^{110}Pd(^{37}Cl,3nγ) 1996Pi11

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	A. A. Sonzogni	NDS 93, 599 (2001)	1-Dec-2000

Includes 1995Pi09. E=140-160 MeV, measured γ, $\gamma\gamma$, DSAM (plunger). Nordball array: 20 Compton-suppressed Ge plus 60-element inner ball; also 2 low-energy photons detectors (LEPs). Only information above (8^-) isomer was reported.

^{144}Eu Levels

E(level)	J^{π}[†]	$T_{1/2}$	Comments
1127.9[‡]	(8^-)	1.0[‡] μs	
1338.3	(9^-)	5.0[‡] ns	
1669.7	(9^+)	76 ps *7*	Additional information 1.
1669.7+x	(10^+)		Hypothetical level corresponding to a (πh_11/2 νh_11/2)$^{10+}$ configuration. The energy x is expected to be small,≈50 keV.
2162.0+x	(11^+)		This level was seen by 1981Ha25 and interpreted as having $J^{\pi}=10^+$. Based on what is known for neighboring nuclei, 1996Pi11 expect this level to have $J^{\pi}= 11^+$, and speculate about the existence of a 10^+ level at 1669.7+x keV.
2801.8+x	(11^+)		
2903.8+x	(12^+)		
3369.4+x	(12^+)		
3454.5+x	(13^+)		
3454.5+y	(14)		No γ's were observed de-populating this level. Its existance is based on timing data from the plunger. it is assumed to feed the 3454.5 + x level. The energy difference, Y-x, is expected to be≤200 keV.
3486.0+y	(15)		
3650.5+y	(16)	<7 ps	
4366.8+y	(17)		
4399.5+y	(15)		
4508.4+y	(16)	<7 ps	
4597.2+y	(17)		
4791.0+y	(17)		
4851.2+y	(18)		
5174.6+y	(18)		
5225.5+y	(19)		
5671.4+y			
5844.4+y	(19)		
6171.6+y	(20)		
6374.5+y	(20)		
6426.5+y	(20)		
6454.9+y	(21)		
6715.4+y	(22)		
6747.9+y	(21)		Feeds 5225+y level through unknown transition(s).
6842.0+y	(21)		
7326.4+y	(23)		
7350.1+y	(21)		Feeds 5225+y level through unknown transition(s).
7847.2+y	(24)		
8136.0+y	(25)		
8214.2+y	(22)		
8220.7+y	(22)		
8223.8+y			
8436.5+y	(23)		
8715.5+y	(24)		
9079.1+y	(25)		
9083.1+y	(25)		
9533.2+y	(26)		
9889.9+y	(27)		

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^{110}Pd(^{37}Cl,3nγ) 1996Pi11 (continued)

^{144}Eu Levels (continued)

E(level)	J$^{\pi}$[†]	$T_{1/2}$	Comments
10060.4+y	(27)		
10217.8+y	(27)		
10641.6+y	(28)		
10873.7+y	(29)		
12035.1+y	(31)		
z[#]			E(level): z> 5 MeV.
z+831.7[#]			E(level): from γ energy difference depopulating z+1922 level.
z+1921.6[#]	J		
2568.9+z[#]	J+2		
3131.3+z	J+3		
3463.3+z[#]	J+4		
3995.6+z[#]	J+5		
4056.2+z[#]	J+5		
4556.5+z[#]	J+6		
4914.6+z[#]	J+7		
5394.7+z[#]	J+9	8.5 ps *3*	
6053.2+z[#]	J+11	<1.4 ps	
6962.7+z[#]	J+13	<0.35 ps	
8121.4+z[#]	J+15		
9491.4+z[#]	J+17		
11033.7+z[#]	J+19		

[†] From ado values, α and shell-model calculations.
[‡] From Adopted Levels.
[#] Band(A): ΔJ=2 band.

