^{193}Ir(n,n′γ) 1987Pr10

History

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

Reactor fast-neutron beam, θ=90°; enriched ^{193}Ir targets (97.6%); measured Eγ, Iγ (Ge(Li), FWHM=2.0 keV at 1332 keV); determined level-population rates.
Others: 1959An30, 1984Ya02.

^{193}Ir Levels

E(level)†	Jπ‡	$T_{1/2}$	Comments
0.0#	3/2+		
73.0@	1/2+		
80.2c	11/2−	10.53 d *4*	%IT=100 $T_{1/2}$: From Adopted Levels.
138.9#	5/2+		
180.0@	3/2+		
299.3a	7/2−		
357.7#	7/2+		
361.8@	5/2+		
460.5&	3/2+		
469.4c	13/2−		
479.0c	15/2−		
516.4@	7/2+		
521.8#	9/2+		
557.3&	1/2+		
559.2	5/2+		
563.3a	9/2−		
598.1b	3/2−		
621.0	7/2+		
695.1&	5/2+		
712.1	3/2+		
740.3b	5/2−		
806.9	5/2+		Jπ: alternate 7/2+ assignment by 1987Pr10 not consistent with observation of 733.9γ to 1/2+ (evaluator).
828.9	(9/2−)		
833.2a	11/2−		
(834.7@)	9/2+		
848.9	5/2+		
857.2#	11/2+		
874.2			1987Pr10 suggest that this is the 7/2+ member of the second Kπ=1/2+ band. However, a weak γ to 1/2+ level, seen in ^{193}Os β− decay contradicts this assignment.
892.2	9/2+		
918.3b	7/2−		
930.4c	17/2−		
964.4	(1/2+,3/2+)		Jπ: Adopted 1/2+.
972.8	(5/2+)		
1009.3	11/2+		
1019.6@	11/2+		
1035.6	(3/2,5/2,7/2)+		
1038.2	(+)		
1065.9	(+)		

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^{193}Ir(n,n′γ) 1987Pr10 (continued)

^{193}Ir Levels (continued)

E(level)[†]	Jπ[‡]	Comments
1076.4	(3/2+)	
1077.9	(3/2−,5/2−)	
1131.1		
1145.7[b]	9/2−	
1168.2[a]	13/2−	
1169.2	11/2+	
1250.5	(3/2+,5/2+)	
1434.1[@]	(13/2+)	
1511.9	(3/2+,5/2+)	Jπ: Adopted (3/2+).

[†] From 1987Pr10.
[‡] From comparison of experimental and theoretical level-population rates, band structure, and γ-ray decay systematics (1987Pr10).
[#] Kπ=3/2+ band.
[@] Kπ=1/2+ band.
[&] Second Kπ=1/2+ band.
[a] Kπ=7/2− band.
[b] Kπ=3/2− band.
[c] Kπ=11/2− band.

γ(^{193}Ir)

Eγ	Iγ[†]	Ei(level)	J_i^π	Ef	J_f^π	Mult.	Comments
(73.040[‡] *12*)		73.0	1/2+	0.0	3/2+		
(80.22[‡] *2*)		80.2	11/2−	0.0	3/2+	M4	Mult.: From Adopted Gammas.
107.07 *5*	122 *16*	180.0	3/2+	73.0	1/2+		
139.23 *4*	480 *50*	138.9	5/2+	0.0	3/2+		
142.2 *9*	24 *7*	740.3	5/2−	598.1	3/2−		
154.67[f] *9*	11[f] *5*	516.4	7/2+	361.8	5/2+		Iγ: from adopted gammas Iγ(154γ)/Iγ(336γ)=0.40 *13* which would indicate that all the observed intensity belongs to this location in level scheme.
154.67[f] *9*	11[f] *5*	712.1	3/2+	557.3	1/2+		Iγ: from adopted gammas Iγ(155γ)/Iγ(252γ)=0.14 *2* which suggests Iγ(155γ)=4.7 *7*.
164.19 *17*	7.3 *25*	521.8	9/2+	357.7	7/2+		
177.97 *4*	28 *3*	918.3	7/2−	740.3	5/2−		
180.09 *4*	34 *3*	180.0	3/2+	0.0	3/2+		
181.79 *2*	81 *6*	361.8	5/2+	180.0	3/2+		
[x]211.70 *5*	7.2 *20*						
219.24[g] *3*	850[g#] *70*	299.3	7/2−	80.2	11/2−		
219.24[g] *3*	150[g#] *12*	357.7	7/2+	138.9	5/2+		
227.35 *9*	8.8 *10*	1145.7	9/2−	918.3	7/2−		
234.61 *3*	63 *12*	695.1	5/2+	460.5	3/2+		
[x]242.37 *6*	11.5 *18*						
[x]247.5 *1*	5.1 *12*						
251.64 *3*	33.9 *13*	712.1	3/2+	460.5	3/2+		
259.8 *13*	3.5 *13*	621.0	7/2+	361.8	5/2+		
264.00[g] *3*	96[g&] *15*	563.3	9/2−	299.3	7/2−		
264.00[g] *3*	9.0[g&] *8*	621.0	7/2+	357.7	7/2+		This placement suggested by evaluator on basis of Coulomb excitation and (n,γ) data.

