Coulomb excitation 1979Ri13,1992Fa05

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 75,199 (1995)	31-May-1995

1979Ri13: (^{16}O,^{16}Oγ) E=58-62 MeV. Enriched (91.5%) target. Measured γ, particle γ coin, $\gamma(\theta)$.
1992Fa05 (also 1986Va24): (^{16}O,^{16}Oγ) E=57 MeV; (^{32}S,^{32}S$'\gamma$) E=115 MeV and (^{58}Ni,^{58}Ni$'\gamma$) E=224 MeV. Enriched (97%) target. Measured γ, (particle)(particle)$\gamma(\theta)$. Deduced B(E2), Q. Calculations using collective model and IBA model.
1975Wo08: (α,α') E=13 MeV. Enriched (96%) target. FWHM=23 keV. Deduced electric quadrupole and hexadecapole transition matrix elements.
1981Cr03: (^{16}O,^{16}Oγ) E=12, 14 MeV. Enriched (97%) target. Measured G.
1979Wa15: (^{40}Ca,^{40}Ca$'\gamma$) E=168 MeV. Measured particle γ coin, $\gamma(\theta$,H). Deduced g factor.
1977Ke06 (also 1974Ke04): (^{56}Fe,^{56}Fe$'\gamma$) E=232 MeV and (^{84}Kr,^{84}Kr$'\gamma$) E=348 MeV. Measured γ, $T_{1/2}$ from Doppler broadening.
Earlier studies:
1970Sa09: ($\alpha,\alpha'\gamma$) E=7-10 MeV and (^{16}O,^{16}Oγ) E=25-52 MeV. Measured G.
1967Ec01: (p,p$'\gamma$) E=3 MeV. Mossbauer effect following Coulomb excitation. Deduced quadrupole moments.
1966Ti01: (p,p$'$). Measured $T_{1/2}$ and g factor by pulsed beam.
1965Yo04: (^{16}O,^{16}Oγ) E=43-48 MeV.
1964De07: (^{16}O,^{16}O$'$) E=18-44 MeV.
1962Bi05: (α,α') E=3 MeV.
1960El07: (d,d$'$) E=4.5 MeV.
1958Ch36: (p,p$'$) E=3.7 MeV.

^{172}Yb Levels

1992Fa05 give transition matrix elements. B(E2) values given here are matrix elements squared divided by $2J_f+1$, where J_f=spin of final state to which the γ transition proceeds.

E(level)	J^{π}[b]	$T_{1/2}$[†]	Comments
0[@]	0^+		
78.7[@]	2^+	1.65 ns *5*	B(E2)=6.03 *6* (1975Wo08). Others: 6.0 *6* (1992Fa05), 5.9 *5* (1970Sa09) 5.80 (1964De07), 5.89 *20* (1960El07). $T_{1/2}$: from B(E2). Other: γ(t) in pulsed beam: 1.71 ns *5* (1966Ti01), 1.66 ns *14* (1962Bi05). β_2=0.284 *+10−7* or 0.326 *+10−8* (1975Wo08). g factor=0.332 *8* (1979Wa15). Q/Q(2^+ in ^{170}Yb)=1.01 *2* (1967Ec01).
260.3[@]	4^+	0.122[‡] ns *8*	B(E2)=3.24 *23* (1970Sa09), 2.8 *3* (1992Fa05). B(E4)=0.05 *+7−4* (1975Wo08). β_4=−0.006 *+27−40* or −0.008 *+27−43* (1975Wo08).
540.0[@] *3*	6^+	16.6[‡] ps *15*	B(E2)=3.2 *3* (1992Fa05), 2.54 *13* (1970Sa09).
911.5[@] *5*	8^+	3.54 ps *27*	B(E2)=2.7 *3* (1992Fa05), 1.9 *5* (1970Sa09). $T_{1/2}$: B(E2) gives 4.0 ps *6*.
1042.9[&]	0^+	3.3[‡] ps *9*	B(E2)(from 79,2^+)=0.0055 *13* (1992Fa05), 0.0032 *10* (1979Ri13). ρ(E0)=0.0027 *9* (1981Cr03).
1117.2[&] *5*	2^+	3.7[‡] ps *4*	B(E2)(from 0^+,g.s.)=0.0081 *17* (1992Fa05), 0.0066 *3* (1981Cr03), 0.0068 *5* (1968SaXY). B(E2)(from 2^+,79)=0.0052 *+46−5* (1992Fa05). B(E2)(from 4^+,260)=0.0081 *+12−41* (1992Fa05). B(E2)(from 0^+,1043)=9.1 *+54−14* (1992Fa05).
1155.0	1^-		
1221.8	3^-		B(E3)=0.045 *3* (1981Cr03), 0.048 *19* (1979Ri13).
1352	(5^-)		
1370.5[@] *5*	10^+	1.32 ps *8*	B(E2)=2.6 *3* (1992Fa05) gives $T_{1/2}$=1.31 ps *15*.
1466.5[a] *4*	2^+	0.47[‡] ps *3*	B(E2)(from 0^+,g.s.)=0.043 *+5−15* (1992Fa05), 0.0395 *16* (1981Cr03), 0.041 *10* (1979Ri13),

