^{172}Yb(^{14}N,4nγ) 1990Kr06

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 130, 21 (2015)	15-Jul-2015

1990Kr06: E=70-83 MeV. Measured γ, $\gamma\gamma$, $\gamma(\theta)$, $\gamma\gamma$(t), excitation functions. See also 1986Kr09 from the same group.
2007Ho20 mention (reference 11 in their paper) another high-spin study by H. Somacal, Ph.D. thesis, University of Buenos Aires, Argentina (1996). This work seems to be from the same group as 1990Kr06. Copy of this thesis was not available to the evaluators.
Additional information 1.

^{182}Ir Levels

E(level)[†]	J^{π}[#]	$T_{1/2}$[‡]	Comments
0+x[@]	5$^+$		E(level): x=25.6 keV based on data from ^{182}Pt ε decay (1995Sa42,1999Sa40, 2007Ho20) and Adopted Levels. J$^{\pi}$: from systematics of doubly decoupled bands (1990Kr06).
45.3+x *3*	5$^+$	170 ns *40*	Possible configuration=$\pi h_{9/2}\otimes\nu$7/2[514] (1990Kr06).
84.2+x[&] *3*	6$^+$		
126.8+x[a] *4*	(5)$^-$		
145.5+x[@] *3*	7$^+$		
150.7+x[a] *4*	(6)$^-$	130 ns *50*	
160.0+x[&] *4*	7$^+$		
205.9+x[a] *4*	(7)$^-$		
240.9+x[a] *5*	(8)$^-$		
266.4+x[&] *4*	8$^+$		
321.0+x[a] *6*	(9)$^-$		
400.1+x[&] *4*	9$^+$		
413.6+x[@] *4*	9$^+$		
494.1+x[a] *6*	(10)$^-$		
564.9+x[&] *4*	10$^+$		
606.7+x[a] *6*	(11)$^-$		
750.5+x[&] *4*	11$^+$		
781.1+x[@] *4*	11$^+$		
881.8+x[a] *6*	(12)$^-$		
959.5+x[&] *4*	12$^+$		
1013.3+x[a] *6*	(13)$^-$		
1186.3+x[&] *5*	13$^+$		
1222.5+x[@] *5*	13$^+$		
1382.9+x[a] *7*	(14)$^-$		
1431.0+x[&] *5*	14$^+$		
1528.9+x[a] *7*	(15)$^-$		
1688.7+x[&] *6*	15$^+$		
1704.2+x[@] *5*	15$^+$		
1960.4+x[&] *6*	16$^+$		
1969.6+x[a] *7*	(16)$^-$		
2133.4+x[a] *8*	(17)$^-$		
2212.0+x[@] *6*	17$^+$		
2241.3+x[&] *7*	17$^+$		
2533.9+x[&] *6*	18$^+$		
2756.2+x[@] *7*	19$^+$		

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$^{172}Yb(^{14}N,4n\gamma)$ 1990Kr06 (continued)

^{182}Ir Levels (continued)

E(level)[†]	Jπ[#]	E(level)[†]	Jπ[#]	E(level)[†]	Jπ[#]
2797.6+x[a] 8	(19)⁻	3146.6+x[&] 7	20⁺	3466.3+x[&] 8	21⁺
2834.3+x[&] 7	19⁺	3362.7+x[@] 7	21⁺	3494.7+x[a] 9	(21)⁻
				3843.6+x[&] 8	22⁺

[†] From least-squares fit to Eγ data. Add 25.6 keV to obtain absolute excitation energies.

[‡] γγ(t) (1990Kr06).

[#] From 1990Kr06. The assignments are based on systematics of neighboring nuclei and possible band structures. Most of these assignments are the same in Adopted Levels, except that these are given in parentheses there due to lack of strong supporting arguments. For the band based on 126.8+x, spin is less by one unit in Adopted Levels, following the assignment from 2007Ho20 for 152.4 level.

[@] Band(A): $\pi h_{9/2}\nu 1/2[521]$. Doubly-decoupled band (1990Kr06).

[&] Band(B): $\pi 5/2[402]\nu i_{13/2}$ or $\pi h_{9/2}\nu 7/2[514]$.

[a] Band(C): $\pi h_{9/2}\nu i_{13/2}$. Semi-decoupled band (1990Kr06). According to the work of 2007Ho20 (and work in reference 11 of 2007Ho20), the spin may need to be adjusted by one unit less for each member of this band.

