Adopted Levels, Gammas

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

Q(β^-)=−8.06×10^3 *3*; S(n)=1.073×10^4 *6*; S(p)=280 *16*; Q(α)=5981 *5* 2012Wa38

Note: Current evaluation has used the following Q record −8030 3010700 60 *243* 206052 18 2003Au03.

Other Reactions:

^{89}Y(^{90}Zr,γ), E(^{90}Zr)=352 MeV (346 MeV mid-target) (2003Ca14): fragment mass analyzer with position-sensitive parallel-grid avalanche counter at focal plane; recoils implanted in Si double-sided strip detector; 4 packs of BaF_2 detectors (37 crystals per pack); BGO multiplicity and sum-energy array (for low-energy γ-rays); measured spectra of high-energy γ-rays emitted by GDR; deduced Γ(GDR)=5.0 MeV *4*.

^{179}Au Levels

Additional information 1.

Cross Reference (XREF) Flags

A ^{183}Tl α decay (53.3 ms)
B ^{90}Zr(^{90}Zr,pγ),
C ^{149}Sm(^{35}Cl,5nγ)

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$	XREF	Comments
0.0	(1/2$^+$,3/2$^+$)	7.1 s *3*	AB	%ε+%β^+=78.0 *9*; %α=22.0 *9* (1986Ke03) J$^\pi$: neighboring lower-mass Au isotopes probably have 1/2$^+$ or 3/2$^+$ ground states, but higher-mass isotopes probably have 3/2$^-$ or 5/2$^-$ ground states. α decay to ^{175}Ir (Eα=5848 *5* (1968Si01), Q(α)=5982 *5* if g.s. to g.s. transition) is unhindered (HF<4), but Q(α)=6052 *18* from 2003Au03 suggests that an excited state in ^{175}Ir is fed. Thus, the structure of ^{179}Au(g.s.) appears to differ from that of the (5/2$^-$) 1/2[541] ^{175}Ir g.s. See 1999Mu05 for calculation of low-lying bandhead energies for odd-A Au isotopes with A=177 through 185. $T_{1/2}$: weighted average of 7.2 s *5* (1968Si01), 8.1 s *7* (1968De01). 6.9 s *3* (1980Da09). Other $T_{1/2}$: 3.3 s *13* (1996Pa01).
0.0+x	(1/2$^+$,3/2$^+$,5/2$^+$)		A	E(level): possibly, a low-energy transition connects this level to the g.s. but was missed in the α-decay study reported in 2004Ra28. Alternatively, this level may itself Be the g.s. (i.e., x=0). J$^\pi$: (E1) 62γ from (3/2$^-$) 62+x level. If J=5/2, level may Be analogous to the low-lying 5/2[402] prolate bandhead in ^{175}Ir.
0.0+z[@]	(5/2$^-$)		B	J$^\pi$: J=5/2 member of 1/2[541] band expected at lower energy than the J=9/2 member, but J=9/2 to 5/2 transition has not yet been observed.
0.0+y[@]	(9/2$^-$)		BC	A (9/2$^-$) 203.6+x level is observed in α decay; its relationship (if any) with this level is not known.
16.6+y *9*			B	J$^\pi$: 371γ is ΔJ=0 or 2 from (13/2$^+$) 388+y; 350γ from (9/2$^+$) 367+y.
21.2+y[a] *10*	(7/2$^-$)		BC	J$^\pi$: from possible band assignment.
61.8+x *3*	(3/2$^-$)		A	J$^\pi$: (E2) 89γ from (7/2$^-$) 151+x. E(level): an alternative value of 89.4+x is possible because order of 62γ-89γ cascade has not been firmly established.
86+x *13*		>100 μs	A	%IT=? E(level): from difference in adopted values of Eα to this level and Eα to 203.6+x level in ^{183}Tl α decay (53.3 ms). $T_{1/2}$: from ^{183}Tl α decay (53.3 ms); no γ observed in coincidence with α feeding this level (2004Ra28).

