Ir(α,xnγ) 1979Go15,1985Ko13

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia	NDS 143, 1 (2017)	31-Mar-2017

1985Ko13: ^{193}Ir(α,4nγ), E(α)=50 MeV; measured Eγ, Iγ (Ge(Li)), E(ce), Ice (mag spect), prompt and delayed (ce)(ce) and (ce)γ, perturbed angular distributions; confirmed Configuration=$(\nu\ i_{13/2})^{+2}$ core structure of the rotation-aligned h11/2 proton-hole band.

1979Go15: ^{193}Ir(α,4nγ), E(α)=51 MeV; measured Eγ, Iγ (Ge(Li)), γγ, γ(θ) (6 angles), γ(t). Earlier reports: 1977Go12, 1976Go22.

1975LaYS: ^{193}Ir(α,4nγ), E(α)=42-52 MeV; natural Ir targets; measured Eγ, Iγ (intrinsic germanium detectors), E(ce), Ice (Si(Li)), γγ, γ(θ);

1975StZE: ^{191}Ir(α,2nγ), E(α)=23-27 MeV; measured Eγ, Iγ (Ge(Li)), E(ce), Ice (Si(Li)), γγ, γ(θ).

1974Tj02: ^{191}Ir(α,2nγ), E(α)=26, 29, 42 MeV; measured Eγ, Iγ (Ge(Li)), γγ coin, γγ(t), γ(θ) (30° and 90°).

^{193}Au Levels

The level scheme is that proposed by 1979Go15 with g.s. band added from 1975StZE and 1974Tj02. For a discussion of the rotation-aligned h11/2 proton-hole bands see 1979Go15, 1985Ko13 and references cited therein.

E(level)[†]	J^π[‡]	$T_{1/2}$	Comments
0.0[#]	3/2+[b]		
38.2	(1/2)+[b]		
224.8	(3/2)+[b]		
258.0[#]	5/2+[b]		
290.2[@]	11/2−[b]	3.9 s *3*	$T_{1/2}$: From Adopted Levels.
508.3	7/2−		
539.0[#]	7/2+		
697.8[@]	15/2−		
789.9	9/2−		
808.6[#]	9/2+		
863.4[&]	13/2−		
890.8	9/2−		
1131.8	(11/2−)[c]		J^π: adopted 9/2−,11/2−.
1153.5[#]	11/2+[c]		
1194.3	(13/2−)[c]		
1284.8	11/2−		J^π: adopted 9/2−,11/2−.
1372.9[&]	17/2−		
1398.5	(15/2−)		J^π: adopted (13/2−).
1418.9[@]	19/2−		
1478.4[#]	(13/2+)		
1496.3			
1946.9	21/2+	10.4 ns *8*	$T_{1/2}$: from (ce(L2) 133γ)(ce(K) 408γ)(t) (1985Ko13). Others: 15 ns *2* (1979Go15), 12 ns *2* (1974Tj02).
2079.8	25/2+	2.51 ns *13*	$T_{1/2}$: (ce(K) 245γ)(ce(L2) 133γ)(t) (1985Ko13).
2087.1[&]	21/2−		
2140.0	23/2(+)		
2172.7[@]	23/2−		
2324.7	27/2+	<0.2 ns	$T_{1/2}$: (ce(L2) 162γ)(ce(K) 245γ)(t) (1985Ko13).
2377.7[@]	27/2−	0.79 ns *8*	$T_{1/2}$: (ce(L2) 99γ)(ce(K) 205K)(t) (1985Ko13). Other:<3 ns (1979Go15). g-factor≤0.7 (1985Ko13); from integral perturbed angular distribution measurements with external magnetic fields.

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Ir(α,xnγ) 1979Go15,1985Ko13 (continued)

^{193}Au Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$	Comments
2476.4[@]	31/2−	3.52 ns *18*	g-factor=0.3 *2* (1985Ko13) from integral perturbed angular distribution measurements with external magnetic fields. $T_{1/2}$: (ce(K) 225γ)(ce(L2) 99γ)(t) (1985Ko13). Other: 6 ns *2* (1979Go15).
2486.5[a]	31/2+	150 ns *50*	$T_{1/2}$: (ce(K) 244γ)γ(t) (1985Ko13). Other:≥100 ns (1979Go15).
2700.9[@]	35/2−	1.80 ns *9*	g-factor=0.13 *11* (1985Ko13); from integral perturbed angular distribution measurements with external magnetic fields. $T_{1/2}$: (ce(K) 225γ)(t) (1985Ko13).
2923.2[a]	35/2+		
3154.9[@]	39/2−	<0.5 ns	$T_{1/2}$: (ce(K) 454γ)(t) (1985Ko13).
3441.7[a]	39/2+		
3895.9[@]	43/2−		
4063.2[a]	43/2+		

† Rounded-off values from Adopted Levels.