γ(^{182}Ir)

Eγ	Iγ[†]	Ei(level)	Jπi	Ef	Jπf	Mult.[‡&]	α[c]	Comments
35.0 3	15 1	240.9+x	(8)⁻	205.9+x	(7)⁻	(M1)[a]	23.3 7	α(L)=18.0 6; α(M)=4.14 13 α(N)=1.02 3; α(O)=0.180 6; α(P)=0.0135 4 A₂=−0.48 8; A₄=+0.21 12
39.0 3	>7	84.2+x	6⁺	45.3+x	5⁺	(M1)[b]	16.9 5	α(L)=13.0 4; α(M)=3.01 9 α(N)=0.739 20; α(O)=0.131 4; α(P)=0.0098 3
45.4 3	71 8	45.3+x	5⁺	0+x	5⁺			A₂=−0.07 8
55.2 3	41 6	205.9+x	(7)⁻	150.7+x	(6)⁻	(M1)[a]	6.09 13	α(L)=4.69 10; α(M)=1.081 23 α(N)=0.266 6; α(O)=0.0470 10; α(P)=0.00354 8
75.7 3	>14	160.0+x	7⁺	84.2+x	6⁺			
79.2 3	>25	205.9+x	(7)⁻	126.8+x	(5)⁻	(E2)[a]	12.4 3	α(K)=0.775 13; α(L)=8.72 20; α(M)=2.24 6 α(N)=0.542 13; α(O)=0.0823 19; α(P)=0.000165 3
80.2 3	33 4	321.0+x	(9)⁻	240.9+x	(8)⁻			
81.5 3	190 20	126.8+x	(5)⁻	45.3+x	5⁺	(E1)[b]	0.666 11	α(K)=0.532 9; α(L)=0.1036 18; α(M)=0.0240 5 α(N)=0.00577 10; α(O)=0.000944 17; α(P)=4.48×10⁻⁵ 8
105.4 3	217[#] 31	150.7+x	(6)⁻	45.3+x	5⁺	(E1)[b]	0.349 6	α(K)=0.282 5; α(L)=0.0514 9; α(M)=0.01188 19 α(N)=0.00287 5; α(O)=0.000475 8; α(P)=2.44×10⁻⁵ 4
106.5 3	>17	266.4+x	8⁺	160.0+x	7⁺			
112.6 3	25 3	606.7+x	(11)⁻	494.1+x	(10)⁻	(M1+E2)	3.6 8	α(K)=2.1 15; α(L)=1.1 6; α(M)=0.28 15 α(N)=0.07 4; α(O)=0.011 5; α(P)=0.00026 19 A₂=−0.64 7; A₄=+0.10 10
ˣ121.2 3	10 1					D		A₂=−0.29 19
ˣ123.2 3	14[#] 1							
131.5 3	7[#] 1	1013.3+x	(13)⁻	881.8+x	(12)⁻			

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^{172}Yb(^{14}N,4nγ) 1990Kr06 (continued)

γ(^{182}Ir) (continued)

