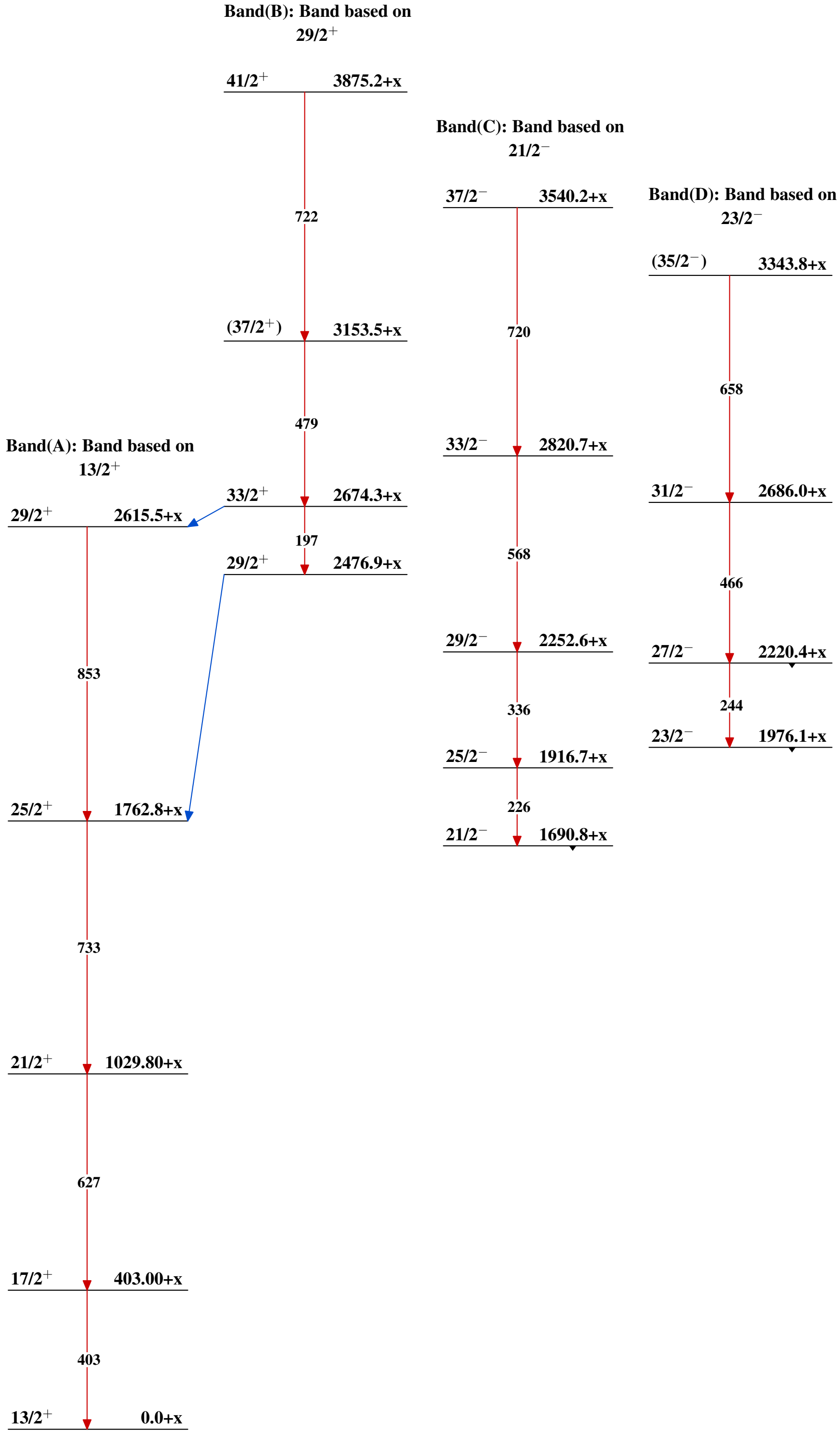
@ Ordering of the 704.8-518.2 γ cascade is reversed as well as built on another level in 1994Be27 and Adopted Levels.

& Placement of transition in the level scheme is uncertain.

x γ ray not placed in level scheme.


^{181}Ta(^{14}N,6nγ) 1983Gu12
Level Scheme
Intensities: Relative Iγ
Legend
Iγ < 2%×Iγmax
Iγ < 10%×Iγmax
Iγ > 10%×Iγmax
γ Decay (Uncertain)
(45/2+) 5579.6+x
866.3 3
(41/2−) 4713.3+x
838.1 6
41/2+ 3875.2+x
(37/2+) 3793.1+x
37/2− 3540.2+x
(35/2−) 3343.8+x
(37/2+) 3153.5+x
(33/2−) 3139.7+x
33/2+ 3123.7+x
33/2− 2820.7+x
31/2− 2686.0+x
33/2+ 2674.3+x
29/2+ 2615.5+x
29/2+ 2476.9+x
29/2− 2434.9+x
29/2− 2252.6+x
27/2− 2220.4+x
23/2− 1976.1+x
25/2− 1916.7+x
25/2+ 1762.8+x
21/2− 1690.8+x
19/2+ 1110.1+x
21/2+ 1029.80+x
15/2+ 473.8+x
17/2+ 403.00+x
13/2+ 0.0+x
721.7 (Q) 7
669.4 4
719.5 (Q) 7
657.8 Q 9
479.2 (E2) 12
704.8 5
646.8 (Q) 8
568.1 (E2) 13
465.6 (E2) 15
197.4 E2 14
58.8 E2 0.080
852.7 (E2) 6
714.1 (E2) 23
518.2 (E2) 6
335.9 (E2) 16
457.5 D 8
244.3 6
946.4 D 5
225.9 E2 28
733.0 (E2) 50
661.0 D 13
580.7 D 11
707.1 D+Q 7
636.3 Q 10
626.8 E2 77
473.8 D+Q 9
403.0 E2 100
$^{189}_{80}$Hg$_{109}$

$^{181}Ta(^{14}N,6n\gamma)$ 1983Gu12



$^{189}_{80}Hg_{109}$