Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Huang Xiaolong, Zhou Chunmei	NDS 104,283 (2005)	1-Jan-2002

Q(β^-)=−600 *4*; S(n)=8072 *3*; S(p)=5783.0 *7*; Q(α)=972.4 *20* 2012Wa38
Note: Current evaluation has used the following Q record −600 3 *8072*.4 *295782*.6 *6* 967.8 17 2003Au03.

^{197}Au Levels

For the interacting boson-fermion model, see 1989Wo04.
For the theoretical investigation of hyperfine interactions and isotope shifts in gold, see 1984Ah07.
1978Vi01 proposed rotational bands built on g.s. and 1/2$^+$ first-excited state using Nilsson-particle asymmetric-rotor model. See 1978Mu08 for Nilsson-model interpretation of π=− states.
For comparison with level spectra in ^{191}Au, ^{193}Au, ^{195}Au, see 1974Tj02.
For FCC (face-centered cubic) nuclear model, see 1987Da18 and 1987Co21.

Cross Reference (XREF) Flags

A	^{197}Pt β^- decay (19.8915 h)	F	^{196}Pt(^{3}He,d)	K	^{197}Au(n,n′γ)
B	^{197}Pt β^- decay (95.41 min)	G	^{197}Au(γ,γ):Mossbauer	L	^{197}Au(pol d,d),(d,d′)
C	^{197}Au IT decay (7.73 s)	H	^{197}Au(γ,γ′),(e,e′)	M	Coulomb excitation
D	^{197}Hg ε decay (64.14 h)	I	^{197}Au(e$^+$,γ),(e$^+$,e$^+$′)		
E	^{197}Hg ε decay (23.8 h)	J	^{197}Au(n,n),(n,n′)		

E(level)†	J$^\pi$	T$_{1/2}$	XREF	Comments
0.0	3/2$^+$	stable	ABCDEFGHIJKLM	J$^\pi$: J=3/2 from optical spectroscopy (1939El03) and π from L=2 in ^{196}Pt(^{3}He,t). μ=+0.145746 *9* (2001StZZ,1989Ra17,1967Da04), +0.148158 *8* (^{2}H standard, 2001StZZ,1989Ra17,1967Na13). Q=+0.594 *10* (2001StZZ,1989Ra17,1967Bl16), +0.547 *16* (2001StZZ,1989Ra17,1974Po12). $<\beta_2^2>^{1/2}$=(−)0.11 (1989Wa11).
77.3510 *20*	1/2$^+$	1.91 ns *1*	ABCDEFG IJKLM	J$^\pi$: L=0 in ^{196}Pt(^{3}He,t). μ=+0.420 *3* (^{197}Au standard,2001StZZ,1989Ra17,1968Co17). T$_{1/2}$: from (γ,γ) Mossbauer. Others: 1.93 ns *3* (1973Ly01), from (191γ)(77γ)(t),1.95 ns *5* (1967Ba27), 1.95 ns *6* (1968Ra29), 1.84 ns *2*(1972Gu03) from delayed coin.
268.788 *10*	3/2$^+$	15.4 ps *13*	A D f JKLM	T$_{1/2}$: recoil-distance Doppler shift in Coulomb excitation (1979Bo10). J$^\pi$: M1+E2 γ to 1/2$^+$.
279.00 *5*	5/2$^+$&	18.6 ps *15*	BC Ef IJKLM	μ=+0.53 *5* (2001StZZ,1989Ra17,1986Ba19) μ: others: +0.74 *5* (1989Ra17), +0.63 *10* from g=+0.25 *4*. T$_{1/2}$: recoil-distance Doppler shift in Coulomb excitation (1979Bo10).
409.15 *8*	11/2$^-$	7.73 s *6*	BC EF IJ	%IT=100 μ=(+)5.98 *9* (2001StZZ,1989Ra17,1983Ha48,1984Ha12) Q=+1.68 *5* (2001StZZ,1996Se06) Others: +6.44 *39* (1983Li21), +5.94 *39* (1982LiZV). Q: Others: +1.35 *22* (^{197}Au standard,1983Be68). J$^\pi$: J=11/2 from $\gamma\gamma(\theta)$ measurements (1956Ka09, ^{197}Au IT decay) and π=− from L=5 in ^{196}Pt(^{3}He,d). See 1974Tj02 for ΔJ=2 bands of ^{191}Au, ^{193}Au, ^{195}Au up to J=23/2 based on decoupled h11/2 proton state. T$_{1/2}$: from γ(t) measurements(1986Ne05, ^{197}Au IT decay).Others: 7.5 s *2* (1966Sm01), 7.86 s *4* (1972Jo05), 7.67 s *7* (1967Yu01), 7.94 s *17*