Eγ	Iγ[†]	Ei(level)	J^{π}_{i}	Ef	J^{π}_{f}	Mult.[‡&]	α[c]	Comments
133.6 3	8[#] 1	400.1+x	9+	266.4+x	8+			
145.4 3	>29[#]	145.5+x	7+	0+x	5+	(E2)[b]	1.071 18	α(K)=0.373 6; α(L)=0.526 9; α(M)=0.1346 23 α(N)=0.0326 6; α(O)=0.00502 9; α(P)=3.71×10^{-5} 6
145.9[d] 3	2.8[#] 5	1528.9+x	(15)−	1382.9+x	(14)−			
147.7 3	5[#] 1	413.6+x	9+	266.4+x	8+			
151.2 3	7[#] 1	564.9+x	10+	413.6+x	9+			
163.5[d] 3	[@]	2133.4+x	(17)−	1969.6+x	(16)−			
165.2 3	8 1	564.9+x	10+	400.1+x	9+	D		A_2=−0.29 8
[x]168.6 3	2.5 8							
173.1 3	100 6	494.1+x	(10)−	321.0+x	(9)−	(M1+E2)	0.9 4	α(K)=0.7 4; α(L)=0.21 4; α(M)=0.051 12 α(N)=0.012 3; α(O)=0.0020 3; α(P)=8.E−5 6 A_2=−0.70 6; A_4=+0.09 9
182.5 3	>14[#]	266.4+x	8+	84.2+x	6+			
185.7 3	11[#] 2	750.5+x	11+	564.9+x	10+			
207.8 3	[#@]	1431.0+x	14+	1222.5+x	13+			
209.0 3	[#@]	959.5+x	12+	750.5+x	11+			
[x]209.2 3	20[#] 3							
[x]223.6 3	12[#] 2					D		A_2=−0.16 4
[x]230.8 3	14 2							A_2=+0.19 9
240.3 3	28 3	400.1+x	9+	160.0+x	7+			
[x]245.3 3	10[#] 2							
[x]251.8 3	11[#] 2							
253.0 3	46[#] 5	494.1+x	(10)−	240.9+x	(8)−	(Q)		A_2=+0.39 7 A_2 for 253.0γ+253.1γ.
253.1 3	27[#] 3	413.6+x	9+	160.0+x	7+	(Q)		A_2=+0.39 7 A_2 for 253.0γ+253.1γ.
254.8 3	25 3	400.1+x	9+	145.5+x	7+	(Q)		A_2=+0.58 9
267.8 3	54 15	413.6+x	9+	145.5+x	7+	(Q)		A_2=+0.13 4; A_4=−0.04 6
[x]268.2 3	[@]							
272.8 3	[@]	1704.2+x	15+	1431.0+x	14+			
275.2 3	28[#] 3	881.8+x	(12)−	606.7+x	(11)−			
285.8 3	70 8	606.7+x	(11)−	321.0+x	(9)−			
298.7 3	60 6	564.9+x	10+	266.4+x	8+			A_2=+0.22 6; A_4=+0.29 8 Sign of A_4 is inconsistent with ΔJ=2, quadrupole expected from ΔJ^{π}.
350.1 3	78 9	750.5+x	11+	400.1+x	9+			
367.3 3	79 9	781.1+x	11+	413.6+x	9+	(Q)		A_2=+0.24 5
369.5 3	25 3	1382.9+x	(14)−	1013.3+x	(13)−			
387.7 3	13[#] 1	881.8+x	(12)−	494.1+x	(10)−			
394.8 3	34 4	959.5+x	12+	564.9+x	10+	(Q)		A_2=+0.19 10
406.5 3	106 14	1013.3+x	(13)−	606.7+x	(11)−	(Q)		A_2=+0.15 3
435.8 3	42 4	1186.3+x	13+	750.5+x	11+	(Q)		A_2=+0.23 9
[x]440.2 3	4.5[#] 8							
440.8 3	16[#] 2	1969.6+x	(16)−	1528.9+x	(15)−			
441.1 3	85 11	1222.5+x	13+	781.1+x	11+			
471.7 3	34 2	1431.0+x	14+	959.5+x	12+			A_2=+0.32 14; A_4=+0.8 2 Sign of A_4 is inconsistent with ΔJ=2, quadrupole expected from ΔJ^{π}.

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^{172}Yb(^{14}N,4nγ) 1990Kr06 (continued)

γ(^{182}Ir) (continued)