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^{193}Ir(n,n′γ) 1987Pr10 (continued)

γ(^{193}Ir) (continued)

E_γ	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Comments
[x]267.91 *14*	4.3 *14*					
269.50 *4*	31 *3*	833.2	11/2$^-$	563.3	9/2$^-$	
271.17 *8*	7.1 *21*	892.2	9/2$^+$	621.0	7/2$^+$	
280.46 *3*	45 *4*	460.5	3/2$^+$	180.0	3/2$^+$	
288.84 *3*	60 *5*	361.8	5/2$^+$	73.0	1/2$^+$	
298.82 *3*	196 *16*	598.1	3/2$^-$	299.3	7/2$^-$	
[x]308.73 *5*	6.1 *13*					
[x]314.30 *7*	3.1 *6*					
321.69 *4*	55 *4*	460.5	3/2$^+$	138.9	5/2$^+$	
[x]329.93 *18*	3.1 *9*					
333.1 *5*	2.8 *9*	695.1	5/2$^+$	361.8	5/2$^+$	
335.21[g] *19*	6.3[ga] *17*	857.2	11/2$^+$	521.8	9/2$^+$	
335.21[g] *19*	2.7[g] *12*	1168.2	13/2$^-$	833.2	11/2$^-$	
336.38 *6*	37 *5*	516.4	7/2$^+$	180.0	3/2$^+$	
337.8 *2*	3.3 *10*	1077.9	(3/2$^-$,5/2$^-$)	740.3	5/2$^-$	
340.1 *9*	2.2 *16*	1035.6	(3/2,5/2,7/2)$^+$	695.1	5/2$^+$	
[x]349.20 *11*	4.6 *12*					
355.1 *4*	2.7 *16*	918.3	7/2$^-$	563.3	9/2$^-$	
357.77 *4*	169 *9*	357.7	7/2$^+$	0.0	3/2$^+$	
361.87 *4*	113 *9*	361.8	5/2$^+$	0.0	3/2$^+$	
369.81 *10*	5.8 *9*	892.2	9/2$^+$	521.8	9/2$^+$	γ not placed by 1987Pr10; placement suggested by Coulomb excitation data.
[x]375.12 *18*	3.2 *11*					
377.50[g] *5*	79[g@] *5*	516.4	7/2$^+$	138.9	5/2$^+$	
377.50[g] *5*	3[g@]	557.3	1/2$^+$	180.0	3/2$^+$	
383.01 *5*	97 *7*	521.8	9/2$^+$	138.9	5/2$^+$	
387.54 *5*	45 *3*	460.5	3/2$^+$	73.0	1/2$^+$	
389.16 *5*	51 *3*	469.4	13/2$^-$	80.2	11/2$^-$	
[x]397.03 *7*	15.1 *4*					
398.76 *6*	26.1 *23*	479.0	15/2$^-$	80.2	11/2$^-$	
[x]405.7 *2*	4.4 *9*					
[x]406.9 *2*	4.4 *9*					
[x]409.10 *11*	5.8 *11*					
413.81 *10*	8.6 *12*	874.2		460.5	3/2$^+$	
418.21 *7*	1.8 *4*	557.3	1/2$^+$	138.9	5/2$^+$	
420.40 *6*	33 *3*	559.2	5/2$^+$	138.9	5/2$^+$	
[x]432.8 *4*	1.7 *10*					
440.99 *6*	37 *3*	740.3	5/2$^-$	299.3	7/2$^-$	
444.75[g] *12*	2.1[ge] *4*	806.9	5/2$^+$	361.8	5/2$^+$	
444.75[gh] *12*	1.2[ge] *3*	1065.9	(+)	621.0	7/2$^+$	
449.21 *6*	20 *2*	806.9	5/2$^+$	357.7	7/2$^+$	
451.39 *14*	2.6 *6*	930.4	17/2$^-$	479.0	15/2$^-$	
460.53 *6*	131 *9*	460.5	3/2$^+$	0.0	3/2$^+$	
[x]467.0 *2*	3.4 *8*					
(482.2 *3*)	≈64	621.0	7/2$^+$	138.9	5/2$^+$	Peak superimposed on impurity (^{7}Li, 477γ); Iγ calculated from relative branching in Coulomb excitation (1987Pr10).
(484.3[‡])	6.3	557.3	1/2$^+$	73.0	1/2$^+$	I_γ: from branching ratio in adopted gammas; γ possibly masked by impurity (477γ of ^{7}Li) (evaluator).
[x]488.46 *18*	2.2 *11*					
492.93 *7*	8.5 *8*	1009.3	11/2$^+$	516.4	7/2$^+$	
499.5 *3*	19 *4*	857.2	11/2$^+$	357.7	7/2$^+$	
503.22 *8*	10.7 *15*	1019.6	11/2$^+$	516.4	7/2$^+$	
(512.3[‡])	2.9[b]	874.2		361.8	5/2$^+$	