γ(^{144}Eu)

E$_{\gamma}$	I$_{\gamma}$[†]	E$_i$(level)	J$_i^{\pi}$	E$_f$	J$_f^{\pi}$	Mult.[‡]	Comments
32[#]		3486.0+y	(15)	3454.5+y	(14)		E$_{\gamma}$: from energy difference, γ was not observed.
85.2 *1*	74	3454.5+x	(13$^+$)	3369.4+x	(12$^+$)	M1	Iγ(37°)/Iγ(79°)= 0.84 *10*.
88.8 *1*	75	4597.2+y	(17)	4508.4+y	(16)	M1	Iγ(37°)/Iγ(79°)= 0.77 *10*.
102.1 *2*	25	2903.8+x	(12$^+$)	2801.8+x	(11$^+$)	M1	Iγ(37°)/Iγ(79°)= 0.76 *9*.
108.9 *1*	36	4508.4+y	(16)	4399.5+y	(15)		Iγ(37°)/Iγ(79°)= 0.75 *8*.
164.5 *1*	311	3650.5+y	(16)	3486.0+y	(15)	M1	Iγ(37°)/Iγ(79°)= 0.82 *5*.
210.4 *1*	346	1338.3	(9$^-$)	1127.9	(8$^-$)	M1	Iγ(37°)/Iγ(79°)= 0.55 *4*.
212.6 *2*	60	8436.5+y	(23)	8223.8+y			Iγ(37°)/Iγ(79°)= 0.80 *8*.
215.8 *2*	66	8436.5+y	(23)	8220.7+y	(22)		Iγ(37°)/Iγ(79°)= 0.73 *7*.
222.3 *2*	62	8436.5+y	(23)	8214.2+y	(22)		Iγ(37°)/Iγ(79°)= 0.67 *7*.
[x]249.5 *5*	32						Iγ(37°)/Iγ(79°)= 0.61 *12*.
[x]251.4 *5*	58						Iγ(37°)/Iγ(79°)= 1.06 *21*.
254.0 *2*	247	4851.2+y	(18)	4597.2+y	(17)		Iγ(37°)/Iγ(79°)= 0.77 *8*.
[x]256.5 *3*	140						Iγ(37°)/Iγ(79°)= 0.99 *15*.
[x]257.8 *4*	86						Iγ(37°)/Iγ(79°)= 0.77 *16*.
260.6 *3*	44	6715.4+y	(22)	6454.9+y	(21)		Iγ(37°)/Iγ(79°)= 0.72 *10*.
279.0 *1*	280	8715.5+y	(24)	8436.5+y	(23)		Iγ(37°)/Iγ(79°)= 0.69 *6*.
283.3 *2*	111	6454.9+y	(21)	6171.6+y	(20)		Iγ(37°)/Iγ(79°)= 0.78 *7*.
[x]307.0 *2*	104						Iγ(37°)/Iγ(79°)= 0.93 *8*.

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^{110}Pd(^{37}Cl,3nγ) 1996Pi11 (continued)

$\gamma(^{144}Eu)$ (continued)