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{197}Au Levels (continued)

E(level)[†]	Jπ	$T_{1/2}$	XREF	Comments
				(1967Bo26), 7.4 s *3* (1947Fr04), 7.23 s *28* (1955Fi30), 7.0 s *2* (1963Ka34), 7.8 s *1* (1981Ha52), 7.85 s *4* (1970Jo16), 7.5 s *4* (1973Fo15), 9 s *2* (1963Va31), 7.2 s *1* (1963Ve13), 7.5 s *5* (1945Wi02). Other evaluation: 7.8 s *1* (1981Ha52).
502.5 *3*	$5/2^{+}$[&]	1.77[a] ps *+19−12*	F JK M	μ=+3.0 *5* (2001StZZ,1989Ra17,1988St16,1988St09) μ: from g=+1.2 *2* in Coul. ex.
547.5 *3*	$7/2^{+}$[&]	4.61[a] ps *+19−13*	JKLM	μ=+0.84 *8* (2001StZZ,1989Ra17,1988St16,1988St09) (from g=+0.241 *21* in Coul. ex.), +0.52 *7* (1989Ra17,1986Ba19) (from g=+0.15 *2* in Coul. ex.), +0.53 *7* (2001StZZ).
583			L	
736.7 *3*	$7/2^{+}$[&]	1.09[a] ps *+13−9*	JKLM	μ=+1.7 *5* (2001StZZ,1989Ra17,1988St16,1988St09) μ: from g=+0.48 *14* in Coul. ex.
855.5 *4*	$9/2^{+}$[&]	2.67[a] ps *+25−15*	JKLM	μ=+1.5 *6* (2001StZZ,1989Ra17,1988St16,1988St09) μ: from g=+0.34 *12* in Coul. ex.
882			L	
888.11 *20*	$1/2^{+}$		F JKLM	Jπ: L=0 in ^{196}Pt(^{3}He,d).
936.0 *3*	$(5/2^{+})$[#]		JKLM	
948			L	
1045.1 *3*	$(5/2^{+})$[#]		JK	
1120 *10*			IJ	
1150.5 *3*	$3/2^{+},5/2^{+}$		F JK	Jπ: L=2 in ^{196}Pt(^{3}He,d).
1217.3 *4*	$(3/2^{+})$		KL	Jπ: tentative $3/2^{+}$ assignment (1971Ba29) via (n,n′γ),(n,n′) from Hauser-Feshbach calculations.
1220.1 *7*			IJ	
1231.0[‡] *8*	$11/2^{+}$[&]	0.91[a] ps *1*	LM	μ=+2.0 *10* (2001StZZ,1989Ra17,1988St16,1988St09) μ: from g=+0.37 *18* in Coul. ex.
1242.0 *4*	$(1/2^{+})$		JK	Jπ: possible $1/2^{+}$ assignment (1971Ba29) via (n,n′γ),(n,n′) from Hauser-Feshbach calculations.
1263			L	
1370			L	E(level): possible 1370-,1380-keV (d,d′) doublet.
1380			L	
1412 *4*	$9/2^{-},11/2^{-}$		F L	XREF: L(1405). L=5 in ^{196}Pt(^{3}He,d).
1478			L	
1488			L	E(level): possible 1478-,1488-keV (d,d′) doublet.
1584			L	
1708 *4*	$3/2^{+},5/2^{+}$		F	Jπ: L=2 in ^{196}Pt(^{3}He,d).
1809			L	
1820			L	
1905			L	
1997 *4*	$5/2^{-},7/2^{-}$[@]		F	
2149 *4*	$5/2^{-},7/2^{-}$[@]		F	
2251	$5/2^{-},7/2^{-}$[@]		F L	
2371			L	
2405 *15*	+*b*		H	
2420 *7*	$5/2^{-},7/2^{-}$[@]		F	
2523 *7*	$5/2^{-},7/2^{-}$[@]		F	
2620 *15*	+*b*		H	
2631 *7*	$(5/2^{-},7/2^{-})$		F	Jπ: L=(3) in ^{196}Pt(^{3}He,d).
2650			L	
2776 *4*	$11/2^{+},13/2^{+}$		F	L=6 in ^{196}Pt(^{3}He,d).
2880 *15*	+*b*		H	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{197}Au Levels (continued)

