^{181}Ta(^{14}N,5nγ) 1982Gu10,1975Li16

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh, [1] and Jun Chen[2]	NDS 169, 1 (2020)	15-Oct-2020

1982Gu10: E=100 MeV. Measured Eγ, Iγ, γγ, γ(θ). Cranking-model calculations.
1983Gu05: E=100 MeV. Measured ce, ce-ce coin, ce(t).
1980Hj01: E=94 MeV. Measured g factor of 12^+ state by differential perturbed angular distribution method.
1975Li16 (also 1974Be11): E=93 MeV. Measured Eγ, Iγ, γγ, γ(θ), γ(t).
1972In02: E=85 MeV. Measured Eγ, Iγ, γ(t), γ(θ).
1967Bu02, 1967Ne02 (also 1967Bu18): E=93 MeV. Measured Eγ, Iγ, ce, γγ, γ(θ). The g.s. band reported up to 6^+ defined by 730-625-416 cascade.
Other: 1999Lu04: E=120 MeV. Measured α-γ coin, deduced contribution from incomplete fusion.

^{190}Hg Levels

The band labels and crossings are given in terms of single-particle (neutron) Routhians (1982Gu10) as follows:
A: ν5/2[642],α=+1/2.
B: ν5/2[642],α=−1/2.
C: ν7/2[633],α=+1/2.
D: ν7/2[633],α=−1/2.
E: ν5/2[503],α=−1/2.
F: ν5/2[503],α=+1/2.

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$	Comments
0.0[@]	0^+		
416.5[@] *2*	2^+		
1041.9[@] *3*	4^+		
1773.4[@] *4*	6^+		
1881.7[b] *5*	5^-		
2078.8[b] *4*	7^-		
2319.4[d] *6*	$8^{(-)}$		
2336.0[b] *5*	9^-		
2465.6[&] *4*	8^+		
2597.5[&] *6*	10^+		
2621.4[&] *8*	12^+	21 ns *2*	$T_{1/2}$: γ(t) (1980Hj01). Other: 24.5 ns *15* (1972In02). g factor=−0.21 *2* (1980Hj01) (differential perturbed γ(θ)).
2724.8[d] *6*	$10^{(-)}$		
2845.2[#] *8*	(10^-)[#]		
2866.2[b] *5*	11^-		
3007.7[#] *9*	(11^-)[#]		
3041.3[&] *8*	14^+		
3278.0[#] *7*	(12^+)[#]		
3359.1[#d] *9*	(12^-)[#]		
3494.0[#] *11*	(13^-)[#]		
3549.6[b] *7*	13^-		
3704.1[&] *8*	16^+		
3980.8[e] *10*	$14^{(-)}$		
4088.4[c] *8*	15^-		
4244.3[e] *10*	$16^{(-)}$		

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^{181}Ta(^{14}N,5nγ) 1982Gu10,1975Li16 (continued)

^{190}Hg Levels (continued)

E(level)[†]	Jπ[‡]	E(level)[†]	Jπ[‡]	E(level)[†]	Jπ[‡]	E(level)[†]	Jπ[‡]
4327.4[c] 9	17⁻	4553.0[e] 11	18(−)	5230.1[a] 11	20+	5796.3[a] 12	(22+)
4493.3[&] 9	18+	4710.5[c] 10	19⁻	5334.5[c] 14	(21⁻)	6523.7[a] 14	(24+)

[†] From least-squares fit to Eγ data.
[‡] As given by 1982Gu10 based on band assignments and previous γ(θ) data, and band assignments. Exceptions are noted.
[#] From the Adopted Levels.
[@] Band(A): g.s. band.
[&] Band(B): AB band,α=0.
[a] Band(C): ABCD band,α=0.
[b] Band(D): AF band,α=1.
[c] Band(E): AFBC band,α=1.
[d] Band(F): AE band,α=0.
[e] Band(G): AEBC band,α=0.

γ(^{190}Hg)

Iγ(38°)/Iγ(90°) values are from 1982Gu10. Expected values are 1.25 for stretched quadrupoles and 0.75 for stretched dipoles. The two values correspond to data from singles spectra and two-fold coincidence spectra.