E_γ	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	Comments
327.1 *4*	28	6171.6+y	(20)	5844.4+y	(19)		Iγ(37°)/Iγ(79°)= 0.66 *11*.
331.4 *2*	452	1669.7	(9$^+$)	1338.3	(9$^-$)	E1	Iγ(37°)/Iγ(79°)= 1.44 *8*.
358.3 *3*	31	4914.6+z	J+7	4556.5+z	J+6		Iγ(37°)/Iγ(79°)= 0.96 *15*.
363.6 *2*	151	9079.1+y	(25)	8715.5+y	(24)		Iγ(37°)/Iγ(79°)= 0.69 *6*.
367.7 *2*	118	9083.1+y	(25)	8715.5+y	(24)		Iγ(37°)/Iγ(79°)= 0.64 *6*.
374.3 *2*	364	5225.5+y	(19)	4851.2+y	(18)		Iγ(37°)/Iγ(79°)= 0.73 *5*.
[x]415.1 *3*	69						Iγ(37°)/Iγ(79°)= 0.81 *12*.
415.6 *5*	17	6842.0+y	(21)	6426.5+y	(20)		Iγ(37°)/Iγ(79°)= 1.1 *3*.
[x]435.9 *4*	37						Iγ(37°)/Iγ(79°)= 0.86 *15*.
454.2 *3*	98	9533.2+y	(26)	9079.1+y	(25)		Iγ(37°)/Iγ(79°)= 0.83 *11*.
480.1 *2*	220	5394.7+z	J+9	4914.6+z	J+7		Iγ(37°)/Iγ(79°)= 1.43 *9*.
484.5 *2*	176	4851.2+y	(18)	4366.8+y	(17)		Iγ(37°)/Iγ(79°)= 0.72 *5*.
492.2 *2*	679	2162.0+x	(11$^+$)	1669.7+x	(10$^+$)	M1	Iγ(37°)/Iγ(79°)= 0.71 *4*.
[x]512.6 *4*	57						Iγ(37°)/Iγ(79°)= 1.65 *25*.
520.8 *5*	12	7847.2+y	(24)	7326.4+y	(23)		Iγ(37°)/Iγ(79°)= 0.41 *15*.
527.1 *4*	36	10060.4+y	(27)	9533.2+y	(26)		Iγ(37°)/Iγ(79°)= 0.65 *12*.
532.2 *3*	88	3995.6+z	J+5	3463.3+z	J+4		Iγ(37°)/Iγ(79°)= 0.82 *11*.
541.7 *2*	548	1669.7	(9$^+$)	1127.9	(8$^-$)	E1	Iγ(37°)/Iγ(79°)= 0.80 *4*.
550.7 *2*	482	3454.5+x	(13$^+$)	2903.8+x	(12$^+$)		Iγ(37°)/Iγ(79°)= 0.60 *4*.
562.4 *4*	35	3131.3+z	J+3	2568.9+z	J+2		Iγ(37°)/Iγ(79°)= 0.72 *12*.
577.4 *2*	113	5174.6+y	(18)	4597.2+y	(17)		Iγ(37°)/Iγ(79°)= 0.61 *6*.
581.2 *4*	15	10641.6+y	(28)	10060.4+y	(27)		Iγ(37°)/Iγ(79°)= 0.71 *15*.
592.7 *4*	26	4056.2+z	J+5	3463.3+z	J+4		Iγ(37°)/Iγ(79°)= 0.89 *20*.
611.0 *3*	40	7326.4+y	(23)	6715.4+y	(22)		Iγ(37°)/Iγ(79°)= 0.64 *12*.
[x]620.5 *2*	102						Iγ(37°)/Iγ(79°)= 0.71 *8*.
[x]635.3 *4*	27						Iγ(37°)/Iγ(79°)= 0.58 *14*.
647.3 *3*	203	2568.9+z	J+2	z+1921.6	J		Iγ(37°)/Iγ(79°)= 1.45 *12*.