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^{193}Ir(n,n′γ) 1987Pr10 (continued)

γ(^{193}Ir) (continued)

E_γ	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Comments
515.06[‡]	≈15	695.1	5/2+	180.0	3/2+	γ not resolved from impurity (517γ in ^{34}Cl) contaminant; Iγ deduced from relative branching in ^{193}Os β− decay (1987Pr10).
(516.48[‡])	4.7[b]	874.2		357.7	7/2+	
[x]521.1 2	3 1					
525.31 8	21.1 8	598.1	3/2−	73.0	1/2+	
531.90 9	12.8 13	712.1	3/2+	180.0	3/2+	
533.89[f] 8	22.7[fc] 14	833.2	11/2−	299.3	7/2−	1987Pr10 places the γ from this level alone.
533.89[f] 8	22.7[fc] 14	892.2	9/2+	357.7	7/2+	
[x]545.85 15	3.1 8					
548.17 11	5.8 13	1169.2	11/2+	621.0	7/2+	
[x]552.8 19	5.6 12					
(556.18[‡])	6 2	695.1	5/2+	138.9	5/2+	γ not observed but expected from ^{193}Os β− decay and ^{192}Ir(n,γ) data. Iγ calculated from relative branching from adopted gammas.
557.35 8	48 4	557.3	1/2+	0.0	3/2+	
559.31 8	98 8	559.2	5/2+	0.0	3/2+	
(573.24[‡])	3.1 10	712.1	3/2+	138.9	5/2+	γ not seen, but expected on the basis of ^{193}Os β− and ^{192}Ir(n,γ) data. Iγ deduced from relative branching in Adopted Levels (evaluator).
582.55 13	1.1 5	1145.7	9/2−	563.3	9/2−	
[x]589.96 23	1.8 6					
599.4[dh] 3	1.8 5	1434.1	(13/2+)	834.7?	9/2+	
610.80[h] 15	3.5 8	972.8	(5/2+)	361.8	5/2+	
619.02 10	12.8 15	918.3	7/2−	299.3	7/2−	
621.05 9	51 3	621.0	7/2+	0.0	3/2+	
627.34 15	2.8 6	806.9	5/2+	180.0	3/2+	
[x]636.76 12	4.7 6					
647.49 11	6.0 12	1169.2	11/2+	521.8	9/2+	
[x]651.64 18	1.8 4					
662.68 14	4.3 10	1511.9	(3/2+,5/2+)	848.9	5/2+	
668.04 9	38 4	806.9	5/2+	138.9	5/2+	
[x]672.99 11	6.1 9					
676.36 18	3.0 6	1038.2	(+)	361.8	5/2+	
677.98 11	7.0 9	1035.6	(3/2,5/2,7/2)+	357.7	7/2+	
695.27 14	4.0 10	695.1	5/2+	0.0	3/2+	
698.64 17	1.8 7	1168.2	13/2−	469.4	13/2−	
704.01 11	5.5 9	1065.9	(+)	361.8	5/2+	
710.01 10	14.4 15	848.9	5/2+	138.9	5/2+	
712.47 26	2.1 7	712.1	3/2+	0.0	3/2+	
718.72 10	41 4	1076.4	(3/2+)	357.7	7/2+	
733.93 15	3.0 6	806.9	5/2+	73.0	1/2+	
735.59 18	2.0 4	874.2		138.9	5/2+	
748.68 9	66 5	828.9	(9/2−)	80.2	11/2−	
[x]750.97 19	6.9 12					
752.73[f] 15	9.2[fc] 14	833.2	11/2−	80.2	11/2−	1987Pr10 places the γ from this level alone.
752.73[f] 15	9.2[fc] 14	892.2	9/2+	138.9	5/2+	
[x]760.4 7	1.4 14					
[x]761.5 4	2.8 14					
[x]764.1 5	0.9 6					
[x]769.50 18	2.8 9					
[x]774.02 24	2.3 14					
[x]776.50 19	3.8 8					