Continued on next page (footnotes at end of table)

Coulomb excitation 1979Ri13,1992Fa05 (continued)

^{172}Yb Levels (continued)

E(level)	$J^{\pi b}$	$T_{1/2}$[†]	Comments
			0.037 *3* (1968SaXY). B(E2)(from 2^+,79)=0.0125 *17* (1992Fa05). B(E2)(from 4^+,260)=0.00044 *+14−6* (1992Fa05).
1476[#]	2^+	48[‡] ps *11*	B(E2)(from 0^+,g.s.)=0.00021 *4* (1981Cr03).
1609.7 *8*	2^+	1.1[‡] ps *2*	B(E2)(from 0^+,g.s.)=0.0101 *7* (1981Cr03), 0.0159 *17* (1968SaXY).
1658[a]	$(4)^+$	0.05[‡] ps *3*	B(E2)(from 2^+,79)=0.0097 *+71−40* (1992Fa05). B(E2)(from 4^+,260)=0.023 *+9−11* (1992Fa05).
1711[#]	$3^{(-)}$		B(E3)=0.025 *6* (1981Cr03).
1821[#]	3^-		B(E3)=0.033 *7* (1981Cr03).
1850[#]	2^+	0.8[‡] ps *5*	B(E2)(from 0^+,g.s.)=0.0040 *21* (1981Cr03).
1909.1[@] *5*	(12^+)	0.52 ps *7*	B(E2)=2.34 *24* (1992Fa05) gives $T_{1/2}$=0.63 ps *7*.
1957[#]	2^+	0.29[‡] ps *15*	B(E2)(from 0^+,g.s.)=0.0095 *49* (1981Cr03).
2518[@]	(14^+)	0.29 ps *4*	E(level): level included in the analysis by 1992Fa05. No population was observed in the experiment. $T_{1/2}$: from B(E2)=2.6 *+4−3* (1992Fa05).

[†] From Doppler-broadened lineshape analysis (1977Ke06) except when stated otherwise.
[‡] From B(E2) (weighted average of available values) and adopted branching ratios.
[#] Level from 1981Cr03.
[@] Band(A): $K^\pi=0^+$ g.s. band.
[&] Band(B): $K^\pi=0^+$ band.
[a] Band(C): $K^\pi=2^+$ band.
[b] From Adopted Levels.

$\gamma(^{172}Yb)$

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.	α[&]	Comments
78.7	2^+	78.70 *1*		0	0^+	E2	8.37	E_γ: from curved-crystal (1958Ch36).
260.3	4^+	181.6		78.7	2^+	E2	0.38	
540.0	6^+	279.7[#] *3*		260.3	4^+	E2	0.092	
911.5	8^+	372.1 *5*		540.0	6^+			
1042.9	0^+	964.2		78.7	2^+			
1117.2	2^+	74.9		1042.9	0^+			
		856.4[#] *5*	101	260.3	4^+			
		1038.8[#] *6*	100	78.7	2^+			
		1117.4[#] *10*	43	0	0^+			
1155.0	1^-	1076.3		78.7	2^+			
1352	(5^-)	1091.7		260.3	4^+			
1370.5	10^+	458.5[@] *5*		911.5	8^+			
1466.5	2^+	348.1	0.48	1117.2	2^+			
		423.0	0.22	1042.9	0^+			
		1205.6	3.5	260.3	4^+			
		1387.8[#] *4*	113	78.7	2^+			
		1466.6[#] *6*	100	0	0^+			
1609.7	2^+	1530.3[#] *10*		78.7	2^+			