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Adopted Levels, Gammas (continued)

^{179}Au Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	XREF	Comments
104.9+y?[#] *7*	(7/2$^-$)	B	
151.2+x *4*	(7/2$^-$)	A	J$^{\pi}$: M1 52γ from (9/2$^-$) 204+x. HF≈12 in α-decay from the 9/2$^-$ isomer of ^{183}Tl suggests a modest change of angular momentum in α decay without underlying structural change (2004Ra28). This suggests similar structure for the (7/2$^-$) 151+x and (9/2$^-$) 204+x levels in ^{179}Au.
203.6+x *4*	(9/2$^-$)	A	J$^{\pi}$: α decay from (9/2$^-$) ^{183}Tl(625 keV) is unhindered (HF=1.6 *4*). The relationship (if any) between this level and the (9/2$^-$) 0.0+y level observed in ^{90}Zr(^{90}Zr,pγ) is unclear.
242.0+y[a] *9*	(11/2$^-$)	BC	J$^{\pi}$: intraband Q 221γ to (7/2$^-$) 21+y.
242.6+y[@] *5*	(13/2$^-$)	B	J$^{\pi}$: intraband Q 243γ to (9/2$^-$) 0+y.
296.9+y[#] *5*	(11/2$^-$)	B	J$^{\pi}$: D 297γ to (9/2$^-$) 0.0+y; intraband 192γ to (7/2$^-$) 105+y.
366.8+y[&] *10*	(9/2$^+$)	B	
387.6+y[&] *7*	(13/2$^+$)	BC	J$^{\pi}$: (E1) 145γ to (13/2$^-$) 243+y; 146γ to (11/2$^-$) 242+y.
540.5+y[&] *9*	(17/2$^+$)	BC	J$^{\pi}$: intraband Q 153γ to (13/2$^+$) 388+y.
574.5+y[a] *10*	(15/2$^-$)	B	J$^{\pi}$: intraband Q 333γ to (11/2$^-$) 242+y.
583.0+y[#] *5*	(15/2$^-$)	B	J$^{\pi}$: intraband Q 286γ to (11/2$^-$) 297+y.
592.8+y[@] *7*	(17/2$^-$)	B	
802.4+y[&] *10*	(21/2$^+$)	BC	J$^{\pi}$: intraband Q 262γ to (17/2$^+$) 541+y.
950.7+y[#] *7*	(19/2$^-$)	B	
998.1+y[a] *11*	(19/2$^-$)	B	
1024.4+y[@] *9*	(21/2$^-$)	B	
1156.3+y[&] *11*	(25/2$^+$)	BC	
1391.6+y[#] *9*	(23/2$^-$)	B	
1498.2+y[a] *12*	(23/2$^-$)	B	
1530.0+y[@] *10*	(25/2$^-$)	B	
1590.7+y[&] *12*	(29/2$^+$)	BC	
1899.0+y[#] *10*	(27/2$^-$)	B	
2057.6+y[a] *13*	(27/2$^-$)	B	
2097.8+y[&] *13*	(33/2$^+$)	BC	
2461.5+y[#] *12*	(31/2$^-$)	B	
2671.3+y[&] *14*	(37/2$^+$)	B	
3304.3+y[&] *15*	(41/2$^+$)	B	
3984.2+y[&] *16*	(45/2$^+$)	B	
4722.9+y[&] *17*	(49/2$^+$)	B	
5510.2+y[&] *20*	(53/2$^+$)	B	
6332.2+y?[&] *22*	(57/2$^+$)	B	
7172.2+y?[&] *24*	(61/2$^+$)	B	