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^{193}Ir(n,n′γ) 1987Pr10 (continued)

γ(^{193}Ir) (continued)

E_γ	I_γ †	E_i(level)	J_i^π	E_f	J_f^π
778.60 *9*	40 *4*	1077.9	(3/2$^-$,5/2$^-$)	299.3	7/2$^-$
x781.88 *10*	14.5 *14*				
784.58 *15*	5.1 *8*	964.4	(1/2$^+$,3/2$^+$)	180.0	3/2$^+$
x795.00 *13*	4.7 *8*				
x797.00 *15*	4.3 *9*				
x802.93 *9*	8.8 *9*				
x829.8 *4*	2.2 *13*				
848.95 *8*	35 *4*	848.9	5/2$^+$	0.0	3/2$^+$
856.5 *6*	1.1 *7*	1035.6	(3/2,5/2,7/2)$^+$	180.0	3/2$^+$
858.2 *3*	2.0 *8*	1038.2	($^+$)	180.0	3/2$^+$
x862.10 *12*	5.7 *11*				
874.26 *9*	36 *4*	874.2		0.0	3/2$^+$
x875.9 *4*	4.0 *14*				
885.91 *8*	15.5 *21*	1065.9	($^+$)	180.0	3/2$^+$
888.42 *10*	9.1 *8*	1250.5	(3/2$^+$,5/2$^+$)	361.8	5/2$^+$
891.41 *9*	22.5 *23*	964.4	(1/2$^+$,3/2$^+$)	73.0	1/2$^+$
892.89 *13*	8.4 *11*	1250.5	(3/2$^+$,5/2$^+$)	357.7	7/2$^+$
899.98 *13*	4.9 *7*	972.8	(5/2$^+$)	73.0	1/2$^+$
x910.8 *3*	2.5 *6*				
x914.7 *5*	2.0 *10*				
x916.0 *3*	3.1 *12*				
x920.14 *17*	2.8 *9*				
x927.17 *12*	4.3 *7*				
x930.29 *11*	5.0 *7*				
937.49 *13*	12.3 *20*	1076.4	(3/2$^+$)	138.9	5/2$^+$
x943.33 *22*	2.5 *8*				
x947.44 *20*	2.7 *11*				
951.10 *11*	7.6 *13*	1131.1		180.0	3/2$^+$
954.37 *15*	5.1 *10*	1511.9	(3/2$^+$,5/2$^+$)	557.3	1/2$^+$
x956.49 *17*	4.4 *10*				
x959.5 *3*	3.0 *10*				
x964.06 *10*	18.7 *18*				
x966.17 *21*	3.1 *6*				
972.08 *24*	2.4 *8*	972.8	(5/2$^+$)	0.0	3/2$^+$
x976.8 *3*	3.9 *11*				
x981.35 *11*	15.9 *15*				
992.2[f] *5*	2.8[f] *17*	1065.9	($^+$)	73.0	1/2$^+$
992.2[f] *5*	2.8[f] *17*	1131.1		138.9	5/2$^+$
x993.4 *5*	2.5 *14*				