658.5 *3*	199	6053.2+z	J+11	5394.7+z	J+9		Iγ(37°)/Iγ(79°)= 1.59 *21*.
669.8 *5*	48	5844.4+y	(19)	5174.6+y	(18)		Iγ(37°)/Iγ(79°)= 0.67 *10*.
684.6 *4*	43	10217.8+y	(27)	9533.2+y	(26)		Iγ(37°)/Iγ(79°)= 0.85 *11*.
716.3 *2*	176	4366.8+y	(17)	3650.5+y	(16)		Iγ(37°)/Iγ(79°)= 0.57 *6*.
741.7 *2*	420	2903.8+x	(12$^+$)	2162.0+x	(11$^+$)		Iγ(37°)/Iγ(79°)= 0.96 *6*.
806.8 *3*	88	9889.9+y	(27)	9083.1+y	(25)		Iγ(37°)/Iγ(79°)= 1.33 *15*.
809.6 *5*	17	8136.0+y	(25)	7326.4+y	(23)		Iγ(37°)/Iγ(79°)= 1.8 *4*.
810.8 *4*	30	9889.9+y	(27)	9079.1+y	(25)		Iγ(37°)/Iγ(79°)= 1.65 *25*.
817.7 *4*	36	9533.2+y	(26)	8715.5+y	(24)		Iγ(37°)/Iγ(79°)= 1.57 *25*.
858 *1*	10	4508.4+y	(16)	3650.5+y	(16)		
858.3 *3*	63	4914.6+z	J+7	4056.2+z	J+5		Iγ(37°)/Iγ(79°)= 1.34 *15*.
864.2 *3*	65	3995.6+z	J+5	3131.3+z	J+3		Iγ(37°)/Iγ(79°)= 1.33 *15*.
894.4 *2*	149	3463.3+z	J+4	2568.9+z	J+2		Iγ(37°)/Iγ(79°)= 1.51 *12*.
909.5 *2*	102	6962.7+z	J+13	6053.2+z	J+11		Iγ(37°)/Iγ(79°)= 1.31 *10*.
919.0 *3*	176	4914.6+z	J+7	3995.6+z	J+5		Iγ(37°)/Iγ(79°)= 1.52 *11*.
[x]925.2 *5*	18						
944.9 *5*		4399.5+y	(15)	3454.5+y	(14)		
946.0 *3*	271	6171.6+y	(20)	5225.5+y	(19)		Iγ(37°)/Iγ(79°)= 0.70 *10*.
946.6 *5*	50	4597.2+y	(17)	3650.5+y	(16)		
981.3 *5*	5	10060.4+y	(27)	9079.1+y	(25)		
983.8 *3*	69	10873.7+y	(29)	9889.9+y	(27)		Iγ(37°)/Iγ(79°)= 1.53 *18*.
[x]1006.5 *3*	67						Iγ(37°)/Iγ(79°)= 1.41 *16*.
[x]1012.6 *4*	64						Iγ(37°)/Iγ(79°)= 1.33 *15*.
[x]1018.0 *5*	39						Iγ(37°)/Iγ(79°)= 1.23 *25*.
1022.4 *3*	248	4508.4+y	(16)	3486.0+y	(15)		Iγ(37°)/Iγ(79°)= 0.81 *9*.
[x]1040.7 *5*	33						Iγ(37°)/Iγ(79°)= 0.86 *15*.
[x]1043.2 *4*	37						Iγ(37°)/Iγ(79°)= 1.9 *5*.
[x]1049.4 *4*	31						Iγ(37°)/Iγ(79°)= 1.58 *20*.
1086.4 *4*	48	8436.5+y	(23)	7350.1+y	(21)		Iγ(37°)/Iγ(79°)= 1.51 *20*.
1089.9 *4*	33	z+1921.6	J	z+831.7			Iγ(37°)/Iγ(79°)= 1.55 *18*.