E(level)†	Jπ	XREF
3025 *15*	+*b*	H
3175 *15*	−*b*	H
3260 *15*	+*b*	H
3515 *15*	+*b*	H

† For the states connecting γ rays, E(levels) are from adopted scheme and adopted γ radiations using least-squares fit to data.
‡ From Coulomb excitation and Mossbauer studies. ΔE not given by authors.
# Tentative $5/2^+$ assignment (1971Ba29) from (n,n′),(n,n′γ) based on observed γ decay, Hauser-Feshbach calculations.
@ L=3 in ^{196}Pt(^{3}He,d).
& From angular correlations of deexcitation γ rays in Coul. ex.
a From Doppler-broadened lineshape technique (1988St16) in Coul. ex.
b From excitation character in (γ,γ′),(e,e′).

Adopted Levels, Gammas (continued)

γ(^{197}Au)

E_i(level)	J_i^π	E_γ [†]	I_γ [&]	E_f	J_f^π	Mult.[c]	δ[c]	α[f]	Comments
77.3510	1/2+	77.351[‡] *2*	100	0.0	3/2+	M1+E2	−0.368 *14*	4.36 *14*	B(M1)(W.u.)=0.00409 *16*; B(E2)(W.u.)=35 *3*
268.788	3/2+	191.437[#] *10*	100[‡] *3*	77.3510	1/2+	M1+E2	0.14 *1*	1.174[d] *2*	B(M1)(W.u.)=0.089 *9*; B(E2)(W.u.)=18 *3*
		268.78[#] *5*	6.2[‡] *3*	0.0	3/2+	E2(+M1)	>3.4	0.147[d] *3*	B(M1)(W.u.)<0.00018; B(E2)(W.u.)>18.5 *19*
279.00	5/2+	201.6 *3*	1.50[b] *9*	77.3510	1/2+	E2		0.37	B(E2)(W.u.)=14.4 *17*
		279.01 *5*	100[b] *5*	0.0	3/2+	M1+E2	−0.40 *4*	0.380 *7*	B(M1)(W.u.)=0.034 *4*; B(E2)(W.u.)=26 *6*
409.15	11/2−	130.2[a] *1*	100[a] *4*	279.00	5/2+	E3[a]		30.3	B(E3)(W.u.)=0.003 *+41−10*
		409.1[a] *1*	3.4[a] *11*	0.0	3/2+	M4[a]		3.97	B(M4)(W.u.)=2.4 *8*
502.5	5/2+	425.0[c] *5*	2.5 *7*	77.3510	1/2+	E2[e]		0.0392	B(E2)(W.u.)=7.6 *23*
		502.6 *3*	100 *2*	0.0	3/2+	M1+E2	−0.24 *9*	0.084 *3*	B(M1)(W.u.)=0.083 *10*; B(E2)(W.u.)=7 *6*
547.5	7/2+	268.5[c]	5.2[b] *3*	279.00	5/2+	M1+E2	+0.055 *10*	0.465	B(M1)(W.u.)=0.0116 *10*; B(E2)(W.u.)=0.18 *7*
		278.7[c]	0.7[b] *2*	268.788	3/2+	[E2]		0.13	B(E2)(W.u.)=6.8 *20*
		547.5[c] *3*	100[b] *5*	0.0	3/2+	E2		0.021	B(E2)(W.u.)=33 *3*
736.7	7/2+	457.7[c] *3*	100 *3*	279.00	5/2+	M1+E2	−0.26 *3*	0.106 *1*	B(M1)(W.u.)=0.175 *23*; B(E2)(W.u.)=21 *6*
		468.1 *5*	1.9 *12*	268.788	3/2+	E2[e]		0.031	B(E2)(W.u.)=6 *4*