† Relative Iγ at θ=90°.
‡ From adopted gammas.
# Deduced from Iγ(complex peak)=1000 *70* and relative branching from 357.7 level from other sources (1987Pr10).
@ Deduced from Iγ(complex peak)=82 *5* and relative branching from 557.3 level from other sources (1987Pr10).
& Deduced from Iγ(complex peak)=105 *13* and relative branching from 621.0 level from adopted gammas (evaluator).
[a] Deduced from Iγ(complex peak)=9 *3* and relative branching from 857.2 level from adopted gammas (evaluator).
[b] γ expected on the basis of ^{193}Os β$^-$ decay data. γ probably masked by annihilation radiation and/or impurity (^{36}Cl 517 line). Iγ from relative branching in adopted gammas (evaluator).
[c] Multiple placement by evaluator on the basis of Coulomb excitation and/or ^{192}Ir(n,γ) data.
[d] γ identified as the 13/2$^+$ to 9/2$^+$ transition in a rotational band. The 9/2$^+$ level was not seen, the transition from it was assumed to be masked by impurities. The energy of the 9/2$^+$ level was estimated to be 834.7 keV. From Adopted Levels E(9/2$^+$)=839.1

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^{193}Ir(n,n′γ) 1987Pr10 (continued)

$\gamma(^{193}Ir)$ (continued)

keV. Therefore, the adopted E(13/2$^+$)=1438.5 keV.

[e] Deduced from from Iγ(complex peak)=3.3 *6* and relative branching from 806.9 level from adopted gammas (evaluator).

[f] Multiply placed with undivided intensity.

[g] Multiply placed with intensity suitably divided.

[h] Placement of transition in the level scheme is uncertain.