[†] From least-squares fit to Eγ, except as noted.
[‡] Values given without comment are from (^{90}Zr,pγ) and based on deduced band structure, transition multipolarities, i$_{13/2}$ band alignment and analogy to very similar structures in neighboring odd-A Au isotopes.
[#] Band(A): α=−1/2 band.
[@] Band(B): (π h$_{9/2}$), α=+1/2 band. 1/2[541] proton intruder band. Band parameters: A=41, B=+44, B$_{2K}$=+1935, a=+4.9 (J=9/2 through 25/2).
[&] Band(C): (π i$_{13/2}$), α=+1/2 band. 1/2[660] proton intruder band. Alignment (≈6$\hbar$) at low frequencies is same as for this band

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Adopted Levels, Gammas (continued)

^{179}Au Levels (continued)

in ^{181}Au, ^{183}Au and ^{185}Au. Absence of signature partner suggests large signature splitting, as expected for low-K, prolate band. Band parameters: A=33, B=+16, B_{2K}=+990, a=+8.8 (J=9/2 through 25/2).

[a] Band(D): π=(−), α=−1/2 band. Possibly favored π $f_{7/2}$ mixed with unfavored π $h_{9/2}$. Band parameter: A=11.5.

$\gamma(^{179}Au)$

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]	α[@]	Comments
61.8+x	(3/2$^-$)	61.8[#] *3*	100[#]	0.0	(1/2$^+$,3/2$^+$)	E1	0.305 *6*	Mult.: from intensity balance at 62+x level in ^{183}Tl α decay (53.3 ms).
151.2+x	(7/2$^-$)	89.4[#&] *2*	100[#]	61.8+x	(3/2$^-$)	(E2)	8.37 *15*	Mult.: from ^{183}Tl α decay based on characteristics of ce-α summing, low observed I(K x ray) and intensity balance arguments.
203.6+x	(9/2$^-$)	52.4[#] *2*	100[#]	151.2+x	(7/2$^-$)	M1	8.58 *16*	Mult.: from α(exp) based in intensity balance and from characteristics of ce-α summing in ^{183}Tl α decay (53.3 ms).
242.0+y	(11/2$^-$)	220.8 *5*	100	21.2+y	(7/2$^-$)	(E2)	0.268 *5*	
242.6+y	(13/2$^-$)	242.6 *5*	100	0.0+y	(9/2$^-$)	(E2)	0.197	
296.9+y	(11/2$^-$)	192.0[&] *5*	<21	104.9+y?	(7/2$^-$)			
		296.9 *5*	100 *10*	0.0+y	(9/2$^-$)	D		
366.8+y	(9/2$^+$)	350.2 *5*	100	16.6+y				
387.6+y	(13/2$^+$)	145.0 *5*	63 *4*	242.6+y	(13/2$^-$)	(E1)	0.162 *3*	Other Iγ: 67 *7* in ^{104}Ru(^{78}Kr,2npγ). Mult.: from α(exp) deduced in ^{149}Sm(^{35}Cl,5nγ).
		145.6 *5*	100 *6*	242.0+y	(11/2$^-$)			Other Iγ: 100 *9* in ^{104}Ru(^{78}Kr,2npγ).
		371.0 *5*	68 *5*	16.6+y				Other Iγ: 190 *16* from recoil-decay tagged spectrum in (^{90}Zr,pγ); 104 *12* in ^{104}Ru(^{78}Kr,2npγ). Mult.: anisotropy in (^{90}Zr,pγ) consistent with ΔJ=2 or D, ΔJ=0.
540.5+y	(17/2$^+$)	152.9 *5*	100	387.6+y	(13/2$^+$)	E2	0.976 *19*	Mult.: Q from γ anisotropy in (^{90}Zr,pγ); not M2 from α(exp) in ^{149}Sm(^{35}Cl,5nγ).
574.5+y	(15/2$^-$)	332.5 *5*	100	242.0+y	(11/2$^-$)	(E2)	0.0758	
583.0+y	(15/2$^-$)	286.1 *5*	100 *8*	296.9+y	(11/2$^-$)	(E2)	0.1180 *18*	Other Iγ: 100 *12* in ^{104}Ru(^{78}Kr,2npγ).
		340.3 *5*	20 *5*	242.6+y	(13/2$^-$)			Other Iγ: 37 *7* in ^{104}Ru(^{78}Kr,2npγ).
592.8+y	(17/2$^-$)	350.2 *5*	100	242.6+y	(13/2$^-$)			
802.4+y	(21/2$^+$)	261.9 *5*	100	540.5+y	(17/2$^+$)	(E2)	0.1548 *24*	
950.7+y	(19/2$^-$)	357[&]		592.8+y	(17/2$^-$)			
		367.7 *5*	100 *6*	583.0+y	(15/2$^-$)	(E2)	0.0572	
998.1+y	(19/2$^-$)	423.6 *5*	100	574.5+y	(15/2$^-$)	(E2)	0.0392	
1024.4+y	(21/2$^-$)	431.6 *5*	100	592.8+y	(17/2$^-$)	(E2)	0.0373	
1156.3+y	(25/2$^+$)	353.9 *5*	100	802.4+y	(21/2$^+$)	(E2)	0.0636	
1391.6+y	(23/2$^-$)	440.9 *5*	100	950.7+y	(19/2$^-$)	(E2)	0.0353	
1498.2+y	(23/2$^-$)	500.1 *5*	100	998.1+y	(19/2$^-$)			