‡ From 1979Go15 and/or 1974Tj02, unless otherwise noted. Assignments are based on coincidence data and γ-ray multipolarities. 1985Ko13 state that their experimental conversion coefficients (not given) confirm the Jπ assignments of 1979Go15. Many assignments are the same as adopted values but given under parentheses.

\# g.s. band.

@ Favored h11/2 decoupled band.

& Unfavored h11/2 decoupled band.

a Rotation-aligned band based on 31/2+ level.

b From Adopted Levels.

c Jπ suggested by 1975StZE.

γ(^{193}Au)

Eγ[†]	Iγ[‡]	E_i(level)	$J^π_i$	E_f	$J^π_f$	Mult.[#]	Comments
(32.21[@] *3*)		290.2	11/2−	258.0	5/2+		
(38.23[@] *2*)		38.2	(1/2)+	0.0	3/2+		
98.7 *3*	3 *1*	2476.4	31/2−	2377.7	27/2−	(E2)[c]	Mult.: A_2=+0.32 *11*, A_4=−0.06 *17* (1979Go15).
132.9 *3*	11 *1*	2079.8	25/2+	1946.9	21/2+	E2[c]	Mult.: A_2=+0.32 *3*, A_4=−0.02 *5* (1979Go15), A_2=+0.30 *5* (1975LaYS). Mult.: prompt decay of 2079.8 level (2.51 ns) consistent with E2 assignment.
161.8 *3*	7 *2*	2486.5	31/2+	2324.7	27/2+	(E2)[b]	Mult.: α(exp)=0.97 *20* (1979Go15); theory: α(E2)=0.792, α(E1)=0.123, α(M1)=1.84; A_2=+0.12 *4*, A_4=−0.01 *6* (1979Go15).
186.6[&]		224.8	(3/2)+	38.2	(1/2)+		Iγ(30°)/Iγ(90°)=0.74 (1974Tj02). Iγ: Iγ/Iγ(407.6)=0.109 (1974Tj02).
193.1 *3*	5 *2*	2140.0	23/2(+)	1946.9	21/2+	D+Q	Mult.: A_2=−0.11 *5*, A_4=−0.04 *8* (1979Go15).
204.9 *3*	17 *2*	2377.7	27/2−	2172.7	23/2−	(E2)[c]	Mult.: A_2=+0.32 *4*, A_4=−0.04 *6* (1979Go15), A_2=+0.31 *4* (1975LaYS).
218.1[&]		508.3	7/2−	290.2	11/2−		Iγ(30°)/Iγ(90°)=1.03 (1974Tj02). Iγ: Iγ/Iγ(407.6)=0.307 (1974Tj02).
219.9[&]		258.0	5/2+	38.2	(1/2)+		Iγ(30°)/Iγ(90°)=1.03 (1974Tj02). Iγ: Iγ/Iγ(407.6)=0.116 (1974Tj02).
224.5 *3*	8 *1*	2700.9	35/2−	2476.4	31/2−	(E2)[c]	Mult.: A_2=+0.34 *4*, A_4=−0.06 *6* (1979Go15).

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Ir(α,xnγ) 1979Go15,1985Ko13 (continued)