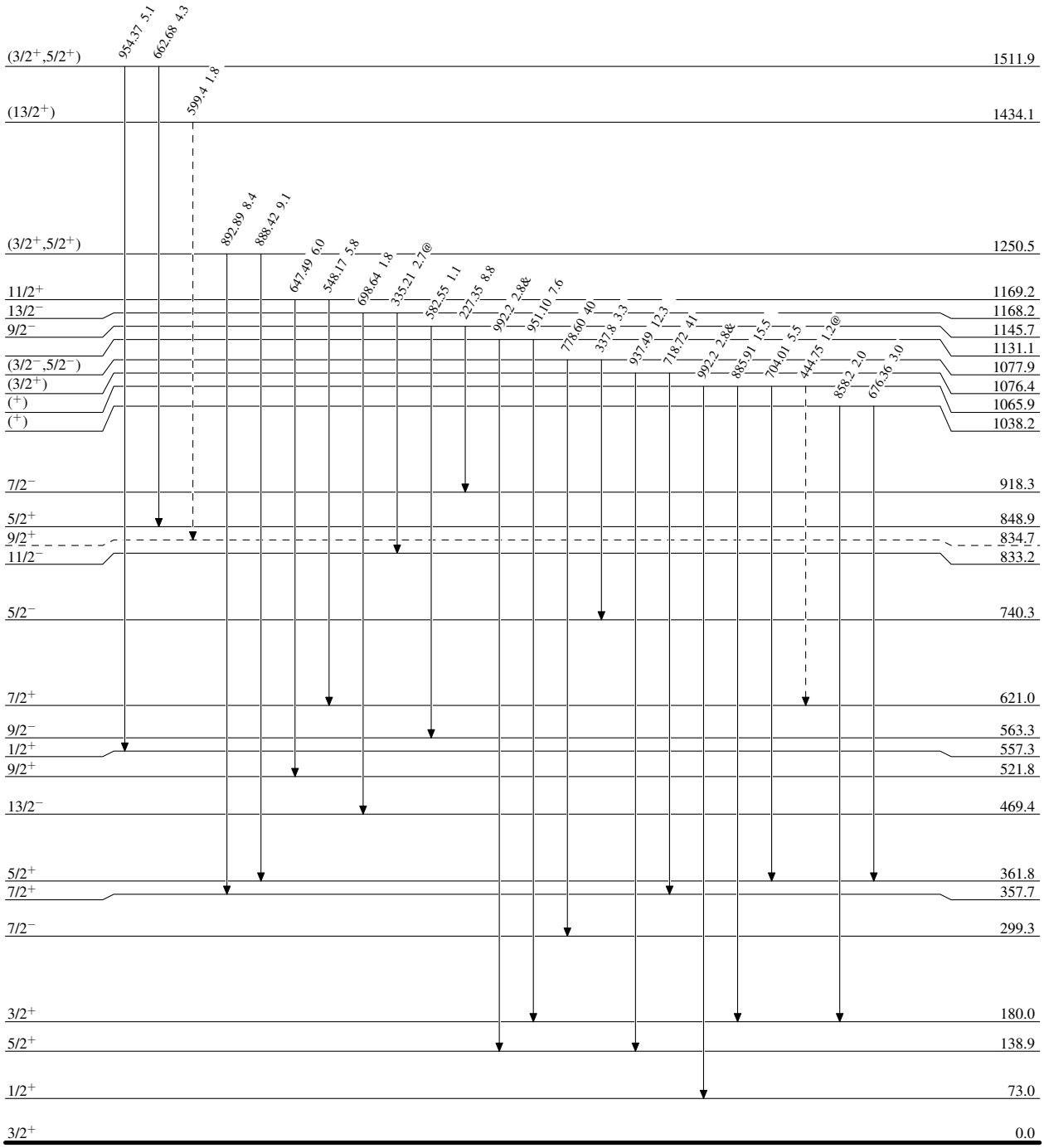
[x] γ ray not placed in level scheme.

^{193}Ir(n,n′γ) 1987Pr10

Level Scheme

Intensities: Relative Iγ At θ=90°
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

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)