855.5	9/2+	308.0 *5*	13 *4*	547.5	7/2+	M1+E2	−0.30 *9*	0.30 *1*	B(M1)(W.u.)=0.028 *10*; B(E2)(W.u.)=10 *7* I_γ: from Iγ(308γ)/Iγ(577γ)=14/86 (1988St16) and Iγ(308γ)/Iγ(577γ)=8/92 (1981Ve12).
		576.5 *4*	100 *4*	279.00	5/2+	E2		0.0186	B(E2)(W.u.)=41 *5* I_γ: see 308γ notes.
888.11	1/2+	619.4[c] *3*	27[b] *4*	268.788	3/2+				
		810.6[c] *3*	100[b] *8*	77.3510	1/2+				
		888.3 *5*	9 *3*	0.0	3/2+				
936.0	(5/2+)	432.5[g] *5*	24 *5*	502.5	5/2+				
		657.1 *5*	20 *4*	279.00	5/2+				
		667.1 *5*	61 *6*	268.788	3/2+				
		858.6 *5*	25 *6*	77.3510	1/2+				
		936.2 *5*	100 *9*	0.0	3/2+				
1045.1	(5/2+)	766.3 *5*	100 *16*	279.00	5/2+				
		776.9 *5*	69 *12*	268.788	3/2+				
		1044.2 *5*	48 *21*	0.0	3/2+				
1120		691[@]		409.15	11/2−				
		1100[@]		0.0	3/2+				
1150.5	3/2+,5/2+	881.9 *5*	100 *19*	268.788	3/2+				
		1073.4 *5*	93 *23*	77.3510	1/2+				
		1150.2 *5*	26 *23*	0.0	3/2+				
1217.3	(3/2+)	1139.5 *5*	62 *21*	77.3510	1/2+				
		1217.7 *5*	100 *24*	0.0	3/2+				
1220.1		811[@]		409.15	11/2−				

$^{197}_{79}Au_{118}$-4

Adopted Levels, Gammas (continued)

$\gamma(^{197}Au)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[&]	E_f	J_f^π	Mult.[c]	α[f]	Comments
1220.1		1220[@]		0.0	$3/2^+$			
1231.0	$11/2^+$	376[c]	12[‡]	855.5	$9/2^+$	M1,E2[e]	0.120[d] *67*	B(M1)(W.u.)=0.0238 *21*; B(E2)(W.u.)=64 *6* I_γ: from Iγ(376γ)/Iγ(683γ)=11/89 (1981Ve12) in Coul. ex.
		683[c]	100	547.5	$7/2^+$	E2	0.0127	B(E2)(W.u.)=53.6 *8*
1242.0	$(1/2^+)$	973.0 *5*	17 *14*	268.788	$3/2^+$			
		1242.2 *5*	100 *33*	0.0	$3/2^+$			

† From ^{197}Au(n,n′γ), except where noted otherwise.
‡ From ^{197}Hg ε decay (64.14 h).
# From ^{197}Pt β^- decay (19.8915 h).
@ From ^{197}Au(e$^+$,γ),(e$^+$,e$^{+\prime}$).
& Relative photon branching from each level. Data are from (n,n′γ), except as noted.
a From ^{197}Hg ε decay (23.8 h).
b From Coul. ex.
c From Coulomb excitation and Mossbauer studies.
d From [α(M1) + α(E2)]/2 +- [α(M1) − α(E2)]/2.
e From mult=D,E2 (from RULER program on the basis of given $T_{1/2}$ and branching) and ΔJ and $\Delta\pi$ between transition levels.
f 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.
g Placement of transition in the level scheme is uncertain.