γ(^{193}Au) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	δ	Comments
244.9 3	11 3	2324.7	27/2+	2079.8	25/2+	(M1)[b]		Mult.: α(exp)=0.72 20 (1979Go15); theory: α(M1)=0.579, α(E2)=0.192; A_2=0.00 3, A_4=+0.02 5 (1979Go15).
258.1[&]		258.0	5/2+	0.0	3/2+			Iγ(30°)/Iγ(90°)=0.87 (1974Tj02). I_γ: Iγ/Iγ(407.6)=2.89 (1974Tj02).
269.2[ad]		808.6	9/2+	539.0	7/2+			γ not seen in ^{193}Hg decay.
281.5[&]		539.0	7/2+	258.0	5/2+			Iγ(30°)/Iγ(90°)=0.77 (1974Tj02). I_γ: Iγ/Iγ(407.6)=0.104 (1974Tj02).
281.6[a]		789.9	9/2−	508.3	7/2−			
298.0 3	7 2	2377.7	27/2−	2079.8	25/2+			A_2=−0.13 4, A_4=+0.02 6 (1979Go15).
342.4[a]		1131.8	(11/2−)	789.9	9/2−			
344.1[a]		1153.5	11/2+	808.6	9/2+			
364.9[a]		1496.3		1131.8	(11/2−)			
382.2[&]		890.8	9/2−	508.3	7/2−			Iγ(30°)/Iγ(90°)=1.66 (1974Tj02). I_γ: Iγ/Iγ(407.6)=0.449 (1974Tj02).
394.5[a]		1284.8	11/2−	890.8	9/2−			
404.8[a]		1194.3	(13/2−)	789.9	9/2−			
407.6 3	100 7	697.8	15/2−	290.2	11/2−	(E2)[c]		Mult.: A_2=+0.28 2, A_4=−0.03 3 (1979Go15), A_2=+0.28 2 (1975LaYS); Iγ(30°)/Iγ(90°)=1.41 (1974Tj02).
436.7 3	7 2	2923.2	35/2+	2486.5	31/2+	(E2)[c]		Mult.: A_2=+0.39 11, A_4=−0.05 17 (1979Go15).
454.0 3	6 2	3154.9	39/2−	2700.9	35/2−	(E2)[c]		Mult.: A_2=+0.39 13, A_4=−0.09 19 (1979Go15).
500.0[a]		789.9	9/2−	290.2	11/2−			
518.5 3	3 1	3441.7	39/2+	2923.2	35/2+	(E2)[c]		Mult.: A_2=+0.21 8, A_4=−0.01 12 (1979Go15).
527.9 3	42 3	1946.9	21/2+	1418.9	19/2−	E1		Mult.: from α(K)exp=0.0075 15 (1975LaYS); theory: α(K)(E1)=0.00637; A_2=−0.07 2, A_4=+0.01 3 (1979Go15); A_2=−0.26 2 (1975LaYS); Iγ(30°)/Iγ(90°)=0.94 (1974Tj02). I_γ: Iγ/Iγ(407.6)=0.229 (1974Tj02).
535.7[&]		1398.5	(15/2−)	863.4	13/2−	M1+E2		Mult.: α(K)exp=0.065 13 (1975LaYS); theory: α(K)(M1)=0.0583, α(K)(E2)=0.0162; A_2=+0.28 5 (1975LaYS); Iγ(30°)/Iγ(90°)=1.19 (1974Tj02). I_γ: Iγ/Iγ(407.6)=0.143 (1974Tj02). δ: adopted δ=1.4 +12−5 from ^{193}Hg decay.
539.3[&]		539.0	7/2+	0.0	3/2+			Iγ(30°)/Iγ(90°)=1.24 (1974Tj02). I_γ: Iγ/Iγ(407.6)=0.201 (1974Tj02).
551.2[&]		808.6	9/2+	258.0	5/2+			A_2=+0.22 8 (1975LaYS); Iγ(30°)/Iγ(90°)=1.19 (1974Tj02). I_γ: Iγ/Iγ(407.6)=0.172 (1974Tj02).
572.9 3	6 2	863.4	13/2−	290.2	11/2−	M1+E2	+0.36 7	Mult.: α(K)exp=0.053 11 (1975LaYS); theory: α(K)(M1)=0.0489 A_2=+0.18 6, A_4=+0.08 9 (1977Go12,1979Go15); A_2=+0.25 6 (1975LaYS); Iγ(30°)/Iγ(90°)=1.43 (1974Tj02). I_γ: Iγ/Iγ(407.6)=0.342 (1974Tj02). δ: from γ(θ) (1977Go12), δ not reported in 1979Go15.
600.9[&]		890.8	9/2−	290.2	11/2−			Iγ(30°)/Iγ(90°)≈1.7 (1974Tj02). I_γ: Iγ/Iγ(407.6)=0.08 (1974Tj02).
614.9[a]		1153.5	11/2+	539.0	7/2+			
621.5 3	2 1	4063.2	43/2+	3441.7	39/2+	(E2)[c]		Mult.: A_2=+0.22 12, A_4=−0.01 18 (1979Go15).
668.2 3	5 1	2087.1	21/2−	1418.9	19/2−			Mult.: A_2=+0.18 3, A_4=−0.01 5 (1979Go15); A_2=+0.21 5 (1975LaYS).