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^{110}Pd(^{37}Cl,3nγ) 1996Pi11 (continued)

γ(^{144}Eu) (continued)

E_γ	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Comments
1093.6 *4*	54	4556.5+z	J+6	3463.3+z	J+4	Iγ(37°)/Iγ(79°)= 1.26 *15*.
1108.5 *5*	16	10641.6+y	(28)	9533.2+y	(26)	Iγ(37°)/Iγ(79°)= 1.2 *3*.
[x]1120.4 *3*	50					Iγ(37°)/Iγ(79°)= 1.2 *4*.
1132.1 *3*	81	2801.8+x	(11^+)	1669.7+x	(10^+)	Iγ(37°)/Iγ(79°)= 0.66 *10*.
1140.5 *5*	37	4791.0+y	(17)	3650.5+y	(16)	Iγ(37°)/Iγ(79°)= 0.84 *20*.
[x]1141.0 *4*						Iγ(37°)/Iγ(79°)= 1.1 *4*.
1149.0 *4*	39	6374.5+y	(20)	5225.5+y	(19)	Iγ(37°)/Iγ(79°)= 0.90 *20*.
1158.7 *5*	51	8121.4+z	J+15	6962.7+z	J+13	Iγ(37°)/Iγ(79°)= 1.36 *15*.
1161.4 *5*	45	12035.1+y	(31)	10873.7+y	(29)	Iγ(37°)/Iγ(79°)= 1.44 *16*.
1201.0 *4*	57	6426.5+y	(20)	5225.5+y	(19)	Iγ(37°)/Iγ(79°)= 0.88 *12*.
1207.5 *3*	161	3369.4+x	(12^+)	2162.0+x	(11^+)	Iγ(37°)/Iγ(79°)= 0.52 *6*.
1233.9 *4*	65	2903.8+x	(12^+)	1669.7+x	(10^+)	Iγ(37°)/Iγ(79°)= 1.26 *14*.
1292.3 *3*	92	3454.5+x	(13^+)	2162.0+x	(11^+)	Iγ(37°)/Iγ(79°)= 1.39 *14*.
[x]1338.1 *5*	27					Iγ(37°)/Iγ(79°)= 0.83 *20*.
1369.9 *6*	13	9491.4+z	J+17	8121.4+z	J+15	Iγ(37°)/Iγ(79°)= 1.48 *25*.
1372.1 *5*	16	8214.2+y	(22)	6842.0+y	(21)	Iγ(37°)/Iγ(79°)= 1.05 *25*.
1381.9 *5*	11	8223.8+y		6842.0+y	(21)	Iγ(37°)/Iγ(79°)= 0.66 *30*.
1472.8 *5*	16	8220.7+y	(22)	6747.9+y	(21)	Iγ(37°)/Iγ(79°)= 0.92 *20*.
1499.2 *8*	4	8214.2+y	(22)	6715.4+y	(22)	
1508.3 *8*	3	8223.8+y		6715.4+y	(22)	
1542.3 *6*	10	11033.7+z	J+19	9491.4+z	J+17	Iγ(37°)/Iγ(79°)= 1.35 *23*.
1699.8 *3*	143	3369.4+x	(12^+)	1669.7+x	(10^+)	Iγ(37°)/Iγ(79°)= 1.47 *15*.
1759.3 *5*	15	8214.2+y	(22)	6454.9+y	(21)	Iγ(37°)/Iγ(79°)= 0.81 *20*.
1768.7 *6*	8	8223.8+y		6454.9+y	(21)	Iγ(37°)/Iγ(79°)= 0.8 *3*.
1921.6 *7*	9	z+1921.6	J	z		
2020.9 *8*	8	5671.4+y		3650.5+y	(16)	Iγ(37°)/Iγ(79°)= 1.9 *4*.