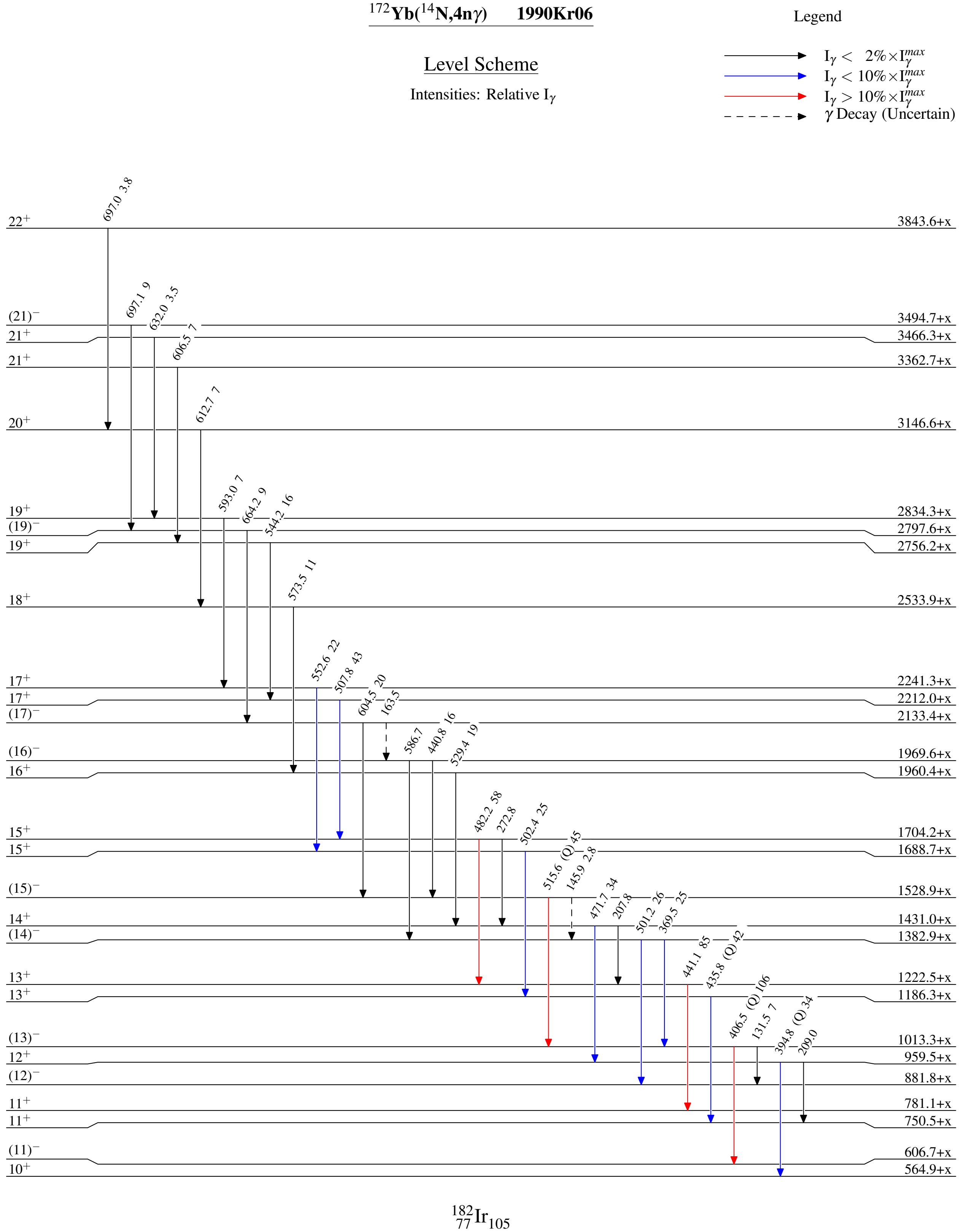
E_γ	I_γ[†]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[‡&]	Comments
[x]476.4 *3*	38 *4*					D	A_2=−0.55 *12*
482.2 *3*	58 *7*	1704.2+x	15+	1222.5+x	13+		
[x]482.6 *3*	9[#] *2*						
501.2 *3*	26 *5*	1382.9+x	(14)−	881.8+x	(12)−		
502.4 *3*	25[#] *2*	1688.7+x	15+	1186.3+x	13+		
507.8 *3*	43[#] *5*	2212.0+x	17+	1704.2+x	15+		
515.6 *3*	45 *4*	1528.9+x	(15)−	1013.3+x	(13)−	(Q)	A_2=+0.57 *15*
[x]519.0 *3*	13[#] *1*						
529.4 *3*	19[#] *2*	1960.4+x	16+	1431.0+x	14+		
544.2 *3*	16[#] *2*	2756.2+x	19+	2212.0+x	17+		
552.6 *3*	22[#] *2*	2241.3+x	17+	1688.7+x	15+		
573.5 *3*	11[#] *2*	2533.9+x	18+	1960.4+x	16+		
586.7 *3*	[@]	1969.6+x	(16)−	1382.9+x	(14)−		
593.0 *3*	7[#] *1*	2834.3+x	19+	2241.3+x	17+		
604.5 *3*	20[#] *2*	2133.4+x	(17)−	1528.9+x	(15)−		
606.5 *3*	7[#] *1*	3362.7+x	21+	2756.2+x	19+		
612.7 *3*	7[#] *1*	3146.6+x	20+	2533.9+x	18+		
632.0 *3*	3.5[#] *7*	3466.3+x	21+	2834.3+x	19+		
664.2 *3*	9[#] *2*	2797.6+x	(19)−	2133.4+x	(17)−		
697.0 *3*	3.8[#] *7*	3843.6+x	22+	3146.6+x	20+		
697.1 *3*	9[#] *2*	3494.7+x	(21)−	2797.6+x	(19)−		