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Adopted Levels, Gammas (continued)

γ(^{179}Au) (continued)

E_i(level)	J_i^π	E_γ [†]	I_γ [†]	E_f	J_f^π	Mult.[‡]	α[@]
1530.0+y	(25/2⁻)	505.6 *5*	100	1024.4+y	(21/2⁻)		
1590.7+y	(29/2⁺)	434.4 *5*	100	1156.3+y	(25/2⁺)	(E2)	0.0367
1899.0+y	(27/2⁻)	507.4 *5*	100	1391.6+y	(23/2⁻)		
2057.6+y	(27/2⁻)	559.4 *5*	100	1498.2+y	(23/2⁻)		
2097.8+y	(33/2⁺)	507.1 *5*	100	1590.7+y	(29/2⁺)		
2461.5+y	(31/2⁻)	562.5 *5*	100	1899.0+y	(27/2⁻)	(E2)	0.0195
2671.3+y	(37/2⁺)	573.5 *5*	100	2097.8+y	(33/2⁺)	(E2)	0.0187
3304.3+y	(41/2⁺)	633.0 *5*	100	2671.3+y	(37/2⁺)	(E2)	0.01491
3984.2+y	(45/2⁺)	679.9 *5*	100	3304.3+y	(41/2⁺)	(E2)	0.01274
4722.9+y	(49/2⁺)	738.7 *5*	100	3984.2+y	(45/2⁺)		
5510.2+y	(53/2⁺)	787.3	100	4722.9+y	(49/2⁺)		
6332.2+y?	(57/2⁺)	822[&]	100	5510.2+y	(53/2⁺)		
7172.2+y?	(61/2⁺)	840[&]	100	6332.2+y?	(57/2⁺)		

[†] From mass-gated spectra in ^{90}Zr(^{90}Zr,pγ), except as noted.
[‡] Based on γ anisotropy data in ^{90}Zr(^{90}Zr,pγ), except as noted, assigning Δπ=(no) for intraband transitions.
[#] From ^{183}Tl α decay (53.3 ms).
[@] 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.
[&] Placement of transition in the level scheme is uncertain.