Relative intensities at other E(^{14}N)

Eγ (1975Li16)	I(γ+ce)(E=93 MeV) (1975Li16)	Iγ(E=85 MeV) (1972In02)
131.8 3	44 6	
196.6 3	23 6	
239.9 3	22 6	16.8 7
256.9 3	25 5	
305.1 3	24 5	
416.2 3	100 10	100 3
419.6 3	37 6	
529.6 3	16 4	
625.4 3	110 10	103 3
691.8 3	79 9	44.7 19
731.0 3	103 10	61.3 23
839.1 3	16 4	16.8 7

Eγ[†]	Iγ[†]	Ei(level)	J^π_i	Ef	J^π_f	Mult.	α[b]	Comments
23.9 5	0.006 1	2621.4	12+	2597.5	10+	[E2]	5.2×10³ 6	Eγ: uncertainty assigned by evaluators. Reported in ce-ce coin data as ce(M)(23.9γ) (1983Gu05). Iγ: deduced from I(γ+ce)(419.9γ)=I(γ+ce)(23.9γ).
131.9 4	12.4 6	2597.5	10+	2465.6	8+	E2	1.80 4	K/L=0.5 1 (1983Gu05); A_2=+0.19 4; A_4=−0.10 6 (1975Li16) α(K)=0.426 7; α(L)=1.030 21; α(M)=0.269 6 α(N)=0.0667 14; α(O)=0.01112 22; α(P)=5.80×10⁻⁵

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^{181}Ta(^{14}N,5nγ) 1982Gu10,1975Li16 (continued)

γ(^{190}Hg) (continued)