[†] From the A_0 coefficient of $\gamma(\theta)$, unless otherwise stated. Based on assumed multipolarities (from the level scheme) 1990Kr06 give transition intensities also.
[‡] 1990Kr06 assume E2 for ΔJ=2 transitions and M1 for ΔJ=1, Δπ=no and E1 for ΔJ=1, Δπ=yes. Data supporting these assignments are lacking, except for a few transitions.
[#] From $\gamma\gamma$.
[@] Weak transition.
[&] 1990Kr06 assign multipolarities to all the transitions, majority of which are simply inferred from ΔJ^π in the band structures. These assignments are omitted here.
[a] From comparison of prompt and delayed coincidence intensities (1990Kr06).
[b] From intensity balance (1990Kr06).
[c] 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.
[d] Placement of transition in the level scheme is uncertain.
[x] γ ray not placed in level scheme.

^{172}Yb(^{14}N,4nγ) 1990Kr06

Level Scheme

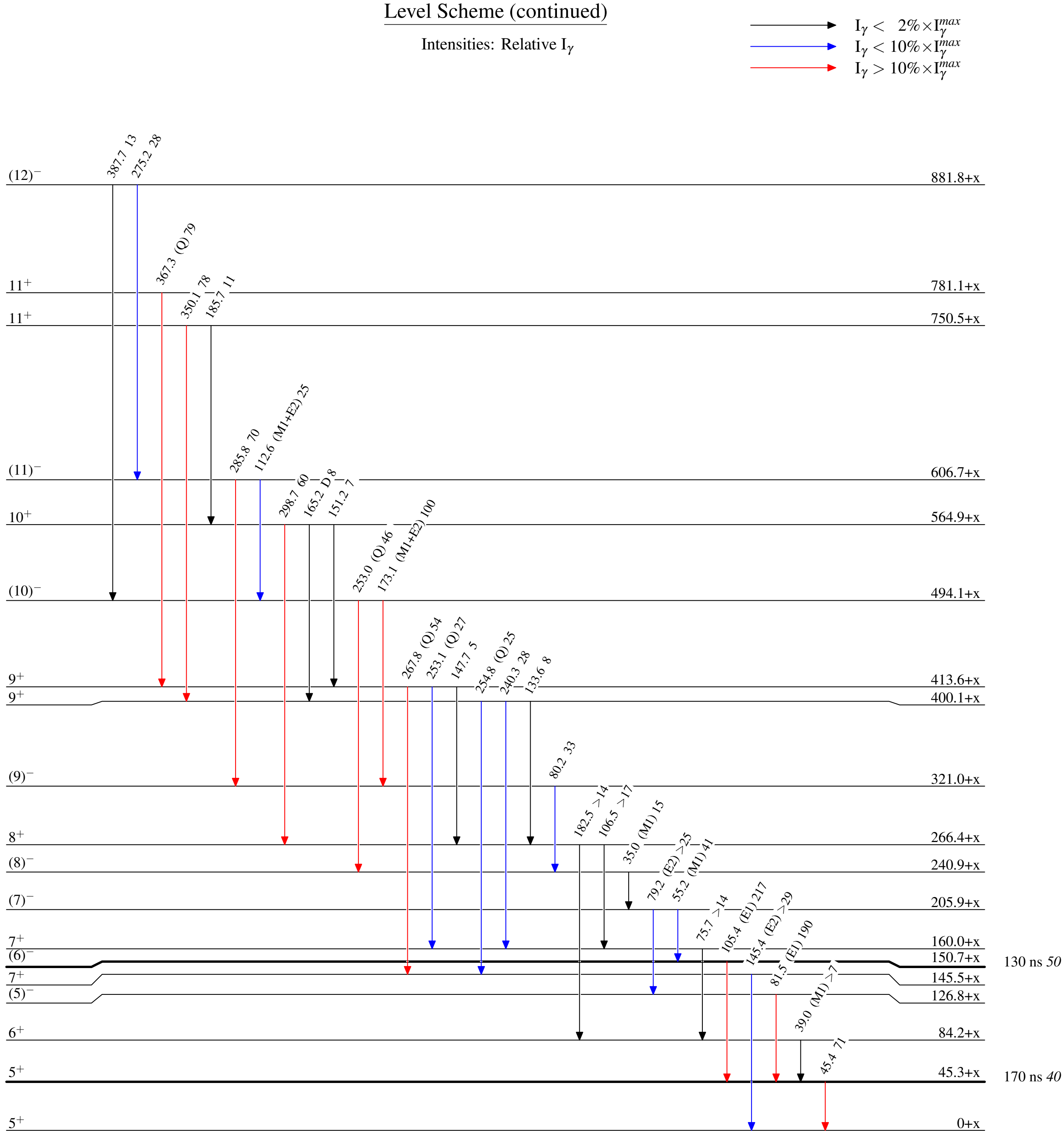
Intensities: Relative I_γ



^{172}Yb(^{14}N,4nγ) 1990Kr06

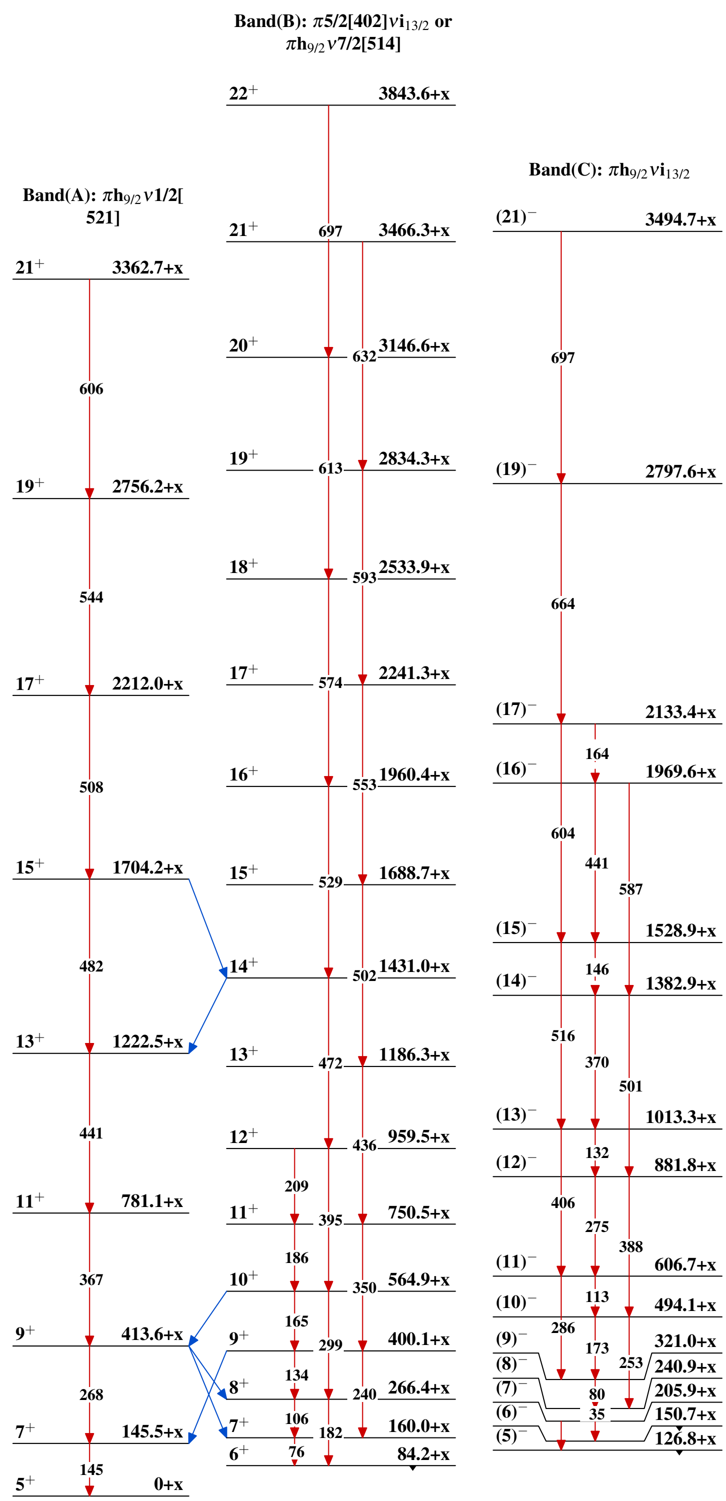
Level Scheme (continued)

Intensities: Relative I_γ



$^{182}_{77}Ir_{105}$

^{172}Yb(^{14}N,4nγ) 1990Kr06



$^{182}_{77}Ir_{105}$