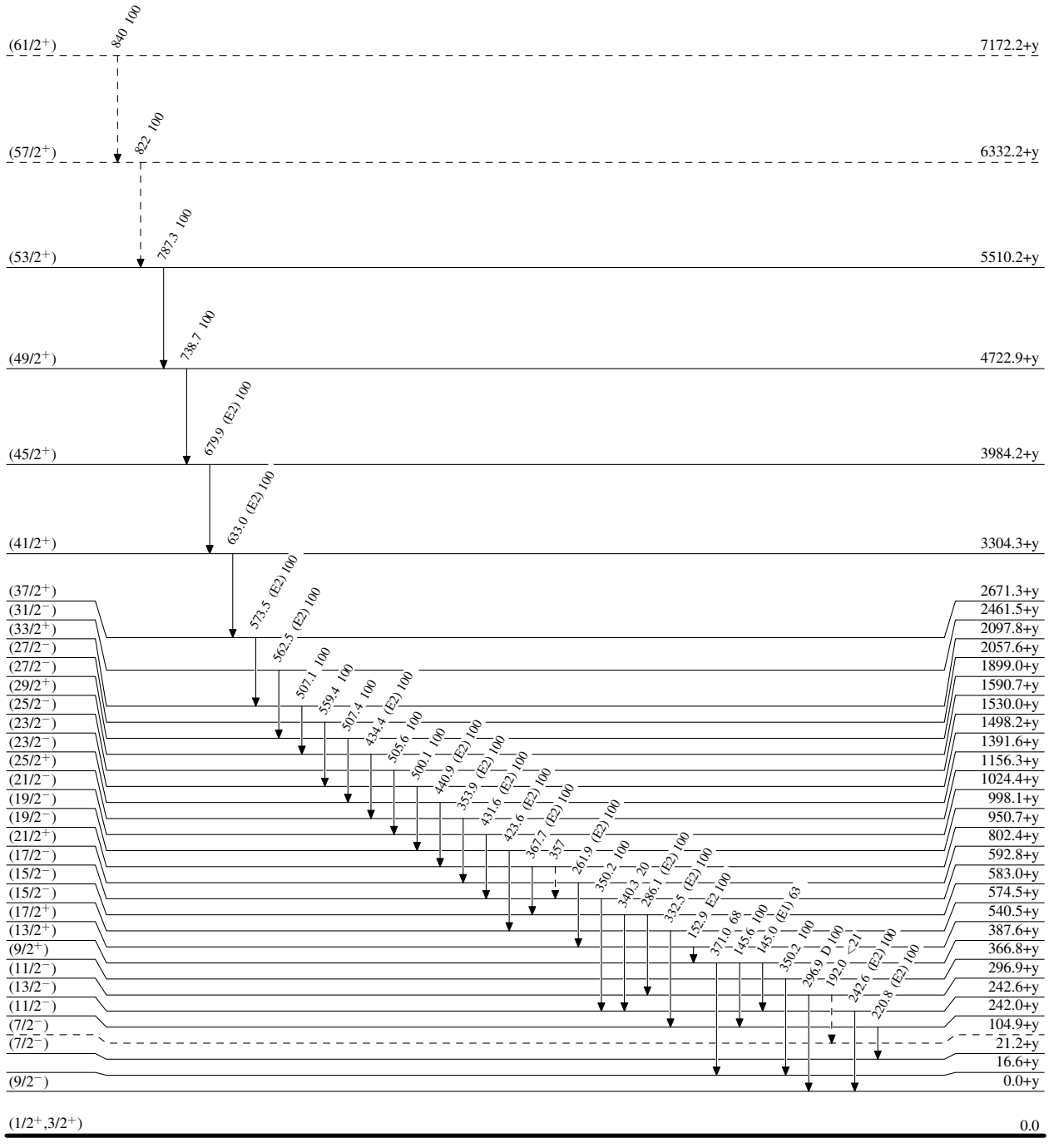
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{179}_{79}Au_{100}$

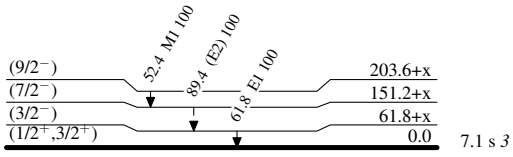
Adopted Levels, Gammas

Legend

Level Scheme (continued)