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Ir(α,xnγ) 1979Go15,1985Ko13 (continued)

γ(¹⁹³Au) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	δ	Comments
669.8[&]		1478.4	(13/2⁺)	808.6	9/2⁺			Mult.: α(K)exp=0.043 *9* (1975LaYS); theory: α(K)(M1)=0.0326, α(K)(E2)=0.0102; Iγ(30°)/Iγ(90°)=1.23 (1974Tj02). Data suggests a M1, ΔJ=1 transition, level scheme requires E2 multipolarity. Possibly a doublet with the major component the 668.2γ from the 2087-keV 21/2⁻ level. I_γ: Iγ/Iγ(407.6)=0.135 (1974Tj02).
674.8 *3*	6 *1*	1372.9	17/2⁻	697.8	15/2⁻	M1+E2	+0.39 *6*	Mult.: α(K)exp=0.035 *8* (1975LaYS); theory: α(K)(M1)=0.0320 A_2=+0.25 *5*, A_4=+0.05 *8* (1977Go12,1979Go15); A_2=+0.28 *5* (1975LaYS); Iγ(30°)/Iγ(90°)=1.49 (1974Tj02). I_γ: Iγ/Iγ(407.6)=0.068 (1974Tj02). δ: from γ(θ) (1977Go12) (mistakenly shown as δ of 720.0γ in table 1 of 1977Go12), δ not reported in 1979Go15. Adopted δ=1.5 *+10−5* from ¹⁹³Hg decay.
720.9 *3*	79 *8*	1418.9	19/2⁻	697.8	15/2⁻	E2		Mult.: α(K)exp=0.013 *3* (1975LaYS); theory: α(K)(E2)=0.00877, α(K)(M1)=0.0270; A_2=+0.27 *3*, A_4=−0.02 *5* (1979Go15); A_2=+0.26 *3* (1975LaYS); Iγ(30°)/Iγ(90°)=1.17 (1974Tj02). I_γ: Iγ/Iγ(407.6)=0.413 (1974Tj02).
741.0 *3*	3 *1*	3895.9	43/2⁻	3154.9	39/2⁻	(E2)[c]		Mult.: A_2=+0.37 *13*, A_4=−0.13 *19* (1979Go15).
753.8 *3*	25 *2*	2172.7	23/2⁻	1418.9	19/2⁻	(E2)		Mult.: α(K)exp=0.014 *3* (1975LaYS); theory: α(K)(E2)=0.00802, α(K)(M1)=0.0241; A_2=+0.32 *3*, A_4=−0.04 *5* (1979Go15); A_2=+0.33 *4* (1975LaYS).
777.5[a]		1284.8	11/2⁻	508.3	7/2⁻			
(994.61[@] *15*)		1284.8	11/2⁻	290.2	11/2⁻			
1249.3 *3*	11 *1*	1946.9	21/2⁺	697.8	15/2⁻	(E3)		Mult.: A_2=+0.31 *3*, A_4=+0.02 *5* (1979Go15). Stretched octupole character inferred from γ(θ). The partial $T_{1/2}$ for the 1947.0 level via 1249.3γ (=50 ns) is low relative to the Weisskopf single-particle estimate for E3 (=116 ns). E3 is nevertheless preferable to other assignments (1979Go15).

† From 1979Go15, unless otherwise noted.
‡ From 1979Go15; arbitrary units, relative to Iγ(407.6γ)=100 in ¹⁹³Ir(α,4nγ), E(α)=51 MeV.
# I(ce)/Iγ normalized to α(K)(E2)=0.030 for the 407.6γ.
@ From Adopted Gammas.
& From 1974Tj02; uncertainties estimated to be 0.3 keV, as in 1979Go15 (evaluator).
a From 1975StZE.
b α(exp) deduced from intensity balance in level scheme in delayed coin from the 2486.5 level ($T_{1/2}$=150 ns), with the assumption that Ti(244.9γ)=Ti(161.8γ)=Ti(132.9γ,E2)=Ti(407.6γ,E2).
c From γ-ray angular distributions in 1979Go15; stretched E2 assignments were based on large positive A_2, and intraband M1+E2 assignments on rotational structure and negative A_2.
d Placement of transition in the level scheme is uncertain.

Ir(α,xnγ) 1979Go15,1985Ko13

Level Scheme

Intensities: Relative Iγ for ^{193}Ir(α,4nγ), E(α)=51 MeV

Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)