[†] For E=160 MeV, uncertainties are ≈5%, larger for weak and complex lines.
[‡] Based on intensity balance arguments or ce measurements.
[#] Placement of transition in the level scheme is uncertain.
[x] γ ray not placed in level scheme.

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Level Scheme

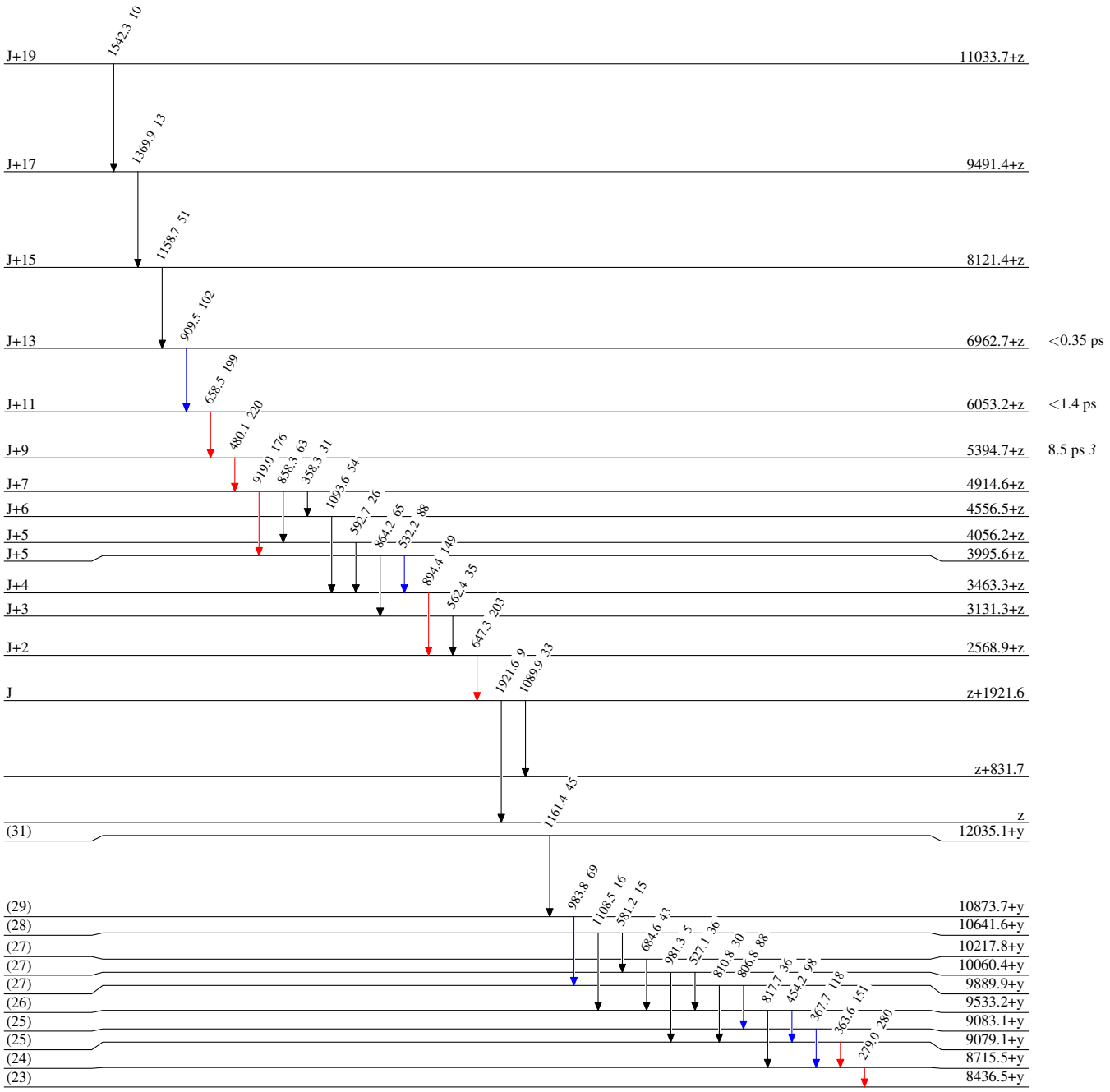
Intensities: Relative I_γ

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$

$I_\gamma < 10\% \times I_\gamma^{max}$

$I_\gamma > 10\% \times I_\gamma^{max}$