$^{197}_{79}Au_{118}$-5

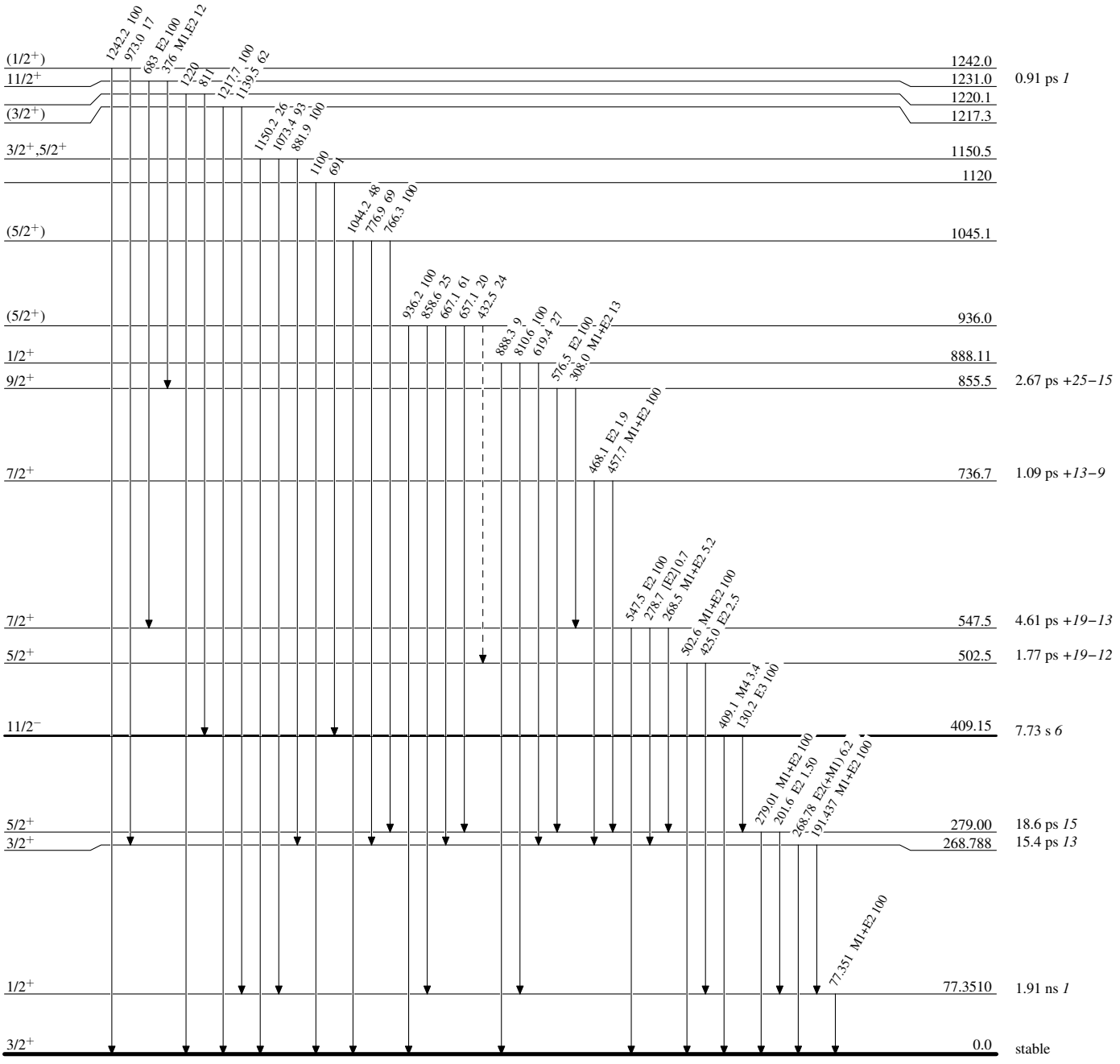
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{197}_{79}Au_{118}$