Eγ[†]	Iγ[†]	Ei(level)	J^π_i	Ef	J^π_f	Mult.	δ	α[b]	Comments
									10 Mult.: from K/L and γ(θ). K/L gives δ(E2/M1)>9. Iγ(38°)/Iγ(90°)=1.30 *4*, 1.30 *8*.
(162.5 *3*)		3007.7	(11⁻)	2845.2	(10⁻)				γ from adopted gammas. Not reported by 1982Gu10.
197.1 *2*	15.9 *6*	2078.8	7⁻	1881.7	5⁻	E2		0.411	K/L=0.81 *3* (1983Gu05); A_2=+0.28 *6*; A_4=−0.13 *9* (1975Li16) α(K)=0.1755 *25*; α(L)=0.177 *3*; α(M)=0.0456 *7* α(N)=0.01133 *17*; α(O)=0.00191 *3*; α(P)=2.19×10^{-5} *4* Mult.: from and γ(θ). Iγ(38°)/Iγ(90°)=1.20 *5*, 1.16 *8*.
239.0 *4*	5.8 *7*	4327.4	17⁻	4088.4	15⁻	(E2)[@]			Iγ(38°)/Iγ(90°)=1.40 *17*.
240.6 *4*	12.6 *7*	2319.4	8$^{(-)}$	2078.8	7⁻	M1+E2	≈0.85	≈0.472	K/L=4.0 *4* (1983Gu05); A_2=−0.19 *6*; A_4=−0.09 *9* (1975Li16) α(K)≈0.360; α(L)≈0.0853; α(M)≈0.0206 α(N)≈0.00515; α(O)≈0.000936; α(P)≈5.04×10^{-5} Mult.,δ: from K/L and γ(θ). Iγ(38°)/Iγ(90°)=0.56 *10*. Iγ(45°)/Iγ(90°)=0.70 *7* (1972In02).
257.2 *2*	17.0 *6*	2336.0	9⁻	2078.8	7⁻	(E2)[&]			A_2=+0.24 *5*; A_4=−0.13 *7* (1975Li16) Iγ(38°)/Iγ(90°)=1.21 *4*, 1.22 *5*.
263.5 *4*	10.7 *6*	4244.3	16$^{(-)}$	3980.8	14$^{(-)}$	(E2)[@]			Iγ(38°)/Iγ(90°)=1.14 *6*, 1.17 *4*.
305.4 *2*	26.2 *6*	2078.8	7⁻	1773.4	6⁺	D			K/L=6 *1* (1983Gu05); A_2=−0.32 *5*; A_4=+0.04 *8* (1975Li16) Mult.: from K/L and γ(θ). Iγ(38°)/Iγ(90°)=0.72 *2*, 0.69 *2*.
308.7 *4*	6.8 *6*	4553.0	18$^{(-)}$	4244.3	16$^{(-)}$	(E2)[@]			Iγ(38°)/Iγ(90°)=1.20 *13*, 1.25 *12*.
383.1 *4*	9.6 *7*	4710.5	19⁻	4327.4	17⁻	(E2)[@]			Iγ(38°)/Iγ(90°)=1.15 *8*, 1.36 *11*.
388.9 *6*	4[‡] *2*	2724.8	10$^{(-)}$	2336.0	9⁻				
405.3 *4*	7.1 *7*	2724.8	10$^{(-)}$	2319.4	8$^{(-)}$	(E2)[@]			Iγ(38°)/Iγ(90°)=1.23 *13*, 1.24 *12*.
416.5 *2*	100 *1*	416.5	2⁺	0.0	0⁺	(E2)[a]			A_2=+0.31 *2*; A_4=−0.11 *4* (1975Li16) Iγ(38°)/Iγ(90°)=1.21 *1*, 1.18 *2*. Iγ(45°)/Iγ(90°)=1.25 *3* (1972In02).
419.9 *2*	34.0 *7*	3041.3	14⁺	2621.4	12⁺	(E2)[&]			A_2=+0.15 *6*; A_4=−0.19 *9* (1975Li16) Iγ(38°)/Iγ(90°)=1.21 *3*, 1.33 *5*.
486.3[#] *6*	4.7 *8*	3494.0	(13⁻)	3007.7	(11⁻)	Q[@]			Iγ(38°)/Iγ(90°)=1.18 *15*.
525.8[#] *6*	4.6 *8*	2845.2	(10⁻)	2319.4	8$^{(-)}$	Q[@]			Iγ(38°)/Iγ(90°)=1.66 *25*, 1.53 *25*.
530.2 *2*	18.0 *6*	2866.2	11⁻	2336.0	9⁻	Q[&]			A_2=+0.19 *10*; A_4=−0.22 *15* (1975Li16) Iγ(38°)/Iγ(90°)=1.25 *6*, 1.38 *8*.
538.8 *4*	9.1 *9*	4088.4	15⁻	3549.6	13⁻	Q[@]			Iγ(38°)/Iγ(90°)=1.19 *10*, 1.33 *13*.
566.2 *6*	7[‡] *2*	5796.3	(22⁺)	5230.1	20⁺				
621.7 *4*	7.1 *9*	3980.8	14$^{(-)}$	3359.1	(12⁻)	Q[@]			For placement see comment for 634.3γ. γ(38°)/Iγ(90°)=1.16 *13*, 1.40 *17*.
624 *1*	9[‡] *2*	5334.5	(21⁻)	4710.5	19⁻				
625.4 *2*	105 *4*	1041.9	4⁺	416.5	2⁺	Q[a]			A_2=+0.26 *3*; A_4=−0.16 *5* (1975Li16) Iγ(38°)/Iγ(90°)=1.15 *3*, 1.54 *7*. Iγ(45°)/Iγ(90°)=1.30 *4* (1972In02).
634.3 *6*	6.4[‡] *11*	3359.1	(12⁻)	2724.8	10$^{(-)}$	Q[@]			Iγ(38°)/Iγ(90°)=1.49 *14*, 1.44 *17*.

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^{181}Ta(^{14}N,5nγ) 1982Gu10,1975Li16 (continued)

γ(^{190}Hg) (continued)