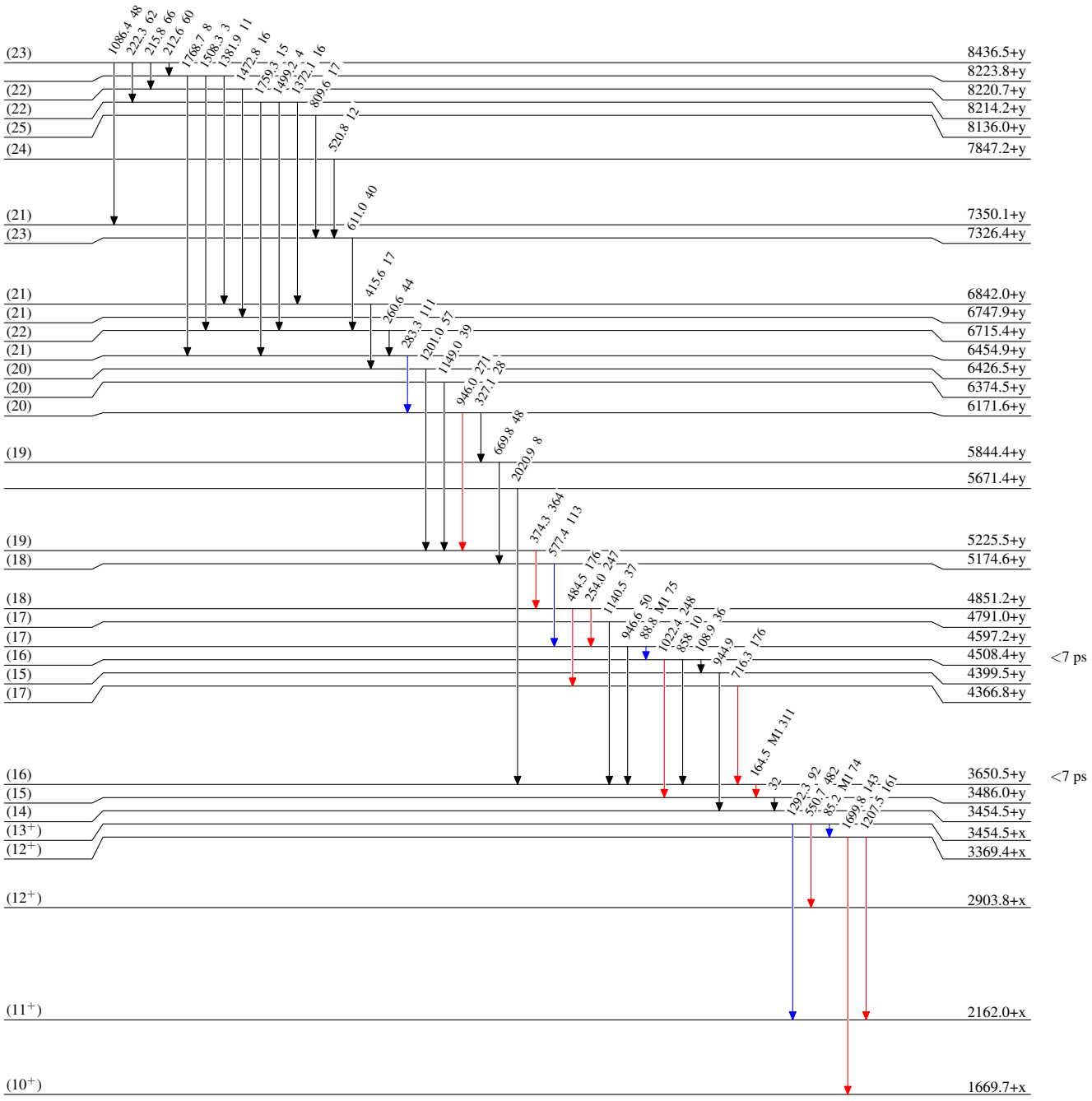
$^{144}_{63}Eu_{81}$

^{110}Pd(^{37}Cl,3nγ) 1996Pi11

Level Scheme (continued)

Intensities: Relative I_γ

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)

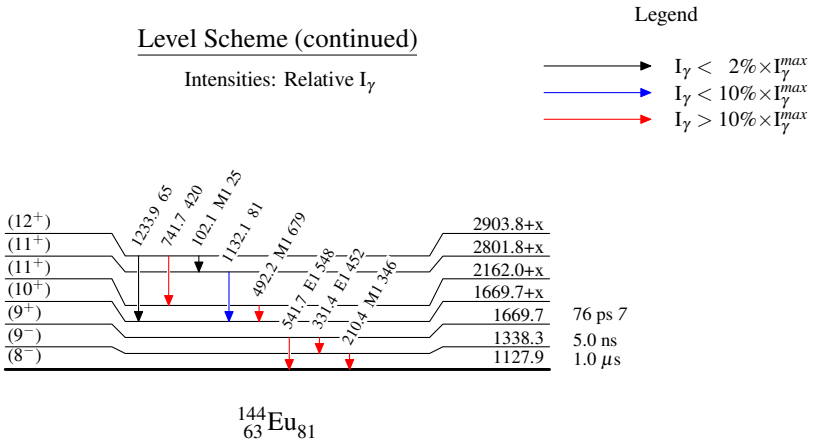


$^{144}_{63}Eu_{81}$

^{110}Pd(^{37}Cl,3nγ) 1996Pi11

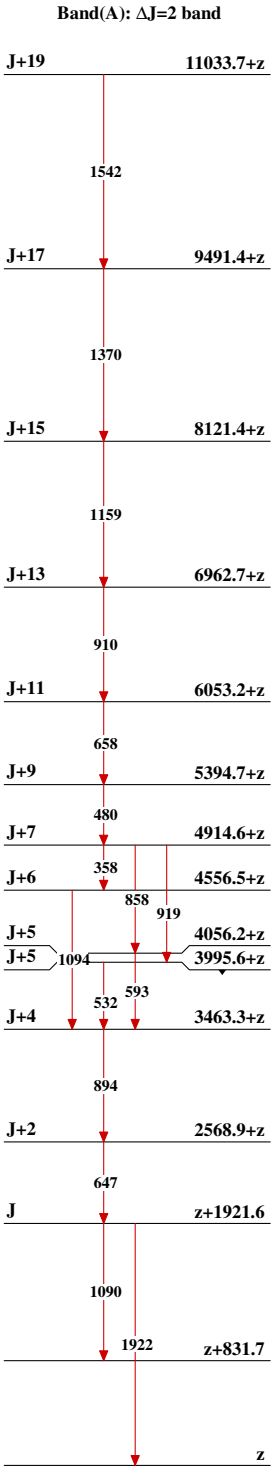
Level Scheme (continued)

Intensities: Relative I_γ



$^{144}_{63}Eu_{81}$

^{110}Pd(^{37}Cl,3nγ) 1996Pi11



$^{144}_{63}Eu_{81}$