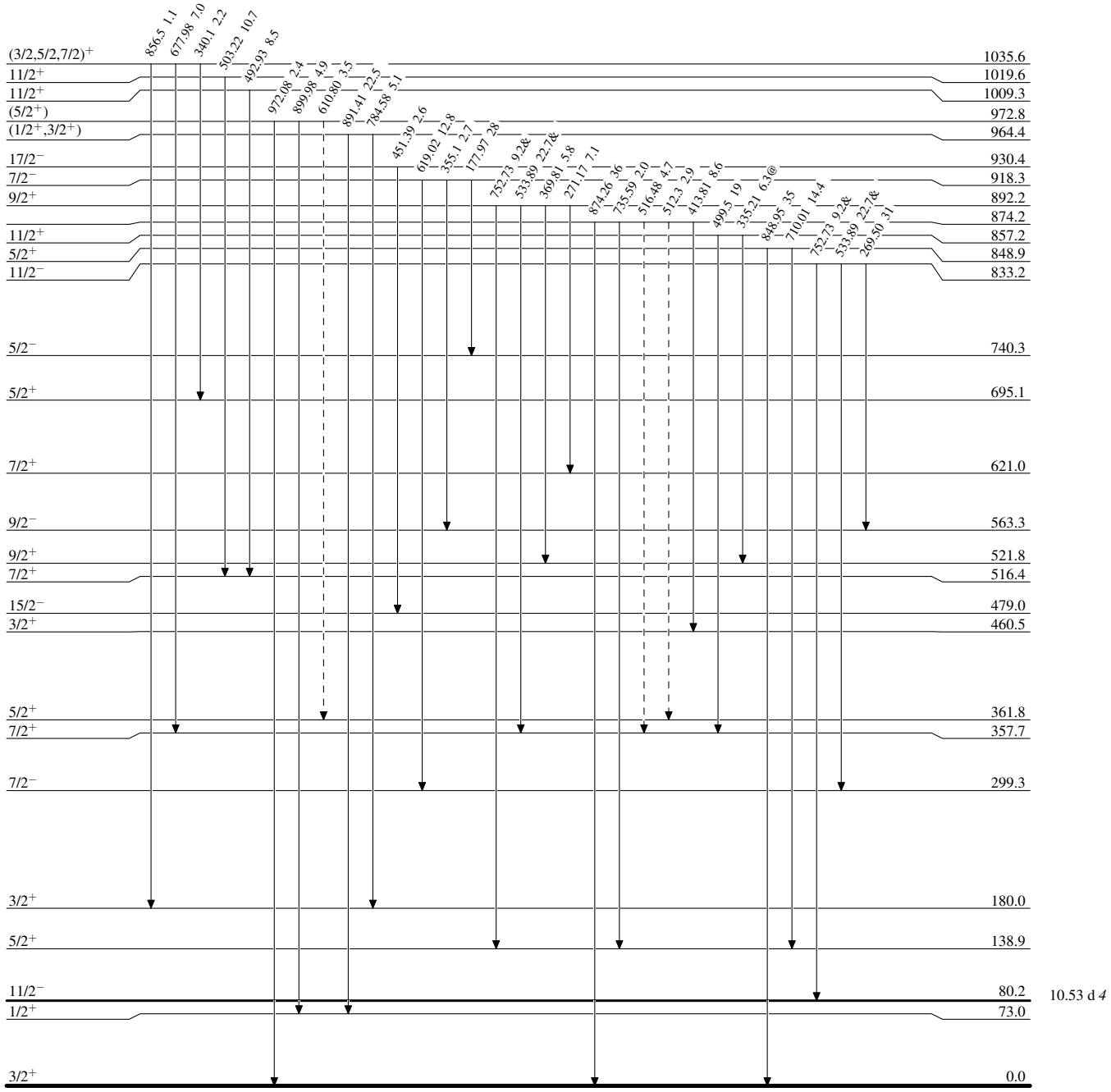
$^{193}_{77}Ir_{116}$

^{193}Ir(n,n′γ) 1987Pr10

Level Scheme (continued)

Intensities: Relative Iγ At θ=90°
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

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)