E_γ[†]	I_γ[†]	E_i(level)	J^π_i	E_f	J^π_f	Mult.	Comments
							Placement is from high-spin levels, gammas. The ordering of the 621.6γ-633.9γ cascade was reversed in 1982Gu10 which defined the intermediate level at 3346 instead of the present level at 3358.
662.8 *2*	30.7 *13*	3704.1	16+	3041.3	14+	Q[@]	Iγ(38°)/Iγ(90°)=1.31 *4*, 1.18 *5*.
680.5[#] *4*	8.4 *8*	3278.0	(12+)	2597.5	10+	Q[@]	Iγ(38°)/Iγ(90°)=1.42 *18*, 1.2 *4*.
683.4 *4*	13.0 *10*	3549.6	13−	2866.2	11−	Q[@]	Iγ(38°)/Iγ(90°)=1.15 *7*, 1.19 *9*.
692.2 *2*	58.4 *10*	2465.6	8+	1773.4	6+	Q[&]	A_2=+0.28 *7*; A_4=+0.02 *10* (1975Li16) Iγ(38°)/Iγ(90°)=1.20 *2*, 1.16 *5*. Iγ(45°)/Iγ(90°)=1.20 *6* (1972In02).
727.4 *6*	4 *3*	6523.7	(24+)	5796.3	(22+)		
731.5 *2*	83.4 *14*	1773.4	6+	1041.9	4+	Q[a]	A_2=+0.23 *3*; A_4=−0.09 *5* (1975Li16) Iγ(38°)/Iγ(90°)=1.19 *2*, 1.17 *3*. Iγ(45°)/Iγ(90°)=1.39 *5* (1972In02).
736.8 *6*	14[‡] *2*	5230.1	20+	4493.3	18+	Q[@]	Iγ(38°)/Iγ(90°)=1.14 *10*, 1.20 *15*.
[x]784.5 *9*							This γ ray is reported by 1972In02 only. Its existence is considered as questionable (evaluators). Additional information 1.
789.2 *2*	20.7 *8*	4493.3	18+	3704.1	16+	Q[@]	Iγ(38°)/Iγ(90°)=1.58 *7*, 1.37 *7*.
839.8 *6*	19.7[‡] *9*	1881.7	5−	1041.9	4+	D	A_2=−0.26 *11*; A_4=+0.06 *17* (1975Li16) Iγ(38°)/Iγ(90°)=0.84 *4*, 0.73 *6*. Mult.: ΔJ=1, dipole from γ(θ).

[†] From ^{181}Ta(^{14}N,5nγ),E=100 MeV (1982Gu10). Energy uncertainty given as 0.2 to 0.6 keV (1982Gu10). The uncertainties assigned (evaluators) are: 0.2 keV for Iγ>15, 0.4 keV for Iγ=5-15, 0.6 keV for Iγ<5 and complex peaks.

[‡] Complex peak. Iγ from γγ (1982Gu10).

[#] Placement from Adopted Levels, gammas. Unplaced in 1982Gu10.

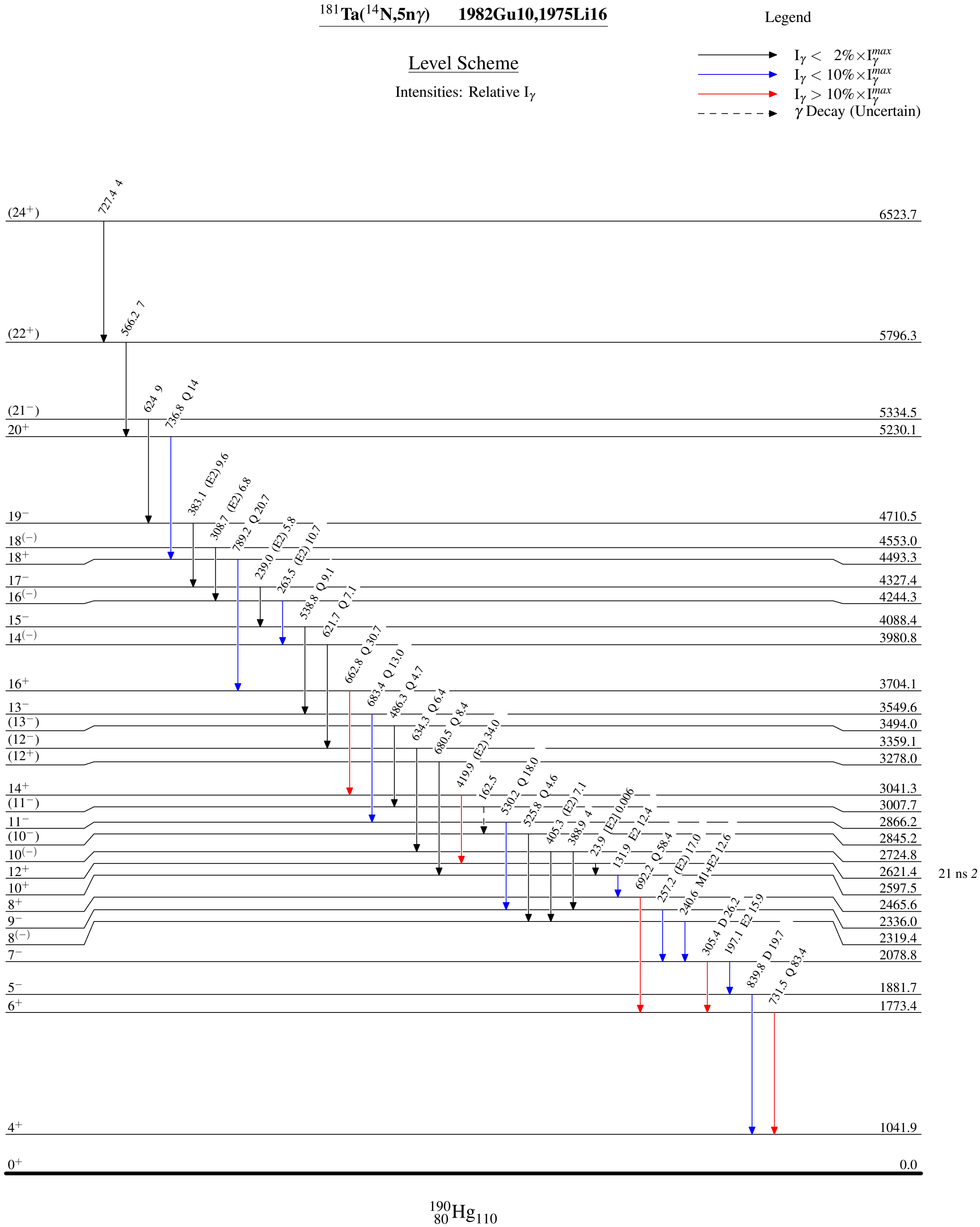
[@] ΔJ=(2), quadrupole from γ(θ) data (at two angles).