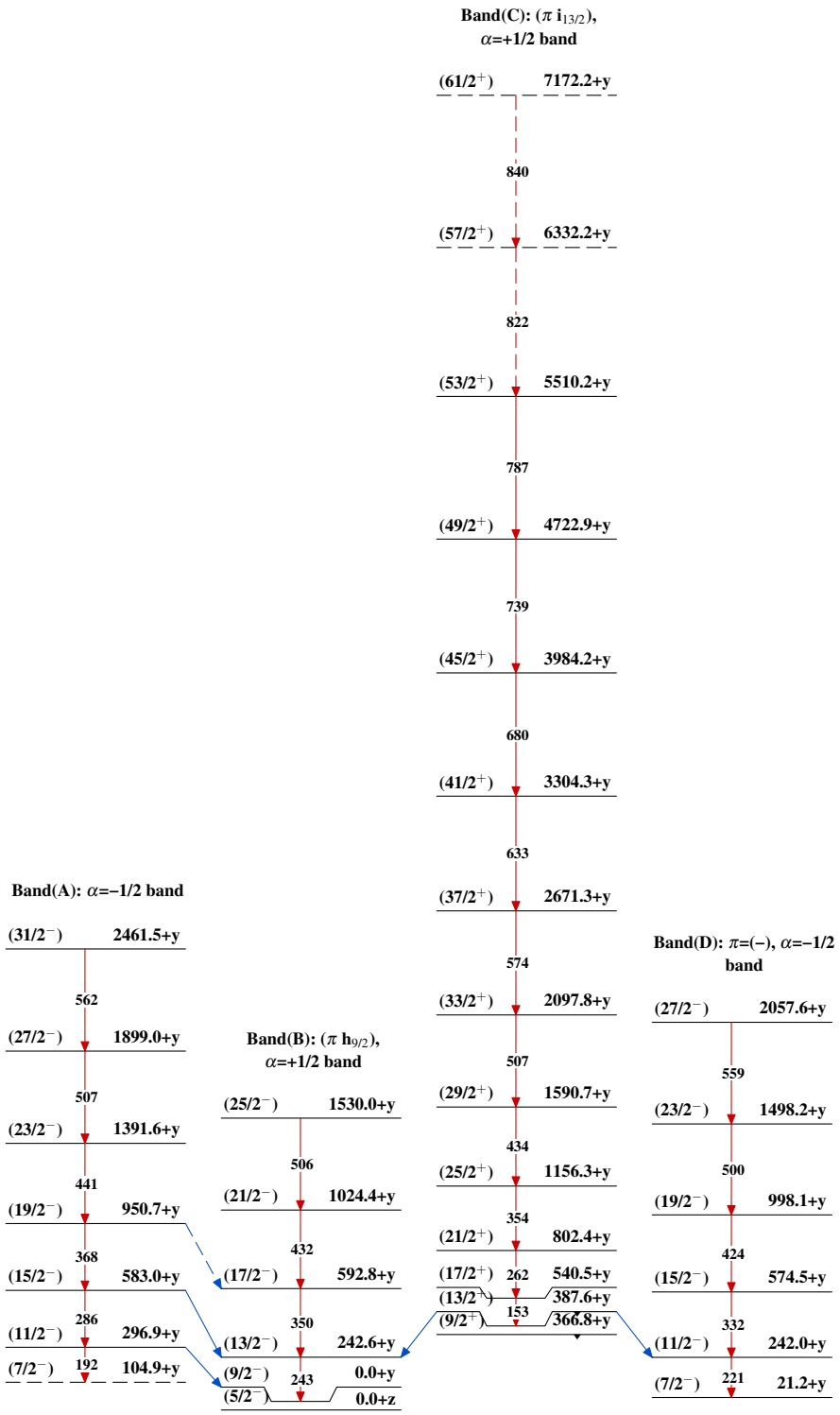
Intensities: Relative photon branching from each level

- - - - - - ► γ Decay (Uncertain)



$^{179}_{79}Au_{100}$

Adopted Levels, Gammas



$^{179}_{79}Au_{100}$