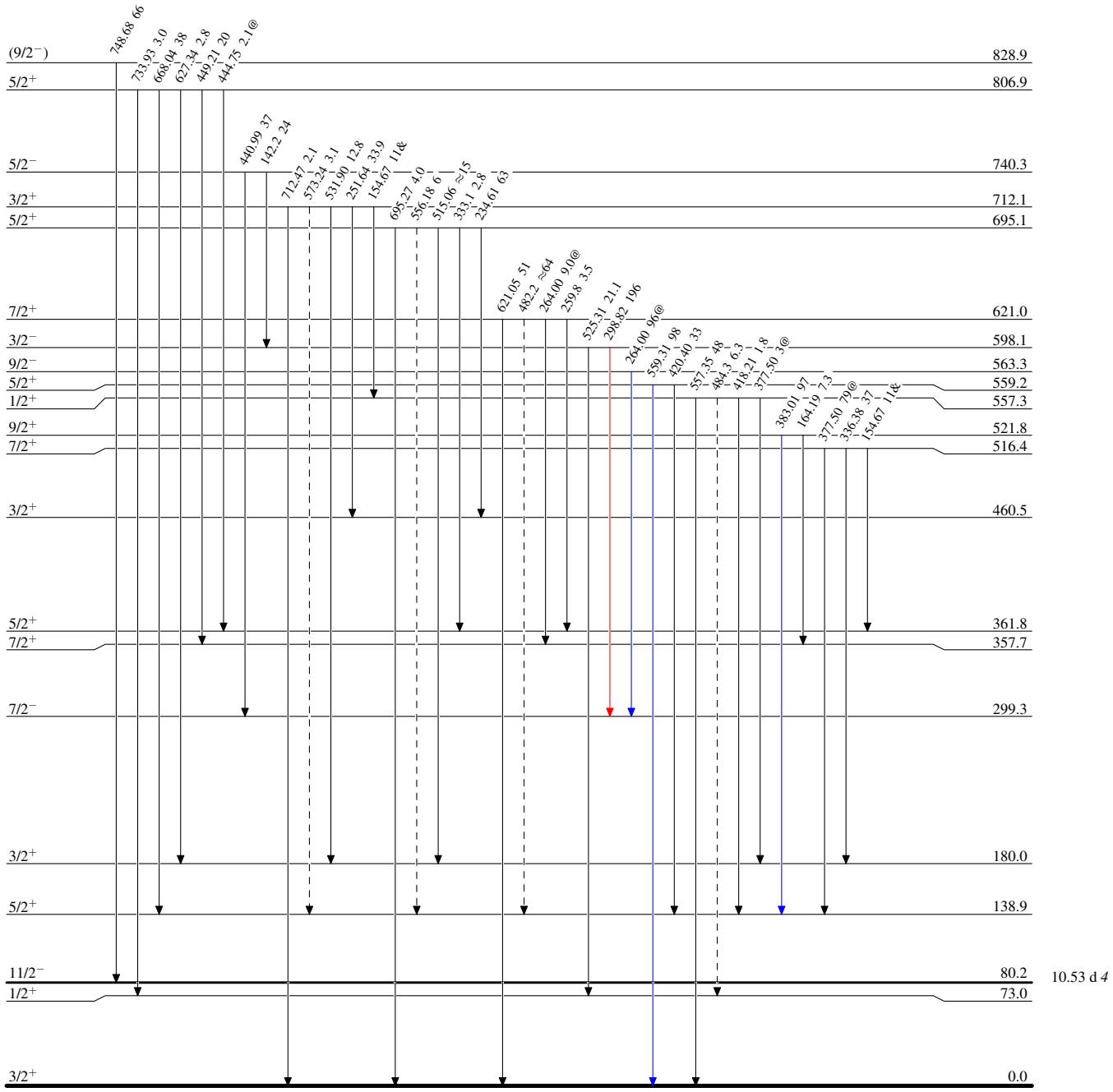
$^{193}_{77}Ir_{116}$

^{193}Ir(n,n′γ) 1987Pr10

Level Scheme (continued)

Intensities: Relative Iγ At θ=90°
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

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)



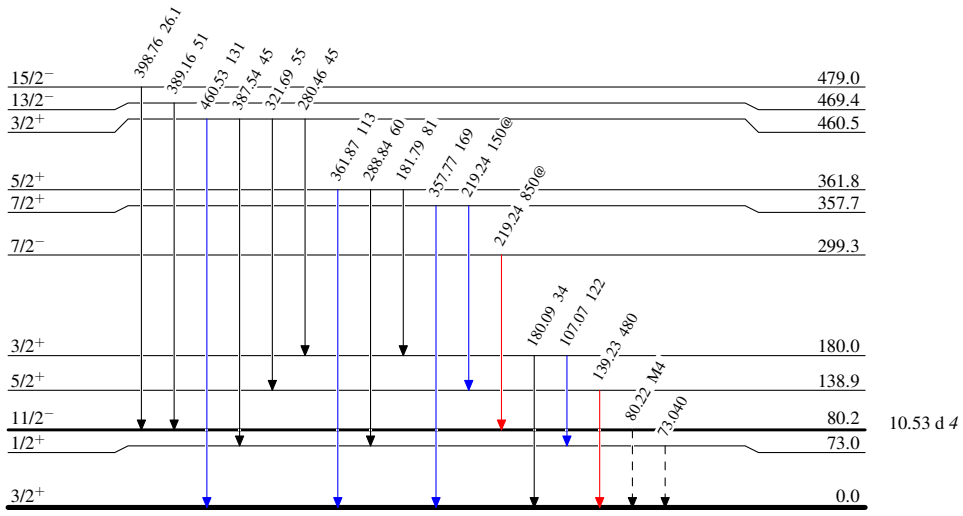
$^{193}_{77}Ir_{116}$

^{193}Ir(n,n′γ) 1987Pr10

Level Scheme (continued)

Intensities: Relative Iγ At θ=90°
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

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)



$^{193}_{77}Ir_{116}$