[&] A_2 and A_4 coefficients from γ(θ) data indicate ΔJ=2, quadrupole (likely E2). For γ rays below 500 keV, evaluators assign (E2) based on RUL (for E2 and M2), assuming timing resolution of ≈20 ns in γγ-coin arrangement.

[a] From K/L (1967Bu02) and ΔJ=2 from γ(θ).

[b] 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.

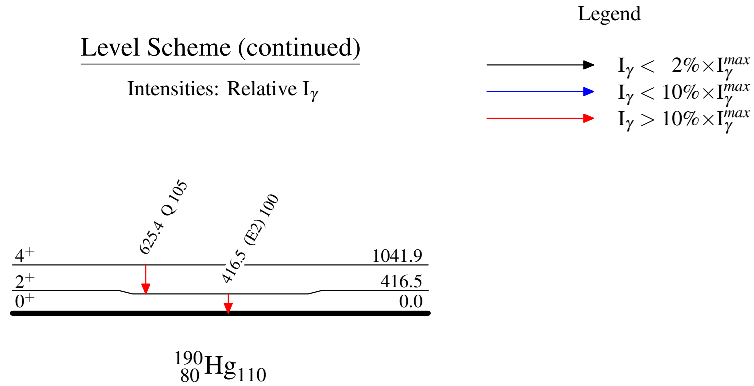
[x] γ ray not placed in level scheme.


^{181}Ta(^{14}N,5nγ) 1982Gu10,1975Li16
Level Scheme
Intensities: Relative Iγ
Legend
Iγ < 2%×Iγ^max
Iγ < 10%×Iγ^max
Iγ > 10%×Iγ^max
γ Decay (Uncertain)
(24+) 6523.7
(22+) 5796.3
(21−) 5334.5
20+ 5230.1
19− 4710.5
18(−) 4553.0
18+ 4493.3
17− 4327.4
16(−) 4244.3
15− 4088.4
14(−) 3980.8
16+ 3704.1
13− 3549.6
(13−) 3494.0
(12−) 3359.1
(12+) 3278.0
14+ 3041.3
(11−) 3007.7
11− 2866.2
(10−) 2845.2
10(−) 2724.8
12+ 2621.4
10+ 2597.5
8+ 2465.6
9− 2336.0
8(−) 2319.4
7− 2078.8
5− 1881.7
6+ 1773.4
4+ 1041.9
0+ 0.0
21 ns 2
727.4 4
566.2 7
624 9
736.8 Q 14
383.1 (E2) 9.6
308.7 (E2) 6.8
789.2 Q 20.7
239.0 (E2) 5.8
263.5 (E2) 10.7
538.8 Q 9.1
621.7 Q 7.1
662.8 Q 30.7
683.4 Q 13.0
486.3 Q 4.7
634.3 Q 6.4
680.5 Q 8.4
419.9 (E2) 34.0
162.5
530.2 Q 18.0
525.8 Q 4.6
405.3 (E2) 7.1
388.9 4
23.9 [E2] 0.006
131.9 E2 12.4
692.2 Q 58.4
257.2 (E2) 17.0
240.6 M1+E2 12.6
305.4 D 26.2
197.1 E2 15.9
839.8 D 19.7
731.5 Q 83.4
$^{190}_{80}Hg_{110}$