Continued on next page (footnotes at end of table)

Coulomb excitation 1979Ri13,1992Fa05 (continued)

$\gamma(^{172}Yb)$ (continued)

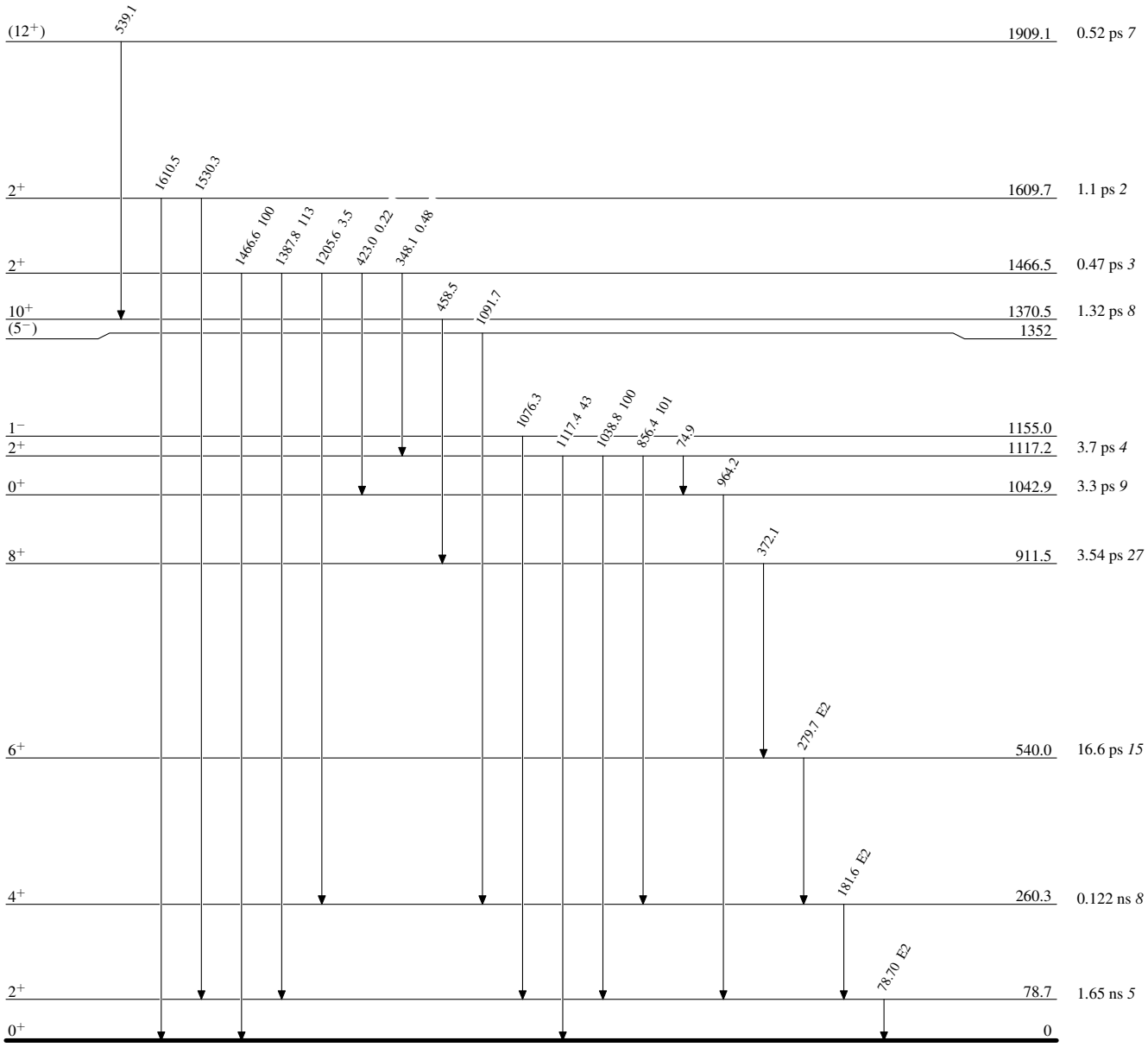
E_i(level)	J_i^π	E_γ[†]	E_f	J_f^π
1609.7	2^+	1610.5[#] *10*	0	0^+
1909.1	(12^+)	539.1[@] *5*	1370.5	10^+