^{181}Ta(^{14}N,5nγ) 1982Gu10,1975Li16

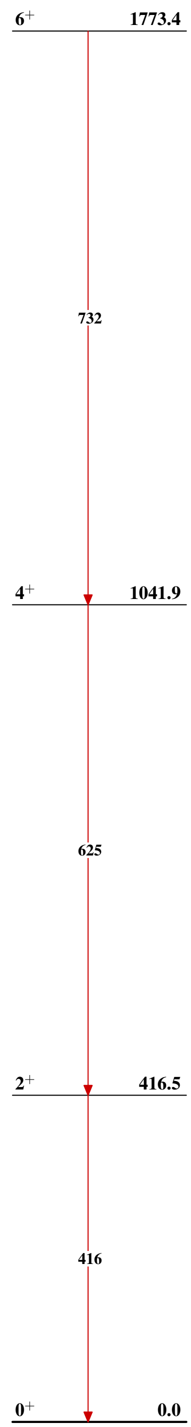
Level Scheme (continued)

Intensities: Relative I_γ



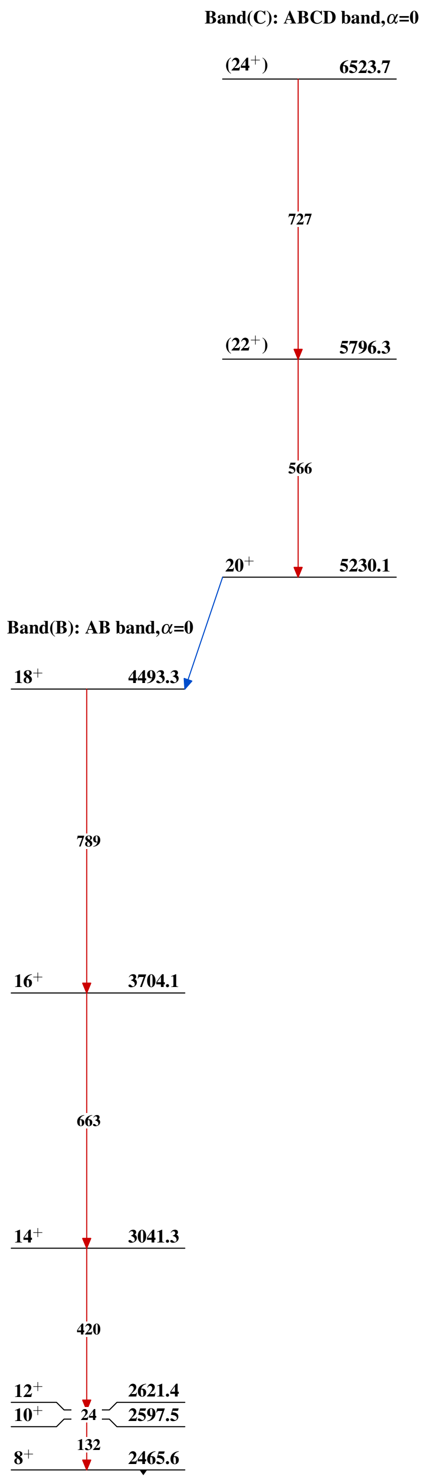
$^{181}Ta(^{14}N,5n\gamma)$ 1982Gu10,1975Li16

Band(A): g.s. band



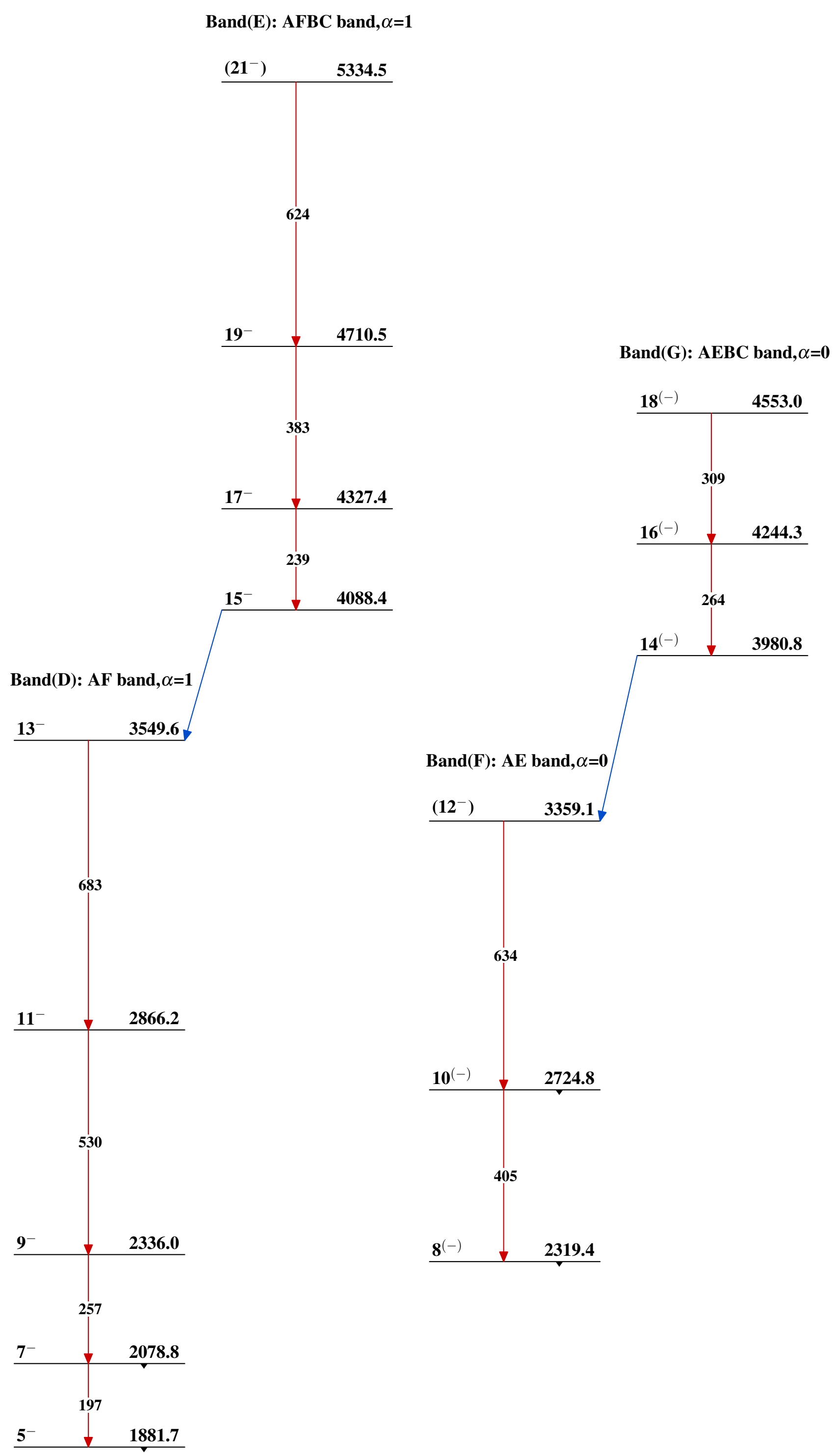
$^{190}_{80}Hg_{110}$

$^{181}Ta(^{14}N,5n\gamma)$ 1982Gu10,1975Li16 (continued)



$^{190}_{80}Hg_{110}$

$^{181}Ta(^{14}N,5n\gamma)$ 1982Gu10,1975Li16 (continued)



$^{190}_{80}Hg_{110}$