[†] From 1979Ri13 unless otherwise stated.
[‡] Photon branchings (1992Fa05).
[#] From 1970Sa09.
[@] From 1977Ke06.
[&] 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.

Coulomb excitation 1979Ri13,1992Fa05

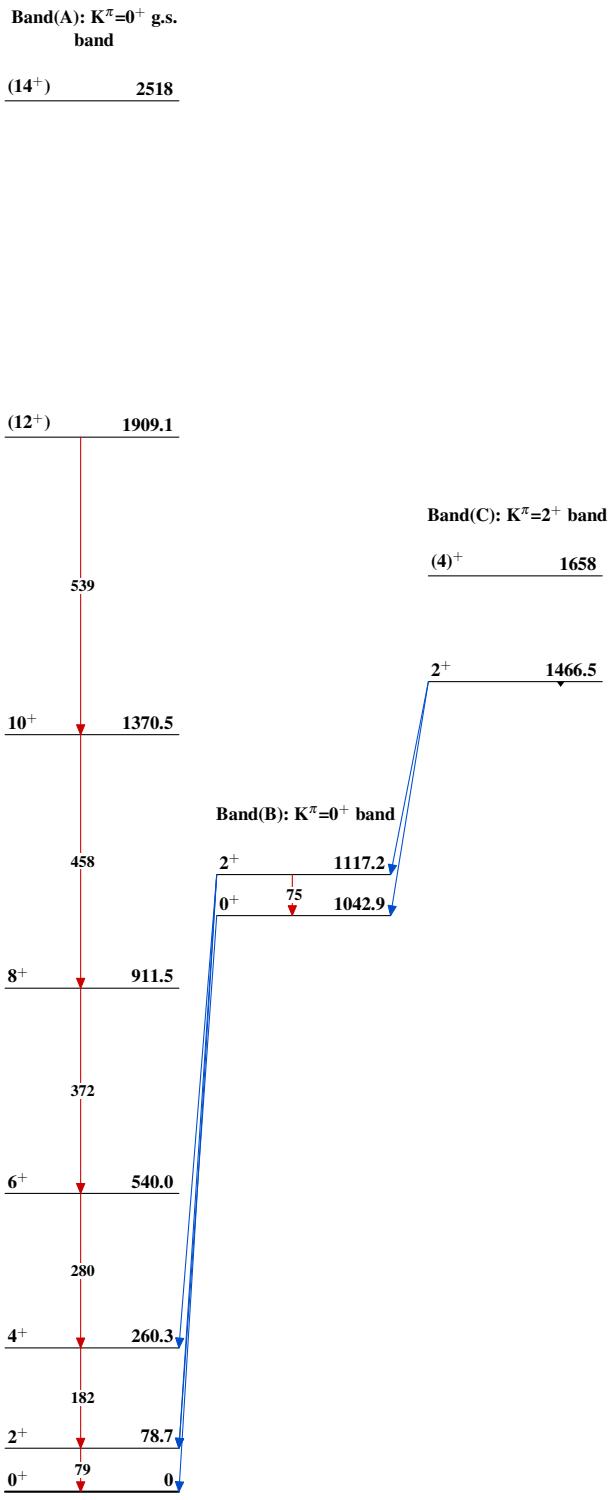
Level Scheme

Intensities: Relative photon branching from each level



$^{172}_{70}Yb_{102}$

Coulomb excitation 1979Ri13,1992Fa05



$^{172}_{70}Yb_{102}$